



MAMBA CEMENT CO

LTD

Exo	M	6	19	
DIF	F.4	6	23/11/13	DA
Dotto	Ju	6	21/8/13	Q
Exo	M	6	31/11/14	Q
DIF	F.6	6	31/11/14	Q
IPA	F.6	6	20/5/10	Q
DCA	F.7	6	3/12/10	Q
DIF	F.8	6	4/11/13	Q
Dotto	F.9	6	1/4/16	Q
DIF	F.9	6	2/4/16	Q
Dotto	M.3	6	15/7/16	Q
DIF	M.3	6	15/7/16	Q
M4	6	6	10/7/16	Q
F13	10/8/13	6	4/5/17	Q
F13	10/8/13	6	4/5/17	Q
M5	10/8/13	6	5/5/17	Q
M6	10/8/13	6	5/5/17	Q
M6	10/8/13	6	5/5/17	Q
M7	10/8/13	6	5/5/17	Q
M7	10/8/13	6	7/5/17	Q
M8	10/8/13	6	7/5/17	Q

# MINUTE SHEET

DOKEZO  
No.

# MINUTE SHEET

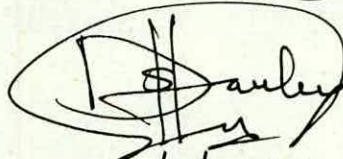
DOKEZO  
No.

# MINUTE SHEET

Dokezo  
No. 3r

DIF

F8 contains all required documents to amend COI no 042496. Therefore COI can be sent to EXD for signature.

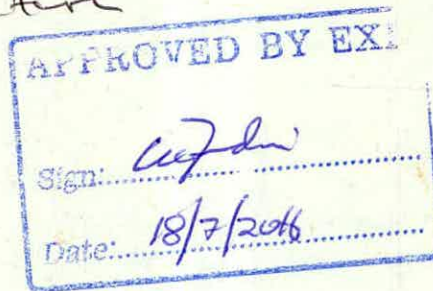
 - Ag. IFM  
18/7/2016

4

AS EXD

Certificate of incentives has been amended as per folio 10 and is hereby submitted for your signature

18/7/2016



  
DIF

AS DIF

The project developer has requested three years extension since the project is still not yet been implemented due to the following:-

1. Delays obtaining ~~title~~ land title where competition has been made now waiting the process to be completed
2. Funding of the project, the negotiation of funding is still going on, the project is estimated to be US\$ 195m

Besides of the above obstacles the project developer has made some positive progress such as:-

# MINUTE SHEET

Dokezo  
No.

1-0

## EXD

The approved project has fulfilled the investment requirements, which are: -

- (a) Minimum finance investment threshold has been exceeded, the project expects to invest ... us\$ 1.75m .....
- (b) Legal entity has been incorporated under certificate  
No. .... 93066 ..... of .... 16/02/2012 .....

Based on the above, the letter of approval is hereby submitted for signature in order for the project to comply with the requirements of Section 17 of Tanzania Investment Act, 1997.

Submitted for signature.



N. Senzia  
DIF

18<sup>th</sup> July, 2013

2.0


## EXD

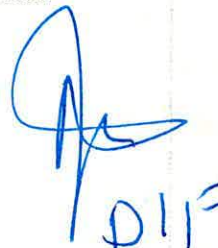
In response to the TIC letter of registration dated 17<sup>th</sup> July 2013 .....

the project has submitted the required documents namely: -

- (a) Company Board Resolution.
  - (b) Reference letter/Financing from Standard Chartered LTD .....
  - (c) Letter from Directors Commission and minutes of the meeting for land allocation as evidence of land .....
- With the above submission EXD is requested to sign Certificate of Incentives No. 042496 .....

7/08/2013

<b>APPROVED BY EXD</b>	
Sign: .....	
Date: .....	<u>13/08/13</u>



DIF

# MINUTE SHEET

Dokezo  
No.

1. Environmental Clearance Certificate has been obtained
2. Limestone reserve statement and mining plan done
3. Route Survey Completed
4. Hydro-geological Study completed
5. Market Study prepared etc

Since the project require huge investment capital amounting to us\$ 195m and there are still many pending issues which need to be resolved, I recommend three years extension of implementation period to be granted to facilitate the implementation of the project

S IFO ~~Head~~ 5/5/2017

EXD.

60 Mamba Cement is among strategic projects approved by NISC however there has been project implementation delays especially on land acquiring process, financial closure, environmental issues and raw materials availability. So far most of these issues have been completed pending finalisation of financial closure to begin construction. To facilitate implementation in fully, investor requests TIC to extend CoI for additional 3 years. I recommend TIC to grant 3 years extension to facilitate project take off.



A. D. F.

5/5/2017

APPROVED BY EXD

Sign: 

Date: 5/5/2017

# MINUTE SHEET

Dokezo  
No.

Co Ag DIF

Folio 15 and Ms contains all required document for ~~imp~~ amendment of implementation period of COI NO: 042496. Therefore COI recommended to be sent to EXD for signature  
SIFO ~~Wed~~ 5/5/2017

70 Ag EXD

Certificate of incentives has been amended as per MG and is hereby submitted for your signature.

~~Dragga~~

Ag. DIF

09/05/2017



Ref No: MHL/M.10/1321

Date: 09/07/2013

The Executive Director  
Tanzania Investment Centre  
P. O. Box. 938  
Dar es Salaam.



Dear Sir,

**RE: APPLICATION FOR APPROVAL OF TIC PROJECT**

We take the privilege to inform that we are setting up an **integrated cement plant** at Talawanda village at Bagamoyo, which is about **110 kms** from Dar es Salaam with a **total project investment cost of USD 195 Million**. Our project includes **Lime Stone Mining** and we have been provided mining license for 19.5 sq km area. We are also setting up a **20MW Captive power plant** for the required electricity in the cement plant, staff & workers quarters etc. We will be building up about 150 residential houses for the staff and workers to stay in the said location along with medical & Educational arrangements. Our cement plant will have a capacity of producing 3000 ton per day i.e. one million ton cement per annum (Portland Lime Cement 82% & Ordinary Portland Cement 18%)

We enclose herewith our application for approval of TIC project along with two sets of feasibility report prepared by Ercom Engineering – India (Cement Plant Consultants) and other relevant documents.

We kindly request you to approve our project.

Thanking you

Yours truly,  
**FOR, MAMBA CEMENT COMPANY LTD.**

A handwritten signature in blue ink, appearing to read "Subhash M. Patel".

**SUBHASH M. PATEL**  
**MANAGING DIRECTOR**



Unclaimed refund beyond three years will be forfeited

9229



11239

**TANZANIA INVESTMENT CENTRE**

Shaaban Robert Street, P.O. Box 938, Dar Es Salaam, Tel. +255 22 2116328-31, Fax: +255 22 2118253

RECEIPT REC011914

No.006079

Received from : **MAMBA CEMENT CO. LTD.**

Address : **P.O. Box 3030, BAGAMOYO.**

Received the sum of (In words): **ONE HUNDRED AND ZERO CENTS ONLY.**

Being payment in respect of **REGISTRATION FEE**

Amount : **USD. 100.00**

Cash / Cheque No: D/Deposit 08/07

Date : 08-Jul-2011

For Executive Director  
Tanzania Investment Centre  
Buisso  
Receiving Officer

3

TICC/PP.10/042496/3

18<sup>th</sup> July 2013

Managing Director,  
Mamba Cement Company Limited,  
P.O. Box 3030,  
**BAGAMOYO**

**RE: CERTIFICATE OF INCENTIVES FOR INVESTMENT IN THE  
ESTABLISHMENT AND OPERATING CEMENT MANUFACTURING  
PLANT**

We wish to acknowledge receipt of your project proposal to establish and operate a plant to manufacture 3000 ton/day of cement as presented in the TIC P.A. 1 Form No. 00 and Feasibility Study with a projected investment of USD 195m.

We have studied your project proposal and we are pleased to inform you that your investment proposal is now officially registered and therefore your project will be granted a CERTIFICATE OF INCENTIVES, given under authority conferred upon TIC under Part III, Section 17 (1-8) of the Tanzania Investment Act, 1997. In order to enable TIC prepare your Certificate of Incentives, You will be required to submit the following:-

- Company Board Resolution accompanied by Bank Reference for equity funding or a letter from Bank/Financial Institution that a loan is granted or is under consideration as required by Section 17(3) (f) of Tanzania Investment Act,1997.
- Certified document showing evidence of Land ownership for the location of the project.

You will also be required to submit to the Centre a Progress Report on the implementation of the project after every six months for our information and review. Guidelines for the preparation of the report are contained in annexure 2 also attached to this letter. Please do not hesitate to contact the Centre for any clarification if the need arises. Please also note that a facilitation fee equivalent to US\$ 1000.00 is payable at the ruling exchange rate before your Certificate of Incentives is prepared. Please arrange to make payments at your earliest convenience. Please make deposit direct to the bank as per bank details below:

TICC/PP.10/042496/3

18<sup>th</sup> July 2013

*Tanzania Investment Centre  
Standard Chartered Bank(T) Ltd  
US Dollar A/C 8702006002000  
T.Shs A/C 0102006002000*

We wish you every success in the implementation of the project.

Yours sincerely,

**Tanzania Investment Centre**



Juliet R. Kairuki

**EXECUTIVE DIRECTOR**

Copy to: Permanent Secretary,  
Ministry of Finance and Economic Affairs,  
P. O. Box 9111,  
**DAR ES SALAAM**

Permanent Secretary,  
Ministry of Industry, Trade and Marketing,  
P.O. Box 9503,  
**DAR ES SALAAM**

Commissioner General,  
Tanzania Revenue Authority,  
P. O. Box 11491,  
**DAR ES SALAAM**



## TIC Evaluation Report

Name of the Company  
**Mamba Cement Company Limited**

Post Box	Talawanda Village	COI Number	93066	Contact	Gopalan Devadoss
Post Office	3030	COI Date	16/08/2012	Designation	Financial Director
Region	Bagamoyo	Application F. No	00	Phone	0
Country	Tanzania	Status	New	Direct Phone	2139158
		Sector	Manufacturing	Cell Phone	2139176
		Sub Sector	Cement production	Fax	21117963
		File No	042496	E-Mail Address	Hq@Motisun.Com

Project Location		Investment Finance Plan in Millions USD											
Plot/Block	Talawanda Village	<table border="1"> <thead> <tr> <th>Foreign Equity</th> <th>Local Equity</th> <th>Foreign Loan</th> <th>Local Loan</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>65</td> <td>130</td> <td>0</td> </tr> </tbody> </table>	Foreign Equity	Local Equity	Foreign Loan	Local Loan	0	65	130	0			
Foreign Equity	Local Equity		Foreign Loan	Local Loan									
0	65		130	0									
Street	Bagamoyo												
District	Bagamoyo												
Region	Coast (Pwani)												

Shareholders Detail			Investment Breakdown (USD Million)	
Name	Nationality	(%)	Land/Building	40
Girdharbhai M. Patel	Tanzanian	5	Plant	123
Subhash M. Patel	Tanzanian	5	Vehicles	17
Esprit Developers Ltd	Tanzanian	90	Furniture & Fittings	2
			Pre-expenses	9
			Others	1
			Working Capital	3
			Total	195

Employment	300	Evaluated By	,wf officer3
Capacity	Cement 3000 ton/day	Drawn By	wf registry2
Project Turn Over		Project Type	Mixed(Local & Foreign)

### Description

To establish and operate a plant to manufacture 3000 Ton/day of cement

### Recommendations

Be approved subject to providing evidence as required by section 17 of Tanzania Investment Act, 1997

### Decision

**APPROVED BY EXD**

Sign: *[Signature]*

Date: 17/07/13

2<sup>nd</sup> July 2013

Mamba Cement Company Limited

Dar Es Salaam

Dear Subhash bhai

**Subject: Structuring bank for Mamba Cement Company Limited**

Thank you for the information provided and management time to explain advantages of proposed cement project. It does seem from your letter that the project is well placed to become the lowest cost producer in the region and that the market demand is compelling.

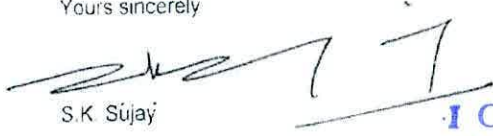
Given the stated intention of the sponsors to develop the project on a limited recourse basis there are certain steps which need to be undertaken in order to ensure a successful financing. Also given the need for more than US\$100m of debt it is likely that the local bank market will not be able to meet your needs, which will necessitate raising most of your funding from the international market. Standard Chartered has a strong track record across the continent of raising long term finance for infrastructure developments. We have a strong reputation in the market and are trusted by the lending community. All of this makes us well suited to act as your partner in this fund raising exercise.

In order to ensure a successful financing it is necessary to approach the market with a detailed information package which will enable banks to make an informed assessment of the viability of the project. The information package should consist of independent consultants' reports written for the benefit of lenders; these reports should provide insight into market conditions, construction risks and mitigants as well as a legal due diligence. Along with these reports a detailed financial model and term sheet will be shown to potential lenders. This shall reduce project team's time to respond to multiple information requirements and loan structuring proposed by prospective lenders for a project of such size.

The most reliable way to put such a package together is to appoint an experienced bank to "structure" the debt package. This process will entail time and resources and would require Standard Chartered to charge a structuring fee in addition to traditional arranging fees that would be charged by lenders to the project. It should be noted that Standard Chartered has a successful track record in getting complex projects to financial close through this process. We will act as a partner to the sponsors during the structuring process, ensuring that the project will be well placed to achieve financial close in the shortest possible time.

If you are amenable to us pursuing such an approach we will be delighted to prepare and revert with a comprehensive structuring proposal for you to consider.

Yours sincerely



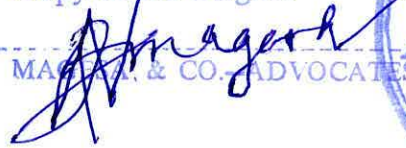
S.K. Sujay

Director, Origination & Client Coverage

Africa

Standard Chartered Bank  
 Johannesburg Branch  
 5th Floor, 4 Sandown Valley Crescent,  
 Sandton 2196, Gauteng, South Africa  
 P.O. Box 782080, Sandton 2146, Gauteng, South Africa  
 Tel +27 (0) 11 217 6600 Fax +27 (0) 11 217 6601  
 www.standardchartered.com/za

I Certify this to be the true  
 Copy of the Original

  
 H. M. MAGÉS & CO. ADVOCATES



2/8/2013

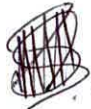
# MAMBA CEMENT COMPANY LIMITED

P.O BOX 3030, DAR ES SALAAM, TANZANIA

**TRUE COPY OF THE RESOLUTION PASSED IN THE BOARD MEETING  
HELD ON MONDAY THE 8<sup>TH</sup> DAY OF APRIL 2013 AT THE REGISTERED  
OFFICE OF THE COMPANY**

Resolved that to establish a cement plant at Talawanda village at Bagamoyo District, Coast Region with a production capacity of 3000 ton per day along with 20 MW Power Generation Captive Power Plant and limestone mining activities. It is further resolved that to approach Standard Chartered Bank's Africa Head Quarters in South Africa to arrange for the Banking facility and a term loan of US\$ 130 Million for the capital investment of the said project.

Yours truly,  
**FOR, MAMBA CEMENT COMPANY LTD.**



**SUBHASH M. PATEL  
(BOARD CHAIRMAN)**



**G.DEVADOSS  
(COMPANY SECRETARY)**



Email:- [hq@motisun.com](mailto:hq@motisun.com), Tel:- +255 22 2119265 / +255 22 2119266

Fax:- +255 22 2117963



# TANZANIA REVENUE AUTHORITY

## CERTIFICATE OF REGISTRATION

### FOR

## TAXPAYER IDENTIFICATION NUMBER (TIN)

(ISSUED UNDER SECTION 133 OF THE INCOME TAX ACT NO. 11 OF 2004)

### THIS IS TO CERTIFY THAT

MAMBA CEMENT COMPANY LIMITED

.....  
has been registered with the Tanzania Revenue Authority and assigned the Taxpayer Identification Number

121-218-917

.....  
28-06-2013

with effect from .....

  
P. N. Kassera

OFFICIAL SEAL

COMMISSIONER FOR DOMESTIC REVENUE

# HALMASHAURI YA WILAYA YA BAGAMOYO

**MKOA WA PWANI**

**Telegraph:**  
"DISCO" BAGAMOYO  
**Simu:**  
023 - 2440338  
**Fax:** 023 2440338



**OFISI YA MKURUGENZI MTENDAJI(W)**  
**IDARA YA ARDHI, MALIASILI NA**  
**MAZINGIRA,**  
**S.L.P. 11,**  
**BAGAMOYO**

Kumb. Na. Kumb Na.HWB/T.40/20/50

4/4/2013

Mkurugenzi Mtendaji  
M.M.INTEGRATED STEEL MILLS LIMITED  
S.L.P 3030  
Dar es Salaam.

## **YAH: MAKISIO YA GHARAMA KWA AJILI YA KUFANYA UTHAMINI WA MALI ZA WANANCHI ZITAKAZOATHIRIWA NA UJENZI WA KIWANDA CHA SARUJI KATA YA TALAWANDA, WILAYANI BAGAMOYO.**

Tafadhari rejea kichwa cha habari hapo juu pamoja na barua yako yenye kumb Na M.M.I/07/2013/14 ya tarehe 3/04/2013 na mawasiliano tuliofanya na ofisi yako kuhusiana na ombi la kufanya kazi ya uthamini wa eneo la Talawanda Wilayani Bagamoyo.

Pamoja na barua hii tunaambatanisha makisio ya gharama ya kazi ya uthamini wa mali za wananchi wote watakaoathiriwa.

Makisio haya ni kwa ajili ya wataalamu watakaofanya kazi hiyo,usafiri,ukodishaji na ununuzi wa vifaa vya kazi,valuation fee,utayarishaji wa valuation report, upitishaji wa valuation report kwa Mthamini Mkuu wa serikali(valuation approval).

A handwritten signature in black ink, appearing to read "Patrick Seese".

MKURUGENZI MTENDAJI (W)

(PATRICK SESE)

Kny: **MKURUGENZI MTENDAJI (W)**  
**BAGAMOYO**

Nakala: Mkurugenzi Mtendaji (W)  
**BAGAMOYO – Aione kwenye jalada.**

# M.M. Integrated Steel Mills Limited

20/11/2012

Kumb Na.M.M.I/08/2012/12

Mkurugenzi Mtendaji,  
Halmashauri ya Wilaya,  
Bagamoyo.  
S.L.P 11,  
**Pwani.**

## YAH:RIDHAA YA KUPATIWA ENEO KIJIJINI TALAWANDA

Husika na kichwa cha barua hapo juu.

Kampuni yangu ya M.M.Integrated Steel Mills Ltd iliomba eneo la ekari 150 kwa ajili ya utekelezaji wa mradi wa Kiwanda cha Saruji katika kijiji cha Talawanda Kata ya Talawanda.

Taratibu zote za kuomba eneo katika ngazi ya kijiji nilizifuata kwa kupitia vikao mbalimbali vya kijiji,sambamba na kukubali masharti ya kijiji na pia nilijibiwa kwa barua ya Afisa Mtendaji mnamo tarehe 27/11/2006 ya kukubaliwa .

Hivyo naleta ombi katika ofisi yako kuridhia kupitia mamlaka iliyonayo ili niweze kupata eneo hilo taratibu za mradi zianze .

Nataraji ombi langu litakubaliwa ili utekelezaji uanze.

Wako katika ujenzi wa Taifa.



**SUBHASH M.PATEL.**  
**MKURUGENZI MTENDAJI**

*P.O.Box 3030, Dar es Salaam, Tanzania.*

*Tel Office: +255 22 2138040 / 2139158 Fax: +255 22 2117963 / 2116298*

*Tel Factory: +255 22 2771309 / 2773425/7 Fax: +255 22 2775426*

*E-mail: motisunhl@cats-net.com Web: www.mmsteel.com*

MALUMU WAJUMBUWA WA WAZOZOA WA  
ULIOAMVIRA Tm 03 - 2013. T.M. A.W. K.M.D.A.

JINA KAMILI	CHEO	NDI SIMU	SAHIHI
1 SAIDI - DIBWE - MYAKURU	MW/KIJI		S. S. S.
2 MASUDI - ONYESHA - SAKIASATA	MW/KITONGO		
3 DAUDI NYOTA SITIMA	MJUMBE	0786738407	
4 RAMADHANI - H - KINGIMAR	MW/ALDI	0765039352	
5 BUSHIRI - RAHISI	MJUMBE	0753457849	
6 AJERINA - H - MALILA	" - "	068899631	Wiliam
7 MALIAMU - ALLY	" - "		M.A.R.
8 IMANI MWANIKWA	" - "		Imrose
9 TAIU - A - DAUDI	" - "		T.O.A.
10 MWAJUMA - KILUMANGA	" - "	0719268421	M.I.K.
11 RING'WESI NAMBAW	" - "	0784248616	
12 HAMSI - KILIMILA	" - "		
13 ABEDI - MALUNGO	MWANCHI		A.M.
14 ANA - TENGEZA	" - "		
15 ASHA - MLISHO	" - "		R.E
16 AMINA - RAMADHANI	" - "		A.H
17 ASHA - HIYALI	" - "		
18 SAIMONI - JOJI	" - "		
19 RAMADHANI - SAIDI	" - "		M. Iwany
20 MOHAMEDI - IMANI	" - "		
21 RAJABU - ALLY	" - "		
22 SAIDI - DEGERE	MW/TAW. VU.		
23 RUPIA - DAUDI	MWANCHI		
24 SAIDI - KILUMANGA	" - "		L.M.D

Certify this to be the true copy of the Original  
MAGESA & CO. ADVOCATES



2/8/2013


JINA KAMIA

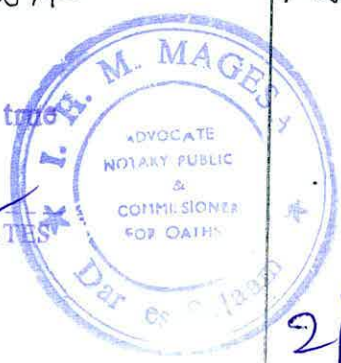
	HEO	NO. SIMU	SANA
25 RAMADHANIE HOSSENI	MWANICHI		
26 MRISHO SAIDI KILUNGOLA	Mwanimu	0713782099	
27 SONYO - HIYACI	MWANICHI		
28 MOHAMEDI - RAJABU	" - "		
29 FATUMA - MKIMWA	" - "		
30 RIJWA - SHABANI	" - "		MR
31 ROBERTI - REONI	" - "		
32 RASHIDI - MAUGILA	" - "		
<del>SHABANI</del>	" - "		
33 SHABANI - HOSSENI	" - "		
34 KINGALU - TENGEZA	" - "		
35 SHABANI - SALIMU	" - "		Kingala
36 HALUFANI - <del>AL</del> LOSESA	" - "		SHABANI
37 PATELY - SELEMA	" - "		HAL Jo
38 ELIASI - TOMASI	" - "		w.
39 SIVINI - MAIKO	" - "		PATELY
40 HALFANI - ZEMBULE	" - "		Shile
41 MGALAMO - KUNGULUZA	" - "		SMS
42 RASHIDI - RAJABU	" - "		
43 JOMO - HALFOSI	" - "		
44 DAMASI - IBADA	" - "		
45 <del>AL</del> LEGISA PATELI	" - "		Isbado
46 JUMA SHIDA	" - "		US
47 MICHAEL MOGITU	" - "		Side
48 KANIN KISATIWA	" - "		
49 SHABANI O. SAWASAWA	" - "		M.M.P
50 MUHOBE DAVID	" - "		Ktan
51 KOTOKIAI MALALAI	" - "		Sawa
52 MUZA SAID	" - "		Ingama

0656922260

~~SHABANI~~  
M.P.

53	Abdallah Rajabu	M/KUBWA		Abdallah Rajabu
54	Taimu Juma			Taimu Juma
55	MICHAEL MUKINDO	M/KUBWA	0653 80193	MICHAEL MUKINDO
56	TAZIMA - AMU	11 - 11	-	TAZIMA - AMU
57	Shabani Muzko Kegawilo	M/KUBWA	0788 1477	Shabani Muzko Kegawilo
58	HOSSENI - SELEMANI	11 - 11	-	HOSSENI - SELEMANI
59	BAKARI M. MASAYA	11 - 11	-	BAKARI M. MASAYA
60	Paul Joseph			Paul Joseph
61	OMALHY. SELEMANI	11 - 11		OMALHY. SELEMANI
62	ALLY - TAZIME	11 - 11		ALLY - TAZIME
63	Ali Rajabu			Ali Rajabu
64	Attamai Hoseni	11 - 11		Attamai Hoseni
65	MAKONDA - MAIYA	M/K. ALB.		MAKONDA - MAIYA
67	HEHYMANI - JOJI			HEHYMANI - JOJI
68	GEORGE LUBALATI			GEORGE LUBALATI
69	Idi H. Gihliwa			Idi H. Gihliwa
70	ABAM R. CHOWBE	M/KITI		ABAM R. CHOWBE
71	Aboubakary M Lawz	M/SUMBE	0756 098597	Aboubakary M Lawz
72	KANIKI - MACHAU	M. M. I	Mue Keraji	KANIKI - MACHAU
73	JUMA O. SAWA SAWA	M/W/K.WU		JUMA O. SAWA SAWA
		M/LUMBE	0758 584595	JUMA O. SAWA SAWA

I Certify this to be the true Copy of the Original  
  
 I. B. M. MAGEZI & CO. ADVOCATES



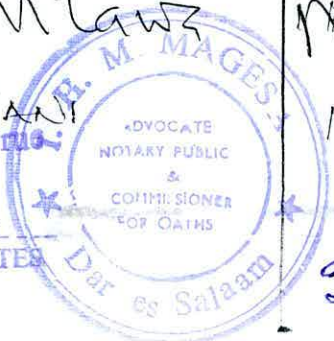
2/8/2013

KUWI CHA MACHUMATI MAALUMU  
 KAMPUNI YA M.M.I. STEEL MILLS LTD KILI  
 SU ANEO LA MPFLA. ULIOFANZIKA MITAME  
 NI TARIFE 3/2/2013

MATHUDHURIO

JINA	CHAO	ATOKAKO	SAHHI
1. RAMADHANI AHUMANI BIGA	MWENYEKUTI	MAGULUMATI	<i>[Signature]</i>
2. MASSOUD A. CHABU	KATIIBU		<i>[Signature]</i>
3. MOHAMED O. ZIKATIMU	M/HALMASTAAU	M/MATAZI	<i>[Signature]</i>
4. MUHAMMAD H. ZIKATIMU	" "	" "	<i>[Signature]</i>
5. KISANJO STEFI	" "	" "	<i>[Signature]</i>
6. PAPAA KUPATIEI	M/KIJI KIONGO	KITONGO	<i>[Signature]</i>
7. RAMADHANI I. SELEMANI	M/HALMASTAAU	M/MATAZI	<i>[Signature]</i>
8. JOSEPH R. MALIPESA	" "	" "	<i>[Signature]</i>
9. SAIDI M. HEMBE	MW/KIJI KIONGO	M/nyama	<i>[Signature]</i>
10. AMINA M. MZIMBA	M/HALMASTAAU	M/MATAZI	<i>[Signature]</i>
11. ALLY P. MAVURA	" "	" "	A.M.
12. RAZARO T. MAVURA	" "	" "	<i>[Signature]</i>
13. PILI SEMWANJA	" "	" "	<i>[Signature]</i>
14. CHABU A. CHABU	" "	" "	P.S
15. RESTUJA CLEMENS	" "	" "	<i>[Signature]</i>
16. MIRAJI MBEWA	MW/KIJI KIONGO	M/MATAZI	<i>[Signature]</i>
17. KIPUTAI REBOT	M/HALMASTAAU	M/MATAZI	<i>[Signature]</i>
18. FAICUMA MUMJUMA	MJUMBE	M/MATAZI	<i>[Signature]</i>
19. MIRAJI M. MALUNGO	M/HALMASTAAU	M/MATAZI	<i>[Signature]</i>
20. Aboubakary MALAW	Mw/kezi	M.M.I	<i>[Signature]</i>
EMARI RAMADHANI	" "	" "	<i>[Signature]</i>

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2/8/2013

47	John		
42	Shirley		
41	Raimond		
40	Harold		
39	Mirko		
38	Diner		
37	Stephan		
36	Clara		
35	Turner		
34	Harris		
33	Misko		
32	Ed		
31	Salmun		
30	Rajab		
29	Charles		
28	Rasheed		
27	Shaban		
26	Charles		
25	Kirk		
24	Salmun		
23	Sadi		
22	Raimond		

47	John		
42	Shirley		
41	Raimond		
40	Harold		
39	Mirko		
38	Diner		
37	Stephan		
36	Clara		
35	Turner		
34	Harris		
33	Misko		
32	Ed		
31	Salmun		
30	Rajab		
29	Charles		
28	Rasheed		
27	Shaban		
26	Charles		
25	Kirk		
24	Salmun		
23	Sadi		
22	Raimond		

John

69. KAS...  
 40. RONAS...  
 41. J...  
 42. ALY...  
 43. R...  
 44. R...  
 45. L...  
 46. M...  
 47. A...  
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95 CHARLES LEOPOLD MASAKA MANSIRO  
 94 ALHAJI MUHAMMAD LEBOS  
 93  
 92 JUMANE I ZIKRIMU  
 91 MARIKA TUGU  
 90 SPIDI JOEL  
 89 RAHMAN HANIS  
 88 NEERA IARABU  
 87  
 86 Moeang Manguha Ida  
 85 Michael Mavula  
 84 STHA R. ZIKRIMU  
 83 JUMANE ASUMANI  
 82 MARABO KRISAN  
 81 Amy Amuran  
 80 AHMADI KAHANI  
 79 KASBI S. DIRMASARI  
 78  
 77 JOEL S. MAVULA  
 76 KORO A. MAISHA  
 75 AHMAD R. ZIKRIMU  
 74 IBAI D. ZIKRIMU  
 73 JUMANE IBAI SEUMANA  
 72 TAFIBU MUBDE  
 71 LINA LAM  
 70 SEFANI STANBA  
 69 SOLIMO CREEL  
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95	ZENAS	95	JARAI	M/materials	95	ATKONDA	M/materials
97	88/8	97	CHATAI	M/materials	97	MATERIAL	M/materials
98	HRATAI P. CHAI	98	CHAI	M/materials	98	MATERIAL	M/materials
99	HRATAI	99	ATKONDA	M/materials	99	MATERIAL	M/materials
100	KOTA	100	JARAI	M/materials	100	MATERIAL	M/materials
101	70TU	101	KATARA	M/materials	101	MATERIAL	M/materials
102	PLI	102	KATARA	M/materials	102	MATERIAL	M/materials
103	HRATAI	103	KATARA	M/materials	103	MATERIAL	M/materials
104	XETHA	104	ATKONDA	M/materials	104	MATERIAL	M/materials
105	XETHA	105	ATKONDA	M/materials	105	MATERIAL	M/materials
106	KOTA	106	MATERIAL	M/materials	106	MATERIAL	M/materials
107	KATARA	107	ATKONDA	M/materials	107	MATERIAL	M/materials
108	MARIA	108	KATARA	M/materials	108	MATERIAL	M/materials
109	MARIA	109	KATARA	M/materials	109	MATERIAL	M/materials
110	80TUMA	110	JARAI	M/materials	110	MATERIAL	M/materials
111	7TU	111	JARAI	M/materials	111	MATERIAL	M/materials
112	ATKONDA	112	ATKONDA	M/materials	112	MATERIAL	M/materials
113	AMUK	113	ATKONDA	M/materials	113	MATERIAL	M/materials
114	HELEND	114	ATKONDA	M/materials	114	MATERIAL	M/materials
115	MUKATARA	115	ATKONDA	M/materials	115	MATERIAL	M/materials
116	PLI	116	ATKONDA	M/materials	116	MATERIAL	M/materials
117	MATUA	117	ATKONDA	M/materials	117	MATERIAL	M/materials
118	MATARA*	118	ATKONDA	M/materials	118	MATERIAL	M/materials
119	MATUA	119	ATKONDA	M/materials	119	MATERIAL	M/materials
120	ATKONDA	120	ATKONDA	M/materials	120	MATERIAL	M/materials
21	80TUMA	21	MATERIAL	M/materials	21	MATERIAL	M/materials
22	ATKONDA	22	ATKONDA	M/materials	22	MATERIAL	M/materials

129	Stacy Jones	11	11	11	A.S.G.
125	Nura Anam	11	11	11	
126	Shura AH	11	11	11	
127	Luca Permatasari	11	11	11	Records
128	Atun Hefan	11	11	11	T.R.
129	Suzela Wilson	11	11	11	
130	Piki Sabela	11	11	11	B
131	Sho Kiyari	11	11	11	A.K.
132	Atun Mawit	11	11	11	
133	Kipangre Tolon	11	11	11	
134	Mokim Joku	11	11	11	
	Siti Saipul	11	11	11	
	Atun Permatasari	11	11	11	
	Mekis Salurus	11	11	11	
	Rea Demens	11	11	11	
	Zaini Ahly	11	11	11	M.S.
	Fitra	11	11	11	L.C.
	Sifim Mwanke	11	11	11	Z.A
	Zaina Omar	11	11	11	Records
	Mkpongbe Mbeng	11	11	11	
	Sabane Msa bara	11	11	11	

S.M

A.S.G.

		Mwananchi	Mogoloni	
146	Miraji S. Pendo	U U	U U	
147	Mirisho Omani	U U	U U	PARA
148	Stamili Greza	U U	U U	M.O
149	Ramadhani Greza	U U	U U	S Greza
150	Mihal Ally	U U	U U	
151	Duma O. Zikathuu	U U	U U	<del>Ally</del>
152	Abdu Salimu	U U	U U	J.O-Z
153	Ramadhani Mwelupungu	U U	U U	R
154	Palaketi Reboi	U U	U U	<del>Ally</del>
155	Sambana Kipuyati	U U	U U	
156	Dodoi Anshuber	U U	U U	PARA
157	Moses Lyamu	U U	U U	Skipuy
158	Alhman Jalibu	U U	U U	A.
159	Jalibu Ally	U U	U U	M Jan
160	ALPhoneo Rubalati	U U	U U	Ajalibu
161	Wema Hamisi	U U	U U	J.A.
162	Wema FARAHISHA	U U	U U	A. Lulad
163	UBA YA Ramadhan	U U	U U	WEMA
164	Muingwa Ramadhan	U U	U U	URamadhan
165	Fulahisho Mbene	U U	U U	M.R
166	Said Hamisi	U U	U U	Ally
167	Jumane Ramadhan	U U	U U	Said
168	Mustapha Ally	U U	U U	J Ramath
169		U U	U U	R

1. Kufunga mkutano.
2. Mwekezaji kuelezea eneo la mradi linalohitajika. (ATAFITI)
3. Kufunga mkutano.

AGENDA NO 1 KUFUNGA MKUTANO

Mwenyekiti aliwathukuru wananchi kwa Maheshwari ya. Niwomba dua wale ambao wanamua Muaga awape nafuu. Mkutano huu ni maalumu. Niwomba wenzangu Sports. Akiunga mkutano SCS SCS na wasu mchana.

AGENDA NO 2. MWEKEZAJI KUELEZA ENEO LA MRADI LINALOHITAJIKA.

Majaja wa kampi ni wa M.M 1 MILLS L.M.D Alianza kuoleza swala zina la utafiti eneo la mpora kwa tungfanya utafiti SCS utafiti tayari. Niwomba eneo la mpora kuanzia mto M Kambazi. Niwomba kwa mujibu wa Sheria yenu ili tufate eneo la mto mkomberzi had kwari utafiti unonebea mali ipo. Tunahitaji kauli yenu ili tufadilise wilayani. Kwa hapa ngomb riza yenu wananchi Mwenyekiti aliwape nafasi wananchi kwa haja na maswali.

Swali Kuna wata wanaoamika eneo la m...  
di Je Kuna wata wanaofanya kinyume ch...  
Sheria wata wanaoekaa Mikuzi hii ina...  
weje?

Jibu Kweli Kuna wata wanaofanya vitu k...  
nyume ch Sheria Kuna wata wanaoatol...  
mikuzi hizi wanaoamika taratibu. Kika...  
cha Halmesburu kinaidunus wajumbe...  
wa kamati ya ardhi ili kulifanyis...  
kezi. Tote ambaye anahitaji kum...  
amari wote wanaohusika hata wali...  
25 kisheria zitafuat. Kuzi hii leo...  
hatahitaji wata kuweka mikuzi. Heki...  
25 wanaochi hazipotoi.

Swali Je ardhi tunakokodi au...  
tunakuzi.

Jibu Halmesburu eneo wote hatukodi...  
Shur ile tunc... <sup>na</sup> wote hatukodi...  
kwa wanaohusika. wanaostali baada ya tathmini.

Swali Sisi tunasiri je meono je...  
mababu neliio tunagoma hapa Serikali...  
unasema msioke vyaliko.

Jibu Wata utalipwa kwa majibu wa Sher...  
a. Kuna wote meano na Serikali je...  
Kijiji cha Maguhumatali

Swali Tunauliza je utalipa kiasi gani...  
kwa tathmini ya ekari.

Swali Serikali unazua mikuzi wakati...  
sisi neliio tunagoma meono hapa inaku...  
weje?

Jibu. Iki tathmini ifanye anahitaji kiji...  
vitu hapa kuna kitu gani nyocho mekabar

hitaji archi kampuni imepata mali na w  
- Mumba. Mmesema tanchiteji gha  
mbezi anachiteji kwanza wapi hali

Mumba - Mmesema unachiteji mto mka  
mbezi je visima yetu maswaka wapi?

Majibu - kuhusu ahali tumeanza kut  
kelezi tunasomeba wata 40 Shule 2  
Sokondani.

Kuhusu visima tunawachia wanao  
wenzake na Shule 20 katika  
visima.

Maswali:

Tunachiteji yafanuzi kuhusu mto na  
kipanalo kipi tunachotoa tunachiteji Mwa  
nyekiti utafanulize vizuri.

Jibu Mwenyekiti. Kwa Mudi huu kam  
puni haijapata tena ili ana eno  
le yuma kwa anazis mto mkombe  
zi hali solum fuleni bea ya tena  
le eno.

Kwenz taweke nyaka kati ya tele  
wawala na Maguluma adal na Mkenge.  
Mtoa soti kachia kyaliza.

Kama nuombeji anachiteji eno mwiho  
mbaya tunatoa. lakini kama sio hiyo  
kutoa inskwa ngumu.

Jibu Mpenzi unaothua fuleni kapitiwa  
na utafiti wa kampuni. Iki hapa tunatoa  
mzee je kutoa archi lakini hani yupo  
kwenye malipo ni wataalamu wa archi

leo utafuna kama tunakuliza maswali  
mwingi. Tuneliza muda mwingi sana na  
tunaculeta kulizi. Iki tunahitaji kaji  
mwanzo na mwisho wa eneo ili tukuf

Jibu. Kulizi kwenu ndio mimi kupata  
wataalamu waje wapime archi.  
Haya ni mpendekezo nyie kusoma ST

Mwisho archi ni ya Serikali. Kunshata  
nyingi mpaka archi hii ipatikane.

Aminio Wananchi wameku salama  
kumpo eneo hilo muwokozi ili afany  
shughuli za kuwokozi kwanza.

AETNDA NO 3 KUTUNGA MKUTANO Mas

nyekiti aliwa shukuru wananchi kwa  
kuliza kumpo eneo hilo muwokozi. Aliwa  
ataka wananchi waweli salama yumban  
tunamua muwokozi tunakuomba utuloto  
e wataalamu ili wamalizo kuwokozi mabang  
o ya mpingo wa matumizi bora. Kwa mwa  
ya kuwokozi mwenyekiti mimi nitekuwa sifu  
ngwi mkutano hili ya kutibitisha shir  
kukamilisha mpingo. Alimtokei Sefeni  
nyama muwokozi. Alifunga mkutano sa  
a JIS na dakika zote hizi.



Ramadhani A. Bigg



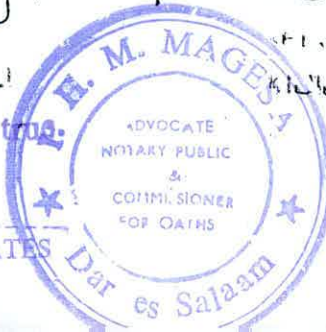
Masoud A. Dady

Mw/Kiti Kijiji  
SERIKALI YA KIJILI  
KIJILI CHA MABULUMATAI

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MAGESA & CO.-ADVOCATES



FIWA ATENDAJI WA KIJILI  
KIJILI CHA MABULUMATAI  
BATA MOYO

2/8/2013

SHAWRI TA KISIJI NA KAMPUNI YA M.M. INTE  
 GRATED STEEL MILLS LIMITED INAYOOMBA  
 ARDHI EKARI 200 KWA AJILI TA UTEKELEZAJI  
 WA MRADI WA CEMENT KILICHOFANYIKA  
 KATIKA OFISI YA SERIKALI YA KISIJI TAREHE  
 16/8/2012 KUANZIA SAA 12:15

	JINA	CHAO	ATAKAKO	SAHHI
1	Ramadhani A. Biji	MWIKITI	Maguluma	<del>SAHHI</del>
2	Mbaraka Meku	MWIKITI	Kisambi	MM
3	Hamza Ramadhani	MWIKITI	Kulihungu	SAHHI
4	Rest C. Malila	-11-11-	Maguluma	SAHHI
5	Chabu A. Chabu	-11-11-	M/Nyamala	SAHHI
6	Saidi M. Shu	-11-11-	-11-11-11-	SAHHI
7	Wagao Tongo	-11-11-	Kuhungu	SAHHI
8	Razali Laimu	-11-11-	Maguluma	SAHHI
9	Marta Lonamba	-11-11-	-11-11-	SAHHI
10	Ramadhani Iddi	-11-11-	Kuhungu	SAHHI
11	Anina Muhamadi	-11-11-	Maguluma	SAHHI
12	Muharuni H. dikatimu	-11-11-	-11-11-	SAHHI
13	Papa Kuyodoi	-11-11-	Kuhungu	SAHHI
14	Fatumu Mwingu	Mjumba	-11-11-	SAHHI
15	Mwaji Mberra	-11-11-	M/Matali	SAHHI
16	JOSPH LAFAELI	" "	M/Matali	SAHHI
17	Pili Semwaja	MWIKITI	M/Nyamala	SAHHI
18	Mwanochu dora	" "	M/Matali	SAHHI
19	MOHAMED ZIKATIMU	" "	M. yamara	SAHHI
20	CHAZI SUDI SAIDI	" "	M/Nyamala	SAHHI
21	RABU S. SHIMBUA	KATIBU COM TAWI	MAGULU	SAHHI
22	Shabani A Kisulu	MWIKITI	MAGULU MATAZI	SAHHI
23	Omari Ramadhani	Mjumba	-11-11-	SAHHI
	Flize Samueli	-11-11-	Kulihungu	SAHHI
	ALY P Mavua	-11-11-	-11-11-	SAHHI
	Masood A. Chabu	-11-11-	-11-11-	SAHHI
	Abubakar M. Mwangi	-11-11-	-11-11-	SAHHI

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 M. MAGESSES  
 ADVOCATE  
 2/8/2013

AGENDA

1. Kufungua kikao.
2. Maombi ya ardhi ekari 200 kwa kam-  
pani ya M.M. Integrated steel mills Limi-  
ted katika eneo la mpera kijiji cha Magu  
lunatali
3. Kufunga kikao.

AGENDA NO 1 KUFUNGUA KIKAO Mwe-  
nyekiti wa kijiji aliwaambiana wajum-  
be kwa Maluchuro yao pia alisaidia  
kumwajioni kufika mepoma kwenda  
kikao. Aliwataka wajumbo wawe wote  
livi na wasikivu muda wote wa  
kikao. Alifungua kikao saa sita na  
robo mchana.

AGENDA NO 2. MAOMBI YA ARDHI EKARI  
200 KWA KAMPUNI YA M.M. INTEGRATED  
STEEL MILLS LIMITED KATIKA ENEO LA MPERA  
KIJILI CHA MAGULUNATALI

Afisa mtonzi  
kwa barua ya maombi ya ardhi  
10/8/2012 inayotaja kikao chetu  
agenda kubwa ni maombi ya ardhi ekari  
200 kwa kijili ya mada wa ciment. Hivyo  
mimi sio mtonzi wa kampuni iliy-  
opo mtonzi wa kampuni maswali  
afajibu yeye kasir na ya kampuni  
Mh. Mwenyekiti wa kijiji alisisi  
fizi kuambis wajumbo tawe makini  
sana.

Kwani Swala lili Sio mchero ni Soka  
Kubwa sana. Mwanayokiti aliwapa nafasi  
wajumbe kuhanga kaja.

Mjumbe - Tunosikia kampuni inaomba  
ekari 200 Je ekari hizo kijiji cha Mag  
ulumatali au na Talawanda?  
Jibu Maombi haya kwa Kijiji cha Magulu  
madali.

Mjumbe - Kampuni yeny inaoneo upande  
wa Talawanda kwani halitaki?  
Jibu Kweli tunalo eneo ila madini ni  
uchache sana mwanba mkubwa unpoke  
kwa eneo la Magulumatali. Ika mwele  
huyu ni mkubwa unahitaji wafanyazi  
Zaidi ya mita sita kutafanya jumbe  
za wafanyazi.

Mjumbe - Eneo hilo linawata wafanyazi  
200? Je kilimo itakuwa maeneo

Jibu Sisi hafunani eneo ila tutalipa  
Jalia kwa wale wenyema maeneo.

Mjumbe Kijiji kimsufika kuta gani  
wakati ardhi inshauri toka ardhi ya  
Kijiji hadi ardhi ya Jumuiya?

Jibu Kijiji kimsufika kwa kura na  
mwele na kodi ndogandogo.

Mjumbe - Kwani mwanjanga Talawanda  
Je watoto wetu watajira ajira.

Jibu Swala la ajira kwa vijana  
wetu watajira.

Mjumbe - Mtona kama wasumbufika  
tunataka kuslowa. Soshoni nyingi watu  
wanazua ardhi tu je wawe hampa  
kama wao.

kuwa aji ya maraka. Siyo vinginevi

Maisha: de machipa machamba au

huo mpana unepita kuwenge maene

ya wata wanao kutafuta maisha

ya ya kila siku mashamba.

Jibu tumacha elekeza ndicho tuta-

machamba

we ardhi kuyo lakini kuilingana na ombi

limetaki kuwa kama kiji kutoka majale

ama hadi Wilaya ilidhi kuwa uwezo

wea Sisi kama kiji ekari (5) wewe umeo

mbo ekari (20)

Mjumba-Tumekubali kupendelea kwa

Masharti. Ujenge zakant ya kiji cha kiji

AL. ENDA NO 3 KUFUNGA KIKAO Mwenye  
Kiti wa Kijiji alioa Bukuru wajumbe  
kwa umiliki wao waliogeha muda  
wote wa kikao. Alwaga chagamoto waga  
ni swala hili mlifanyaji heraka sana  
kwani wote wachaniteji maendeleo. Alwa  
faka Safari nyuma wageni warudi  
Salama yumbani. Alwatakiwa Safa  
ni nyuma wajumbe wa Halma Shauri  
za Kijiji. Alifunga kikao saa saa  
na musu elezi.

~~RA~~ Biega

Ramadhani & Biza  
Mwenyekiti Kijiji

SERIKALI YA KIJUJI  
KIJUJI CHA MAGULUMATI  
BAGAMOYO

Magesa  
Masoud A. Chady

AFIWA ATENDAJI WA KIJUJI  
KIJUJI CHA MAGULUMATI  
BAGAMOYO

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*Magesa*  
MAGESA & CO. - ADVOCATES



2/8/2013

MUHIASARI WA MKUJAMU MKUU MAAJUMUI  
WA KISIJI CHA TALAWANDA - ULIDFANYIKA  
TAR. 03-11-2012 - PAMOJA NA MWEKEZANI.

WAJUMBE WALIHUDHURIA

JINA KAMILI

CHEO

SIMU NO

SATMI

1	SAID DIBWE MNYAKULL	MW/KISIJI		S. D Mwe
2	BUSHALI R. KILIMILA	M/H/KISIJI	0753 457849	Kilimila
3	ANGELINA H. MALILA	" "	0688996381	AH
4	PETER B MPIMA	" "	0765426501	M/KISIJI
5	MARIAMU A. RAJABU	" "		M/H
	JAPU ALLY DAUDI	" "	T.A	T.A
7	HAMISI M. MSAURI	" "		A.S.P
8	ASHA PINDUA MIAWA	" "		M.K
9	MWASUMA I KILUMANGA	M/H/KISIJI	071926842	M.K
10	LINGWES N. MACHAU	" "		M/K
11	RAJABU S. MKONDDO	" "		M/K
12	RAMADHANI H. KINGIMAU	M/K/ARDBH	0688-976045	Bikondjo
13	IDD H. QILILIA	M/H/KISIJI	0785-089178	M/K
14	HERMAN A. BUSIA	K/CC/KARA		M/K
15	NASRA A. SHAIBU	K/K/ARDBH	0788-058194	M/shaibu
16	AHMADANI KILUMANGA	MJUMBE		
17	MUHAMMAD A. MUHAMMAD	" "		
18	RAMADHANI H. ZEMBWE	" "		
19	RAMADHANI ALY	" "		
20	AHMADANI SAIDI KILUMANGA	" "		R-A
21	RAMADHANI MUMBI	" "		Ahmed
22	ALI LOLESA	" "		R.M
23	HAMABI R. MINTEMELM	" "		A.L
24	Alois Paul Somera			M/K
25	Benari Huru			A.S.P

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JINA KAMILI	CHED	N: SIMU	SAMI
2 HENRY H GEORGE	Mkulima	0784791561	<del>George</del>
27 MASHO SAIBI KILONGOLA	MwL	0713782099	<del>Masho</del>
28 CHUMA R MAGULUMBAZI	Mkulima	0787184101	<del>Chuma</del>
29 HAMISI MUHAMEDU	Mkulima		<del>Hamisi</del>
30 RAJABU ALLY KILOLEGE	Mkulima	0784225215	HM Kilolege
31 ELIASI THOMAS	Mkulima		
32 MIRAJI ALLY	Mkulima	0717347782	<del>Miraji</del>
33 SAIBI TAZIMA AMBI	Mkulima	0767 850099	Aganya
34 VIDERS REONI MALILA	Mkulima	0715-945552	<del>Vid</del>
35 SHABANI MASHO NK	Mkulima	0786558241	Shabani
36 SALUMU SAIDI	Mkulima	078847752	Salumu
37 ABDALA R KOPA	Mkulima		S. ZAIDI
38 GEORGE KUBALATI	- " -		GEORGE
39 KELLA SUMAIL	- " -		<del>Kella</del>
40 MAAKAMB -M. EDUA	- " -		Makamb
41 AMINA RAMADHANU	- " -		Amina
42 ASHA -M. EDUA	- " -		A.M.E
43 MARIAMU YUSUFI	- " -		M.A
44 MAUA AITHUMANI	- " -		
45 BAKARI MAHILA			
46 HALFAN ZEMWE			
47 TABIA SAIDI			
48 OSCA BOSO			O. BOSCO
49 MAMENO KALOS			M. K.
50 GEORGE H PERG			PERG
51 YUSUFI MAKINDI			
52 CHARLES MWESUA			
53 HUSEINI S. PELA			cm
54 RAMADHANU SUMAILI			
55 BAKARI NIAGARA			<del>Bakari</del>

	JINA KAMILI	LYED	NIA SIMI	SAMI
56	SHABANI HUSSENI	MJUMBE	078220915	<i>[Signature]</i>
57	JAMO ALPHONCE	"	0788975374	<i>[Signature]</i>
58	SIMIONI PAULO	"	0733.517294	<i>[Signature]</i>
59	ABENI SEMINDU	USUMBE	—	A.S.
60	SHABANI ONESHA	MJUMBE	—	<i>[Signature]</i>
61	RAFAERY ANDREA	"	—	M.L. GEORZA
62	MOLIS LEO	"	—	A.J
63	ALY J. MALUNGU	"	—	N.E
64	WILLIAM EBUA	"	—	<i>[Signature]</i>
65	KENGELE MACHAU	ASKAR/KUJI	—	<i>[Signature]</i>
66	MWJABU. R. MUYOMBO	MJUMBE	0789782079	Muyombo
67	XUMASI H. MANGA	"	—	<i>[Signature]</i>
68	JOHN RAPHAEL MLIHOAE	"	0780504039	<i>[Signature]</i>
69	HELMANI GEORGE MALILA	"	—	<i>[Signature]</i>
70	MAKONAA MATUYA	"	0783.901444	<i>[Signature]</i>
71	MASUAI ONESHA SAWASAMA	MW/KITONDOJI	—	<i>[Signature]</i>
72	IAZIMA AMLI MGALULA	MWANANCHA	—	P.Z.A
73	OMARI A. BAKARI	VEO	0784753254	<i>[Signature]</i>
74	Aboubakary M Law	M.M.I.LID	—	<i>[Signature]</i>
75	Michael Mlyambang	DK HREO	Bwony	<i>[Signature]</i>

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2/8/2013

AFISA MTEENDAJI

KIJUJI CHA MAFULUMATA

BARAMOYO

5/11/2012.

Kumb NO BDC/MGT/VTD/VOL III

SUBHASH M. PATEL

ATKURUGENZI MTEENDAJI M.M.

INTERGRATED STEEL MILLS L.T.D.

~~TAH KUTIBU MAOMBI ZA UWEKAZA~~  
JI KATIKA KIJUJI CHA MAFULUMATA

na Raja Soma la hapojum kutokana  
cha kikao cha Helms Shringi Kijiji  
Magulumatai cha faraha 6/8/2012  
Kilipiti cha kukupa eneo la nyota kw  
uwekezaji eneo la ekari 200. Pia Mkutano  
Mkuu maalumu wa Wanaschi umobiz  
kuwekeza eneo hilo mkutano uliyenyike  
3/11/2012.

Hayo Wanaschi wote wamobiz kutoka  
eneo hilo kas uwekezaji.

Tunatanguliza Shukrani  
Wako katika utunzi

Xsente

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*Magesh*

*Magesh*  
Masoud A - Chabry

AFISA MTEENDAJI  
KIJUJI CHA MAFULUMATA  
BARAMOYO

2/8/2013

MUNI TASARI WA MKUTANO MAAZUNI WA KISI

CHA MAGURUMATAZI KATA TALAWANDA ULIOFANYIKA

TAREHE 3-11-2012

WALIOHUDHURIA

	CHAO	SALINI
1 RAMADHANI ATHUMANI BIGA	MWENYEKITI	
2 MASSOUDI A-CHABU	KABU (VCO)	
3 RAZARO T. MAUWA	MJUMBE	
4 MUHARAM H. ZIKATIM	" " "	
5 ALY <del>MAKAE</del> PENDEZA	" " "	
6 FATUMA MWENJUMA	" " "	
<del>7 MOHAMED D. ZIKATIM</del>	" " "	
7 CHABU A CHABU	" " "	
8 KISANJO STELE MACHAU	MW. K. KITONGOSI	
9 RAMADHANI IDDI SELEMANI	" " "	
10 PILY SEMWANJA	" " "	
11 SAIDI MRISHO HEMBE	" " "	
12 MOHAMED ZIKATIMU	" " "	
13 MBRARAKA MEKU	" " "	
14 RESTI CHEMETISI	" " "	
15 JOSEPH RAFALI MARIPESA	MW. K. KITONGOSI	

	JINA	CHAO	MAUMU
16	TATU S ZIKATIMU	MJUMBE	Zikatimu
17	FURAH HAFANI	"	Hafani
18	KOLETA MFAUMU	"	"
19	SAROME ANDEA	MJUMBE	K. M. =
20	SHIDA RAMADHANI ZIKATIMU	MJUMBE	S - A
21	OMARI RAMADHANI ZIKATIMU	"	Rajika
22	LEO GEUZA	"	Omari
23	RAMADHANI MIBENA	"	LEO
24	AJUA PENDEZA	" "	
25	SALUMO ZAIDI	" "	
26	TARATIBU MUHODU	"	ZAIDI
27	SALUMU OMARI	"	
28	ALPHONTE RUBALATI	" - "	Alphonse
29	PENDEZA MAWULA	" - "	Atubaru
30	OMARI MUTAMEA	" - "	
31	AAASHAUA ABEB	- " - "	Abad
32	FANI ULISA	- " - "	
33	ABIDI PENDEZA	- " - "	
34	MWELANGI MBUGULU	- " - "	Mwanga
35	KIPUYATI REBO	- " - "	
36	SALUMU MWEMJUMA	- " - "	S.M.J.
37	JOEL THOMAS	- " - "	Thomas
38	ROJASI ERINESI MGUSI	"	Mgusi
39	RAJABU S MAISHA	"	
40	RAJABU S MAISHA	"	
41	RAJABU S MAISHA	"	
42	MASHA RAMADHANI	- " - "	
43	RAMADHANI MIBENA	- " - "	
44	SALUMU S NIBWE	"	
45	STEPHAN MICHIEL	"	Michiel

No	Name	Parent 1	Parent 2	Signature
45	JUMA	MOHAMED	MJUMBE	
46	SHABANI	ALLY	RABWO LWAMBO	
47	MSIBA	A.	MKONDO	
48	SELEMANI	S	PENDO	
49	SAMBI	S	PENDO	
50	SELEMA			
51	ANJELINA	MUBENA		
52	ASHA	CISERGE		
53	ZENA	OMARI		A. GEORGETE
54	TATU	SHABANI		
55	PU	RAJABU		
56	PU	JUMA	KIDUKA	
57	KOREIA	MATUENO		
58	FATUMA	HALUFANI		
59	SALINA	SAIDI		
60	ZAINABU	SAIDI		
61	RAJABU	S	DHIBWA	
62	HAMUSI	SAIDI		
63	SALIMU	SAIDI		
64	SHABANI	REMIAMA		
65	KIUMBO	RAJABU	MULLI (KATULA)	MKARIBI SHWA
66	HADISA	REMIAMA		
67	MURJUMA	IBDI		
68	ASHA	SAIDI		
69	ASHA	KWULI		
70	SA	FATUMA	FAHAMU	
71	ASHA	MASONGARO		
72	ZAINA	SHIDA	ALLY	
73	MAUA	SAIDI		
74	SALIMU	SAIDI		
75	ZENA	WAHADI		
76	CHANZI	SAIDI	RASHIDI	
77	MIRAJI	SUBI	SAIDI	
78	MIRAJI	FAHAMU	SEKAMBA	



95	HADJA	R. UIVANGA	Mjumba	
96	Amuna	SAIDI	" "	AS'
97	Hossen	JOSEPHU	" "	H.T
98	ALY	HALUFANI	" "	
99	ROJAS	DARAI	" "	
100	NEILASI	NATURI	" "	
101	MIRAJI	LAINI	" "	
102	ALY	MURUHO	" "	
103	RAJABU	HOSSENI	" "	
104	SHABANI	PINDUWA	" "	RAJ
105	MALWA	SHABANI	MKONDO	
106	MURUHO	AMANI	" "	BIKOROB
107	KITUGWE	ASHA	" "	AMANI SHA
108	ALY	SMARI	" "	
109	SUWEDI	SELEMANI	" "	
110	IDA	SALLUMA	" "	SISLUM
111	SEIFU	ELIMU	" "	
112	LODI	RAMADHANI	" "	
113	TUMAI	FENDO	" "	
114	JUMBA	FARE	" "	
115	JUMBA	SAIDI	" "	
116	SHABANI	FENDO	" "	
117	COSMASI	SUMOFO	" "	
118	SATOF	HABIBU	" "	
119	MURUHO	SAIDI	" "	MURUHO
120	MIRAJI	RAMADHANI	" "	
121	MUSTAFA	ALY	" "	
122	SHUDA	SAIDI	" "	
123	RAMADHANI	LODI	" "	
124	MUDI	RAJABU	" "	R.DD
125	MASHAKA	YUSUFU	" "	

JINA

CHEO

SATHI

~~126~~  
~~127~~  
~~128~~  
~~129~~  
130

MAUWA

IMANI

Mjumba

ZAIWA

SMARI

— " — "

ZAIWA

MUHAMMADI

— " — "

MAUWA

RAMADHANI

— " — "

HACPA

A MKONDO

Mjumba

Muzuni

~~Muzuni~~

ACENDA

1. Kufungus mikutano

2. Kufungus M.M Intergraded Steel Mills Limited Katika eneo la mpera Kiji, da Magulumaal;

3. Kufungus mikutano.

ACENDA NO 1 Kufungus mikutano  
Ml: Mademurkhi wa Kiji alioa Shukun  
Wagumbe wa Mikutano katika Mawabwani  
Yao. Alizambiti leo fiantikufant Keti  
ke mikutano mwalimu kump fante  
Makini OziKini munda wote wa  
Mikutano. Alfungu mikutano 525  
Sita na robo mchana.

ACENDA NO 2. Kufungus mikutano  
wa wakerezi wa Kampuni ya M.M  
Intergraded Steel Mills Limited Keti  
ke eneo la mpera Kiji, da Maguluma  
matali. Afis mtendaji wa Kiji  
alioambiti wawacha Kiji leo fante  
na wageni wawacha Kiji leo fante  
ke eneo la mpera. Bada  
ya kusoma kazi afis alioambiti

महसुबाने वर कम्पाने

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महसुबाने वर कम्पाने  
महसुबाने वर कम्पाने

Konkrete Fälle kann helfen.

(1) Koffein als Nahrungsmittel ist nicht  
schädlich: auch als Süßholzmasse

(2) Valium Antikonvulsiva.  
Leber: gute Wirkung, aber geringe  
Kombi. mit anderen.

Braun für Kuren sehr effektiv:  
Krankheiten messen.

Münze. Auf Magulmahl, Funktion  
an Operation für: meeres geht in  
Menschen für Kulte andere Funktionen

Münze frei lang in einem  
Mittelteil: ekari 1/2 der Länge nicht  
Majby Operation für in einer  
Senke: Kok mit warte Ambrosia

Peak Schema: Koke mit warte Ambrosia  
was: Peak Schema: Koke mit warte Ambrosia

Heckig: Masanaki in Kaufingia  
Ker: ardhin ardhin Ambrosia  
Masse: Je mehr geht Halbes

Dien Kelle: Um die warte Ambrosia  
Metall: Das kann aber gut funktionieren

2/8/2013



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MAGULUMATAI & ADVOCATE

SERIKALI YA KIJU  
KIJU CHA MAGULUMATAI  
BAGAMOYO

Matajiriki wa Kijui

Romadhani - Biga

Biga

we wish Green.

Agenda wa 3 Kufunga Mkutano.  
Mh. Madang'ali wa Kijui: Chaudhury  
Wazenda kuti wachangia wao wazenda  
20. Hivyo kuti wazenda Selemu nganda  
n. Piz Chaudhury Selemu nganda  
n. Hifungo mkutano Selemu nganda  
n. Hifungo mkutano Selemu nganda

Baridi wa mesole niyo walio  
Kis kutiwa amano.  
Amano. Wazenda wamekuwa Selemu  
Kumpo eno hilo Muukeregi kuti wazenda  
arti wa Hifungo Selemu nganda  
Bazimbo kuti eno wazenda Selemu nganda  
Eken ngani? 200 shi Kijui wazenda wata  
n. Eken so.

Masoudi A. Gashy

KIJU CHA MAGULUMATAI  
BAGAMOYO

MUHATASARI WA MKUTANO MKUU MAALUM WA  
KIJISI CHA TALAWANDA - KILICHO FANYIKA - TAREHE  
03-11-2012 - PAMOJA NA MWEKEZAJI

AGENDA ZA MKUTANO

- 1 = MWENYETIKI WA KIJISI - KUFUNGA MKUTANO
- 2 = KAMPUNI YA M.M STEELS LTD KUONGEA NA  
WANANCHI WA KIJISI CHA TALAWANDA.
- 3 = KUFUNGA MKUTANO - MWIKI WA KIJISI

1: UFUNGAZI WA MKUTANO - MWENYETIKI -  
amewashukuru wananchi waliokuwira mkutano  
hwa, Baada ya kusema hayo amefunga mkutano  
Saa: 6:30. mchana

2: KAMPUNI YA M M STEELS LTD KUONGEA  
NA WANANCHI WA TALAWANDA.

Kabla ya mwakidishi wa kampuni huyo, hajaongea  
na wananchi. Mh. Biwani, ametoa utangulizi na -  
hari herisi ya ujio wa kampuni huyo.

Baada ya hapo, ndipo alipokaribishwa Afisa Ardhi  
Wilaya; Afisa huyo; amewambia wananchi kwamba  
ni kawaida sana, kwa makampuni yote kufanya  
utafiti kwanza, ili kujua kwamba kile kinacho-  
hitajika kipo ama laa.

Kampuni ikiridhika ya kwa kinachohitajika kipo  
ndipo taratibu za kisheria zitafuata.

Afisa huyo aliendelea, kuambia wananchi hawo  
ya kwamba, tathmini itaanza kufanywa ili malipo.  
yaize kufanywa

(c) = kwa mfano: mt. Magesa kulingana na mali zili-  
zopo hapo.

2/8/2013



(b) = mtu atalipwa pahari hapo, hata kama haina mazao yoyote, isipokuwa wewe unaiishi hapo.

(c) = unatakiwa kuhama, baada ya malipo ya muda wa siku 90 ni sawa na mwezi mitatu tu (3)

(d) = Tathmini ya Asari ya Mazingira itafanywa

(e) = Pia inatakiwa kujua Idadi ya Watoto waliyopo hapo kijijini/pahari husika.

- Baada ya hapo wananchi waliohizi MASIKALI

Swali Na-1 - Wananchi walitaka kujua mtu analipwa Shilingi ngapi? - Jibu hilo ni kwamba mtu analipwa kulingana na Mali au Mazao yake kufanywa Tathmini harisi

- Swali na-2 - Je wale waliyohama zamani nao katilipwa? Jibu: Kama mtu shamba kaliche kwa muda wa miaka 12, katilipwa mtu huyo

- Swali na-3. Sehemu ya MAKABURI itakuwa jibu, utaratibu utafanywa kupanishwa na kutoa au kupewa fidia, kulingana na mchango ZETTERU lake.

- Swali na-4 - Kuna matambiko yetu itakarwaje? swali hilo lilijibiwa kwamba Eneo la Matambiko yatapanishwa Sehemu nyengine

- Baada ya maswali hayo; Mh. Biwani ameshauri kuwa, wale wote watakas lipwa kufungua Akarti.

- Majibu Afisa wa Ardhi Toka Wilaya alisema kwamba utaratibu unatumika mara nyingi ni Wabwazi kuwapa HANDI - kama Sehemu wa mgogoro malipo yatafanjika mehakamani aizo mehakama ya Wilaya/Tetefo au Kati
- Baada ya Majibu hayo, Wananchi wametidhika na majibu hayo na hapatawa na Maswali mengine

3: KUFUNGA MICUTANO - MWIKIJI AMEWASHUKWA  
 Wananchi kwa kuwa kutakiva sana na kuelewa kilicho zungumzwa.

Baada ya kusema hayo amefunga Micutano -

Saa: 7:26:

S. DIBWE  
 HALMASHAURI YA KIJIZI  
 KIJIZI CHA TALAWANDA  
 BAGAMOYO  
 S. DIBWE

OMARI A. BACHIRI  
 AFISA MTENDAJI KIJIZI  
 KIJIZI CHA TALAWANDA  
 AREHE -----

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*I. H. M. Magesa*  
 MAGESA & CO. - ADVOCATES



2/8/2013

MUKHTASARI WA MKUJIANO HUKU HAMA...  
WA MWEKEZAJI WA MADIMI ULIDFANYIKA  
JAR 03-02-2013 JUMA PIWI TALAWATI

MAHUDHURIO

Mahudhurio wajumbe 74 brodha ya majins yao  
ngambatanisha na mukhtasari huu.

AGENDA ZA MKUJIANO

Agenda zilikuwa tatu (3)

- 1- Kufungua mkutano
- 2- Kufahamisha utafiti
- 3- Kufunga mkutano ✓

AGENDA N° 1

Kufungua mkutano

Mwakti aliwashukuru wajumbe kwa mahudhu  
rio yao na aliwambia kwa watulivu w  
kushika  
wango ambao. Na kutamua kwa mkutani  
umefunguliwa. Mkutano umefunguliwa mnamo  
Saa 6:7 Mchana.

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*I. B. M. Magesa*  
MAGESA & CO - ADVOCATES



2/8/2013

## Kufahamisha utafiti

Mwekezaji aliofahamisha wajumbe wa Mkutano  
Juu ya utafiti wao na hatua waliofikia, edhasa mbe  
wajumbe kuu utafiti umeonyesha madini ya Seme-  
ni japo. Kwa hivyo wamekuya kawa ambawash  
wamanchi matokeo ya utafiti. na kuomba vidha  
kwa wamanchi eneo hilo kwa kazi ya  
Uchimbaji wa jiwu.

Baada ya maelezo hayo mwlkiti aliwa  
rudishia wajumbe wa mkutano kwa uchangiaji  
Mjumbe Mgalamu S. Kunguluzo. Hilo eneo mna  
nunua au mnaiazimu? Mwekezaji alijibu kwa  
hilo eneo litakue ni la kwetu

Shabani Kigawito - Je makaburi ita kuwaje?  
Jibu - Makaburi yata heshimwa.

Evazisti Michael Mkindo aluliza - Wanachuu  
ni wapmaji au ni savei - jibu - Serikali na  
wamanchi wenyewe. Mjumbe Legisa Patel - alulize  
Mto Mkombezi ndio tegemeo la mifugo kwa kumy-  
washa mifugo, itakuaje? jibu mto huo ndani ya mradi

Athumani A-Chama - Sisi wakulima tutalime  
wapi? jibu - Swala hilo tutaliangalia kwa pamoja.

Evazisti. M. Mkindo - Kiwanda Kitakus (kitajengwe) wapi?  
jibu - Kiwanda Kitajengwe chapa Idawanda.

Mjumbe Samsoni Martei - Mwekezaji kuzui madhera?  
~~Ita kuwaje~~ kwa mifugo na Bimadamu kwa matumizi ya  
maji. jibu imategemea kwa na buswa

Mwali wa Kwanza...

Everisti M. Mkindo - Kuhusu madhara ya moshu na  
Kumbi la Kwanza. Ibu - Wataalamu watakuja kuyaji  
ia madhara yote yato kanayo na Kwanza.

A2 umu

Wajumbe wa mkutano wamekupokea mradi  
na wamekubali Eneo hito wapewe wawekezaji.  
Pia wataalamu waje wajungumje na wamskiiu kupitia  
mkutano mkuu kama waleo. Ma walipangwa tarehe  
23-02-2013 wataalamu hao wafike.

AGENDA NO 3  
Kufunga mkutano

Mwali alia Shukurani wajumbe kwa uchangiaji  
wao mpaka mwisho wa mkutano na aliwadmba  
kujitokeza kwa wingi zaidi tarehe ya Mkutano.  
Hii kutamua kwa mkutano umefungwa. Mkutano  
umefungwa mnamo saa 7:53 Mchane.

Saini  
Katibi

~~Handwritten signature~~  
AFISA MTENDAJI KIJCHI  
KIJCHI CHA TALAWANDI  
02/02/2013

Saini  
Mwali  
S. Dibwe

I Certify this to be the true  
Copy of the Original  
*Handwritten signature*  
MAGESA & CO. ADVOCATES  
I. H. M. MAGESA  
ADVOCATE  
NOTARY PUBLIC  
&  
COMMISSIONER  
FOR O.A.H.S.  
Dar es Salaam

2/8/2013

2/8/2013

Amount: 1,250,000.00

Date: 2/8/2013  
Cash / Cheque No: 12345678

Being payment in respect of: **RECEIPT FOR PAYMENT**

Received the sum of (in words):

Address:

Received from: Mr. A. B. C.

Zimbabwe Road, P.O. Box 238, Dar Es Salaam, Tel: +255 22 2110358-31 Fax: +255 22 2118523

**TANZANIA INVESTMENT CENTRE**



Receiving Officer

(Signature)

No. 108/13



5

00220158

THE UNITED REPUBLIC OF TANZANIA

# Certificate of Incentives

(Section 17 of the Tanzania Investment Act, 1997)

No: 042496

**This is to certify that**

MAMBA CEMENT COMPANY LIMITED

P.O. BOX 3030

of address

DAR ES SALAAM

has been granted a Certificate of Incentives to invest in a new, ~~rehabilitation or expansion~~ enterprise known as

MAMBA CEMENT COMPANY LIMITED

Which is located at

TALAWANDA & MAGULUMATALI VILLAGES

BAGAMOYO - COAST (PWANI)

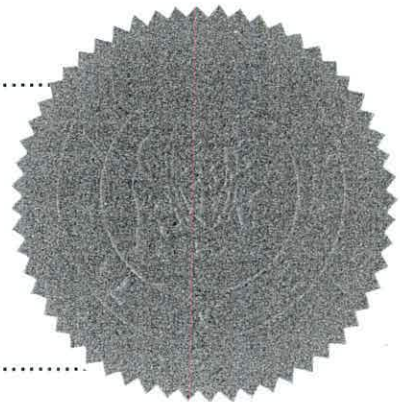
Further particulars required by Section 17 of the Tanzania Investment Act are set out overleaf.

Executive Director

Tanzania Investment Centre  
P.O. Box 938, Dar es Salaam

17TH JULY 2013

Dated



This Certificate is issued in accordance with the provisions of Section 17 of the Tanzania Investment Act, 1997 and subject to the conditions prescribed under item 14 and 15 hereafter:—

1. Shareholders
 

	Nationality	Shareholding (%)
<b>Girdharbhai M. Patel</b>	<b>Tanzanian</b>	<b>5</b>
<b>Subhash M. Patel</b>	<b>Tanzanian</b>	<b>5</b>
<b>Esprit Developers Ltd.</b>	<b>Tanzanian</b>	<b>90</b>
  
2. Proposed Activities : **To establish and operate a plant to manufacture Cement**
  
3. Sector: **Manufacturing** Subsector **Cement Production**
  
4. Investment cost: Foreign **—** Local **USD 195m.** Total **USD 195m.**
  
5. Project Financing: Equity **USD 65m.** Loans **USD 130m.** Total **USD 195m.**
  
6. Source, terms and conditions of loan.....
  
7. Assets to be invested:
 

	Foreign	Local	
Capital items:	<b>—</b>	<b>USD 195m.</b>	<b>Total</b>
			<b>USD 195m.</b>
  
8. Technology Agreement **None**
  
9. Date of TIC Registration: **17th July 2013**
  
10. Implementation period **July 2013 - May 2016**
  
11. Operative date **July 2016**
  
12. Investment Incentive Grade: As defined in part III Section 19 (1), (2) and Section 20 of the Tanzania Investment Act, 1997
  - (i) Applicable Import Duty **And VAT as per Customs Tariff Act, 1976 & VAT Act, 1997**
  - (ii) Applicable with-holding Tax **As per Income Tax Act, 2004 (as amended)**
  - (iii) Eligibility of Capital Allowances **As per Income Tax act, 2004 (as amended)**
  
13. Protection of Investment, Arbitration and Transfer of Foreign Currency: as defined in part III Section 21, 22 and 23 of the Act.
  
14. Conditions attached to this Certificate of Incentives
  - (i) Date of Commencement of investment has to be notified to the Centre.
  - (ii) Certificate not to be transferred, assigned or amended
  - (iii) Failure to commence implementation within two years invalidates Certificate
  - (iv) Failure to operate investment must be notified to the Centre
  - (v) Changes in shareholding, project activities and level of invested capital must be notified to the centre
  
15. Additional conditions attached to Certificate  
**Finished goods are not allowed under this Certificate**

Signed   
Executive Director

Date: 02/01/2014

Ref: MHL/M.10/1628

The Executive Director,  
Tanzania Investment Centre,  
Dar es Salaam, Tanzania

**Sub: Application For Strategic Investor Status.**

**Ref: TICC/C.50/11/25**

Dear Sir,

We acknowledge with thanks the grant of Strategic Investor status to our proposed cement project and feel privileged receiving the additional incentives as per the referred letter.

In addition to the incentives granted, we had requested for few other incentives too, however the same have not been granted. The summary of remaining incentives requested along with the justification is as given below with a request for reconsideration:

Sn.	Incentive	Justification
1.	Import duty, VAT and Excise duty on Heavy duty dumping trucks - 100 Heavy duty truck tractors Trailers 400 Double cabin pick up vans - 50 Staff busses - 10 4x4 vehicles - 25 Non utility vehicles - 100	<p>The project has been provided incentive for:            Heavy duty dumping trucks: 25            Staff busses: 5</p> <p>The complete machinery for the cement &amp; power plant and raw materials (coal, gypsum and iron ore) will have to imported and transported from Dar es Salaam to the plant site. It is envisaged that about 3,000 containers may be received for the project machinery during the execution. This will require huge amount of trucks &amp; trailers to transport the goods from port to project site. In order to construct the plant on time and to ensure continuous round the clock production, the requested number of trucks &amp; trailers will be required.</p> <p>The double cabin pick up vans will be required for the movement of machine and material within the project site both during construction and operations.</p> <p>During the construction and then during the operation, more than 300 people will be employed. Project will have its own residential colony close to the plant, Additionally, the staff will be staying in area nearby, staff busses, non-utility vehicles will be required for these staff to reach cement plant and back home.</p>

Sn.	Incentive	Justification
		<p>The basic raw material for the cement plant is limestone and for the proposed cement it is spread in an area of about 20 sq km. In order to traverse the area for planning the limestone exploration and to supervise the mining activities, 4x4 vehicles are very essential.</p> <p>Grant of incentive for import duty, VAT and Excise duty will facilitate the project to purchase the required trailers/ trucks/ pickup vans and other vehicles. Thus ensuring the timely and economical execution of project.</p>
2.	Import duty, VAT and Excise duty on imported raw material	<p>Quality cement manufacturing would require limestone, clay, iron ore, gypsum as raw material and coal as the fuel. Coal will also be the fuel for power plant. Limestone is available adjacent to the plant, however iron ore, gypsum, coal etc. may have to be imported in order to produce cement.</p> <p>The per month requirement of the imported raw material &amp; coal would be about 35,000 tonnes.</p> <p>Exemption in duties will enable controlling the cost of production for manufacturing quality cement at economical cost and shall also facilitate repayment of term loan.</p>
3.	Excise duty and Road toll taxes for: Oil and lubricants Diesel - 2,000,000 lit/yr for project life (3 years). Diesel - 200,000 lit/yr for cement and power plant operation (for 10years) Grease 20 tonnes/yr (for 10years) Furnace oil 100,000 lit/yr (for 10years)	<p>The limestone for the cement project is spread in an area of about 20 sq km. Potential locations for the limestone exploitation will have to be developed and this shall involve removal of over burden, development of mining pits, laying of haulage roads etc.. Similarly, the location for the cement plant, power plant and residential colony will have to be developed and constructed. All this will require engagement of heavy earth moving equipment resulting in tremendous consumption of diesel and lubricants. Exemption in duties will enable controlling the project cost.</p> <p>Upon execution of project, during the operation of the cement plant, lubricant will be regularly required for production. Exemption in duties in this phase will enable controlling the cost of production and facilitate providing quality cement at economical price.</p>
4.	Withholding tax on foreign insurance premium	<p>The proposed project being capital incentives, required insurance and the same is available through insurance companies only. Any withholding tax on payments made to insurers will have to be borne by MCCL and this will increase the project cost. Exemption in withholding tax will enable controlling the project cost.</p>
5.	Pre shipment inspection Cement, power plant and mining machinery	<p>Grant of exemption on pre shipment inspection shall avoid delays and extra cost. This may help to achieve</p>



**Corporate office**

Sn.	Incentive	Justification
		the timely implementation of the project and the reduce the interest burden that may occur due to delays. The items can be subject to inspection at destination by customs.
6.	Additional foreign immigration for specialised mining technical experts, management and technical experts for cement & power plant construction and operation.  Exemption required for about 150 people	The project proposes to utilise the latest technology for cement production, ensuring quality production economically. Most of the technology being proposed will be the first of its kind in Tanzania and would require experienced manpower.  Considering the complexities involved in executing the state of the art, modern cement project along with power plant with the latest technology, we request to provide relaxed work permit measures to ensure timely availability of technical and skilled work force to support plant construction and operations.  This shall also enable skill development of local qualified manpower and will provide them opportunity to be at par with the international skills.
7.	Additional foreign immigration for skilled workmen like welders, fitters etc. for construction on a short term permit. The number of short term permits required will be about 1,000 during the peak of construction for a duration of 6 - 8 months.	The project has been provided incentive for additional foreign immigration quota as per TIC act 1997, Immigration Law 1995 and Labour laws 2004 for a period of 3 years.  The execution of cement & power plant requires construction of heavy complex structures and installation of heavy equipment with high precision. The project will require experienced staff with similar past experience. They may not have high education but the skills acquired by virtue of experience will be of immense importance for the project. Further, this shall also help in developing local skill for the future projects of similar nature.  Considering the complexities involved in executing the state of the art, modern cement project along with power plant with the latest technology, we request to provide work permit for about 1,000 skilled workmen to facilitate timely execution of project.

We once again request your good office to re-consider our request and grant us the incentives requested, considering the magnitude of the investment required, the job opportunities project will create, the boost the project will provide in developing the infrastructure of the area, etc. due to the size of project.



**MAMBA  
CEMENT**  
*Nguvu ya Mwisho*

**Mamba Cement  
Company Limited**

Your kind approval shall enable us to execute the project economically and on time.

Thanking you.

Yours truly

For, Mamba Cement Company Limited

(Subhash Patel)

Managing Director



A Division of **motisun** GROUP

**Corporate office**  
Neelkanth Tower, 6th Floor,  
Sewa street, P.O.Box 3030  
Dar-es-salaam, Tanzania

Tel: +255 22 2139158  
Fax: +255 22 2117963  
Email: [info@mambacement.co.tz](mailto:info@mambacement.co.tz)  
[www.mambacement.co.tz](http://www.mambacement.co.tz)

**JAMHURI YA MUUNGNO WA TANZANIA**  
**OFISI YA WAZIRI MKUU**  
**TAWALA ZA MIKOA NA SERIKALI ZA MITAA**



OFISI YA MKUU WA WILAYA

**Anwani ya Simu:**

"Admin" BAGAMOYO

**Simu ya Mdomo:** 023-2440002

**Fax:** 023 - 2440096

**Unapojibu tafadhali taja:**

S.L.P. 54,

BAGAMOYO.

31/07/2013

Kumb. Na AB.24/125/01/66

Mkurugenzi Mtendaji,

Kituo cha Uwekezaji,

S.L.P. 938

**DAR ES SALAAM.**

**YAH: UWEKEZAJI WA KIWANDA CHA SARUJI BAGAMOYO.**

Husika na kichwa cha barua hapo juu.

Kampuni ya Mamba Cement Limited ya Jijini D'Salaam kupitia Kampuni Mama ya M.M. Intergrated Steel Mills Limited ilipewa katika Vijiji vya Talawanda na Magulumatali Kata ya Talawanda Wilaya ya Bagamoyo Mkoa wa Pwani kwa ajili ya Uwekezaji wa Kiwanda cha Saruji.

Kampuni hiyo emefuata taratibu zote za umiliki wa eneo hilo kuanzia Ngazi ya Kijiji hadi Wilaya kwa kuitisha Vikao mbali mbali na jamii sambamba na kutimiza masharti ya Vijiji katika eneo la Mradi.

Jamii iliridhia utekelezaji wa Mradi huo na sasa hivi taratibu za fidia kwa wananchi na mali zao zinaendelea ili kupisha Mradi huo uanze kuanza mara moja.



Hivyo nawatambulisha kwako ili waweze kupata Cheti cha uwekezaji katika Wilaya ya Bagamoyo na pia kupata msaada wowote wanaohitaji katika Ofisi yako, kwani wanatambulika rasmi ndani ya Wilaya hii.

Ahsante



**JOHN M. MAHALI**  
**KATIBU TAWALA WILAYA**  
**BAGAMOYO.**

Nakala kwa:- Mkuu wa Wilaya  
S.L.P. 54  
**BAGAMOYO.** - Kwa taarifa.

" " Mamba Cement Co. Ltd  
S.L.P. 3030  
**DAR ES SALAAM.**



Mamba Cement  
Company Limited

Date: 02-12-2015

Ref: MHL/M.10/4446

The Secretary,  
National Investment Steering Committee,  
Dar es Salaam, Tanzania



**Sub: Progress Report on the Project.**

Dear Sir,

This refers to the performance contract agreed between Government of Tanzania, represented Tanzania Investment Centre (TIC) and Mamba Cement Company Limited (MCCL) on 15th April 2014, awarding project the status of strategic investor.

Since the time of signing the performance contract, the project has made substantial progress towards smooth and successful implementation. A report detailing the progress is enclosed with this letter.

For your immediate reference following are the key progresses made:

- Compensation for the land acquisition paid as per the law and the records submitted to authorities. project now awaits the title transfer.
- Standard Chartered Bank has been appointed as the advisor bank for debt raising.
- The process of due diligence from the lenders side initiated and in progress.
- The execution of project changed to turnkey EPC mode.
- Project has received the Environmental clearance certificate.
- JORC competent limestone reserve statement and mining plan prepared through Morgan World Wide, USA
- Route survey completed for providing connectivity to the nearest Bagamoyo-Msata highway.
- Hydro-geological study completed to prove availability of ground water.
- Market study report prepared to understand the future growth of cement market.
- MCCL has signed MoU for turnkey execution of cement and power plant with reputed contractors. (CNBM & FLS for cement plant and ISGEC for power plant)
- Planning for sourcing of manpower completed.



A Division of **motisun** GROUP

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[www.mambacement.co.tz](http://www.mambacement.co.tz)

# **PROGRESS REPORT**

## **1.0 MTPA (3000 TPD) GREENFIELD CEMENT PLANT AT BAGAMOYO, TANZANIA**



**Being Presented  
to  
The Secretary**

**National Investment Steering Committee**



**MAMBA CEMENT COMPANY LIMITED**



## **INTRODUCTION**

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### **➤ The Project**

Installation of a 1.0 mio tpa clinker/ 1.14 mio tpa cement Greenfield cement plant along with 30 MW captive power plant at Tarawanda village in the Bagamoyo district. The cement project will produce about 82% PLC (Portland Limestone Cement) and 18% OPC (Ordinary Portland Cement).

The note in hand details out the progress made by Mamba Cement Company Limited (MCCL) in the project implementation since the performance contract was signed on 15<sup>th</sup> April 2014 with Government of Tanzania represented by Tanzania Investment Centre (TIC).

### **➤ Promoter's Background**

Mamba Cement Company Limited (MCCL), promoted by the holding company, Motisun Holdings Limited, a diversified Group engaged in the manufacture of various industrial products in Tanzania.

#### **The Main Promoters of the Project are:**

- **Espirit Developers - 90%**
- **Mr. Subhash Patel - 5%**
- **Mr. Girdharbhai M Pindolia - 5%**

In addition to the above promoters, in future other promoters may also join for equity participation.

## MARKET SCENARIO FOR THE PROJECT

The cement consumption in Tanzania increased by around 12% pa in the past 10 years to reach 4.12 mio t in 2014 from around 1.40 mio t in 2004. The major driver of cement consumption has been the construction of residential and commercial housing.

There are 5 major plants in Tanzania holding around 90% of the capacity share. The other notable players include Camel Cement, Fortune Cement, Lee Building Resources, Arusha Cement and Kesarave Cement. Currently, the total effective capacity of all cement plants is around 5.0 mio tpa. The current cement capacity of the plants is given below.

*Figures in mio tpa*

Sn	Company and Plant Location	Effective Cement Capacity
1	Tanzania Portland Cement Company (TPCC)	2.00
2	Tanga Cement Company (TCC)	1.10
3	Mbeya Cement Company (MCC)	0.35
4	ARM Cement (GU)	0.70
5	Lake Cement	0.50
6	ARM Cement	_*
7	Amson Industries (T) Ltd. (GU)	0.18
8	Fortune Cement (GU)	0.15
8	Lee Building Resources (GU)	0.15
9	Kesarave Cement (GU)	0.10
10	Arusha Cement (GU)	0.10
<b>Total</b>		<b>5.33</b>

\* Only clinkerisation – with a capacity of 1.5 mio tpa

GU – Grinding Unit

Table below gives the future cement demand estimates for Tanzania.

Year	Demand ( mio t)
2015	4.61
2016	5.16
2017	5.77
2018	6.46
2019	7.24
2020	8.10
2021	9.07
2022	10.15

### **Strategic Advantages of Mamba Cement**

- Group run by professionals, trained and experienced in every field of business.
- Vast experience of Promoters in operating ventures in Tanzania in diverse industries for many years.
- The promoters of the project have established market in building materials and can extend the existing infrastructure for marketing of cement
- Plant will be located close to the two large ports in the country viz. Dar-es-Salam and Bagamoyo (proposed).
- Tanzania is poised for rapid economic growth, with ever increasing need of cement
- Many infrastructure projects viz. airports, sea ports, roads, housing, water works etc. planned with World Bank funds shall create demand for cement. This additional demand will have to be complimented through increased cement production within Tanzania.
- Increase in cement production will enable avenues for more exports to neighboring cement deficit countries, thereby earning of foreign exchange for the country.



## **1.0 MTPA (3,000 TPD ) Cement Plant at Bagamoyo, Tanzania Mamba Cement Company Limited**

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- The project is strategically located close to the major market consumption centre i.e. Dar es Salaam. The project will also cater to other markets, ensuring economical availability particularly in the central part of Tanzania.
- The project will have state of art machineries and equipments with aim to lower the cost of production by high capacity utilization, reducing down time, saving in energy consumption, minimizing maintenance cost etc.
- Assured off take of around 20% of the cement production by Estim Constructions, one of the largest construction company in Tanzania.
- Captive limestone mines with adequate quality and quantity of proven reserves.
- Strong possibilities of utilizing quality coal from group coal mines.
- Modern plant with state of the art technology.
- Captive Power Plant ensuring uninterrupted power supply.
- Plant operation through highly experienced operators and managers.

### **RAW MATERIALS**

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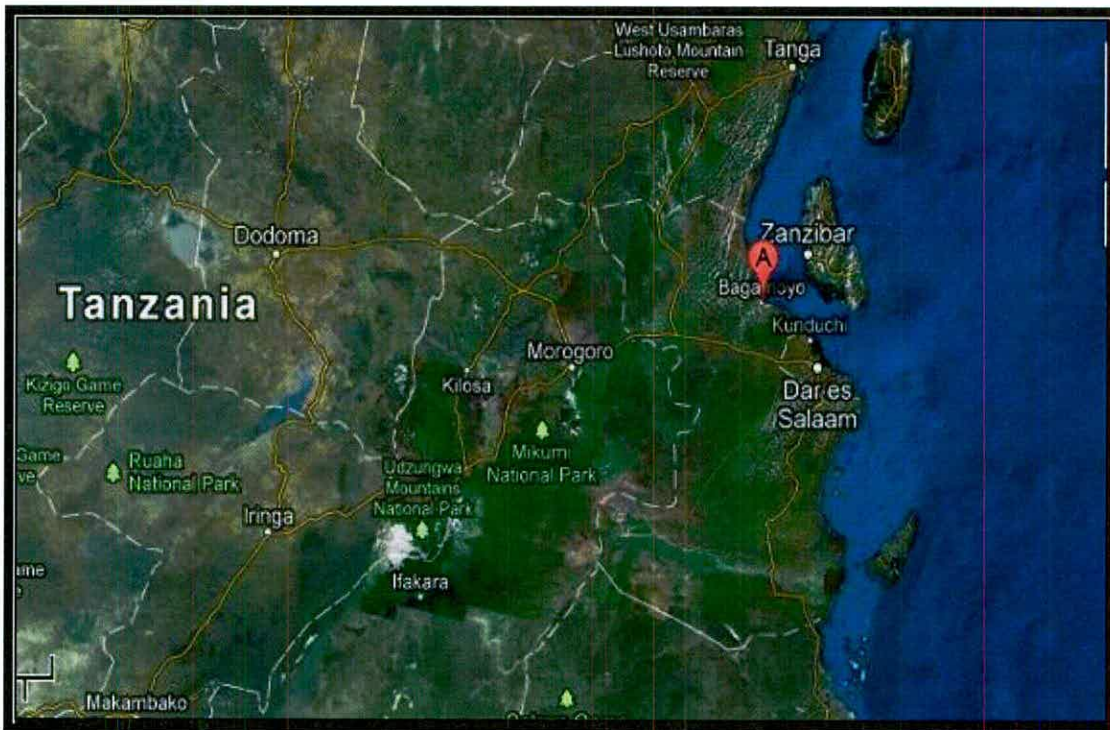
The Tarawanda Limestone deposit area has been acquired by M/s Mamba Cement Co Ltd (MCCL), at Tarawanda in north-eastern Coastal district Bagamoyo. MCCL obtained Mineral Prospecting Rights under the Mining Act 1998 of Tanzanian Government (ML 423/ 2007) for about 18.48 Sq Kms.

The Tarawanda Limestone deposit area is located at about 4 Km south- southeast of Tarawanda village and about 110 kms from Tanzania's capital Dar- es- Salaam. The motorway connects Dar-es Salaam – Chellinze (on Northern Highway going towards Arusha) – Bagamoyo to Tarawanda – with a 22 Kms long gravel road in the north.

MCCL has five mining leases, ML/ 420, 421, 422, 423 & 424. MCCL has completed detailed geological studies for the area (ML/ 423), which forms a part of the Tanzanian Survey Sheet No- 185/1 (Scale 1: 50,000)

The proposed Limestone area is a gentle rolling parallel north-south trending low height ridges (Creeks) of Middle Jurassic to Lower Cretaceous age shallow water coralline deposit in this valley.

The Limestone is calcretic, fine grained and micro- crystalline in appearance.



**Fig1: Project Location**

## ➤ **Limestone**

Promoters have taken mining license for about 21 sq km area. The area will have the limestone along with the proposed cement plant and captive power plant.

Limestone is the primary raw material required for production of cement. About 90 - 95 % limestone as raw material will be required to produce quality cement. Promoters have

conducted the detailed geological explorations to ensure the qualitative and quantitative reserves. This exploration has been done by drilling about 65 bore holes. Based on the geological exploration limestone deposits of about 160 mio tonnes have been estimated. This reserve estimate has also been validated by JORC certified independent agency, PB World U.K.

Mining operations shall be carried out by mechanized open cast method utilizing Heavy Earth moving equipment in conjunction with loading and transportation arrangement . To start with the production in the existing mining blocks, slices / benches shall be kept long. To the extent possible, benches shall be kept along dip and advanced along the strike to give a fairly well blended material in each slice. The direction may be varied in due course based on experience gained, to give wider working periphery, longer faces and proper alignment along haul roads.

#### **Progress on limestone deposit evaluation:**

A Jorc competent reserve statement for the limestone deposit and the mining plan has been prepared by Morgan World Wide, USA (MWW)

MWW has divided the entire block of ML/ 423 in 17 pits and has subjectively categorized the limestone into range of grades, A, B, C, and D, with 37% as being the cutoff between ore and waste (grade D). The resultant grade of A-C (eg. ore) achieved is 44.7% CaO and 14.4% SiO<sub>2</sub>. Therefore a SiO<sub>2</sub> separator at 18% was added to separate this material into two additional categories for each grade. Only grade B had significant quantities of high and low SiO<sub>2</sub> to report both as grades B1 and B2 separately, and it was determined that grade C material with 37-40% CaO had higher than desirable SiO<sub>2</sub> levels. The result of increasing the CaO cutoff yielded an ore grade of 45.9% CaO and 12.9% SiO<sub>2</sub>, which meets the desired quality for the ore. Therefore, the desired and selected cutoff grade for limestone is 40% CaO.

S. No	Grade	CaO	SiO <sub>2</sub>
1.	Grade A	> 45%	Average Less than 18%
2.	Grade B1	40 – 45%	<18%
3.	Grade B2	40 – 45%	>18%
4.	Grade C	37 – 45%	Average More than18%
5.	Grade D	< 37%	Average More than18%

Source: Resource & Reserve Statement for the Talawanda Limestone Deposit submitted by MORGAN WORLDWIDE dated 06 June 2014

The following average blended requirements have been considered for limestone:

- Minimum average CaO of 43%.
- Maximum SiO<sub>2</sub> content of 13%.

Provided that CaO and SiO<sub>2</sub> criteria are met, clay, iron ore, bauxite will be mixed with limestone to produce:

- ✓ Lime Saturation Factor (LSF) of 100% for the mix.
- ✓ Alite (C3S) of 55 for the resultant clinker, basis the standard Bogue equation

Limestone grade control is achieved by blending of various pits. The geologic model indicates a higher SiO<sub>2</sub> content in limestone from pits 11 through 17, and it is desirable to blend some of this material with lower SiO<sub>2</sub> material from pits 1 through 10. The average quality of expected limestone to meet the parameters defined for clinker production is as follows:

Parameter	CaO	SiO <sub>2</sub>	Al <sub>2</sub> O <sub>3</sub>	Fe <sub>2</sub> O <sub>3</sub>	MgO	TiO <sub>2</sub>	LSF	MS	MA
Volume Weighted Average	45.92%	12.83%	1.72%	0.79%	0.56%	0.11%	119.4%	5.11%	2.16%

Source: Resource & Reserve Statement for the Talawanda Limestone Deposit submitted by MORGAN WORLDWIDE dated 06 June 2014

## ESTIMATED RESERVES

The calculated proven reserves as per MWW indicates the life of the mine as approximately 37 years worth of production at 80% recovery for a cement plant that can process 1.6-million tonnes per year. Additional reserves in the area are being explored and this may increase the expected life of mine.

## THEORETICAL RAW MIX CONSIDERATIONS

Based on the average composition of raw material and coal, the raw mix for fifteen (15) years and the Quarterly Raw mix for two years has been worked out. Based on the working MWW has proposed to use grade D waste material (calcareous mudstone) as an alternative to importing clay. The raw mix has been worked out considering fuel from South Africa and Tanzania. The raw mix ensure manufacturing quality clinker as per international standard.

The theoretical calculation for the raw mix for the cement plant works out as follows:

S.No	Description	Composition
1.	Limestone	95.86%
2.	Bauxite	2.64%
3.	Iron Ore	1.50%

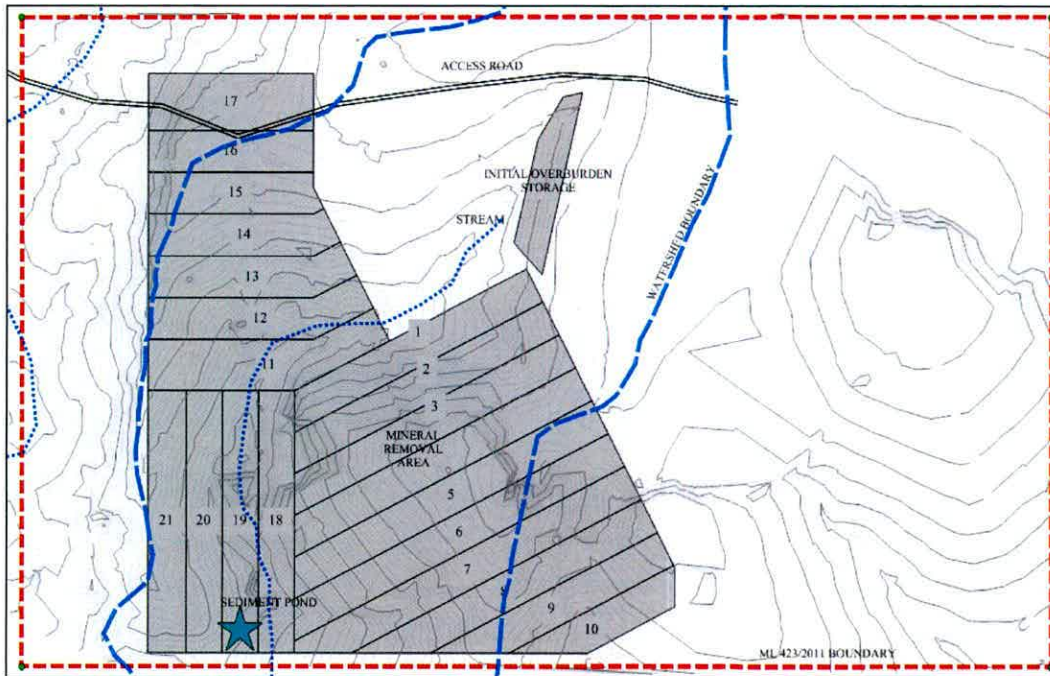
*Theoretical Raw mix*

## CLINKERISATION FACTOR

The average clinkerisation factor for fifteen (15) years works out to 1.54.

## MINE DEVELOPMENT

Strip mining as the proposed mining method shall be utilized for exploiting limestone. Proposed mine pits, in accordance with a proposed strip mining method, is presented below:



**Proposed Mine Pits**

*Source: Resource & Reserve Statement for the Talawanda Limestone Deposit submitted by MORGAN WORLDWIDE dated 06 June 2014.*

Mining is proposed to begin from Pit 1 and progress southeast. The limestone crusher is proposed to be placed on the west edge of Pit 11 or Pit 12, depending on the final alignment of the overland conveyor for transporting crushed limestone to cement plant. Limestone grade control is achieved by blending the limestone mined from Pits 1 through 10 with the limestone of high silica content mined from pits 11 through 17.

**Infrastructure**

➤ **Land**

The land area for the cement plant including the captive power plant shall be about 100 ha (1 sq km). The land towards the western part within the mining license area shall be utilised for the cement plant. The area for the cement is undulated and would require cutting and filling in order to provide a workable gradient for plant construction.

### **Progress on Land:**

MCCL has acquired the land for the entire mining license area. The compensation to the villagers have been paid suitably and the records for the compensation paid have been shared with the respective government authorities. Presently title transfer is in process and is envisaged to be achieved in coming 2 to 3 months.

### **➤ Power**

The power requirement for the cement plant has been estimated to be about 22 MW. The power requirement shall be met by installing a Captive Power Plant. The capacity of power plant was previously selected as 25 MW but now the capacity has been increased to 30 MW considering the future expansions. The power generated shall meet the requirements of cement plant and the residential colony. The power plant shall have two AFBC (Atmospheric air Fluidized Bed Combustion) boilers and one turbo generator. The captive power plant shall ensure availability power for the consistent operation of cement plant and also shall avoid dependence on the National Grid. The technology selected for power plant is an state of the art installation with emission levels well within the international standards.

### **Progress on Power:**

MCCL has negotiated and entered into a MOU with ISGEC, India a reputed power plant contractor. The power plant would be executed in a turnkey EPC mode thus ensuring quality and timely execution of the project. ISGEC has immense experience in thermal power plants and also have good presence in African continent. Presently the work on contract preparation is going under the legal guidance and is envisaged that the contract will be signed by March 2016. ISGEC has guaranteed a execution time of 23 months from the date of contract effectiveness.

## ➤ **Water**

The estimated requirement of water (including process and drinking water) for the cement and power plant will be about 4000 m<sup>3</sup>/day. The possible sources of water can be underground water through bore holes, pipe line from public water supply system or from a nearby stream, after constructing a check dam in the said location. No ground water is available from the mines. The technology of the plant is such selected that there shall be minimum wastage and all of the cooling water shall be recycled. The major water consumption shall be in the grinding process of cement plant and steam generation for power plant. The plant will be equipped with the water treatment system to ensure quality water is available to people for drinking and for the process.

The project has identified three potential source for meeting the water requirement.

- Underground water
- Water from seasonal Mkombezi River
- Water from Wami pipe line

### **Progress on Water:**

Detailed hydro geological study has been completed in the area. Study was conducted by doing pump test by drilling 4 bore wells. It has been reported that there exist is big aquafire in the area and the requirement of water for the project can be met through that. The project has considered drilling of bore holes for recharging the ground water to charge the aquafire. As an alternate source, permission for sourcing water through the wami pipeline has also been achieved. The necessary connection to the pipeline would be done as the plant nears completion.

## ➤ **Roads**

The project site at village Tarawanda is situated about 110 km from Dar-es-Salaam. The site can be reached by travelling about 20km from village Kiwangwa on Bagamoyo - Tanga highway.

The project site from the highway is a single track gravel road and is not suitable for machinery and material transport.

### **Progress on Road:**

The initial survey of the road has been made and estimations received for widening and leveling the same. The work on road paving would start after the heavy rain period of 2016.

## ➤ **Residential Colony**

The project will employ more than 300 people to ensure consistent operation and availability of plant. Project plans to construct residential colony closer to the plant to provide housing for most of these employees. The colony shall be equipped with all the basic amenities like school, market, play ground, dispensary etc.

### **Progress on Residential Colony:**

The planning for the residential colony has been completed. The area shall have houses for the employees along with the essential infrastructure such as schools, dispensary, shopping area, area for worship, play ground etc. The colony has been planned to be located in the south of plant to avoid any disturbance from the plant operations. The

construction of colony would be by the promoters of MCCL and would start after the rainy month in 2016.

## **PROJECT TECHNICAL**

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### **Progress:**

MCCL has negotiated and entered into a MOU with CNBM, China (as lead contractor with FLS, India as main technology provider) and ISGEC, India both reputed cement plant and power plant contractor respectively. Both the plants would be executed in a turnkey EPC mode thus ensuring quality and timely execution of the project. Presently the work on contract preparation is going under the legal guidance and is envisaged that the contract will be signed by March 2016. CNBM and ISGEC have guaranteed a execution time of 29 months and 23 months respectively from the date of contract effectiveness.

The agreed technical details are as follows:

### **Cement Plant**

Clinker is produced using state of art dry process technology complying to EN 197-1 standards with limestone as the main raw material and coal as the primary fuel. Ordinary Portland Cement (OPC) is produced by grinding of cement clinker along with gypsum while Portland Limestone Cement (PLC) is manufactured by addition of limestone to cement clinker and gypsum. The key technical parameters considered for the cement plant are furnished below:

### **Storage Capacities**

The storages capacities considered for various raw materials and finish materials are as follows:

S. No	Description	Unit	Specification
<b>STOCKPILES</b>			
1.	Limestone	MT	2 x 24,000
2.	HG Limestone	MT	1 x 3,000
3.	Bauxite	MT	1 x 7,000
4.	Iron Ore	MT	1 x 3,500
5.	Gypsum	MT	1 x 8,000
6.	Limestone (for PLC)	MT	1 x 7,000
<b>STORAGE HOPPERS</b>			
1.	Surge bin for Limestone	MT	1 x 500
2.	Limestone	MT	2 x 250
3.	Bauxite	MT	1 x 100
4.	Iron Ore	MT	1 x 100
5.	Fourth Corrective	MT	1 x 60
6.	Raw Coal	MT	2 x 100
7.	Kiln feed Bin	MT	1 x 100
8.	Clinker	MT	2 x 250
9.	Limestone	MT	1 x 125
10.	Gypsum	MT	1 x 125
11.	Fly ash	MT	1 x 75
<b>STORAGE SILOS</b>			
1.	Blending Silo	MT	1 x 10,000
2.	Fine Coal Silo	MT	2 x 75
3.	Clinker Silo	MT	1 x 30,000
4.	Off-spec Silo	MT	1 x 1,000
5.	Cement Silo	MT	3 x 6,000
6.	Hot Dust Bin	MT	1 x 200

*Storage Capacities*

## Equipment Capacities

The capacities of major process equipments considered are as follows:

S. No	Description	Unit	Specification
	<b><u>Crushing and Material Handling</u></b>		
1.	Limestone Crusher	tph	800
2.	Over Land Belt Conveyor	tph	1000
3.	Additive Crusher	tph	350
4.	Limestone Stacker	tph	1000
5.	Limestone Reclaimer	tph	350
6.	Corrective Stacker	tph	450
7.	Coal Stacker	tph	250
8.	Coal Side Scrapper	tph	2 x 100
	<b><u>Raw material Grinding</u></b>		
1.	Vertical Mill for Raw materials	tph	275
2.	Hot Air Generator	MW	13.5
	<b><u>Coal Grinding</u></b>		
1.	Vertical Mill for Coal	tph	25
	<b><u>Pyro-processing</u></b>		
1.	Silo Feeding Elevator	tph	350
2.	Preheater Feeding Elevator	tph	250
3.	Preheater	tpd	3000
4.	Rotary Kiln	tpd	3000
5.	Clinker Cooler	tpd	3000
6.	Clinker Pan Conveyor	tph	250
	<b><u>Clinker Grinding</u></b>		
7.	Cement Grinding (RP+Ball mill)	tph	225 (PLC @ 3500Blaine)
	<b><u>Cement Packing and Despatch</u></b>		
1.	Rotary Packer Machines	tph	2 x 150

S. No	Description	Unit	Specification
2.	Truck Loading Machines	Bags/h	6 x 2400
3.	Bulk Loading	tph	1 x 150
	<b><u>Compressed Air System</u></b>		
1.	Compressor Air stations A	m <sup>3</sup> /hr	450
2.	Compressor Air Station B	m <sup>3</sup> /hr	4 x 2160
3.	Compressor Air Station C	m <sup>3</sup> /hr	2 x 2160
4.	Emergency Compressor for Kiln area	m <sup>3</sup> /hr	180
	<b><u>Water System</u></b>		
1.	Water Treatment Plant	m <sup>3</sup> /day	1500
2.	Raw Water Storage Tank	m <sup>3</sup>	2 x 3000
3.	Filtered / Treated Water Tank	m <sup>3</sup>	1000 / 2000
4.	Circulation / Process Water Tank	m <sup>3</sup>	2 x 500 / 500
5.	Cooling Tower	m <sup>3</sup> /hr	2 x 100
	<b><u>Weigh bridges</u></b>		
1.	For Material (In/Out)	MT	120 (pitless)
2.	For Bulk loading	MT	80 (pitless)
	<b><u>Sewage Treatment Plant</u></b>		
1.	Capacity	m <sup>3</sup> /day	500

*Equipment Capacities*

**Power Plant**

The proposed coal based power plant has been designed in conformity with modern concept in power plant engineering consistent with reliability and economy in operation and maintenance, for uninterrupted supply of steam to turbine and continuous generation of power. A non-reheat steam cycle with regenerative feed heating system is considered. Main steam from the Atmospheric Fluidised Bed Combustion boiler (Bubbling bed), after expansion through turbine, is exhausted and cooled in the air-cooled condenser.

The feed heating system consists of one (1) H.P. heater, one (1) deaerator and one (1) L.P. heater. The condensate from the condenser return tank is drawn by condensate extraction pump (2 x 100% capacity) and pumped to the Deaerator via ejector condenser and LP heater. The feed water after being deaerated in the deaerator is drawn by three (3) nos. (3 x 100%) boiler feed pump and pumped to boiler at economiser inlet. The H.P. and L.P. steam systems will supply steam to the deaerator, turbine gland sealing system and the hogging air ejector. Pressure Reducing and Desuperheating Stations (PRDS) is considered to supply pegging steam to deaerator. The PRDS is designed for offline and online steam dumping.

The key technical parameters considered for the power plant are furnished below:

S. No	Description	Unit	Specification
<b>A</b>	<b>POWER GENERATION</b>		
1.	Gross Power Generation	MW	30
2.	Voltage	kV	11±10%
3.	Frequency	Hz	50±5%
<b>B</b>	<b>PROPOSED TECHNICAL SPECIFICATIONS</b>		
<b>a)</b>	<b><u>Steam Generator</u></b>		
1.	The Net Capacity of each Boiler to Meet the Steam Demand at MCR (Maximum Continuous Rating)	tph	2 x 70
2.	The Steam Pressure at the Main Steam Stop Valve Outlet from Minimum Load up to MCR	ata	88
3.	The Steam Temperature at the Main Steam Stop Valve Outlet at MCR	deg C	515±5
4.	Fuel Feeding System		Underbed and Overbed Feeding System
5.	Fuel used for Boiler Start-Up from Cold.		100% High Speed Diesel (HSD)
6.	Configuration of Forced Draft Fans (FD) / Drive	No's	1 x 100% Per Boiler with Variable Frequency Drive

S. No	Description	Unit	Specification
			(VFD)
7.	Configuration of Primary Air Fans (PA) / Drive	No's	1 x 100% Per Boiler with Fixed Drive
8.	Configuration of Induced Draft Fan (ID) / Drive	No's	1 x 100% Per Boiler with VFD
9.	Configuration of Boiler Feed Pump Common	No's	3 x 100% (2W + 1S) Common for both the boilers
10.	Capacity of Boiler Feed Pump		110% of BMCR / VFD
11.	Coal Bunker Storage Capacity Considering Worst Grade Coal for Each Boiler	hrs	24 hours of Coal Consumption per Boiler
12.	Limestone Bunker Storage Capacity for Each Boiler Considering Firing of 100% Worst Grade Coal	hrs	16 hours of Limestone Consumption per Boiler
<b>b)</b>	<b><u>Steam Turbine Generator</u></b>		
1.	Type		Bleed cum Condensing Type
2.	No of Extractions/ Bleed	nos	3
3.	Gross Power at Generator Terminal	MW	30
4.	VWO Margin over Turbine Maximum Continuous Rating	%	5
5.	Deaerator Type		Spray Cum Tray Type
6.	Deaerator Storage Capacity	mins	10 (TGVWO+10% Margin)
7.	Number of Low Pressure Heaters		1
8.	Dumping System		
	-Online		8 MW Load Throw Off Condition
	-Offline		Designed to Suit Cold, Warm and Hot Start Up
9.	Governor Type		Electro Hydraulic Governing System
<b>c)</b>	<b><u>Air Cooled Condenser</u></b>		
1.	Design Ambient Temperature	deg C	35
2.	Condensing Pressure	ata	0.17 ata at TGVWO condition

S. No	Description	Unit	Specification
			+10% heat load margin
3.	Condensate Extraction Pumps		2 x 100%, VFD
4.	Condensate Storage Tank Capacity	mins	20 (TGVWO)
5.	Emergency Condensate Storage Tank	m <sup>3</sup>	120
<b>d)</b>	<b><u>Electrostatic Precipitator</u></b>		
1.	Maximum Dust Content at Outlet with all Fields in Working Condition	mg/Nm <sup>3</sup>	≤ 30
<b>e)</b>	<b><u>Chimney</u></b>		
1.	Quantity	nos	1
2.	Height of Chimney	m	75
3.	Chimney Construction		Mild Steel, Self Supported
<b>f)</b>	<b><u>Fuel Handling System</u></b>		
1.	System Proposed		
	Belt Conveyors from the Tapping Point upto Bunker		1 x 100%
	Crusher and Screens		2 x 100% (1W + 1S)
2.	Total System Throughput Capacity	tph	100
3.	Crusher Type		Impactor
<b>g)</b>	<b><u>Limestone Handling System</u></b>		
1.	System Proposed		1 x 100%
2.	Total System Throughput Capacity	tph	20 (Rated)
3.	Crusher Type		Impactor
<b>h)</b>	<b><u>Ash Handling</u></b>		
1.	Fly Ash Silo Capacity	m <sup>3</sup>	450
2.	Bed Ash Silo Capacity	m <sup>3</sup>	150
<b>i)</b>	<b><u>Water Treatment Plant</u></b>		
1.	Capacity of RO Plant	m <sup>3</sup> /h	2 x 20 (1W + 1S)
2.	Capacity of DM Plant	m <sup>3</sup> /h	2 x 5 (1W + 1S)
<b>j)</b>	<b><u>Auxiliary Cooling Tower (ACW)</u></b>		
1.	Type		Counter Flow Induced Draft

S. No	Description	Unit	Specification
2.	No of Cells		3 (2W+1S)
3.	Capacity	m <sup>3</sup> /hr	3 x 225
<b>k)</b>	<b><u>Fuel Oil Storage and Handling</u></b>		
1.	Diesel Oil Tank	m <sup>3</sup>	1 x 1000
2.	Unloading pumps		2 x 100% (1W + 1S)

*Power plant key technical parameters*

### ➤ **Quality control**

Facilities for chemical and physical analysis of raw material, fuel, clinker and cement will be part of the EPC contract.

The chemistry of the raw materials shall be analyzed by passing it through a PGNAA analyzer located on the raw material transport belt from crusher to stockpile.

The quality control concept includes all sampling stations and a fully equipped chemical and physical laboratory (main laboratory for analytical and physical testing and shift laboratory). The laboratory shall be equipped with all the quality control equipment including the apparatus, instruments, glassware and the required chemicals.

### ➤ **Environmental Protection**

#### **Major Emissions:**

Efficient dedusting and monitoring of dust sources like kiln exhaust gases, clinker cooler vent air; cement mill, power plant etc. have been considered. Baghouse type filters have been considered for the kiln, raw mill, cement mills and ESP for clinker cooler and power plant.

### **Smaller emissions:**

To minimize the dust emissions during operation of the plant, sufficient number of standardized dust filters (nuisance filters) of the fabric type have been considered at:

- Material transport transfer points
- Hoppers, bins and silos
- Dust generating machinery viz. crushers, loading equipment, packing, conveyors etc.

### **Gaseous Emissions and Control**

The proposed kiln system shall be designed with emphasis to minimize emissions to the atmosphere and for compliance with local environmental criteria and international standards for gaseous emissions. Modern technology burners, dosing systems (fuel and kiln feed), emissions monitoring and kiln control systems have been considered to minimize gaseous emissions from combustion processes (e.g. NO<sub>x</sub>, CO, SO<sub>2</sub>).

### **Noise Emissions**

All equipment considered in technical concept shall be designed to operate within the prescribed noise levels as defined by relevant standards. Where necessary special sound enclosures will be provided or the buildings will be designed with noise protection.

### **Sewage and Effluent Treatment**

Both sewage grade water and effluent (e.g. from water cooling system) shall be collected and treated. A sewage treatment plant is part of the contract in order to provide appropriate facilities for the collection and disposal of sewage from the plant (industrial sewage) as well as for the domestic sewage.

The treated water quality will be such to allow for its re-use in the clinker production process (water injection).

## **Site Drainage**

An efficient drainage system will collect rainwater. Water drainage channels, sufficiently dimensioned for anticipated heavy rainfall, have been considered around the proposed plant perimeter to eliminate the possibility of flooding of the site. The collected rain water will be diverted to the seasonal Mkombezi river.

## **Roads**

All roads and paved places planned for traffic movement within the proposed plant will have the tarred surface in order to reduce dust generation and protect the roads against damage.

## **Solid Waste Disposal**

The plant will have provision for collection and disposal of solid wastes i.e. used bricks etc.

## **HUMAN RESOURCES**

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### **Progress:**

The organization structure varies from plant to plant within the Industry. Keeping in view the specific requirements for this project, the following strategy has been considered with respect to headcount:

- Project Execution Team (PMT) – Required to carry out the project activities till commissioning and handover of plant.
- Plant Operations & Maintenance Team (OMT) – Required during the commissioning / handover of plant and is responsible for effective operation of plant after handover.

The total manpower requirement during project phase both cement and power plant shall be 27 (Local – 4 nos, Expat 23 nos).

MCCL has developed a working level multidisciplinary team for the project consisting of financial, technical, geological, construction and project management experts. This team is being supported by the external expert agencies. The working team would be further strengthened as the project progresses toward contract effectiveness.

The total manpower estimated requirement during operation phase shall be as listed below:

S.No	Department	Manpower Requirement	
		Expat	Local
1.	Plant Head	1	
2.	Mines Department	7	60
3.	Technical Department	55	76
4.	Commercial Department	11	28
5.	Marketing Department	4	9
6.	Power plant	30	41
	<b>TOTAL</b>	<b>108</b>	<b>214</b>

*Manpower requirement – Plant operations*

The above requirement of manpower both for project and operation management will be fulfilled utilising the local skill to the extent possible and the expats will be recruited for key skills.

MCCL has worked out the entire recruitment process and have detailed out the month wise recruitment plan. MCCL shall be taking the services of local placement consultant for recruiting the maximum possible skilled manpower available locally. In the EPC contract MCCL has made provisions for the training of its manpower with a view to enhance the local skill set and reduce its dependency of expatriates



## 1.0 MTPA (3,000 TPD) Cement Plant at Bagamoyo, Tanzania Mamba Cement Company Limited

In addition to the above mentioned direct requirement of manpower, the project will generate ample job opportunities and small scale businesses to support the operations. This will lead to indirect employment of about 1,000 people. These indirect employment can be in various skilled and unskilled professions such as drivers, small manufacturing units, teachers, small shop keepers, security personnel etc.

### PROJECT FINANCIALS

#### Progress:

MCCL has appointed Standard Chartered Bank (SCB) as the advisory bank for the project finance requirement. SCB is working on the financial model and are also performing their due diligence on the project. The process of due diligence and financial model preparation is expected to be completed by January and subsequent to that SCB would approach the lenders for project debt raising.

#### ➤ Investment Cost

Based on the two major MOU signed for the turnkey EPC execution of cement and power plant the total investment cost for the project now works out to about USD 288 million. The estimated investment cost for the project has been based on the requirement of fixed and non-fixed assets to meet the prescribed requirements. The total project investment cost is summarized in Table below:

Sn.	Particulars	Estimated Cost In Mio.USD
1.0	Land	15.00
2.0	Site & Mines Development	23.51
3.0	Building and Other Civil Structures	56.16

Sn.	Particulars	Estimated Cost In Mio.USD
4.0	Plant and Machinery	146.48
5.0	Technical Know How Fees	3.20
6.0	Miscellaneous Fixed Assets	6.20
7.0	Pre-Operative Expenses	24.12
8.0	Provision of Contingency	12.93
9.0	Margin Money for Working Capital	0.48
	<b>TOTAL</b>	<b>288.08</b>

The financing of the project based on has been considered as Equity and Term Loans from Financial Institutions. The debt-equity ratio has been considered as 1.857: 1 Interest on Term Loan has been considered as 6 % assumed to be repaid over 10 years from start of commercial production with a moratorium period of 36 months, which includes the construction period also.

Sources of Funds		
1	Debt	187.24
2	Equity	100.82
	<b>TOTAL</b>	<b>288.08</b>



0222581

THE UNITED REPUBLIC OF TANZANIA

# Certificate of Incentives

(Section 17 of the Tanzania Investment Act, 1997)

THIS CERTIFICATE REPLACES

AMENDMENT ON SECTION 10 & 11

THE PREVIOUS ONE No.

HAS BEEN EFFECTED

042496 ISSUED ON

No: ...042496.....

17/07/2013 *W. J. M. Mwakilima*

## This is to certify that

MAMBA CEMENT COMPANY LIMITED

of address..... P.O.Box 3030

DAR ES SALAAM

has been granted a Certificate of Incentives to invest in a new, ~~rehabilitation~~ ~~expansion~~ ~~or equity~~ of the enterprise known as

MAMBA CEMENT COMPANY LIMITED

Which is located at ..... TALAWANDA & MAGULUMATALI VILLAGE

BAGAMOYO - COAST (PWANI)

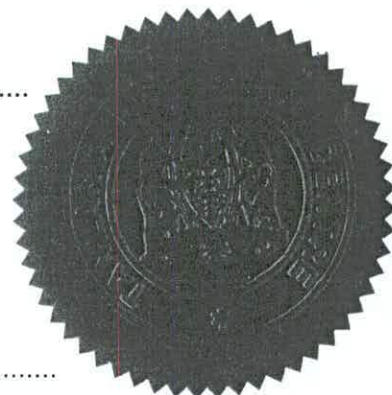
Further particulars required by Section 17 of the Tanzania Investment Act are set out overleaf.

*W. J. M. Mwakilima*  
.....  
Ag Executive Director

Tanzania Investment Centre  
P.O.Box 938, Dar es Salaam

18 JULY 2016

Dated .....



This Certificate is issued in accordance with the provisions of Section 17 of the Tanzania Investment Act, 1997 and subject to the conditions prescribed under item 14 and 15 hereafter:-

1. Shareholders
 

	Nationality	Shareholding (%)
Girdharbhai M. Patel	Tanzanian	5
Subbash M. Patel	Tanzanian	5
Esprit Developers Ltd.	Tanzanian	90
2. Proposed Activities: To Establish and Operate a Plant to Manufacture Cement
3. Sector: Manufacturing Subsector: Cement Production
4. Investment cost: Foreign - Local USD 195m. Total USD 195m.
5. Project Financing:
 

Equity USD 65m.	Loans USD 130m.	Total USD 195m.
-----------------	-----------------	-----------------
6. Source, terms and conditions of loan.....
7. Assets to be invested:
 

Capital items:	Foreign	Local	Total
	-	USD 195m.	USD 195m.
8. Technology Agreement None
9. Date of TIC Registration: 17th July 2013
10. Implementation period July 2013 - June 2017
11. Operative date July 2017
12. Investment Incentive Grade: As defined in part III Section 19(1), (2) and Section 20 of the Tanzania Investment Act, 1997
  - (i) Applicable Import Duty And VAT as per Customs tariff Act, 1976 & VAT Act, 2014
  - (ii) Applicable with-holding Tax As per Income Tax Act, 2004 (as amended)
  - (iii) Eligibility of Capital Allowances AS per Income Tax Act, 2004 (as amended)
13. Protection of Investment, Arbitration and Transfer of Foreign Currency: as defined in part III Section 21, 22 and 23 of the Act.
14. Conditions attached to this Certificate of Incentives
  - (i) Date of Commencement of investment has to be notified to the Centre.
  - (ii) Certificate not to be transferred, assigned or amended
  - (iii) Failure to commence implementation within two years invalidates Certificate
  - (iv) Failure to operate investment must be notified to the Centre
  - (v) Changes in shareholding, project activities and level of invested capital must be notified to the Centre
15. Additional conditions attached to Certificate
 

Finished Goods are not allowed under this Certificate

Signed   
Executive Director

Unclaimed refund beyond three years will be forfeited



# TANZANIA INVESTMENT CENTRE

Shaaban Robert Street, P.O. Box 938, Dar-Es-Salaam, Tel: +255 22 2116328-31, Fax: +255 22 2118253

RECEIPT REC026050

No. 019347

*For Executive Director  
Tanzania Investment Centre*

Received from: **M/ BACEMENT CO. LTD**

Address: **P. O. Box 3000 BACAMOYO**

Received the sum of (In words): **ONE THOUSAND AND ZERO CENTS ONLY**

Being payment in respect of: **CERTIFICATE OF INCENTIVES**

Amount: **USD 1,000.00**

Cash / Cheque No: **D/Deposit 22/06**  
22-Jun-2016

Date:

*For Executive Director*  
**BUSISO**

Receiving Officer



(10)

**PROJECT FOR EXTENSION OF  
IMPLEMENTATION PERIOD**

Name of the Project: MAMBA CEMENT COMPANY LTD

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Project Description: Certificate No: 042496

To establish cement manufacturing plant

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Approval Date: 17<sup>th</sup> July, 2013

Implementation Period Expiry: July 2013 – June 2016

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Number of Previous Extensions: NIL

---

Reasons for this Extension:

To accomplish the implementation of the project

---

Recommendations:

I recommend the project implementation period be extended for one year

---

Decision:



2-10/16

➤ **Financial Analysis**

The Financial Results of the Project are as follows:

S. No	Financial Parameter	Value
1	Net Present Value (NPV) at 10% Discounting Rate (Mio USD)	112.68
2	IRR on Investment (%)	12.87 %
3	IRR on Equity (%)	18.62%
4	Debt Service Coverage Ratio	1.80
5	Payback Period	6 Years & 6 Months

*Financial Results*

04 24 96

(7)

**JAMHURI YA MUUNGANO WA TANZANIA  
WIZARA YA FEDHA**

Anwani ya simu: Hazina Dar es  
Salaam  
SANDUKU LA BARUA 9111,  
Simu 11117 - 76 Dar Es Salaam.  
Unapojibu tafadhali taja:



S.L.P. 9111,  
**DAR ES SALAAM.**

Kumb: Na: CAB.286/547/01

13 Mei, 2014

Mkurugenzi Mtendaji,  
Kituo cha Uwekezaji,  
S.L.P 938,  
**DAR ES SALAAM**



**YAH: MAOMBI YA MSAMAHA WA MAFUTA KWA MWEKEZAJI M/S  
MAMBA CEMENTI**

Tafadhali rejea kichwa cha barua hapo juu.

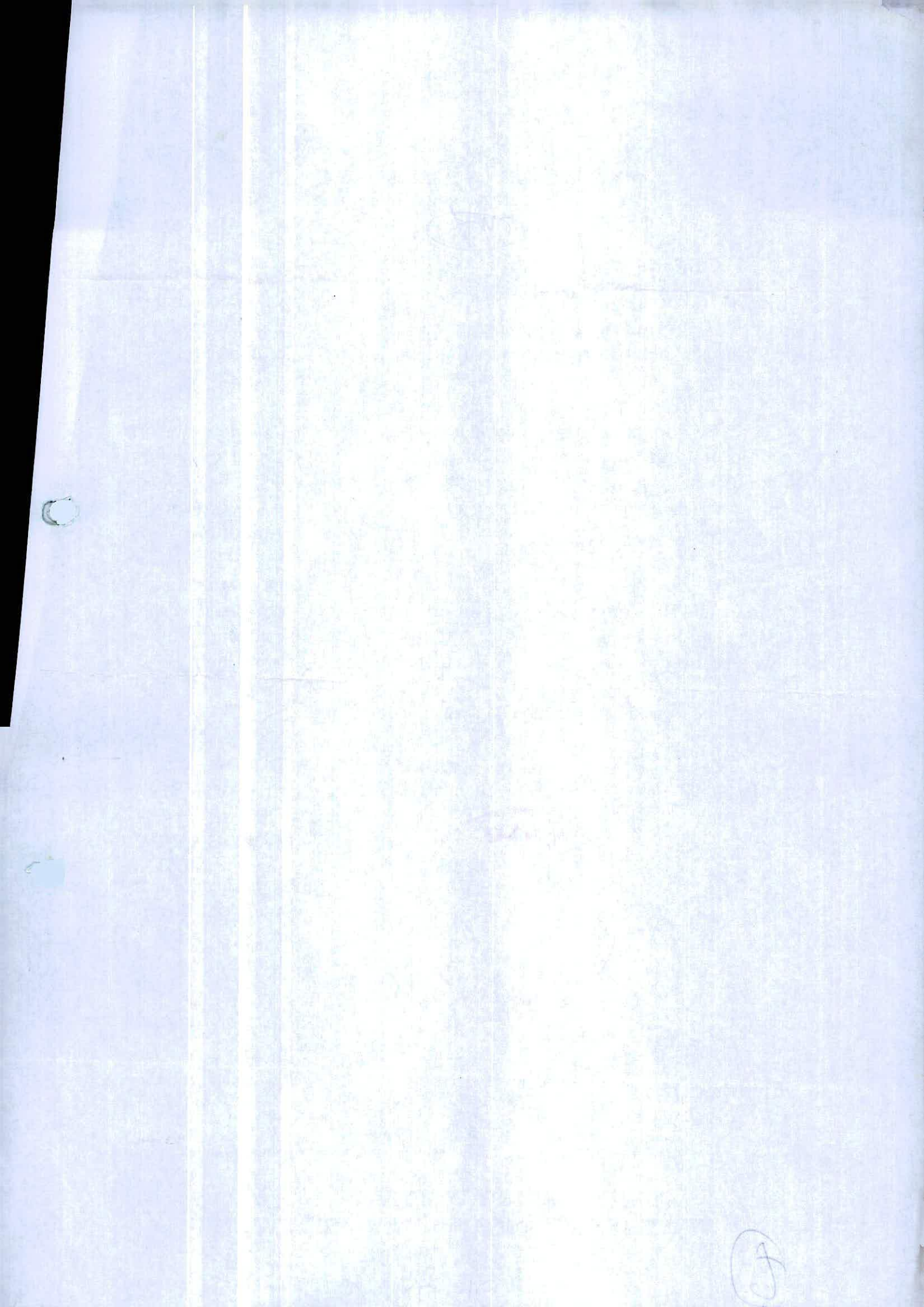
Tumepokea maombi ya msamaha wa mafuta kutoka Kampuni ya M/s Mamba Cementi iliyopewa hadhi ya Mwekezaji Mahiri kupitia Kamati ya Taifa ya Uwekezaji (NISC) ambapo hadhi hiyo huambatana na vivutio vya kodi kwa mwekezaji.

Itakumbukwa kuwa katika mwaka 2013/14, Seri Serikali ilifanya maboresho ya sheria mbalimbali za kodi ikiwa ni pamoja na Sheria ya Uwekezaji Tanzania SURA, 38 ambapo kifungu cha 19 na 20 cha sheria hiyo kilifanyiwa maboresho kwa kuondoa baadhi ya bidhaa kwenye orodha ya kupata misamaha ambapo bidhaa za mafuta ya petoli ziliondolewa.

Kwa kuwa mkataba wa utekelezaji ulisainiwa baada ya sheria ya uwekezaji kufanyiwa maboresho, ni dhahiri kuwa Mwekezaji hastahili kupata msamaha wa kodi ya mafuta, kwa kuzingatia marekebisho hayo. Tafadhali mfahamishe mwekezaji.

Anna Mbelwa

Kny: **KATIBU MKUU - FEDHA**




- Planning for development of residential area for the project completed.
- Presently the contract preparation for the turnkey EPC projects is under progress.
- Discussions with various lending institutes is in progress

In case any details are required, please let us know. MCCL would be glad to share the same.

Thanking you.

Yours truly

For, Mamba Cement Company Limited



(Subhash Patel)  
Managing Director

<



**Corporate office**

9



**MAMBA  
CEMENT**  
*Nguvu ya Mwisho*

**Mamba Cement  
Company Limited**

Date: 30<sup>th</sup> Mar 2016



To  
The Executive Director  
Tanzania Investment Centre  
PO Box 938,  
Dar Es Salaam, Tanzania

**Sub: Progress Report on the Mamba Cement Project and Request for Extension.**

**Reference: Certificate of Incentives No. 042496 and Performance Contract Dated 15<sup>th</sup> Day of April 2014.**

Dear Sir / Madam,

This refers to the Certificate of Incentives No. 042496 and performance contract between Government of Tanzania, represented by Tanzania Investment Centre (TIC) and Mamba Cement Company Limited (MCCL) on 15th April 2014, awarding project the status of strategic investor.

Since the time of signing the performance contract, the project has made some progress like:

- Compensation for the land acquisition paid as per the law and the records submitted to authorities. Project now awaits the title transfer.
- Standard Chartered Bank has been appointed as the advisor bank for debt raising.
- The process of due diligence from the lenders side initiated and in progress.
- The execution of project changed to turnkey EPC mode.
- Project has received the Environmental clearance certificate.
- JORC competent limestone reserve statement and mining plan prepared through Morgan World Wide, USA
- Route survey completed for providing connectivity to the nearest Bagamoyo-Msata highway.
- Hydro-geological study completed to prove availability of ground water.
- Market study report prepared to understand the future growth of cement market.
- MCCL has signed MoU for turnkey execution of cement and power plant with reputed contractors. (CNBM & FLS for cement plant and ISGEC for power plant)
- Planning for sourcing of manpower completed.
- Planning for development of residential area for the project completed.
- Presently the contract preparation for the turnkey EPC projects is under progress.
- Discussions with various lending institutes is in progress

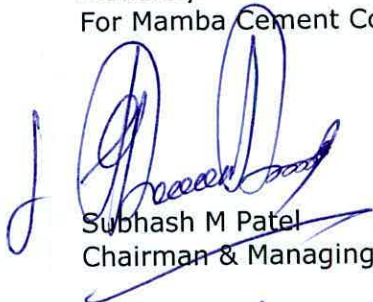
However, the project could not be completed within the timeline as envisaged earlier due to several factors mentioned below:

1. **Delay in Land Acquisition:** The land was acquired from local villagers and the acquisition involved several parties and several approvals. Despite making all payments to effected parties and completing all formalities, we have still not received the Certificate of Occupancy. We are continuously following up to secure the same but the same is delayed mainly due to procedural requirements and process delays.
2. **Price of Cement & Project Profitability:** Price of Cement in the local market has crashed from USD 8/- Per Bag in 2013 to USD 5/- Per Bag in 2016. This has affected the project profitability and bankers are extra cautious to complete the due diligence for the project. The Bankers have loaded additional risk on the project which has increased the project cost and contribution required by promoters. We are currently under negotiation with bankers to reduce the risk loading on the project and change the Debt equity ratio.
3. **Devaluation of Currency:** The devaluation of Tanzanian Shillings against USD by more than 35% in past 4 years has affected the project cost as all our Equipment purchases shall be in United States Dollars or Euro.
4. **Implementation of New VAT Act:** Due to implementation of new VAT Act, the project shall have to pay VAT for all Equipment Purchases exceeding USD 55,000/-. The project implementation period shall be for 3 years and we shall not be able to utilize the VAT Credit for a substantial period of time. This has increased the capital requirement for the project.

Due to above reasons, we request you to please extend the Project implementation period for another 3 years in Tanzania Investment Certificate and Performance Contract. We have already invested more than USD 20 Million on the project and we stay committed to overcome all the difficulties and complete the project within next 3 years. In case any details are required, please let us know. MCCL would be glad to share the same.

Thanking you.

Sincerely  
For Mamba Cement Company Limited

  
Subhash M Patel  
Chairman & Managing Director

MAMBA CEMENT COMPANY LTD.  
P O Box 3030  
DAR ES SALAAM  
TANZANIA



**MAMBA  
CEMENT**

*Nguvu ya Mwisho*

**Mamba Cement  
Company Limited**

15



Date: 25<sup>th</sup> Apr 2017

To  
The Executive Director  
Tanzania Investment Centre  
PO Box 938,  
Dar Es Salaam, Tanzania

**Sub: Application for Extension of TIC Certificate of Mamba Cement Company Limited for a further period of 3 Years.**

**Reference: Certificate of Incentives No. 0222581.**

Dear Sir / Madam,

This refers to the Certificate of Incentives No. 0222581, represented by Tanzania Investment Centre (TIC) to Mamba Cement Company Limited on 18th July 2016.

We would like to share that there has not been any progress on the project and would like to update you some of the challenges which lead to current scenario.

- We had procured the land. Compensation against the same had also been disbursed (as enclosed). We have applied for title transfer. However the project still awaits the title transfer.
- With regard to funding of the project, we have already started negotiations with various foreign institutions and fund managers and they are awaiting for the title transfer approval in order to infuse the money.
- We would also like to bring to your notice that till date we have not imported any machineries or equipments against the said project.

We submit that all the basic work required to kick off the project has been done and will be able to make much faster progress on the project in the coming time. We would also like to share with you the various clearances that are in place:

- Environmental Clearance Certificate has been obtained.
- JORC competent limestone reserve statement and mining plan done and received through Morgan World Wide, USA.
- Route survey completed for providing connectivity to the nearest Bagamoyo-Msata highway.
- Hydro-geological study completed to prove availability of ground water.
- Market study report prepared to understand the future growth of cement market.
- Planning for development of residential area for the project completed.

Enclosed herewith the progress report on the project till date on the various aspects of the project

We hereby request you to please extend the Project implementation period for another 3 years (till July 2020) in Tanzania Investment Certificate.

We have already invested more than USD 20 Million on the project (financials enclosed) and we stay committed to overcome all the challenges and complete the project within next 3 years.

Thanking you.

Sincerely  
For Mamba Cement Company Limited

  
Subhash M Patel  
Chairman & Managing Director

MAMBA CEMENT COMPANY LTD.  
P O Box 3030  
DAR ES SALAAM  
TANZANIA

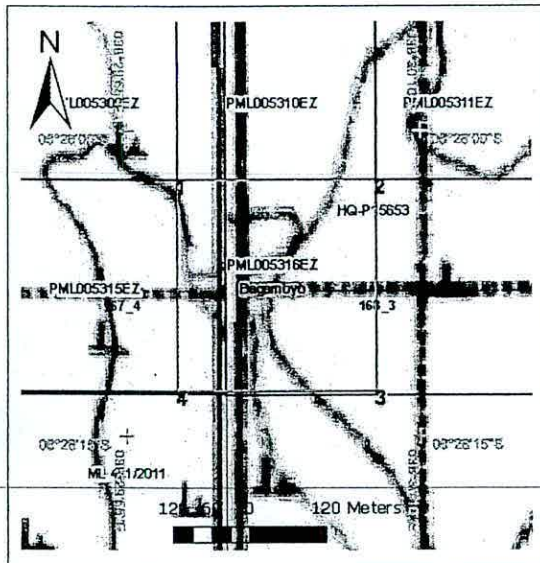
Encl: a) Land Compensation  
b) Audited Financial  
c) Progress Report  
d) Original Certificate of Incentives No. 0222581.

**ANNEX A**

**DESCRIPTION OF THE PRIMARY MINING LICENCE AREA**

The Primary Mining Licence is at Talawanda area, in Bagamoyo District, QDS 167/4, 168/3 defined by the following corner co-ordinates (Arc 1960):

Corner	Latitude	Longitude
1	- 06 deg. 28 min. 02.40 sec.	38 deg. 29 min. 57.56 sec.
2	- 06 deg. 28 min. 02.40 sec.	38 deg. 30 min. 07.69 sec.
3	- 06 deg. 28 min. 12.80 sec.	38 deg. 30 min. 07.69 sec.
4	- 06 deg. 28 min. 12.80 sec.	38 deg. 29 min. 57.56 sec.



<u>Legend</u>	
Licensed area	
License Number	PML005316EZ
District	Bagamoyo
Direction	

An area of approximately 9.94 Hectares.

**ANNUAL RENT PAYMENTS**

Year	ERV	Amount (TShs.)	Date	Signature & Stamp
1.	47453539	397600/-	25-10-2012	ZONAL MINES OFFICER EASTERN ZONE

**THE UNITED REPUBLIC OF TANZANIA  
MINISTRY OF ENERGY AND MINERALS**

THE MINING (MINERAL RIGHTS) REGULATIONS, 2010  
**PRIMARY MINING LICENCE 005316EZ**

*The Mining Act, 2010*

The exclusive right, subject to the provisions of the Mining Act, 2010 and of the regulations thereunder now in force or which may come into force during the continuance of this primary mining licence or any renewal thereof is hereby granted to M/S **Girdharbhai M Pindolia** of **P.O. Box 19716, Dar es Salaam, Tanzania** (hereinafter called the Licensee), to prospect and mine for **Industrial Minerals, Talawanda**, in **Bagamoyo District, QDS 167/4, 168/3** over an area described in Annex A.

This Licence, unless sooner cancelled, suspended or surrendered pursuant to the provisions of the Mining Act, 2010, shall be valid for a period of **seven (7) years**, effective from the date of grant.

Granted this 22<sup>ND</sup> day of OCTOBER 2012

[Signature]



# TANZANIA INVESTMENT CENTRE

## REGISTRATION FORM

FOR

## CERTIFICATE OF INCENTIVES

**(Tanzania Investment Act 1997, Section 17 and 18,  
and the Investment Regulations:  
Regulation 42, Government Notice No. 318A of 2002)**

**Tanzania Investment Centre**  
9A & B Shaaban Robert Street  
P. O. Box 938  
**DAR ES SALAAM**  
Tel. 022 2116328  
Fax. 022 2118253  
e-mail: [information@tic.co.tz](mailto:information@tic.co.tz)  
Website: [www.tic.co.tz](http://www.tic.co.tz)

**(Please fill the form in duplicate)**

**Investment Breakdown US\$/Tshs.M**

Land/Building	..... \$ 40 million
Plant	..... \$ 123 million
Vehicles	..... \$ 17 million
Furniture & Fittings	..... \$ 2 million
Pre-expenses	..... \$ 9 million
Others	..... \$ 1 million
Working Capital	..... \$ 3 million
<b>TOTAL</b>	..... <b>\$ 195 million</b>

**Contact Details:**

Name: ..... Gopalan DEVADESS

Title: ..... FINANCE DIRECTOR

Telephone: ..... 2139158 / 2139176

Fax: ..... 2117963

Email: ..... hg@motisun.com

**Payments to be made payable to:**

TANZANIA INVESTMENT CENTRE  
STANDARD CHARTERED BANK TANZANIA LTD.  
SWIFT ADDRESS: SCBLTZX  
ACCOUNT NO.: 8702006002000

### APPLICATION SUMMARY

Company Name: ..... MAMBA CEMENT COMPANY LIMITED .....

Certificate of Incorporation Number: ..... 93066 ..... Status: ..... LIMITED COMPANY .....

Certificate of Incorporation Date: ..... 16/08/2012 .....

Post Box: ..... 3030 .....

Town: ..... DAR ES SALAAM .....

Sector: ..... MANUFACTURING, MINING & POWER ..... Sub-Sector: ..... MANUFACTURING .....

**Investment Financing Plan in Million US\$/Tshs.**

Foreign Equity	Local Equity	Foreign Loan	Local Loan
----------------	--------------	--------------	------------

..... <u>NIL</u> .....	..... <u>US\$ 65</u> .....	..... <u>US\$ 130</u> .....	..... <u>-</u> .....
------------------------	----------------------------	-----------------------------	----------------------

Project Objectives: ..... To MANUFACTURE 3000 Ton/Day CEMENT .....

..... To produce 20mw power from COAL/GAS .....

..... LIME STONE MINING - 19 1/2 Sq. kms. .....

Capacity: ..... Cement 3000Ton/day .....

Employment: Foreign: ..... 50 ..... Local: ..... 250 ..... Total: ..... 300 .....

Implementation Period: ..... 36 months .....

**Project Location**

Site/Plot/Block No.: ..... TARAWANDA VILLAGE .....

Street: ..... District: BAHAMOYO ..... Region: BAHAMOYO .....

(Attach sketch map showing project location)

Shareholders	Nationality	%
..... <u>ESPRIT DEVELOPERS LTD</u> .....	..... <u>TANZANIA</u> .....	..... <u>90</u> .....
..... <u>SUBHASH M. PATEL</u> .....	..... <u>TANZANIA</u> .....	..... <u>5</u> .....
..... <u>GIRDHARSHAI M. PINDOLIA</u> .....	..... <u>TANZANIAN</u> .....	..... <u>5</u> .....

..... <u>/</u> .....	..... <u>/</u> .....	..... <u>/</u> .....
----------------------	----------------------	----------------------

7. The intended capital investment of the Company in terms of Section 2(2) of the Act is Tshs./US\$ \$195,000,000/2

8. The month and day of the financial year end is 31st DECEMBER

Note: **failure to provide all the required information will result in the return of the application by the Centre.**

I/We enclose a cheque/cash <sup>Receipt</sup> made payable to the **Tanzania Investment Centre** for Tshs./US\$ 100/2 USD ONE HUNDRED ONLY Being the Registration Fees. **In the event this application is unsuccessful we understand that this fee will not be refunded.**

I, SUBHASH MOTIBHAI PATEL of Post Office Number 3030



do solemnly and sincerely declare that I am a director/duly authorized agent of M/S MAMBA CEMENT COMPANY LIMITED

**AND** that all the requirements of the Tanzania Investment Act, 1997 in respect of matters precedent to the registration of the business enterprise under the Act and incidental thereto have been complied with, **AND** I make this solemn declaration conscientiously believing the same to be true.

Declared at Dar es Salaam }  
..... }  
The 12 day of July 2013 }

  
**Applicant**

Before me:

  
  
Commissioner for Oaths

UNITED REPUBLIC OF TANZANIA

THE TANZANIA INVESTMENT ACT

(No. 26 of 1997)

APPLICATION FOR REGISTRATION

(Made under Regulation 42)

To: The Executive Director  
Tanzania Investment Centre  
P. O. Box 938  
DAR ES SALAAM  
Tanzania

1. I/We ..... SUBHASH MOTIBHAI PATEL .....  
(director/directors/agent of M/S MAMBA CEMENT COMPANY LIMITED .....  
(name of business enterprise) apply for registration of MAMBA CEMENT COMPANY LTD .....  
under Section 17 of the Act and Part IV of the Investment Regulations, 2002.

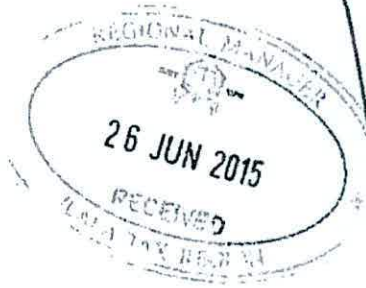
2. The registered office of the company will be situated at 6th Floor NEEL KANTH Tower  
CORNER SEWA STREET & MAMA STREET, CITY CENTRE, DAR ES SALAAM

Copies of the following documents are attached to this application:

- (i) The Memorandum and Articles of Association/or partnership agreement
- (ii) Certificate of Incorporation/Registration
- (iii) A copy of the Project Profile or Feasibility Study showing the implementation period, programme of implementation and operative date
- (iv) Evidence of financing and evidence of land ownership for the project

3. The Head Office of the Company will be situated at ..... AT THE ABOVE ADDRESS .....
4. The Principal Officers of the Company are ..... MANUFACTURING OF CEMENT,  
20MW CAPTIVE POWER PLANT AND LIMESTONE  
MINING .....
5. Auditors of the Company are ..... KPMG - TANZANIA .....
6. The authorized share capital of the Company is Tsh./US\$ ..... 2.00 million .....

**MAMBA CEMENT COMPANY LIMITED**  
**ANNUAL REPORT AND FINANCIAL STATEMENTS**  
**FOR THE YEAR ENDED 31 DECEMBER 2014**



**MAMBA CEMENT COMPANY LIMITED**  
**ANNUAL REPORT AND FINANCIAL STATEMENTS**  
**FOR THE YEAR ENDED 31 DECEMBER 2014**



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Report of the independent auditor	5-6
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Statement of comprehensive income	7
Statement of financial position	8
Statement of changes in equity	9
Statement of cash flows	10
Notes	11-21



**Mamba Cement Company Limited**  
**Company information**  
**For the year ended 31 December 2014**

---

<b>Board of directors</b>	Subhash Motibhai Patel Girdharbhai Meghji Pindolia	<b>Nationality</b> Tanzanian Tanzanian
<b>Company secretary</b>	Gopalan Devadoss 6th Floor, Flat No. 602 Haadi Apartment, Corner of Morogoro Road P.O.Box 3030 Dar es Salaam Tanzania.	
<b>Registered office</b>	6th Floor, Neelkanth Towers Sewa Street, City Centre P.O. Box 3030 Dar es Salaam Tanzania.	
<b>Independent auditor</b>	RSM Ashvir Certified Public Accountants 16th Floor, Golden Jubilee Towers Ohio Street P.O. Box 79586 Dar es Salaam Tanzania.	
<b>Principal bankers</b>	NMB Bank Bank House Branch P.O. Box 2653 Tel: 21601024/2161005 Dar es Salaam Tanzania.	



*Mamba Cement Company Limited*  
*Report of the directors*  
*For the year ended 31 December 2014*

The directors submit their report together with the audited financial statements for the year ended 31 December 2014, which disclose the state of affairs of the company.

**Incorporation**

The company is domiciled in Tanzania where it is incorporated as a private company limited by shares under the Tanzanian Companies Act, 2002 since 16th August 2012. The address of the registered office is set out on page 1.

**Principal activities**

The principal activities of the company include the extraction of limestone and production of cement, cement bricks, concrete blocks and other cement products. The company is still in exploration stage and has not commenced commercial manufacturing.

**Directorate**

The directors who held office during the year and to the date of this report, except where otherwise stated, are set out on page 1.

**Company secretary**

The company secretary as at the date of this report is set out on page 1.

**Results and dividends**

The company is in initial stage and has not yet started production. The directors do not recommend the payment of a dividend for the year.

**Capital structure and cash flows**

The company is under exploration stage and does not generate revenue, with financial assistance being received from the parent company.

The directors have a reasonable expectation that the company has adequate resources to continue in operational existence for the foreseeable future. For this reason, we have adopted the going concern basis in preparing the financial statements.

**Shareholders of the company**

The total number of shareholders during the year is three (2013: three) as indicated below

<i>Name</i>	<i>Nationality</i>	<i>Number of ordinary shares</i>
Espirit Developers Limited	Tanzanian	90
Subhash Motibhai Patel	Tanzanian	5 *
Giridharbhai Meghji Pindolia	Tanzanian	5 *

\* Directors holding shares

**Financial risk management objectives and policies**

To ensure its financial stability, the company has implemented policies and practices for a sound and prudent management and control of the principal financial risks to which it is exposed.

The company's overall risk management programme focuses on the identification and management of risks and seeks to minimize potential adverse effects on its financial performance. A summary of the risk management procedures is disclosed in Note 3.

*Mamba Cement Company Limited*  
*Report of the directors (continued)*  
*For the year ended 31 December 2014*

---

**Future plans**

The company is funded by shareholders and other group companies, and will continue to undertake project generation with follow up on targeted cement productions.

**Employees welfare**

The company is still in exploration stage and has not commenced operations.

**Related party transactions**

Transactions with related parties during the year were in the normal course of business. Details of transactions and balances are included in Note 12.

**Auditor**

During the year, RSM Ashvir was appointed as the company's auditor, RSM Ashvir has expressed its willingness and accepted to be in office in accordance with the Tanzania Companies Act, 2002.

**By order of the Board**

  
.....  
Subhash Motibhai Patel  
Director

MAMBA CEMENT COMPANY LTD.  
P O Box 3030  
DAR ES SALAAM  
TANZANIA

..... 22 June 2015 .....

26 JUN 2015

**Mamba Cement Company Limited**  
**Statement of directors' responsibilities**  
**For the year ended 31 December 2014**


The Tanzanian Companies Act, 2002 requires the directors to prepare financial statements for each financial year that give a true and fair view of the state of affairs of the company as at the end of the financial year and of its profit or loss for that year. It also requires the directors to ensure that the company maintains proper accounting records that disclose, with reasonable accuracy, the financial position of the company and which enable them to ensure the financial statements comply with the Tanzanian Companies Act, 2002. The directors are also responsible for safeguarding the assets of the company, and hence for taking reasonable steps for the prevention and detection of fraud and other irregularities.

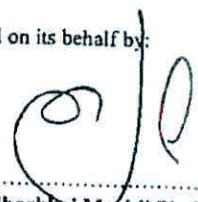
The directors accept responsibility for the preparation and fair presentation of financial statements that are free from material misstatement whether due to fraud or error. They also accept responsibility for:

- i) designing, implementing and maintaining internal controls relevant to the preparation and fair presentation of the financial statements;
- ii) selecting and applying appropriate accounting policies; and
- iii) making accounting estimates and judgements that are reasonable in the circumstances.

The directors are of the opinion that the financial statements give a true and fair view of the state of the financial affairs of the company as at 31 December 2014 and of its loss and cash flows for the year then ended in accordance with International Financial Reporting Standards and the requirements of the Tanzanian Companies Act, 2002.

Approved by the Board of directors on 22 June 2015 and signed on its behalf by:

  
.....  
Subhash Motibhai Patel  
Director

  
.....  
Girdharbhai Meghji Pindolia  
Director

MAMBA CEMENT COMPANY LTD  
P O Box 3030  
DAR ES SALAAM  
TANZANIA

*Mamba Cement Company Limited*  
*Report of the independent auditor to the members of Mamba Cement Company Limited*  
*For the year ended 31 December 2014*

---

**Report on the financial statements**

We have audited the accompanying financial statements of Mamba Cement Company Limited, set out on pages 7 to 21 which comprise the statement of financial position as at 31 December 2014, and the statements of comprehensive income, changes in equity and cash flows for the year then ended, and a summary of significant accounting policies and other explanatory information.

Directors' responsibility for the financial statements

The directors are responsible for the preparation of financial statements that give a true and fair view in accordance with International Financial Reporting Standards and the requirements of the Tanzanian Companies Act, 2002 and for such internal control as the directors determine is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

Auditor's responsibility

Our responsibility is to express an opinion on these financial statements based on our audit. We conducted our audit in accordance with International Standards on Auditing. Those standards require that we comply with ethical requirements and plan and perform the audit to obtain reasonable assurance whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgement, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal controls relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates made by the directors, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion

In our opinion the accompanying financial statements give a true and fair view of the state of financial affairs of the company as at 31 December 2014 and of its financial performance and cash flows for the year then ended in accordance with International Financial Reporting Standards and the Tanzanian Companies Act, 2002.

Emphasis of matter

Without qualifying our opinion, we draw attention to Note 13 in the financial statements which indicates that the company incurred a net loss of TShs 53.2 million (2013: TShs 32 million) during the year ended 31 December 2014 and, as of that date, the company's current liabilities exceeded its total assets by TShs 392 million (2013: TShs 1.05 billion). These conditions indicate the existence of a material uncertainty that may cast significant doubt about the company's ability to continue as a going concern. The parent company has confirmed that they shall provide the necessary funding to meet the company's obligations as they fall due.

26 JUN 2015

*Mamba Cement Company Limited*  
*Report of the independent auditor to the members of Mamba Cement Company Limited (continued)*  
*For the year ended 31 December 2014*

---

**Report on other legal requirements**

This report, including the opinion, has been prepared for, and only for, the company's members as a body in accordance with the Tanzanian Companies Act, 2002 and for no other purpose.

As required by the Tanzanian Companies Act, 2002 we report to you, based on our audit, that in our opinion:

- i) we have obtained all the information and explanations which to the best of our knowledge and belief were necessary for the purposes of our audit;
- ii) the report of the directors is consistent with the financial statements;
- iii) proper accounting records have been kept by the company, so far as appears from our examination of those records;
- iv) the company's statement of financial position and comprehensive income are in agreement with the accounting records; and
- v) information specified by law regarding directors remuneration and transactions is appropriately disclosed.



Nihla Mazrui  
For and on behalf of



26 JUN 2015  
22 June 2015

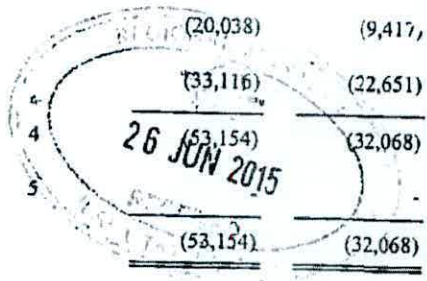
Dar es Salaam

Ref: 073/2014

*Mamba Cement Company Limited*  
*Financial statements*  
*For the year ended 31 December 2014*

**STATEMENT OF COMPREHENSIVE INCOME FOR THE YEAR ENDED 31 DECEMBER**

	Note	2014 TShs'000	
Revenue		-	
Administrative expenses		(20,038)	(9,417)
Establishment expenses		(33,116)	(22,651)
<b>Loss before tax</b>		<b>(53,154)</b>	<b>(32,068)</b>
Taxation		-	-
<b>Total loss for the year</b>		<b>(53,154)</b>	<b>(32,068)</b>



*Mamba Cement Company Limited*  
*Financial statements*  
*For the year ended 31 December 2014*


**STATEMENT OF FINANCIAL POSITION AT 31 DECEMBER 2014**

	Note	2014 TShs'000	2013 TShs'000
<b>EQUITY</b>			
Share capital	6	1,000,000	1,000,000
Accumulated losses		(85,222)	(32,068)
<b>Total equity</b>		<u>914,778</u>	<u>967,932</u>
<b>Non-current liabilities</b>			
Loan from related parties	12	24,374,943	15,860,315
		<u>25,289,721</u>	<u>16,824,019</u>
<b>REPRESENTED BY</b>			
<b>Non-current assets</b>			
Furniture and equipment	8	53,861	67,382
Evaluation and exploration expenses	8	25,290,759	17,806,623
Intangible assets	9	337,080	-
		<u>25,681,700</u>	<u>17,874,005</u>
<b>Current assets</b>			
Other receivables	10	4,848	38,751
Cash at bank and in hand		362,717	343,876
		<u>367,565</u>	<u>382,627</u>
<b>Current liabilities</b>			
Trade and other payables	11	759,544	1,428,385
<b>Net current liabilities</b>		<u>(391,979)</u>	<u>(1,045,758)</u>
		<u>25,289,721</u>	<u>16,828,247</u>

The financial statements on pages 7 to 21 were approved for issue by the Board of directors on 22 June 2015 and were signed on its behalf by:

  
 .....  
 Subhash Motibhai Patel  
 Director

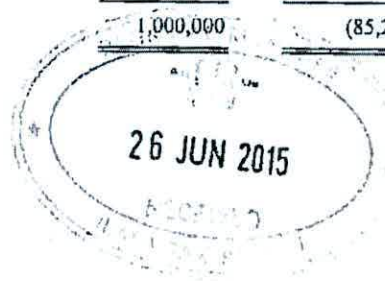
MAMBA CEMENT COMPANY LTD.  
 P O Box 3030  
 DAR ES SALAAM  
 TANZANIA

  
 .....  
 Girdharbhai Meghji Pindolia  
 Director

*Mamba Cement Company Limited*  
*Financial statements*  
*For the year ended 31 December 2014*

STATEMENT OF CHANGES IN EQUITY FOR THE YEAR ENDED 31 DECEMBER 2014

	Share capital TShs'000	Accumulated losses TShs'000	Total TShs'000
At incorporation	-	-	-
Loss for the year	-	(32,068)	(32,068)
Total comprehensive loss for the year	-	(32,068)	(32,068)
<u>Transactions with owners:</u>			
Issue of shares	1,000,000	-	1,000,000
At 31 December 2013	<u>1,000,000</u>	<u>(32,068)</u>	<u>967,932</u>
At 1 January 2014	1,000,000	(32,068)	967,932
Loss for the year	-	(53,154)	(53,154)
Total comprehensive loss for the year	-	(53,154)	(53,154)
At 31 December 2014	<u>1,000,000</u>	<u>(85,222)</u>	<u>914,778</u>



*Mamba Cement Company Limited*  
*Financial statements*  
*For the year ended 31 December 2014*

STATEMENT OF CASH FLOWS FOR THE YEAR ENDED 31 DECEMBER 2014

	Note	2014 TShs'000	2013 TShs'000
<b>Cash flows from operating activities</b>			
Loss before tax		(53,154)	(32,068)
Adjustments for:			
Depreciation of property, plant and equipment	8	32,918	15,549
<b>Operating loss before working capital changes</b>		(20,236)	(16,519)
Decrease/(increase) in other receivables		33,903	(38,751)
(Decrease)/increase in trade and other payables		(668,841)	1,428,387
<b>Cash (used in) / generated from operations</b>		(655,174)	1,373,117
Income tax paid		-	-
<b>Net cash (used in)/ generated from operating activities</b>		(655,174)	1,373,117
<b>Cash flows from investing activities</b>			
Purchase of property, plant and equipment	8	(7,503,533)	(17,889,556)
Purchase of mining licenses	9	(337,080)	-
<b>Net cash used in investing activities</b>		(7,840,613)	(17,889,556)
<b>Cash flows from financing activities</b>			
Issue of ordinary shares	6	-	1,000,000
Amounts received from parent company	12	7,358,770	15,860,315
Amounts received from guarantor	12	1,155,858	-
<b>Net cash generated from financing activities</b>		8,514,628	16,860,315
<b>Net increase in cash and cash equivalents</b>		18,841	343,876
<b>Cash and cash equivalents at 1 January / Incorporation</b>		343,876	-
<b>Cash and cash equivalents at 31 December</b>		362,717	343,876

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**NOTES**

**1. Summary of significant accounting policies**

The significant accounting policies adopted in the preparation of these general purpose financial statements are set out below:

**a) Basis of preparation**

The financial statements are prepared on a going concern basis in compliance with International Financial Reporting Standards (IFRS). The financial statements are presented in Tanzania Shillings (TShs), rounded to the nearest thousand, which is also the functional currency (see (c) below).

The preparation of financial statements in conformity with International Financial Reporting Standards requires the use of estimates and assumptions. It also requires management to exercise its judgement in the process of applying the accounting policies adopted by the company. Although such estimates and assumptions are based on the directors' best knowledge of the information available, actual results may differ from those estimates. The judgements and estimates are reviewed at the end of each reporting period, and any revisions to such estimates are recognised in the year in which the revision is made. The areas involving the judgements of most significance to the financial statements, and the sources of estimation uncertainty that have a significant risk of resulting in a material adjustment within the next financial year, are disclosed in Note 2.

**Measurement basis**

The measurement basis used is the historical cost basis except where otherwise stated in the accounting policies below.

For those assets and liabilities measured at fair value, fair value is the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. When measuring the fair value of an asset or a liability, the company uses market observable data as far as possible. If the fair value of an asset or a liability is not directly observable, it is estimated by the company using valuation techniques that maximise the use of relevant observable inputs and minimise the use of unobservable inputs (e.g. by use of the market comparable approach that reflects recent transaction prices for similar items or discounted cash flow analysis). Inputs used are consistent with the characteristics of the asset/liability that market participants would take into account.

Fair values are categorised into three levels in a fair value hierarchy based on the degree to which the inputs to the measurement are observable and the significance of the inputs to the fair value measurement in its entirety:

- Level 1 fair value measurements are those derived from quoted prices (unadjusted) in active markets for identical assets or liabilities.
- Level 2 fair value measurements are those derived from inputs other than quoted prices included within Level 1 that are observable for the asset or liability, either directly (i.e. as prices) or indirectly (i.e. derived from prices).
- Level 3 fair value measurements are those derived from valuation techniques that include inputs for the asset or liability that are not based on observable market data (unobservable inputs).

**b) New and revised standards**

**i) Adoption of new and revised standards**

All new and revised standards and interpretations that have become effective for the first time in the financial year beginning 1 January 2014 have been adopted by the company. Of those, the following have had an effect on the company's financial statements:

- IAS 1 (Amendment) - Presentation of financial statements: the amendment will require entities to group items of other comprehensive income according to whether or not they will be subsequently reclassified to profit or loss.
- IFRS 13 - Fair Value Measurement: the new standard defines fair value, sets out a framework for measuring fair value, and requires disclosures about fair value measurements. IFRS 13 applies when other standards require or permit fair value measurements: it does not introduce any new requirements to measure an asset or a liability at fair value.

The adoption of the amendment have had no material effect on the company's accounting policies or disclosures.

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NOTES (CONTINUED)

1. Summary of significant accounting policies (continued)

b) New and revised standards (continued)

ii) New and revised standards and interpretations which have been issued but are not yet effective

The company has not applied the following revised standards and interpretations that have been published but are not yet effective for the year beginning 1st January 2014.

- IFRS 14 Regulatory Deferral Accounts (issued in January 2014) - The new standard, effective for annual accounting periods beginning on or after 1 January 2016, defines a regulatory deferral account balance and allows entities to continue to apply their existing policy for regulatory deferral account balances, but requires certain disclosures.

- Amendments to IAS 16 and IAS 38 titled Clarification of Acceptable Methods of Depreciation and Amortisation (issued in May 2014) - The amendments add guidance and clarify that (i) the use of revenue-based methods to calculate the depreciation of an asset is not appropriate because revenue generated by an activity that includes the use of an asset generally reflects factors other than the consumption of the economic benefits embodied in the asset, and (ii) revenue is generally presumed to be an inappropriate basis for measuring the consumption of the economic benefits embodied in an intangible asset; however, this presumption can be rebutted in certain limited circumstances. They are prospectively effective for annual periods beginning on or after 1 January 2016.

- Amendments to IAS 16 and IAS 41 titled Agriculture: Bearer Plants (issued in June 2014) - The amendments, applicable to annual periods beginning on or after 1 January 2016, define bearer plants - ie living plants which are used solely to grow produce over several periods and usually scrapped at the end of their productive lives (eg grape vines, rubber trees, oil palms) - and include them within IAS 16's scope while the produce growing on bearer plants remains within the scope of IAS 41.

- Amendments to IFRS 11 titled Accounting for Acquisitions of Interests in Joint Operations (issued in May 2014) - The amendments, applicable prospectively to annual periods beginning on or after 1 July 2016, require an acquirer of an interest in a joint operation in which the activity constitutes a business (as defined in IFRS 3) to apply all of the business combinations accounting principles and disclosure in IFRS 3 and other IFRSs, except for those principles that conflict with the guidance in IFRS 11. The amendments apply both to the initial acquisition of an interest in a joint operation, and the acquisition of an additional interest in a joint operation (in the latter case, previously held interests are not remeasured).

The Directors have assessed the potential impact of the above and expect that they will not have a significant impact on the company's financial statements for 2015.

c) Translation of foreign currencies

On initial recognition, all transactions are recorded in the functional currency (the currency of the primary economic environment in which the company operates), which is Tanzania Shillings.

Transactions in foreign currencies during the year are converted into the functional currency using the exchange rate prevailing at the transaction date. Monetary assets and liabilities at the financial position date denominated in foreign currencies are translated into the functional currency using the exchange rate prevailing as at that date. The resulting foreign exchange gains and losses from the settlement of such transactions and from year-end translation are recognised on a net basis in comprehensive income in the year in which they arise.

NOTES (CONTINUED)

1. Summary of significant accounting policies (continued)

d) Furniture and equipment

All categories of furniture and equipment are initially recognised at cost and subsequently carried at cost less accumulated depreciation and accumulated impairment losses. Cost includes expenditure directly attributable to the acquisition of the assets. Computer software, including the operating system, that is an integral part of the related hardware is capitalised as part of the computer equipment.

Depreciation is calculated using the reducing balance method to write down the cost of each asset to its residual value over its estimated useful life using the following annual rates:

	<u>Rate - %</u>
Computer equipment	37.5

As no parts of items of furniture and equipment have a cost that is significant in relation to the total cost of the item, the same rate of depreciation is applied to the whole item.

The assets' residual values and useful lives are reviewed, and adjusted if appropriate, at each financial position date.

Gains and losses on disposal of furniture and equipment are determined by reference to their carrying amount and are taken into account in determining operating profit.

e) Intangible assets

Exploration and development costs

Exploration costs are charged to the statement of comprehensive income as incurred.

When it has been established that mineral reserves are determined to be proven and probable and a decision has been made to formulate a mining plan (which occurs upon completion of a positive economic analysis of the mineral deposit), the costs subsequently incurred to develop the mine on the property prior to the start of the mining operations are capitalized. Capitalized amounts may be written down if future undiscounted cash flows, including potential sales proceeds, related to a mineral property are estimated to be less than the carrying value of the property.

Mineral property acquisition costs

All direct costs related to the acquisition of mineral properties are capitalized by property and related license until the viability of the mineral interest is determined. On the commencement of commercial production, the capitalized costs will be depleted using the unit-of-production method based upon the estimate of proven and probable reserves.

On a periodic basis, management reviews the carrying values of capitalized mineral property costs with a view to assessing whether there has been any impairment in value. Management takes into consideration various information including, but not limited to, results of exploration activities conducted to date, estimated future metal prices, and reports and opinions of outside geologists, mine engineers and consultants. Capitalized amounts may be written down if future cash flows, including potential sales proceeds, related to the mineral interest are estimated to be less than the carrying value of the property.

Although the company has taken steps to verify title and/or license holder(s) to mineral properties in which it has an interest, according to the usual industry standards for the stage of exploration of such properties, these procedures do not guarantee the company's title or license(s). Such properties may be subject to prior agreements or transfers and title may be affected by undetected defects.

From time to time, the company acquires or disposes of properties pursuant to the terms of option agreements. Options are exercisable entirely at the discretion of the optionee and, accordingly, are recorded as mineral property costs or recoveries when the payments are made or received.

NOTES (CONTINUED)

1. Summary of significant accounting policies (continued)

f) Income taxes

Income tax expense is the aggregate amount charged/(credited) in respect of current tax and deferred tax in determining the profit or loss for the year. Tax is recognised in the statement of comprehensive income except when it relates to items recognised directly in equity, in which case it is also recognised directly in equity.

Current tax

Current tax is the amount of income tax payable on the taxable profit for the year, and any adjustment to tax payable in respect of prior years, determined in accordance with the Tanzanian Income Tax Act.

Deferred income tax

Deferred tax is determined for all temporary differences arising between the tax bases of assets and liabilities and their carrying amounts for financial reporting purposes, using tax rates and laws enacted or substantively enacted at the statement of financial position date and expected to apply when the asset is recovered or the liability is settled.

The measurement of deferred tax assets and liabilities reflects the tax consequences that would follow from the manner in which the company expects, at the end of the reporting period, to recover or settle the carrying amount of its assets or liabilities.

Deferred tax assets are recognised only to the extent that it is probable that future taxable profits will be available against which temporary differences can be utilised. Recognised and unrecognised deferred tax assets are reassessed at the end of each reporting period and, if appropriate, the recognised amount is adjusted to reflect the extent that it has become probable that future taxable profits will allow the deferred tax asset to be recovered.

g) Share capital

Ordinary shares are recognised at par value and classified as 'share capital' in equity.

h) Financial instruments

Classification

The company classifies its financial instruments into the following categories:

- i) **Loans and receivables**, which comprise non-derivative financial assets with fixed or determinable payments that are not quoted in an active market, and excludes assets which the entity intends to sell immediately or in the near term or those which the entity upon initial recognition designates as at fair value through profit or loss.
- ii) **Financial liabilities**, which comprise all financial liabilities except financial liabilities at fair value through profit or loss.

Financial instruments held during the year were classified as follows:

- Trade and other receivables were classified as 'loans and receivables'.
- Trade and other liabilities were classified as financial liabilities.

Recognition and measurement

*Financial assets*

All financial assets are recognised initially using the trade date accounting which is the date the company commits itself to the purchase or sale. Financial assets are recorded at the fair value of the consideration given plus the transaction cost.

Subsequently, loans and receivables are carried at amortised cost using the effective interest method.

NOTES (CONTINUED)

1. Summary of significant accounting policies (continued)

h) Financial instruments (continued)

Recognition and measurement (continued)

Amortised cost is the amount at which the financial asset or liability is measured on initial recognition minus principal repayments, plus or minus the cumulative amortisation using the effective interest method of any difference between the initial amount and the maturity amount, and minus any reduction for impairment or uncollectibility.

The company assesses at each statement of financial position date whether there is objective evidence that a financial asset is impaired. If any such evidence exists, an impairment loss is recognised. Impairment loss is the amount by which the carrying amount of an asset exceeds its recoverable amount. In the case of loans and receivables, the recoverable amount is the present value of the expected future cash flows, discounted using the asset's effective interest rate.

Changes in the carrying values and impairment losses of loans and receivables are recognised in the statement of comprehensive income. Trade and other receivables not collectible are written off against the related provision. Subsequent recoveries of amounts previously written off are credited to the statement of comprehensive income in the year of recovery.

Financial liabilities

All financial liabilities are recognised initially at fair value of the consideration given plus the transaction cost.

Subsequently, financial liabilities are carried at amortised cost using the effective interest method.

Presentation

All financial assets are classified as non-current except those with maturities of less than 12 months from the statement of financial position date, those which the directors have the express intention of holding for less than 12 months from the statement of financial position date or those that are required to be sold to raise operating capital, in which case they are classified as current assets.

All financial liabilities are classified as non-current except those expected to be settled in the company's normal operating cycle, those payable or expected to be paid within 12 months from the statement of financial position date and those which the company does not have an unconditional right to defer settlement for at least 12 months after the statement of financial position date.

Derecognition

Financial assets are derecognised when the rights to receive cash flows from the investments have expired or the company has transferred substantially all risks and rewards of ownership.

Financial liabilities are derecognised only when the obligation specified in the contract is discharged or cancelled or expires.

Offsetting

Financial assets and liabilities are offset and the net amount reported in the statement of financial position only when there is a legally enforceable right to set off the recognised amounts and there is an intention to settle on a net basis, or realise the asset and settle the liability simultaneously.

i) Impairment of non-financial assets

Non-financial assets that are carried at amortised cost are reviewed at the end of each reporting period for any indication that an asset may be impaired. If any such indication exists, an impairment loss is recognised for the amount by which the asset's carrying amount exceeds its recoverable amount. The recoverable amount is the higher of an asset's fair value less costs to sell and value in use.

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**NOTES (CONTINUED)**

**1. Summary of significant accounting policies (continued)**

**j) Provision for liabilities and charges**

Provisions are recognised when the company has a present legal or constructive obligation as a result of past events, it is probable that an outflow of resources embodying economic benefits will be required to settle the obligation, and a reliable estimate of the amount of the obligation can be made.

**k) Post-employment benefit obligations**

The company and the employees contribute to the National Social Security Fund (NSSF), a national defined contribution scheme. Contributions are determined by local statute and the company's contributions are charged to the statement of comprehensive income in the year to which they relate.

**l) Cash and cash equivalents**

Cash and cash equivalents comprise of only cash in hand and bank balances.

**2. Significant judgements and key sources of estimation uncertainty**

In the process of applying the accounting policies adopted by the company, the directors make certain judgements and estimates that may affect the carrying values of assets and liabilities in the next financial period. Such judgements and estimates are based on historical experience and other factors, including expectations of future events that are believed to be reasonable under the current circumstances. The judgements and estimates are reviewed at each financial reporting date to ensure that they are still reasonable under the prevailing circumstances based on the information available, and any revisions to such judgements and estimates are recognised in the year in which the revision is made.

**a) Significant judgements made in applying the company's accounting policies**

The judgements made by the directors in the process of applying the company's accounting policies have the most significant effect on the amounts recognised in the financial statements is:

i) Whether it is probable that future taxable profits will be available against which temporary differences can be utilised.

**b) Key sources of estimation uncertainty**

Key assumptions about the future and other sources of estimation uncertainty made that have a significant risk of causing a material adjustment to the carrying amount of assets and liabilities within the next financial year include:

**i) Intangible assets**

Assumptions made by the management in determining the carrying values of capitalized mineral property costs. The carrying amount of the intangible assets and the key assumptions made in estimating the impairment provision are set out in Note 1 (e) and Note 9.

NOTES (CONTINUED)

3. Risk management objectives and policies

a) Financial risk management

The company's activities expose it to a variety of financial risks including credit, liquidity and market risks. The company's overall risk management policies are set out by the board and implemented by the management, and focus on the unpredictability of changes in the business environment and seek to minimise the potential adverse effects of such risks on the company's performance by setting acceptable levels of risk. The company does not hedge against any risks.

The company's activities are exposed to the following risks:

i) Credit risk

Credit risk is the risk that one party to a financial instrument will cause a financial loss for the other party by failing to discharge an obligation. Credit risk mainly arises from financial assets, and is managed on a company-wide basis. The company does not grade the credit quality of financial assets that are neither past due nor impaired.

Credit risk on financial assets with banking institutions is managed by dealing with institutions with good credit ratings.

The financial assets of the company are fully performing.

ii) Liquidity risk

Liquidity risk is the risk that the company will encounter difficulty in meeting obligations associated with financial liabilities. The company depends on the parent company for ensuring that all financial liabilities are settled as they fall due.

The table below summarises the maturity analysis for financial liabilities to their remaining contractual maturities. The amounts disclosed are the contractual undiscounted cash flows.

	Between 1-3 months TShs'000	Between 3-12 months TShs'000	Over 1 year TShs'000
<b>Year ended 31 December 2014</b>			
Trade and other payables	721,958	37,586	-
Amounts due to parent company	-	-	24,374,943
	<u>721,958</u>	<u>37,586</u>	<u>24,374,943</u>
<b>Year ended 30 September 2013</b>			
Trade and other payables	-	1,428,385	-
Amounts due to parent company	-	-	15,860,315
	<u>-</u>	<u>1,428,385</u>	<u>15,860,315</u>

iii) Market risk

Market risk is the risk that the fair value or future cash flows of financial instruments will fluctuate because of changes in market price and comprises three types of risks: currency risk, interest rate risk and other price risk. The company is not exposed to any market risk.

*Mamba Cement Company Limited*  
*Financial statements*  
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NOTES (CONTINUED)

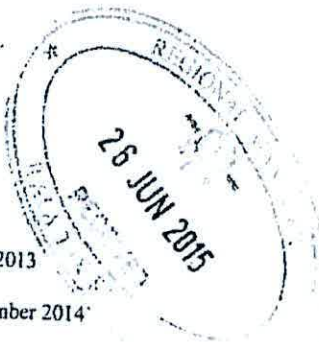
	2014 TShs'000	2013 TShs'000
4. Loss before tax		
(a) Items charged		
The following items have been charged in arriving at loss before tax:		
Depreciation on furniture and equipment	32,917	15,549
Auditor's remuneration		
Current year	8,750	5,000

5. Taxation		
Current income tax	-	-
Deferred income tax (Note 7)	-	-
Taxation	-	-

The tax on the company's loss before income tax differs from the theoretical amount that would arise using the statutory income tax rate as follows:

Loss before income tax	(53,154)	(32,068)
Tax calculated at the statutory tax rate of 30%		
Tax effect of:	(15,946)	(9,620)
Expenses not deductible for tax purposes	2,314	-
Deferred tax not recognised	13,632	9,620
Income tax	-	-

6. Share capital	No. of ordinary shares	Issued & Paid Up capital TShs'000
At Incorporation		
Shares issued during the year ended 31 December 2013	100	1,000,000
At 31 December 2013, 1 January 2014 and 31 December 2014	100	1,000,000



The total number of authorised ordinary shares is 5,000 with a par value of TShs 10,000,000 each.

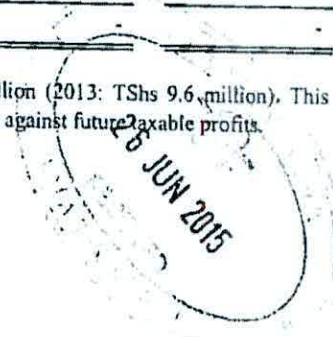
NOTES (CONTINUED)

7. Deferred income tax

Deferred income tax is calculated using the enacted tax rate of 30%. Deferred tax assets and liabilities, and the deferred tax charge/(credit) in the statement of comprehensive income are attributable to the following items:

	At 1 January TShs'000	(Credited)/charge statement of comprehensive income TShs'000	At 31 December TShs'000
<b>Year ended 31 December 2014</b>			
Deferred income tax asset			
Tax losses carried forward	14,285	11,769	26,054
Furniture and equipment	(4,665)	1,862	(2,803)
<b>Net deferred tax asset</b>	<b>9,620</b>	<b>13,632</b>	<b>23,252</b>
<b>Deferred tax asset not recognised</b>	<b>(9,620)</b>	<b>(13,632)</b>	<b>(23,252)</b>
<b>Deferred income tax</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>Year ended 31 December 2013</b>			
Deferred income tax asset			
Tax losses carried forward	-	14,285	14,285
Furniture and equipment	-	(4,665)	(4,665)
<b>Net deferred tax asset</b>	<b>-</b>	<b>9,620</b>	<b>9,620</b>
<b>Deferred tax asset not recognised</b>	<b>-</b>	<b>(9,620)</b>	<b>(9,620)</b>
<b>Deferred income tax</b>	<b>-</b>	<b>-</b>	<b>-</b>

The company has not recognized deferred tax asset amounting to TShs 23.3 million (2013: TShs 9.6 million). This deferred tax assets arises from taxable losses that are available for offset indefinitely against future taxable profits.



*Mamba Cement Company Limited*  
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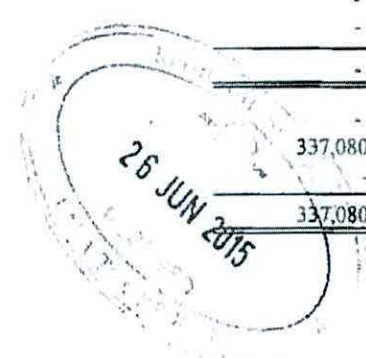
**NOTES (CONTINUED)**

8. Property, plant and equipment	Computer equipment	Evaluation & explorations	Total
	TShs'000	TShs'000	TShs'000
<b>Year ended 31 December 2013</b>			
Opening carrying amount	-	-	-
Additions	82,931	17,806,623	17,889,556
Depreciation charge	(15,549)	-	(15,549)
Closing carrying amount	<u>67,382</u>	<u>17,806,623</u>	<u>17,874,007</u>
<b>At 31 December 2013</b>			
Cost	82,931	17,806,623	17,889,556
Accumulated depreciation	(15,549)	-	(15,549)
Net carrying amount	<u>67,382</u>	<u>17,806,623</u>	<u>17,874,007</u>
<b>Year ended 31 December 2014</b>			
Opening carrying amount	67,382	17,806,623	17,874,007
Additions	19,397	7,484,136	7,503,533
Depreciation charge	(32,918)	-	(32,918)
Closing carrying amount	<u>53,861</u>	<u>25,290,759</u>	<u>25,344,623</u>
<b>At 31 December 2014</b>			
Cost	102,328	25,290,759	25,393,090
Accumulated depreciation	(48,467)	-	(48,467)
Net carrying amount	<u>53,861</u>	<u>25,290,759</u>	<u>25,344,623</u>

**9. Intangible assets**

The carrying values of the company's Tanzanian mineral properties rights and cost associated are as follows:

	TShs'000
At Incorporation	-
Additions	-
<b>At 31 December 2013</b>	-
At 1 January 2014	-
Additions	337,080
Impairment	-
<b>At 31 December 2014</b>	<u>337,080</u>



*Mamba Cement Company Limited*  
*Financial statements*  
*For the year ended 31 December 2014*

NOTES (CONTINUED)

	2014 TShs'000	2013 TShs'000
<b>10. Other receivables</b>		
Other receivables	4,848	38,751
<b>11. Trade and other payables</b>		
Trade payables	37,586	1,068
Accruals	721,958	718,209
Payable to related party (Note 12 (i))	-	709,108
	<u>759,544</u>	<u>1,428,385</u>

**12. Related party transactions**

The holding company is Espirit Developers Limited and other related companies which are under Motisun and Estim Group of companies and are related through common shareholding or common directorships.

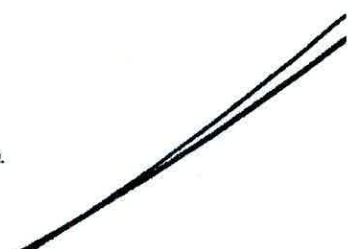
	2014 TShs'000	2013 TShs'000
<b>(i) Payable to related parties</b>		
- Estim Construction Co. Ltd	-	709,108
- PNP Industries	-	-
	<u>-</u>	<u>709,108</u>
<b>(ii) Loan from parent company</b>		
Opening balance	15,860,315	-
Amount received	7,358,770	15,860,315
Interest charged	1,155,858	-
Repayments	-	-
Closing balance	<u>24,374,943</u>	<u>15,860,315</u>

The loan has been advanced by M.M. Intergrated Steel Mills Limited. The loan is unsecured and interest charged at 5.62% per annum which is currently being serviced annually by the guarantor, Motisun Holding Limited on behalf of Mamba Cement Company Limited up to the completion of the drilling and sampling phase or 31 December 2018, whichever is earlier. The interest amount is repayable by the company to the guarantor on 31 December 2018 and the principal amount is repayable by the company to the lender on 31 December 2029.

**13. Going concern**

At the financial position date, the current liabilities exceeded current assets by TShs 391,979,000 (2013: TShs 1,045,759,000). The company's operations are fully financed by its parent company as all the company's tenements are still at exploratory phase and consequently the company has no revenue. The company depends on its parent company to finance its operations. The parent company has confirmed that it will continue to provide financial support that may be required by the company in the foreseeable future.

RSM Ashvir is a member of the RSM network. Each member of the RSM network is an independent accounting and advisory firm which practices in its own right. The RSM network is not itself a separate legal entity in any jurisdiction.

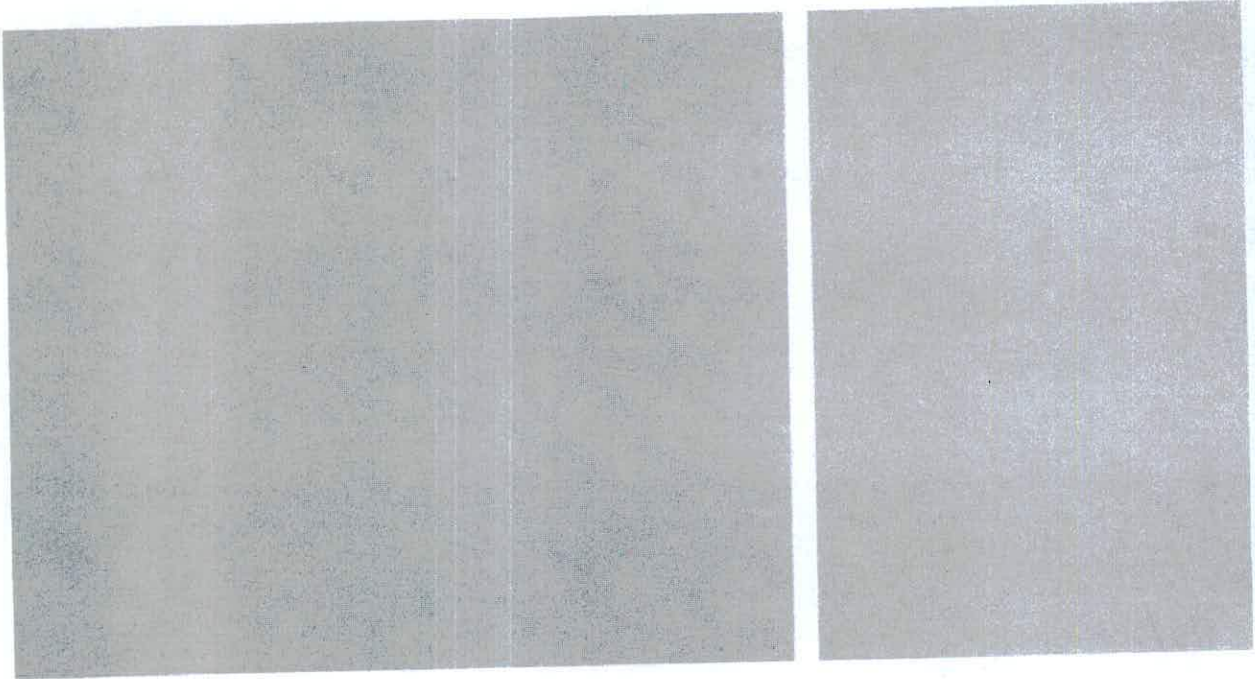


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MAMBA CEMENT COMPANY LIMITED  
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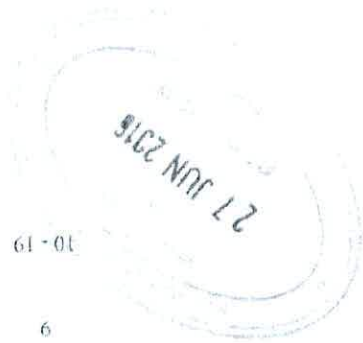
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*Mamba Cement Company Limited*  
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*For the year ended 31 December 2015*

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		<b>Nationality</b>
<b>Board of directors</b>	Subhash Motibhai Patel Girdharbhai Meghji Pindolia	Tanzanian Tanzanian
<b>Company secretary</b>	Gopalan Devadoss 6th Floor, Flat No. 602 Haadi Apartment, Corner of Morogoro Road P.O.Box 3030 Dar es Salaam Tanzania.	
<b>Registered office</b>	6th Floor, Neelkanth Towers Sewa Street, City Centre P.O. Box 3030 Dar es Salaam Tanzania.	
<b>Independent auditor</b>	RSM Eastern Africa (Formerly RSM Ashvir) Certified Public Accountants 16th Floor, Golden Jubilee Towers Ohio Street P.O. Box 79586 Dar es Salaam Tanzania.	
<b>Principal bankers</b>	NMB Bank Bank House Branch P.O. Box 2653 Tel: 21601024/2161005 Dar es Salaam Tanzania.	



The directors submit their report together with the audited financial statements for the year ended 31 December 2015, which disclose the state of affairs of the company.

**Incorporation**

The company is domiciled in Tanzania where it is incorporated as a private company limited by shares under the Tanzanian Companies Act, 2002. The address of the registered office is set out on page 1.

**Principal activities**

The principal activities of the company include the extraction of limestone and production of cement, cement bricks, concrete blocks and other cement products. The company is still in exploration stage and has not commenced commercial manufacturing.

**Directorate**

The directors who held office during the year and to the date of this report, except where otherwise stated, are set out on page 1.

**Company secretary**

The company secretary as at the date of this report is set out on page 1.

**Results and dividends**

The company is in initial stage and has not yet started production. The directors do not recommend the payment of a dividend for the year.

**Capital structure and cash flows**

The company is under exploration stage and does not generate revenue, with financial assistance being received from the parent company. The directors have a reasonable expectation that the company has adequate resources to continue in operational existence for the foreseeable future. For this reason, we have adopted the going concern basis in preparing the financial statements.

**Shareholders of the company**

The total number of shareholders during the year is three (2014: three) as indicated below:

Name	Nationality	Number of ordinary shares
Espiri Developers Limited	Tanzanian	90
Subhash Motibhai Patel	Tanzanian	5 *
Girdharbhai Meghji Pindolia	Tanzanian	5 *

\* Directors holding shares

**Financial risk management objectives and policies**

To ensure its financial stability, the company has implemented policies and practices for a sound and prudent management and control of the principal financial risks to which it is exposed.

The company's overall risk management programme focuses on the identification and management of risks and seeks to minimize potential adverse effects on its financial performance. A summary of the risk management procedures is disclosed in

**Future plans**

The company is funded by shareholders and other group companies, and will continue to undertake project generation with follow up on targeted cement productions.



*Mamba Cement Company Limited*  
*Report of the directors (continued)*  
*For the year ended 31 December 2015*

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**Auditor**

The company's auditor, RSM Eastern Africa has expressed its willingness to continue in office in accordance with the Tanzania Companies Act, 2002.

**By order of the Board**



.....  
Subhash Motibhai Patel  
Director

24/06/2016 ..... 2016



*Mamba Cement Company Limited*  
*Statement of directors' responsibilities*  
*For the year ended 31 December 2015*

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The Tanzanian Companies Act, 2002 requires the directors to prepare financial statements for each financial year that give a true and fair view of the state of affairs of the company as at the end of the financial year and of its profit or loss for that year. It also requires the directors to ensure that the company maintains proper accounting records that disclose, with reasonable accuracy, the financial position of the company and which enable them to ensure the financial statements comply with the Tanzanian Companies Act, 2002. The directors are also responsible for safeguarding the assets of the company, and hence for taking reasonable steps for the prevention and detection of fraud and other irregularities.

The directors accept responsibility for the preparation and fair presentation of financial statements that are free from material misstatement whether due to fraud or error. They also accept responsibility for:

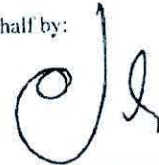
- i) designing, implementing and maintaining internal controls relevant to the preparation and fair presentation of the financial statements;
- ii) selecting and applying appropriate accounting policies; and
- iii) making accounting estimates and judgements that are reasonable in the circumstances.

The directors are of the opinion that the financial statements give a true and fair view of the state of the financial affairs of the company as at 31 December 2015 and of its loss and cash flows for the year then ended in accordance with International Financial Reporting Standards and the requirements of the Tanzanian Companies Act, 2002.

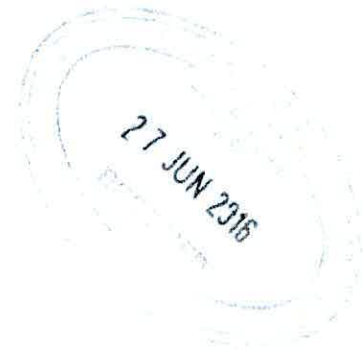
Approved by the Board of directors on 29/06/..... 2016 and signed on its behalf by:



.....  
**Subhash Motibhai Patel**  
Director



.....  
**Girdharbhai Meghji Pindolia**  
Director



**Report on the financial statements**

We have audited the accompanying financial statements of Mamba Cement Company Limited, set out on pages 6 to 19 which comprise the statement of financial position as at 31 December 2015, and the statements of comprehensive income, changes in equity and cash flows for the year then ended, and a summary of significant accounting policies and other explanatory information.

Directors' responsibility for the financial statements

The directors are responsible for the preparation of financial statements that give a true and fair view in accordance with International Financial Reporting Standards and the requirements of the Tanzanian Companies Act, 2002 and for such internal control as the directors determine is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

Auditor's responsibility

Our responsibility is to express an opinion on these financial statements based on our audit. We conducted our audit in accordance with International Standards on Auditing. Those standards require that we comply with ethical requirements and plan and perform the audit to obtain reasonable assurance whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgement, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal controls relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates made by the directors, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion

In our opinion the accompanying financial statements give a true and fair view of the state of financial affairs of the company as at 31 December 2015 and of its financial performance and cash flows for the year then ended in accordance with International Financial Reporting Standards and the Tanzanian Companies Act, 2002.

**Report on other legal requirements**

This report, including the opinion, has been prepared for, and only for, the company's members as a body in accordance with the Tanzanian Companies Act, 2002 and for no other purpose.

As required by the Tanzanian Companies Act, 2002 we report to you, based on our audit, that in our opinion:

- i) we have obtained all the information and explanations which to the best of our knowledge and belief were necessary for the purposes of our audit;
- ii) the report of the directors is consistent with the financial statements;
- iii) proper accounting records have been kept by the company, so far as appears from our examination of those records;
- iv) the company's statement of financial position and comprehensive income are in agreement with the accounting records; and
- v) information specified by law regarding directors remuneration and transactions is appropriately disclosed.



**Nihla Mazrui**  
For and on behalf of  
RSM Eastern Africa



24 June 2016

Dar es Salaam

Ref: 060/2016

STATEMENT OF PROFIT OR LOSS AND COMPREHENSIVE INCOME FOR THE YEAR ENDED 31 DECEMBER 2015

	Note	2015 TZS'000	2014 TZS'000
Revenue		-	-
Administrative expenses		(18,123)	(20,038)
Establishment expenses		(38,513)	(33,116)
Loss before tax	4	(56,636)	(53,154)
Taxation	5	-	-
Total loss for the year		(56,636)	(53,154)



*Mamba Cement Company Limited*  
*Financial statements*  
*For the year ended 31 December 2015*

STATEMENT OF FINANCIAL POSITION AT 31 DECEMBER 2015

	Note	2015 TZS'000	2014 TZS'000
<b>EQUITY</b>			
Share capital	6	1,000,000	1,000,000
Accumulated losses		(141,858)	(85,222)
<b>Total equity</b>		<b>858,142</b>	<b>914,778</b>
<b>Non-current liabilities</b>			
Loan from related parties	12	38,722,311	24,374,943
		<b>39,580,453</b>	<b>25,289,721</b>
<b>REPRESENTED BY</b>			
<b>Non-current assets</b>			
Furniture and equipment	8	15,489	53,861
Evaluation and exploration expenses	8	40,298,420	25,290,759
Intangible assets	9	170,226	337,080
		<b>40,484,135</b>	<b>25,681,700</b>
<b>Current assets</b>			
Other receivables	10	-	4,848
Cash at bank and in hand		24,661	362,717
		<b>24,661</b>	<b>367,565</b>
<b>Current liabilities</b>			
Trade and other payables	11	928,343	759,544
		<b>(903,682)</b>	<b>(391,979)</b>
<b>Net current liabilities</b>		<b>39,580,453</b>	<b>25,289,721</b>

The financial statements on pages 6 to 19 were approved for issue by the Board of directors on 27 JUN 2016 and were signed on its behalf by:

  
 .....  
 Subhash Motibhai Patel  
 Director

  
 .....  
 Girdharbhai  
 Director

STATEMENT OF CHANGES IN EQUITY FOR THE YEAR ENDED 31 DECEMBER 2015

	Share capital TZS'000	Accumulated losses TZS'000	Total TZS'000
At 1 January 2014	1,000,000	(32,068)	967,932
Loss for the year	-	(53,154)	(53,154)
Total comprehensive loss for the year	-	(53,154)	(53,154)
At 31 December 2014	1,000,000	(85,222)	914,778
At 1 January 2015	1,000,000	(85,222)	914,778
Loss for the year	-	(56,636)	(56,636)
Total comprehensive loss for the year	-	(56,636)	(56,636)
At 31 December 2015	1,000,000	(141,858)	858,142

27 JUN 2016

STATEMENT OF CASH FLOWS FOR THE YEAR ENDED 31 DECEMBER 2015

	Note	2015 TZS'000	2014 TZS'000
<b>Cash flows from operating activities</b>			
Loss before tax		(56,636)	(53,154)
<b>Adjustments for:</b>			
Depreciation of property, plant and equipment	8	38,373	32,918
Amortization of intangible asset		18,914	-
<b>Operating loss before working capital changes</b>		651	(20,236)
Decrease in other receivables		4,847	33,903
Increase/(decrease) in trade and other payables		168,799	(668,841)
<b>Cash generated/ (used in) from operations</b>		174,297	(655,174)
<b>Net cash generated from/(used in) operating activities</b>		174,297	(655,174)
<b>Cash flows from investing activities</b>			
Purchase of property, plant and equipment	8	(14,845,931)	(7,503,533)
Purchase of mining licenses	9	(13,790)	(337,080)
<b>Net cash used in investing activities</b>		(14,859,721)	(7,840,613)
<b>Cash flows from financing activities</b>			
Amounts received from parent company	12	13,112,546	7,358,770
Amounts received from guarantor	12	1,234,822	1,155,858
<b>Net cash generated from financing activities</b>		14,347,368	8,514,628
<b>Net (decrease) / increase in cash and cash equivalents</b>		(338,056)	18,841
Cash and cash equivalents at 1 January		362,717	343,876
Cash and cash equivalents at 31 December		24,661	362,717

27 JUN 2016

**NOTES**

**1. Summary of significant accounting policies**

The significant accounting policies adopted in the preparation of these general purpose financial statements are set out below:

**a) Basis of preparation**

The financial statements are prepared on a going concern basis and in compliance with International Financial Reporting Standards (IFRS). They are presented in Tanzania Shillings, which is also the functional currency (see (c) below), rounded to the nearest thousand (TZS'000).

The financial statements comprise a statement of comprehensive income, statement of financial position, statement of changes in equity, statement of cash flows, and notes. Income and expenses, including the components of other comprehensive income, are recognised in the statement of comprehensive income. Other comprehensive income is recognised in the statement of comprehensive income and comprises items of income and expense (including reclassification adjustments) that are not recognised in the profit and loss as required or permitted by IFRS. Reclassification adjustments are amounts reclassified to the profit and loss in the current period that were recognised in other comprehensive income in the current or previous periods. Transactions with the owners of the company in their capacity as owners are recognised in the statement of changes in equity.

**Measurement basis**

The measurement basis used is the historical cost basis except where otherwise stated in the accounting policies below.

For those assets and liabilities measured at fair value, fair value is the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. When measuring the fair value of an asset or a liability, the company uses market observable data as far as possible. If the fair value of an asset or a liability is not directly observable, it is estimated by the company using valuation techniques that maximize the use of relevant observable inputs and minimize the use of unobservable inputs (e.g. by use of the market comparable approach that reflects recent transaction prices for similar items or discounted cash flow analysis). Inputs used are consistent with the characteristics of the asset / liability that market participants would take into account.

Fair values are categorised into three levels in a fair value hierarchy based on the degree to which the inputs to the measurement are observable and the significance of the inputs to the fair value measurement in its entirety:

- Level 1 fair value measurements are those derived from quoted prices (unadjusted) in active markets for identical assets or liabilities.
- Level 2 fair value measurements are those derived from inputs other than quoted prices included within Level 1 that are observable for the asset or liability, either directly (i.e. as prices) or indirectly (i.e. derived from prices).
- Level 3 fair value measurements are those derived from valuation techniques that include inputs for the asset or liability that are not based on observable market data (unobservable inputs).

Transfers between levels of the fair value hierarchy are recognised by the company at the end of the reporting period during which the change occurred.

**b) New and revised standards**

**i) Adoption of new and revised standards**

A number of amendments to standards and one interpretation became effective for the first time in the financial year beginning 1 January 2015 and have been adopted by the company. None of them has had an effect on the company's financial statements.

NOTES (CONTINUED)

1. Summary of significant accounting policies (continued)

b) New and revised standards (continued)

ii) New and revised standards and interpretations which have been issued but are not effective

The following revised standards and interpretations have been published but are not yet effective for the year beginning 1 January 2015. The company has not early adopted any of these amendments or interpretations.

- Amendments to IAS 16 and IAS 38 titled *Clarification of Acceptable Methods of Depreciation and Amortisation* (issued in May 2014) – The amendments add guidance and clarify that (i) the use of revenue-based methods to calculate the depreciation of an asset is not appropriate because revenue generated by an activity that includes the use of an asset generally reflects factors other than the consumption of the economic benefits embodied in the asset, and (ii) revenue is generally presumed to be an inappropriate basis for measuring the consumption of the economic benefits embodied in an intangible asset; however, this presumption can be rebutted in certain limited circumstances. They are prospectively effective for annual periods beginning on or after 1 January 2016.

- IFRS 15 *Revenue from Contracts with Customers* (issued in May 2014) - The new standard, effective for annual periods beginning on or after 1 January 2017, replaces IAS 11, IAS 18 and their interpretations (SIC-31 and IFRIC 13, 15 and 18). It establishes a single and comprehensive framework for revenue recognition to apply consistently across transactions, industries and capital markets, with a core principle (based on a five-step model to be applied to all contracts with customers), enhanced disclosures, and new or improved guidance.

- IFRS 9 *Financial Instruments* (issued in July 2014) – This standard will replace IAS 39 (and all the previous versions of IFRS 9) effective for annual periods beginning on or after 1 January 2018. It contains requirements for the classification and measurement of financial assets and financial liabilities, impairment, hedge accounting and derecognition:

- o IFRS 9 requires all recognised financial assets to be subsequently measured at amortised cost or fair value (through profit or loss or through other comprehensive income), depending on their classification by reference to the business model within which they are held and their contractual cash flow characteristics.

- o For financial liabilities, the most significant effect of IFRS 9 relates to cases where the fair value option is taken: the amount of change in fair value of a financial liability designated as a fair value through profit or loss that is attributable to changes in the credit risk of that liability is recognised in other comprehensive income (rather than in profit or loss), unless this creates an accounting mismatch.

- o For the impairment of financial assets, IFRS 9 introduces an "expected credit loss" model based on the concept of providing for expected losses at inception of a contract; it will no longer be necessary for there to be objective evidence of impairment before a credit loss is recognised.

- o For hedge accounting, IFRS 9 introduces a substantial overhaul allowing financial statements to better reflect how risk management activities are undertaken when hedging financial and non-financial risk exposures.

- o The derecognition provisions are carried over almost unchanged from IAS 39.

- IFRS 16 *Leases* (issued in January 2016) - The new standard, effective for annual periods beginning on or after 1 January 2019, introduces a new lessee accounting model, and will require a lessee to recognise assets and liabilities for all leases with a term of more than 12 months, unless the underlying asset is of low value. A lessee will be required to recognise a right-of-use asset representing its right to use the underlying leased asset and a lease liability representing its obligation to make lease payments.

- Amendments to IAS 12 titled *Recognition of Deferred Tax Assets* (issued in January 2016) – The amendments, applicable to annual periods beginning on or after 1 January 2017, provide additional guidance on the estimation of future taxable profits when considering the recoverability of deferred tax assets.

NOTES (CONTINUED)

1. Summary of significant accounting policies (continued)

b) New and revised standards (continued)

ii) New and revised standards and interpretations which have been issued but are not effective (continued)

- Amendments to IAS 7 titled Disclosure Initiative (issued in January 2016) – The amendments, applicable to annual periods beginning on or after 1 January 2017, require enhanced disclosure concerning changes in liabilities arising from financing activities.

The directors do not plan to apply any of the above until they become effective. Based on their assessment of the potential impact of application of the above, they do not expect that there will be a significant impact on the company's financial statements, other than the new standard on Leases, which will result in the recognition of additional assets and liabilities, and aggregate additional depreciation and interest costs in excess of current operating lease rentals.

c) Translation of foreign currencies

On initial recognition, all transactions are recorded in the functional currency (the currency of the primary economic environment in which the company operates), which is Tanzania Shillings.

Transactions in foreign currencies during the year are converted into the functional currency using the exchange rate prevailing at the transaction date. Monetary assets and liabilities at the statement of financial position date denominated in foreign currencies are translated into the functional currency using the exchange rate prevailing as at that date. The resulting foreign exchange gains and losses from the settlement of such transactions and from year-end translation are recognised on a net basis in the statement of comprehensive income in the year in which they arise.

d) Financial instruments

Classification

- i) **Loans and receivables**, which comprise non-derivative financial assets with fixed or determinable payments that are not quoted in an active market, and excludes assets which the entity intends to sell immediately or in the near term or those which the entity upon initial recognition designates as at fair value through profit or loss or as available-for-sale financial assets.
- ii) **Financial liabilities**, which comprise all financial liabilities except financial liabilities at fair value through profit or loss.

Financial instruments held during the year were classified as follows:

- Demand and term deposits with banking institutions and trade and other receivables were classified as 'loans and receivables'.
- Trade and other liabilities were classified as financial liabilities.

Recognition

*Financial assets*

All financial assets are recognised initially using the trade date accounting which is the date the company commits itself to the purchase or sale. Financial assets are recorded at the fair value of the consideration given plus the transaction cost.

NOTES (CONTINUED)

1. Summary of significant accounting policies (continued)

d) Financial instruments (continued)

Recognition and measurement (continued)

Subsequently, loans and receivables are carried at amortised cost using the effective interest method.

Amortised cost is the amount at which the financial asset or liability is measured on initial recognition minus principal repayments, plus or minus the cumulative amortisation using the effective interest method of any difference between the initial amount and the maturity amount, and minus any reduction for impairment or uncollectibility.

The company assesses at each statement of financial position date whether there is objective evidence that a financial asset is impaired. If any such evidence exists, an impairment loss is recognised. Impairment loss is the amount by which the carrying amount of an asset exceeds its recoverable amount. In the case of loans and receivables, the recoverable amount is the present value of the expected future cash flows, discounted using the asset's effective interest rate.

Changes in the carrying values and impairment losses of loans and receivables are recognised in the statement of comprehensive income. Trade and other receivables not collectible are written off against the related provision. Subsequent recoveries of amounts previously written off are credited to the statement of comprehensive income in the year

Financial liabilities

All financial liabilities are recognised initially at fair value of the consideration given plus the transaction cost. Subsequently, all financial liabilities are carried at amortised cost using the effective interest method.

Presentation

Financial assets are classified as non-current except those with maturities of less than 12 months from the statement of financial position date, those which the directors have the express intention of holding for less than 12 months from the statement of financial position date or those that are required to be sold to raise operating capital, in which case they are classified as current assets.

Financial liabilities are classified as non-current except those expected to be settled in the company's normal operating cycle, those payable or expected to be paid within 12 months of the statement of financial position date and those which the company does not have an unconditional right to defer settlement for at least 12 months after the statement of financial position date.

Derecognition

Financial assets are derecognised when the rights to receive cash flows from the investments have expired or the company has transferred substantially all risks and rewards of ownership.

Financial liabilities are derecognised only when the obligation specified in the contract is discharged or cancelled or expires.

Offsetting

Financial assets and liabilities are offset and the net amount reported in the statement of financial position only when there is a legally enforceable right to set off the recognised amounts and there is an intention to settle on a net basis, or realise the asset and settle the liability simultaneously.

NOTES (CONTINUED)

1. Summary of significant accounting policies (continued)

e) Income taxes

Income tax expense is the aggregate amount charged/(credited) in respect of current tax and deferred tax in determining the profit or loss for the year. Tax is recognised in the statement of comprehensive income except when it relates to items recognised in other comprehensive income, in which case it is also recognised in other comprehensive income, or to items recognised directly in equity, in which case it is also recognised directly in equity.

Current tax

Current income tax is the amount of income tax payable on the taxable profit for the year, and any adjustment to tax payable in respect of prior years, determined in accordance with the Tanzanian Income Tax Act.

Deferred income tax

Deferred income tax is provided in full on all temporary differences except those arising on the initial recognition of an asset or liability, other than a business combination, that at the time of the transaction affects neither the accounting nor taxable profit or loss. Deferred income tax is determined using the liability method on all temporary differences arising between the tax bases of assets and liabilities and their carrying values for financial reporting purposes, using tax rates and laws enacted or substantively enacted at the statement of financial position date and expected to apply when the related deferred income tax asset is realised or the deferred tax liability is settled.

Deferred income tax assets are recognised only to the extent that it is probable that future taxable profits will be available against which temporary differences can be utilised. Recognised and unrecognised deferred tax assets are reassessed at the end of each reporting period and, if appropriate, the recognised amount is adjusted to reflect the extent that it has become probable that future taxable profits will allow the deferred tax asset to be recovered.

f) Cash and cash equivalents

Cash and cash equivalents include demand deposits that are readily convertible to known amounts of cash and which are subject to an insignificant risk of changes in value.

2. Significant judgments and key sources of estimation uncertainty

In the process of applying the accounting policies adopted by the company, the directors make certain judgments and estimates that may affect the carrying values of assets and liabilities in the next financial period. Such judgments and estimates are based on historical experience and other factors, including expectations of future events that are believed to be reasonable under the current circumstances. The directors evaluate these at each financial reporting date to ensure that they are still reasonable under the prevailing circumstances based on the information available.

In the opinion of the directors, they have made no assumptions and there are no sources of estimation uncertainty that are likely to cause a material adjustment to the carrying values of assets and liabilities within the next financial year.

3. Risk management objectives and policies

a) Financial risk management

The company's activities expose it to a variety of financial risks including credit, liquidity and market risks. The company's overall risk management policies are set out by the board and implemented by the management, and focus on the unpredictability of changes in the business environment and seek to minimise the potential adverse effects of such risks on the company's performance by setting acceptable levels of risk. The company does not hedge against any risks.

NOTES (CONTINUED)

3. Risk management objectives and policies

a) Financial risk management (continued)

i) Credit risk

Credit risk is the risk that one party to a financial instrument will cause a financial loss for the other party by failing to discharge an obligation. Credit risk mainly arises from financial assets, and is managed on a company-wide basis. The company does not grade the credit quality of financial assets that are neither past due nor impaired.

Credit risk on financial assets with banking institutions is managed by dealing with institutions with good credit ratings and placing limits on deposits that can be held with each institution.

The company is only exposed to credit risk to the extent balances disclosed on the statement of financial position

ii) Liquidity risk

Liquidity risk is the risk that the company will encounter difficulty in meeting obligations associated with financial liabilities. The company depends on the parent company for ensuring that all financial liabilities are settled as they fall due.

The table below summarises the maturity analysis for financial liabilities to their remaining contractual maturities. The amounts disclosed are the contractual undiscounted cash flows.

	Between 1-3 months TZS'000	Between 3-12 months TZS'000	Over 1 year TZS'000
<b>Year ended 31 December 2015</b>			
Trade and other payables	-	-	761,608
Amounts due to parent company	12,412,460	700,000	25,609,765
	<u>12,412,460</u>	<u>700,000</u>	<u>26,371,373</u>
<b>Year ended 31 December 2014</b>			
Trade and other payables	721,958	37,586	-
Amounts due to parent company	-	-	24,374,943
	<u>721,958</u>	<u>37,586</u>	<u>24,374,943</u>

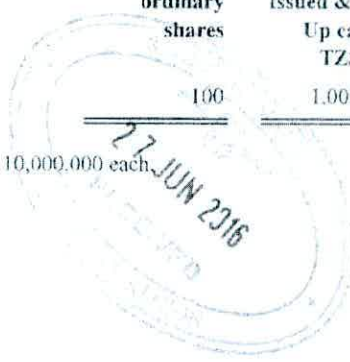
iii) Market risk

Market risk is the risk that the fair value or future cash flows of financial instruments will fluctuate because of changes in market price and comprises three types of risks: currency risk, interest rate risk and other price risk. The company is not exposed to any market risk.

NOTES (CONTINUED)

	2015 TZS'000	2014 TZS'000
<b>4. Loss before tax</b>		
<b>Items charged</b>		
The following items have been charged in arriving at loss before tax:		
Depreciation on furniture and equipment	38,373	32,917
Auditor's remuneration		
Current year	7,350	8,750
	<u>          </u>	<u>          </u>
<b>5. Taxation</b>		
Current income tax	-	-
Deferred income tax (Note 7)	-	-
Taxation	<u>          </u>	<u>          </u>
	<u>          </u>	<u>          </u>
The tax on the company's loss before income tax differs from the theoretical amount that would arise using the statutory income tax rate as follows:		
<b>Loss before income tax</b>	(56,636)	(53,154)
Tax calculated at the statutory tax rate of 30%	(16,991)	(15,946)
Tax effect of:		
Expenses not deductible for tax purposes	353	2,314
Deferred tax not recognised	16,638	13,632
	<u>          </u>	<u>          </u>
Income tax	<u>          </u>	<u>          </u>
	<u>          </u>	<u>          </u>
<b>6. Share capital</b>	<b>No. of ordinary shares</b>	<b>Issued &amp; Paid Up capital TZS'000</b>
1 January 2014, 31 December 2014, 1 January 2015 and 31 December 2015	100	1,000,000
	<u>          </u>	<u>          </u>

The total number of authorised ordinary shares is 5,000 with a par value of TZS 10,000,000 each.



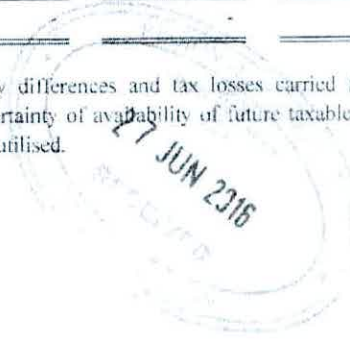
NOTES (CONTINUED)

7. Deferred income tax

Deferred income tax is calculated using the enacted tax rate of 30% (2014: 30%). Deferred tax assets and liabilities, and the deferred tax charge/(credit) in the statement of comprehensive income are attributable to the following items:

	At 1 January TZS'000	(Credited) /charged statement of comprehensive income TZS'000	At 31 December TZS'000
<b>Year ended 31 December 2015</b>			
<b>Deferred income tax asset</b>			
Tax losses carried forward	26,054	10,135	36,189
Furniture and equipment	(2,803)	6,503	3,700
<b>Net deferred tax asset</b>	<u>23,251</u>	<u>16,638</u>	<u>39,889</u>
<b>Deferred tax asset not recognised</b>	<u>(23,251)</u>	<u>(16,638)</u>	<u>(39,889)</u>
<b>Deferred income tax</b>	<u>-</u>	<u>-</u>	<u>-</u>
<b>Year ended 31 December 2014</b>			
<b>Deferred income tax asset</b>			
Tax losses carried forward	14,285	11,769	26,054
Furniture and equipment	(4,665)	1,862	(2,803)
<b>Net deferred tax asset</b>	<u>9,620</u>	<u>13,631</u>	<u>23,251</u>
<b>Deferred tax asset not recognised</b>	<u>(9,620)</u>	<u>(13,631)</u>	<u>(23,251)</u>
<b>Deferred income tax</b>	<u>-</u>	<u>-</u>	<u>-</u>

The deferred tax asset has not been recognised on deductible temporary differences and tax losses carried forward amounting to TZS 133 million (2014: TZS 77.5 million) due to lack of certainty of availability of future taxable profits against which such deductible temporary differences and tax losses could be utilised.



*Mumba Cement Company Limited*  
*Financial statements*  
*For the year ended 31 December 2015*

NOTES (CONTINUED)

	Computer equipment TZS'000	Evaluation & explorations TZS'000	Total TZS'000
<b>8. Property, plant and equipment</b>			
<b>At 1 January 2014</b>			
Cost	82,931	17,806,623	17,889,554
Accumulated depreciation	(15,549)	-	(15,549)
Net carrying amount	<u>67,382</u>	<u>17,806,623</u>	<u>17,874,005</u>
<b>Year ended 31 December 2014</b>			
Opening carrying amount	67,382	17,806,623	17,874,005
Additions	19,397	7,484,136	7,503,533
Depreciation charge	(32,918)	-	(32,918)
Closing carrying amount	<u>53,861</u>	<u>25,290,759</u>	<u>25,344,620</u>
<b>At 31 December 2014</b>			
Cost	102,328	25,290,759	25,393,087
Accumulated depreciation	(48,467)	-	(48,467)
Net carrying amount	<u>53,861</u>	<u>25,290,759</u>	<u>25,344,620</u>
<b>Year ended 31 December 2015</b>			
Opening carrying amount	53,861	25,290,759	25,344,620
Additions	-	14,845,931	14,845,931
Transfers from intangible assets	-	161,730	161,730
Depreciation charge	(38,372)	-	(38,372)
Closing carrying amount	<u>15,489</u>	<u>40,298,420</u>	<u>40,313,909</u>
<b>At 31 December 2015</b>			
Cost	102,328	40,298,420	40,400,748
Accumulated depreciation	(86,839)	-	(86,839)
Net carrying amount	<u>15,489</u>	<u>40,298,420</u>	<u>40,313,909</u>

**9. Intangible assets**

The carrying values of the company's Tanzanian mineral properties rights and cost associated are as follows:

	2015 TZS'000	2014 TZS'000
At 1 January	337,080	337,080
Additions	13,790	-
Transfers to property, plant and equipment	(161,730)	-
Amortization	(18,914)	-
<b>At 31 December</b>	<u>170,226</u>	<u>337,080</u>

*Mamba Cement Company Limited*  
*Financial statements*  
*For the year ended 31 December 2015*

NOTES (CONTINUED)

	2015 TZS'000	2014 TZS'000
<b>10. Other receivables</b>		
Other receivables	-	4,848
<b>11. Trade and other payables</b>		
Trade payables	37,500	37,586
Accruals	890,843	721,958
Payable to related party (Note 12 (i))	-	-
	<u>928,343</u>	<u>759,544</u>

**12. Related party transactions**

The holding company is Espirit Developers Limited and other related companies which are under Motisun and Estim Group of companies and are related through common shareholding or common directorships.

	2015 TZS'000	2014 TZS'000
<b>(i) Loan from parent company</b>		
Opening balance	24,374,943	15,860,315
Amount received	13,112,546	7,358,770
Interest charged	1,234,822	1,155,858
Closing balance	<u>38,722,311</u>	<u>24,374,943</u>

The loan has been advanced by M.M. Intergrated Steel Mills Limited. The loan is unsecured and interest is charged at 5.62% per annum which is currently being serviced annually by the guarantor, Motisun Holding Limited on behalf of Mamba Cement Company Limited. The interest amount is repayable by the company to the guarantor on 31 December 2018 and the principal amount is repayable by the company to the lender on 31 December 2029.

**13. Going concern**

At the financial position date, the current liabilities exceeded current assets by TZS 903,082,000 (2014: TZS 391,979,000). The company's operations are fully financed by its parent company as all the company's investments are still at exploratory phase and consequently the company has no revenue. The company depends on its parent company to finance its operations. The parent company has confirmed that it will continue to provide financial support that may be required by the company in the foreseeable future.

Unclaimed refund beyond three years will be voided



## TANZANIA INVESTMENT CENTRE

Shaaban Robert Street, P.O. Box 938, Dar Es Salaam, Tel. +255 22 2116328-31, Fax: +255 22 2118253

RECEIPT REC032254

No. 025535

Received from : MAMBA CEMENT CO. LTD.

Address : P.O. Box 3030, RAGAMQYO.

Received the sum of (In words): ONE THOUSAND AND ZERO CENTS ONLY.

Being payment in respect of : CERTIFICATE OF INCENTIVES

Amount : USD 1,000.00

Cash / Cheque No: D Deposit 02/05

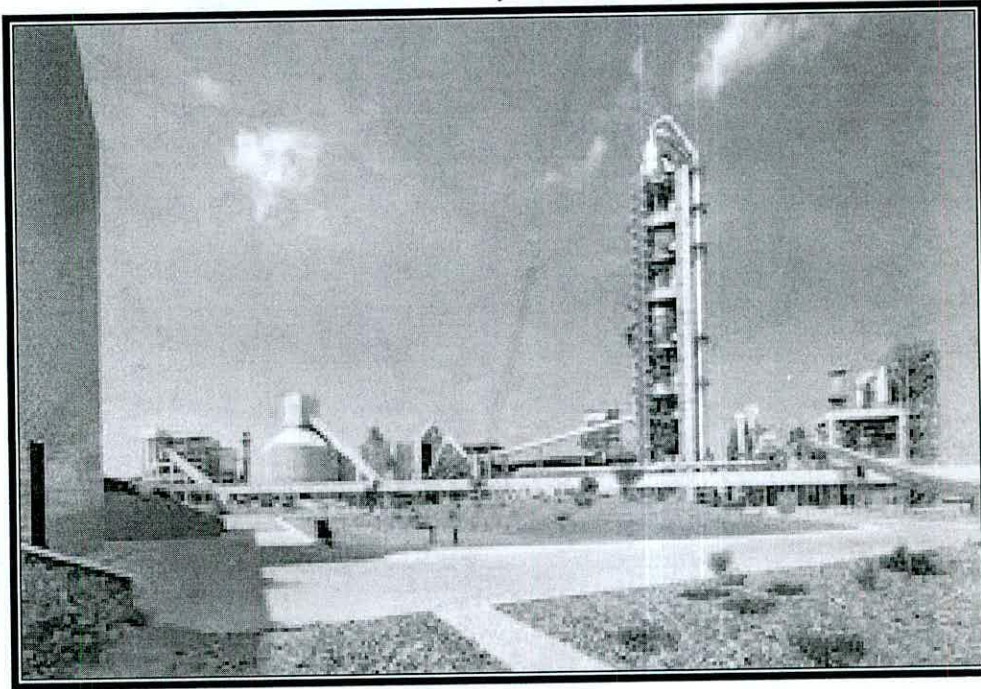
Date : 08-May-2017

Buisso

Receiving Officer

# **PROGRESS REPORT**

## **1.0 MTPA (3000 TPD) GREENFIELD CEMENT PLANT AT BAGAMOYO, TANZANIA**



**MAMBA CEMENT COMPANY LIMITED**



## **INTRODUCTION**

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### **➤ The Project**

Installation of a 1.0 mio tpa clinker/ 1.14 mio tpa cement Greenfield cement plant along with 30 MW captive power plant at Tarawanda village in the Bagamoyo district. The cement project will produce about 82% PLC (Portland Limestone Cement) and 18% OPC (Ordinary Portland Cement).

The note in hand details out the progress made by Mamba Cement Company Limited (MCCL) in the project implementation since the performance contract was signed on 15<sup>th</sup> April 2014 with Government of Tanzania represented by Tanzania Investment Centre (TIC).

### **➤ Promoter's Background**

Mamba Cement Company Limited (MCCL), promoted by the holding company, Motisun Holdings Limited, a diversified Group engaged in the manufacture of various industrial products in Tanzania.

#### **The Main Promoters of the Project are:**

- **Espirit Developers - 90%**
- **Mr. Subhash Patel - 5%**
- **Mr. Girdharbhai M Pindolia - 5%**

In addition to the above promoters, in future other promoters may also join for equity participation.

## MARKET SCENARIO FOR THE PROJECT

The cement consumption in Tanzania increased by around 12% pa in the past 10 years to reach 4.12 mio t in 2014 from around 1.40 mio t in 2004. The major driver of cement consumption has been the construction of residential and commercial housing.

There are 5 major plants in Tanzania holding around 90% of the capacity share. The other notable players include Camel Cement, Fortune Cement, Lee Building Resources, Arusha Cement and Kesarave Cement. Currently, the total effective capacity of all cement plants is around 5.0 mio tpa. The current cement capacity of the plants is given below.

*Figures in mio tpa*

Sn	Company and Plant Location	Effective Cement Capacity
1	Tanzania Portland Cement Company (TPCC)	2.00
2	Tanga Cement Company (TCC)	1.10
3	Mbeya Cement Company (MCC)	0.35
4	ARM Cement (GU)	0.70
5	Lake Cement	0.50
6	ARM Cement	-*
7	Amson Industries (T) Ltd. (GU)	0.18
8	Fortune Cement (GU)	0.15
8	Lee Building Resources (GU)	0.15
9	Kesarave Cement (GU)	0.10
10	Arusha Cement (GU)	0.10
<b>Total</b>		<b>5.33</b>

\* Only clinkerisation – with a capacity of 1.5 mio tpa



**1.0 MTPA (3,000 TPD) Cement Plant at Bagamoyo, Tanzania**  
**Mamba Cement Company Limited**

GU – Grinding Unit

Table below gives the future cement demand estimates for Tanzania.

Year	Demand ( mio t)
2015	4.61
2016	5.16
2017	5.77
2018	6.46
2019	7.24
2020	8.10
2021	9.07
2022	10.15

**Strategic Advantages of Mamba Cement**

- Group run by professionals, trained and experienced in every field of business.
- Vast experience of Promoters in operating ventures in Tanzania in diverse industries for many years.
- The promoters of the project have established market in building materials and can extend the existing infrastructure for marketing of cement
- Plant will be located close to the two large ports in the country viz. Dar-es-Salam and Bagamoyo (proposed).
- Tanzania is poised for rapid economic growth, with ever increasing need of cement
- Many infrastructure projects viz. airports, sea ports, roads, housing, water works etc. planned with World Bank funds shall create demand for cement. This additional demand will have to be complimented through increased cement production within Tanzania.
- Increase in cement production will enable avenues for more exports to neighboring cement deficit countries, thereby earning of foreign exchange for the country.

- The project is strategically located close to the major market consumption centre i.e. Dar es Salaam. The project will also cater to other markets, ensuring economical availability particularly in the central part of Tanzania.
- The project will have state of art machineries and equipments with aim to lower the cost of production by high capacity utilization, reducing down time, saving in energy consumption, minimizing maintenance cost etc.
- Assured off take of around 20% of the cement production by Estim Constructions, one of the largest construction company in Tanzania.
- Captive limestone mines with adequate quality and quantity of proven reserves.
- Strong possibilities of utilizing quality coal from group coal mines.
- Modern plant with state of the art technology.
- Captive Power Plant ensuring uninterrupted power supply.
- Plant operation through highly experienced operators and managers.

## **RAW MATERIALS**

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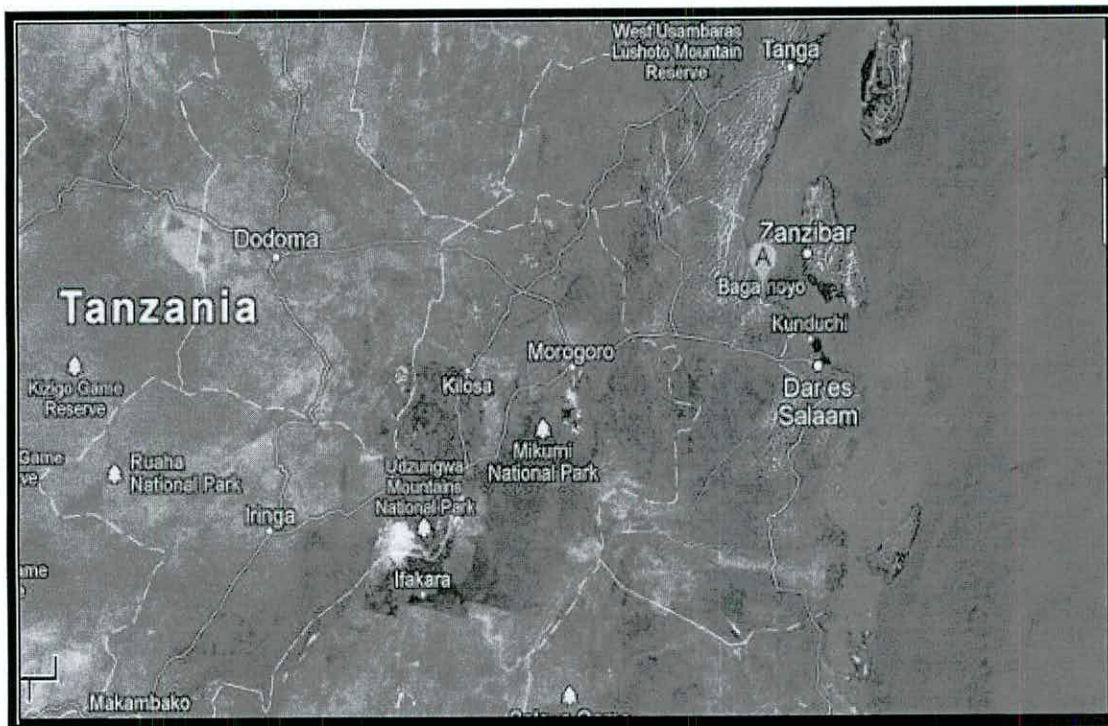
The Tarawanda Limestone deposit area has been acquired by M/s Mamba Cement Co Ltd (MCCL), at Tarawanda in north-eastern Coastal district Bagamoyo. MCCL obtained Mineral Prospecting Rights under the Mining Act 1998 of Tanzanian Government (ML 423/ 2007) for about 18.48 Sq Kms.

The Tarawanda Limestone deposit area is located at about 4 Km south- southeast of Tarawanda village and about 110 kms from Tanzania's capital Dar- es- Salaam. The motorway connects Dar-es Salaam – Chellinze (on Northern Highway going towards Arusha) – Bagamoyo to Tarawanda – with a 22 Kms long gravel road in the north.

MCCL has five mining leases, ML/ 420, 421, 422, 423 & 424. MCCL has completed detailed geological studies for the area (ML/ 423), which forms a part of the Tanzanian Survey Sheet No- 185/1 (Scale 1: 50,000)

The proposed Limestone area is a gentle rolling parallel north-south trending low height ridges (Creeks) of Middle Jurassic to Lower Cretaceous age shallow water coralline deposit in this valley.

The Limestone is calcretic, fine grained and micro- crystalline in appearance.



**Fig1: Project Location**

### ➤ Limestone

Promoters have taken mining license for about 21 sq km area. The area will have the limestone along with the proposed cement plant and captive power plant.

Limestone is the primary raw material required for production of cement. About 90 - 95 % limestone as raw material will be required to produce quality cement. Promoters have



**1.0 MTPA (3,000 TPD) Cement Plant at Bagamoyo, Tanzania**  
**Mamba Cement Company Limited**

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conducted the detailed geological explorations to ensure the qualitative and quantitative reserves. This exploration has been done by drilling about 65 bore holes. Based on the geological exploration limestone deposits of about 160 mio tonnes have been estimated. This reserve estimate has also been validated by JORC certified independent agency, PB World U.K.

Mining operations shall be carried out by mechanized open cast method utilizing Heavy Earth moving equipment in conjunction with loading and transportation arrangement. To start with the production in the existing mining blocks, slices / benches shall be kept long. To the extent possible, benches shall be kept along dip and advanced along the strike to give a fairly well blended material in each slice. The direction may be varied in due course based on experience gained, to give wider working periphery, longer faces and proper alignment along haul roads.

**Progress on limestone deposit evaluation:**

A Jorc competent reserve statement for the limestone deposit and the mining plan has been prepared by Morgan World Wide, USA (MWW)

MWW has divided the entire block of ML/ 423 in 17 pits and has subjectively categorized the limestone into range of grades, A, B, C, and D, with 37% as being the cutoff between ore and waste (grade D). The resultant grade of A-C (eg. ore) achieved is 44.7% CaO and 14.4% SiO<sub>2</sub>. Therefore a SiO<sub>2</sub> separator at 18% was added to separate this material into two additional categories for each grade. Only grade B had significant quantities of high and low SiO<sub>2</sub> to report both as grades B1 and B2 separately, and it was determined that grade C material with 37-40% CaO had higher than desirable SiO<sub>2</sub> levels. The result of increasing the CaO cutoff yielded an ore grade of 45.9% CaO and 12.9% SiO<sub>2</sub>, which meets the desired quality for the ore. Therefore, the desired and selected cutoff grade for limestone is 40% CaO.

S. No	Grade	CaO	SiO <sub>2</sub>
1.	Grade A	> 45%	Average Less than 18%
2.	Grade B1	40 – 45%	<18%
3.	Grade B2	40 – 45%	>18%
4.	Grade C	37 – 45%	Average More than 18%
5.	Grade D	< 37%	Average More than 18%

Source: Resource & Reserve Statement for the Talawanda Limestone Deposit submitted by MORGAN WORLDWIDE dated 06 June 2014

The following average blended requirements have been considered for limestone:

- Minimum average CaO of 43%.
- Maximum SiO<sub>2</sub> content of 13%.

Provided that CaO and SiO<sub>2</sub> criteria are met, clay, iron ore, bauxite will be mixed with limestone to produce:

- ✓ Lime Saturation Factor (LSF) of 100% for the mix.
- ✓ Alite (C3S) of 55 for the resultant clinker, basis the standard Bogue equation

Limestone grade control is achieved by blending of various pits. The geologic model indicates a higher SiO<sub>2</sub> content in limestone from pits 11 through 17, and it is desirable to blend some of this material with lower SiO<sub>2</sub> material from pits 1 through 10. The average quality of expected limestone to meet the parameters defined for clinker production is as follows:

Parameter	CaO	SiO <sub>2</sub>	Al <sub>2</sub> O <sub>3</sub>	Fe <sub>2</sub> O <sub>3</sub>	MgO	TiO <sub>2</sub>	LSF	MS	MA
Volume Weighted Average	45.92%	12.83%	1.72%	0.79%	0.56%	0.11%	119.4%	5.11%	2.16%

Source: Resource & Reserve Statement for the Talawanda Limestone Deposit submitted by MORGAN WORLDWIDE dated 06 June 2014

## ESTIMATED RESERVES

The calculated proven reserves as per MWW indicates the life of the mine as approximately 37 years worth of production at 80% recovery for a cement plant that can process 1.6-million tonnes per year. Additional reserves in the area are being explored and this may increase the expected life of mine.

## THEORETICAL RAW MIX CONSIDERATIONS

Based on the average composition of raw material and coal, the raw mix for fifteen (15) years and the Quarterly Raw mix for two years has been worked out. Based on the working MWW has proposed to use grade D waste material (calcareous mudstone) as an alternative to importing clay. The raw mix has been worked out considering fuel from South Africa and Tanzania. The raw mix ensure manufacturing quality clinker as per international standard.

The theoretical calculation for the raw mix for the cement plant works out as follows:

S.No	Description	Composition
1.	Limestone	95.86%
2.	Bauxite	2.64%
3.	Iron Ore	1.50%

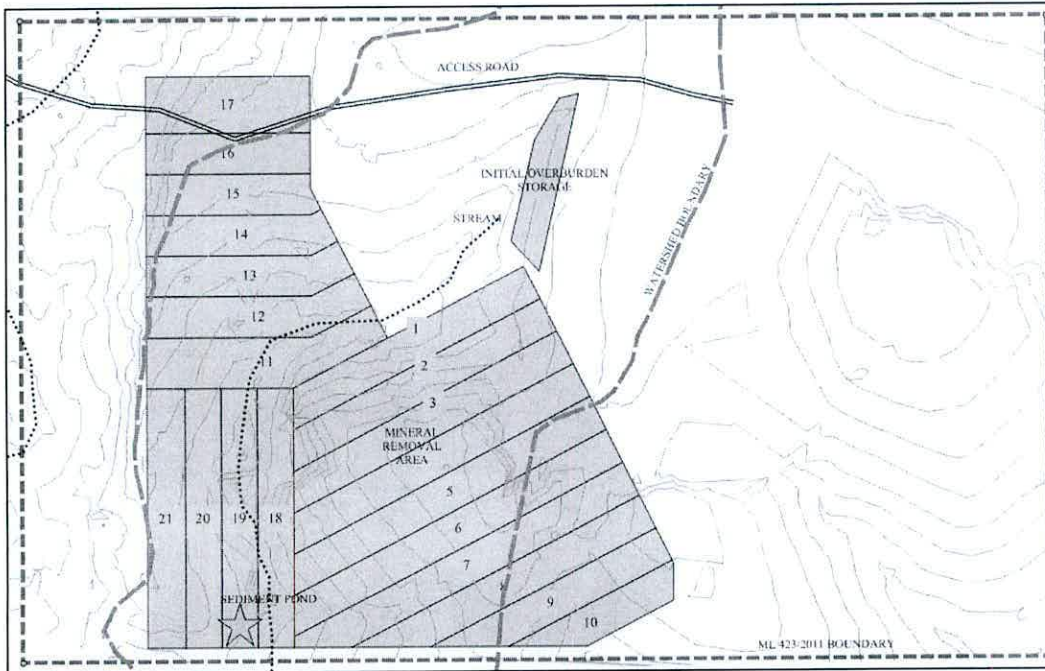
*Theoretical Raw mix*

## CLINKERISATION FACTOR

The average clinkerisation factor for fifteen (15) years works out to 1.54.

## MINE DEVELOPMENT

Strip mining as the proposed mining method shall be utilized for exploiting limestone. Proposed mine pits, in accordance with a proposed strip mining method, is presented below:



**Proposed Mine Pits**

*Source: Resource & Reserve Statement for the Talawanda Limestone Deposit submitted by MORGAN WORLDWIDE dated 06 June 2014.*

Mining is proposed to begin from Pit 1 and progress southeast. The limestone crusher is proposed to be placed on the west edge of Pit 11 or Pit 12, depending on the final alignment of the overland conveyor for transporting crushed limestone to cement plant. Limestone grade control is achieved by blending the limestone mined from Pits 1 through 10 with the limestone of high silica content mined from pits 11 through 17.

**Infrastructure**

➤ **Land**

The land area for the cement plant including the captive power plant shall be about 100 ha (1 sq km). The land towards the western part within the mining license area shall be utilised for the cement plant. The area for the cement is undulated and would require cutting and filling in order to provide a workable gradient for plant construction.

### **Progress on Land:**

MCCL has acquired the land for the entire mining license area. The compensation to the villagers have been paid suitably and the records for the compensation paid have been shared with the respective government authorities. Presently title transfer is in process and is envisaged to be achieved in coming 2 to 3 months.

### **➤ Power**

The power requirement for the cement plant has been estimated to be about 22 MW. The power requirement shall be met by installing a Captive Power Plant. The capacity of power plant was previously selected as 25 MW but now the capacity has been increased to 30 MW considering the future expansions. The power generated shall meet the requirements of cement plant and the residential colony. The power plant shall have two AFBC (Atmospheric air Fluidized Bed Combustion) boilers and one turbo generator. The captive power plant shall ensure availability power for the consistent operation of cement plant and also shall avoid dependence on the National Grid. The technology selected for power plant is an state of the art installation with emission levels well within the international standards.

### **Progress on Power:**

MCCL has negotiated and entered into a MOU with ISGEC, India a reputed power plant contractor. The power plant would be executed in a turnkey EPC mode thus ensuring quality and timely execution of the project. ISGEC has immense experience in thermal power plants and also have good presence in African continent. Presently the work on contract preparation is going under the legal guidance and is envisaged that the contract will be signed by March 2016. ISGEC has guaranteed a execution time of 23 months from the date of contract effectiveness.

## ➤ Water

The estimated requirement of water (including process and drinking water) for the cement and power plant will be about 4000 m<sup>3</sup>/day. The possible sources of water can be underground water through bore holes, pipe line from public water supply system or from a nearby stream, after constructing a check dam in the said location. No ground water is available from the mines. The technology of the plant is such selected that there shall be minimum wastage and all of the cooling water shall be recycled. The major water consumption shall be in the grinding process of cement plant and steam generation for power plant. The plant will be equipped with the water treatment system to ensure quality water is available to people for drinking and for the process.

The project has identified three potential source for meeting the water requirement.

- Underground water
- Water from seasonal Mkombezi River
- Water from Wami pipe line

### **Progress on Water:**

Detailed hydro geological study has been completed in the area. Study was conducted by doing pump test by drilling 4 bore wells. It has been reported that there exist is big aquafire in the area and the requirement of water for the project can be met through that. The project has considered drilling of bore holes for recharging the ground water to charge the aquafire. As an alternate source, permission for sourcing water through the wami pipeline has also been achieved. The necessary connection to the pipeline would be done as the plant nears completion.

## ➤ Roads

The project site at village Tarawanda is situated about 110 km from Dar-es-Salaam. The site can be reached by travelling about 20km from village Kiwangwa on Bagamoyo - Tanga highway.

The project site from the highway is a single track gravel road and is not suitable for machinery and material transport.

### **Progress on Road:**

The initial survey of the road has been made and estimations received for widening and leveling the same. The work on road paving would start after the heavy rain period of 2016.

## ➤ Residential Colony

The project will employ more than 300 people to ensure consistent operation and availability of plant. Project plans to construct residential colony closer to the plant to provide housing for most of these employees. The colony shall be equipped with all the basic amenities like school, market, play ground, dispensary etc.

### **Progress on Residential Colony:**

The planning for the residential colony has been completed. The area shall have houses for the employees along with the essential infrastructure such as schools, dispensary, shopping area, area for worship, play ground etc. The colony has been planned to be located in the south of plant to avoid any disturbance from the plant operations. The



construction of colony would be by the promoters of MCCL and would start after the rainy month in 2016.

## **PROJECT TECHNICAL**

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### **Progress:**

MCCL has negotiated and entered into a MOU with CNBM, China (as lead contractor with FLS, India as main technology provider) and ISGEC, India both reputed cement plant and power plant contractor respectively. Both the plants would be executed in a turnkey EPC mode thus ensuring quality and timely execution of the project. Presently the work on contract preparation is going under the legal guidance and is envisaged that the contract will be signed by March 2016. CNBM and ISGEC have guaranteed a execution time of 29 months and 23 months respectively from the date of contract effectiveness.

The agreed technical details are as follows:

### **Cement Plant**

Clinker is produced using state of art dry process technology complying to EN 197-1 standards with limestone as the main raw material and coal as the primary fuel. Ordinary Portland Cement (OPC) is produced by grinding of cement clinker along with gypsum while Portland Limestone Cement (PLC) is manufactured by addition of limestone to cement clinker and gypsum. The key technical parameters considered for the cement plant are furnished below:

### **Storage Capacities**

The storages capacities considered for various raw materials and finish materials are as follows:

S. No	Description	Unit	Specification
<b>STOCKPILES</b>			
1.	Limestone	MT	2 x 24,000
2.	HG Limestone	MT	1 x 3,000
3.	Bauxite	MT	1 x 7,000
4.	Iron Ore	MT	1 x 3,500
5.	Gypsum	MT	1 x 8,000
6.	Limestone (for PLC)	MT	1 x 7,000
<b>STORAGE HOPPERS</b>			
1.	Surge bin for Limestone	MT	1 x 500
2.	Limestone	MT	2 x 250
3.	Bauxite	MT	1 x 100
4.	Iron Ore	MT	1 x 100
5.	Fourth Corrective	MT	1 x 60
6.	Raw Coal	MT	2 x 100
7.	Kiln feed Bin	MT	1 x 100
8.	Clinker	MT	2 x 250
9.	Limestone	MT	1 x 125
10.	Gypsum	MT	1 x 125
11.	Fly ash	MT	1 x 75
<b>STORAGE SILOS</b>			
1.	Blending Silo	MT	1 x 10,000
2.	Fine Coal Silo	MT	2 x 75
3.	Clinker Silo	MT	1 x 30,000
4.	Off-spec Silo	MT	1 x 1,000
5.	Cement Silo	MT	3 x 6,000
6.	Hot Dust Bin	MT	1 x 200

*Storage Capacities*

S. No	Description	Unit	Specification
2.	Truck Loading Machines	Bags/h	6 x 2400
3.	Bulk Loading	tph	1 x 150
	<b><u>Compressed Air System</u></b>		
1.	Compressor Air stations A	m <sup>3</sup> /hr	450
2.	Compressor Air Station B	m <sup>3</sup> /hr	4 x 2160
3.	Compressor Air Station C	m <sup>3</sup> /hr	2 x 2160
4.	Emergency Compressor for Kiln area	m <sup>3</sup> /hr	180
	<b><u>Water System</u></b>		
1.	Water Treatment Plant	m <sup>3</sup> /day	1500
2.	Raw Water Storage Tank	m <sup>3</sup>	2 x 3000
3.	Filtered / Treated Water Tank	m <sup>3</sup>	1000 / 2000
4.	Circulation / Process Water Tank	m <sup>3</sup>	2 x 500 / 500
5.	Cooling Tower	m <sup>3</sup> /hr	2 x 100
	<b><u>Weigh bridges</u></b>		
1.	For Material (In/Out)	MT	120 (pitless)
2.	For Bulk loading	MT	80 (pitless)
	<b><u>Sewage Treatment Plant</u></b>		
1.	Capacity	m <sup>3</sup> /day	500

*Equipment Capacities*

**Power Plant**

The proposed coal based power plant has been designed in conformity with modern concept in power plant engineering consistent with reliability and economy in operation and maintenance, for uninterrupted supply of steam to turbine and continuous generation of power. A non-reheat steam cycle with regenerative feed heating system is considered. Main steam from the Atmospheric Fluidised Bed Combustion boiler (Bubbling bed), after expansion through turbine, is exhausted and cooled in the air-cooled condenser.

### Equipment Capacities

The capacities of major process equipments considered are as follows:

S. No	Description	Unit	Specification
<b><u>Crushing and Material Handling</u></b>			
1.	Limestone Crusher	tph	800
2.	Over Land Belt Conveyor	tph	1000
3.	Additive Crusher	tph	350
4.	Limestone Stacker	tph	1000
5.	Limestone Reclaimer	tph	350
6.	Corrective Stacker	tph	450
7.	Coal Stacker	tph	250
8.	Coal Side Scrapper	tph	2 x 100
<b><u>Raw material Grinding</u></b>			
1.	Vertical Mill for Raw materials	tph	275
2.	Hot Air Generator	MW	13.5
<b><u>Coal Grinding</u></b>			
1.	Vertical Mill for Coal	tph	25
<b><u>Pyro-processing</u></b>			
1.	Silo Feeding Elevator	tph	350
2.	Preheater Feeding Elevator	tph	250
3.	Preheater	tpd	3000
4.	Rotary Kiln	tpd	3000
5.	Clinker Cooler	tpd	3000
6.	Clinker Pan Conveyor	tph	250
<b><u>Clinker Grinding</u></b>			
7.	Cement Grinding (RP+Ball mill)	tph	225 (PLC @ 3500Blaine)
<b><u>Cement Packing and Despatch</u></b>			
1.	Rotary Packer Machines	tph	2 x 150

The feed heating system consists of one (1) H.P. heater, one (1) deaerator and one (1) L.P. heater. The condensate from the condenser return tank is drawn by condensate extraction pump (2 x 100% capacity) and pumped to the Deaerator via ejector condenser and LP heater. The feed water after being deaerated in the deaerator is drawn by three (3) nos. (3 x 100%) boiler feed pump and pumped to boiler at economiser inlet. The H.P. and L.P. steam systems will supply steam to the deaerator, turbine gland sealing system and the hogging air ejector. Pressure Reducing and Desuperheating Stations (PRDS) is considered to supply pegging steam to deaerator. The PRDS is designed for offline and online steam dumping.

The key technical parameters considered for the power plant are furnished below:

S. No	Description	Unit	Specification
<b>A</b>	<b>POWER GENERATION</b>		
1.	Gross Power Generation	MW	30
2.	Voltage	kV	11±10%
3.	Frequency	Hz	50±5%
<b>B</b>	<b>PROPOSED TECHNICAL SPECIFICATIONS</b>		
<b>a)</b>	<b><u>Steam Generator</u></b>		
1.	The Net Capacity of each Boiler to Meet the Steam Demand at MCR (Maximum Continuous Rating)	tph	2 x 70
2.	The Steam Pressure at the Main Steam Stop Valve Outlet from Minimum Load up to MCR	ata	88
3.	The Steam Temperature at the Main Steam Stop Valve Outlet at MCR	deg C	515±5
4.	Fuel Feeding System		Underbed and Overbed Feeding System
5.	Fuel used for Boiler Start-Up from Cold.		100% High Speed Diesel (HSD)
6.	Configuration of Forced Draft Fans (FD) / Drive	No's	1 x 100% Per Boiler with Variable Frequency Drive

S. No	Description	Unit	Specification
			(VFD)
7.	Configuration of Primary Air Fans (PA) / Drive	No's	1 x 100% Per Boiler with Fixed Drive
8.	Configuration of Induced Draft Fan (ID) / Drive	No's	1 x 100% Per Boiler with VFD
9.	Configuration of Boiler Feed Pump Common	No's	3 x 100% (2W + 1S) Common for both the boilers
10.	Capacity of Boiler Feed Pump		110% of BMCR / VFD
11.	Coal Bunker Storage Capacity Considering Worst Grade Coal for Each Boiler	hrs	24 hours of Coal Consumption per Boiler
12.	Limestone Bunker Storage Capacity for Each Boiler Considering Firing of 100% Worst Grade Coal	hrs	16 hours of Limestone Consumption per Boiler
<b>b)</b>	<b><u>Steam Turbine Generator</u></b>		
1.	Type		Bleed cum Condensing Type
2.	No of Extractions/ Bleed	nos	3
3.	Gross Power at Generator Terminal	MW	30
4.	VWO Margin over Turbine Maximum Continuous Rating	%	5
5.	Deaerator Type		Spray Cum Tray Type
6.	Deaerator Storage Capacity	mins	10 (TGVWO+10% Margin)
7.	Number of Low Pressure Heaters		1
8.	Dumping System		
	-Online		8 MW Load Throw Off Condition
	-Offline		Designed to Suit Cold, Warm and Hot Start Up
9.	Governor Type		Electro Hydraulic Governing System
<b>c)</b>	<b><u>Air Cooled Condenser</u></b>		
1.	Design Ambient Temperature	deg C	35
2.	Condensing Pressure	ata	0.17 ata at TGVWO condition

S. No	Description	Unit	Specification
			+10% heat load margin
3.	Condensate Extraction Pumps		2 x 100%, VFD
4.	Condensate Storage Tank Capacity	mins	20 (TGVWO)
5.	Emergency Condensate Storage Tank	m <sup>3</sup>	120
<b>d)</b>	<b><u>Electrostatic Precipitator</u></b>		
1.	Maximum Dust Content at Outlet with all Fields in Working Condition	mg/Nm <sup>3</sup>	≤ 30
<b>e)</b>	<b><u>Chimney</u></b>		
1.	Quantity	nos	1
2.	Height of Chimney	m	75
3.	Chimney Construction		Mild Steel, Self Supported
<b>f)</b>	<b><u>Fuel Handling System</u></b>		
1.	System Proposed		
	Belt Conveyors from the Tapping Point upto Bunker		1 x 100%
	Crusher and Screens		2 x 100% (1W + 1S)
2.	Total System Throughput Capacity	tph	100
3.	Crusher Type		Impactor
<b>g)</b>	<b><u>Limestone Handling System</u></b>		
1.	System Proposed		1 x 100%
2.	Total System Throughput Capacity	tph	20 (Rated)
3.	Crusher Type		Impactor
<b>h)</b>	<b><u>Ash Handling</u></b>		
1.	Fly Ash Silo Capacity	m <sup>3</sup>	450
2.	Bed Ash Silo Capacity	m <sup>3</sup>	150
<b>i)</b>	<b><u>Water Treatment Plant</u></b>		
1.	Capacity of RO Plant	m <sup>3</sup> /h	2 x 20 (1W + 1S)
2.	Capacity of DM Plant	m <sup>3</sup> /h	2 x 5 (1W + 1S)
<b>j)</b>	<b><u>Auxiliary Cooling Tower (ACW)</u></b>		
1.	Type		Counter Flow Induced Draft

S. No	Description	Unit	Specification
2.	No of Cells		3 (2W+1S)
3.	Capacity	m <sup>3</sup> /hr	3 x 225
<b>k)</b>	<b><u>Fuel Oil Storage and Handling</u></b>		
1.	Diesel Oil Tank	m <sup>3</sup>	1 x 1000
2.	Unloading pumps		2 x 100% (1W + 1S)

*Power plant key technical parameters*

### ➤ Quality control

Facilities for chemical and physical analysis of raw material, fuel, clinker and cement will be part of the EPC contract.

The chemistry of the raw materials shall be analyzed by passing it through a PGNAA analyzer located on the raw material transport belt from crusher to stockpile.

The quality control concept includes all sampling stations and a fully equipped chemical and physical laboratory (main laboratory for analytical and physical testing and shift laboratory). The laboratory shall be equipped with all the quality control equipment including the apparatus, instruments, glassware and the required chemicals.

### ➤ Environmental Protection

#### **Major Emissions:**

Efficient dedusting and monitoring of dust sources like kiln exhaust gases, clinker cooler vent air; cement mill, power plant etc. have been considered. Baghouse type filters have been considered for the kiln, raw mill, cement mills and ESP for clinker cooler and power plant.

### **Smaller emissions:**

To minimize the dust emissions during operation of the plant, sufficient number of standardized dust filters (nuisance filters) of the fabric type have been considered at:

- Material transport transfer points
- Hoppers, bins and silos
- Dust generating machinery viz. crushers, loading equipment, packing, conveyors etc.

### **Gaseous Emissions and Control**

The proposed kiln system shall be designed with emphasis to minimize emissions to the atmosphere and for compliance with local environmental criteria and international standards for gaseous emissions. Modern technology burners, dosing systems (fuel and kiln feed), emissions monitoring and kiln control systems have been considered to minimize gaseous emissions from combustion processes (e.g. NO<sub>x</sub>, CO, SO<sub>2</sub>).

### **Noise Emissions**

All equipment considered in technical concept shall be designed to operate within the prescribed noise levels as defined by relevant standards. Where necessary special sound enclosures will be provided or the buildings will be designed with noise protection.

### **Sewage and Effluent Treatment**

Both sewage grade water and effluent (e.g. from water cooling system) shall be collected and treated. A sewage treatment plant is part of the contract in order to provide appropriate facilities for the collection and disposal of sewage from the plant (industrial sewage) as well as for the domestic sewage.

The treated water quality will be such to allow for its re-use in the clinker production process (water injection).



### **Site Drainage**

An efficient drainage system will collect rainwater. Water drainage channels, sufficiently dimensioned for anticipated heavy rainfall, have been considered around the proposed plant perimeter to eliminate the possibility of flooding of the site. The collected rain water will be diverted to the seasonal Mkombezi river.

### **Roads**

All roads and paved places planned for traffic movement within the proposed plant will have the tarred surface in order to reduce dust generation and protect the roads against damage.

### **Solid Waste Disposal**

The plant will have provision for collection and disposal of solid wastes i.e. used bricks etc.

## **HUMAN RESOURCES**

---

### **Progress:**

The organization structure varies from plant to plant within the Industry. Keeping in view the specific requirements for this project, the following strategy has been considered with respect to headcount:

- Project Execution Team (PMT) – Required to carry out the project activities till commissioning and handover of plant.
- Plant Operations & Maintenance Team (OMT) – Required during the commissioning / handover of plant and is responsible for effective operation of plant after handover.

The total manpower requirement during project phase both cement and power plant shall be 27 (Local – 4 nos, Expat 23 nos).

MCCL has developed a working level multidisciplinary team for the project consisting of financial, technical, geological, construction and project management experts. This team is being supported by the external expert agencies. The working team would be further strengthened as the project progresses toward contract effectiveness.

The total manpower estimated requirement during operation phase shall be as listed below:

S.No	Department	Manpower Requirement	
		Expat	Local
1.	Plant Head	1	
2.	Mines Department	7	60
3.	Technical Department	55	76
4.	Commercial Department	11	28
5.	Marketing Department	4	9
6.	Power plant	30	41
	<b>TOTAL</b>	<b>108</b>	<b>214</b>

*Manpower requirement – Plant operations*

The above requirement of manpower both for project and operation management will be fulfilled utilising the local skill to the extent possible and the expats will be recruited for key skills.

MCCL has worked out the entire recruitment process and have detailed out the month wise recruitment plan. MCCL shall be taking the services of local placement consultant for recruiting the maximum possible skilled manpower available locally. In the EPC contract MCCL has made provisions for the training of its manpower with a view to enhance the local skill set and reduce its dependency of expatriates

MCCL has developed a working level multidisciplinary team for the project consisting of financial, technical, geological, construction and project management experts. This team is being supported by the external expert agencies. The working team would be further strengthened as the project progresses toward contract effectiveness.

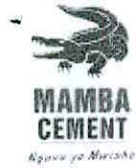
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## **1.0 MTPA (3,000 TPD) Cement Plant at Bagamoyo, Tanzania** **Mamba Cement Company Limited**

In addition to the above mentioned direct requirement of manpower, the project will generate ample job opportunities and small scale businesses to support the operations. This will lead to indirect employment of about 1,000 people. These indirect employment can be in various skilled and unskilled professions such as drivers, small manufacturing units, teachers, small shop keepers, security personnel etc.

### **PROJECT FINANCIALS**

#### **Progress:**

MCCL has appointed Standard Chartered Bank (SCB) as the advisory bank for the project finance requirement. SCB is working on the financial model and are also performing their due diligence on the project. The process of due diligence and financial model preparation is expected to be completed by January and subsequent to that SCB would approach the lenders for project debt raising.

#### **➤ Investment Cost**

Based on the two major MOU signed for the turnkey EPC execution of cement and power plant the total investment cost for the project now works out to about USD 288 million. The estimated investment cost for the project has been based on the requirement of fixed and non-fixed assets to meet the prescribed requirements. The total project investment cost is summarized in Table below:

<b>Sn.</b>	<b>Particulars</b>	<b>Estimated Cost In Mio.USD</b>
1.0	Land	15.00
2.0	Site & Mines Development	23.51
3.0	Building and Other Civil Structures	56.16

Sn.	Particulars	Estimated Cost In Mio.USD
4.0	Plant and Machinery	146.48
5.0	Technical Know How Fees	3.20
6.0	Miscellaneous Fixed Assets	6.20
7.0	Pre-Operative Expenses	24.12
8.0	Provision of Contingency	12.93
9.0	Margin Money for Working Capital	0.48
	<b>TOTAL</b>	<b>288.08</b>

The financing of the project based on has been considered as Equity and Term Loans from Financial Institutions. The debt-equity ratio has been considered as 1.857: 1 Interest on Term Loan has been considered as 6 % assumed to be repaid over 10 years from start of commercial production with a moratorium period of 36 months, which includes the construction period also.

Sources of Funds		
1	Debt	187.24
2	Equity	100.82
	<b>TOTAL</b>	<b>288.08</b>

➤ **Financial Analysis**

The Financial Results of the Project are as follows:

<b>S. No</b>	<b>Financial Parameter</b>	<b>Value</b>
1	Net Present Value (NPV) at 10% Discounting Rate (Mio USD)	112.68
2	IRR on Investment (%)	12.87 %
3	IRR on Equity (%)	18.62%
4	Debt Service Coverage Ratio	1.80
5	Payback Period	6 Years & 6 Months

*Financial Results*



0223099

THE UNITED REPUBLIC OF TANZANIA

# Certificate of Incentives

(Section 17 of the Tanzania Investment Act, 1997)

THIS CERTIFICATE REPLACES  
THE PREVIOUS ONE NO. 042496  
ISSUED ON 18/7/2016

AMENDMENT ON SECTION 10 & 11  
HAVE BEEN EFFECTED

No: ..... 042496 .....

## This is to certify that

.....  
MAMBA CEMENT COMPANY LIMITED  
.....

of address..... P.O. BOX 3030

.....  
DAR ES SALAAM  
.....

has been granted a Certificate of Incentives to invest in a new, ~~rehabilitation/ expansion~~  
~~XXXXXX of the~~ enterprise known as

.....  
MAMBA CEMENT COMPANY LIMITED  
.....

Which is located at ..... TALAWANDA & MAGULUMATALI VILLAGE

.....  
BAGAMOYO- COAST (PWANI)  
.....

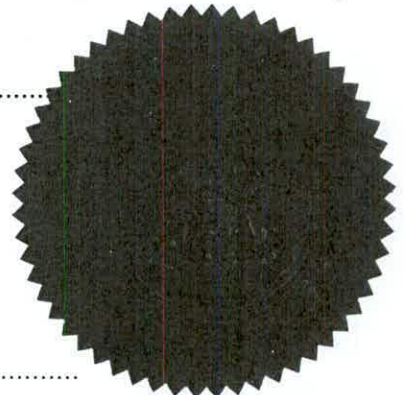
Further particulars required by Section 17 of the Tanzania Investment Act are set out overleaf.

*[Signature]*

.....  
Ag. Executive Director

Tanzania Investment Centre  
P.O.Box 938, Dar es Salaam

Dated 8TH MAY 2017



This Certificate is issued in accordance with the provisions of Section 17 of the Tanzania Investment Act, 1997 and subject to the conditions prescribed under item 14 and 15 hereafter:-

1. Shareholders
 

<b>Girdharbhai M. Patel</b>	Nationality <b>Tanzanian</b>	Shareholding (%) <b>5</b>
<b>Subbhash M. Patel</b>	Nationality <b>Tanzanian</b>	Shareholding (%) <b>5</b>
<b>Esprit Developers Ltd.</b>	Nationality <b>Tanzanian</b>	Shareholding (%) <b>90</b>
2. Proposed Activities: **To Establish and Operate a Plant to Manufacture Cement**
3. Sector: **Manufacturing** Subsector: **Cement Production**
4. Investment cost: Foreign **-** Local **USD 195m.** Total **USD 195m.**
5. Project Financing:
 

Equity <b>USD 65m.</b>	Loans <b>USD 130m.</b>	Total <b>USD 195m.</b>
------------------------	------------------------	------------------------
6. Source, terms and conditions of loan.....
7. Assets to be invested:
 

Capital items:	Foreign	Local	Total
	<b>-</b>	<b>USD 195m,</b>	<b>USD 195m.</b>
8. Technology Agreement ..... **None**
9. Date of TIC Registration: ..... **17th July 2013**
10. Implementation period ..... **July 2013 - June 2020**
11. Operative date..... **July 2020**
12. Investment Incentive Grade: As defined in part III Section 19(1), (2) and Section 20 of the Tanzania Investment Act, 1997
  - (i) Applicable Import Duty **And VAT as per Customs Tariff Act, 1976&VAT Act, 2004**
  - (ii) Applicable with-holding Tax ..... **As per Income Tax Act, 2004 (as amended)**
  - (iii) Eligibility of Capital Allowances ..... **As per Income Tax Act, 2004 (as amended)**
13. Protection of Investment, Arbitration and Transfer of Foreign Currency: as defined in part III Section 21, 22 and 23 of the Act.
14. Conditions attached to this Certificate of Incentives
  - (i) Date of Commencement of investment has to be notified to the Centre.
  - (ii) Certificate not to be transferred, assigned or amended
  - (iii) Failure to commence implementation within two years invalidates Certificate
  - (iv) Failure to operate investment must be notified to the Centre
  - (v) Changes in shareholding, project activities and level of invested capital must be notified to the Centre
15. Additional conditions attached to Certificate  
**Finished Goods are Not Allowed Under This Certificate**

Signed .....  
Ag. Executive Director

TICC/P.10/042496/3

21<sup>st</sup> June, 2017

**Managing Director,**  
Mamba Cement Company Limited,  
P.O Box 3030,  
**Bagamoyo.**

Dear Sir,

**RE: REQUEST FOR THE EXTENSION OF PERFORMANCE CONTRACT UP TO  
NOVEMBER 2019**

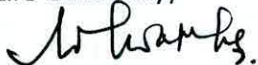
This is a response to your letter dated 2<sup>nd</sup> June, 2016 bearing the above subject matter.

We acknowledge the receipt of the letter requesting for extension of performance contract up to 2019.

Your request will be submitted to the Technical Committee of the National Investment Steering Committee for evaluation and later to the National Investment Steering Committee for approval.

We will communicate to you on the progress and the outcome of the meetings.

Yours Sincerely,



Geoffrey I. Mwambe  
**EXECUTIVE DIRECTOR**



**MAMBA  
CEMENT**  
*Nguvu ya Mwisho*

Mamba Cement  
Company Limited

ASDIF  
Fifa  
els



Date: 2<sup>nd</sup> June 2017

16

To  
The Executive Director  
Tanzania Investment Centre  
PO Box 938,  
Dar Es Salaam, Tanzania

**Sub: Request for the Extension of Performance Contract up to November 2019**  
**Reference: Certificate of Incentives No. 042496 and Performance Contract**  
**Dated 15<sup>th</sup> Day of April 2014.**

Dear Sir,

In continuation of our letter dated 30<sup>th</sup> March 2016 requesting for extension of Performance Contract. We refer to the Certificate of Incentives No. 042496 and performance contract between Government of Tanzania, represented by Tanzania Investment Centre (TIC) and Mamba Cement Company Limited (MCCL) on 15th April 2014, awarding the status of strategic investor.

Since the performance contract was ceased on November 2016 we request you to please extend the Project implementation period for another 3 years in Performance Contract. We enclosed herewith the Progress Report for your kind perusal.

We already invested over USD 25 Million on this project and we stay committed to overcome all the difficulties and complete the project within next 3 years. We hereby request you to extend the performance contract till November 2019.

Thanking you.

Yours Sincerely  
For Mamba Cement Company Limited

Subhash M Patel  
Chairman & Managing Director

MAMBA CEMENT COMPANY LTD.  
P O Box 3030  
DAR ES SALAAM  
TANZANIA



A Division of **motisun** GROUP

**Corporate office**

Neelkanth Tower, 6th Floor,  
Sewa street, P.O.Box 3030  
Dar-es-salaam, Tanzania

Tel: +255 22 2139158  
Fax: +255 22 2117963  
Email: info@mambacement.co.tz  
[www.mambacement.co.tz](http://www.mambacement.co.tz)

**TANZANIA INVESTMENT CENTRE**  
**DAR ES SALAAM**  
**PROGRESS REPORT**

**1. Planned Activities for the period:**

To Establish a Cement factory at Bagamoyo with a production capacity of 3000 Metric Ton Per Day.

In addition to direct employment of over 500 people at Bagamoyo region about 1000 people will indirectly get benefited from our project.

Needless to mention that cement is an import substitute and our country can save the Foreign Exchange out flow of about USD 120 million per annum.

**2. Achievements made on the project implementation to date:**

Since the time of signing the performance contract, the project has made some progress like:

- Compensation for the land acquisition paid as per the law and the records submitted to authorities.  
Project now awaits the title deed in favor of the Company.
- Standard Chartered Bank has been appointed as advisory bank for debt raising.
- The process of due diligence from the lenders side initiated and in progress.
- The execution of project changed to turnkey EPC mode.
- Project has received the Environmental clearance certificate.
- JORC competent limestone reserve statement and mining plan prepared through Morgan World Wide, USA
- Route survey completed for providing connectivity to the nearest Bagamoyo-Msata highway.
- Hydro-geological study completed to prove availability of ground water.
- Market study report prepared to understand the future growth of cement market.
- MCCL has signed MoU for turnkey execution of cement and power plant with reputed contractors. (CNBM & FLS for cement plant and ISGEC for power plant)
- Planning for sourcing of manpower completed.
- Planning for development of residential area for the project completed.
- Presently the contract preparation for the turnkey EPC projects is under progress.
- Discussions with various lending institutes is in progress
- Opinion to establish a Joint venture along with a reputed Cement manufacturing company is in progress.

**3. Project Financial Expenditure to date:**

	Foreign	Local	Total
Land and Building		USD 25,289,788	=USD 25,289,788
Computer & Electronic Equipment's	---	USD 63,572	=USD 63,572
Plant and Machinery	---	---	
Vehicles/Aircrafts Furniture	---	---	
Insurance Cover	---	---	
Pre Operational Expenses	---	---	
<b>GRAND TOTAL</b>	---	<b>USD25,353,360</b>	<b>=USD 25,353,360</b>

#### 4. Project Financing

The project is financed by the shareholders/directors and as part of their equity contribution and part of the fund is generated from bank borrowing. The absolute means of finance is as under.

1. Equity Contribution	USD 100.82mn
2. Debt	USD 187.24mn
	-----
Total Project cost	USD 288.06mn

#### 5. Problems and Solution

- 1) **Price of Cement & Project Profitability:** Price of Cement in the local market has crashed from USD 8/- Per Bag in 2013 to USD 4/- Per Bag in 2017. This has affected the project profitability and bankers are extra cautious to complete the due diligence for the project. The Bankers have loaded additional risk on the project which has increased the project cost and contribution required by promoters. We are currently under negotiation with bankers to reduce the risk loading on the project and change the Debt equity ratio.
- 2) **Devaluation of Currency:** The devaluation of Tanzanian Shillings against USD by more than 70% in past 4 years has affected the project cost as all our Equipment purchases shall be in United States Dollars or Euro.
- 3) **Implementation of New VAT Act:** Due to implementation of new VAT Act, the project shall have to pay VAT for all Equipment Purchases exceeding USD 55,000/-. The project implementation period shall be for 3 years and we shall not be able to utilize the VAT Credit for a substantial period of time. This has increased the capital requirement for the project.



Mamba Cement  
Company Limited

Date: 30<sup>th</sup> Mar 2016

To  
The Executive Director  
Tanzania Investment Centre  
PO Box 938,  
Dar Es Salaam, Tanzania

**Sub: Progress Report on the Mamba Cement Project and Request for Extension.**

**Reference: Certificate of Incentives No. 042496 and Performance Contract Dated 15<sup>th</sup> Day of April 2014.**

Dear Sir / Madam,

This refers to the Certificate of Incentives No. 042496 and performance contract between Government of Tanzania, represented by Tanzania Investment Centre (TIC) and Mamba Cement Company Limited (MCCL) on 15th April 2014, awarding project the status of strategic investor.

Since the time of signing the performance contract, the project has made some progress like:

- Compensation for the land acquisition paid as per the law and the records submitted to authorities. Project now awaits the title transfer.
- Standard Chartered Bank has been appointed as the advisor bank for debt raising.
- The process of due diligence from the lenders side initiated and in progress.
- The execution of project changed to turnkey EPC mode.
- Project has received the Environmental clearance certificate.
- JORC competent limestone reserve statement and mining plan prepared through Morgan World Wide, USA
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- Planning for sourcing of manpower completed.
- Planning for development of residential area for the project completed.
- Presently the contract preparation for the turnkey EPC projects is under progress.
- Discussions with various lending institutes is in progress

However, the project could not be completed within the timeline as envisaged earlier due to several factors mentioned below:



A Division of **motisun** GROUP

**Corporate office**

Neelkanth Tower, 6th Floor,  
Sewa street, P.O Box 3030  
Dar-es-salaam, Tanzania

Tel: +255 22 2139158

Fax: +255 22 2117963

Email: info@mambacement.co.tz

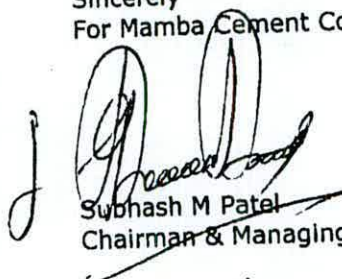
[www.mambacement.co.tz](http://www.mambacement.co.tz)

1. **Delay in Land Acquisition:** The land was acquired from local villagers and the acquisition involved several parties and several approvals. Despite making all payments to effected parties and completing all formalities, we have still not received the Certificate of Occupancy. We are continuously following up to secure the same but the same is delayed mainly due to procedural requirements and process delays.
2. **Price of Cement & Project Profitability:** Price of Cement in the local market has crashed from USD 8/- Per Bag in 2013 to USD 5/- Per Bag in 2016. This has affected the project profitability and bankers are extra cautious to complete the due diligence for the project. The Bankers have loaded additional risk on the project which has increased the project cost and contribution required by promoters. We are currently under negotiation with bankers to reduce the risk loading on the project and change the Debt equity ratio.
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4. **Implementation of New VAT Act:** Due to implementation of new VAT Act, the project shall have to pay VAT for all Equipment Purchases exceeding USD 55,000/-. The project implementation period shall be for 3 years and we shall not be able to utilize the VAT Credit for a substantial period of time. This has increased the capital requirement for the project.

Due to above reasons, we request you to please extend the Project implementation period for another 3 years in Tanzania Investment Certificate and Performance Contract. We have already invested more than USD 20 Million on the project and we stay committed to overcome all the difficulties and complete the project within next 3 years. In case any details are required, please let us know. MCCL would be glad to share the same.

Thanking you.

Sincerely  
For Mamba Cement Company Limited

  
Subhash M Patel  
Chairman & Managing Director

MAMBA CEMENT COMPANY LTD.  
P O Box 3030  
DAR ES SALAAM  
TANZANIA

THE COMPANIES ACT 2002  
COMPANY LIMITED BY SHARES

MEMORANDUM  
AND  
ARTICLES OF ASSOCIATION

OF

MAMBA CEMENT COMPANY LIMITED

DRAWN BY:  
SUBHASH M. PATEL  
P.O. BOX 3030  
DAR ES SALAAM

SUBSCRIBER

THE COMPANIES ACT 2002  
COMPANY LIMITED BY SHARES  
MEMORANDUM OF ASSOCIATION  
OF

MAMBA CEMENT COMPANY LIMITED

1. The name of the Company is **MAMBA CEMENT COMPANY LIMITED**.
2. The registered office of the Company will be situated in the United Republic of Tanzania.
3. The objects for which the Company is established are:-
  - a) To manufacture cement, concrete blocks, cement bricks and other cement products and construction materials either alone or jointly with any other persons, firms or companies, to acquire by purchase, lease, exchange, hire or otherwise any existing cement factory or factories.
  - b) To purchase, take on lease, option or license exchange or otherwise acquire in any part of the world prospecting rights and contracts, mining, leases, options, mineral or other properties, grants, concessions, charters, privileges, either absolutely or conditionally.
  - c) To carry on the business of clearing and forwarding of cargo, clearing and forwarding agents, cargo claiming (Cargo brokers), stores and warehousemen.
  - d) To do business of import and export and trading and distribution of various types of commodities.
  - e) To acquire all or any part of the assets or liabilities of any Company, person or firm or to promote another company for the purpose of acquiring all or any of the property and liabilities of this company or for any other purpose, which may seem directly or indirectly calculated to benefit this company.
  - f) To carry on business as importers and exporters, general merchants, commission agents, del creditor agents, factors, brokers and indenters of goods required for aforesaid purposes and to grant and enter into all manner of bonds, obligations guarantees and indemnities for or in connection with any of the business aforesaid, and to transact every kind of agency business and generally to engage in any business or transaction which may seem to the Company directly or indirectly conducive to the interest or convenience of the "Company's member or any section thereof".

- g) To purchase or otherwise acquire all or any part of the business and property and assets or liabilities of any persons, firm, society, association or group of persons carrying on or (in the case of a Company) formed to carry on all or any part of such business as is within the objects of this company and in consideration thereof to pay cash or to issue any shares, stock or obligations of this Company, and in connection with any such transaction to undertake any liabilities relating to the business or property so acquired.
- h) To amalgamate or enter into partnership or any arrangement whether perpetual or terminable, for sharing profits, union of interest, joint adventure, reciprocal concessions or co-operation with any person, firm, society, association or group of persons carrying on or engaged in or about to carry on or (in the case of a company) formed to carry or engage in any business or transaction or course which may seem to the company capable of being conducted so as directly or indirectly to benefit the company or to prevent or minimize apprehended loss, damage or cost to the company or to such person, firm, society, association or group of persons, and to purchase subscribe for or otherwise acquire and hold shares (fully or partly paid up) or stock in or securities of, or to lend money, to guarantee the contracts of, subsidies or otherwise assist any such person, firm, society, association or group of persons, and to sell hold, re-issue with or without guarantee or otherwise deal with such shares, stock or securities.
- i) To establish, promote and otherwise assist any Company or Companies for the purpose of acquiring all or any part of the property or furthering any of the objects of this Company.
- j) To receive money or deposit or loan and borrow or raise money in such manner as the Company shall think fit, and in particular by the issue of debentures, or debenture stock and to secure the repayment of any money borrowed, raised or owing by mortgage, charge or lien upon all or any of the property or assets of the company (both present and future), including its uncalled capital and also by a similar mortgage, charge or lien to secure and guarantee the performance by the Company or any other person or Company of any obligation undertaken by the Company or any other person or Company as the case may be.
- k) To sell, lease, mortgage or otherwise dispose of the property assets and / or undertaking of the Company or any part thereof for such consideration as the Company may think fit, and in particular for shares, stock debentures, or other securities of any other Company

whether or not having objects altogether or in part similar to those of this Company.

- l) To draw, make, accept, endorse discount, execute and issue promissory notes, bills of exchange, bills of lading, warrants, debentures and other negotiable or transferable instrument.
- m) To establish agencies and local boards in Tanzania and elsewhere, and to regulate and discontinue the same.
- n) To acquire from any sovereign state or authority supreme local or otherwise any concessions, grants, decrees, rights, or privileges whatsoever, which may seem to the Company capable of being turned to account and to work, develop, carry out, exercise and turn to account the same.
- o) To procure the Company to be registered or recognized in any foreign country or place.
- p) To capitalize if and when deemed advisable the whole or part of the undivided profits of the Company and / or its reserves and to distribute such sum either as bonus or in any other manner and either by way of shares credited as fully, paid up or in such other manner as may seem expedient and whether amongst holders of shares in the Company or others.
- q) To distribute any of the property of the Company among the members in specie, and either by way of dividends or upon any return of capital.
- r) To provide for the welfare of persons in the employment of the Company, or formerly in the employment of the Company or its predecessors in business and the wives, widows and families of such persons by grants of money, pension or other payments.
- s) To form subscribe to an otherwise aid benevolent, religious, scientific, national charitable or other institutions or objects of a public character or which have and moral or other claims to support or aid by the Company by reason of the nature or locality of its operations or otherwise.
- t) To invest the moneys of the Company in such manner other than in the shares, of this Company, as a may from time to time be determined.
- u) To act as agents or brokers and as trustees of any person, firm or group of persons in respect of any business or matter of any nature

whatsoever notwithstanding that the Company may not be empowered to act as principal in connection herewith.

- v) To purchase, take or lease or otherwise acquire land or any interest therein, and to hold, build upon, work, exercise, develop, finance and turn to account agricultural estates, building plots and lands or hereditaments of any nature and of any tenure in Tanzania or of elsewhere, and to sell, let on lease or otherwise dispose of and grant rights there over.
- w) To apply for, purchase, or otherwise acquire any patents, brevets d'invention, licenses, trademarks, copy-rights, concessions and the like conferring any exclusive or non-exclusive of a limited right, to use any secret or other information as to any invention which may seem capable of being used for any of the purposes of the Company or the acquisition of which may seem calculated directly or indirectly to benefit the Company, and to use, exercise, develop, grant licenses in respect of, or otherwise turn to account the property, rights and information so acquired.
- x) To carry on, develop, extend and turn to account any trade, business or operation whatsoever which can in the opinion of the Company be advantageously or conveniently carried out by the Company by way of extension of or in connection with all or any of the trade, business and operations which the Company is authorized to carry on, or is calculated directly or indirectly to develop any branch of the Company's business or to increase the value of or to increase the value of or turn to account any of the Company's property and rights.
- y) To pay the expenses of and preliminary and incidental to the promotion establishment and registration of the Company or of any other company promoted, formed established or registered by the company and all brokerage, discount and other expenses lawfully payable which may at any time and from time to time be deemed expedient for taking, placing or underwriting all or any of the shares or debentures, or other obligations of the company or of any company so promoted, formed, established or registered by the Company.
- z) To pay for any rights or property acquired by the Company, and to remunerate any person or company whether by cash payment or by the allotment of shares, debentures or other securities of the Company credited as paid up in full or in part otherwise.
- aa) To carry on the business of buying and selling building materials and hardwares, agricultural and industrial spare parts tools and machinery.

bb) To sell and dispose of the undertaking of the Company or any part thereof for such consideration as the Company may think fit, and in particular for shares debentures or securities of any other company having objects altogether or in part similar to those of the Company.

To grant and enter into all manner of bonds, obligations, guarantees and indemnities for or in connection with any of the business aforesaid.

cc) To buy, sell, import, export and otherwise deal in all manner of goods, commodities and merchandise, and to carry on and exercise all kinds, of financial, commercial, industrial and trading operations in any part of the world.

dd) To acquire by subscription, purchase or otherwise, and to accept and take, hold and sell, shares or stock in any Company, society or undertaking, the objects of which shall, either in whole or in part, be similar to those of this Company or such as may be likely to promote or advance the interest of this Company.

ee) To raise money by entering into agreement with the financial institutions/ private parties in such manner as the Company shall think fit, and in particular by the issue of debentures, perpetual or otherwise, charged upon all or any of the Company's property and rights both present and future.

ff) To act as managing agents and trustees for any person, firm or company, and to undertake and perform subcontracts and also to act in any of the business of the company through or by means of agents, brokers, subcontractors or others.

gg) To do all or any of the matters hereby authorized in any part of the world either along or in connection with or by or through factors, trustees or agents.

hh) Generally to do all such other things as may appear to be incidentals or conducive to the attainment of the above objects or any of them.



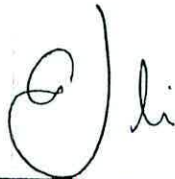
ii) To carry on the business of buying and selling of stationary, office equipments and domestic equipments.

4. The liability of the members is limited.

5. The share capital of the Company in Tanzania Shillings Fifty billion (Shs. 50,000,000,000/-) divided into 5000 shares of Shs. 10,000,000/- each with

power for the Company to increase or reduce such capital and to issue any part of the capital original or increased with or without any preference priority or special privilege or subject to any postponement of rights or to any conditions or restrictions and so that unless the conditions of issue shall otherwise expressly declare every issue of shares whether declared to be preference or otherwise shall be subject to the power hereinbefore contained. We, the several persons whose names, addresses and description are subscribed are desirous of being formed into a company in pursuance of the

Memorandum of Association and we respectively agree to take the number of shares in the capital of the company set out opposite our respective names.

NAME, ADDRESS AND DESCRIPTION OF SUBSCRIBER	NUMBER OF SHARES TAKEN BY EACH SUBSCRIBER	SIGNATURE OF SUBSCRIBER
ESPRIT DEVELOPERS LTD P.O. BOX 19716 , DAR ES SALAAM	90	
SUBHASH MOTIBHAI PATEL P.O. BOX 3030 DAR ES SALAAM	5	
GIRDHARBHAI MEGHJI PINDOLIA. P.O. BOX 19716 DAR ES SALAAM	5	

Dated at Dar es Salaam this 20<sup>th</sup> day of July, 2012  
 Witness to the above signatures



  
 COMMISSIONER FOR OATHS  
 Dar es Salaam

THE COMPANIES ACT 2002  
COMPANY LIMITED BY SHARES  
ARTICLES OF ASSOCIATION  
OF  
MAMBA CEMENT COMPANY LIMITED.

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26835  
01/08/2012  
26835  
01/08/2012

1. In these regulations:

"The Act means" the Companies Act 2002 of the Laws of Tanzania.

When any provision of the Act is referred to, the reference is that provision is as modified by any law for the time being in force.

Unless the context otherwise requires, the expressions defined in the Act any statutory modification thereof in the force at the date at which these regulations become binding on the company, shall have the meaning so defined.

Any words importing the singular shall include the plural and vice versa, and words importing the masculine gender shall include females, and the words importing persons shall include bodies corporate, partnership, firms, cooperative societies, etc.

The regulations of Companies Act shall not apply to the company, save in so far as they are varied or excluded hereby, but in case of any conflict between the provision herein, and the provisions under this regulation the former shall prevail, and in addition to substitution shall be the regulation of the Company.

**PRIVATE COMPANY**

2. The company is a private Company and accordingly:

a) The right to transfer shares of the Company is restricted in manner and to the extend hereafter prescribed.

b) THE MEMBER OF THE COMPANY (exclusive of persons who are in employment of the company and of persons who have been formerly in the employment of the company were while in such employment to be the member of the Company) is limited to fifty, provided that where two or more persons hold one or more shares

in the company jointly they shall for the purpose of this regulations be treated as a single member.

c) Any invitations to the public to subscribe for any shares or debentures of the Company is prohibited.

d) The Company shall not power to issue share warrants to bearer.

## SHARES

3. The initial capital of the Company is shillings 50,000,000,000/= divided into 5,000 shares of Shs. 10,000,000/= each. The shares taken by the subscribers to the Memorandum of Association shall be duly issued by the Directors.
4. The Director by an unanimous resolution may issue any shares as paid up, in payment in whole or in part of the purchase price of any business, or property acquired, or to be acquired by the Company or by way of remuneration for services rendered or otherwise for such considerations as they may think fit.
5. Any call shall be deemed to have been made at the time the resolution of the Directors authorizing such call was passed.
6. Any money due from the Company to a shareholder may without the consent of such shareholder be applied by the Company in or toward payment of any money due from him to the Company for calls of otherwise.
7. The company may from time to time by special resolution increase the share capital by such sum, to be divided in to share of such amount, as the resolution shall prescribe.
8. The Company may, by special resolution, reduce its share capital and any capital redemption reserve fund in any manner and with, and subject to, any incident authorized, and consent required by law.
9. Every person whose name is entered as a member in the register of members shall be entitled to Certificate under the seal of the Company specifying the share or shares, held by him and the amount paid up thereon, provided that in respect of a share or shares, held jointly by several persons the company shall not be bound to issue more than one certificate and delivery of a certificate for a share to one whose name appears first of several joint holders shall be delivered to all. The register of members shall be kept at the registered office of the Company.

## TRANSFER OF SHARES

10. The Directors may in their direction and without assigning any reasons thereof refuse to register the transfer of any share to any person who it shall in their opinion be undesirable for any reason what so ever to admit to membership.
11. Subject to clauses 2 and 3 hereof the right to members to transfer their shares shall be restricted as follows:
  - (a) No share shall be transferred to a person who is not a member so long as any member of any person selected by the directors as one who it is desirable in the interest of the company to admit to membership.
  - (b) Every shareholder or trustee in bankruptcy, or any person who may desire to sell or transfer any such shares and every who may desire to sell or transfer any such shares and every personal representatives of a deceased shareholder shall give notice in writing to the Directors that he desires to make such sale or transfer. Such notice shall constitute the Board of Directors of the Company and his agent for the sale of the said shares to any member or members of the company at the price to be agreed upon between the party giving such notice and the board, or in case of difference to be determined by the Auditor of the company.
  - (c) Upon price of such shares being agreed on a determined as per clause (b) above, the board shall forthwith give notice to such of the shareholders other than the shareholders desiring to sell or transfer the said shares, stating the number and price of such share inviting the person to whom notice is sent to state within 21 days from the date of such notice whether he is willing to purchase any, if so what maximum number of such shares. At the expiration of such days 21 notice board shall apportion such shares. Shares among the shareholders (if more than one) who shall have expressed their desire to purchase to purchase number of shares already held by them respectively, or if there be only one such shareholder, that the whole of such shares shall be sold to him, provided no shareholder shall obliged to take more than the maximum number of such shares in his answer to the said notice upon such apportionment being made or such one shareholder notifying his intention to purchase, as the case may be, the party desiring to sell or transfer such shares shall be bound upon payment of the said price to transfer the shares to the respective shareholders or to single shareholder who shall have agreed to purchase the same.

## FORFEITURE OF SHARES

12. If a member fails to pay the whole or any part of any call or installment of a call on the day appointed for payment thereof, the Directors may, at any time thereafter during such time as any part of such call or installment remains unpaid, serve a notice on him requiring payment of so much of the call or installment as is unpaid, together with any interest which may have accrued and all expenses which may have been incurred by the Company by reason of such non-payment.

### 13. GENERAL MEETING: NOTICE OF GENERAL MEETING AND PROCEEDINGS OF THE GENERAL MEETING

The Regulation of Companies Act shall apply the following variations:-

- a.) A General Meeting, Ordinary or Extraordinary may with the consent in writing of all members, be convened on a shorter notice than seven days or without notice.
- b.) Two members, present either personally or by proxy shall form quorum.
- c.) Any ordinary resolution of the company determined without any general meeting and evidenced by writing under the hands of the majority of the directors and of the members or the company holding three – fourths of the issued shares of the company shall be valid and effectual as an ordinary resolution duly passed at a general meeting of the company.

### 14. DIRECTORS

- a.) Until otherwise determined by the company in General Meeting the directors shall not be less than two and not more than seven in number.
- b.) The following persons shall be the first director of the company:-

- 1.) MR. SUBHASH MOTIBHAI PATEL
- 2.) MR. GIRDHARBHAI MEGHJI PINDOLIA

15. The shareholding qualification for Director may be fixed by the company in general meeting, and unless and until so fixed no qualification shall be required.

16. The quorum of Directors for transacting business shall, unless otherwise, fixed by the directors, be two.
17. A resolution in writing signed by all Directors then in Tanzania shall be as valid and effectual as if it had been passed at a meeting of Directors duly called and constitute.
18. The Directors may from time to time borrow or raise any money for the purposes of the Company which may exceed the issued the capital of the company

### **BORROWING POWERS**

19. The Directors may from time to time, raise or borrow or may themselves lend for the purpose of the company's business such sums of money as they think fit and secure the repayment of or raise any such sum or sums as aforesaid by mortgage or charge upon the whole or any part of the property and assets of the company, both present and future including its uncalled capital or by the issue at such prices as they may think fit, or bonds or debentures or both either charged upon the whole or any part of the property and assets of the company or in such way as the Directors think expedient.

### **VOTES OF MEMBERS**

20. On a show of hands every member present in person and every proxy for or attorney or an absent member (if such proxy or attorney is not himself a member and entitled to vote) shall be entitled to one vote. On a poll every member shall have one vote for every share for which he is a holder.
21. No member shall be entitled to vote at any general meeting unless all calls or other sums presently by him in respect of shares in the company had been paid.

### **DISQUALIFICATION OF DIRECTORS**

22. The office of a Director shall be vacated if the Director:
  - a) Becomes bankrupt; or
  - b) If found to be a lunatic or becomes of unsound mind; or
  - c) Resigns his office by notice in writing to the Company;

- d) Abstains himself from meetings of the directors for a period of six months without special leave of absence from the other Directors.

### **SEAL**

23. The Directors shall provide for the safe custody of the Seal. The Seal of the Company shall not be affixed to any instrument except by the authority of a resolution of the Board of Directors and in the presence of at least two Directors or a Director and Secretary or other person as aforesaid shall sign every instrument to which the seal of the company is so affixed in their presence.

### **ALTERNATE DIRECTORS**

24. Any director shall have power to nominate any person to act or attend as alternate Director during his absence or during his inability so to act. Such Director shall be subjected in all respects to the terms and conditions existing with reference to the other Directors and such Alternate director shall exercise and discharge all the duties of director whom he represents.
25. Unless otherwise decided by the Directors the quorum necessary to transact business of the Directors shall be two Directors personally present.

### **SECRETARY**

26. The Secretary shall be appointed by the Board for such terms at such remuneration and upon such condition as it may think fit, and any secretary so appointed may be removed by the Board.

### **ALTERATION OR ADDITION**

27. Subject to the provisions of the Act and to those contained in the Memorandum of Association the company may by special Resolution make alteration or addition so made shall be as valid and effectual as if originally contained in those articles and be subject in like manner to alteration by special Resolution.

### **ARBITRATION**

28. If and whenever any dispute or difference shall arise between the company and any of the members or their respective representatives touching upon the construction or meaning of any of the Articles herein

contained or any act matter or thing made or done or omitted to be done or with regard to the rights or liabilities arising here under or arising out of the relation existing between the parties by reasons of these Articles or the Ordinance, such differences shall (unless a sole arbitrator be agreed upon) forthwith be referred to the arbitration of three (3) arbitrators, one to be appointed by each party and third to be appointed by the first two or, in the event of failure to agree within (Cap. 15) or any then existing statutory modifications or re-enactment thereof shall apply.

### **AUDIT**

29. All accounts books shall be audited by a qualified Auditor who will be company of each annual general meeting and that it will be the duty of the directors to furnish the auditors with all information and documents he or they want. The directors shall lie before the general meeting at least once in every year the auditors report together with the accounts for the proceeding period within six months of the end of the year.

### **PRELIMINARY EXPENSES**

30. In order to meet the preliminary expenses, the shareholders will have to contribute shillings one hundred thousand (100,000) in form of entrance fees which will not be refundable,




### **WINDING UP**

31. with the sanction of a special resolution of the shareholders any part of the assets of the company including any shares in other companies may be divided between the members of the company in special or may be vested in Trustees for the benefit of such members and the liquidation of the company may be closed and the company dissolved but so that no member shall be compelled to accept any shares where upon there is any liability.

### **IDEMNITY**

36. Every Director, or other officer of the company shall be entitled to be indemnified out of the assets of the Company against all losses or liabilities which he may sustain or incur in or about the execution of the duties of his office or otherwise in relation thereto, and no Director or other officer shall be liable for any loss, damage or misfortune which may happen to or be incurred by the company in the company in the execution of the duties of his office or in relation thereto. This Article

shall only have effect in so far as its provisions are not availed by the said section.

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ESPRIT DEVELOPERS LTD P.O. BOX 19716 , DAR ES SALAAM	90	
SUBHASH MOTIBHAI PATEL P.O. BOX 3030 DAR ES SALAAM	5	
GIRDHARBHAI MEGHJI PINDOLIA P.O. BOX 19716 DAR ES SALAAM	5	

Dated at Dar es Salaam this 20<sup>th</sup> day of July, 2012

Witness to the above signatures .....



  
COMMISSIONER FOR OATHS

# MAMBA CEMENT COMPANY LIMITED

TECHNO-ECONOMIC FEASIBILITY REPORT  
FOR 1.0 MTPA (3000 TPD) GREENFIELD  
CEMENT PLANT AT BAGAMOYO, TANZANIA



PROJECT: 2391  
APRIL: 2013



**ERCOM ENGINEERS PVT LTD.**  
ERCOM HOUSE

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## 5.2.2 RAW MATERIALS

### Limestone

The main raw material i.e. limestone is available from Tarawanda Limestone deposits. As per the Government explorations and estimates, around 105.36 Million Tons of Limestone is available

### Clay

Clay is available in the Limestone mines.

### Red Soil

Red Soil is available at about 20Km north-west of the Limestone deposit at Mindu Tulieni.

## 5.2.3 FUEL

The raw mix prepared for the cement manufacturing shall be fired in the rotary kiln by fuel such as Coal. The approximate coal requirement would be around 13% of the cement grade clinker produced depending upon the calorific value of fuel. The coal with heat value around 6000Kcals and above shall be suitable.

The bulk transport of coal is possible by road connected to other states. A facility has to be prepared at the plant site for the unloading and storage. To protect the coal from the Rains, suitably covered sheds are essential at the plant site.

### PROXIMATE ANALYSIS OF COAL CONSIDERED

Sr. No.	Parameter	Design Quality
1	Minimum CV, Kcal/kg (gross)	6000
2	Maximum Ash, %	20%
3	Maximum Moisture, %	10.0%
4	Maximum Sulphur, %	1.2%
5	Minimum Volatile Matter	22%
6	HGI	45
7	Sizing	1-75mm

The diesel required for earth moving equipment, trucks and lights vehicles is locally available. Diesel shall be transported to the plant site in oil tanker by road and stored in main diesel storage tanks. A diesel / petrol dispensing unit is also considered for filling diesel / petrol in the vehicles.

#### **5.2.4 GYPSUM**

Mineral grade Gypsum will be transported by road and is proposed to be procured from Makanya area, which is about 350 Kms south of proposed plant site.

### **5.3 POWER**

#### **5.3.1 HYDRO POWER STATION IN TANZANIA**

<b>Hydroelectric Station</b>	<b>Type</b>	<b>Capacity</b>	<b>Name of Reservoir</b>	<b>River</b>
Mtera Power Station	Reservoir	80 MW	Mtera Reservoir	Rufiji River
Kihansi Power Station	Reservoir	180 MW	Kihansi Reservoir	Kihansi River
Nyumba ya Mungu Power Station	Reservoir	8 MW	Nyumba ya Mungu Reservoir	Mt. Kilimanjaro Streams
Kidatu Power Station	Reservoir	204 MW	Kidatu Dam	Rufiji River
Pangani Power Station	Reservoir	68MW		Pangani River
Hale Power Station	Reservoir	21MW		

#### **5.3.2 Mtera Power Station**

**Mtera Dam** is a hydroelectric dam in Tanzania. The dam is located midway between Iringa and Dodoma on the border between the Iringa Region and the Dodoma Region. The travel time from Dodoma is about three hours on a gravel road.

**Distance between Mtera Power station and proposed plant location is approx.500 km.**

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## **ACKNOWLEDGEMENT**

**WE EXPRESS OUR SINCERE GRATITUDE TO THE MANAGEMENT AND OFFICERS OF MAMBA CEMENT COMPANY LIMITED, FOR THEIR IMMENSE ASSISTANCE AND CO-OPERATION IN OUR STUDIES AND DISCUSSIONS BUT FOR WHICH THIS REPORT COULD NOT HAVE BEEN PREPARED SUCCESSFULLY.**

## **CONFIDENTIAL**

**THIS DOCUMENT SHOULD BE TREATED AS CONFIDENTIAL AND MUST NOT BE REPRODUCED, COPIED, LOANED OR DISPOSED DIRECTLY OR INDIRECTLY NOR USED FOR ANY PURPOSE OTHER THAN THAT FOR WHICH IT IS SPECIFICALLY FURNISHED WITHOUT THE PRIOR WRITTEN CONSENT OF M/S ERCOM ENGINEERS PVT. LTD., NEW DELHI.**

**CHAPTER – 1**  
**INTRODUCTION AND SCOPE OF WORK**

## CHAPTER – 1

### INTRODUCTION AND SCOPE OF WORK

#### 1.0 INTRODUCTION

Mamba Cement Company Limited (MCCL- Client), belonging to the holding company, MOTISUN HOLDINGS LIMITED (MHL), a diversified Group engaged in the manufacture of various industrial products in Tanzania, is planning to set up a 1.0 Million TPA (3000 TPD Clinkerization) integrated cement plant at Village - Tarawanda, District Bagamoyo, Tanzania. For preparing a Techno Economic Feasibility Report (TEFR) for this project, the Client has commissioned the services of M/s Ercom Engineers Pvt. Ltd. as their Consultant.

#### 1.1 BIOGRAPHY OF MAIN PROMOTERS AND MANAGEMENT TEAM

##### THE MAIN PROMOTERS:

1. **Mr. Subhash Patel (50%)** – The main promoter of Mamba Cement is Mr. Subhash Patel who is a reputable businessman with over 26 years of outstanding experience in various businesses in Tanzania. Amongst other specialties, his main expertise is in promotion and management of successful manufacturing industries & hotels. Among the many industries successfully promoted and managed by him are the following:

- MMI Steel Mills Limited, Tanzania- steel products
- MMI steel Mills Limited, Zambia- steel products
- MMI steel Mills Limited, Uganda- steel products
- MMI steel Mills Limited, Mozambique- steel products
- M.M. Industries Limited – Plastic products
- P.N.P Industries Limited – Steel Products
- Motisun Oxygen Company Limited – Oxygen gases
- Kiboko Paints Ltd. - Paint Products

- Sayona Drinks Limited – Soft drinks, juices & mineral water and aerated Beverages
  - Raksha Engineering Limited – Engineering works
  - White Sands Hotel Limited – Hotel & Resort
  - Sea cliff Hotel, Zanzibar- Hotel & Resort
  - Sea Cliff Court Limited – Hotel
  - Motisun Industries Limited – Rubber components & automobile filters
  - Best Bite Limited – Fast food centre & Ice cream parlor
2. **Mr. Girdharbhai M Pindolia (30%)** –He is a visionary entrepreneur and leader on infrastructure development specialized in building residential and commercial buildings and road sector. A civil engineer by qualification Mr. Gidharbhai has more than 20 years of experience in floating new ventures and managing them profitably. Among many companies that he own, Estim Construction Company Limited, a flagship company has executed more than 50 projects and has been awarded many certificates for its outstanding quality work completed in given time and cost.
3. **Mr. Kumar Vinodrai Pujara & Mr. Vishnu Rooplal Wadhawan (10% Each)** Mr. Pujara is a Chartered Accountant from India and a CPA from Tanzania. Prior to starting his own group companies, he was the Executive Director and Shareholder of Sabuni Products Ltd. Mr. Kumar Pujara was instrumental in turning around the company in just two years after which it was taken over by the Sumaria Group in Tanzania in 1995. Mr. Vishnu is a Bachelor of Arts and Economics and Master in Computer Applications from India who has wide and diversified experience of around 17 years in running and managing various companies in Gulf, India and Africa. With their deft management and marketing skills gained from practical experience over the years they have successfully established a number of companies in the East African Region and captured substantial share of the

relevant markets in all the operating areas. Below are brief details of the major investments and achievements:

- **Neelkanth Lime Ltd., Tanzania** - Acquired Land admeasuring 35.64 Hectares of Land in Tanga for the first manufacturing unit promoted by the group for crushing aggregate lime stones. Commercial production commenced in Sep 2008. Already installed 24 Furnaces to manufacture value added Quick & Hydrated Lime, production of which commenced January 2010.
- **Neelkanth Tanzania Ltd.** – In 2009, set up a trading business in Tanzania to trade mainly in corrugated roofing sheets, plastic items and stationeries including toners, cartridges in Tanzania, Kenya, Uganda, Zimbabwe, Congo, Malawi & Mozambique.
- **Neelkanth Printing & Packaging Ltd. Zambia** – in 2011, Set up a state of the art facility for manufacture of plain and printed envelopes in Lusaka catering to the local as well as export markets of Mozambique, Malawi, Congo, Tanzania, Kenya & Uganda.
- **Neelkanth Lime Ltd. Zambia** – Acquired Mining license and acquired land admeasuring 1.16 sq. kms near Ndola in Zambia for the purpose of mining and processing of limestone. Construction of the furnaces and processing plant has commenced and expected to commence commercial production by July 2012.

#### **THE KEY MANAGEMENT TEAM:**

##### **Mr. Ravi Tripathi (CFO)**

He is responsible for overall financial management of the company, its financial reporting and transparency, and for multiple corporate functions including Controller, Treasury, investor relations, long-range planning and corporate and strategic development.

Prior to joining Mamba Cement, Mr.Ravi Tripathi held the position of Vice president of finance and corporate controller at Hyderabad based Australian iron ore mine company. A corporate officer in that position, he also served as the company's principal interface with the board of directors' audit committee.

A native of Hyderabad, India, Mr.Ravi Tripathi attended Mumbai University where he earned a Master's degree in Accounting. In 1995 he qualified as Chartered Accountant and became member of the Institute of Chartered Accountants of India.

### **THE OTHER CONSULTANT TEAM:**

#### **1. Mr. Ajay Chaudhary (Project Manager)**

He is responsible for providing technical consultancy service to Mamba Cement and is also responsible for follow up and discussing the matters with M/s Ercom Engineers.

An excellent professional with more than 20 (Twenty) Years of Experience in Cement and other related Industry, covering entire Industry spectrum viz. Technology development, Engineering and Project Management, preparation of Techno-Economic Feasibility Report, Market Survey, Basic and Detailed Engineering and Project Management involving visit to many countries overseas in connection with work in cement projects. He has worked in reputed Companies like Binani Cement, Holtec, Ercom etc.

Currently he is working with L&T Construction Company and is responsible for business development, by way of identifying potential projects in Northern India, Africa and Middle East. He is also responsible for the identification of potential equipment suppliers as per the need and requirement of Project.

He is a native of Faridabad, India and completed his Bachelors degree in Instrumentation in the year 1994 from Poona University.

## **2. Mr. Sushil Dani (Chief Geologist)**

A competent professional with over 30 years of exploration and mining experience in varied top functional areas in State Government, Public Sector undertakings, Private Multinationals and International groups.

He is having excellent experience and exposure to various aspects of Mining, Minerals & Metal Industries. Mineral Exploration, Resource evaluation, Due diligence on Mining & Mineral based projects, Business negotiations followed by execution of various commercial Agreements, Transfer of Mineral rights, Feasibility study, Development of Business Plans, Mine Development (both Open pit & Underground), Production, Quality Control & Environmental Management are my key strengths, and have, demonstrated commitment to safety, community and environment.

## **1.2 BACKGROUND OF ERCOM ENGINEERS PVT. LTD.**

ERCOM Engineers Pvt. Ltd. (ERCOM) is an, India based, ISO-9001:2000 certified multi-disciplinary management and technical consultancy organization in the field of Cement and other mineral based industries apart from power plants, material handling and building material industry.

ERCOM is also specialized in Engineering for Cement Plant rehabilitation and modernization of old Cement Projects leading to reconstruction and re-commissioning of existing Cement Plants.

For the past 27 years, ERCOM has built up a formidable group of clientele in India and 21 other countries including Albania, Bahrain, Bangladesh, Columbia, Germany, Lebanon, Mauritania, Mauritius, Nepal, Nigeria, Oman, Sri Lanka, Sudan, UAE, Uzbekistan, South Africa, Botswana, Tanzania, Mozambique, Yemen and number of other countries.

### 1.3 SCOPE OF WORK OF ERCOM

The scope of work comprised a comprehensive report covering the study of the various aspects of the Project, as detailed in the following paragraphs.

#### i) Site Visit & Data Collection

ERCOM deputed a multi-disciplinary team comprising of 3 experts for collection of data and discussion with Client and other concerned agencies.

#### ii) Raw Materials

ERCOM reviewed the various raw materials required for the Cement Plant i.e. Limestone, additive materials, gypsum, etc., which are required for the manufacture of cement, covering the following.

- A qualitative and quantitative assessment of the sources for availability of these materials and their suitability for manufacturing cement.
- Recommendation of preliminary Raw Mix, keeping in view the quality of limestone and corrective materials.
- Outlining brief concept on Mining of limestone along with the various types of Mining Machinery required for the same.
- Suggested further Geological prospecting required.

#### iii) Broad Market Assessment

ERCOM looked into the cement market scenario to establish the demand supply gap, taking into consideration the future demand and future supply by studying past demand and consumption pattern, market size, role of competition and their capacity utilization, number of units running ( and coming up/ closed down), export and import data etc.

**iv) Infrastructure and Site Selection**

ERCOM evaluated the proposed location(s) for the Cement Plant, which has been identified for availability and suitability of the followings:

- Land.
- Utilities like power, fuel, water,
- Adequate road transportation net-work etc. including logistic requirement for movement and dispatch of cement.
- Communication facilities and social amenities.
- Access to the market.

**v) Manufacturing Process and Technical Concept**

ERCOM recommended the most appropriate, sustainable, cost effective and suitable technical concept and manufacturing process for the Cement covering the following.

- Recommended the optimum capacity of the cement plant based on availability of raw materials, infrastructure and market.
- Recommended the technical concept and type of core equipment most suitable for the Project, keeping in view the quality of the available raw materials and other relevant site parameters.
- Provided list of Machines and accessories.
- Established an efficient layout and alignment of the unit giving due consideration to the topography of the area.
- Prepared a preliminary process flow sheet based on the technical concept.
- Worked out Broad sizing of major equipment and storages as per the cement industry norms.
- Estimated the requirement of Captive Power generation potential.

**vi) Electrical, Instrumentation and Control System**

The Report highlighted the following in the area of Electrical, Instrumentation and Control System:

- Outline of the Electrical Equipment required for the Cement Project.
- Broad scheme for Power distribution along with Single Line Diagram.
- Broad Scheme for Instrumentation & Control System.
- Outlined the various field instruments and other instruments for process measurements and quality control.
- Recommended an appropriate plant control system along with the control system configuration drawing.

**vii) Civil Engineering Considerations**

ERCOM included in the report the requirement of various structures, non-plant buildings and other civil engineering aspects for the cement project. The required local site data, prevailing unit rates of civil construction and safe bearing capacity of the soil etc., were provided by the Client.

**viii) Manpower Requirement and Training**

- Prepared a complete scheme indicating the requirement of skilled and unskilled personnel and supervisory staff, and senior management staff required for trouble free operation of the plant.
- Suggested overall manpower organization structure for the proposed cement project.
- Recommended an outline of organization structure of production, sales, and administration.

**ix) Environmental Aspect**

- Identified and evaluate the likely environmental pollution caused due to the operation of the Cement Plant as well as the mining operations.
- Discussed the likely impact of such environmental pollution and suggest control and mitigating measures for the same keeping in view the environmental norms prescribed by the environmental authorities.
- Outlined brief list and location of various dust collectors and other dust control equipment in the plant.

**x) Project Implementation Schedule**

- Projections were made on the mode of project implementation with the help of Bar Charts showing various activities till the commissioning of the project.
- The strategy to be taken by various implementing agencies for timely execution of the project up to commencement of commercial operation was given in the TEFRR.

**xi) Assessment of Capital Cost & Means of Finance**

ERCOM assessed the capital cost of the project, covering the cost of the following:

- Land and development.
- Plant & Machinery
- Civil & Structural Works
- Miscellaneous Fixed Assets
- Pre-operative expenses.
- Contingency
- Working Capital requirement.

**xii) Cost of Production and Profitability**

Assessment was made of the cost of production based on all items covered under variable and fixed costs and the projection of profitability during the operating period of first 10 years.

**xiii) Investment and Financial Analysis**

A detailed investment analysis was carried out as per the Standard Financial Institution format and the following financial indicators were arrived at to determine the economic viability of the Project.

- Pay back period.
- Break-even point (both project and cash based)
- Debt Services Coverage Ratio (DSCR).
- Internal Rate of Return (IRR)
- Net Present Value (NPV)
- Sensitivity analysis by changing the major cost input, selling price, capacity utilization
- Broad Project cash flow and balance sheet for 10 years of plant operation.

All the above sections have been covered in the various chapters of the TEF. An Executive Summary has been included, summarizing the overall findings and conclusions.

**CHAPTER – 2**

**EXECUTIVE SUMMARY**

CHAPTER – 02

EXECUTIVE SUMMARY

- 2.0 PROJECT : CEMENT PLANT AT BAGAMOYO, TANZANIA
- 2.1 NAME OF THE COMPANY : M/s Mamba Cement Company Limited (MCCL)
- 2.2 PROPOSED CAPACITY
- Clinker : 990,000 Metric Tonnes Per Annum
- Cement : 1,142,640 Metric Tonnes Per Annum
- PLC : 82%
- OPC : 18%
- 2.3 Report Prepared by : ERCOM Engineers Pvt. Ltd., New Delhi.

2.4 ESTIMATED PRODUCTION

Year of Operation	Operating Efficiency %	Portland Limestone Cement (PLC) Production in MTPA	Ordinary Portland Cement (OPC) Production in MTPA	Total Cement Production in MTPA
1 <sup>st</sup> Year	70	668541	131305	799846
2 <sup>nd</sup> Year	80	764047	150063	914110
3 <sup>rd</sup> Year & onwards	90	859553	168821	1028374

2.5 MARKET SCENARIO

PROJECTED FUTURE DEMAND OF CEMENT IN TANZANIA

INSTALLED CAPACITY OF EXISTING CEMENT PLANT

Sn.	Name of the Plant / Group	Installed Capacity in MTPA	Operating capacity @ 80 percent efficiency level in MTPA
1	Tanzania Portland Cement	1.40	1.12
2	Tanga Cement	1.25	1.00
3	Mbeya Cement	0.35	0.28
4	Athi river Mining	0.75	0.6
	<b>Total</b>	<b>3.75</b>	<b>3.00</b>

PROJECTED ADDITIONAL CAPACITY OF EXISTING AND NEW CEMENT PLANTS BY 2016-2017

Sn.	Name Of the Plant / Group	Installed Capacity with expansion in MTPA
1	Tanzania Portland Cement	2.00
2	Tanga Cement	1.25
3	Mbeya Cement	0.35
4	Athi river Mining	1.50
5	Lake Cement Limited	0.50
6	Dangote	1.00
7	Mamba Cement Co. Ltd	1.00
	<b>Total</b>	<b>7.60</b>

On a conservative scale, it should be assumed that 63% of the above additional capacity will mature in next 4 years. Considering this projection, 5.10 million tonnes capacity may be added by 2016-17. This amounts to 14% annual compounded growth, as given in the Table below.

**Table – 3.3.**

**PROJECTED CEMENT DEMAND (IN MILLION TONNES)**

Year	Projected demand @ 14% compounded growth MTPA	Projected demand @ 8% compounded growth MTPA, considering 7% GDP growth rate every year
2012-13	3.00	3.00
2013-14	3.42	3.24
2014-15	3.90	3.50
2015-16	4.44	3.78
2016-17	5.07	4.08
2017-18	5.78	4.40
2018-19	6.58	4.76
2019-20	7.50	5.14

It may be noted from the above that with planned capacity addition of existing and new cement companies and with a reasonable growth rate of cement demand in the country, a cement capacity surplus situation is likely to be created in the country, thus putting a strain on the pricing of cement. Such a situation can be mitigated by adopting one or all of the following steps.

- a) Installation of the cement plant as quickly as possible, thus establishing the brand in the country.
- b) Establishing an effective marketing network in Tanzania.
- c) Exploring export possibility vigorously in the neighboring countries

## **CONCLUSION**

- Tanzania is poised for rapid economic growth, with ever increasing need of cement
- Many infrastructure projects viz. airports, sea ports, roads, housing, water works etc. planned with World Bank funds which will create demand of cement. No difficulty is foreseen in selling Mamba cement
- It is necessary to build an effective network of sales and distribution in the country, targeting the various consumer centers, in the cities.
- It will be necessary to build brand image of Mamba cement for effective sale of its product

## **2.6 CEMENT PLANT AT TANZANIA**

### **2.6.1 Reserve of Limestone**

Based on the available data and consultant's observation / interpretation of data collected during the visit to the limestone deposit of Tanzania, the limestone reserve of the area has been estimated to be approx. 105.36 million Tonnes. Based on the reserve, the estimated life of the plant shall be around 41 years. The figure of reserves and life will be further updated after receipt of drilling results of remaining bore holes.

### **2.6.2 Site Selection**

**Proposed Location** Village - Tarawanda, District Bagamoyo, Tanzania.

**Limestone Deposit** M/s Mamba Cement Company Limited, (MCCL) has obtained mining lease over an area of 18.48 Sq. Kms for putting up the cement plant of 3000 TPD Clinkerization capacity.

As per the MCCL explorations and estimates, around

105.36 Million Tons of Limestone is available.

**Limestone Quality**

Average Grade :

SiO <sub>2</sub> :	7.27 %
CaO :	49.56 %
MgO :	0.76 %
Al <sub>2</sub> O <sub>3</sub> :	2.25%
Fe <sub>2</sub> O <sub>3</sub> :	0.96%
LOI :	38.96%

**Gypsum and other Additives**

Gypsum will be made available from Makanya area, which is about 350 Kms south of proposed plant site.

Red Soil will be available at about 20Km north-west of Limestone deposit at Mindu Tulieni.

Blue dust will be imported.

**Coal**

Coal will either be procured from local mines or imported from South Africa and can be transported to proposed plant site by road.

**Power**

Captive Power Plant of M/s Mamba Cement Company Ltd.

**Infrastructure**

Village Tarawanda, the project site is situated at approx. 110 km from Dar-es-Salaam, 22km from Bagamoyo. The project site is mainly single track. Metal topping of the road is eroded at many areas. As such these roads are not suitable for heavy and long trailer annexed vehicles, which are essentially required for the transportation of large equipment of the plant.

### 2.6.3 Principal Raw Materials, Power & Fuel Requirements:

#### Raw Mix for Clinker

-	Limestone	:	87.50%
-	Clay	:	11.00%
-	Blue dust	:	1.50%

#### Material Requirement for PLC

-	Clinker	:	85 %
-	Limestone	:	10 %
-	Gypsum	:	05 %

#### Material Requirement for OPC

-	Clinker	:	95 %
-	Gypsum	:	05 %

#### Requirement per tonnes of product

-	Limestone	:	1.4 T/ T of Clinker
-	Clay	:	0.176 T/T of Clinker
-	Blue Dust	:	0.024 T/ T of Clinker
-	Coal for pyro-section	:	0.12 T/ T of Clinker
-	Coal for captive power plant	:	0.0042 T/ T of Cement
-	Gypsum	:	0.05 T/ T of Cement

#### Annual Requirement

-	Annual production of Clinker	:	990,000 Tonnes
-	Limestone for Clinker	:	1,386,000Tonnes
-	Clay	:	174,240 Tonnes
-	Blue Dust	:	23,760 Tonnes

-	Coal for pyro-section	:	118,800 Tonnes
-	Coal for captive power plant	:	0.099 MTPA
-	Gypsum	:	57009.29 Tonnes

#### 2.6.4 Sources of Raw Materials and Fuel:

-	Limestone	:	Captive mines
-	Red Soil	:	Mindu Tulieni
-	Coal	:	MCCL mines
-	Gypsum	:	Makanya

#### 2.6.5 Total Power Demand

Power	:	90 kWh/ T of OPC
	:	90 kWh/ T of PLC
Capacity of Captive Power Plant	:	2 X 10 MW (Max.)

#### 2.6.6 Process

	:	Dry process with 6/5 stages Preheater /Precalciner
Heat Consumption	:	730 Kcal/Kg Clk.
Specific Power Consumption	:	60 kwh/ton for Clinker @ 3200 Blaine 30 kwh/ton for OPC grinding 30 kwh/ton for PLC grinding

#### 2.6.7 Major Equipment Capacities

-	Limestone Crusher	:	750 TPH
-	Raw Mill (VRM)	:	275 TPH
-	Kiln	:	3000 TPD
-	Coal Mill (Ball Mill)	:	25 TPH
-	Cement Mill (Roll Press +Ball Mill):	:	200 TPH
-	Packer	:	3 x 120 TPH

### 2.6.8 Major Storages

- Limestone and Clay Storage	:	2 x 17,000 T
- High Grade Limestone	:	5,000 T
- Continuous Blending Silo	:	10,000 T
- Clinker Silo	:	45,000 T
- Coal Storage	:	11,000 T
- Gypsum Storage	:	5,200 T
- OPC Silo	:	5,000 T
- PLC Silo	:	2 X 5,000 T

### 2.6.9 Man Power

The total manpower estimated for Mines, Proposed Plant and Administration is as follows:

- Mines Staff	:	67
- Plant Staff	:	107
- Administrative & Supervisory Staff:		37
- Contract labour (for gardening, Loading, Unloading, Packing Plant etc)	:	50
<b>Total</b>	<b>:</b>	<b>261</b>

### 2.6.10 Project Implementation Period:

- 30 months from the date of ordering of Main Machinery.

2.7 PROJECT COST

SN.	PARTICULARS	ESTIMATED COST IN Mio.USD
1.0	Land & Site Development	6.00
2.0	Buildings	34.86
3.0	Plant & Machinery	123.04
4.0	Technical Know How & Engineering services & Expenses on Foreign Technicians	1.50
5.0	Miscellaneous Fixed Assets	6.51
6.0	Preliminary Expenses	0.50
7.0	Pre-operative Expenses	9.30
8.0	Provision for Contingencies	9.09
9.0	Margin Money	4.62
	<b>TOTAL</b>	<b>195.41</b>

2.8 FINANCIAL ANALYSIS

Sn.	Particulars	Value
1.0	Project cost (in Mio.USD)	195.41
2.0	IRR (%)	18.62%
3.0	Average DSCR	2.10
4.0	Pay back period in years	6
5.0	Break Even points:	
	-Project (%)	55.54%
	- Cash (%)	41.87%
6.0	NPV before Tax	81.78
7.0	NPV after Tax	81.78
8.0	Specific Investment	171.02

**2.9 ESTIMATED PRODUCTION COST ANALYSIS**

<b>Sn.</b>	<b>Particulars</b>	<b>III rd Year (90% Production)</b>
		<b>Price USD/T of Cement</b>
<b>1.0</b>	<b>Total Raw Material Cost</b>	<b>11.51</b>
<b>2.0</b>	<b>Utilities</b>	
	Power	0.00
	Fuel	25.58
	Water	0.00
	<b>Total Utilities</b>	<b>25.58</b>
<b>3.0</b>	<b>Labour &amp; Plant Overheads</b>	
	Wages	5.83
	Contract Labour	0.50
	<b>Total Labour</b>	<b>6.33</b>
<b>4.0</b>	<b>Factory Overheads</b>	
	Spares / Repair, Maintenance & consumables	5.00
	Light	0.19
	Rent, Rates & Taxes	0.19
	Insurance on Factory Assets	1.55
	Misc.Factory Expenses	0.19
	<b>Total Factory Overheads</b>	<b>7.13</b>
	<b>Production Cost</b>	<b>50.55</b>

**2.10 CONCLUSION**

**MAMABA CEMENT PROJECT IS TECHNO-COMMERCIALLY VIABLE AND SPEEDY IMPLEMENTATION IS RECOMMENDED.**

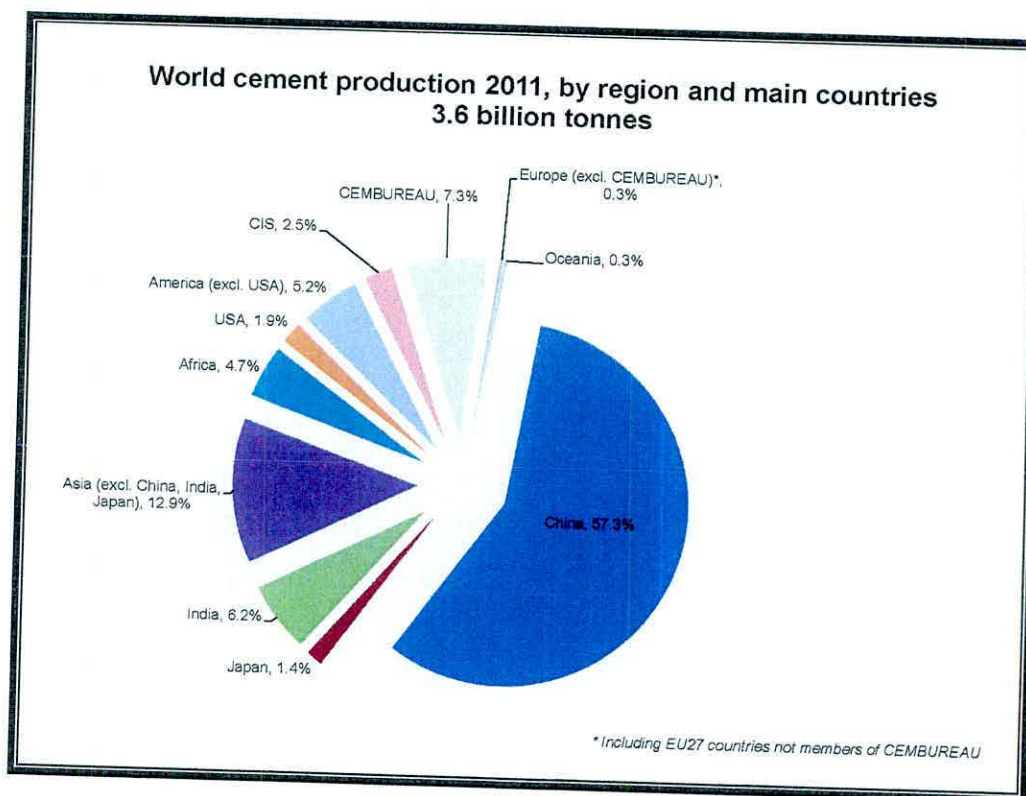
**CHAPTER – 3**  
**BROAD MARKET ASSESSMENT**

## CHAPTER – 03

### BROAD MARKET ASSESSMENT

#### 3.0 INTRODUCTION

Cement is a 4.0 Billion metric tonnes of global business. The boom in the cement industry is expected to continue, with the global cement consumption to touch approximately 3.78 Billion metric tonnes with growth of around six percent till 2012. The consumption & Production of cement across the world is expected to be about 4.50 Billion metric tonnes & 4.77 Billion metric tonnes by 2015 and 6.02 Billion metric tonnes & 6.39 Billion metric tonnes by 2020 respectively at the rate of 6% annually consumption growth.



**Figure 1. World cement Production in 2011**

Global cement consumption is directly correlated to the global GDP growth and historically, it has grown at 1.2 times of global GDP growth.

# **TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 3 – BROAD MARKET ASSESSMENT**

Recent years have seen the cement industry grow dynamically with most of the actions taking place in emerging economies. Despite the ongoing financial crisis the global economy is facing, the need for housing and continued government investments in infrastructure development by emerging economies is offsetting downturn in mature markets. Though, at present, demand is growing, but at a decelerated pace, the phase is expected to be momentary. Long-term projections indicate healthy demand growths, as world economy stabilizes and construction activity picks up across global markets in the next decade.

This trend is expected to continue for the next 3 to 5 years driven by high oil prices and abundant liquidity in such countries. Such expansions will be mainly concentrated around China, India, the Middle East, Russia and Africa. In the global cement industry, China and India hold substantial market shares.

In case of Africa, the cement consumption usually increases in the ratio of 1.5 – 2.0 times of its country GDP. For the present TEFR, a conservative figure of compounded average growth rate of cement consumption of 8.5% over year to year basis has been considered.

## **3.1 ECONOMIC GROWTH OF AFRICA**

### **3.1.1 GENERAL OVERVIEW**

According to April's African Pulse, the World Bank predicted that the region's Real Gross Domestic Product, (its total output of goods and services adjusted for price changes) will grow by 5.2%, up from last year's 4.9%. The region posted growth in 2011 despite twists and turns in the global financial market arena, a slowdown in South Africa (the region's largest economy), threats to stability in a number of countries (particularly Cote d' Ivoire), and ravaging drought in several areas.

## **TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 3 – BROAD MARKET ASSESSMENT**

The economies of Ghana, Mozambique, Nigeria, Rwanda and Ethiopia grew by 7%, surpassing the average figure of 6% achieved by at least a third of the countries in the region that posted growth rates of between 4% and 6% for 2011.

Foreign direct investment to the region had been spurred by increased global competition for natural resources, improvements in the region's regulatory environment, higher commodity prices, robust economic growth and a fast rising middle class, the bank stated. It further added that the region is now a popular investment destination even for private equity investors.

### **3.1.2 INFRASTRUCTURE DEVELOPMENT**

With the exception of Kenya, countries in the low income bracket, including Ghana and Botswana, will post a fall in growth rates this year, but there is an anticipated growth in budgetary allocations for infrastructure development, underlying the huge growth projections by cement makers in the region.

Infrastructure development, especially roads, ports, bridges, residential and non-residential buildings, has been given priority in the region's national budgets at a time when Sub-Saharan Africa is said to enjoy a high level of budgetary discipline, especially in the public sector.

Kenya, Tanzania, Uganda and Rwanda are the other East African countries that have increased their infrastructure budgets for this year, raising hopes for increased sale volumes for regional cement makers, Bamburi Cement, Athi River Mining and East African Portland Cement Company.

Within East Africa, a number of joint regional infrastructure projects have come up in the past two years. They have created a huge market for cement, with producers predicting increased sales volumes in the short and medium-term. For example, Kenya and Ethiopia, with financial backing from the African Development Bank and the European Union, are constructing a 438 km road linking the two countries' capitals of Nairobi and Addis Ababa. The project component currently underway, which is estimated to cost US\$493 million,

# TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 3 – BROAD MARKET ASSESSMENT

involves construction of the 245 km Merille River-Marsabit-Turbi road in Kenya and the 193 km Ageremariam-Yabelo-Mega road in Ethiopia.

Kenya and Tanzania are also constructing a 240 km road between Athi River (Kenya) to Arusha(Tanzania). The two contracts, financed by the African Development Bank and Japan International Cooperation Agency (JICA), will cover Athi River to Namanga and Namanga to Arusha.

Earlier this year, Rwanda and Uganda launched the construction of the 202 km Kigali-Katuna-Mbarara road. The US\$150 million Mlbarara-Katuna contract has been awarded to Reynolds.

Strabag International has been awarded the US\$60 million Kigali-Katuna contract covering 78 km.

The growing demand for cement for infrastructure projects has enabled cement makers in the region to post profits and sustain high turnovers.

## 3.2 CEMENT PRODUCTION IN AFRICA

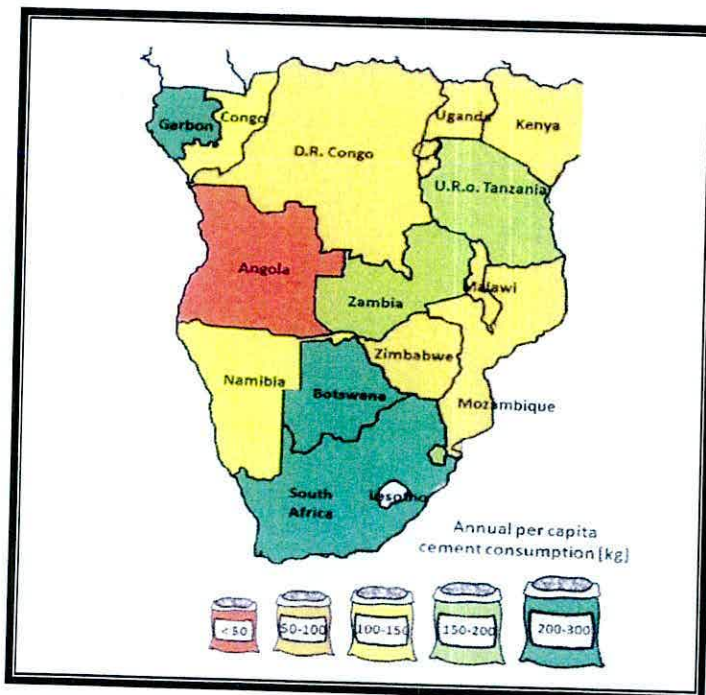


Figure 2. Annual per capita cement consumption in sub-equatorial Africa.

**TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 3 – BROAD MARKET ASSESSMENT**

**Table 3.1.**  
**African countries with high per capita cement consumption (kg).**

Equatorial Guinea	800
Libya	582
Tunisia	551
Mauritius	523
Egypt	424
Cape Verde	420
Seychelles	400
Algeria	380
Morocco	314
Botswana	300
Gabon	286
South Africa	252

The list in Table 1 provides data of some of the African Countries in the world's 30 highest per capita consumers of cement. A closer look exhibits that these are either North African countries or sub-Saharan countries that do not adequately represent the situation for the largest part of Africa.

In sub-Saharan Africa, infrastructure development has been largely neglected due to its history of civil unrest, political instability and a poor investment climate. The per capita cement consumption is growing fast all over the continent.

Cement is produced in many African countries and the cement industry has contributed to the development of important infrastructural facilities and helped to speed up economic development in the continent. However, cement production in African countries is very low. South Africa produces approximately 15 million tpa of cement in eleven plants, which is 16.5 times higher than the average of all other sub-Saharan countries. The annual per capita cement consumption for South Africa is about 250 kg compared to approximately 90 kg

# TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 3 – BROAD MARKET ASSESSMENT

the average for the entire continent. Figure 2 shows per capita cement consumption in the Central and Southern African region.

### 3.3 TANZANIA FACTS AT A GLANCE

Tanzania is a popular East African destination for visitors. It has many natural attractions including Zanzibar, Mount Kilimanjaro, the Serengeti and the Ngorongoro Crater. Tanzania is a large country and because of lack of proper infrastructure, it takes time to get around.

**Location:** Tanzania is located in East Africa bordering the Indian Ocean, between Kenya and Mozambique.



**Area:** 945,087 sq km, a little more than twice the size of California.

**Capital City:** Dodoma (but the commercial capital and largest city is Dar-es-Salaam).

**Population:** Around 39 million people live in Tanzania.

# TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 3 – BROAD MARKET ASSESSMENT

**Language:** Kiswahili or Swahili (official), English (official, primary language of commerce, administration, and higher education), Arabic (widely spoken in Zanzibar) and many local languages.

**Religion:** Mainland - Christian 30%, Muslim 35%, and indigenous beliefs 35%. Zanzibar, more than 99% Muslim.

**Climate:** Tanzania lies just south of the equator and on the whole enjoys a tropical climate. There are two rainy seasons, generally the heaviest rains (called Masika) usually fall from mid-March to May and a shorter period of rain (called mvuli) from November to mid-January. The dry season, with cooler temperatures, lasts from May to October.

**Currency:** Tanzanian Shilling.

**Tanzania's International Airport:** Tanzania has two international airports, one outside the commercial capital Dar-es-Salaam and the other near Arusha called Kilimanjaro International Airport . Charter flights and some international operators fly directly to Zanzibar Island.

There are long-distance bus services between Tanzania and Kenya, Malawi, Rwanda, Mozambique and Uganda.

## 3.4 ECONOMY OF TANZANIA

### 3.4.1 BASIC FACTS AND FIGURES

**Economy:** Tanzania is in the bottom ten percent of the world's economies in terms of per capita income. The economy depends heavily on agriculture, which accounts for more than 40% of GDP, provides 85% of exports, and employs 80% of the work force. Topography and climatic conditions, however, limit cultivated crops to only 4% of the land area. Industry traditionally is processing of agricultural products and light consumer goods. Continued donor assistance and solid macroeconomic policies supported real GDP growth of 7.1% in 2008.

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The World Bank, the IMF and bilateral donors have provided funds to rehabilitate Tanzania's aging economic infrastructure, including rail and port infrastructure that are important trade links for inland countries. Recent banking reforms have helped increase private-sector growth and investment, and the government has increased spending on agriculture to 7% of its budget. Continued donor assistance and solid macroeconomic policies supported a positive growth rate, despite the world recession. In 2008, Tanzania received the world's largest Millennium Challenge Compact grant, worth \$698 million. Dar-es-Salaam used fiscal stimulus and loosened monetary policy to ease the impact of the global recession. GDP growth in 2009-11 was a respectable 6% per year due to high gold prices and increased production.

### **GDP (purchasing power parity)**

\$63.44 billion (2011 est.)

\$59.77 billion (2010 est.)

\$56.1 billion (2009 est.)

### **GDP - real growth rate**

6.1% (2011 est.)

6.4% (2010 est.)

6.7% (2009 est.)

### **GDP - composition by sector**

**agriculture:** 27.8%

**industry:** 24.2%

**services:** 48% (2011 est.)

### **Labor force**

24.06 million (2011 est.)

### **Labor force - by occupation**

**agriculture:** 80%

**industry and services:** 20% (2002 est.)

Unemployment, youth ages 15-24

**Total:** 8.8%

**Male:** 7.4%

**Female:** 10.1% (2005)

**Investment (gross fixed)**

26.1% of GDP (2011 est.)

**Inflation rate (consumer prices)**

11.1% (2011 est.)

7.2% (2010 est.)

**Commercial bank prime lending rate**

18.1% (31 December 2011 est.)

14.55% (31 December 2010 est.)

**Stock of money**

\$2.464 billion (31 December 2008)

\$2.285 billion (31 December 2007)

**Agriculture - products**

Coffee, sisal, tea, cotton, pyrethrum (insecticide made from chrysanthemums), cashew nuts, tobacco, cloves, corn, wheat, cassava (tapioca), bananas, fruits, vegetables; cattle, sheep, goats.

**Industries**

Agricultural processing (sugar, beer, cigarettes, sisal twine); mining (diamonds, gold, and iron), salt, soda ash; cement, oil refining, shoes, apparel, wood products, fertilizer.

**Industrial production growth rate**

7% (2010 est.)

**Electricity - production**

4.281 billion kWh (2008 est.)

**Electricity - production by source**

**fossil fuel:** 18.9%

**hydro:** 81.1%

**nuclear:** 0%

**other:** 0% (2001)

**TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 3 – BROAD MARKET ASSESSMENT**

**Oil - production**

0 bbl/day (2010 est.)

**Oil - consumption**

38,000 bbl/day (2010 est.)

**Oil - proved reserves**

0 bbl (1 January 2011 est.)

**Natural gas - production**

658 million cu m (2009 est.)

**Natural gas - proved reserves**

6.513 billion cu m (1 January 2011 est.)

**Current Account Balance**

-\$2.071 billion (2011 est.)

-\$1.978 billion (2010 est.)

**Exports**

\$5.659 billion (2011 est.)

\$4.297 billion (2010 est.)

**Exports - commodities**

Gold, coffee, cashew nuts, manufactures, cotton

**Exports - partners**

China 15.6%, India 11%, Japan 6.1%, UAE 5%, Germany 4% (2009)

**Imports**

\$8.65 billion (2011 est.)

\$7.55 billion (2010 est.)

**Imports - commodities**

Consumer goods, machinery and transportation equipment, industrial raw materials, crude oil

**Reserves of foreign exchange**

\$3.573 billion (31 December 2011 est.)

\$3.645 billion (31 December 2010 est.)

**Debt - external**

\$9.114 billion (31 December 2011 est.)

\$8.259 billion (31 December 2010 est.)

**Exchange rates**

Tanzanian shillings (TZS) per US dollar -

1,571.1 (2011 est.)

1,409.3 (2010 est.)

**TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 3 – BROAD MARKET ASSESSMENT**

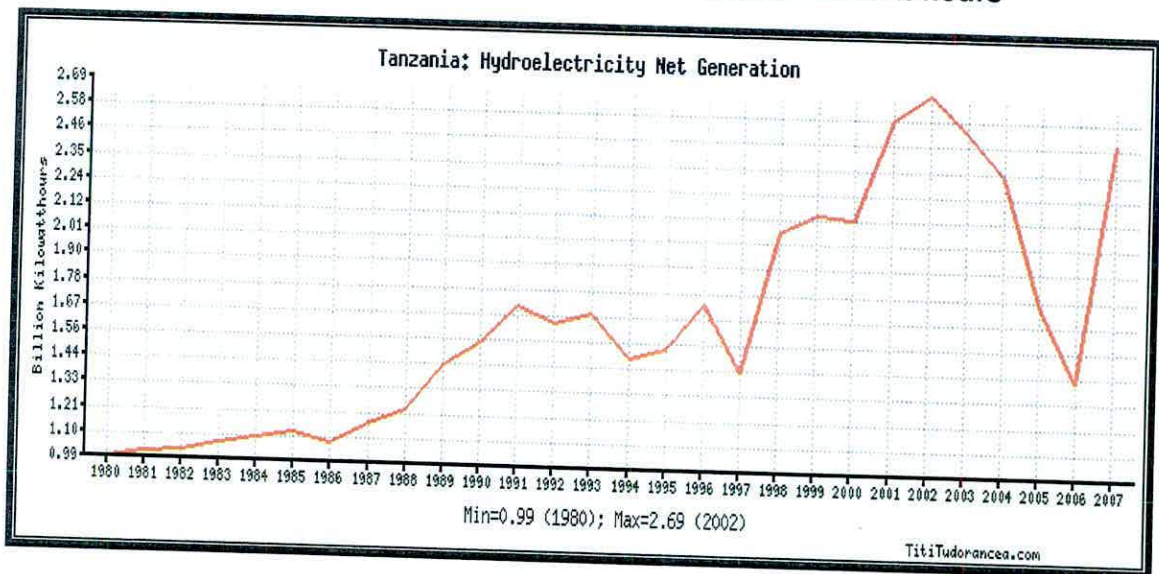
1,320.3 (2009)  
1,178.1 (2008)  
1,255 (2007)

**Fiscal year**

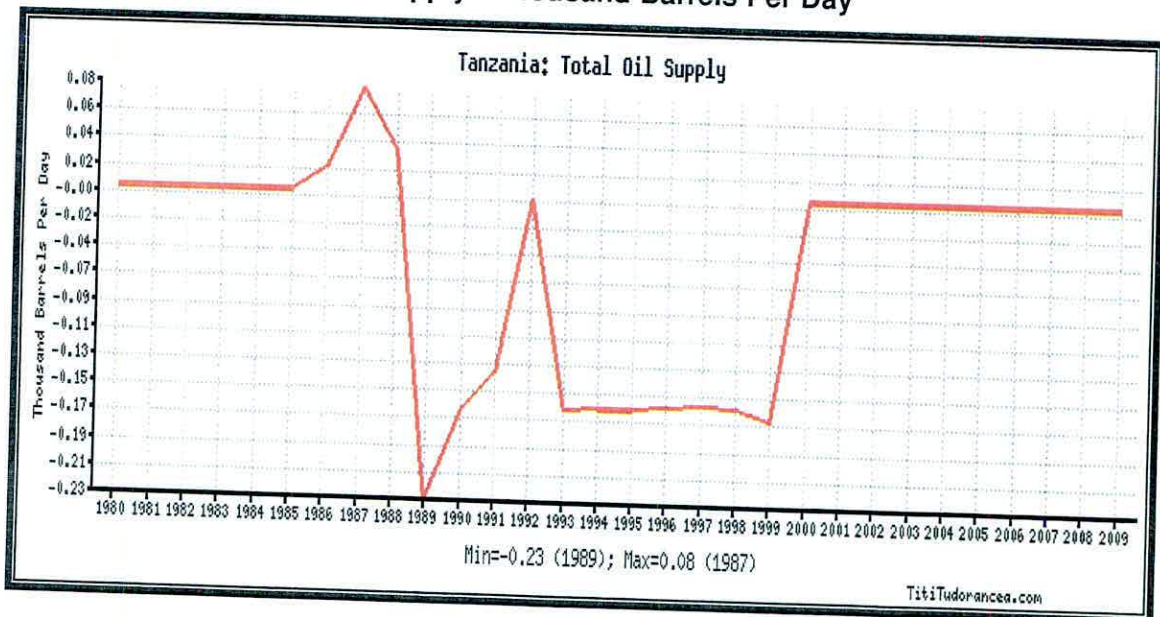
1 July - 30 June

**3.4.2 ECONOMIC INDICATORS OF TANZANIA**

**Tanzania: Hydroelectricity Net Generation - Billion Kilowatt-hours**

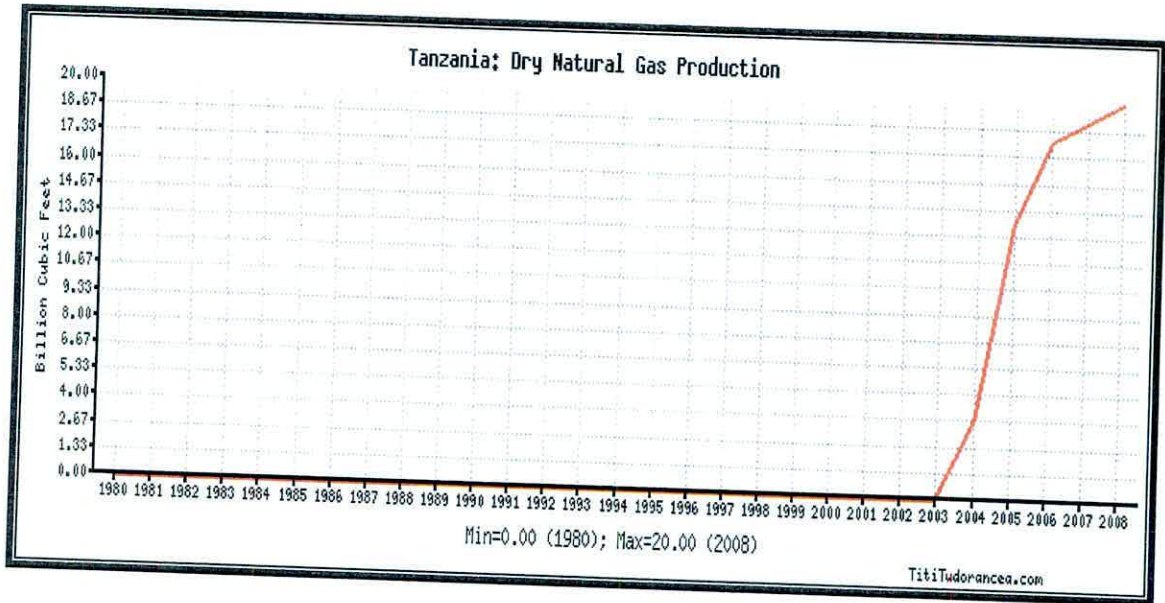


**Tanzania: Total Oil Supply - Thousand Barrels Per Day**

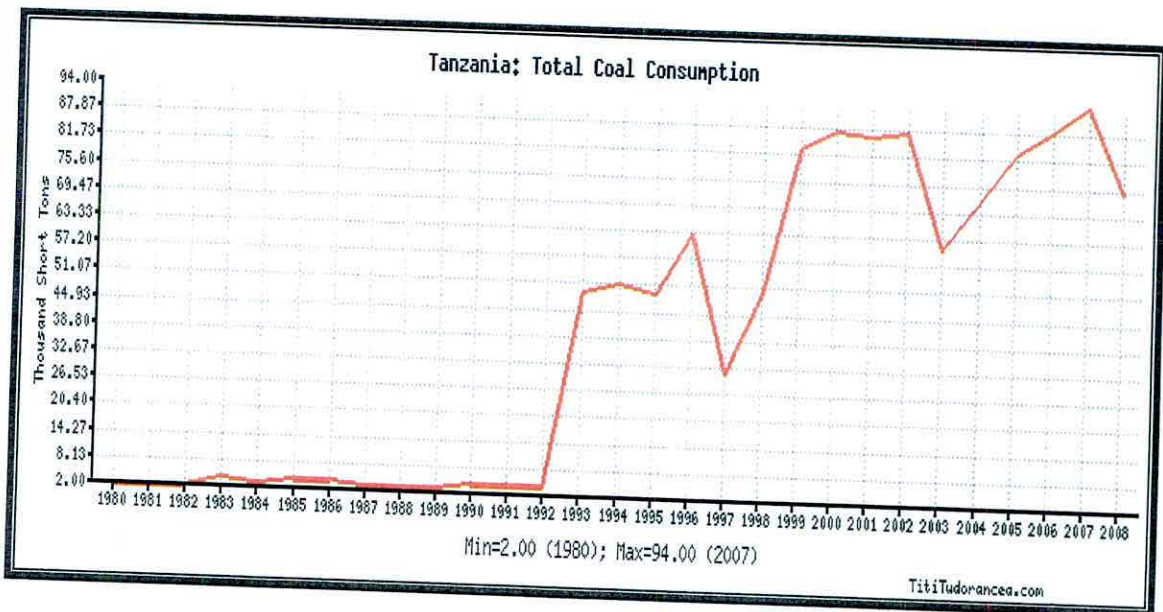


**TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA - CHAPTER 3 - BROAD MARKET ASSESSMENT**

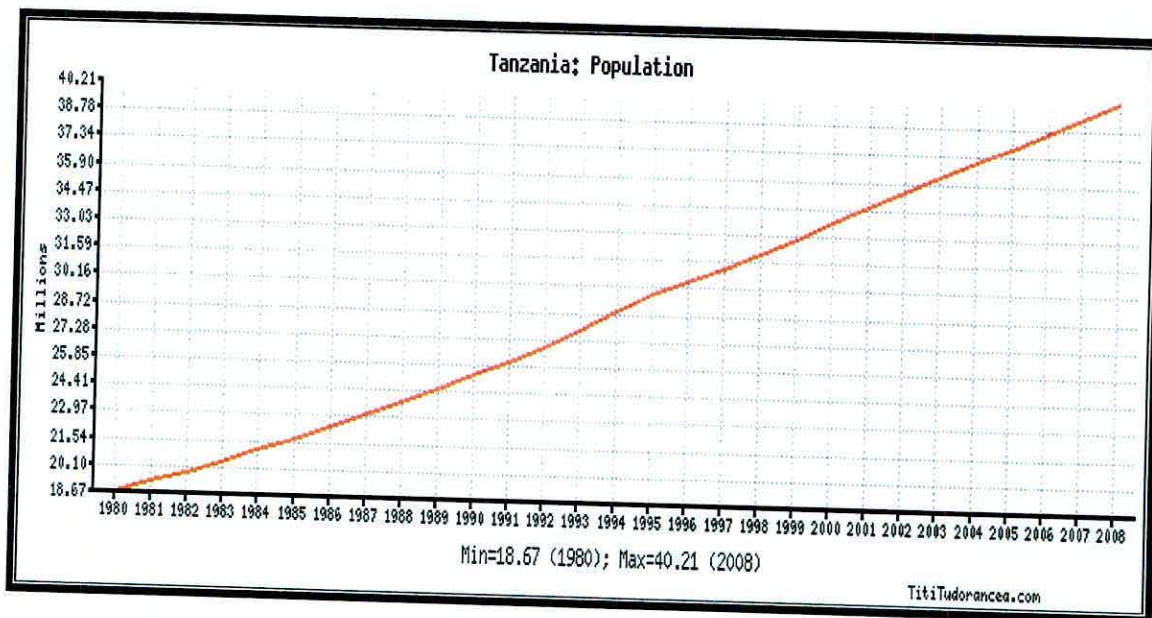
**Tanzania: Dry Natural Gas Production - Billion Cubic Feet**



**Tanzania: Total Coal Consumption - Thousand Short Tons**



**Tanzania: Population - Millions**



It may be noted from the above indicators that there is a continuous upswing of all vital basic infrastructure items like electricity, coal, gas, oil etc., which are needed for growth of Tanzania.

**3.5 TANZANIA INDUSTRY GROWTH STORY – REALITY AND VISION**

**3.5.1 GROWTH CORRIDOR DEVELOPMENT OF TANZANIA**

**Uhuru (TANZAM) Development Corridor** runs through the rich agricultural land in the four Tanzanian regions of Morogoro, Iringa, Mbeya and Rukwa, along the Tanzania-Zambia Railway (TAZARA) and Tanzania-Zambia (TANZAM) highway. The corridor has recently attracted investor's attention as a targeted area under the Southern Agricultural Growth Corridor of Tanzania (SAGCOT) project, which designates the area as the potential bread basket for the Eastern and Central African region. SAGCOT proposes to develop commercial agriculture over an area of 350,000 hectares of farmland involving more than US\$ 1.2 billion annual turnover worth of production activities creating 420,000 new jobs in the agricultural value chain through coordinated US\$ 2.1 private investment and US\$ 1.2 billion public investment.

**Mtwara Development Corridor (MDC)** is known as Minerals Corridor. At the head of Mtwara Corridor, a large natural gas reserve is under development. A nitrogen fertilizer plant and other gas related chemical industries are expected to grow in Mtwara industrial zone. Having limestone, red clay and gypsum, Mikindani is ready for cement production. Iron marking and coal production at Liganga and Mchuchuma are about to take off. Reserves of base and rare metals such as nickel, copper, niobium, vanadium, titanium and others are known to exist along the corridor. Recent drilling tests confirmed the presence of high grade zones of sandstone-hosted uranium in Mkuju River.

**Tanga Development Corridor (TDC)** was originally designed to link Tanga port and the Great Lake Zones and to provide logistics services to Great lake zone countries. TDC has considerable potential for creating an economic growth area extending beyond Tanzanian borders. With Kilimanjaro International Airport providing international transportation links, the northern highlands regions of Kilimanjaro and Arusha have great potential for export oriented horticulture and development of agro-related industries as well as hospitality industries on the basis of tourism. Thanks to moderate climate and logistics, the highlands are considered as providing an excellent destination for foreign direct investment. The corridor should develop a cold chain transport and storage facilities for horticulture and perishable food industries including meat, milk, dairy products, cut-flowers, highland vegetables and fruits industries.

### **3.5.2 POWER SUPPLY**

Although peak power demand in Tanzania as of the end of 2010 was estimated at around 833 MW, actual stable power supply remains at around 600 MW due to several reasons. Shortage of power supply and its unreliability has been a most crucial factor to strain industrial growth of the country. The Tanzanian economy has been growing at 7.1% on average for last 10 years and the industrial power purchase has been growing at 10.1% per annum. The growth

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of industrial power demand is expected to accelerate because of (i) increased power consumption associated with industrial advances inclusive of shift from manual work to mechanized work and (ii) Expansion of electricity distribution network which connects isolated self-power generating workshops to the national grid. TANESCO Power Master Plan 2009 under estimates the growth trends of industrial power demand.

### 3.5.3 GAS DEVELOPMENT

Despite the presence of abundant natural gas and a series of finding of gas reserves since the 1990s, commercialization of gas has been suffering from a noticeable amount of time. Natural Gas has a number of qualities that make it superior to liquid oil. However, the heavy initial investment outlays requirement in transportation systems often prevents quick mobilization of the resources of medium size gas reserves. In fact, it took 13 years to commercialize Songo gas after its finding in 1992. Mnazi Bay gas got its development license in 2006 and is yet to be fully developed. It is not only in Tanzania that medium scale gas fields take time to find a way for commercialization. However, in the case of Tanzania, all the discovered medium scale gas reserves and the major gas consuming spots are all situated along the coastal line. Once a common gas pipe line is constructed along the coast, all the gas reserves can be developed for commercial operation quickly. Quick commercialization would reduce the operational costs of gas producers and also prompt competition among them.

On top of commercialization of medium size gas reserves which are mainly for domestic and regional use, finding of gas reserve in deep sea oil and gas concessions off southern coast may having bring a huge impact on altering the economic structure of the country. Full scale exploration started after 2010 has reported symptoms indicating the presence of large gas reserve which exceeds a benchmark scale of LNG (Liquefied Natural Gas) development of 5 trillion cubic feet. Once the implementation of an LNG project starts, the structure of Tanzania's trade pattern would change overnight. The exports would fill up country's trade deficit and, thanks to a fair production sharing agreement

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established in this business, may add billion dollar revenue to the government revenue. Nevertheless the revenue does not guarantee prosperity of the country and happiness of people. It would be, rather, a serious challenge to industrialization which has to maintain competitiveness against over-evaluated local currency at that time. The revenue has to be spend for country's welfare and infrastructure development wisely in order to maintain competitiveness of export industries overcoming so called curse of resources.

### **3.5.4 IRON AND STEEL SUB-SECTOR**

The Mchuchuma coal mine and Liganga iron ore mines have been earmarked by the Government as key expansion sub-sectors. NDC signed a JVA with Chinese consortium to jointly develop the mines for East Africa's first iron making plant and large scale coal power station. The project has to fight with a number of challenges, and IIDS extends full support for the successful completion of the project.

With the completion of the iron making project, metal related industries such as steel processing and metal fabrication are expected to be developed. To support internationally competitive manufacturing sector, formulation of a metal industry cluster should be prioritized.

### **3.5.5 MINING:**

Mining sector contributes about 2.3 per cent of the GDP, which is projected to account 10 per cent in 2025. It is one of the leading components in generating foreign exchange earnings within the non-traditional exports. Further it has great potentials for employment opportunities and spearheading for both the forward and backward linkage of the Tanzania's economy.

#### **Mineral Resources Endowments**

Tanzania has a great potential particularly for gold, base metals, diamonds, ferrous minerals and a wide variety of gemstones, some of, which are unique such as Tanzanites. Coal, uranium, and various industrial minerals such as

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soda, kaolin, tin, gypsum, phosphate and dimension stones are available at an attractive economic rates.

## **Coal:**

Coal resources similar in quality to the Gondwana coals of southern Africa occur in the Ruhuhu and Songwe-Kiwira basins in the Southwest Tanzania. A total of about 1 .5 billion tonnes in reserves have so far been identified.

The country's only coal mine at Kiwira has an average annual output of 35,000 tonnes - all of which is consumed mostly locally for power generation.

China's Sichuan Hongda Co. Ltd. has signed a \$3 billion deal with Tanzania to mine coal and iron ore in the resource-rich east African country.

The investment involves construction of the Mchuchuma integrated coalmine, a 600-megawatt (MW) thermal power station and the Liganga iron ore mine in southern Tanzania.

Dubbed the single-biggest investment deal in east Africa, Sichuan Hongda will own 80 percent of the joint venture project, with the remaining stake held by Tanzania's state-run National Development Corporation (NDC).

## **Industrial Minerals:**

Limestone and dolomite-good resources of high purity occur in the white marble deposit of the Morogoro Region. Potential for dimension stone and refractory grade limestone is therefore excellent.

A variety of clays- bentonite, kaolin and fullers earth - in size-able deposits have been identified and are only scantily exploited. The Pugu kaolin deposit located some 30 kms West of Dar es Salaam has a great potential for development.

## **TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 3 – BROAD MARKET ASSESSMENT**

Evaporates and saline deposits of economic significance are associated with the rift valley lakes. Investigations of the Soda ash deposits at Lake Natron revealed a potential recovery of over one million tonnes a year. Currently, salt production stands at 105,000 tonnes per annum.

Graphite occurs in high-grade gneisses mainly in the Usagaran system. Sufficient reserves have been identified at Merelani, northern Tanzania, for a 40 year operation at a mining rate of 15,000 tonnes per year of high grade flake graphite of 97-98% purity. The mine will also produce Tanzanite, which occurs in association with graphite.

Phosphate deposits have been exploited at Minjingu in Arusha Region at around 48,000 tonnes per year in order to support fertiliser manufacturing. Following the closure of the fertiliser plant in Tanga, current production is mainly used for direct application.

### **Supplementary Cementitious materials as a possible alternative in Africa**

Africa sits on an abundance of raw materials that could be used as binders or extenders of hydraulic binders. A combination of economic and environmental factors lies behind the exploration of alternative materials as partial replacement for cement in Africa. Possible SCMs may come from industrial wastes and byproducts, agricultural wastes or natural deposits of pozzolanic materials.

**From the foregoing study, it is obvious that for a developing country like Tanzania, Government has given top most attention to development of infrastructure in almost all areas. Basic infrastructure material like cement will have a cascading demand in the coming years and with the availability of raw materials like limestone, Mamba Cement will have a bright future.**

### **3.6 CURRENT CEMENT PRODUCTION IN TANZANIA**

Tanzania Portland Cement in Dar es Salaam is the major producer with a production capacity totaling 1.4 million tpa, followed by Tanga cement with 1.25 million tpa capacity. The Mbeya cement plant has an installed capacity of 0.35 million tpa.

Tanzania Securities, a stock brokerage firm, expects the cement demand to grow at a substantial rate if the retail business, infrastructure development and mining investments are sustained. The research, a guideline to investors, has analysed the sector in the past five years and also looked at industry activities for the next three years.

The main drive of cement consumption is the construction and housing sector, which have compounded the annual growth rate of about 10%, thus pushing up demand of the commodity.

These statistics indicate that the Tanzania construction sector will continue to grow and contribute more to the economic growth of the country. The demand for cement in the East African region is anticipated to grow at a rate of approximately 5 – 6% in the next few years.

Kenya's Athi River Mining (ARM) will be the first private company to build a cement factory in Tanzania. This plant, with an expected production capacity of approximately 4000 tpd of cement i.e. 1.5 million tpa of cement, will be the largest of its kind in East Africa and will be capable of addressing some of the growing demand for cement in the region.

After the construction of the new US\$120 million ARM cement plant is completed, Tanzania will be the only country in the region with four cement plants. Currently, cement plants include Mbeya Cement, Tanga Cement and Tanzania Portland Cement.

## TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 3 – BROAD MARKET ASSESSMENT

The projected capacity of the factory, to be built in Mtwara, southern Tanzania, is 3 million tonnes per year, and Dangote is looking to get a good chunk of the market share.

The construction, in conjunction with Chinese firm Sinoma International Engineering Company Ltd, has already commenced and head of communication Tony Chiejina says the factory will be completed in the second quarter of 2015.

Also being set up is a \$1.85 billion fertiliser plant in Mtwara whose construction will go hand in hand with the cement plant.

Dangote hopes that the new cement plant will supply countries in the East African Community market as well as Malawi and DR Congo.

The region is currently undergoing a massive infrastructure upgrade, which has pushed up demand for cement, as governments invest in the construction of roads, ports and bridges, railways and energy projects.

### 3.9 PROJECTED FUTURE DEMAND OF CEMENT IN TANZANIA

**TABLE 3.2.**  
**INSTALLED CAPACITY OF EXISTING CEMENT PLANT**

Sn.	Name of the Plant / Group	Unit	Installed Capacity
1	Tanzania Portland Cement	MTPA	1.40
2	Tanga Cement	MTPA	1.25
3	Mbeya Cement	MTPA	0.35
4	Athi river Mining	MTPA	0.75
	<b>Total</b>	<b>MTPA</b>	<b>3.75</b>

**TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 3 – BROAD MARKET ASSESSMENT**

**PROJECTED ADDITIONAL CAPACITY OF EXISTING AND NEW CEMENT PLANTS BY 2015-2016**

Sn.	Name Of the Plant / Group	Unit	Installed Capacity with expansion
1	Tanzania Portland Cement	MTPA	2.0
2	Tanga Cement	MTPA	1.25
3	Mbeya Cement	MTPA	0.35
4	Athi river Mining	MTPA	1.50
5	Lake Cement Limited	MTPA	0.50
6	Dangote	MTPA	1.50
7	Savanna Cements	MTPA	1.50
8	Mamba Cement Co. Ltd	MTPA	1.00
	<b>Total</b>	<b>MTPA</b>	<b>9.60</b>

On a conservative scale, it should be assumed that 60% of the above additional capacity will mature in next 3 years. Considering this projection, 5.76 million tonnes capacity may be added by 2015-16. This amounts to 15% annual compounded growth, as given in the Table below.

**Table – 3.3.**

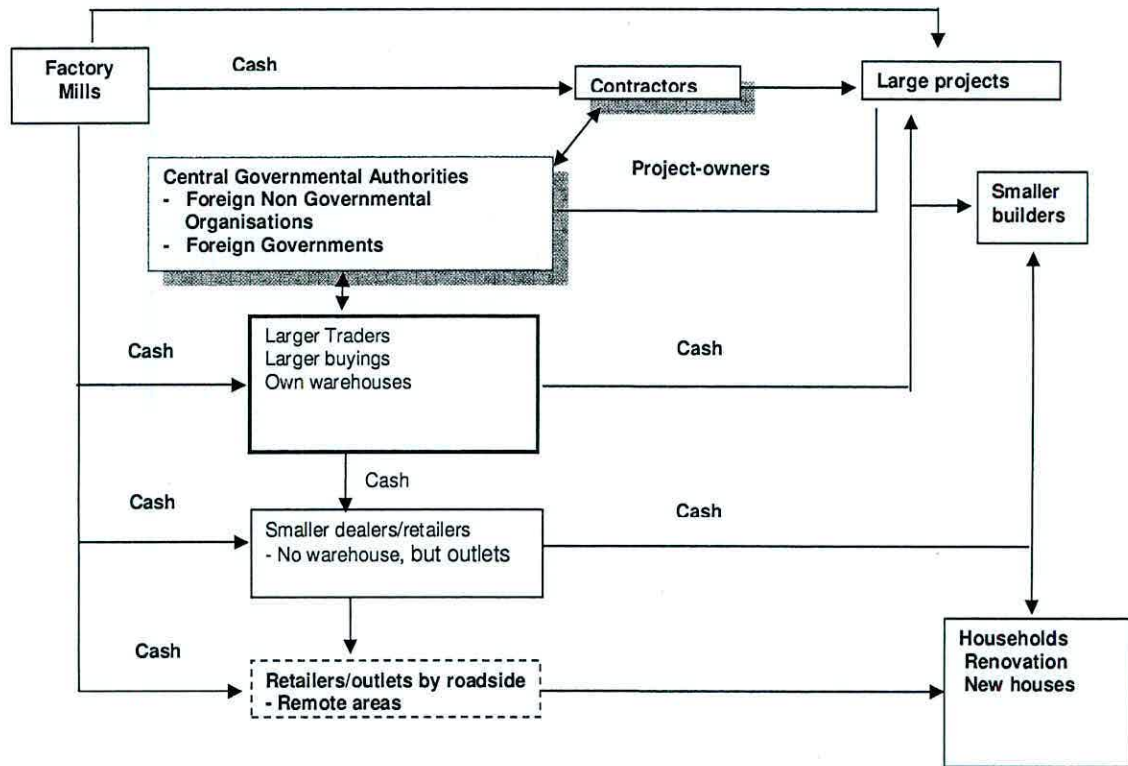
**PROJECTED CEMENT DEMAND (IN MILLION TONNES)**

Year	Present and Planned Capacity (Million Tonnes per Annum)	Projected demand @ 15% compounded growth (Million Tonnes per Annum)
2012-13	3.75	
2013-14	5.00	4.31
2014-15	7.00	4.96
2015-16	9.60	5.70
2016-17		5.90
2017-18		6.56
2018-19		7.54
2019-20		8.67

**TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 3 – BROAD MARKET ASSESSMENT**

It may be noted from the above that addition of 9.6 Million tonnes per annum capacity by 2015-16 is an optimistic figure, as it is dependent on a high compounded growth of cement in the country.

**3.10 SUGGESTED SALES STRUCTURE IN TANZANIA**



**3.11 CEMENT SCENARIO IN FEW NEIGHBOURING COUNTRIES**

Irrespective of the growth of demand in the country, steps should be initiated in exploring the export potential of Mamba cement. In this situation, cement production and consumption scenarios in the neighboring countries is covered in the following sections.

**TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 3 – BROAD MARKET ASSESSMENT**

**UGANDAN CEMENT FACTORY (FUTURE)**

The plant is having a daily production capacity of 5,000 metric tonnes of cement. Construction work is expected to kick off in 2013 on the plant.

Total out put from the two running cement Plants: 1,162,241 metric tons

Imported cement - 566,082 metric tones

Local production for cement doesn't cover the whole demand in Uganda that is why imports are high here.

A bag of cement goes for \$12 in local retail outlets in Kampala City.

**3.11.5 SUMMARY OF CEMENT PRODUCTION AND PRICES**

Installed Capacity in MT in 2011		
Sn.	Country	Capacity in tonnes
1	Burundi	100,000
2	Rwanda	100,000
3	Comoro	Not known
4	Uganda	3,500,000
Sales Price per bag		
Sn.	Country	Price per bag in US \$ Dollars
1	Burundi	\$16
2	Rwanda	\$9.8-\$10.0
3	Sudan	\$23
4	Tanzania	\$7.8 to \$9.3
5	Uganda	\$12

**TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 3 – BROAD MARKET ASSESSMENT**

**3.12 CEMENT PRICING AND CEMENT SALES DISTRIBUTION**

**3.12.1 TRANSPORT COSTS RELATED TO THE DISTANCE FROM SITE**

City Name	Estimate Transport cost in US \$ per Tonnes - Assumed	Distance from Bagamoyo in km	Average Retail cement price per tonne
<b>1.0 Tanzania</b>			
Dar es Salaam	15.00	60	<b>140.00</b>
Mwanza	100.00	910	
Zanzibar City	15.00	135	
Arusha	50.00	540	
Mbeya	60.00	740	
Morogoro	30.00	250	
Tanga	30.00	250	
Dodoma	50.00	470	
Kigoma	110.00	1200	
Moshi, Kilimanjaro	50.00	500	
<b>2.0 Burundi</b>	100.00	1520	320.00
<b>3.0 Rwanda</b>	100.00	1235	200.00
<b>4.0 Uganda</b>	100.00	1135	200.00

It may be seen from the above that after allowing transport cost from Mamba plant to the neighbouring countries, it will not be viable to sell cement in Rwanda and Uganda. Only country can be Burundi, where there is a high prevailing cement price. But demand in the country is very low.

**TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 3 – BROAD MARKET ASSESSMENT**

**3.12.2 FACTORS AFFECTING TANZANIA CEMENT PRICING**

- ❖ Poor and unreliable rail transport causing escalation in cement prices.
- ❖ Lack of level playing field for both local and foreign companies.
- ❖ An acute shortage of power where about 30% of the total electricity required to run the company depends on the company's own production.
- ❖ Lack of own depots in remote areas so as to have the commodity's retail price reduced
- ❖ Cement price rise due to the constant depreciation of the Shilling against the Dollar.
- ❖ In Tanzaniaia, 50kg bag of imported cement retails at Tsh12,500 (\$7.8) while locally produced brands are selling at between Tsh13,000 (\$8) and Tsh15,000 (\$9.3).
- ❖ In Kenya, current prices range between Ksh700 (\$8) and Ksh750 (\$8.5) per 50kg bag while in Uganda, the average price is Ush32,000 (\$12) as at December 2012.

**TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 3 – BROAD MARKET ASSESSMENT**

**3.12.3 PROJECTED CEMENT SALES– 95,000 TONNES PER MONTH, CORRESPONDING TO ANNUAL CEMENT PRODUCTION OF 1,140,000 TONNES**

City Name	Estimate Transport cost in US \$ per Tonne	Population	Projected monthly cement sales in Tonne
<b>1.0 Tanzania</b>			
Dar es Salaam	15.00	2 700 000	60,000
Zanzibar City	15.00	403 700	5,000
Arusha	50.00	341 000	5,000
Mbeya	60.00	291 650	5,000
Morogoro	30.00	250 900	5,000
Tanga	30.00	224 900	5,000
Dodoma	50.00	180 540	5,000
Moshi, Kilimanjaro	50.00	156 960	5,000

**It is recommended to initiate a sales and distribution network of cement in the country to achieve the above sales targets in different parts of the country.**

**3.12.4 CONCLUSION**

- Country is expected to achieve installation capacity of 9.6 million tonnes per annum, if all the plans of different industrial groups mature.
- However, on a high growth rate of 15% per annum on the basis of present capacity, only 60% of the above capacity is likely to mature.
- It is necessary to build a network of sales and distribution in the country, targeting the various consumer centers.
- High transport costs may make it difficult to export cement to the neighboring countries. All attempts should be made to sell the produce within the country.

**CHAPTER – 4**  
**RAW MATERIALS**

## CHAPTER – 04

### RAW MATERIALS

#### 4.0 INTRODUCTION

The proposed Tarawanda Limestone deposit area has been acquired by M/s Mamba Cement Co Ltd (MCCL), a subsidiary of M/s MOTISUNS HOLDINGS LTD, (MHL) Dar-es-Salaam, Tanzania for their proposed 3000 TPD Cement project at Tarawanda in north-eastern Coastal district Bagamoyo. The Client has obtained Mineral Prospecting Rights under the Mining Act 1998 of Tanzanian Government (ML 423/ 2007) for about 18.48 Sq Kms (Scanned copies of their licenses are enclosed).

The Tarawanda Limestone deposit area is located at about 4 Km south- southeast of Tarawanda village and about 112 kms from Tanzania's capital Dar- es- Salaam. The motorway connects Dar-es Salaam – Chellinze (on Northern Highway going towards Arusha) – Bagamoyo to Tarawanda – with a 22 Kms long gravel road in the north.

The Prospected limestone area (ML/ 423) forms a part of the Tanzanian Survey Sheet No- 185/1 (Scale 1: 50,000) and the area has tentative co-ordinates as given below:

Sr No	Latitude	Longitude
1	S06 30' 00.00"	E 38 30'00"
2	S 06 34' 19.78"	E 38 30'00"
3	S 06 34' 19.78"	E 38 31' 15.42"
4	S 06 34' 19.78"	E 38 32' 50.46"
5	S 06 31' 54.56"	E 38 32' 50.46"
6	S 06 31' 54.56"	E38 31' 15.42"
7	S 06 30' 00"	E38 31' 15.42"

**4.1 PHYSIOGRAPHY AND DRAINAGE**

The proposed Limestone area is a gentle rolling parallel north-south trending low height ridges (Creeks) of Middle Jurassic to Lower Cretaceous age shallow water coralline deposit in this valley. The highest altitude is 184mRL. A prominent scarp of variable height rises 8 to 16 meters above the ground level, bordering the alluvial plain/ valleys filled with soil and scree materials. The Limestone is calcretic, fine grained and micro- crystalline in appearance. The presence of crushed corals and sea shells with sea sand has been observed in this limestone.

**4.2 GEOLOGY OF THE AREA**

As mentioned above, the Tarawanda Limestone deposit is north-south trending parallel ridges, belonging to Middle Jurassic to Lower Cretaceous with a thin exposure of sand and gravels (which may be probably of Tertiary age). The Limestone is gently dipping towards east -southeast covered with Black cotton soil and forest bushes. The valley are filled with scree and soil as thick over burden( as thick as 1m to 22m at places).The limestone bands are sporadic and detached and at places concealed. Therefore a systematic drilling with close spacing is very essential to prove its continuity along the strike directions.

A generalised stratigraphic sequence of the area under investigation has been established on the basis of surface as well as sub surface drilling data, which is as follows:

<u>Age</u>	<u>Lithology</u>
Quaternary (Recent)	Top Soil and Calcareous sand
_____ UNCONFORMITY _____	
Middle Jurassic- Lower Cretaceous	Off White Limestone Yellow Limestone Greyish White Limestone Fossiliferous(Coralline) Limestone

The different rock types found in the area are as follows:

**a) Top Soil, Black Cotton Soil and Calcareous Sand:**

A substantial portion of the deposit are covered with forest bushes and top soil cover of Black Cotton soil (BC Soil). Thin bands of calcareous sand is also seen in between weathered limestone and top soil( BC Soil). It is a light buff / off white coloured, fragmented calcaritic gravel rock cemented with calcium carbonate and clay material. It is a hard weathered rock which appears to be formed by capillary action of ground water in this limestone terrain condition. The average thickness of this bed is 1m to 1.50m at the contact of top soil and lower limestone beds.

**b) LIMESTONE:**

The limestone beds are generally fine grained, micro crystalline, medium hard, brittle, fossiliferous and at places porous in nature. At places Limestone is highly fossiliferous with coarse fragmented as well as complete shells of gastropods and other shells. The colour of the limestone is varying from yellowish to buff and off creamy white to gray. The limestone bands are sporadic detached and at places concealed.

There is occurrence of typical fragmented braccia characterised by presence of small and irregular fragments embedded in calcareous matrix. The areal exposed limestone ridges have concluded presence of more than one band in this area which has further been confirmed by drilling.

**1. Exploration Status**

As such there is no record of any type of earlier geological investigation carried out by Directorate for Geology, Tanzania or any other government agency. Therefore the client has engaged an investigating agency to carry out some geological prospecting and drilling work in this area.

The detailed investigation comprises of contouring, geological mapping and drilling in **an area of about 18.48 Sq. km.** was explored as initial phase of Prospecting .

The overall drilling was planned to delineate size of the limestone body and its sub

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surface quality, the expected thickness of carbonate sediments, and the preliminary character of exploration. As surveying for accurate location of boreholes in this configuration was not organised, the drilling sites were roughly located in field at 400m x400m or 200mx200m spacing. The drilling agency was advised that each completed borehole should be regularly marked properly by a cement block bearing inscribed number of borehole. The drilling agency was also advised to for surveying the borehole levels and record their locations by GPS coordinates on layout plan of the boreholes.

Total 55 boreholes were drilled with a total length of **1112 (for 31 BHs)m** with borehole depth varying between 4m to 62m (average depth 35.87m) depending mostly on the intersection of carbonaceous rock thickness, to enable us to have an overall idea of subsurface litho stratigraphic column and the geological structures in the investigating area. Out of these 55 boreholes it has been reported that 15 boreholes are in western block (18.48 Sq Km) and remaining 40 boreholes are in eastern block ( 4.99 Sq Km). The drilling diameters are 116 mm and 74 mm in each borehole.

It has been revealed from the drilled core that there is not much thickness of the limestone bed exposed in eastern block (i.e. in BH Nos. TLW-01 to 10 & BH nos. TLW-21 to 25). Similarly out of remaining 40 boreholes about 31 BHs have intersected 1 to 4 limestone (mineralised) bands up to 62m depth. For easy to commutation of quality and reserves these four bands have been further re-grouped in TWO bands, namely (a) Upper band ( 0 to 27m) and (b) Lower band (27 to 66m).Total 13 boreholes have intersected both (upper & lower band).

Details of the drilled bore hole are as given below:

BH Id	EASTING	NORTHING	COLLAR RLs
BH01	443466	9284627	177
BH02	443567	9284558	167
BH03	443478	9284431	166
BH04	443559	9284335	158
BH05	443162	9283967	157
BH06	443229	9283866	152
BH07	443050	9283662	163
BH08	443121	9283592	176
BH09	443096	9283311	165

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BH10	443176	9282829	154
BH11	445491	9284272	173
BH12	445627	9284194	177
BH13	445321	9284019	169
BH14	445465	9283961	170
BH15	445329	9283832	168
BH16	445429	9283684	165
BH17	445300	9283420	142
BH18	445391	9283358	143
BH19	445315	9283130	150
BH20	445507	9282910	154
BH21	443718	9284451	152
BH22	443651	9284159	154
BH23	443345	9283705	164
BH24	443304	9283513	169
BH25	443333	9282705	152
BH26	446061	9283990	165
BH27	445665	9283532	155
BH28	445745	9283317	161
BH29	445729	9283109	169
BH30	445780	9282620	154
BH31	445138.61	9282845.16	152
BH32	445134.24	9282635.01	153
BH33	445510.75	9282630.63	170
BH34	445795.32	9284241.76	178
BH35	445799.7	9284031.61	172
BH36	445795.32	9283817.09	164
BH37	445812.83	9283598.18	173
BH38	445804.08	9283383.66	177
BH39	445812.83	9283142.87	170
BH40	445812.83	9282902.07	178
BH41	445804.08	9282639.39	155
BH42	446040.49	9284237.38	174
BH43	446044.87	9284031.61	170
BH44	446062.38	9283821.46	174
BH45	446062.38	9283602.56	178
BH46	446049.25	9283383.66	181
BH47	446062.38	9283151.62	175
BH48	446071.14	9282902.07	168
BH49	446101.78	9282643.77	160
BH50	446307.55	9284250.51	181
BH51	446311.93	9284044.74	183.8
BH52	446320.69	9283825.84	183
BH53	446329.44	9283606.94	184
BH54	446333.82	9283392.41	181
BH55	446342.58	9283160.38	173

### 4.3 QUALITY OF LIMESTONE

#### 4.3.1 Deposit Quality:

During the reconnaissance survey of the Tarawanda limestone deposit few samples have been collected randomly and analyzed by the client. The analysis results were found to be quite promising.

Based upon the preliminary observations it was decided to take up systematic prospecting for further proving of this limestone deposit by drilling.

Accordingly MCCL, Tanzania has engaged M/s Paulsum Geo-Engineering Co, Tanzania to carry out systematic survey, Geological Mapping and drilling in this area. Accordingly a total **1112m** of drilling, total 1112 sample meter wise for every one meter core length have been prepared and sent for Chemical Analysis (through XRF). The powdered samples are analysed for LOI, SiO<sub>2</sub>, Al<sub>2</sub>O<sub>3</sub>, Fe<sub>2</sub>O<sub>3</sub>, CaO, MgO, SO<sub>3</sub>, K<sub>2</sub>O, Na<sub>2</sub>O, TiO<sub>2</sub>, Mn<sub>2</sub>O<sub>3</sub>, P<sub>2</sub>O<sub>5</sub>, Cr<sub>2</sub>O<sub>3</sub> and Chlorine.

Based up on the chemical analysis results received, ERCOM's interpretation is as follows:

a) Out of total 55 BHs drilled 31 BHs has intersected the cement grade limestone ( details as per given Table below) that there are total **Three categories** of litho units, namely as

1. Topsoil and Black Cotton soil (CaO: < 40%, SiO<sub>2</sub>: >20%, MgO:>3.0%)
2. Cement Grade Limestone (CaO:>42.5 to 48 %, SiO<sub>2</sub>: <6 to 12.5%, MgO:<3.0%)
3. Siliceous (Marly) Limestone (CaO:>40%to42.5%, SiO<sub>2</sub>: 12.5 to 20%, MgO:<3.0%)
4. Dolomite / Dolomitic Limestone (CaO: > 40%, SiO<sub>2</sub>: <20%, MgO:>3.0%)

#### ANNEXURE-I

**TABLE- DETAILS OF MINERALISED ZONE ( CEMENT GRADE LIMESTONE) IN DRILLED BHs**

Sr No	Borehole No.	Cement Grade Limestone Thickness Intersected in Borehole				Total thickness in Upper and Lower Band		OB/IB(in Mtrs)
		1st Band	2 <sup>nd</sup> Band	3 <sup>rd</sup> Band	4 <sup>th</sup> Band	Upper Band	Lower Band	
1	TLW-11	10-13m(3m)	----	-----	31-35m(4m)	3m	4m	- / 18m
2	TLW-12	-----	-----	-----	-----	-----	-----	-----
3	TLW-13	0-9m(9m)	11-21m(10m)	27-31m(4m)	37-43m(6m)	19m	10m	---- / 12m
4	TLW-14	0-9m(9m)	19-33m(14m)	----	-----	23m	-----	-----/ 10m
5	TLW-15	0-31m(31m)	-----	-----	-----	31m	----	-----/-----
6	TLW-16	0-3m(3m)	21-28m(8m)	----	-----	11m	-----	-----/18m

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7	TLW-17	2-9m(7m)	10-18m(8m)	----	----	15m	----	2m /1m
8	TLW-18	0-4m(4m)	9-26m(17m)	----	----	21m	----	--- /5m
9	TLW-19	0-8m(8m)	10-15m(5m)	----	----	13m	----	--- / 2m
10	TLW-20	0-16m(16m)	----	----	----	16m	----	----
11	TLW-25	-----	-----	-----	-----	-----	-----	-----
12	TLW-26	0-3m(3m)	----	----	----	3m	----	----
13	TLW-27	1-11m(10m)	13-17m(4m)	----	----	14m	----	1m / 2m
14	TLW-28	0-11m(11m)	----	----	----	11m	----	----
15	TLW-29	14-26m(12m)	-----	28-33m(5m)	----	12m	5m	14m / 2m
16	TLW-30	0-20m(20m)	-----	24-29m(5m)	----	20m	5m	---/4m
17	TLW-31	0-2m(2m)	6-35m(29m)	39-42m(3m)	52-54m(2m)	31m	5m	---/24m
18	TLW-32	0-2m(2m)	13-19m(6m)	20-44m(24m)	53-62m(9m)	8m	33m	--- / 21m
19	TLW-33	0-9m(9m)	10-27m(17m)	36-41m(5m)	----	26m	5m	--- /10m
20	TLW-34	16-20m(4m)	----	-----	-----	4m	-----	16m /---
21	TLW-35	7-9m(2m)	18-22m(4m)	-----	-----	6m	-----	7m /9m
22	TLW-36	-----	-----	-----	-----	-----	-----	-----
23	TLW-37	-----	-----	-----	-----	-----	-----	-----
24	TLW-38	1-19m(18m)	-----	-----	-----	18m	-----	1m
25	TLW-39	-----	-----	-----	-----	-----	-----	-----
26	TLW-40	1-19m(18m)	20-33m(13m)	-----	-----	18m	13m	1m / 1m
27	TLW-41	4-10m(6m)	-----	-----	-----	6m	-----	4m /---
28	TLW-42	0-13m(13m)	-----	-----	-----	13m	-----	--- /
29	TLW-43	1-10m(9m)	-----	-----	-----	9m	----	1m /--
30	TLW-44	0-3m(3m)	6-11m(5m)	----	----	8m	-----	--- /3m
31	TLW-45	5-19m(14m)	20-35m(15m)	-----	-----	14m	15m	5m / 1m
32	TLW-46	0-2m(2m)	-----	19-38m(19m)	49-55m(6m)	2m	25m	--- / 28m
33	TLW-47	0-3m(3m)	-----	21-42m(21m)	44-46m(2m)	3m	28m	--- /23m
					49-54m(5m)			
34	TLW-48	-----	20-23m(3m)	29-32m(3m)	-----	3m	3m	20m / 6m
35	TLW-49	-----	21-23m(2m)	26-29m(3m)	30-32m(2m)	2m	5m	21m / 4m
36	TLW-50	8-13m(5m)	15-17m(2m)	-----	-----	7m	-----	8m /2m
37	TLW-51	NA	NA	NA	NA	NA	NA	NA
38	TLW-52	NA	NA	NA	NA	NA	NA	NA
39	TLW-53	NA	NA	NA	NA	NA	NA	NA
40	TLW-54	NA	NA	NA	NA	NA	NA	NA
41	TLW-55	NA	NA	NA	NA	NA	NA	NA
42	TLW-21	NA	NA	NA	NA	NA	NA	NA
43	TLW-22							
44	TLW-23							
45	TLW-24							
46	TLW-01 to TLW- 10 either quality of limestone not good or not analysed							

Based upon the core analysis results it has been concluded that there are TWO Bands of cement grade limestone in this deposit (a) UPPER BAND and (b) LOWER BAND.

**a) UPPER LIMESTONE BAND:** This limestone band just underlies the top soil /Black Cotton Sol or at places exposed on the surface. The upper band's thickness has intersected in 31 Boreholes with 1m (Min) to 21m (MAX) and an average thickness of 12.58m. There are 16 borehole where no over burden has been reported and limestone is exposed at the surface. The average Chemical analysis of Upper Limestone Band is as given below:

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<u>CaO%</u>	<u>SiO<sub>2</sub>%</u>	<u>Al<sub>2</sub>O<sub>3</sub>%</u>	<u>Fe<sub>2</sub>O<sub>3</sub>%</u>	<u>MgO%</u>	<u>LOI</u>
49.40	7.42	2.37	0.99	0.73	38.81

Qualitatively limestone appears to be Cement grade and suitable for cement manufacture.

**b) LOWER LIMESTONE BAND:** Another limestone band is underlying the siliceous / magnesian impure band of mari, siliceous calcareous and sand stone band as inter layered inter burden which has varying thickness from 1m to 28m and average thickness of this inter burden is 9.37m, The thickness of Lower Limestone Band is 3m (Min) and 33m (Max) with an average thickness of 12m, The average Chemical analysis of Lower Limestone Band is as given below:

<u>CaO%</u>	<u>LOI</u>	<u>SiO<sub>2</sub>%</u>	<u>Al<sub>2</sub>O<sub>3</sub>%</u>	<u>Fe<sub>2</sub>O<sub>3</sub>%</u>	<u>MgO%</u>
50.18	6.91	1.98	0.89	0.85	39.43

Qualitatively limestone appears to be Cement grade and suitable for cement manufacture.

Based upon the core samples analysis results the average **run – of mine** quality as achieved is as follows:

<u>CaO%</u>	<u>SiO<sub>2</sub>%</u>	<u>Al<sub>2</sub>O<sub>3</sub>%</u>	<u>Fe<sub>2</sub>O<sub>3</sub>%</u>	<u>MgO%</u>	<u>LOI</u>
49.56	7.27	2.25	0.96	0.76	38.96

Qualitatively limestone appears to be Cement grade and suitable for cement manufacture.

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**4.4 ESTIMATED RESERVES**

Based up on the prospecting work carried out by the drilling agency as engaged by MCCL, Tanzania, it can be concluded that western block with 15 BHs have very thin layer of limestone and have not been considered promising. On the other hand the eastern block has total 40 borehole out of which about 31 BHs has intersected the limestone bands.

The details of the Limestone bands intersected are as given below:

Sr No	Borehole No.	Cement Grade Limestone Thickness Intersected in Borehole				Total thickness in upper and Lower Band		OB/IB (in Mtr) - / 18m
		1st Band	2 <sup>nd</sup> Band	3 <sup>rd</sup> Band	4 <sup>th</sup> Band	Upper Band	Lower Band	
1	TLW-11	10-13m(3m)	----	-----	31-35m(4m)	3m	4m	
2	TLW-12	-----	-----	----	-----	----	----	----
3	TLW-13	0-9m(9m)	11-21m(10m)	27-31m(4m)	37-43m(6m)	19m	10m	----/ 12m
4	TLW-14	0-9m(9m)	19-33m(14m)	----	-----	23m	-----	-----/ 10m
5	TLW-15	0-31m(31m)	-----	-----	-----	31m	----	----/----
6	TLW-16	0-3m(3m)	21-28m(8m)	---	-----	11m	-----	----/18m
7	TLW-17	2-9m(7m)	10-18m(8m)	----	-----	15m	----	2m /1m
8	TLW-18	0-4m(4m)	9-26m(17m)	-----	-----	21m	-----	---- /5m
9	TLW-19	0-8m(8m)	10-15m(5m)	-----	-----	13m	-----	--- / 2m
10	TLW-20	0-16m(16m)	-----	-----	-----	16m	-----	----
11	TLW-25	-----	-----	-----	-----	-----	-----	-----
12	TLW-26	0-3m(3m)	-----	-----	-----	3m	-----	----
13	TLW-27	1-11m(10m)	13-17m(4m)	-----	-----	14m	-----	1m / 2m
14	TLW-28	0-11m(11m)	-----	-----	-----	11m	-----	-----
15	TLW-29	14-26m(12m)	-----	28-33m(5m)	-----	12m	5m	14m / 2m
16	TLW-30	0-20m(20m)	-----	24-29m(5m)	-----	20m	5m	___ /4m
17	TLW-31	0-2m(2m)	6-35m(29m)	39-42m(3m)	52-54m(2m)	31m	5m	----/24m
18	TLW-32	0-2m(2m)	13-19m(6m)	20-44m(24m)	53-62m(9m)	8m	33m	--- / 21m
19	TLW-33	0-9m(9m)	10-27m(17m)	36-41m(5m)	-----	26m	5m	--- /10m
20	TLW-34	16-20m(4m)	-----	-----	-----	4m	-----	16m /---
21	TLW-35	7-9m(2m)	18-22m(4m)	-----	-----	6m	-----	7m /9m

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22	TLW-36	-----	-----	-----	-----	-----	-----	-----	
23	TLW-37	-----	-----	-----	-----	-----	-----	-----	
24	TLW-38	1-19m(18m)	-----	-----	-----	18m	-----	1m	
25	TLW-39	-----	-----	-----	-----	-----	-----	-----	
26	TLW-40	1-19m(18m)	20-33m(13m)	-----	-----	18m	13m	1m / 1m	
27	TLW-41	4-10m(6m)	-----	-----	-----	6m	-----	4m /---	
28	TLW-42	0-13m(13m)	-----	-----	-----	13m	-----	--- /	
29	TLW-43	1-10m(9m)	-----	-----	-----	9m	---	1m /--	
30	TLW-44	0-3m(3m)	6-11m(5m)	-----	-----	8m	-----	--- /3m	
31	TLW-45	5-19m(14m)	20-35m(15m)	-----	-----	14m	15m	5m / 1m	
32	TLW-46	0-2m(2m)	-----	19-38m(19m)	49-55m(6m)	2m	25m	--- / 28m	
33	TLW-47	0-3m(3m)	-----	21-42m(21m)	44-46m(2m) 49-54m(5m)	3m	28m	--- /23m	
34	TLW-48	-----	20-23m(3m)	29-32m(3m)	-----	3m	3m	20m / 6m	
35	TLW-49	-----	21-23m(2m)	26-29m(3m)	30-32m(2m)	2m	5m	21m / 4m	
36	TLW-50	8-13m(5m)	15-17m(2m)	-----	-----	7m	-----	8m /2m	
37	TLW-51	NA	NA	NA	NA	NA	NA	NA	
38	TLW-52	NA	NA	NA	NA	NA	NA	NA	
39	TLW-53	NA	NA	NA	NA	NA	NA	NA	
40	TLW-54	NA	NA	NA	NA	NA	NA	NA	
41	TLW-55	NA	NA	NA	NA	NA	NA	NA	
42	TLW-21	NA	NA	NA	NA	NA	NA	NA	
43	TLW-22	NA	NA	NA	NA	NA	NA	NA	
44	TLW-23	NA	NA	NA	NA	NA	NA	NA	
45	TLW-24	NA	NA	NA	NA	NA	NA	NA	
46	TLW-01 to TLW- 10 either quality of limestone not good or not analysed								

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From above table it has been observed that

(A) Total 31 BHs have intersected the limestone, of which 13 BHs have intersected both UPPER and LOWER Band (Thickness: Upper Band 12.38m and Lower band 12m) with OB:12.2m (5 BHs) and IB: 11.85m in 13 BHs

(B) Total 31BHs have intersected only UPPER Band with Av thickness of Limestone band as 12.58m (Min: 2m Max:31m) .OB :7.77m (in 13 BHs) and IB 4.9m (in 11BHs.). OB::(Thickness) 1 to 21m, IB:1 to 18m)

(C) Similarly total 13 BHs have only intersected LOWER Band with Av Thickness : 12m with IB (Thickness) 9.37m (Min.1 to 28m)

Similarly during site visit we have examined the drilled core in Core boxes (preserved at Aggregate Quarry's store Mindu Tulieni , about 20 km NW of drilled limestone site). The core recovery in loose soil and fragmented rock is very poor (< 40%) where as in Limestone core recovery appears to be varying between 50% to 100%.

As the limestone is fine crystalline and compact the Sp. Gr. for the limestone has been considered as 2.6 for estimation of the Reserves.

Therefore keeping in view of all these parameter Reserves have been estimated as follows:

(A) WESTERN BLOCK (8.48 Sq Km)

S.No	No. of BHs	Area of Influence	Av. Thickness of Limestone	Volume Cu,mtr	Reserves ( in Million Ton)
<b>(A) WESTERN BLOCK ( 18.48 Sq. Km)</b>					
1	15( Detail not available)		NA	NA	
<b>(B) EASTERN BLOCK ( Additional Area : 4,99 Sq Km)</b>					
1	31(Upper Band)	1750mx1500m	12.58m	33022500	85.86 MT
2	13(Lower Band)	(a)750mx500m (b)500mx250m (c ) 500mx250m	12m	375000 125000 125000	19.50MT
<b>TOTAL( Geological Insitu Reserves)=105.36MT</b>					

## **TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 4 – RAW MATERIALS**

The above **105.36 million ton** estimated reserves are **Geological Insitu Reserves** and keeping in view the spacing of boreholes, core recovery, provision for core loss, voids and cavities we have to consider 70% of these reserves as **Recoverable Mineable Reserves**. However these reserves have high potential of additional quantity which needs further close space drilling and proving of additional reserves in north and south ward extension of these quality reserves as Phase- II Prospecting and Exploration. These Recoverable Reserves can be categorised as per the exploration norms as **INDICATED** or **PROBABLE RESERVES** (UNFC Classification 112 122 & 222).

Out of these reserves about **38.70 million ton (37.90%)** reserves are available in both Upper as well as in Lower Bands.

As per the norms the required reserves for the proposed 3000 tpd clinkerisation plant are as follows:

- a) **PROVED RESERVES: 54 Million Ton for 30years of Plant Life**
- b) **PROBABLE RESERVES: 39 Million Ton for another 15 years**

Hence the estimated available 105.36 million ton reserves are sufficient for the proposed 3000 TPD capacity cement plant for 41 years of plant's life. However it requires further detailed close space drilling to confirm the quality consistency and reserves availability.

The Ore (Limestone) to Over Burden Ratio for this deposit has been calculated as follows:

- (a) **UPPER BAND: ORE:OB :: 1.0:0.62**
- (b) **LOWER BAND: ORE:OB:: 1.0:0.78**
- (c) **OVER ALL for Both Bands ORE:OB:: 1.0:0.94**

#### 4.5 OTHER CORRECTIVE MATERIALS REQUIRED AND AVAILABILITY

As the Captive limestone source is comparatively high grade with low in Silica content and in Iron content. It is recommended to add small quantity of Clay siliceous marl and laterite as corrective component during preparation of a suitable raw mix. The details of their availability and chemical quality is as given below:

##### 4.5.1 Top Soil / Black Cotton Soil / Clay

There is sufficient quantity of availability of this material and its chemical analysis as analysed and provided by the Client is as given below:

<u>CaO%</u>	<u>SiO<sub>2</sub>%</u>	<u>Al<sub>2</sub>O<sub>3</sub>%</u>	<u>Fe<sub>2</sub>O<sub>3</sub>%</u>	<u>MgO%</u>	<u>LOI</u>
4.08	61.30	12.00	3.85	1.26	10.82

Qualitatively the above material appears to be suitable as a corrective component for preparation of a suitable Raw mix.

##### 4.5.2 Red Soil / Laterite /Red Ochre

Red Soil / Laterite / Red Ochre are available at about 20Km north-west of this Limestone deposit at Mindu Tulieni. This deposit is open quarry of red ochre (or Laterite) with 1 to 2m overburden of top soil. The chemical analysis as analysed and provided by the Client is as given below:

<u>CaO%</u>	<u>SiO<sub>2</sub>%</u>	<u>Al<sub>2</sub>O<sub>3</sub>%</u>	<u>Fe<sub>2</sub>O<sub>3</sub>%</u>	<u>MgO%</u>	<u>LOI</u>
0.38	40.80	30.36	11.63 *	0.21	15.31

To compensate the deficiency of Iron of the Lime stone the Iron bearing additive should have > 50% Iron content.

# TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 4 – RAW MATERIALS

## 4.5.3 Gypsum

About 3.5 to 5 percent gypsum is added during grinding of clinker to retard the hydration reaction of the produced cement. The natural gypsum is proposed to be procured from **Makanya** area, which is about 350 Kms south of proposed plant site. The expected chemical quality of this gypsum is as follows:

<u>CaO%</u>	<u>SiO2%</u>	<u>Al2O3%</u>	<u>Fe2O3%</u>	<u>MgO%</u>	<u>LOI</u>	<u>SO3</u>
18.75	7.88	1.88	0.63	0.03	6.78	46.29

Qualitatively the above material appears to be suitable as a corrective component for preparation of a suitable Raw mix.

## 4.6 RAW MIX DESIGN

In order to arrive at broad parameters for process consideration and estimation of raw mix components, the tentative estimated quality of ROM-limestone has been considered.

From the analysis it appears that we can reuse a part of the quarry overburden as silica-alumina source. We may not need clay at all for the mix, if a part of the overburden is mixed properly with the limestone.

At plant site, the clinker raw mix would be

Limestone	88.50%
Clay	8.50%
Red Soil	3.00%

The clinker produced from the above raw mix will have the following qualitative parameters-

<b>Quality parameters</b>	<b>% Value</b>
C <sub>3</sub> S	58.74
C <sub>2</sub> S	17.79
C <sub>3</sub> A	12.87
C <sub>4</sub> AF	7.72
LSF	95.02

# TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 4 – RAW MATERIALS

SM	2.4
AM	2.55 *
Liquid Phases	25.93

## NORMS FOR RAW MIX DESIGN

Parameter	Norm	Remarks
L.S.F	0.9-0.97	
A.M	1.2-1.5	
S.M	2.2-2.5	

**\*To lower the A.M (Alumina Modulus) which is in higher side the Iron content of the Red soil is not sufficient. Another source of additive having iron content not less than 50% has to be located by the client.**

**NOTE** - The estimated raw mix design as described above is based on the limited available data on the limestone deposit. The actual raw mix design may, as such, have to be modified to suit the chemistry of the raw material that will be known after the detailed geological investigation of the deposit is completed and all additive sources have been identified.

## 4.7 MINING

This proposed limestone deposit has TWO Bands of cement grade limestone and have an average limestone thicknesses of around 12.58m and 12m with overburden of an average thickness around 7.77m and inter burden between UPPER and LOWER Band is 9.37m. However, Over burden/ inter burden, interstitial clay and waste rock expected to be generated during the course of mining is likely to comprise about 94% of R.O.M. quantity. This means that each 0.94 ton of reject material will be generated for recovery of 1 ton of usable limestone ( ORE:OB Ratio: 1.0:0.94).However during actual mining this OB removal shall be carried out as Developmental work at initial stage as well as during intermittent stages for removal of Inter Burden.

# TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 4 – RAW MATERIALS

## **Working Face Design**

Mining operations shall be carried out by mechanized open cast method utilizing Heavy Earth moving equipment like surface miner (Alternative-1) or conventional methods of mining (Alternative-2) in conjunction with loading and transportation arrangement . To start with the production in the existing mining blocks, slices / benches shall be kept long. To the extent possible, benches shall be kept along dip and advanced along the strike to give a fairly well blended material in each slice. The direction may be varied in due course based on experience gained, to give wider working periphery, longer faces and proper alignment along haul roads.

## **Working Face Development**

Limestone deposit occurs with average overburden of 7- 10 m., which shall be removed by means of dozer. There shall be no other development as such to expose the deposit. However, provision of haul roads / ramps, opening and development of slices / faces which are essential as a pre-production stage shall be the only development activity involved. The run of mine materials can be loaded directly on to truck / wagons. As a pre-production activity, considering the movements of heavy earth moving equipment, roads to mining area, from mining faces to the proposed dump area, from ground level to the mining area, to the mines office complex, and to the garage / workshop will be developed. Access roads / haul roads from topmost bench to benches at lower levels shall also be developed gradually. Face management, which is a continuous process, shall be taken into account to secure shortest (average) lead distance up to dump yard as also to prevent clustering of dumpers.

## **Working Task**

Total working days in a year: 300 days

Working shifts/day : Two Shift of 8 hours each day.

# TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 4 – RAW MATERIALS

## **Working Benches**

Height : 9.0 m  
Width : 20-25 m

## **Primary blast holes**

Size : 100-115 mm Dia.  
Length : 9.0 – 10.0 m  
Angle : 70 – 80 Deg.

## **Compressors**

Compressor suitable to the drills for drilling 100 – 115 mm Dia. Holes will be considered.

## **Explosive**

ANFO/ANFO based slurries.

Open cast gelatins

Detonators – Electric / delay – cordex.

## **Excavations**

Incase of alternative-2 i.e of conventional mining limestone and hard overburden/ intra burden shall be raised by excavator / dumper combination.

## **Transport**

Dumpers will be engaged to transport the Lime stone from the Mining faces to the loading points at pit head and materials will be transported through rail wagon to the plant site for unloading by wagon loader and subsequently will be transported to stacker and reclaimer area.

Based on the above concept the list of the mining equipments proposed for the new line Project is given in Annexure- 4.1. The equipment listed will suffice for the

**TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA CEMENT PLANT  
IN BAGAMOYO, TANZANIA – CHAPTER 4 – RAW MATERIALS**

initial period of first two years when the limestone raised during mine development stage shall also be used partly to meet the requirement of the plant.

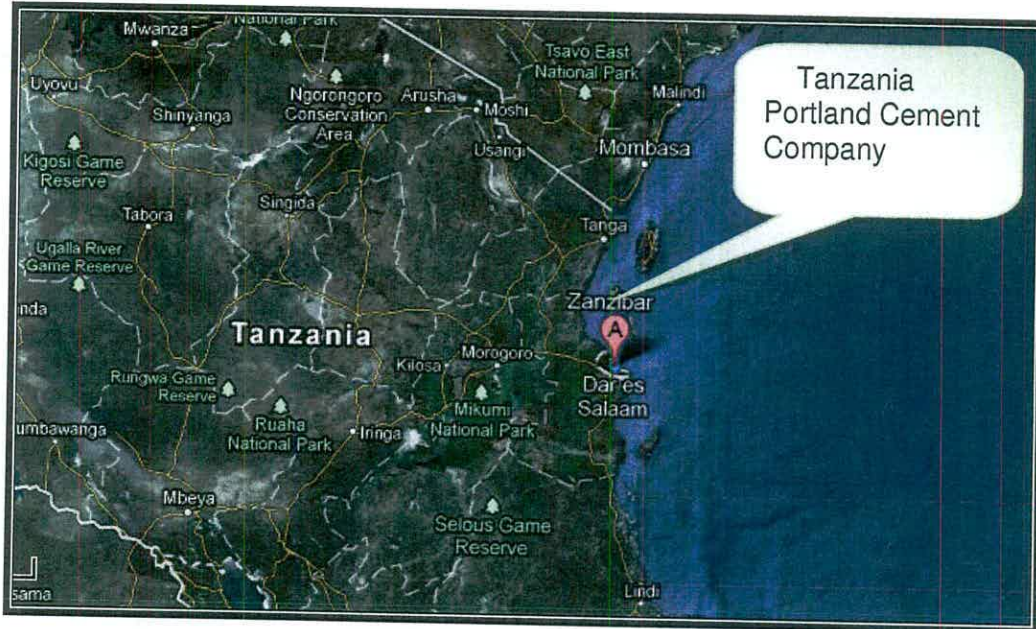
**Annexure – 4.1**

**LIST OF MINING EQUIPMENTS**

<b>Sl. No.</b>	<b>Equipment</b>	<b>Nos.</b>
01.	Hydraulic Excavator 3.9 M3 capacity bucket	4
02.	Rear Dump trucks 35-ton capacity.	8
03.	150 mm Dia (hydraulic drill ) crawler mounted high pressure drills (150 PSI:) with integral compressor	2
04.	Wheel loader 3.9 M3 capacity for waste rock & material handling	1
05.	Bulldozer 380 HP ( Electronic Version )	2
06.	Explosive Van ( 5 tons )	1
07.	Water cum Diesel tanker (20 tonnes capacity)	1
08.	Road Grader / Rock Breaker	1 each
09.	Tractor	1
10.	Ambulance	2
11.	Mobile Service Van	1 set
12.	Diesel Jeep	2
13.	Fork Lift ( 3.0 Tonnes )	1
14.	Miscellaneous tools & Equipments	1 Set

TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 3 – BROAD MARKET ASSESSMENT

3.7 LOCATION MAP OF TANZANIA CEMENT PLANTS  
TANZANIA PORTLAND CEMENT COMPANY

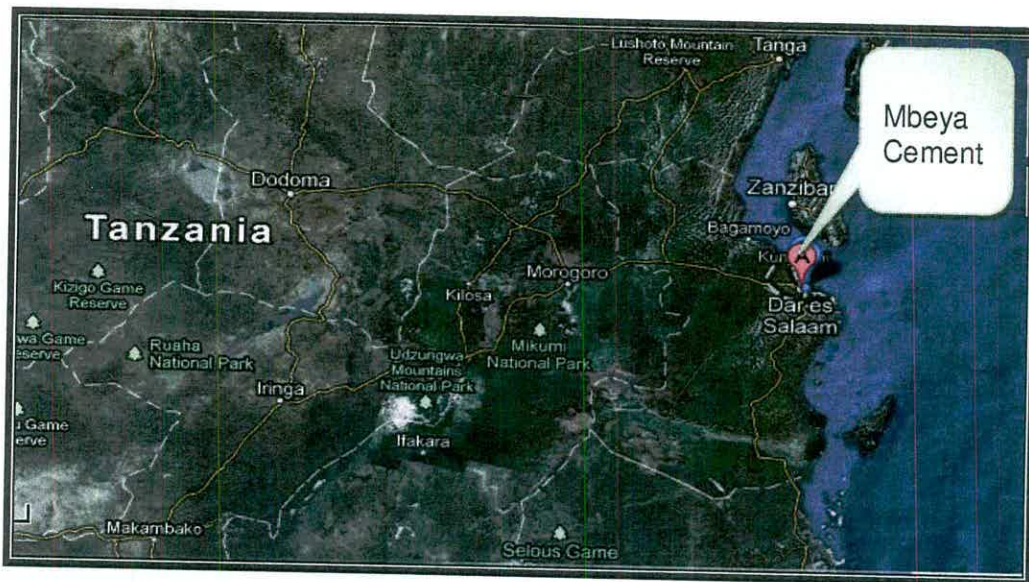


SIMBA CEMENT



# TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 3 – BROAD MARKET ASSESSMENT

## MBEYA CEMENT



## MAMBA CEMENT (PROPOSED)

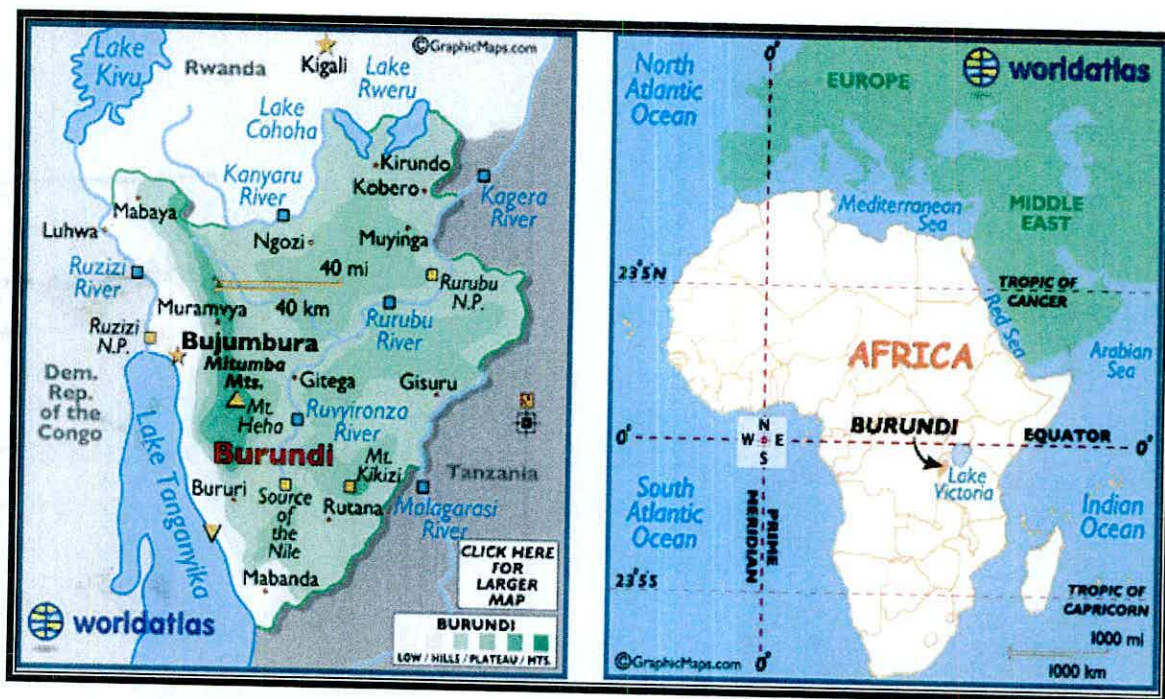


### 3.8 EXPANSION PLANS OF DANGOTE GROUP

Tanzania is set to more than double its cement production by 2015, when a \$420 million cement factory set up by Nigeria-based conglomerate Dangote is completed.

# TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 3 – BROAD MARKET ASSESSMENT

## 3.11.1 MARKET SCENARIO IN BURUNDI



In 2011, Burundi Cement Company (BUCECO) has started cement production at its plant in the northern province of Chibitoke and aims to produce approximately 35 000 Tonns. Till 2012, the cement Production of the company increased upto 70,500 Tonns. This year BUCECO is expected to reach its full capacity of 100000 TPA by installing a new raw material plant.

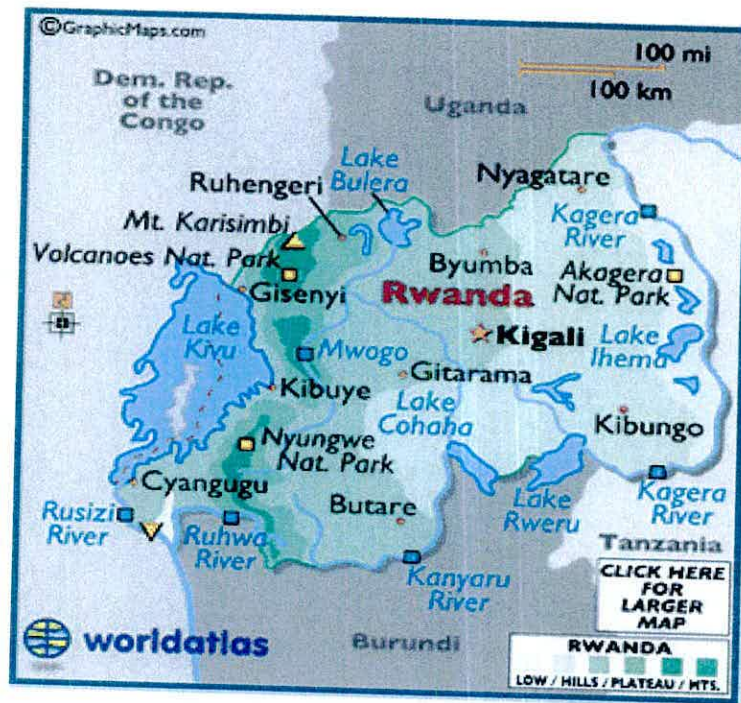
Aime Mananda, the director general of BUCICO, has stated that the country has been importing all their cement from their East African Community (EAC) neighbours that include Uganda, Kenya and Tanzania.

According to official statistics of Burundi's Ministry of Trade and Industry, more than 120,000 Tonns of cement were imported to the country in 2010. Consumption of cement is around 400,000 Tonns per year.

On an average, a 50 kilogram bag of BUCECO Cement costs \$16 USD, about \$1 less than the imported product.

TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 3 – BROAD MARKET ASSESSMENT

3.11.2 MARKET SCENARIO IN RWANDA



Major Player in RWANDA is:  
 CIMERWA LTD. – Capacity 100,000 Tonnes

3.11.3 MARKET SCENARIO IN COMOROS



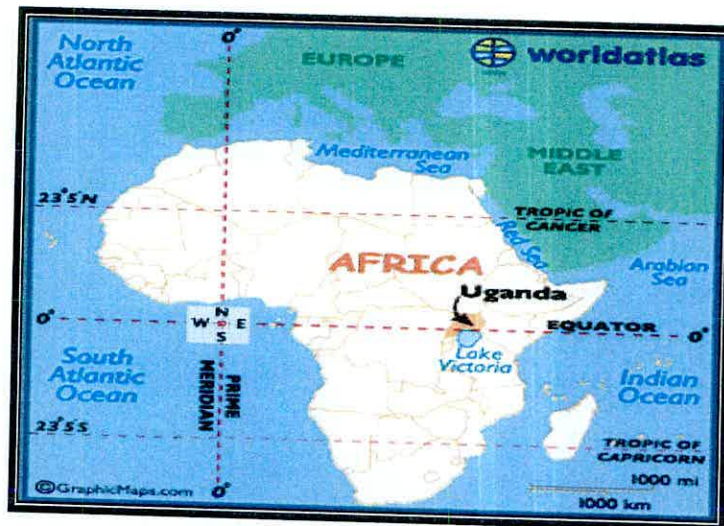
# TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 3 – BROAD MARKET ASSESSMENT

In 2005, imports of cement amounted to 55,867 metric tons (t).

Lack of indigenous cement production facilities means that the country imports its entire cement requirement. Imports of cement were 48,006t in 2004 compared with 44,255t in 2003 and just 25,094t back in 1999. The value of cement imports (all bagged) amounted to about us\$4.4m in 2004, or five per cent of total imports.

Major Player in Comoros is **COMOROS CEMENT FACTORY**

## 3.11.4 MARKET SCENARIO IN UGANDA



There are three major players in Uganda.

### **TORORO CEMENT LTD. (RUNNING)**

The plant has an annual production capacity of over 1 million metric tonnes.

### **HIMA CEMENT LTD. (RUNNING)**

Hima Cement Limited is the second-largest manufacturer of cement in Uganda, producing an estimated 850,000 metric tonnes annually.

**CHAPTER – 5**  
**INFRASTRUCTURE AND SITE SELECTION**

## CHAPTER 5

### INFRASTRUCTURE AND SITE SELECTION

#### 5.0 INTRODUCTION

Cement being a high bulk and low-value commodity, outward freight accounts for close to one-fifth of the total cost. In addition, for every ton of cement produced, close to 1.7 tonnes of raw material (including coal) have to be transported. In this scenario, the location of a cement plant assumes crucial importance. While deciding on the plant location, a trade-off has to be made between proximity to raw material sources and nearness to the consuming markets. Besides these, there are other locations issues such as logistics (evacuation of cement by rail, road or waterways), power availability in the region, and availability of materials (limestone, coal, fly ash etc).

Cement plant as a rule, are located at places where a steady supply of raw materials is assured and the market is near, besides having other infrastructural facilities such as power, water, road etc.

Factors influencing the site selection can be broadly categorized as:

- ❖ Availability of suitable Limestone and additive materials like Silica sand, Iron ore, Gypsum etc. for the manufacture of cement.
- ❖ Availability of adequate Power, Fuel and Water.
- ❖ Availability of sufficient land.
- ❖ Availability of transport and communication facility.
- ❖ Nearness to the market for product sale.
- ❖ Vicinity to the social infrastructural facilities, market center, educational institutions, local transport, medical facilities and township etc.
- ❖ The land required for mining and plant should not be a part of declared forest area.
- ❖ Scope for increasing further capacity.

Keeping in view all the above factors, the suitable sites have been considered.

# TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000 TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 5 – INFRASTRUCTURE AND SITE SELECTION

## 5.1 PROPOSED CEMENT PLANT SITE AT BAGAMOYO

As discussed, in Chapter- 4, District Bagamoyo, Tanzania is considered for the proposed mining site. The plant shall be located in Tarawanda village approx.4 km from the mining area where sufficient flat land is available.

## 5.2 INFRASTRUCTURE AND UTILITIES

### 5.2.1 LAND

The land requirement for the proposed plant site is estimated about 247 Acres (100 hectare) for the plant and auxiliaries. The plain private land is available towards the side of the mining lease area, which is acquired for the proposed Cement plant.



LOCATION MAP

## 5.2.2 RAW MATERIALS

### Limestone

The main raw material i.e. limestone is available from Tarawanda Limestone deposits. As per the Government explorations and estimates, around 105.36 Million Tons of Limestone is available

### Clay

Clay is available in the Limestone mines.

### Red Soil

Red Soil is available at about 20Km north-west of the Limestone deposit at Mindu Tulieni.

## 5.2.3 FUEL

The raw mix prepared for the cement manufacturing shall be fired in the rotary kiln by fuel such as Coal. The approximate coal requirement would be around 13% of the cement grade clinker produced depending upon the calorific value of fuel. The coal with heat value around 6000Kcals and above shall be suitable.

The bulk transport of coal is possible by road connected to other states. A facility has to be prepared at the plant site for the unloading and storage. To protect the coal from the Rains, suitably covered sheds are essential at the plant site.

### PROXIMATE ANALYSIS OF COAL CONSIDERED

Sr. No.	Parameter	Design Quality
1	Minimum CV, Kcal/kg (gross)	6000
2	Maximum Ash, %	20%
3	Maximum Moisture, %	10.0%
4	Maximum Sulphur, %	1.2%
5	Minimum Volatile Matter	22%
6	HGI	45
7	Sizing	1-75mm

The diesel required for earth moving equipment, trucks and lights vehicles is locally available. Diesel shall be transported to the plant site in oil tanker by road and stored in main diesel storage tanks. A diesel / petrol dispensing unit is also considered for filling diesel / petrol in the vehicles.

#### **5.2.4 GYPSUM**

Mineral grade Gypsum will be transported by road and is proposed to be procured from Makanya area, which is about 350 Kms south of proposed plant site.

### **5.3 POWER**

#### **5.3.1 HYDRO POWER STATION IN TANZANIA**

<b>Hydroelectric Station</b>	<b>Type</b>	<b>Capacity</b>	<b>Name of Reservoir</b>	<b>River</b>
Mtera Power Station	Reservoir	80 MW	Mtera Reservoir	Rufiji River
Kihansi Power Station	Reservoir	180 MW	Kihansi Reservoir	Kihansi River
Nyumba ya Mungu Power Station	Reservoir	8 MW	Nyumba ya Mungu Reservoir	Mt. Kilimanjaro Streams
Kidatu Power Station	Reservoir	204 MW	Kidatu Dam	Rufiji River
Pangani Power Station	Reservoir	68MW		Pangani River
Hale Power Station	Reservoir	21MW		

#### **5.3.2 Mtera Power Station**

**Mtera Dam** is a hydroelectric dam in Tanzania. The dam is located midway between Iringa and Dodoma on the border between the Iringa Region and the Dodoma Region. The travel time from Dodoma is about three hours on a gravel road.

**Distance between Mtera Power station and proposed plant location is approx.500 km.**

### **5.3.3 Kihansi Power Station**

**Kihansi Dam** is a hydroelectric dam located on the Kihansi River at the end of the Kihansi Gorge before the convergence with the Ulanga River in Tanzania approximately 450 km southwest of Dar Es Salaam.

**Distance between Kihansi Power station and proposed plant location is approx.510km.**

### **5.3.4 Nyumba ya Mungu Power Station**

**Nyumba ya Mungu Dam** is a hydroelectric dam in Tanzania. It is in Mwanga District, Kilimanjaro Region. The water runs down the slopes of Kilimanjaro in the deep valleys. These streams pour their water in the Nyumba ya Mungu reservoir. Nyumba ya Mungu means 'House of God'. Its installed capacity is 8 MW.

**Distance between Nyumba ya Mungu Power station and proposed plant location is approx.400km.**

### **5.3.5 Kidatu Power Station**

**Kidatu Dam** is a hydroelectric dam located in the Rufiji River Basin in Tanzania. The Kidatu power plant was built in two phases under the name of Great Ruaha Power Project in the 1970's for phase one and 1980's for phase two. Phase I was completed in 1975 starting with the construction of an earth-rock fill dam, a generating capacity of 2 x 50MW, and 220kv transmission line to Dar es Salaam via Morogoro. Phase II, completed in 1980, involved two more 50MW generators, and construction of a bigger storage dam at Mtera with a capacity of 3,200 Mill m3.

**Distance between Kidatu Power station and proposed plant location is approx.150km.**

### **5.3.6 Pangani Power Station**

Distance between Pangani Power station and proposed plant location is approx.3000km.

### **5.3.7 Hale Power Station**

Distance between Hale Power station and proposed plant location is approx.3000km

## **5.4 POWER FROM CAPTIVE POWER PLANT (CPP)**

Power sources are far away from the proposed plant site as mentioned above so MCCL intends to install a coal based (primary fuel) thermal power plant having capacity of 25 MW for proposed cement plant to be located inside the plant premises.

### **5.4.1 Fuel Source:**

The main fuel for this captive power plant is domestic coal which will be sourced from MCCL mines. It may be transported to plant site by road.

Support fuel Light Diesel Oil (LDO) will be used only for cold start and Heavy Fuel Oil (HFO) will be used as support fuel at low loads and for flame stabilization.

### **5.4.2 Fuel Quantity:**

Maximum total annual coal consumption for the 25 MW power plant will be about 0.118 MTPA. This quantity has been arrived based on consumption of proposed coal consumption of design Gross Calorific Value (GCV) of 6000 kcal/kg.

Apart from coal, HFO/LDO will be used as auxiliary fuel.

### 5.4.3 WATER

The estimated requirement of water (including process and drinking water) for the plant is around 3000 m<sup>3</sup>/day. The water shall be obtained from Bore holes, pipe line from Public water supply system or from nearby stream, after making a barrage. No ground water is mines.

#### WATER SOURCES

There are three potential water sources:

a.) **Groundwater**

A deep borehole drilled recently between Mkumbezi River and the road to Kiwanga has indicated an existence of a fractured/sandy aquifer with yield capacity of at least 21,000 lt/hr of fresh water. The aquifer should be mapped and two exploratory/ production boreholes drilled.

b.) **Mkombezi River.**

All streams in the area including River Mkombezi are seasonal. The amount of flow during and a few months after the rain periods (November – December and March – May) in Mkombezi River is however enormous and can be harvested by constructing a dam across one suitable river section.

c.) **Piped Water**

The nearest piped water is at Lugoba township where a 150 mm dia. Wami-Chalinze pipe line passes. To bring water to Tarawanda will require laying of a 21 km long pipe line.

### 5.4.4 COMMUNICATION

Telephone facility is available at Bagamoyo, the plant site, Medical facilities are also available near the proposed project site.

# TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000 TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 5 – INFRASTRUCTURE AND SITE SELECTION

## 5.4.5 TRANSPORTATION

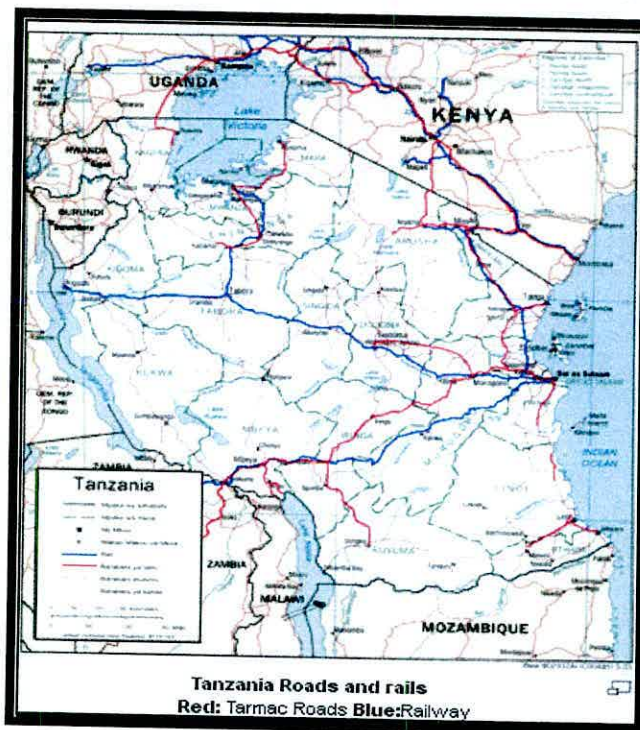
### Roads

Village Tarawanda, the project site is situated at approx. 108 km from Dar-es-Salaam, 22km from Bagamoyo. The project site is mainly single track. Metal topping of the road is eroded at many areas. As such these roads are not suitable for heavy and long trailer annexed vehicles, which are essentially required for the transportation of large equipment of the plant.

Therefore widening and retopping of the roads is essential. For all such activities, the state authorities are to be approached for approvals, sanctions and assistance if any. However budgetary provision has been kept for road widening and repair works for essential road segment in the broad project cost estimate.

### Rail Heads and Junctions

Nearest railhead is Dar es Salaam, which is about 60 km from the plant site.



### **5.4.3 WATER**

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### **5.4.4 COMMUNICATION**

Telephone facility is available at Bagamoyo, the plant site, Medical facilities are also available near the proposed project site.

## **Airport**

Tanzania has two international airports.

The nearest major airport is Zanzibar International Airport (ZNZ / HTZA), which has international and domestic flights from Zanzibar, Tanzania and is about 43 km from the Proposed Plant Site.

Another major airport is Julius Nyerere International Airport (DAR / HTDA), which has international and domestic flights from Dar Es Salaam, Tanzania and is 76 km from the Plant Site.

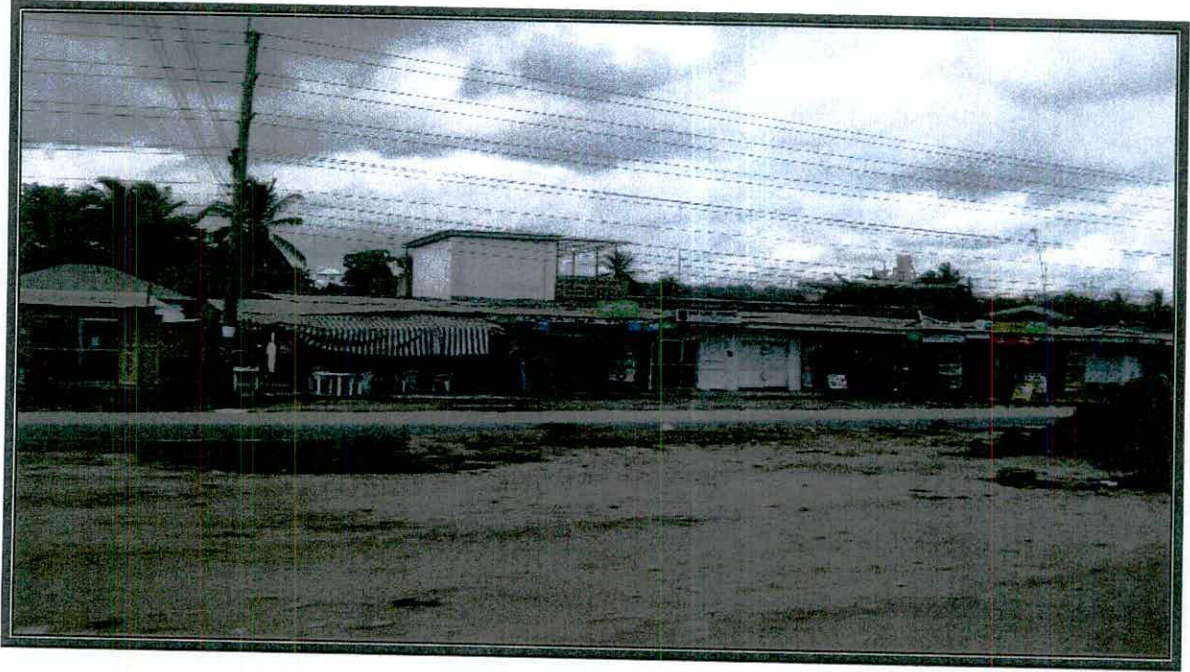
## **5.5 CONCLUSION & RECOMMENDATIONS**

It is seen from the above findings that the proposed project site has sufficient Limestone deposits suitable for manufacture of cement and flat land near the deposits for setting up the plant. The infrastructural facilities such as Power, Roads, Rail transportation facilities etc are adequate except that the approach roads need to be widened and repaired.

**TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000 TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 5 – INFRASTRUCTURE AND SITE SELECTION**

**5.6 SITE PHOTOGRAPHS**

**1. ROAD CONNECTING SITE**



**TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000 TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 5 – INFRASTRUCTURE AND SITE SELECTION**



**2. SITE INSPECTION**



**TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000 TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 5 – INFRASTRUCTURE AND SITE SELECTION**

**3. DIFFERENT VIEWS OF SITE**



TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000 TPD) CEMENT  
PLANT IN BAGAMOYO, TANZANIA – CHAPTER 5 – INFRASTRUCTURE AND SITE  
SELECTION

4. PLANT SITE



**CHAPTER – 6**  
**MANUFACTURING PROCESS**

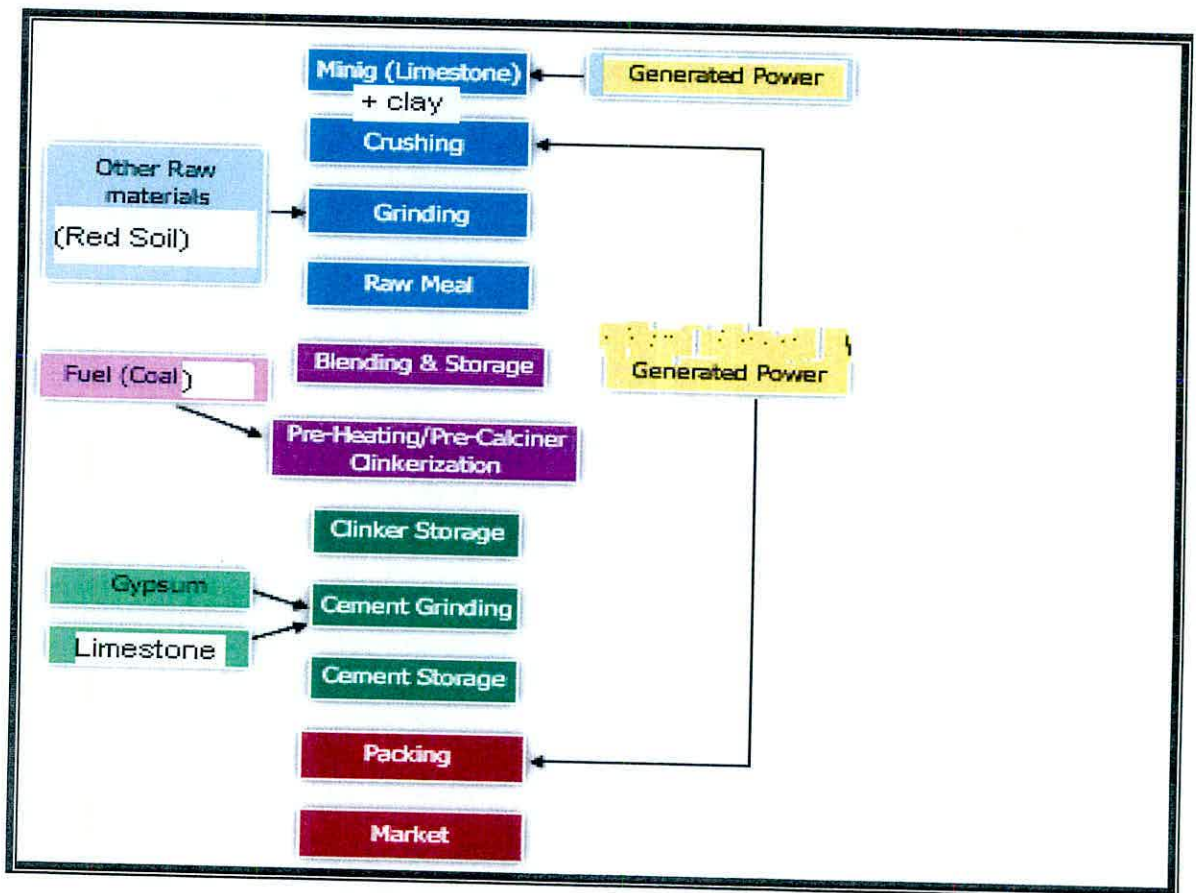
CHAPTER – 06

MANUFACTURING PROCESS

6.0 INTRODUCTION TO CEMENT

Cement is a fine powder which sets after a few hours when mixed with water, and then hardens in a few days into a solid, strong material. Cement is mainly used to bind fine sand and coarse aggregates together in concrete. Cement is a hydraulic binder, i.e. it hardens when water is added.

There are 27 types of common cement which can be grouped into 5 general categories and 3 strength classes: ordinary, high and very high. In addition, some special cement exists like sulphate resisting cement, low heat cement and calcium aluminate cement.



Cement Manufacturing Process



A TYPICAL CEMENT PLANT PHOTOGRAPH



ROTARY KILN UNDER ERECTION

## **6.1 TWO STEP PROCESS OF MAKING CEMENT**

Basically, cement is produced in two steps: first, clinker is produced from raw materials. In the second step cement is produced from cement clinker. The first step can be a dry, wet, semi-dry or semi-wet process according to the state of the raw material.

### **6.1.1 MAKING CLINKER**

The raw materials are delivered in bulk, crushed and homogenised into a mixture which is fed into a rotary kiln. This is a rotating pipe of 60 to 90 m long and up to 6 m in diameter. This kiln is heated by a 2000°C flame inside of it. The kiln is slightly inclined to allow for the materials to slowly reach the other end, where it is quickly cooled to 100-200°C.

Four basic oxides in the correct proportions make cement clinker: calcium oxide (65%), silicon oxide (20%), alumina oxide (10%) and iron oxide (5%). These elements are mixed homogeneously (called “raw meal” or slurry) will combine when heated by the flame at a temperature of approximately 1450°C. New compounds are formed: silicates, aluminates and ferrites of calcium. Hydraulic hardening of cement is due to the hydration of these compounds.

The final product of this phase is called “clinker”. These solid grains are then stored in huge silos.

### **6.1.2 CLINKER TO CEMENT**

The second phase is handled in a cement grinding mill. Gypsum (calcium sulphates) and possibly additional cementitious (such as blast furnace slag, coal fly ash, natural pozzolanas etc.) or inert materials (limestone) are added to the clinker. All constituents are ground leading to a fine and homogenous powder. The cement is then stored in silos before being dispatched either in bulk or bagged.

## **6.2 CONCRETE AND BLENDED CEMENT**

### **6.2.1 CONCRETE**

Concrete is a solid material made of cement, sand, water, aggregates and often with admixtures. When fresh, it has certain workability and takes the form of the mould into which it is put. When set and hardened, it is as strong as natural stone and resists time, water, frost, mechanical constraints and fire. Typically, concrete is the essential material used in all types of construction residential (housing), non-residential (offices) and civil engineering (roads, bridges, etc.).

### **6.2.2 BLENDED CEMENT**

Cement is a finely ground powder which when mixed with water sets into a hard mass. Cement is generally identified with OPC although other types of blended Cement, such as Pozzolana Portland Cement (PPC) and Portland Blast Furnace Slag Cement (PBFSC) are also popular and used extensively.

Blended cements are composite cements produced by blending clinker—which is the output of the kiln, at the grinding stage with pozzolanic or other material with cement-like properties.

The blended material has a high content of finely divided particles of oxides of Silica and Alumina ( $\text{SiO}_2$  and  $\text{Al}_2\text{O}_3$ ) which fill up the undesirable pores and voids normally present in the hydrated paste of OPC, and also react with the hydrated products of the OPC paste to improve both the strength and durability of the concrete. Different grades of OPC, PPC and PBFSC cements are commonly used by the construction industry.

High strength cements permit greater material and energy economy, since for a given structural requirement, reduced volumes of cement need to be transported. The improvement in strength is derived largely from superior clinker grinding system and enhanced control over operating parameters at every stage of manufacture including standardization of raw material quality.

## TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000 TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 6 – MANUFACTURING PROCESS

The compressive strength of the major types of blended Cement viz. PPC and PBFS is equivalent to that of Grade 33 OPC cement after 28 days of setting. In addition, blended cements have the following positive aspects:

- ❖ Low heat of hydration resulting in a reduction in the risk of thermal cracking. Low heat of hydration also ensures that lesser quantity of water is required for curing.
- ❖ Superior performance under elevated temperature-curing conditions.
- ❖ Good long-term strength.
- ❖ Higher resistance to acids, sulphate and alkali attacks, making them suitable for coastal areas.
- ❖ Higher resistance to oil fumes, acidic gases, microorganisms etc.
- ❖ Reduced permeability with consequent improvement in durability, resulting in lower water consumption as pores are less and the concrete is impermeable and dense.
- ❖ Higher impermeability also ensures lower corrosion of reinforcement rods.
- ❖ Reduced chloride diffusivity.
- ❖ Lower specific energy consumption. Transportation activities of raw material as well as outward movement of the finished product are reduced, while the coal consumed in the kilns per ton of the finished product is also low.
- ❖ Lower bulk density, resulting in increased cement volume for the same weight.
- ❖ Enhancement of the output potential of the fixed investment in cement kilns, which account for bulk of the capital invested in the industry.
- ❖ Effective usages of materials like fly ash and slag resulting in reduction in environmental pollution.
- ❖ Preservation of usage of the limited limestone reserves.
- ❖ Finishing smoother because of greater fineness.

### **6.2.3 PORTLAND-LIMESTONE CEMENT (PLC)**

PLC is manufactured by intergrinding portland cement clinker with between 6% and 15% limestone. The clinker used to make PLC is the same clinker used to manufacture regular portland cement. Maximum addition of limestone to PLC is permitted to 35% in European standards.

#### **Performance**

The performance of PLC is dependent on the quality of the limestone. Accordingly, limestone used in PLC is tested for calcium carbonate content, clay content and total organic carbon content. PLC performance specifications are similar to those of regular portland cement in that it must meet the same physical requirements.

#### **Energy Savings and Reduced Emissions**

The introduction of PLC represents a proactive step by both the cement and concrete industries to help mitigate climate change. Manufacturing PLC results in up to 10% less CO<sub>2</sub> emissions as compared to manufacturing regular portland cement.

### **6.3 SELECTION OF MANUFACTURING PROCESSES**

During the various phases of development, the cement industry has adopted the following manufacturing processes:

- ❖ Wet Process.
- ❖ Semi-dry Process.
- ❖ Dry Process.

The process nomenclature is basically derived in the manner, the raw material is prepared for kiln feed.

# TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000 TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 6 – MANUFACTURING PROCESS

The selection of kiln process is mainly guided by the thermal and electrical energy economy. The specific heat requirements per kg of clinker in the three processes are shown below:

Process	Specific heat Requirements (K cal/Kg clinker)
Wet	1350-1500
Semi-dry	950-1100
Dry (Suspension preheater)	850-950
Dry (with precalcinator)	650-750

The power consumption in the wet process is marginally lower compared to that in conventional dry process. However, with improvement in the design of low-pressure drop cyclones, the difference has been narrowed down and the overall energy efficiency is in favour of dry process plants (with precalcinator). The trend all over the world is therefore, to adopt dry process with pre-calcinator along with low-pressure drop cyclones and the same been used in the proposed plant.

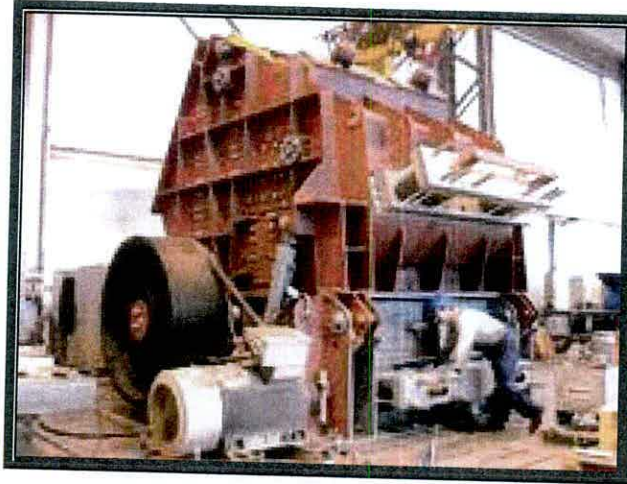
## 6.4 DRY PROCESS OF CEMENT MANUFACTURE

The dry process essentially consists of the following operational steps:

- ❖ Crushing of limestone.
- ❖ Preblending of crushed limestone.
- ❖ Drying – cum-grinding of raw materials.
- ❖ Homogenization of raw meal in a blending silo.
- ❖ Clinkerization of the raw meal in a rotary kiln with preheater and precalcinator.

#### 6.4.1 Crushing of Limestone

Crushing of limestone is done usually in a single stage impact crusher to reduce the size of ROM limestone from 1.0 m to less than 80 mm to feed ball mill. This will be achieved in a single or double rotor impact crusher.



#### 6.4.2 Preblending of Crushed Limestone

Prehomogenization is mostly applied to the main component of the cement raw material namely limestone. The additives like clay, sandstone, laterite, bauxite, iron ore are usually homogeneous although many cement plants have to prehomogenize such raw material components also, particularly clay. In case where granulated furnace slag is employed in the process of cement manufacture, it is useful to prehomogenize also these components.

According to the projected chemical composition of the raw mix, the prehomogenized, components after proportioning them via feed bins and weigh feeders are fed in to the raw grinding mill. The chemical analysis of the raw mix leaving the raw mill supplies the information as to what corrective measures should be taken.

With qualitatively controlled stacking of blending beds initial oscillations of about 10% in the  $\text{CaCO}_3$  content of the limestone can be reduced to 1.5% and sometimes even to a lower rate. An online X-ray analyzer gravimetrically proportions the prehomogenized limestone components before feeding the

material to the raw mill. The raw mix leaving the raw mill then enters the blending silos, where possible remaining oscillations in the chemistry of the raw mix are reduced to one tenth of the entering oscillations.

Usually, a raw material consumption of 5 – 6 working days is taken in to consideration, when estimating the size blending stockpiles. The size will also depend on the angle of repose of the particular raw material ultimately leading to the length of the material bed. Special quarry and transportation conditions may sometimes require blending beds with higher capacities. The length to width ratio of blending beds should be as large as possible at least 3:1.

### **6.4.3 Drying and Grinding of Raw Material**

In the dry process, the raw materials are dried and ground in close circuit drying-grinding installations. The following alternative processes are available:

- ❖ Ball mill
- ❖ Vertical Roller Mill (VRM)
- ❖ Roller Press (RP)

Selection of process is based on the energy saving and drying requirements. The table below shows the comparison of energy consumption and drying capacities in the three systems:

**TABLE – 6.1**  
**Consumption of Raw Grinding Systems**

<b>Process</b>	<b>Relative Energy Consumption</b>	<b>Drying capacity % H<sub>2</sub>O in Raw Material</b>
Close Circuit Ball mill	100%	6-8
VRM	80 – 85 %	10-15
Roller Press	70 – 77 %	2.5 – 3.5 %

### **Roll Press Grinding system**

It may be observed from the above that although roller press is having the better efficiency over the others, it has a serious limitation of ineffective drying of raw materials.

An additional crusher dryer or flash dryer may be required to dry the materials before feeding to roll press. Further the roller press installation needs highly skilled manpower and availability of costly spares to operate the system. This option is not considered for this plant in view of the above aspects and the size of the plant.

### **VRM Grinding system**

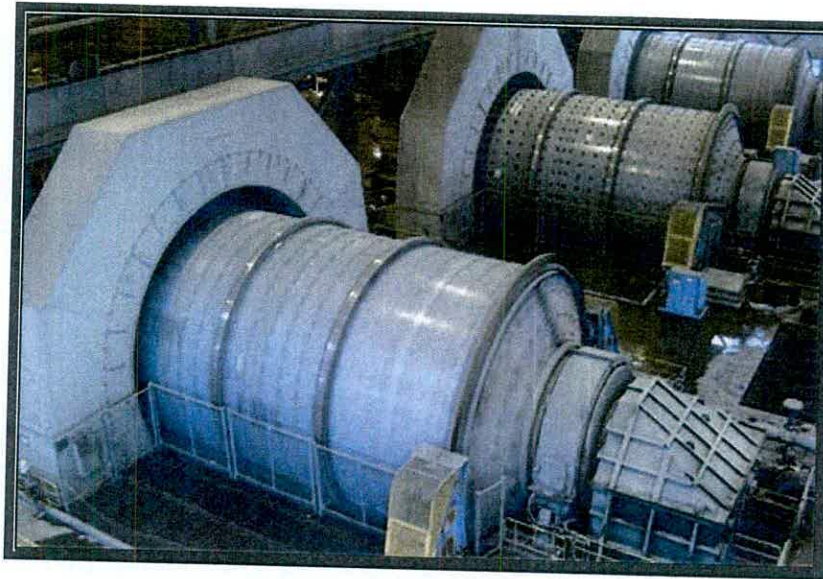
- ❖ Smaller plant space for installation of VRM compared to ball Mill.
- ❖ 20 to 30% Power saving possible as compared to close circuit ball mill.
- ❖ Drying capacity up to 15% moisture possible compared to 6% in ball mill.
- ❖ Civil construction for VRM building is less compared to close circuit ball mill.
- ❖ Operational flexibility is high and loading is good in VRM compared to close circuit ball mill.

The advantage of VRM grinding system is its capability to drying of the material during grinding and less power consumption in comparison to the Ball Mill grinding system.

### **Ball Mill Grinding system**

In the case of Raw materials having moisture content less than 10% and hot gases from the Kiln is available to be utilized for drying during grinding then Ball Mill grinding system is preferred since this system is cost effective in comparison to the VRM grinding system.

Being simple to operate, and with low maintenance cost, Ball mill system has been recommended for Mamba Cement.



#### 6.4.4 Blending of raw meal and Storage of kiln feed

Continuously operated silo for blending and storage of cement raw mix called the CF silo (Controlled Flow), which extracts the material simultaneously at different rates from a number of outlets in the silo bottoms is adopted for the plant. The new system incorporating kiln feed equipment ensures stable kiln feed composition with minimum power consumption and investment costs for blending and storage. The CF silo is a continuously operating blending and storage plant for raw mix, which is used in the production of cement.

In order to achieve a higher degree of homogeneity in a continuously operating flow through silo without air agitation two conditions must be met:

- ❖ All the raw mix in the silo must be kept in constant movement towards the outlet openings.
- ❖ The raw mix passing the silo must have different residence times.

This is attained by the operating principle of the CF silo, which extracts raw mix at different rates from several points in the silo bottom and mixes the streams from various outlets. This in fact divides the silo into a number of flow streams which operate in parallel at different flow rates, the process being followed by final

# TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000 TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 6 – MANUFACTURING PROCESS

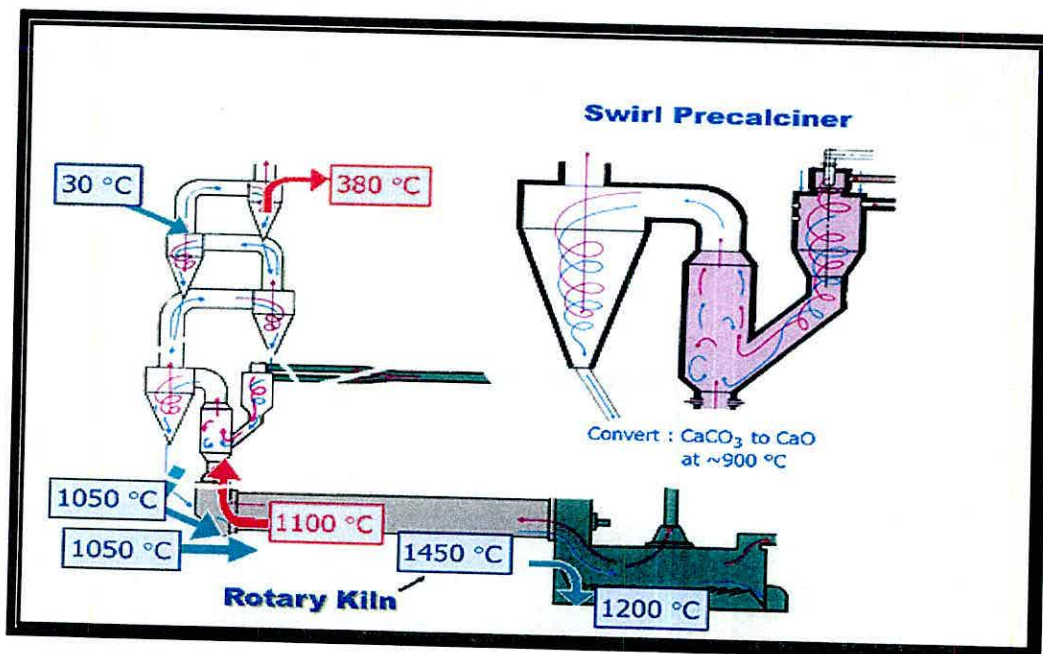
blending in a small aerated kiln feed or blending bin. A kiln feed with stable chemical composition is thus obtained. The CF silo is provided with a programmable control unit for its extraction equipment.

## 6.4.5 Preheater, Precalculator, Kiln and cooler

In cyclone preheater system, an efficient heat transfer takes place to dispersed raw material particles when they come in contact with hot gases from kiln.

The preheater is multi stage cyclone system (4, 5 or 6 stages) connected with gas ducts and meal chutes. The raw meal is fed into top stage gas duct and is carried by hot gas stream into cyclone. The material gets separated from gas in cyclones and then travels downward and through meal chute is discharged into next lower stage gas duct. In this way, material comes into contact with high temperature gases and gets preheated and partially calcined and then enters the precalcinator.

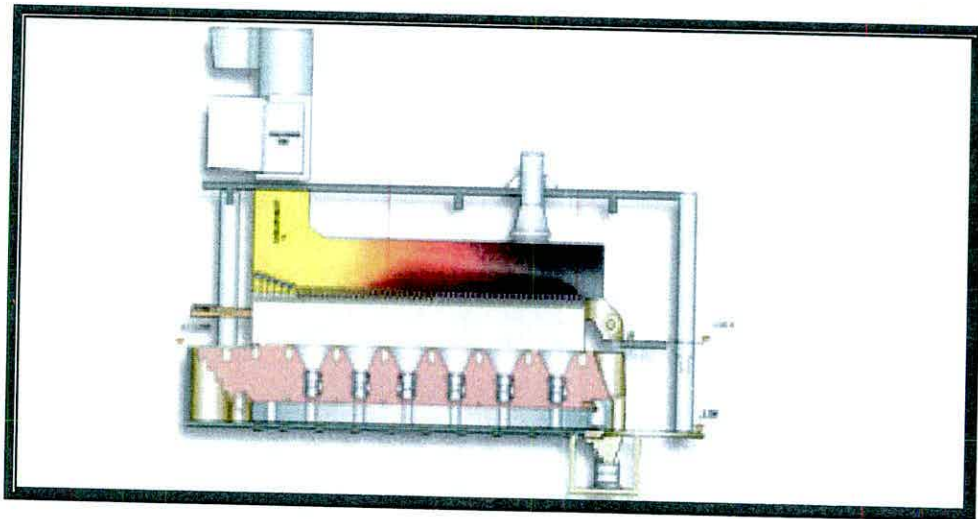
In the precalcinator, further calcination takes place by firing pulverized coal and then material is discharged to the kiln. The feed travels down as the kiln rotates. The chemical reaction is completed when the material reaches the burning zone and cement clinker is formed.



#### 6.4.6 Cooling of Clinker

The clinker is discharged from kiln at around 1000 Deg. C temp and is cooled in a grate cooler. A Controlled Flow Grate (CFG) type of high efficiency cooler can be used.

The cooled clinker is then transported to clinker storage silo by a set of Deep Bucket Conveyor (DBC).



Clinker cooler



Cooled Clinker from a cooler

TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000 TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 7 – TECHNICAL CONCEPT

8.3 FUEL ANALYSIS FOR CAPTIVE POWER PLANT

Constituents	Values
Maximum Ash	20 %
Maximum Sulphur	1.2 %
Maximum Volatile matter	22 %
Maximum moisture	10 %
Gross Calorific Value (kcal/kg)	6000

FUEL HANDLING SYSTEMS SHALL BE DESIGNED BASED ON FOLLOWING FUEL INPUT SIZE:

Fuel	Size
Coal	<75 mm

FUEL FIRING CONDITIONS (WEIGHT BASIS):

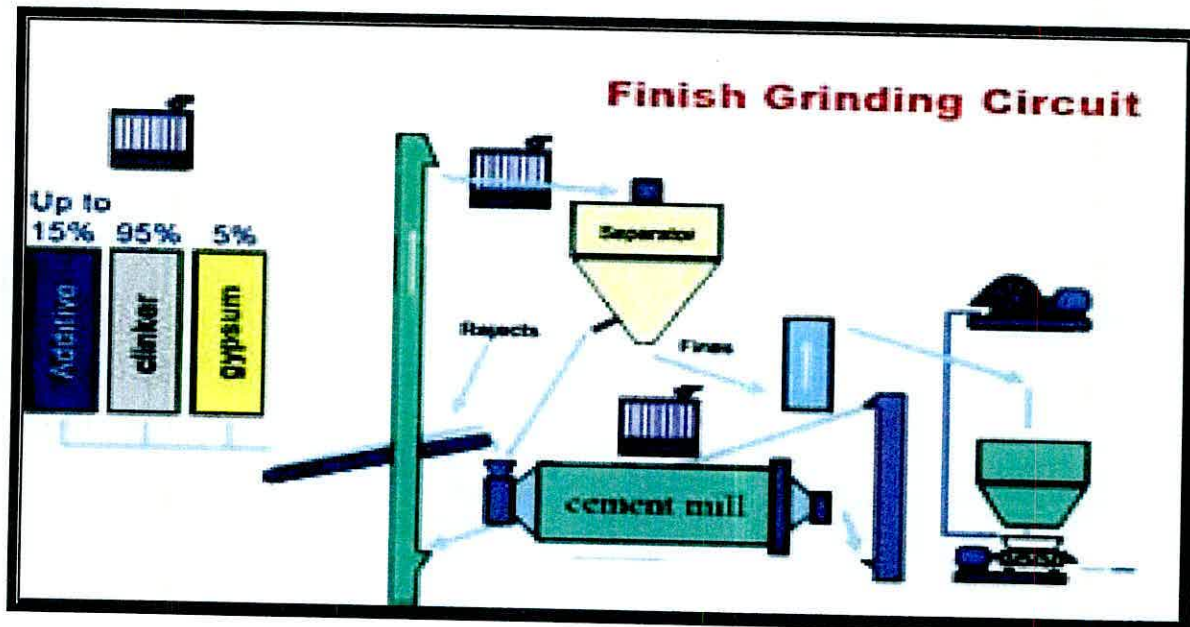
S.No.	Fuel	Percentage (%) BMCR
1	Coal	100%

ESP SIZING

Design Criteria	Data
ESP Outlet Solid Particulate Emission limit while firing 100% Coal	30 mg/Nm <sup>3</sup>

8.4 TECHNICAL SPECIFICATIONS FOR CAPTIVE POWER PLANT EQUIPMENTS

SL. NO.	Description	Unit	
A	Steam Generator (Boiler)	TPH	110
	Type		Circulating fluidized bed combustion(CFBC)
	Nos of Unit	no	1
	Start up vent Capacity	% BMCR	30



CLOSE CIRCUIT BALL MILL FINISH GRINDING CIRCUIT

**B) ROLLER PRESS AND BALL MILL COMBINATION**

The Clinker grinding takes place in Roll Press Circuit in semi finished mode, which is equipped with separator and balance fine grinding, takes place in single chamber close circuit ball mill with high efficiency separator. Here, the roll press acts as a pre-grinder. This is not very capital intensive but specific power consumption is low.

**C) ROLLER PRESS (FINISHED MODE)**

The roller press in finish mode is also in use for cement grinding and it is capital intensive and consumes less power but not very widely used in the cement industry for clinker grinding application.

**D) BETA MILL AND BALL MILL COMBINATION**

The Clinker grinding takes place in Beta Mill Circuit in semi finished mode, which is equipped with separator and balance fine grinding, takes place in single chamber close circuit ball mill with high efficiency separator. Here, the roll press acts as a pre-grinder. This is not very capital intensive but specific power consumption is low and less operational difficulty and instability.

**E) VERTICAL ROLLER MILL (FINISHED MODE)**

The vertical roller mill in finish mode is also in use for cement grinding and it is capital intensive and consumes less power but not very widely used in the cement industry for clinker grinding application, due to higher wear rate of roller and table liner. The broad comparison of the above available systems is furnished below:

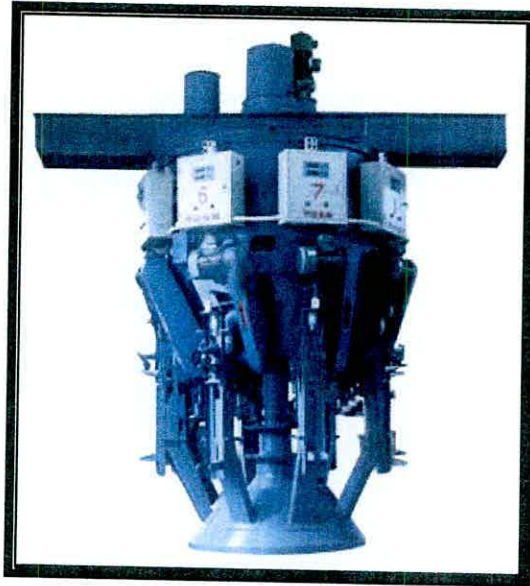
Sn.	Close circuit Ball mill with high efficiency separator	Semi finish mode Roller Press and Ball Mill Combination	Semi finish mode Beta Mill and Ball Mill Combination	Vertical Roller Mill Finish Mode	Roller Press Finish Mode
1.	<b>Capital investment</b>				
	Initial Capital investment is low.	The initial capital investment is higher in comparison to Semi finish Mode Beta Mill and Ball Mill Combination	The initial capital investment is lower in comparison to Semi Finish Mode with Close Circuit Ball Mill and Finish Mode Vertical Roller Mill.	The capital investment is significantly more than Close Circuit Ball Mill with high efficiency separator and Roller press & Ball Mill combination	The capital investment is more than the Roller Press with close circuit Ball Mill
2.	<b>Pre-grinding</b>				
	This system can work as an independent grinding system.	Roll press works as pre-grinder	Beta Mill works as a pre-grinder	This system can work as an independent grinding system.	This system can work as an independent grinding system.
3	<b>Power – Consumption per tonne</b>				
	35 kwh / tonne	27 kwh / tonne	25 kwh / tonne	25 kwh / tonne	22 kwh / tonne
4.	<b>Maintenance</b>				
	Low in comparison to other system.	High due to higher wear rate of roller liner	High due to higher rate of roller liner	High due to higher wear rate of roller and table liner	High due to higher wear rate of roller liner

**6.5.2 RECOMMENDATION**

Looking to the factors like, early delivery of equipment, less time required for implementation of project and less initial installation cost, it is recommended to go with a Closed circuit Ball mill with high efficiency separator, for the proposed project. Also for PLC production Ball mill is the most suitable and preferred system

compared to VRM and Roll Press.

## **6.6 CEMENT PACKING**



From silos, Cement will be extracted and packed in HDPE bags of 50 kg weight by Rotary type electronic packer and stored in a godown or loaded on to the trucks with the help of automatic truck loaders. In line with the most modern technical concept of the plant, the electronic packing machine shall be with microprocessor based fully automatic operation and shall ensure minimum weight variations from bag to bag.

## **6.7 CAPTIVE POWER PLANT**

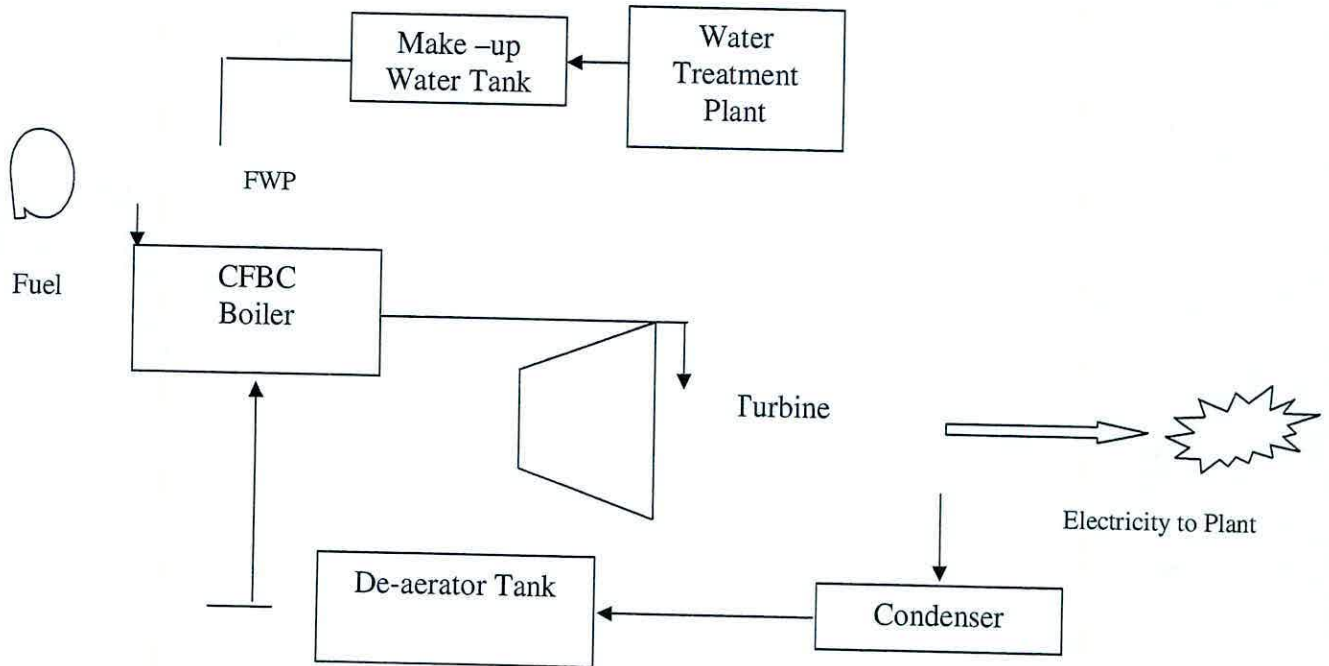
MCCL intends to install a coal based (primary fuel) thermal power plant having capacity of 25 MW for proposed cement plant to be located inside the plant premises.

The generating unit will consist of one Circulating Fluidized Bed Combustion (CFBC) boiler firing coal as primary fuel, one condensing steam turbine and generator, one air cooled condenser and other necessary auxiliary equipment including balance of plant equipment. The generating station shall be designed to

**TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000 TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 6 – MANUFACTURING PROCESS**

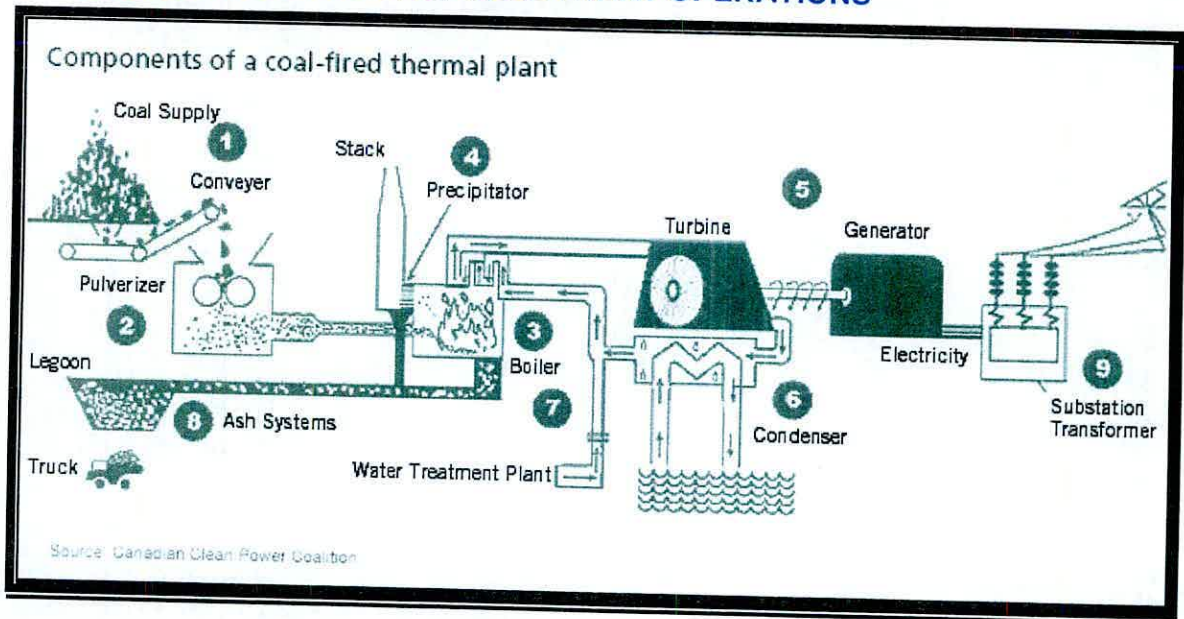
operate with high efficiency and availability at various modes throughout the lifetime of the project considering the nature of cement plant loading.

**Schematic diagram of the Captive Power Plant**



The schematic diagram shows the basic layout of the plant. There are various sections of the power plant described as below.

**6.8 UTILITIES FOR THE PROPOSED PLANT OPERATIONS**



In the proposed plant, various utilities will be provided for the smooth and efficient functioning of the plant.

- Coal Handling System
- Fuel Oil System
- Steam Generator Units
- Steam Turbine Unit
- Condenser
- Boiler Feed Pumps
- Condenser Feed Pumps
- De-aerator and Regenerative Feed Heating system
- Electrostatic Precipitators and Stack
- Ash Handling System
- Fly Ash System
- Bottom Ash System
- Ash Disposal System

## **6.9 FUEL REQUIREMENT, SOURCE AND QUALITY AND TRANSPORTATION:**

### **6.9.1 Fuel Storage and Handling:**

This section will include all the necessary equipments like coal crusher, conveyor and drives. Coal from the source shall be crushed into required size and taken to the feed hopper of the boiler room. Coal yard will have separate arrangements for incoming coal and crushed coal to be sent to the hopper.

### **6.9.2 Boiler and other Auxiliary equipments:**

The boiler house will have the main boiler as mentioned above along with Primary and secondary fans, ducts, Pollution control equipment (ESP/Bag Filter), and other necessary valves, piping and fittings. Fuel from the conveyor shall be put into the main hopper from where it shall be fed to the boiler furnace.

### **6.9.3 Water Treatment Plant:**

In order to have smooth operation and long life of the boiler system, it requires suitable water treatment plant. Depending upon the test results of the water sample, appropriate treatment methods and equipment shall be decided upon.

### **6.9.4 Turbine and Control Room:**

Turbine and control room shall be housed in the separate building other than boiler house. This shall also house other turbine auxiliary equipment, cable cellar, switchgear room, central control room and other administrative facilities. The steam from the boiler shall be expanded and condensed in the turbine to get electricity.

### **6.9.5 Condenser / D-E Tanks:**

At the exit of the turbine, we get low-pressure steam. This shall be routed through de-super heater, condenser and de-aerator tank. This water shall be directly fed into the boiler to continue the loop.

### **6.9.6 Fly ash disposal:**

After combustion of coal inside the boiler furnace, it liberates heat that is used for steam generation. At the same time it generates ash that is a byproduct of combustion process. This ash travels through various parts of the system like pollution control equipment through ducts. There is also some collection at the bottom of the furnace. In the end, flue gases are fed into the chimney/stack through ID fan and vented out in the atmosphere. Ash shall be collected at different points and moved by using suitable material handling systems and collected into the silos (Dry fly ash).

All the equipment including valves, pumps, standby pumps & valves etc shall be operated, monitored and controlled from central control room. In this way, generated power and fly ash shall be sent to the cement plant for their respective usages.

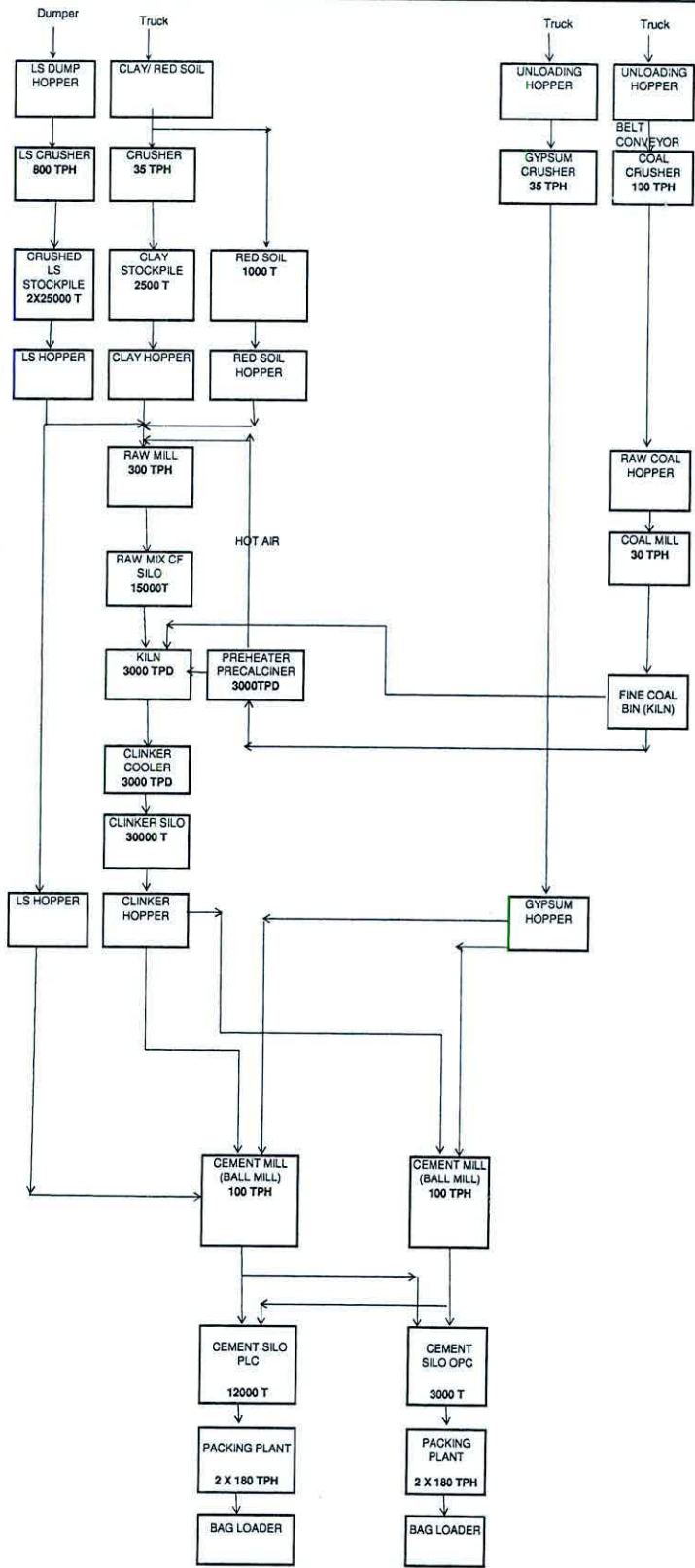
### **6.9.7 Electrostatic Precipitators and Stack**

The steam generating units will be provided with an electrostatic precipitator (ESP). ESP would have two parallel flue gas paths, any of which can be isolated for maintenance when required, keeping the other paths in operation. Each path will comprise the required number of fields in series for collection of fly ash. The overall efficiency of ESP would be 99.8% to 99.9%. ESP would be provided with adequate number of ash hoppers provided with electric heaters. The control of ESP would be based on microprocessor using semi-pulse device. The design of ESP will be such that the outlet dust burden does not exceed 30 mg/Nm<sup>3</sup> at 100% MCR with worst coal.

The plant will construct 90-m high stack which is expected to bring down the ground level concentration of SO<sub>2</sub> based on 24-hourly average to a minimum. Concrete twin flue stacks for the steam generating units have been proposed.

The project will include the complete civil construction of the buildings, reservoirs, pump house, MCC room, WTP plant area building, cooling tower including fore bay, ash silos, covered fuel shed, site infrastructure, supply and installation of all mechanical equipment, piping, instrumentation and electrical system and other necessary equipment for the completion and satisfactory operation of the generating unit.

**PROPOSED MASS FLOW DIAGRAM FOR MAMBA CEMENT COMPANY LIMITED**



**PROPOSED MASS FLOW DIAGRAM FOR PHASE EXPANSION OF MAMBA CEMENT COMPANY LTD.**

MAMBA CEMENT COMPANY LTD.  
CAPACITY = 1.0 MILLION TPA (3000 TPD)

ERCOM ENGINEERS PVT. LTD. (AN ISO 9001:2008 COMPANY)  
ERCOM HOUSE C-1, C-BLOCK  
COMMUNITY CENTRE NARAINA VIHAR NEW  
DELHI-110028 (INDIA)



DATE: 26.04.2013 (R-0)

**CHAPTER – 7**  
**TECHNICAL CONCEPT**

## **CHAPTER – 7**

### **TECHNICAL CONCEPT**

#### **7.0 INTRODUCTION**

A technical concept of the plant has been developed keeping in view the state-of-art technology in size reduction, comminution and Pyroprocessing as well as an effective control on the level of pollution for the clinker production, PLC (Portland Limestone Cement) and OPC (Ordinary Portland Cement) at the integrated cement Plant at Village - Tarawanda, District Bagamoyo, Tanzania.

#### **7.1 KILN CAPACITY**

Kiln being the main process equipment in the cement plant its capacity is decided first. Sizing of other equipment would depend upon the capacity of the kiln. The capacity of kiln is taken as 3000 TPD.

Sizing of all upstream and downstream equipment has been done to suitably match 3000 TPD kiln capacity. Standard norms have been used for sizing of various equipments.

#### **7.2 EQUIPMENT SIZING AND STORAGE CAPACITIES**

Norms for sizing of core equipment is based on industry experience in India/abroad regarding availability and efficiencies of comparable size plants. Safety factors have also been considered for sizing of equipment. The following table gives the estimation of various equipment capacities, running hours, storages of various materials.

TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000 TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 7 – TECHNICAL CONCEPT

EQUIPMENT SIZING AND STORAGE CAPACITIES

Description	Quantity	Unit
<b>Rated capacity of the plant</b>	3,000.00	TPD
Kiln Capacity	3,000.00	TPD
PLC Percentage	0.82	
OPC Percentage	0.18	
Clinker for PLC	2,400.00	TPD
Clinker for OPC	600.00	TPD
Plant working/ yr	330.00	days/yr
Clinkerisation factor	1.60	
Daily Raw meal	4,800.00	TPD
<b>Raw Mix in Clinker</b>		
Limestone	0.885	
Clay	0.085	
Red Ochre	0.03	
Daily limestone	4,656.00	TPD
Daily additive	144.00	TPD
<b>Raw Materials in Cement (PLC)</b>		
Clinker	85.00%	
Lime Stone	10%	
Gypsum	5%	
<b>Raw Materials in Cement (OPC)</b>		
Clinker	95.00%	
Gypsum	5.00%	
<b>Cement produced</b>		
Daily PLC	2,823.53	TPD
Annual PLC	931,764.71	TPA
Daily OPC	631.58	TPD
Annual OPC	208,421.05	TPA
Total Cement Produced	1,140,185.76	TPA
Daily Limestone for PLC	282.35	TPD
Total daily limestone	4,938.35	TPD
Daily cement	3,455.11	TPD
Daily gypsum	172.76	TPD
<b>Coal</b>		
Heat consumption (kcal/kg)	750.00	

**TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000 TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 7 – TECHNICAL CONCEPT**

Calorific value	6,000.00	Assumed
Coal consumption	13%	(kcal/kg)

<b>Safety factor of machinery</b>		
Crusher	1.25	
Raw Mill (Srm)	1.10	
Coal Mill (Sco)	1.10	
Cement Mill (Sce)	1.10	
Packer (Spk)	1.25	
<b>EQUIPMENT SIZING</b>		
<b>Crusher</b>		
Crusher working per day	10.00	hrs
Crusher no. of days per week	6.00	
Total operating hours per week	60.00	
Daily limestone requirement	4,938.35	TPD
Weekly limestone requirement	34,568.47	TPW
Crusher capacity	720.18	TPH
<b>Raw Mill</b>		
Raw mill working per day	20.00	hrs
Mill no. of days per week	7.00	
Total operating hours per week	140.00	
Daily limestone requirement	4,800.00	TPD
Weekly limestone requirement	33,600.00	TPW
Mill capacity	264.00	TPH
<b>Coal Mill</b>		
Coal mill working per day	18.00	hrs
Mill no. of days per week	7.00	
Total operating hours per week	126.00	
Daily Coal requirement	375.00	TPD
Weekly coal requirement	2,625.00	TPW
Mill capacity	22.92	TPH
<b>Kiln capacity</b>	3,000.00	TPD

**TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000 TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 7 – TECHNICAL CONCEPT**

<b>Cement Mill</b>		
Cement mill working per day	20.00	hrs
Mill no. of days per week	7.00	
Total operating hours per week	140.00	
Daily cement requirement	3,455.11	TPD
Weekly cement requirement	24,185.76	TPW
Mill capacity	190.03	TPH
<b>Packing plant</b>		
Packing plant working per day	15.00	hrs
Mill no. of days per week	7.00	
Total operating hours per week	105.00	
Daily packing requirement	3,455.11	TPD
Weekly cement requirement	24,185.76	TPW
Packer capacity	287.93	TPH
<b>Storage norms</b>		
Limestone preblending stockpile	10.00	days
Additive storage	15.00	days
Raw meal silo	3.00	days
Clinker stockpile	10.00	days
Coal Storage	14.00	days
Gypsum storage	30.00	days
Cement Silo	4.00	days
<b>STORAGE CAPACITIES IN TONNES BASED ON ABOVE NORMS</b>		
Limestone preblending stockpile	50,000	T
Clay storage	2,500	T
Raw meal silo	15,000	T
Coal Storage	6,000	T
Clinker	30,000	T
Gypsum storage	6,000	T
Cement Silo – PLC	12,000	T
Cement Silo – OPC	3,000	T

**TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000 TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 7 – TECHNICAL CONCEPT**

<b>SUMMARY PLANT CAPACITIES</b>		
Limestone Crusher	800	TPH
Raw Mill	300	TPH
Coal Mill	30	TPH
Rotary Kiln	3,000	TPD
Cement Mill	2 x 100	TPH
Packing Plant	2 x 180	TPH

**7.3 PLANT LAYOUT**

Plant layout has been based on rational flow of material, overall plant economy and easy operation as shown in Drg. No. **2391-A1-02-011-01**.

Storages of various products have been planned, keeping in mind storage requirement of limestone, additives, coal, gypsum and other products. Layout was planned keeping the shape of the land in mind, available after acquisition. Following are the various departments shown in the attached plant layout drawing no. **2391-A1-02-011-01**.

<b>SN.</b>	<b>DEPARTMENTS</b>
1.	Limestone Crushing Plant
2.	Additive Unloading Dump Hopper
3.	Coal Unloading Dump Hopper
4.	Transfer Tower
5.	Limestone Stockpile (2X25,000T)
6.	Additive Crusher
7.	Additive Storage
8.	Additive Dump Hopper
9.	Raw Material Hoppers
10.	Coal Storage
11.	Coal Dump Hopper
12.	Coal Crusher
13.	Coal Mill
14.	Raw Mill House
15.	Bag House for Raw Mill & Kiln

**TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000 TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 7 – TECHNICAL CONCEPT**

<b>SN.</b>	<b>DEPARTMENTS</b>
16.	Preheater Building
17.	C.F Silo
18.	Rotary Kiln
19.	Grate Cooler
20.	ESP
21.	Clinker Silo
22.	Reject Clinker Silo
23.	Gypsum Unloading Dump Hopper
24.	Gypsum Storage
25.	Gypsum Crusher
26.	Gypsum Dump Hopper
27.	Cement Mill Hoppers
28.	Cement Mill-2 nos (with Bag House)
29.	Cement Silo-2 nos
30.	Cement Bulk Loading
31.	Packing Plant
32.	Truck Loading Platform
33.	Gunny Bags Godown
34.	Weigh Bridges
35.	Load Centre no-1
36.	Compressor House no 1
37.	Load Center-2
38..	Compressor House no 2
39..	CCR/Lab/Tech. Office
40.	General Store
41.	Workshop (elect/ mech)
42.	Water treatment Plant & Pump House
43.	Bore hole
44.	Administration Building
45.	Cement dispatch office
46.	Canteen
47.	U.G water tank (Process water)
48.	Car Parking

**TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000 TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 7 – TECHNICAL CONCEPT**

<b>SN.</b>	<b>DEPARTMENTS</b>
49.	Truck Parking
50.	Time and Security / Sales office
51.	Security office
52.	Load centre-3 (Raw & Coal Mill Section)
53.	Load centre-4 (Cement Mill Section)
54.	First Aid Room
55.	Captive Power Plant

Major features of the layout are described below.

- ❖ Considering the security factor, two gates have been constructed, one for the entry of incoming raw materials and the other for the exit of finished material.
- ❖ Provision of future expansion of plant has been kept.
- ❖ Limestone crusher is located in the plant area and belt conveyor installed from the crushing plant to the PBSP.
- ❖ Separate storages have been planned for limestone, additives, coal and gypsum.
- ❖ Conveying system has been designed to carry out various raw materials to raw mill and cement grinding section.
- ❖ Pyro-section along with raw grinding section has been located with optimum utilization of space.
- ❖ Clinker silo has been located suitably.
- ❖ Cement grinding section along with OPC and PLC silos have been located with maximum utilization of space.
- ❖ Packing plant along with bag has been strategically located.
- ❖ 30 percent area has been kept for development of greenery in the plant.
- ❖ All other auxiliary and non-plant buildings have been located, keeping in mind their functional requirements.

#### 7.4 BROAD SYSTEM DESIGN FOR THE PLANT

The system design for the proposed plant is proposed in the flow sheets Drg. No.2391-A3-2-021-01 (**Sheet 1 to 15**). Layout and Flow sheets will undergo suitable revision during detailed engineering stage, when machinery supplier is selected and technology is frozen in all respects.

##### 7.4.1 Limestone Transport from the Mines, Crushing and Storage

###### 2391-A3-2-021-01 (Sheet 1)

Limestone shall be raised by mechanized means and Run-of-mine limestone shall be transported to the crusher by means of dumpers. From the dump hopper, the limestone shall be extracted by an inclined apron feeder for feeding to the crusher at a controlled rate.

Crushed limestone will be discharged on a short horizontal belt conveyor, which will transfer the material to a belt conveyor for transporting to Preblending stockpile in the plant.

Preblending of crushed limestone shall be done in a longitudinal stockpile, which will be provided with suitable stacking and reclaiming system. The reclaim belt will also be provided with an emergency dump hopper with a feeder so that in case of any problem with Reclaimer, the crushed limestone can be conveyed to raw mill hoppers through this hopper. The same belt conveyor shall also be used for transporting additives. Crushed limestone will be reclaimed by Reclaimer and conveyed to raw mill hopper by means of belt conveyor. The belt conveyor shall be provided with a fix tripper to discharge additives into respective hoppers. An additional belt conveyor shall be installed to transport the material to cement mill hoppers, as an additive for manufacturing PLC, along with clinker and gypsum.

#### **7.4.2 Additive crushing, storage and handling**

##### **2391-A3-2-021-01 (Sheet 2)**

Additives viz. laterite, iron ore etc. shall be brought by truck to the plant and taken to the storage through an additive crusher (with a bypass provision). From the storage, material will be taken to the raw mill hoppers.

#### **7.4.3 Raw Material Grinding**

##### **2391-A3-2-021-01 (Sheet 3)**

Ball Mill with high efficiency Separator has been considered for grinding of the raw materials. Kiln waste gases from Pre heater of the Kiln shall be utilized for drying the material during grinding. No auxiliary furnace is envisaged.

Preblended limestone, high grade limestone and additive (Laterite/Bauxite) shall be extracted from their respective hoppers in a pre-determined proportion by weigh feeders, which will discharge on a belt conveyor for conveying to raw mill. The belt conveyor shall be suitably provided with a magnetic separator and metal detector to avoid damage to the mill from any tramp iron.

After grinding and separation the final product shall be collected in Cyclones and the coarse shall be returned back to the mill for further grinding.

The Ball Mill shall be provided with a bag house for dedusting purpose.

Ground raw meal shall be conveyed to blending silo by means of air slide and bucket elevator. Also, a bucket elevator will be provided to serve as common stand-by for conveying raw meal either to silo or to preheater.

#### **7.4.4 Blending Silo and Kiln feed system**

##### **2391-A3-2-021-01 (Sheet 4)**

A continuous blending (C.F) silo of concrete construction shall be used for homogenization/feeding the raw meal into Kiln feed system.

# TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000 TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 7 – TECHNICAL CONCEPT

Control and metering of kiln feed shall be done by a solid flow meter. The kiln feed shall be conveyed to kiln by air slide and bucket elevator.

The common bucket elevator (standby) for conveying material from raw mill to blending silo will also have provision for feeding kiln feed from blending silo to preheater. The same bucket elevator will be used for recirculation back to blending silo.

## **7.4.5 Preheater, Kiln, Cooler and Clinker Transport**

### **2391-A3-2-021-01 (Sheet 5)**

A 5-stage preheater with precalcinator shall be used. The preheater shall however, has provision to feed kiln feed either in 5<sup>th</sup> stage or 4<sup>h</sup> stage. Waste gases from preheater will be utilized for drying of raw materials/ coal during grinding.

Clinker shall be cooled in grate type cooler with controlled airflow arrangement. Cooled clinker shall be transported to storage silo by an inclined deep bucket conveyor.

The cooler vent air shall be passed through an ESP for de-dusting before releasing to atmosphere.

## **7.4.6 Coal handling, Storage, Grinding and dosing system**

### **2391-A3-2-021-01 (Sheet 6, 7 & 8)**

Coal shall be brought by truck to the plant and taken to the storage through an additive crusher (with a bypass provision). From the storage, material will be taken to the coal mill hoppers.

A Ball mill is proposed for coal grinding utilizing preheater waste gases for drying. Collection of ground material will be done in a bag filter. Fine coal shall be conveyed to two bins for firing into kin and Precalciner, through a coal dosing system.

**7.4.7 Clinker Storage and transport, gypsum storage and transport**

**2391-A3-2-021-01 (Sheet 9 & 10)**

Clinker shall be stored in a Clinker Silo. Clinker shall be further conveyed by belt conveyor to clinker hopper at cement grinding section.

Gypsum after bringing by truck to the plant shall be taken to the storage yard.

Gypsum shall be crushed in a roll crusher and crushed gypsum shall be conveyed to cement mill hopper for feeding to cement mill.

Crushed L/stone shall be brought by conveyor from the pre-blending stockpile and shall be further transported to the Limestone hopper in Cement Grinding section.

**7.4.8 Cement Grinding**

**2391-A3-2-021-01 (Sheet 11 & 12)**

Clinker, Gypsum and Lime stone (in case of PLC) and Clinker and Gypsum (in case of OPC) shall be extracted from respective hoppers in required proportion with the help of weigh feeders for grinding in a Ball Mill having high efficiency separator. After separating the fines from coarse particles of the Cement in the separator the coarse particles of Cement shall be returned to the mill for further grinding and fine particles shall be collected in cyclones for further transportation to the Cement silo by air slides and Bucket elevator.

**7.4.9 Cement storage**

**2391-A3-2-021-01 (Sheet 13)**

Two different types of cement OPC and PLC shall be stored in two different silos or a multi-compartment silo with complete and aeration arrangement for withdrawal of cement to the packing plant.

**7.4.10 Cement Packing and Dispatch**

**2391-A3-2-021-01 (Sheet 14 & 15)**

Packing of cement will be done by 2 numbers electronic packing machines each having 12 spouts with double discharge arrangement. Hence, there will be 8 loading lines available for packed bag loading in trucks/wagon.

Loading of cement in trucks shall be done by automatic loading machines.

**7.5 MASS FLOW DIAGRAM**

A broad mass flow diagram is attached, showing the flow of materials.

**8.0 CAPTIVE POWER PLANT**

**8.1 PROJECT SIZE OF OPERATION INCLUDING RESOURCES**

The capacity of Captive power plant will be 25-MW, One (1) sub critical boiler will be installed for power generation. The details of proposed power plant are presented below:

**DETAILS OF PROPOSED POWER PLANT**

Sr. No.	Features	Description
1	Capacity	25 MW
2	Configuration	1X25
3	Type of boilers	Pulverized coal fired sub critical boilers
4	Power Generation & evacuation	Power will be generating at 11KV or 6.6KV Voltage level and to be used for cement plant.
5	Fuel	Coal
6	Source of Coal	Coal for the plant would be linked to MCCL owned coal mines
7	Coal Requirement @ 15 TPH	$15 \times 24 \times 330 / 1000,000 = 0.118$ MTPA

# TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000 TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 7 – TECHNICAL CONCEPT

8	Sulphur content	0.35%
9	Ash Content in Coal	20.00%
10	ESP efficiency	99.99%
11	Stack	One 90-m height Stack.
12	Water Requirement	3000 m3/day

## 8.2 BROAD SCOPE OF SUPPLY

- ❖ The proposed plant shall be configured with one nos of Coal fired CFBC Boiler capable of generating 110 TPH steam at 90 ata, 540 °C.
- ❖ One no. of 25MW steam Turbine generators along with required no of bleed for HP heater, Deaerator and LP heater and all accessories.
- ❖ One no. of Air cooled Condenser after steam turbine is envisaged to condense the exhaust steam from Steam Turbine.
- ❖ One no. of Fuel Handling System consisting of two stream (1w+1s) meeting the fuel requirement of the proposed power plant is envisaged.
- ❖ Dense Phase pneumatic Ash Handling System shall be used for conveying the Bed Ash and Fly Ash generated in the proposed CFBC boiler to respective Ash silos.
- ❖ The proposed water treatment System includes Pre-treatment along with Demineralised water system.
- ❖ Mechanical BOP systems like Auxiliary cooling water system, compressed air system, fire fighting system etc.
- ❖ Electrical Auxiliary systems for the proposed power plant.
- ❖ Distributed Control System (DCS) is envisaged for the operation and monitoring of main power plant equipment.
- ❖ Design and Engineering of the Power Plant and supply of Power Plant systems/ equipments.
- ❖ Complete civil design of the proposed power plant.

**TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000 TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 7 – TECHNICAL CONCEPT**

**8.3 FUEL ANALYSIS FOR CAPTIVE POWER PLANT**

Constituents	Values
Maximum Ash	20 %
Maximum Sulphur	1.2 %
Maximum Volatile matter	22 %
Maximum moisture	10 %
Gross Calorific Value (kcal/kg)	6000

**FUEL HANDLING SYSTEMS SHALL BE DESIGNED BASED ON FOLLOWING FUEL INPUT SIZE:**

Fuel	Size
Coal	<75 mm

**FUEL FIRING CONDITIONS (WEIGHT BASIS):**

S.No.	Fuel	Percentage (%) BMCR
1	Coal	100%

**ESP SIZING**

Design Criteria	Data
ESP Outlet Solid Particulate Emission limit while firing 100% Coal	30 mg/Nm <sup>3</sup>

**8.4 TECHNICAL SPECIFICATIONS FOR CAPTIVE POWER PLANT EQUIPMENTS**

SL. NO.	Description	Unit	
A	Steam Generator (Boiler)	TPH	110
	Type		Circulating fluidized bed combustion(CFBC)
	Nos of Unit	no	1
	Start up vent Capacity	% BMCR	30

**TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000 TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 7 – TECHNICAL CONCEPT**

	Feed water Temp. to Economiser	°C	200
	Feed water Temp. at Deaerator outlet	°C	150
	Main Steam Temperature Control range	% BMCR	60% to 100%
	Main steam Temperature	°C	540+/-5
	Main steam Pressure	Ata	90
<b>B</b>	<b>PA Fan</b>		
	Nos per Unit	% BMCR	2X60%
<b>C</b>	<b>FD Fan</b>		
	Nos per Unit	% BMCR	2X60%
<b>D</b>	<b>ID Fan</b>		
	Nos per Unit	% BMCR	2X60%
<b>E</b>	<b>Boiler Feed pumps</b>		
	Nos per Unit	nos	2X100% (1W+1S)
<b>F</b>	<b>Deaerator</b>		
	Type		Spray Cum Tray
	Nos of Deaerator	nos	one
	Deaerator feed water storage	minutes	10 minutes for Boiler operating at 100% BMCR.
<b>G</b>	<b>Air Pre-Heater</b>		
	APH type		Tubular
<b>H</b>	<b>ESP</b>		
	Nos of flue gas path	nos	1
	ESP emission level with all fields working	Mg/Nm3	30
<b>I</b>	<b>Hot gas Generator</b>		
	Nos of HGG	nos	2
	Capacity to support generation	% BMCR	Only for start up
	Start up fuel		HSD/LDO
	Type of Igniter		LPG flame
<b>J</b>	<b>Oil storage &amp; Pumping</b>		

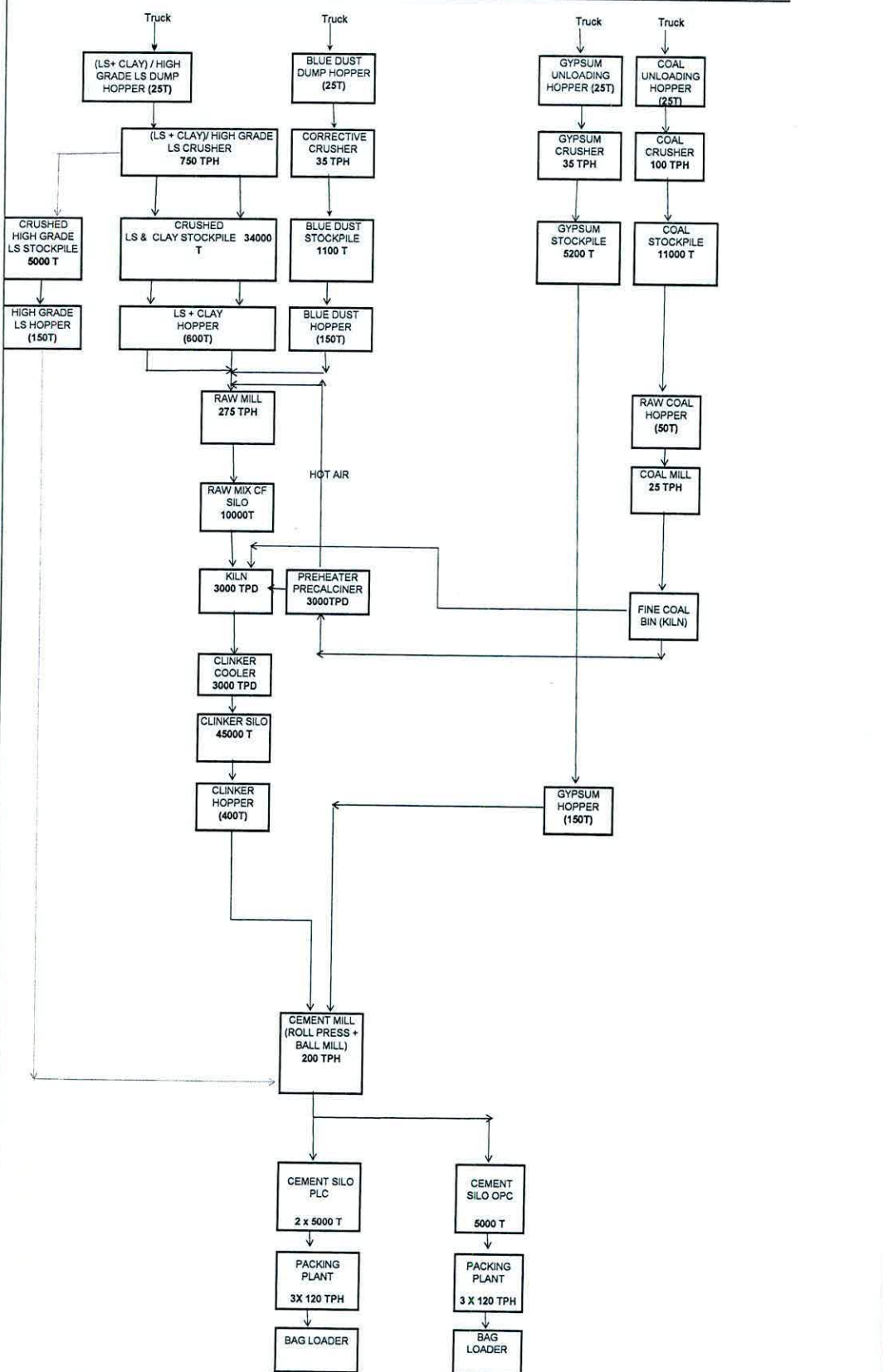
**TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000 TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 7 – TECHNICAL CONCEPT**

	Nos of bulk storage tank	nos	1
	Capacity of bulk storage tank	KL	50
	Nos of HSD Unloading cum Transfer pumps	nos	2(1W+1S)
<b>K</b>	<b>Bunker and fuel feeding</b>		
	Nos of bunker	nos	2
	Type of fuel feeder		Drag Chain
	Type of drive for fuel feeder		VFD
	Material of construction of bunker	MS/ RCC	MS
<b>L</b>	<b>Duct</b>		As per system requirement
<b>M</b>	<b>Chimney</b>		
	Construction of chimney	RCC/ MS	RCC
<b>N</b>	<b>Steam Turbogenerator (STG) and auxiliaries</b>		
	Turbine inlet steam temperature	°C	535
	Turbine inlet steam pressure	ATA	87
	Type of condenser		Air cooled
	Gear box with service factor of 1.3		Double helical/ Single helical
	HP Heater's		Vertical/ Horizontal
	LP Heater's		Vertical/ Horizontal
<b>O</b>	<b>Water System</b>		
	Raw water for WTP		At plant boundary
	Clarifier feed pumps	nos	2X100%
	Clarifier storage tank		8 hrs storage (RCC)
	High pressure RO feed pumps	nos	2X 100%
	Permeate storage tank		4hrs storage
	DM feed pumps		2(1W+1S)
	Dual media filter operation		Semi Automatic

**TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000 TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 7 – TECHNICAL CONCEPT**

	Activated carbon filter operation		Semi Automatic
	No of DM water storage tank at DM plant	nos	2X150 m3
	Type of cooling Tower		FRP
	Cooling water temperature range	°C	9
	Nos of ACW pumps	nos	3X 100%
<b>P</b>	<b>Fuel Handling System</b>		
	Battery limit for fuel		At the inlet of Grizzly hopper
	Inlet lump size for fuel at battery limit	mm	(-)75
	Output particle size at boiler bunker	mm	(-)8
<b>Q</b>	<b>Ash handling system</b>		
	Type of bed ash conveying system		Dense phase Pneumatic
	Type of fly ash conveying system		Dense phase Pneumatic
	Nos of fly ash silo (RCC)	nos	1
	Nos of bed ash silo (RCC)	nos	1
<b>R</b>	<b>Compressed Air system</b>		
	Nos of plant air compressors	nos	2
	type		Oil lubricated screw type
	Discharge pressure of compressed air required at battery limit	Kg/ cm2 (g)	8
<b>S</b>	<b>EOT Crane</b>		
	No of EOT Crane	nos	1
	Capacity	Tonnes	30/5
	Location		TG Hall

PROPOSED MASS FLOW DIAGRAM FOR MAMBA CEMENT COMPANY LIMITED



PROPOSED MASS FLOW DIAGRAM FOR PHASE EXPANSION OF MAMBA CEMENT COMPANY LTD.

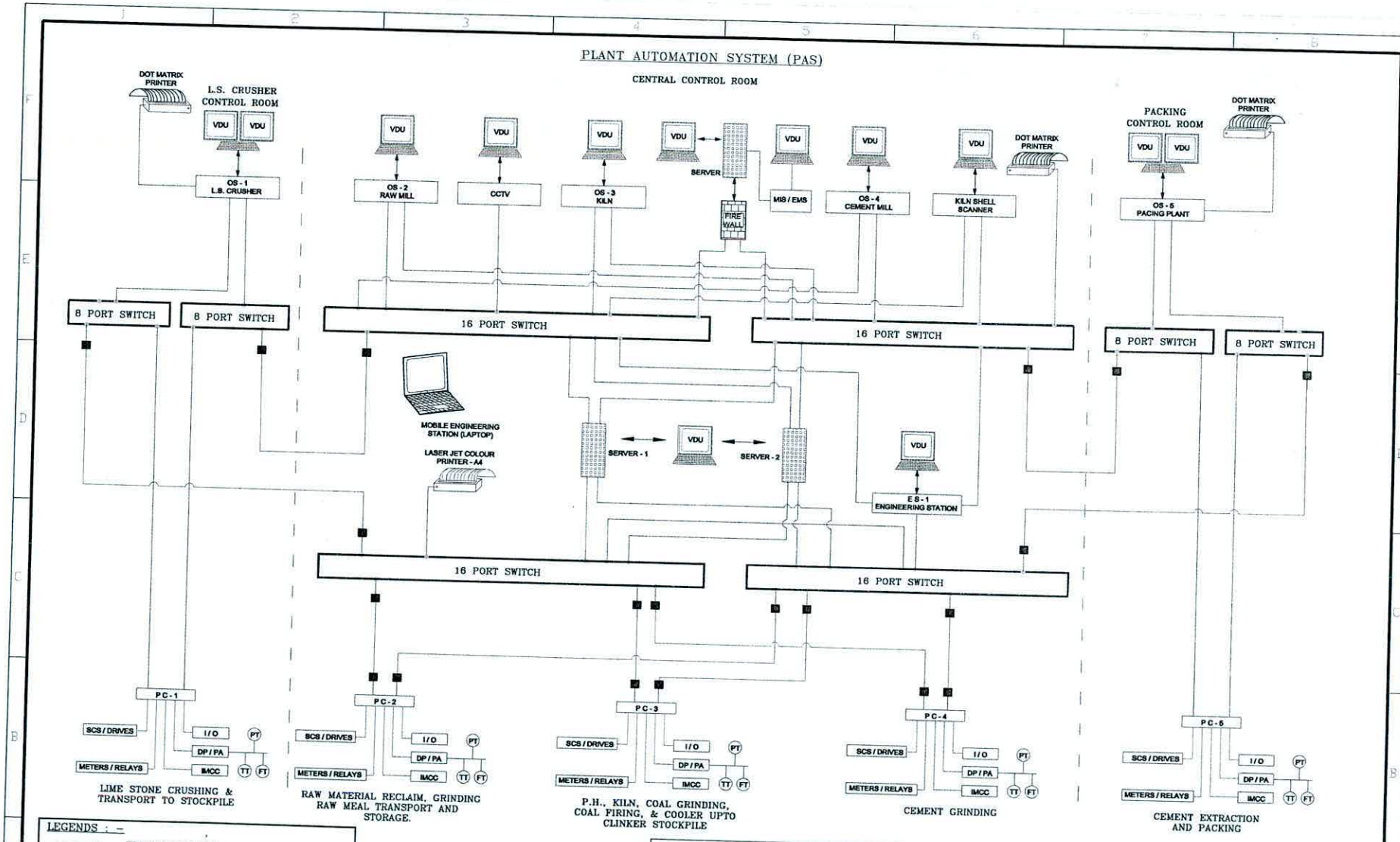
<p>MAMBA CEMENT COMPANY LTD, CAPACITY = 1.0 MILLION TPA (3000 TPD)</p>	<p>ERCOM ENGINEERS PVT. LTD. (AN ISO 9001:2008 COMPANY) ERCOM HOUSE C-1, C-BLOCK COMMUNITY CENTRE NARAINA VIHAR NEW DELHI-110028 (INDIA)</p>
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DATE: 27.05.2013 (R-0)



**CHAPTER – 8**  
**ELECTRICAL, INSTRUMENTATION AND  
CONTROL SYSTEM**





**ERCOM ENGINEERS PVT. LTD.**  
 (AN ISO 9001 : 2008 COMPANY)  
 ERCOM HOUSE C-1.C-BLOCK COMMUNITY CENTRE  
 NARAINA VIHAR NEW DELHI-110028 (INDIA)

CUSTOMER  
 M/s MAMBA CEMENT TANZANIA  
 PROJECT  
 2391  
 CAD FILE NO  
 022-01-RO DWG.  
 TITLE

**PROPOSED CONTROL SYSTEM CONFIGURATION**

DESIGN	DRAWN	CHECKED	APPROVED	SCALE	DRAWING NUMBER	REV
SSW	RAJESH	SKG	SSS	NTS	2391-A3-04-022-01	0

REV.	DATE	DESCRIPTION	BY	CHKD

## CHAPTER – 8

### ELECTRICAL, INSTRUMENTATION AND CONTROL SYSTEM

#### 8.0 INTRODUCTION

The Electrical, Instrumentation & Control System suitable for the proposed 1.0MTPA Clinker Cement grinding project has been envisaged, based on the state-of-the-art technology as available today. The system description is outlined in the following paragraphs.

#### 8.1 POWER REQUIREMENT

The power requirement for the proposed plant of capacity 3000TPD clinker capacity is worked out based on the following considerations:

##### For Clinkerization:

Clinker Production	:	3000 TPD
Maximum specific energy consumption	:	65 KWH / Ton of clinker
Peak production	:	110%
Peak load factor	:	1.3
Average Power Factor	:	0.95
Running hour considered per day	:	24
Max. Demand	=	$\frac{3000 \times 1.1 \times 65 \times 1.3}{24 \times 1000 \times 0.95}$
	=	12.23 MVA

##### Cement Grinding:

##### For OPC

Cement Production	:	631.58 TPD
Proportion of gypsum (included)	:	5%
Maximum specific energy consumption	:	45KWH / Ton OPC cement
Peak production	:	110%
Peak load factor	:	1.3

**TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000 TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 8 – ELECTRICAL, INSTRUMENTATION AND CONTROL SYSTEM**

Average Power Factor	:	0.95
Running hour considered per day	:	20
Max. Demand	=	$\frac{631.58 \times 1.1 \times 45 \times 1.3}{20 \times 1000 \times 0.95}$
	=	2.13 MVA

**For PLC**

Cement Production	:	2823.53 TPD
Proportion of gypsum (included)	:	5%
Lime Stone	:	282.35
Maximum specific energy consumption	:	40KWH / Ton PLC cement.
Peak production	:	110%
Peak load factor	:	1.3
Average Power Factor	:	0.95
Running hour considered per day	:	20
Max. Demand	=	$\frac{2823.53 \times 1.1 \times 40 \times 1.3}{20 \times 1000 \times 0.95}$
	=	8.50 MVA

**Total max. demand** = 12.23+2.13+8.50 = 22.86 MVA  
**= Say 23 MVA**

Additional power of 1 MVA will be considered for lighting, auxiliaries and quarry so total Power Demand is **24 MVA**.

Hence estimated maximum power required for the plant is 25MVA. So Captive Power Plant of 25MVA is recommended.

**Source of Power**

The receiving power supply shall be available from CPP (Captive Power Plant) for the cement plant, which is would be located in the plant premises. The power generation is considered at the 6.6KV level.

## **8.2 SYSTEM DESIGN**

Design considerations (For Main plant with cement grinding):

The electrical system of the cement plant has been designed to achieve overall economy on the following basic principles:

- Energy efficiency
- Technical soundness
- Modern concept
- System reliability
- Ease of maintenance
- Safety of personnel and equipment
- Remote operation
- Centralized control
- Variable speed drives for wide range of speed control.

Radial system of power distribution has been adopted as it is more economical, simpler, and safer and allows for convenient future expansion.

## **8.3 LOAD CENTERS / INDOOR SUB-STATIONS**

### **Main Plant with Cement grinding at: BAGAMOYO**

The main power source is CPP which will feed the main switchboard of cement plant and that to be located in the Main Substation. The switchboard will receive power from the CPP (Captive Power Plant), refer S.L.D related drawing no-**2391-A1-03-01-01,rev-0**. The power at 6.6 KV will be fed to the 6.6 KV switch -boards in Main Sub station and shall be distributed to the various load center substations, for further feed to 6.6 KV motors & distribution transformers.

Electrical equipment for power distribution system like 6.6 KV switchboard, distribution transformer, LT switchboard and MCCs, capacitor banks etc. shall be housed in respective load center substations as detailed below:

# TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000 TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 8 – ELECTRICAL, INSTRUMENTATION AND CONTROL SYSTEM

- Main Receiving Substation
- Load Center 1: L.S. crushing & Stacking
- Load Center 2: Reclaimer, RM Feeding , Raw meal grinding and blending silo
- Load Center 3: PH, Kiln, Kiln Feed, Cooler, Clinker Transport, Coal Mill & coal firing.
- Load Center 4: Cement grinding and packing

## 8.4 VOLTAGE SELECTION

Considering the economy in overall capital cost of electrical equipment, the following voltages have been selected for Main Plant with Cement Grinding at one Location:

### Power Source:

- Receiving voltage : 6.6 KV, 3 Ph., 50 Hz.
- Generating Voltage (CPP) : 6.6KV, 3 Ph., 50 Hz.

### Distribution voltage:

- High voltage : 6.6 KV, 3 Ph. 50 Hz.
- Low voltage : 415 V, 3 Ph. 50 Hz

### Motor Terminal Voltages:

#### A.C. Motors:

- Above 200 KW : 6.6 kV, 3 Ph., 50 Hz.
- 200 KW and below : 415 V, 3 Ph., 50 Hz.
- Up to 250 KW VVVF drives : 415 V, 3 Ph., 50 Hz.
- Above 250KW VVVF drive : 690V and 6.6 KV,3 Ph,50Hz.

### Control Supply:

- AC Control circuit : 110V, 1 Ph. 50 Hz from 415/110V control transformer.
- DC Control Circuits : 110 V DC from battery with float-cum-boost charger.

# TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000 TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 8 – ELECTRICAL, INSTRUMENTATION AND CONTROL SYSTEM

Welding Set and Heaters	: 415V, 3 Ph, 50 Hz
Plant & Township Lighting	: 230 V, 1 Ph, 50 Hz

## 8.5 6.6 KV SWITCHBOARDS

All the 6.6 KV switch gears shall be high speed, Vacuum circuit breaker. Each feeder shall be equipped with necessary metering and protection.

## 8.6 6.6 KV/433V DISTRIBUTION TRANSFORMERS

Unitized design step-down transformers for indoor sub-stations have been considered. These transformers shall be natural air cooled and shall have OFF load tap changer.

The transformer capacities have been worked out on the basis of expected loads. About 30% spare capacity has been provided in the transformers.

## 8.7 415 V MAIN LT DISTRIBUTION BOARDS

The LT boards considered are with fully drawing out motor operated air circuit breakers with necessary safety switches to facilitate safe operation and easy maintenance. These will be located at load center substations and shall receive 415 V power through bus duct from distribution transformers.

## 8.8 MOTOR CONTROL CENTERS (MCCS)

Functional MCCs i.e. MCCs controlling a group of interconnected and simultaneously operated loads have been considered. All the MCCs considered are fully draw-out type.

## 8.9 DRIVE SELECTION

The types of motors considered are based on the following requirements:

- Load characteristics
- Starting torque requirement of driven machines.
- Operating characteristics i.e. high power factor and efficiency at operating point.

# TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000 TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 8 – ELECTRICAL, INSTRUMENTATION AND CONTROL SYSTEM

- Accuracy and range of speed control required for variable speed control applications.
- Minimum power loss in variable speed application with the use of efficient method of speed control.

Keeping in view the above essential requirements, following types of drive motors have been considered for the plant.

## 8.10 AC Motors

- |                |   |  |
|----------------|---|--|
| Above 200 KW   | : | 6.6 KV, Class F insulated slip ring induction motor with motor operated liquid rotor starter and also Slip power recovery system (SPRS) for speed control if required between 60% to 100% range                  |
| 200 KW & below | : | 415 V, Class F insulated squirrel cage induction motor with contactor type DOL starter. However, wherever application demands slip ring induction motors with motor operated liquid rotor starter shall be used. |
| Up to 250 KW   | : | 415 V, Class F insulated, squirrel cage induction motor with VVVF drives for soft starting and speed control of motors for energy saving.  |
| Above 250 KW   | : | 690V or higher, Class F insulated, squirrel cage induction motor with VVVF drives for soft starting and speed control of motors for energy saving.   |

VVFD Drives shall be provided for all variable speed application.

## 8.11 POWER FACTOR IMPROVEMENT

In order to maintain a high overall plant power factor to reduce the demand charges, static power factor improving capacitors of suitable KVAR ratings and voltage grade have been considered. In the scheme envisaged, suitable size capacitors have been considered for direct connection across stator terminals of 6.6 KV motors. Further, for compensation of LT loads, multi-step automatic

# TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000 TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 8 – ELECTRICAL, INSTRUMENTATION AND CONTROL SYSTEM

controlled capacitor banks have been considered for connection to main LT boards. The capacitor banks have been sized to maintain the overall power factor to about 0.97 to 0.98 lag.

## 8.12 EARTHING

Electrical power distribution system shall be effectively earthed with the help of GI earth continuity conductor of suitable cross-section. Earth pit with GI pipe electrodes shall be provided around all the load centers and process buildings for earthing of load center equipment and various drives in the plant in order to keep earth resistance below one ohm.

Separate earthing systems for distribution transformers, ESP's, lightning arrestors and other electrical equipment have been considered.

LT system shall be solidly earthed through neutrals of the distribution transformers.

## 8.13 LIGHTING

A very efficient illumination scheme for plant buildings and roads inside the plant area has been considered with the following aims in view:

- ❖ To boost up productivity.
- ❖ To minimize accidents.
- ❖ To facilitate maintenance round the clock.
- ❖ To provide daylight feeling to the operating personnel.
- ❖ To minimize pilferage.

## 8.14 CABLES

The following type of cables has been considered keeping in view the lower capital cost and cable installation cost due to reduction in weight and overall size:

# TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000 TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 8 – ELECTRICAL, INSTRUMENTATION AND CONTROL SYSTEM

6.6 KV Power cable	:	XLPE insulated armoured Aluminium.
415V Power cable	:	PVC alternatively XLPE insulated, armoured Aluminium cable.
Control Cable	:	Stranded copper conductor, PVC insulated and armoured, with Cross section of 1.5 sq. mm.
Signal cables	:	Stranded copper conductor, PVC insulated and armoured, with Aluminium tape screening with drain wire of 1.0 sq. mm cross-section.

## 8.15 BATTERY WITH CHARGER

110V, 150 AH maintenance free batteries with standard accessories have been considered one for the main sub-station and one for each of the load center substations.

The battery charger shall be thyristor type with automatic and manual float-cum-boost charging facility. The emergency lighting load of the substation building shall be connected on the batteries.

## 8.16 INSTRUMENTATION & CONTROL SYSTEM:

### 8.16.1 General

For effective control of various variables, a system of instrumentation and control has been considered keeping the following objectives in view:

- Dependable and rugged instrumentation network.
- Maximum protection against dust and vibrations.
- Minimum moving parts.
- Operational safety.
- Easy maintenance and repairs.
- Flexibility to adopt future development / modifications.
- Optimum operating efficiency and good quality product.
- Maximum standardization to keep inventory low.

# TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000 TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 8 – ELECTRICAL, INSTRUMENTATION AND CONTROL SYSTEM

The instrumentation scheme envisaged incorporates following essential features for safe operation of plant and machinery and provides necessary operating data to evaluate the operating performance and likelihood of faults:

- Suitable programmable logic controller with required input/output cards.
- Automatic Close Loop Control System.
- Distributed control system (DCS) based supervisory system for fault monitoring, plant control and MIS generation.
- Self-diagnostic facility for process and quality related problems.
- Foolproof software control for critical process, control of hazardous functions by means of alarm generation/tripping/re-routing to safe mode of operation.
- MIS functions with breakdown history generation & such other reporting features.

## 8.16.2 Instrumentation & Control Scheme

The instrumentation and control scheme envisaged for the plant would include the following:

- Electronic weigh feeders/solid flow feeder for desired proportioning and feed to the raw grinding mill and cement mills.
- Control system for optimizing the raw mill output.
- Control system of the raw meal blending system.
- Control system for kiln feed.
- Control system for preheater and kiln.
- Control system for optimizing clinker cooler operation.
- Control system for coal grinding mill, fine coal feed to kiln and Precalciner.
- Control system for optimizing cement mill operation.
- Control system for ESP operation and for optimum efficiency of ESP.
- Control system for packing and loading of cement, as well as, monitoring of dispatches.

### **8.16.3 Control Center**

#### **A Main Plant with cement Grinding at one Location:**

Considering the plant layout and proposed manufacturing process the various sections of the plant have been divided into the following control centers: **Ref Drg No. : 2391-A3-04-022-01, Rev 0 Control System Configuration.**

- |                            |  |
|----------------------------|--|
| <b>Control Center - 1:</b> | For limestone crushing and transport and stacking.   |
| <b>Control Center –2:</b>  | For raw material reclaim, raw material grinding & blending, kiln feed, kiln, cooler, coal transport, grinding and fine coal storage, kiln & Precalciner firing, cement grinding and storage. |
| <b>Control Centre-3</b>    | Cement silo extraction, Packing and dispatch of cement.  |

### **8.16.4 Brief Description of Control Center**

The Control Centers – 1 & 3 will have local control rooms for plant operation and monitoring. Each will have one operating station with mimic pages, indicating various process parameters and keyboard for start/stop and control of the plant. Programmable logic control shall be used for sequential start/stop of the drives.

The central portion of the plant i.e. from raw material reclaim to cement storage shall be controlled from Control Centre -2. A modern microprocessor based Digital Distributed Control System has been considered for this area. 4 no. Operating stations, one each for process control of raw mill, coal mill, kiln and cement mill sections and one no operating station for engineering station for carrying out software changes have been considered in this control room. Suitably rated PLC and remote I/O racks, one for each major process section has been considered.

The plant shall be controlled and monitored through colored VDU screens and keyboards. The system shall also provide detailed information on plant operation, process parameters, and alarm summary, MIS data on production, power and fuel consumption etc. on pre selectable time period.

#### **8.16.5 Brief Description of Logic Panel**

The logic panel in the control centers shall have programmable logic controls. These logic panels shall have necessary hardware to achieve interlocking between the drives in various sections achieving an automatic sequential start and stop scheme. Local control of start and stop can also be done, if necessary, by proper selection of remote/local selection switch key operated lockable switches for accessibility of mode change only to authorized persons. In local mode drives can be started/stopped independently from local push button station and there shall be no inter-locking between drives.

The starting, stopping and alarm sequences for the drives shall be suitably designed to take care have operational and safety requirements.

#### **8.16.6 CONTROL DESKS**

Control desks have been envisaged for main plant CCR, packing plant control room, Crusher & associated DCS engineering room.

#### **8.16.7 DCS/PLC**

##### **Department Level Processors**

The functions of group level processors shall be remote starting and stopping of all plant equipment in predetermined sequential manner as well as in individual mode.

Staggering the starting and stopping movement of drives by internally programmable timers.

Normal operation of plant equipment in remote mode with necessary basic safety and process interlocks.

Process control with the help of PID/PI, fuzzy, cascade, & feed forward algorithms / controller built in the PCs.

The processor shall monitor the input/output, interface and communication modules. As soon as the processor senses any internal hardware failure or

communication failure, immediately all digital/analogue outputs shall be disabled. The status of the I/Os in case of such failure shall be software configurable. The processor shall have multi tasking, multi slicing, parallel processing and shall have separate scanning for program & I/O done parallel with adjustable scan time. That is read / writes of I/O during program execution.

#### **Supervisory Control Level (MMI)**

This shall consist of large capacity computers comprising colour monitor with keyboards, printers, programming aids etc. The MMI programming and configuration shall be enabled in all the MMI stations with password privileges. Any creation, change or modification done in any one MMI shall be reflected and updated in all MMI stations in the network.

#### **8.16.8 PROCESSOR AND I/O PANEL**

It is intended to have CPU and I/O in the separate panels. The programmable controllers shall have separate panels along with their redundant power supply and located in the Distributed locations in respective load centers.

#### **8.16.9 ENGINEERING STATION**

The engineering station shall be able to upload/download developed programs and modifications thereof to departmental level processors over high speed Ethernet data high way. The engineering station shall be capable to perform all necessary functions for configuration of system. The MMI graphics development, configuration and editing software shall be available in the engineering station.

#### **8.16.10 PORTABLE PROGRAMMING UNIT**

A laptop computer of latest configuration with necessary licensed software including OS loaded as Portable Programming Unit for the programmable controller and other field instruments / devices / drives. This shall act as a portable engineering station. This portable computer shall be loaded with the necessary software.

#### **8.16.11 DATA HIGHWAY**

Open system Interconnection type data highway shall be provided (e.g. Ethernet) Communication speed shall be Min. 100 MB/ sec.

Topology: Bus topology with (two) redundant network having 16 (min) port Manageable Ethernet switches. 25% spare ports shall be available in Ethernet switches. The failure of any network card in the MMI station or failure of any one Ethernet switch / anyone Ethernet bus shall not affect the operation of the plant in any manner.

Redundant OFC Shall be used for monitoring packing plant and crusher operations.

#### **8.16.12 CONTROL SYSTEM EQUIPMENT**

Supervisory computers (MMI); computers for Management information System, peripherals; programmable controllers (PCs); power supplies; Ethernet switches; distributed / remote I/O panels, Field mounted instruments and their accessories, Un-interrupted Power Supply systems (UPS) supplying to DCS equipment in three control rooms.

#### **8.16.13 MIS / EMS SYSTEM**

For the MIS system, a separate server having stable, reliable and comprehensive data archiving capacity to act as a data warehouse & algorithms with client server architecture shall be used. The server shall be connected to the redundant high speed Ethernet highway. The server shall Read / write data as required from / to the respective controllers / the MMI stations / the X-ray system / Bulk solid analyzer system / the EMS system / the refractory management system and any other system available in the plant intra net that may have the data required by the MIS server like lab data.

#### **8.16.14 SUB-CONTROL SYSTEMS**

The design, manufacturing, testing, erection and commissioning of sub control systems and field instrumentation shall be as per latest applicable international standard and recommendations of principal suppliers for the main machinery items.

#### **8.16.15 GAS ANALYSER SYSTEM**

Gas Analyser is considered for the following Process areas equipped with all accessories -

- Kiln inlet gas analyser system
- Preheater outlet analyser system
- Coal mill bag filter and fine coal bins analyzer system.

#### **8.16.16 GENERAL PURPOSE CCTVS**

Surveillance Camera for viewing and monitoring of different process area and for security purpose range up to 500 meter has been envisaged which is consisting of high Resolution, day & night colour camera , Auto Iris Motorized zoom lens, Camera enclosure, with sun shield, and thermostatically controlled heater and blower with filter , Motorized Pan & Tilt , Pedestal Mount, Receiver driver unit, Junction box near Camera, Short unarmoured cable between Junction box near camera, Receiver and camera.

#### **8.16.17 KILN SHELL MONITORING SYSTEM**

The kiln shell monitoring system shall be designed for installation in the hot, dirty and aggressive environment near the kiln with the necessary protective devices such as protective enclosure, automatic acting shutter, cooling fan, sensors or whatever is required for protecting the equipment against the environment near the kiln.

#### **8.16.18 OFF LINE X RAY ANALYSER**

It shall be used for analysis of samples of raw meal, clinker, cement, coal etc and automatically adjust the set points of weigh feeders of raw material feed to the Raw mill to ensure uniform chemical properties of raw meal feed to kiln.

#### **8.16.19 CROSS BELT ANALYSER**

Cross belt analyser shall be used for mine control to build preblending stockpile of uniform chemical composition as required

#### **8.16.20 FIRE DETECTION AND ALARM SYSTEM**

The system shall be a complete, electrically supervised fire detection and notification system, microprocessor based operating system having communication between network nodes, each supporting an interactive, self-standing, intelligent local control panel, with system wide displays. The local system shall provide status indicators and control switches for Audible and visual notification alarm circuit zone control.

The fire alarm system is required for the following areas:

- Main Receiving substation, Load center substations, Local MCC rooms, Cable tunnel & shafts & cable cellars
- Central control room and local control rooms
- Empty cement bag storage room of Packing plant

#### **8.16.21 C&I SYSTEM CABLES**

All data, field bus, Ethernet, I/O data and CCTV cables that are necessary, including redundant cables, connectors, terminators, junction boxes that may require for these cables shall be the part of system. The outer sheaths of these cables are to be colour coded as per international standards for easy identification.

# TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000 TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 8 – ELECTRICAL, INSTRUMENTATION AND CONTROL SYSTEM

OFC is envisaged for cables from Programmable controller to Remote I/O and for extension of the high speed Ethernet to MMI packing plant and to the EMS station at the electrical load center.

## 8.16.22 JUNCTION BOXES

Heavy duty junction boxes, wall mounted type, totally enclosed, dust and vermin proof, enclosure class IP- 54 with synthetic rubber gasket fabricated out of 2 mm thickness sheet, chemically de rusted, degreased, phosphates, primer coated and painted with shade RAL 7035 Siemens gray have front door either hinged or bolted otherwise has been considered.

## 8.16.23 UNINTERRUPTED POWER SUPPLY (UPS) SYSTEM.

Redundant Un-interrupted power supply (UPS) system including switchboards with input isolation transformer, output stabilizer with power distribution Board for supervisory computers, group level processors and field instruments, Lab Automation system etc.

## 8.17 AIR CONDITIONING SYSTEM

In order to maintain the designed measuring and control accuracy of the electronic components, window type air-conditioners of adequate capacity has been considered for the central control room & electronic panel room.

### 8.17.1 Ventilations System

For all electrical substations, Pressurization and ventilation systems have been considered for dust protection and maintaining desired ambient temperature and control of dust ingress in local sub-station and control rooms.

## **8.18 COMMUNICATION**

### **Telephone Exchange**

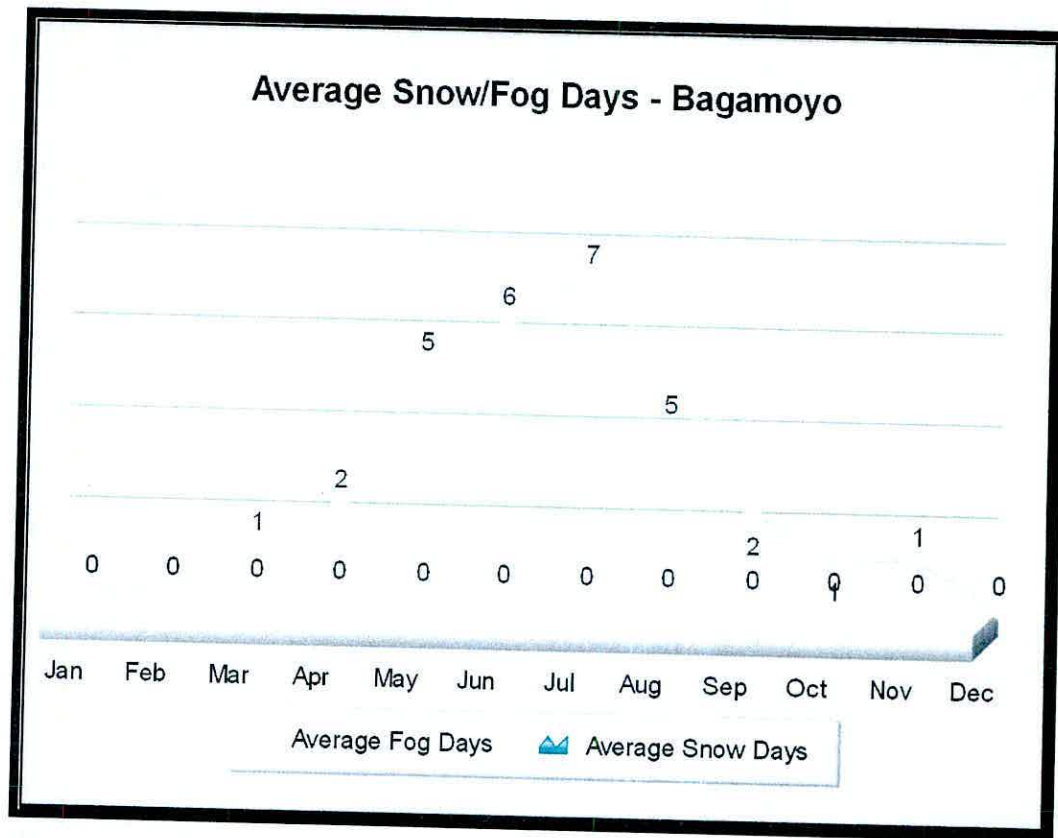
Telephone exchange is required for the communication inside the plant premises & colony premises. The system shall be the latest design with all the facilities mentioned below. The system shall have 100 Line ports with extendable up to 250 lines. IP PBX –IP card to connect two systems in LAN or Wan or to use Internet to make calls (VOIP) or use IP phones or wi-fi phones.

**CHAPTER – 9**

**CIVIL ENGINEERING CONSIDERATIONS**

**TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000 TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 9 – CIVIL ENGINEERING CONSIDERATIONS**

**Snow/Fog**



**9.3 SEISMICITY**

For the purpose of design of plant structures, precautionary measures have to be considered relevant to the standards of civil and structural design. Following seismic data and history of earthquake incidents may be noted for the country as a whole:

Energy mapping revealed these pockets of high seismic activity.

**M 4.3 - TANZANIA – 2012-05-23 05:32:47 UTC**

Magnitude Mb 4.3  
 Region TANZANIA  
 Date time 2012-05-23 05:32:47.0 UTC  
 Location 6.95 S; 35.84 E  
 Depth 10 km

## CHAPTER – 09

### CIVIL ENGINEERING CONSIDERATIONS

#### 9.0 CEMENT PLANT AT TANZANIA

Based on the topography of the area, material availability, transport system, the plant site has been suitably located.

All major civil work of the project except for Geo technical conditions of the site is described in this chapter.

#### 9.1 SITE CONDITIONS AND DESIGN CRITERIA

##### Topography and Grading

Bagamoyo is situated at 6.43° South latitude, 38.9° East longitude and 1 meter elevation above the sea level.

Bagamoyo is a town in Tanzania, having about 82426 inhabitants.

The area is undulating (elevation varying between 425.00 M to 450.00 M above MSL). The various natural level differences, to the extent possible, would be taken advantage of for location of various departments in the plant. The colony will also be located near the plant site. The extent of site grading and leveling would be known only after a detailed contour survey of the site is carried out.

#### 9.2 CLIMATOLOGY OF THE LOCATION

##### For Tanzania

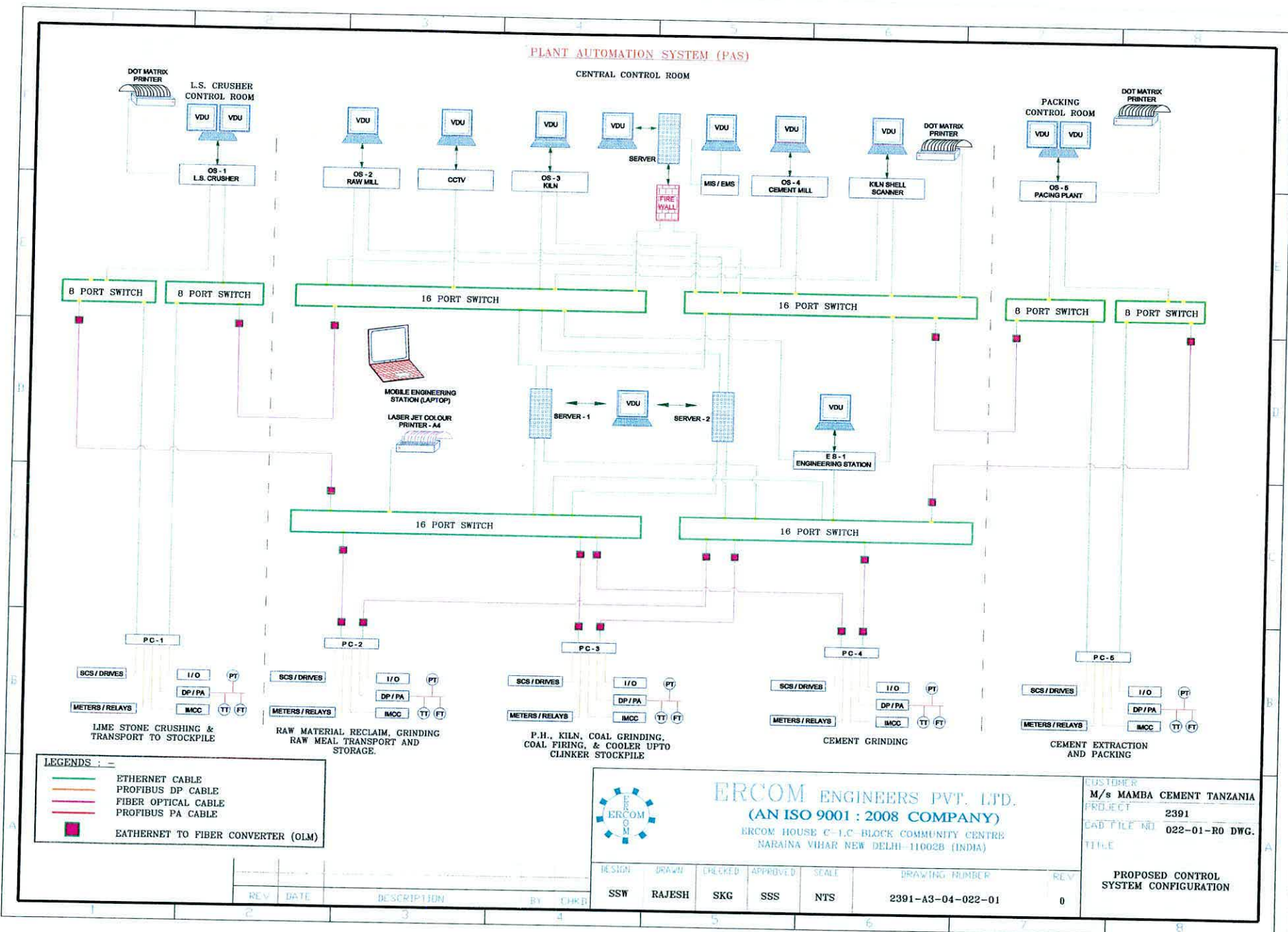
##### Temperature

Maximum	:	26°C
Minimum	:	19°C
Average	:	23°C



PLANT AUTOMATION SYSTEM (PAS)

CENTRAL CONTROL ROOM



- LEGENDS :-**
- ETHERNET CABLE
  - PROFIBUS DP CABLE
  - FIBER OPTICAL CABLE
  - PROFIBUS PA CABLE
  - EATHERNET TO FIBER CONVERTER (OLM)



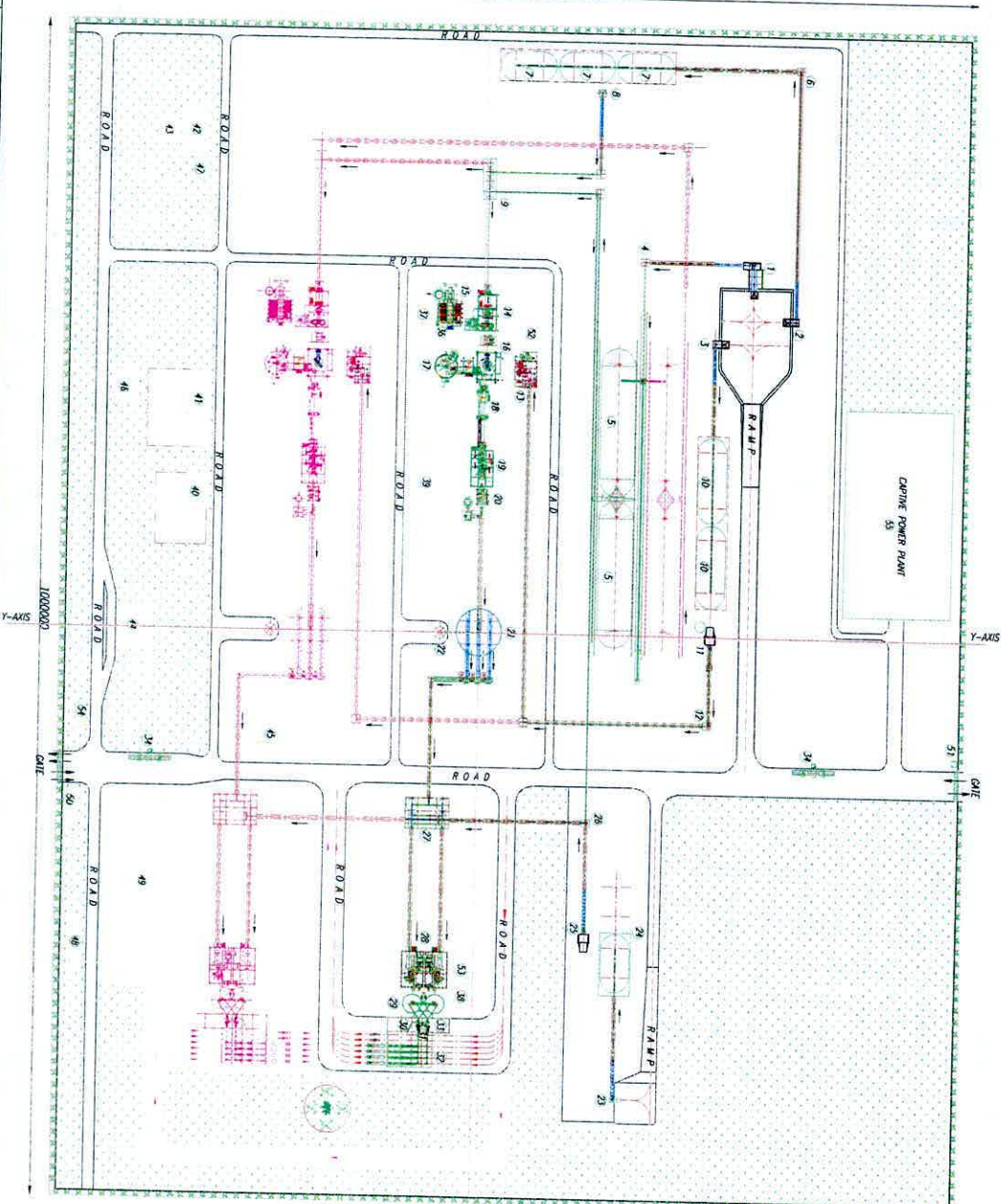
**ERCOM ENGINEERS PVT. LTD.**  
 (AN ISO 9001 : 2008 COMPANY)  
 ERCOM HOUSE C-1.C BLOCK COMMUNITY CENTRE  
 NARAINA VIHAR NEW DELHI-110028 (INDIA)

CUSTOMER  
**M/s MAMBA CEMENT TANZANIA**  
 PROJECT 2391  
 CAB FILE NO 022-01-R0 DWG.  
 TITLE

DESIGN	DRAWN	CHECKED	APPROVED	SCALE	DRAWING NUMBER	REV
SSW	RAJESH	SKG	SSS	NTS	2391-A3-04-022-01	0

**PROPOSED CONTROL SYSTEM CONFIGURATION**

REV	DATE	DESCRIPTION	BY	CHKD



800000  
X-AXIS  
Y-AXIS

S.NO.	DESCRIPTION	REMARKS
1	LANDING CRANE/PILE PILING	
2	ADDITIVE CRANE/PILE PILING	
3	COIL LIFTING CRANE/PILE PILING	
4	COIL LIFTING CRANE/PILE PILING	
5	LANDING CRANE/PILE PILING (2x150000)	
6	ADDITIVE CRANE/PILE PILING	
7	ADDITIVE CRANE/PILE PILING	
8	ADDITIVE CRANE/PILE PILING	
9	RAW WATER HOPPER	
10	COIL STORAGE	
11	COIL DUMP HOPPER	
12	COIL CRASHER	
13	COIL MILL	
14	RAW MILL HOIST	
15	BAG HOUSE FOR RAW MILL & RWH	
16	PREHEATER BUILDING	
17	CF. SMO	
18	ROUNDRY KILN	
19	GRATE COOLER	
20	ESP	
21	CLAMPER SMO	
22	RECTIFY CLAMPER SMO	
23	GRISAM LIFTING CRANE HOPPER	
24	GRISAM STORAGE	
25	GRISAM CRASHER	
26	GRISAM DUMP HOPPER	
27	CLAMPER MILL - 2 NOS. (WITH BAG HOUSE)	
28	CLAMPER MILL - 2 NOS. (WITH BAG HOUSE)	
29	CLAMPER MILL (OLD)	
30	PACKING PLANT	
31	TRUCK LOADING PLATFORM	
32	GRATE COOLER (OLD)	
33	RAW MILL HOIST (OLD)	
34	COMPRESSOR HOUSE - 1 (BELOW RAW MILL BAG HOUSE)	
35	COMPRESSOR HOUSE - 2 (BELOW RAW MILL BAG HOUSE)	
36	COMPRESSOR HOUSE - 3 (BELOW RAW MILL BAG HOUSE)	
37	COMPRESSOR HOUSE - 4 (BELOW RAW MILL BAG HOUSE)	
38	COMPRESSOR HOUSE - 5 (BELOW RAW MILL BAG HOUSE)	
39	COIL MILL HOIST	
40	COIL MILL HOIST	
41	ELECT. MACH. WORKSHOP	
42	WATER TREATMENT PLANT & PUMP HOUSE	
43	BOILER HOUSE	
44	ADMINISTRATION BUILDING	
45	CRANE/PILE PILING OFFICE	
46	CONTROL ROOM	
47	QC WATER TANK (PROCESS WATER)	
48	COIL CRASHER	
49	TRUCK PARKING	
50	TIME AND SECURITY / SALES OFFICE	
51	STORAGE OFFICE	
52	LOAD CRANE - 3 (RAW & COIL MILL SECTION)	
53	LOAD CRANE - 4 (CLAMPER MILL SECTION)	
54	FACTORY ROAD	
55	CAPTIVE POWER PLANT	

FOR TIER ONLY  
LAND AREA - 70 HECTARE OR 700,000 SQ. METERS

CONCURRENCE  
THIS DRAWING IS PROPERTY OF  
AND IS NOT TO BE REPRODUCED  
OR COPIED IN ANY MANNER  
WITHOUT THE WRITTEN PERMISSION OF THE  
ENGINEER IN CHARGE.

REFERENCERS  
REF. NO. DETAILS

NOTES  
1. DO NOT SCALE WORK TO DIMENSIONS ONLY.

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED

REV. NO. DATE BY CHD APPROV. DETAILS

**ERCOM ENGINEERS PVT. LTD.**  
 3000 7RD CRANE PLANT LAYOUT  
 PROJECT: MANITO CRANE COMPANY LTD. TANZANIA  
 DRAWN: 22.01.13  
 CHECKED: 22.01.13  
 APPROVED: SB  
 SCALE: 2391  
 DRAWING NUMBER: 2391-A1-02-011-01  
 SHEET NO: 0

# TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000 TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 9 – CIVIL ENGINEERING CONSIDERATIONS

Distances 380 km W Dar es salaam (pop 2,698,652; local time 08:32:47.0 2012-05-23)

87 km S Dodoma (pop 180,541; local time 08:32:47.0 2012-05-23)

30 km NE Izazi (pop 18,010; local time 08:32:47.0 2012-05-23)

## **M 4.8 - TANZANIA - 2012-10-02 09:32:48 UTC**

Magnitude mb 4.8

Region TANZANIA

Date time 2012-10-02 09:32:48.0 UTC

Location 4.69 S; 36.09 E

Depth 2 km

Distances 387 km S Nairobi (pop 2,750,547; local time 12:32:48.6 2012-10-02)

161 km SW Arusha (pop 341,136; local time 12:32:48.6 2012-10-02)

42 km NE Kondoia (pop 23,518; local time 12:32:48.6 2012-10-02)

**Source : U.S. Geological Survey, National Earthquake Information Center  
World Data Center for Seismology, Denver.**

The record of the seismic history of Tanzania is found to be neither complete nor homogeneous. For the period 1954–1988 the frequency-magnitude analyses indicate that the events of magnitude of 4.5 on the richter scale are reasonably reported and the recurrence relations exhibit consistent high *b* values for the three cases examined.

The spatial distribution of epicenters confirms the high correlation of seismic activity with the major rift tectonics and other zones of well-known tectonic features. However, a number of events scatter in zones of less defined tectonism.

**9.4 SUB-SURFACE CONDITIONS**

A detailed soil investigation has to be carried out for assessment of sub-soil condition. A proper assessment of the sub-surface conditions has to be based on the results for the detailed soil investigations. On visual inspection of the site and its vicinity rock outcrop could be noticed.

From visual inspection of the site, the top 4-6 m is expected to be weathered rock. The safe bearing capacity of the soil for the plant location has been assumed as 4.0 to 4.5 kg per sq. cm. for a foundation depth of 3.0metres below ground level.

**9.5 GROUND WATER**

From the visual observation of nearby wells and discussions with the local inhabitants the ground water around the plant site is expected to vary between 15 to 20 meters below the ground surface during the summer and 3 to 4 meters during the rainy season. Thus, the effect of water pressure on structures from design point of view can be considered as minimal.

**9.6 CORROSION**

Corrosion shall be negligible due to comparatively dry weather during major part of the year.

**9.7 SITE DEVELOPMENT**

The extent of work involved in site development has been estimated on the basis of visual examination of the site.

The plant site has moderate undulations and will require some grading and leveling work. Plinth level of the various structures shall however, be kept at about 30cms higher than final finished ground levels to prevent surface water from entering the operational areas.

Paved roads inside the plant shall be made as shown in the layout. The roads with heavy traffic in and around packing plant area will have two lanes. All other roads shall be with single lane width. All roads in the plant area will initially have water bound macadam surface suitable for carpeting with bitumen layer. Till the completion of construction of the plant, the bitumen layer will not be laid.

### **Storm Water System**

Storm water drainage system is envisaged keeping in view occasional heavy rainfall in the area. The drainage system inside the plant will be connected to natural drainage outside the boundaries, which are at a lower level.

### **Sewage**

Septic tanks connected to soak pit are envisaged for sewage treatments. Necessary sanitary blocks would be located at such places like Raw Mill House, MCC Room and Packing Plant.

## **9.8 THE FRONT GATE AND FENCING**

The perimeter of the plant would be fenced using 230mm thick masonry wall of 2.1 meters height with 3 rows of barbed strands.

## **9.9 CIVIL CONSTRUCTION WORK**

Plant structures and non-plant building structures in a modern cement plant, primarily, have to meet the load conditions and functional requirements stipulated by the main machinery suppliers, storage for raw materials, intermediaries and finished goods, as per the technological requirements of process departments. All structures that have to take up heavy and moderate shock loads are envisaged to be designed in reinforced cement concrete. All such structures shall have a reinforced skeleton and suitable brick wall/A.C./ CGS sheet cladding shall be provided wherever necessary. The use of structural steel has been limited to conveyor galleries, equipment supports and working platforms, where flexibility for stage-wise constructions is involved. The construction cost of the plant structures has been limited to the minimum by consolidation of core units as much as

# TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000 TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 9 – CIVIL ENGINEERING CONSIDERATIONS

feasible by adopting either open or partially covered storage for raw material as required by techno-logical/process requirement. The non-plant buildings comprising administrative block, engineering office, laboratory, general stores, workshop, time office, canteen etc. would be constructed at convenient places to meet specific requirements. Due considerations would be given on architectural aspects of design of these buildings to harmonize with the plant visual aesthetics.

## 9.10 CONCEPTUAL DESIGN OF THE PLANT

Considerations based on the plant structures are proposed to be purely functional to provide supports to the equipment placed above the ground and the required access and maintenance platforms only. Ineffective areas inside the buildings will be eliminated.

Due to process requirement, single stage crushing is envisaged and accordingly a single crusher house is provided.

In view of effective control system proposed, the capacities of the feed hoppers have been limited to meet process requirements only.

Bag filter for kiln and raw mill proposed to install on independent foundation to expedite the construction/erection activities.

In view of the system adopted for kiln feed, a separate kiln feed building is not required as this is going to be located under the blending silo.

## 9.11 CONSIDERATIONS BASED ON NATURAL CONDITIONS AT SITE

In view of the natural conditions of the plant site, it has been proposed to adopt the following:

1. Minimum side covering shall be provided considering moderate rainfall and ease of working in hot summer.

# TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000 TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 9 – CIVIL ENGINEERING CONSIDERATIONS

2. Side cladding for the buildings shall be limited only to protect the critical equipment, like electrical and control equipment, packing plant etc.
3. Due to negligible atmospheric corrosion, no special protective measures are required.
4. Occurrence of hard rock strata at reasonable depth would result in low foundation cost. However, exact estimation of the cost can be assessed after the receipt of recommendations from soil investigator.
5. Comparatively low ground water table would also affect some cost savings as no costly water proofing treatment is envisaged for the various pits and basements.
6. Site grading and leveling cost would be comparatively low considering gentle undulations of the plant sites.

## 9.12 DESCRIPTION OF VARIOUS STRUCTURES

Salient features of the involved structures are given below:

### **Raw Mill House**

The raw mill house will be in RCC construction. It would be provided with a HOT crane for maintenance of the Ball mill. No elaborate side cladding arrangement has been envisaged for this building.

### **Blending-Cum-Storage Silo**

A 22 m Dia. silo of RCC/pre-stressed concrete construction has been considered. A suitable shed to accommodate de-dusting equipment has been assumed on the top of this silo. The silo shall be water proofed, as it is necessary for the process requirements. The silo bottom shall be of inverted cone type and equipment for kiln feed and compressors/blowers shall be installed under it.

### **Preheater Tower**

This is a tall structure in RCC framed construction with intermediate floors provided for supporting various equipments at the respective level. Suitable openings are provided in the floor to accommodate the equipment.

Structural steel staircase and lift well made of RCC/brick wall construction will be provided for the entire height. The machine room for the lift shall be provided at terrace level.

### **Rotary Kiln**

The proposed single, rotary kiln will be supported on three piers in RCC construction over heavy RCC foundations. The drive pedestal is monolithic with one of the foundations. Suitable stairs and walkways will be provided in structural steel construction. Walkways construction will be done after the erection of the kiln. Steel trays carrying electrical cables and water pipe will be supported under the walkways, if required.

### **Cooler House and Firing Platform**

This is a RCC framed construction. Suitable openings are provided for various equipments. RCC foundation and underground pits for clinker cooler are provided on the ground floor. The clinker conveyor tunnel would be of RCC construction and suitable RCC foundations would be provided for fans, chimney etc.

### **Clinker Silo**

Clinker silo of 30 m Dia. of concrete construction is considered. Suitable shed would be provided on the top of the silo to house the dust collector and clinker conveyor drive station. The silo will be suitably waterproofed. The silo bottom shall be provided with four suitable sized openings for discharge of clinker through pneumatically operated gates.

### **Coal Mill**

This is of RCC construction with 3 or 4 intermediate floors. Raw coal hopper in RCC construction is provided. Block type heavy RCC foundations are expected to be provided for the coal mill and its drive. Suitable RCC foundation for fans is to be provided. Essential cladding shall be provided as per functional requirement.

### **Raw Coal Hopper**

Raw coal hopper would be of RCC construction.

### **Cement Mill House**

This is of RCC framed construction. The cement mill house is located in between the cement silos on one side and clinker and gypsum hopper on the other side. The mill and its drive are supported on heavy RCC block type foundations. The bag house would be mounted on first floor of this building. Essential side cladding would be of brick masonry in cement mortar with suitable doors and windows. One HOT crane would be provided in the motor house supported on RCC brackets. Suitable structural steel staircase would be provided to serve the floors.

### **Cement Silo**

For Cement Silo RCC construction will be provided. Dust collector house in steel construction and in GI sheet roofing is provided on the top of silos. The silo bottom is that of flat slab resting on peripheral circular wall and RCC columns below. RCC filling to suit equipment is provided on this floor. The top floors of RCC slab will rest on steel beams.

The silo walls shall be constructed with slip form. The silo wall and the roof shall be water proofed.

### **Packing Plant**

This is a RCC framed structure with four to five intermediate floors to support various equipments. Suitable RCC pit for elevator is provided. Essential side cladding shall be in brick wall with suitable doors and windows. Structural

staircases shall be provided to serve the building as well as cement silos. The plant will have adequate truck loading shed of steel structures and AC/ CGS sheet roofing.

### **9.13 Water Supply**

#### **Requirement**

The water required both for drinking and process requirements, for the plant as well as colony have been estimated at 3000 cu m/day.

#### **Sources of Supply**

There are three potential water sources:

##### **i) Groundwater**

A deep borehole drilled recently between Mkumbezi River and the road to Kiwanga has indicated an existence of a fractured/sandy aquifer with yield capacity of at least 21,000 lt/hr of fresh water. The aquifer should be mapped and two exploratory/ production boreholes drilled.

##### **ii) Mkombezi River.**

All streams in the area including River Mkombezi are seasonal. The amount of flow during and a few months after the rain periods (November – December and March – May) in Mkombezi River is however enormous and can be harvested by constructing a dam across one suitable river section.

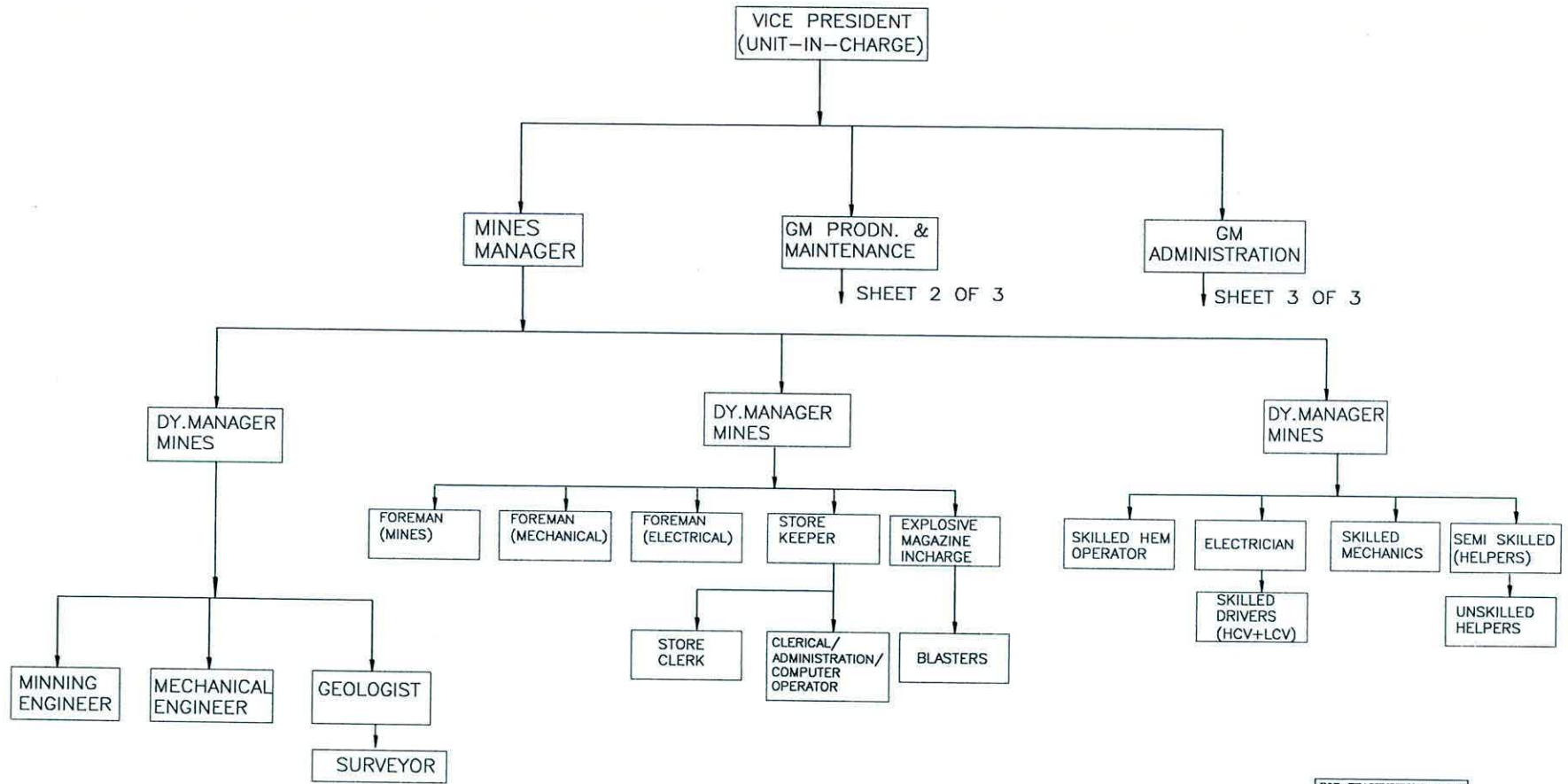
##### **iii) Piped Water**

The nearest piped water is at Lugoba township where a 150 mm dia. Wami-Chalinze pipe line passes. To bring water to Tarawanda will require laying of a 21 km long pipe line.

**CHAPTER – 10**

**MANPOWER REQUIREMENT AND TRAINING**

**PROPOSED MANPOWER AND ORGANISATION STRUCTURE**



FOR FEASIBILITY REPORT

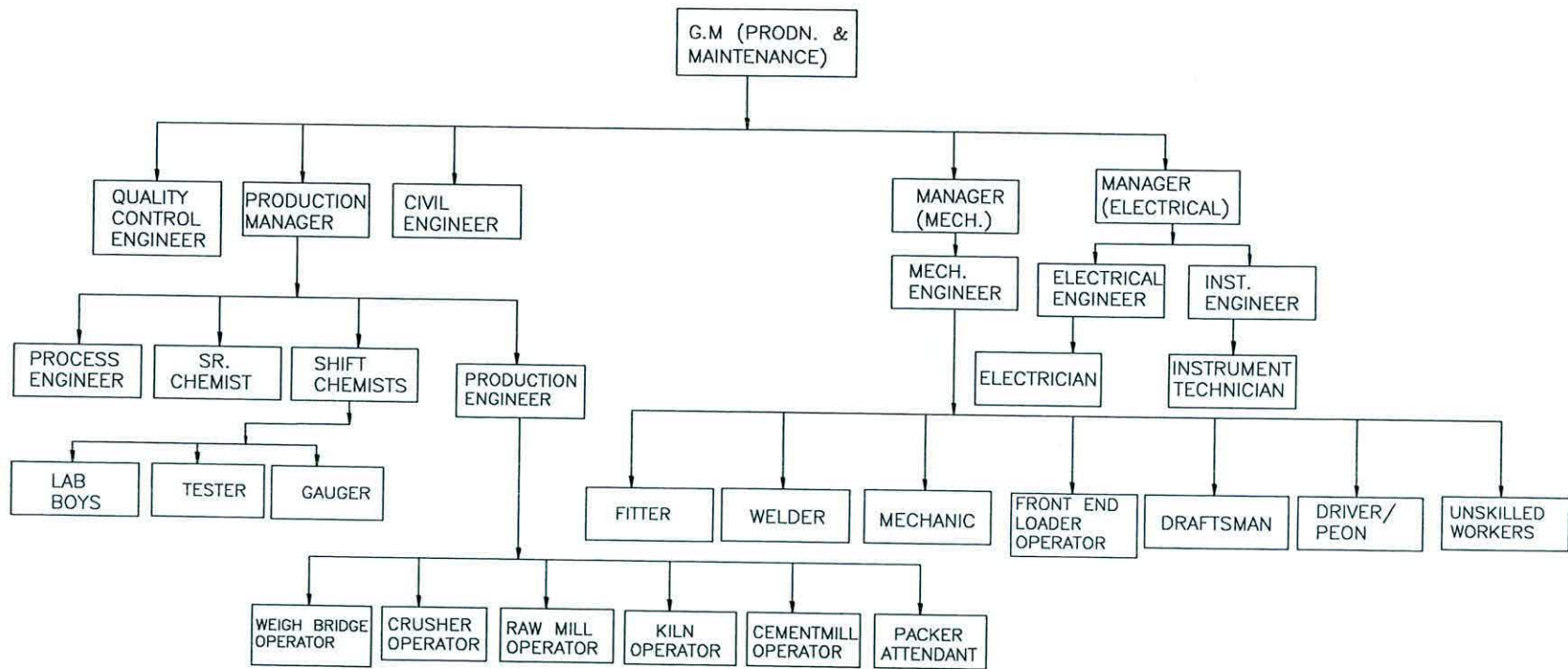


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 ERCOM HOUSE C-1,C-BLOCK COMMUNITY CENTRE  
 NARAINA VIHAR NEW DELHI-110028 (INDIA)

CUSTOMER	M/S MANBA CEMENT COMPANY LTD.
PROJECT	2391
CAD FILE NO	ORGCHART-RO.DWG
TITLE	3000TPD INTEGRATED UNIT AT BAGAMOYO (TANZANIA) ORGANISATION CHART

REV.	DATE	DESCRIPTION	BY	CHKD	DESIGN	DRAWN	CHECKED	APPROVED	SCALE	DRAWING NUMBER	REV.
					ERCOM	NISHANT	SB	SB	NTS	2391-A3-2-011-03 (SHEET NO. 1-OF-3)	0

# PROPOSED MANPOWER FOR PLANT OPERATION AND MAINTENANCE



FOR FEASIBILITY REPORT



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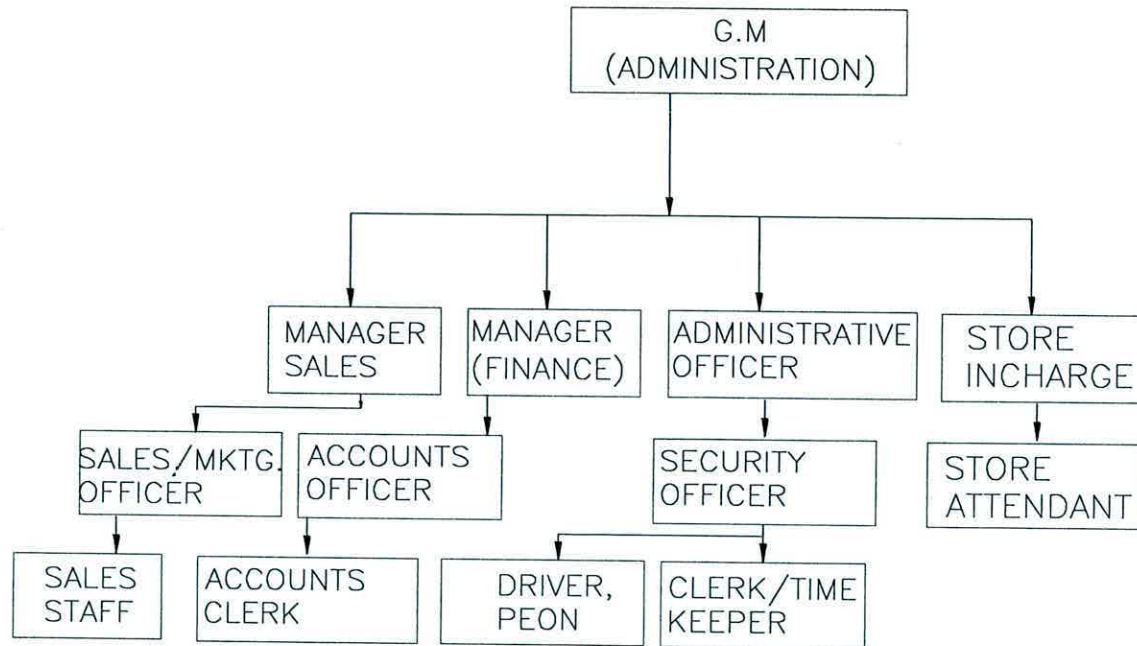
ERCOM HOUSE C-1,C-BLOCK COMMUNITY CENTRE  
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CUSTOMER	
M/S MAMBA CEMENT COMPANY LTD.	
PROJECT	2391
CAD FILE NO.	ORGCHART-RO.DWG
TITLE	
3000TPD INTEGRATED UNIT AT BAGAMOYO (TANZANIA) ORGANISATION CHART	

DESIGN	DRAWN	CHECKED	APPROVED	SCALE	DRAWING NUMBER	REV.
ERCOM	NISHANT	SB	SB	NTS	2391-A3-2-011-03 (SHEET NO. 2-OF-3)	0

REV.	DATE	DESCRIPTION	BY	CHKD

# PROPOSED MANPOWER FOR ADMINISTRATION



FOR FEASIBILITY REPORT



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CUSTOMER		M/S MAMBA CEMENT COMPANY LTD.
PROJECT	2391	
CAD FILE NO.	ORGCHART-RO.DWG	
TITLE		
3000TPD INTEGRATED UNIT AT BAGAMOYO (TANZANIA) ORGANISATION CHART		

DESIGN	DRAWN	CHECKED	APPROVED	SCALE	DRAWING NUMBER	REV.
ERCOM	NISHANT	SB	SB	NTS	2391-A3-2-011-03	0
(SHEET NO. 3-OF-3)						

REV.	DATE	DESCRIPTION	BY	CHKD

## CHAPTER – 10

### MANPOWER REQUIREMENT AND TRAINING

#### 10.0 INTRODUCTION

The key to success of modern Cement Plants, which are designed to achieve sustained operating efficiency and quality of product,

- Well-planned and effective organizational support.
- Optimum deployment of trained manpower.

The proposed organizational structure and manpower requirement takes into account the available manpower strength and their experience and exposure to modern dry process technology, which also entails considerably high degree of sophistication in process control and instrumentation.

Manpower Planning which is also called as Human Resource Planning consists of putting right number of people, right kind of people at the right place, right time, doing the right things for which they are suited for the achievement of goals of the organization. Human Resource Planning has got an important place in the arena of industrialization. Human Resource Planning has to be a systems approach and is carried out in a set procedure. The procedure is as follows:

1. Analysing the current manpower inventory
2. Making future manpower forecasts
3. Developing employment programmes
4. Design training programmes

#### 10.0.1 Steps in Manpower Planning

1. **Analysing the current manpower inventory-** Before a manager makes forecast of future manpower, the current manpower status has to be analysed. For this the following things have to be noted-

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- Type of organization
- Number of departments
- Number and quantity of such departments
- Employees in these work units

Once these factors are registered by a manager, he goes for the future forecasting.

2. **Making future manpower forecasts-** Once the factors affecting the future manpower forecasts are known, planning can be done for the future manpower requirements in several work units.

The Manpower forecasting techniques commonly employed by the organizations are as follows:

- a. **Expert Forecasts:** This includes informal decisions, formal expert surveys and Delphi technique.
- b. **Trend Analysis:** Manpower needs can be projected through extrapolation (projecting past trends), indexation (using base year as basis), and statistical analysis (central tendency measure).
- c. **Work Load Analysis:** It is dependent upon the nature of work load in a department, in a branch or in a division.
- d. **Work Force Analysis:** Whenever production and time period has to be analysed, due allowances have to be made for getting net manpower requirements.
- e. **Other methods:** Several Mathematical models, with the aid of computers are used to forecast manpower needs, like budget and planning analysis, regression, new venture analysis.

# TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000 TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 10 – MANPOWER REQUIREMENT AND TRAINING

3. **Developing employment programmes-** Once the current inventory is compared with future forecasts, the employment programmes can be framed and developed accordingly, which will include recruitment, selection procedures and placement plans.
4. **Design training programmes-** These will be based upon extent of diversification, expansion plans, development programmes, etc. Training programmes depend upon the extent of improvement in technology and advancement to take place. It is also done to improve upon the skills, capabilities, knowledge of the workers.

## 10.0.2 Importance of Manpower Planning

1. **Key to managerial functions-** The four managerial functions, i.e., planning, organizing, directing and controlling are based upon the manpower. Human resources help in the implementation of all these managerial activities. Therefore, staffing becomes a key to all managerial functions.
2. **Efficient utilization-** Efficient management of personnels becomes an important function in the industrialization world of today. Setting of large scale enterprises requires management of large scale manpower. It can be effectively done through staffing function.
3. **Motivation-** Staffing function not only includes putting right men on right job, but it also comprises of motivational programmes, i.e., incentive plans to be framed for further participation and employment of employees in a concern. Therefore, all types of incentive plans become an integral part of staffing function.
4. **Better human relations-** A concern can stabilize itself if human relations develop and are strong. Human relations become strong through effective control, clear communication, effective supervision and leadership in a

concern. Staffing function also looks after training and development of the work force which leads to co-operation and better human relations.

5. **Higher productivity-** Productivity level increases when resources are utilized in best possible manner, higher productivity is a result of minimum wastage of time, money, efforts and energies. This is possible through the staffing and it's related activities ( Performance appraisal, training and development, remuneration)

### **10.0.3 Need of Manpower Planning**

Manpower Planning is a two-phased process because manpower planning not only analyses the current human resources but also makes manpower forecasts and thereby draw employment programmes. Manpower Planning is advantageous to firm in following manner:

1. Shortages and surpluses can be identified so that quick action can be taken wherever required.
2. All the recruitment and selection programmes are based on manpower planning.
3. It also helps to reduce the labour cost as excess staff can be identified and thereby overstaffing can be avoided.
4. It also helps to identify the available talents in a concern and accordingly training programmes can be chalked out to develop those talents.
5. It helps in growth and diversification of business. Through manpower planning, human resources can be readily available and they can be utilized in best manner.
6. It helps the organization to realize the importance of manpower management which ultimately helps in the stability of a concern.

**10.0.4 Steps involved in the process of manpower planning**

- (A) Deciding objectives of manpower Planning -The ultimate objective of manpower planning is one of matching or fitting employee abilities to enterprise requirements with an emphasis on future instead of present arrangements. The objectives may be laid down for a short term i.e. for one year for example the short term objective may be to hire 50 persons from backward classes for purposes of training. The long- term objective may to start a new industry or to expand the market or to produce a new product or to develop its own sales force.
- (B) Estimating future manpower requirements — The management must estimate the structure of the organisation at a given point in time. For this estimate, the number and types of employees needed have to be determined. This determination is affected by many environmental factors viz., business forecasts, expansion and growth, design and structural changes, management philosophy, government policy, product and human skills mire and competition. After estimating the future organisation structure the next step is to draw up the requirements of human resources, both for existing departments and for new vacancies. In determining the requirements of human resources, the expected losses due to labour turnover dismissals, promotions, layoffs etc. should be considered. Then, the real shortage o( surplus will be found out.
- (C) Auditing Human Resources — Once the future human resources needs are estimated the next step is to determine the present supply of manpower resources through "skills inventory". A skills inventory contains data about each employee's skills, abilities, work preferences etc. Some organisations prepare "Organisation charts". "Manning Table" or "Manpower Replacement Charts" Ail these help in determining and evaluating the quantity and quality of the present human resources of an organisation.

- (D) Job-Analysis — After having decided how many persons would be needed, it is necessary to prepare a job analysis which records details of training, skills, qualifications, abilities, experience and responsibilities etc. which are needed for a job. Job analysis includes the preparation of job descriptions and job specification.
  
- (E) Developing a Human Resource Plan — The last step is to develop and to implement the human resource plan which consists in finding out the sources of labour supply with a view to making an effective use of these sources. The first thing to be decided is whether the personnel be hired from within the organisation or to be obtained from an outside source. The best policy, which is followed by most organisations is to fill up higher vacancies by internal sources i.e. promotion etc and lower level positions by recruitment from external sources. The personnel manager should have a thorough knowledge of the labour market. Which source in the labour market will be tapped, depends upon the policy of a firm, position of labour unions and Government regulations.

#### **10.1 ORGANIZATION STRUCTURE AND PERSONNEL REQUIREMENT**

The organization structure varies from plant to plant within the Industry and as such the pattern proposed can be considered only as suggestive and provisional. A well-knit organizational structure headed by a President with the supporting staff has been envisaged. The President will function as the cost center head and will be supported by Departmental Heads of Technical, Commercial, Personnel and HRD, Marketing and Mines. Each Departmental Head is provided with his own supporting staff for the proper functioning of the various departments.

# TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000 TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 10 – MANPOWER REQUIREMENT AND TRAINING

## 10.2 MANPOWER REQUIREMENT

The manpower requirement has been planned keeping in view of the following:

- Smooth and efficient running of the plant
- Effective co-ordination among the various departments
- Rational distribution of responsibilities
- Capacity utilization of the plant with optimum manpower

The total manpower requirement for the mines, Plant and Administration has been estimated on the basis of functional requirement of a modern plant and is furnished in **Annexure-10**.

For loading of cement bags into the trucks and also for loading/ unloading of empty bags, coal, gypsum, other additives and stores and miscellaneous materials, it is a normal practice to employ contract/casual labour, which is not included in the above mentioned manpower requirements.

The manpower for limestone transport from mines to the factory is also not considered which shall be given on contract. The cost for the same is considered in limestone raising cost.

**TABLE - 10**

### MAN POWER REQUIREMENT FOR MINES, PLANT AND ADMINISTRATION

Sl. No.	Designation	No. of person
<b>A.</b>	<b>MINES STAFF</b>	
	<b>EXECUTIVE STAFF</b>	
1	Manager ( Mines )	1
2	Dy Manager Mines	3
3	Minning Engineer	2
4	Mechanical Engineer	1
5	Geologist	1

**TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000 TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 10 – MANPOWER REQUIREMENT AND TRAINING**

6	Surveyor	2
	<b>JUNIOR STAFF</b>	
7	Foremen ( Mines )	2
8	Foremen ( Mechanical )	2
9	Foreman(Electrical)	2
10	Store keeper	2
11	Explosive Magazine Incharge	2
12	Clerical / Administration / Computer Operator	2
13	Blasters	3
14	Store Clerk	1
	<b>MINES WORKERS</b>	
15	Skilled HEM Operator	12
16	Electrician	3
17	Skilled Drivers ( HCV + LCV )	6
18	Skilled Mechanics	5
19	Semi Skilled (Helpers)	5
20	Unskilled Helpers	10
	<b>Sub Total (A)</b>	<b>67</b>
<b>B.</b>	<b>PLANT STAFF</b>	
1	General Manager (Production & Maintenance)	1
2	Production Manager	1
3	Quality Control Engineer	1
4	Process Engineer	3
5	Manager ( Mechanical )	1
6	Mechanical Engineer	4
7	Manager ( Electrical )	1
8	Electrical Engineer	3
9	Instrumentation Engineer	4
10	Civil Engineer	2
11	Production Engineer	4
	<b>JUNIOR STAFF</b>	
12	Sr. Chemist	1
13	Shift Chemists	4
	<b>PLANT WORKER</b>	
14	Tester	4
15	Gauger	2
16	Weigh Bridge Operator	3
17	Crusher Operator	3
18	Raw Mill Operator	4

**TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000 TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 10 – MANPOWER REQUIREMENT AND TRAINING**

19	Kiln Operator	4
20	Cement Mill Operator	4
21	Packer Attendant	3
22	Fitter	4
23	Welder	4
24	Mechanic	4
25	Electrician	4
26	Lab Boys	4
27	Instrument Technician	4
28	Front End Loader Operator	3
29	Draftsman	2
30	Diver/Peon	8
31	Unskilled workers	10
	<b>Sub Total (B)</b>	<b>104</b>
<b>C</b>	<b>ADMINISTRATIVE &amp; SUPERVISORY STAFF</b>	
1	General Manager (Administration)	1
2	Manager ( Sales)	1
3	Administrative Officer	1
4	Security Officer	1
5	Manager(Finance)	1
6	Accounts Officer	2
7	Accounts Clerk	4
8	Sales/Mktg. Officers	3
9	Sales Staff	3
10	Clerk/Time Keeper	6
11	Driver, Peon	6
12	Store Incharge	4
13	Store Attendant	4
	<b>Sub Total (C)</b>	<b>37</b>
	<b>Sub Total (A+B+C)</b>	<b>208</b>
<b>D.</b>	<b>CONTRACT LABOUR (for gardening, loading, unloading, packing plant etc)</b>	<b>50</b>
	<b>Total (A+B+C+D)</b>	<b>258</b>

### 10.3 SALARIES AND WAGE STRUCTURE

The salaries and perquisites for Managerial and Senior Technical and Administrative staff have been found to differ from plant to plant. The salaries that have been considered in this chapter are based on the average emoluments

offered by similar cement companies. The total salaries and the total cost towards wages and salaries include basic salary, allowances and perks payable to the personnel.

It has been envisaged that the Contract/Casual labour will be engaged for loading/unloading operations.

#### **10.4 TRAINING OF PERSONNEL**

Cement manufacturing is a process industry involving sophisticated machinery, equipment and controls and hence personnel employed in the operation and maintenance of the machinery and equipment need to be trained properly so that with the co-ordinate effort of all the plant staff, quality cement is produced through proper plant operation

Training of the required manpower for the proposed project has to be planned well in advance. The key personnel should be selected and trained suitably. The training may be carried out in the following manner:

- Basic training on the concept of plant design, type of machinery, system and layout before construction begins with machinery manufacturers & visits to similar plants in India.
- On site training during the construction phase of the project.
- On job training during the commissioning phase of the project.
- On job training during operation of the plant immediately after commissioning.

The training of the key engineering personnel such as Manager: Production, Manager: Maintenance, Senior Mechanical Engineer, Senior Electrical Engineer and Senior Instrumentation Engineer should be carried out in all the facets.

## **TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000 TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 10 – MANPOWER REQUIREMENT AND TRAINING**

The training of the key operating personnel such as CCR operators, Electrical Foremen, Instrumentation Foremen should be suitably carried out during the construction, erection, and operation phases in addition to training them by visits to similar plants operating in India.

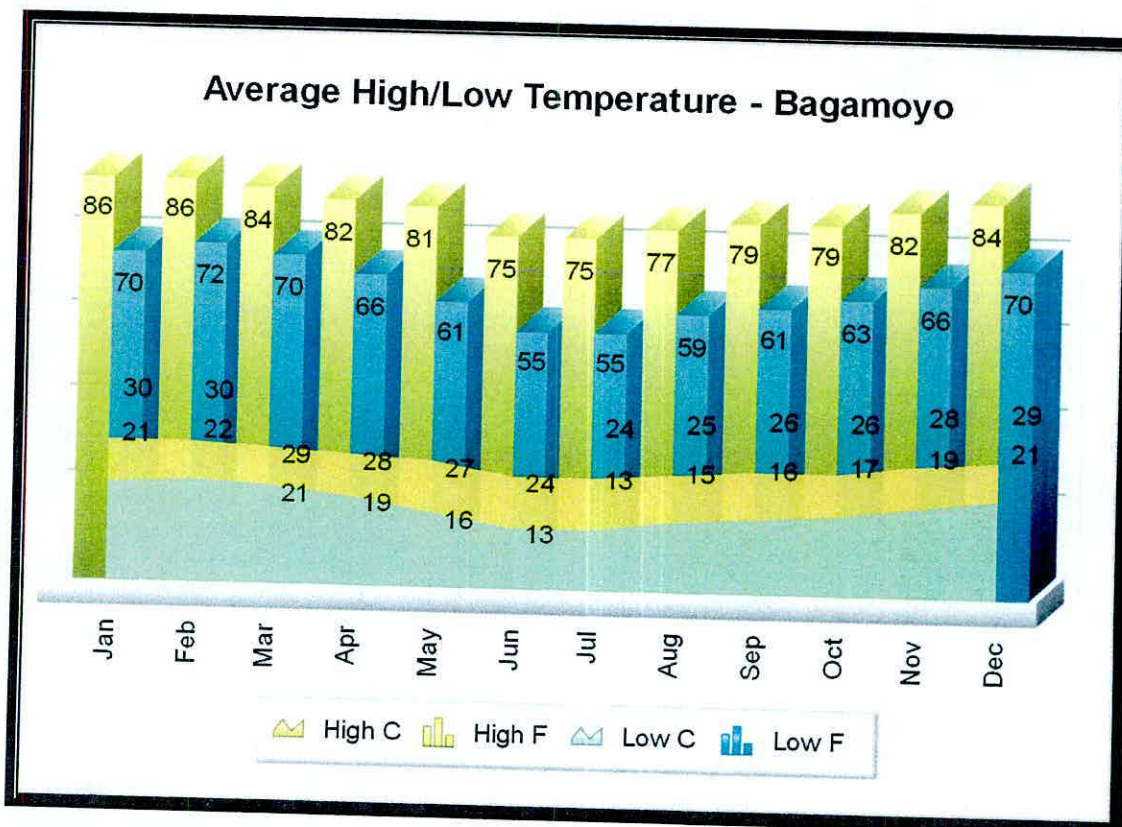
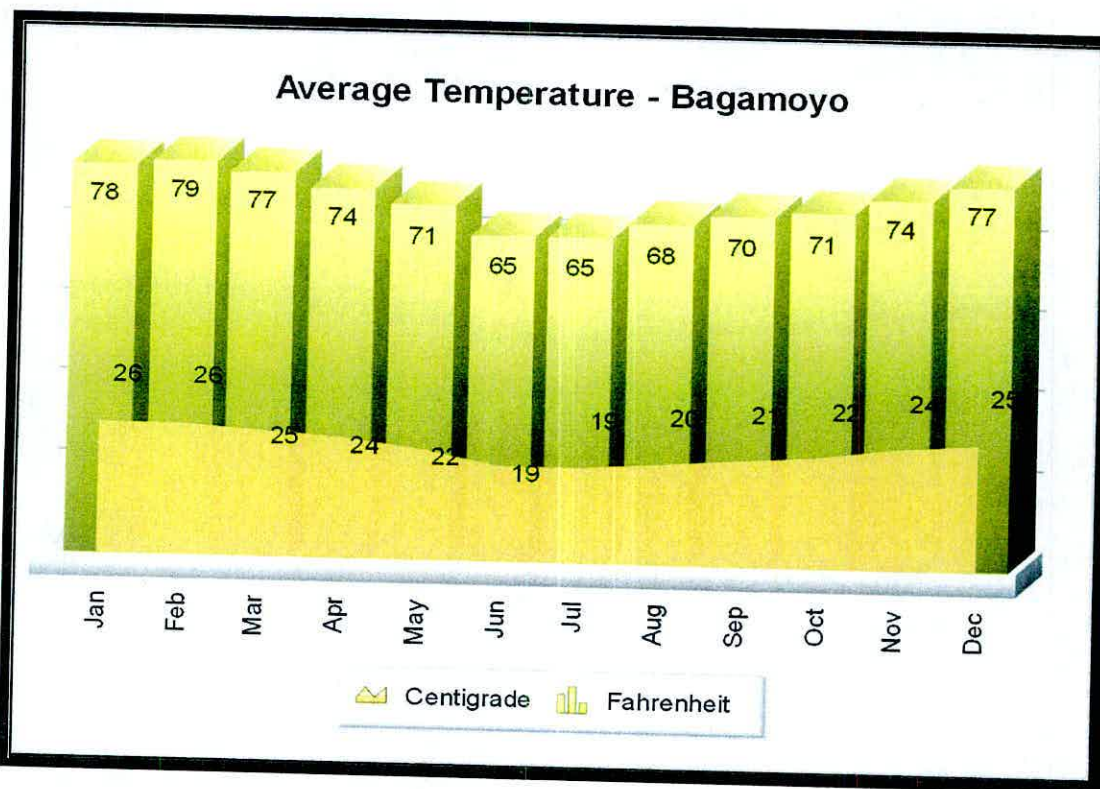
The training program should include the following aspects among others so as to impart knowledge and training to the key personnel in relevant aspects of the plant design, operation, and maintenance:

- Understanding the functions of various units.
- Understanding the equipment in respective sections and the important parts and control in each equipment
- The hazards in respective sections and precautions to be taken for safety of the equipment & personnel.
- Inspection, preparation and start up of equipment in respective sections.
- Routine operation of respective sections.
- Shut down procedures for respective sections.
- Procedure for attending to emergency stoppage due to failure of power, water and air supply.

Besides training the key operating staff described above, in plant training should also be given to other employees at Foremen and Skilled Operating level to enable them to understand the process equipment in the project and prepare them to operate and maintain their respective sections safely, efficiently and skillfully.

The above training should be carried out during construction, commissioning and operating phases of the project.

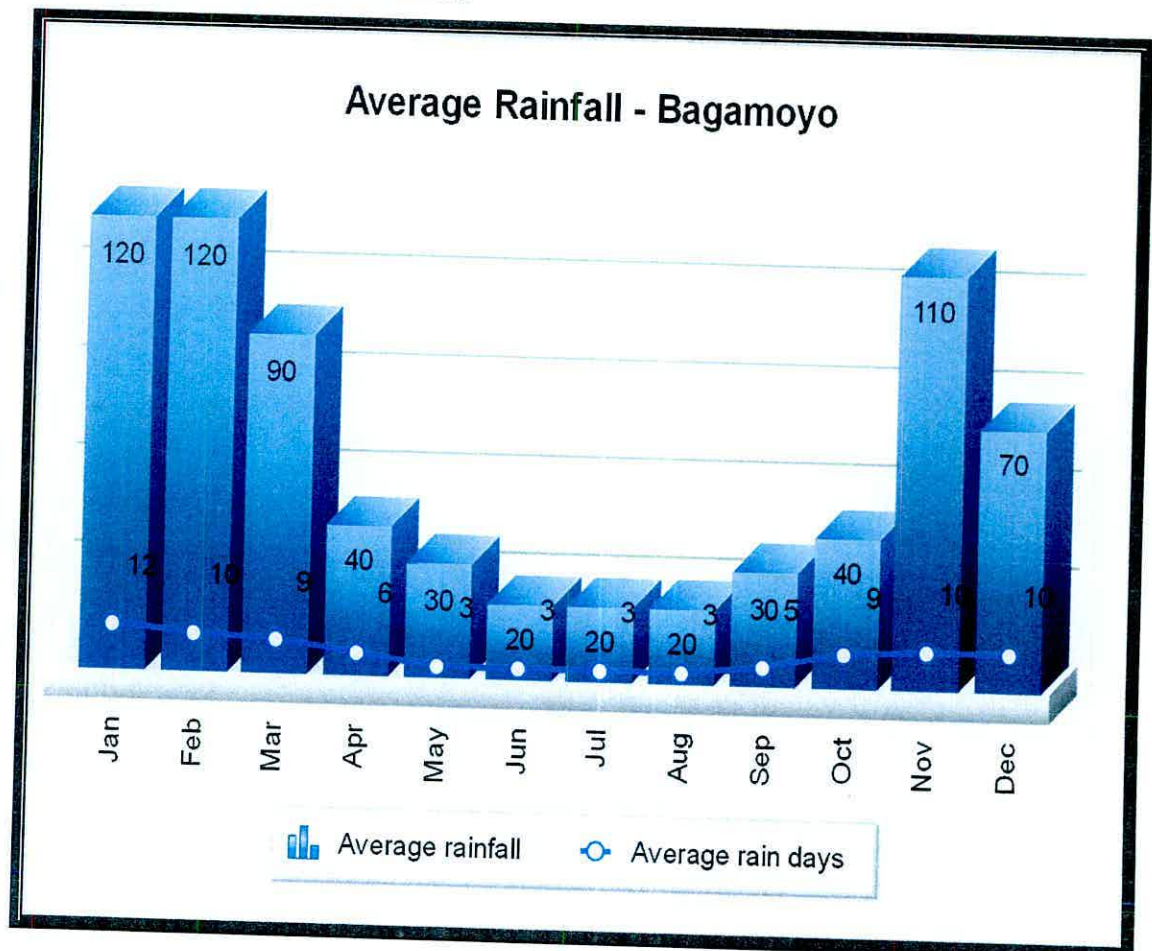
TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000 TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA - CHAPTER 9 - CIVIL ENGINEERING CONSIDERATIONS



# TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000 TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 9 – CIVIL ENGINEERING CONSIDERATIONS

## Rainfall

It rains during the months June to September when the area receives on an average 600 - 900mm of rainfall.



## Humidity

- Maximum	:	92%
- Minimum	:	22%
- Average	:	57%

TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000 TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA - CHAPTER 9 - CIVIL ENGINEERING CONSIDERATIONS



**Wind**

Velocity max: 7.10 m/sec

Velocity min: 4.10 m/sec

**MAMBA CEMENT COMPANY LIMITED – 1.0 MTPA CEMENT PLANT IN TANZANIA**  
**PROJECT IMPLEMENTATION SCHEDULE FOR 1.0 MTPA CEMENT PLANT**

Annexure-11.1

SN.	ACTIVITIES	2013												2014												2015												2016			
		Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr			
1	Preparation of financial application	[Orange bar from Apr to May]																																							
2	Project appraisal by financial institution	[Orange bar from Jun to Jul]																																							
3	Obtaining requisite approval & linkages	[Orange bar from Apr to Sep]																																							
4	MOEF clearance for plant, mines and power plant including DG sets EIA/EMP study & report	[Orange bar from May to Oct]																																							
5	Land acquisition for the plant	[Orange bar from Apr to May]																																							
6	Land acquisition for mines	[Orange bar from Apr to May]																																							
7	Power supply for Construction	[Orange bar from Jun to Sep]																																							
8	Infrastructural development	[Orange bar from Jun to Dec]																																							
9	preparation and diapatch of bulk samples	[Orange bar from Jun to Jul]																																							
10	Basic engineering & Issue of tender enquires	[Blue bar from Jul to Sep]																																							
11	Main machinery order placement	[Blue bar from Sep to Dec]																																							
12	Auxiliary equipment order	[Blue bar from Oct to Dec]																																							
13	Receipt of load data and & vendor dwg. approval	[Blue bar from Nov to Dec]																																							
14	Detail engineering mechanical	[Blue bar from Dec to Feb 2014]																																							
15	Detail engineering electrical & Instrumentation	[Blue bar from Dec to Feb 2014]																																							
16	Civil design	[Blue bar from Dec to Feb 2014]																																							
17	Civil construction	[Blue bar from Dec to Feb 2014]																																							
18	Equipment delivery	[Blue bar from Dec to Feb 2014]																																							
19	Mechanical erection	[Blue bar from Dec to Feb 2014]																																							
20	Electrical & Instrumentation Erection	[Blue bar from Dec to Feb 2014]																																							
21	Trial run and Commissioning	[Blue bar from Dec to Feb 2014]																																							



**CHAPTER – 11**

**PROJECT IMPLEMENTATION SCHEDULE**

## CHAPTER – 11

### PROJECT IMPLEMENTATION SCHEDULE

#### 11.0 INTRODUCTION

Implementation of a modern cement plant is a challenging task and calls for meticulous planning, scheduling and monitoring to realize the project goals in budgeted time frame. The goal can be achieved by adopting modern project management techniques.

In this chapter, the possible schedule for implementation of the project and the assumption thereof are presented.

#### 11.1 PRE-CONDITIONS TO TIMELY PROJECT IMPLEMENTATION

After an investment decision is taken, the main machinery and long delivery items must be ordered out at the earliest, forming the first major step in implementation of the project. It is foreseen that an engineering consultant will be appointed for carrying out the detailed engineering including basic engineering and procurement assistance to Mamba Cement Company Ltd. It is also assumed that reputed and experienced contractors with adequate resources e.g. men, materials, tools and tackles etc. will be engaged for execution of the construction and erection work. The purchase packages for auxiliaries shall be kept minimum so as to reduce the coordination efforts to the minimum.

A great deal of co-ordination between the various agencies involved is required for constructing/erecting the new units. This must be ensured through periodic co-ordination meetings and flow of information from one agency to the other.

#### 11.2 PROJECT SCHEDULE

A bar chart showing the main activities for the implementation of the project is given in enclosed **Annexure - 11.1** for the Proposed Cement plant in Tanzania.

**11.3 STRATEGY FOR TIMELY PROJECT EXECUTION**

It is important to commission a team of experienced personnel for project execution and select the external agencies with due care for rendering the services and supply of equipment for the project. The project activities must be identified, planned and scheduled, and the progress monitored for timely project implementation, preferably by utilizing computer based monitoring system. All the inputs to the project including financial resources must identify and their inflow planned and arranged in time. The project must be managed professionally with necessary coordination among the various agencies and requisite decisions taken promptly.

In short, the following key factors would constitute the strategy for timely execution of all activities in the pre-determined manner as per schedule shown in bar chart.

1. Early selection of an effective in-house technical team (TASK FORCE) by client, headed by a Project Manager for planning and executing the project.
2. Proper choice of external agencies such as consultants for Project Engineering, Machinery suppliers, Construction Agencies etc. Keeping in view, their reputation/past performance and working experience in their fields.
3. Adequate use of computer based PERT/CPM techniques for project planning, scheduling and monitoring.
4. Establishment of an effective monitoring and reporting procedure for progress review and coordination.
5. Computer based monitoring of cash outflow scheduling and cost account/control.

**CHAPTER – 12**  
**ENVIRONMENTAL AND POLLUTION CONTROL**

## CHAPTER – 12

### ENVIRONMENT AND POLLUTION CONTROL

#### 12.0 INTRODUCTION

Environmental control aspects in cement plants are to be given utmost attention. Out of two aspects of pollution of immediate concern, viz. air and water pollution, the cement plant is virtually free of water pollution as no effluents are involved. Even as regards air pollution, which basically can be caused by both particulates and undesirable gases, the plant operation ensures practically no emission of gaseous substances. Adequate no of dust collectors will be installed in order to keep the particulate emission within acceptable limits at all the points of dust generation during the process of cement manufacturing.

#### 12.1 IMPACT ON ECOLOGY

Cement plants can have impact on the ecology of their surrounding areas due to following:

- Mining Operation
- Plant Operation

#### 12.2 ENVIRONMENTAL IMPACT DUE TO MINING EQUIPMENT

Environmental impact due to mining operation can be classified broadly into the following categories:

- ❖ Land degradation due to excavation of pits
- ❖ Water pollution due to loose soil being carried into water stream
- ❖ Air pollution due to gases and fumes caused by blasting and movement of heavy vehicles.

# TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000 TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 12 – ENVIRONMENTAL AND POLLUTION CONTROL

## 12.2.1 Land Degradation

The degraded land shall be reclaimed at the earliest by back filling with topsoil. Compensatory forestation shall be carried out in the nearby areas in order to restore the ecological balance to the extent feasible.

## 12.2.2 Water Pollution

The overburden dump area shall be consolidated and stabilized simultaneously by planting trees and shrubs.

## 12.2.3 Air Pollution

Proper preventive maintenance shall be carried out to control the emission levels from the mining equipment.

Regular sprinkling of water on the mines road shall be done to suppress generation of dust due to movement of heavy vehicles.

## 12.2.4 Noise Pollution

Precautionary measures against noise pollution are proposed to be taken as follows:

- ❖ Choosing quieter machinery provided with efficient silencers
- ❖ Confining noise by isolating the source
- ❖ Planting trees to create a wide green belt

## 12.3 ENVIRONMENTAL IMPACT DUE TO CEMENT PLANT OPERATION

### 12.3.1 Environmental Impact Due to Gaseous Emission.

The impact on ecology due to operation of cement plant is mainly due to CO<sub>2</sub> gas emission, which is reduced by suitable green belt development in the plant and surroundings of the plant. SO<sub>2</sub> gas is absorbed by Alkali in limestone material in preheater and kiln and NO<sub>x</sub> gas is controlled by use of latest burner for coal firing in kiln and Precalculator. Therefore, insignificant quantity of SO<sub>2</sub> and NO<sub>x</sub> are emitted from stack.

### **12.3.2 Environmental Impact Due to Water Pollution**

The unit operation involved in the cement plant utilizes water only for external cooling and does not take part in the process in any manner to produce water pollution in the cement plant.

### **12.3.3 Effluent Treatment and Waste Management**

In the absence of any effluent produced in the plant, there is no requirement of installing any effluent treatment plant. Similarly, there is nothing like any waste generation at any stage of the plant operation as the entire material produced is sold as final product, and there is no generation of any waste products or by-products from the plant. Thus there is no requirement of any waste management.

### **12.3.4 Environmental Impact Due to Particulate Emission**

The impact on ecology due to operation of a cement plant is mainly due to bulk particulate emission from the raw material crushing and the Pyroprocessing section through stack.

It has been observed that out of the total dust emission in a cement plant, nearly 91% emission takes place from the raw-mill and kiln section stacks.

Adequate number of pollution control equipment like bag filter, ESP and dust suppression system will be installed in this section to arrest the fugitive dust and to make the plant area pollution free

However, regarding the dust generation from the other sections viz. cement mill, Material storages, packing and various material transfer points, fabric filters based on the most modern technology are proposed to be installed to ensure that the dust emissions are within the prescribed limits and lower than  $30\text{mg}/\text{Nm}^3$ , which is compatible to the best international standards.

**12.4 POLLUTION CONTROL MEASURES**

The following arrangements for control of pollution are considered:

- ❖ Installation of either bag filter or water spray system in the Limestone crushing section.
- ❖ Installation of either bag filter or water spray system in the Limestone Pre blending, reclaiming, feeding section.
- ❖ Installation of bag filters/ bag house for raw material grinding, storage, up to kiln feed.
- ❖ Installation of ESP for de-dusting of cooler exhaust air.
- ❖ Installation of bag filters /bag house for coal crushing and coal mill section.
- ❖ Installation of bag filters / bag house in the cement grinding section.
- ❖ Installation of bag filters in the cement storage section.
- ❖ Installation of bag filters in the packing section.

Particulate emission from various stacks and material transfer points is the main pollutant from a cement plant. Adequate preventive measures to keep the pollution level of particulate emission to less than 30 mg/Nm<sup>3</sup> should be provided in the plant.

**The list of dust collectors used in proposed plant is summarized as under:**

Sn.	Location	Type of Dust Collectors
<b>1</b>	<b>Limestone Crushing &amp; Transport</b>	
a.	Crusher and Auxiliaries	Reverse Pulse Jet type Bag Filter
b.	Transfer Tower	Reverse Pulse Jet type Bag Filter
<b>2</b>	<b>Raw Material Feed Hopper</b>	
a.	Hopper Top	Reverse Pulse Jet type Bag Filter
b.	Hopper Extraction Equipment.	Reverse Pulse Jet type Bag Filter
<b>3</b>	<b>Raw Material Transport and Grinding</b>	
a.	Raw Mill Auxiliaries	Reverse Pulse Jet type Bag Filter

**TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000 TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 12 – ENVIRONMENTAL AND POLLUTION CONTROL**

Sn.	Location	Type of Dust Collectors
b.	Raw Mill & Kiln	Bag house
<b>4</b>	<b>Blending &amp; Storage Silo</b>	
a.	Silo Top	Reverse Pulse Jet type Bag Filter
b.	Silo Extraction Equipment	Reverse Pulse Jet type Bag Filter
<b>5</b>	<b>Preheater, Kiln &amp; Cooler</b>	
a.	Preheater Top	Reverse Pulse Jet type Bag Filter
b.	Clinker Cooler	ESP
<b>6</b>	<b>Clinker, Gypsum Storage &amp; Transport</b>	
a.	Clinker Silo Top	Reverse Pulse Jet type Bag Filter
b.	Tunnel Ventillation	Reverse Pulse Jet type Bag Filter
<b>7</b>	<b>Coal Crushing &amp; Grinding</b>	
a.	Crusher & Auxiliaries	Reverse Pulse Jet type Bag Filter
b.	Transfer Tower	Reverse Pulse Jet type Bag Filter
<b>8</b>	<b>Fine Coal Transport &amp; Storage</b>	
a.	Fine Coal Bins	Reverse Pulse Jet type Bag Filter
b.	Coal Transportation	Reverse Pulse Jet type Bag Filter
c.	Coal Mill Auxiliaries	Reverse Pulse Jet type Bag Filter
d.	Coal Mill	Bag House
<b>9</b>	<b>Cement Grinding</b>	
a.	Hopper Top	Reverse Pulse Jet type Bag Filter
b.	Fly Ash Silo	Reverse Pulse Jet type Bag Filter
c.	Mill Outlet	Reverse Pulse Jet type Bag Filter
d.	Cement Mill	Reverse Pulse Jet type Bag Filter
<b>10</b>	<b>Cement Storage &amp; Extraction</b>	
a.	Cement Storage silo top	Reverse Pulse Jet type Bag Filter
b.	Silo Extraction	Reverse Pulse Jet type Bag Filter
<b>11</b>	<b>Packing &amp; Truck Loading</b>	
a.	Packer	Reverse Pulse Jet type Bag Filter

Apart from the above, bag dust filters will be installed at all transfer points. Adequate budget provision for pollution control equipment has been also kept while estimating the Capex for this Project.

## **12.5 IMPORTANT POINTS FOR DUST POLLUTION CONTROL**

### **12.5.1 AIR POLLUTION MANAGEMENT**

- Bag dust collectors (bag filters) to control dust emission from various dust generating points in the plant.
- Bag Filters will have high efficiency & the emission level will be maintained <50 mg/Nm<sup>3</sup>.
- If required dry Fly ash will be transported in closed tankers / Pipeline.
- Gypsum will be stored in covered sheds.
- All material transfer points will be adequately de-dusted with the help of bag filters.
- Green area will be developed around/within the premises of the proposed project site to arrest the fugitive emissions.
- Unloading of trucks will be carried out with proper care avoiding dropping of the materials from height.
- Sprinkling of water will be done along the internal roads in the plant in order to control the dust arising due to the movement of vehicular traffic.
- Adequate Stack Height will be provided as per CPCB guidelines.

### **12.5.2 NOISE & VIBRATION MANAGEMENT**

- Proper care will be taken by incorporating sound-proof enclosures for equipments and providing earmuffs and earplugs for operators.
- Properly insulated enclosures will be provided to staff working close to the high noise sources.
- Noise attenuating devices like earplugs and earmuffs will be provided to the workers exposed to high noise level.
- Sufficient green area will be maintained in & around the project site.
- Regular monitoring of noise level will be carried out and corrective measures in concerned machinery will be adopted accordingly.
- Noise level from the DG sets will be as per the prevailing standards. The sound

control system designed to suppress the sound level to 75 dB maximum at 1 meters distance in open free field environment.

### **12.5.3 WATER MANAGEMENT**

- The water requirement during construction phase will be fulfilled by water tankers, arranged by the contractor.
- Proper storage and internal supply facilities shall be developed before undertaking construction activities.
- Domestic waste water generated during construction phase will be discharged into soak pit via septic tank.
- Waste water generated from Captive power plant will be 100% recycled back and utilized for cooling purpose.
- No waste water will be generated from the cement grinding process.
- It will be a Zero-discharge project
- A Rain Water Harvesting Plan will be prepared and water harvesting system would be implemented.

### **12.5.4 SOLID WASTE MANAGEMENT**

The following measures will be implemented for solid waste management within the plant premises:

- Maintenance to prevent spillage and leakage
- Recycling of the collected spillage
- Holes in bends etc. caused by the abrasive character of the materials.
- Deterioration of flexible joints flaps and seals due to corrosion etc.
- If required Fly ash generated from the CPP will be reused 100% in cement grinding process for cement production and therefore there will not be any solid waste disposal either from the grinding unit or from the CPP.

#### **12.5.5 SOCIO ECONOMIC MEASURES**

- Recognizing that even with best efforts, some emissions shall still emanate due to project operation and some marginal adverse impacts can occur which must be tolerated by the persons in surrounding villages in the larger interest of economic and all round development of the area. It is, therefore, recommended that well planned efforts of public relation must be initiated by the plant authorities to remove the misunderstanding and apathy of the people in surrounding villages so that the Management is looked upon as a helpful and reliable neighbour.
- Medical and educational facilities for rural population in surrounding villages will be further strengthened.

#### **12.5.6 GREEN AREA DEVELOPMENT & PLANTATION PROGRAMME**

- Total Plant area : 100 Hectares.
- Plantation will be done as per the existing environmental control guidelines of Tanzania..
- Tree plantation will be done every year in the campus to develop dense green belt. It will help to arrest the particulate matter and noise level in the area and thus attenuate the pollution to a great extent.
- Plantation would be of trees that provide adequate shade and are semi evergreen to evergreen.

Species planted are common in such process plants viz. *Acacia nilotica* (Babool), *Ficus religiosa* (Pipal), *Aegle marmelos* (Bel), *Delonix regia* (Gulmohar), *Mangifera indica* (Mango), *Dalbergia sissoo* (Shisham), *Polyalthia longifolia* (Ashoka), *Cassia fistula* (Amaltash), *Azadirachta indica* (Neem).

# TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000 TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 12 – ENVIRONMENTAL AND POLLUTION CONTROL

## 12.5.7 HEALTH, SAFETY, ENVIRONMENT ACTION PLAN

- Formation of Safety, Environment committee.
- Regular safety inspection.
- Noise/Vibration prone equipments will be properly padded and kept under acoustic.
- Employees working in dust prone area will be provided with dust mask. Their Lungs Function Test will be conducted on regular basis to assess their condition for taking suitable corrective & preventive measures.
- Workers working in noisy area will be provided with ear plug/ear muffs and it will ensure that they use it regularly.
- Regular health check up of all the employees will be conducted.
- Proper ventilation & illumination will be maintained in workplaces.
- Adequate measures will be taken up to provide fire fighting facilities as per safety norms. Fire safety measures will be exercised at the plant.
- Regular training and awareness programmes will be conduct on
- Occupational Health, Safety, and Environment etc.

## 12.6 ENVIRONMENT IN THE ECONOMY OF TANZANIA

### 12.6.1 GENERAL

Importance of Environment in the economy of Tanzania is of four folds: it provides the basic resources for virtually all socio-economic activity in the country, it holds natural habitats, plants and animals that are art of an irreplaceable global heritage, waste receptacle and a foundation for eventual alleviation of abject poverty. It follows therefore that the major thrust of environmental management is protection of the natural living space of human kind and integration of environmental scarcity in making decision on all economic issues and activities.

## TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000 TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 12 – ENVIRONMENTAL AND POLLUTION CONTROL

The Government of Tanzania realised the danger facing such resources including clean air, fossil fuels, whales, hardwoods and endangered species by taking appropriate measures ranging from policy, legal framework and institutional arrangement which are conforming to socio-political and economic system.

The government in collaboration with various stakeholders has put emphasis on promoting, strengthening and sensitising communities and individuals participation as a strategy to invigorate environmental conservation and management. Together with these there were awareness campaign, environmental education and skills development which complemented on various issues of environmental conservation and management. Emphasise for the environmental conservation and management is to raise the capacity and ability of the communities and individuals in sustainable management for own benefits and for the future generation. It is vividly that the efforts has raised the public awareness, interests and actions as more than 159 Community Based Organisations (CBO) and non-Governmental Organisations (NGOS) has been formed as well as private sector and individuals joining the process. Furthermore, the government and other collaborating institutions and agencies such as CBOs / NGOs are implementing various programmes both in rural and urban areas. The media institutions (radio, TV, press, newspapers) has played an significant role in sensitising and undertaking various education programmes on environmental issues thereby cultivating public / private interest, commitment and awareness on environmental management and conservation aspects.

The government adopted sector policies related with forest; mineral, wildlife; fisheries; agriculture and livestock and land which put priority on conservation and management of resources and environment, raising public awareness and understanding of the linkages between environment and livelihood, and promoting international co-operation on environmental agenda. Current intervention are directed in implementing the National Action Programme to Combat Desertification,

# TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000 TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 12 – ENVIRONMENTAL AND POLLUTION CONTROL

Biodiversity Conservation, environmental friendly production practice and abatement of pollution and strengthening both human resources and institution.

## 12.6.2 POLICIES

The overall objectives of the National Environmental Policy 1997 are:

- ❖ To ensure sustainability, security and equitable use of resources for meeting the basic need of the present and future generations without degrading the environment or risking health or safety.
- ❖ To prevent and control degradation of land, water, vegetation, and air which constitute our life support systems.
- ❖ To conserve and enhance our natural and man-made heritage, including the biological diversity of unique ecosystems of Tanzania.
- ❖ To improve the condition and productivity of degraded areas including urban and rural settlements in order that all Tanzanians may live in safe, healthful, productive and aesthetically pleasing surroundings.
- ❖ To raise awareness and understanding of the essential linkages between environment and development, and promote individual and community participation in environmental action.
- ❖ To promote international co-operation on the environmental agenda, and to expand our participation and contribution to relevant bilateral, sub-regional, regional, and global organisation and programmes, including implementation of treaties.

**CHAPTER – 13**

**CAPITAL COST ESTIMATE**

## CHAPTER – 13

### CAPITAL COST ESTIMATES

#### 13.0 INTRODUCTION

This chapter covers the estimates for fixed capital investment, working capital requirement and sources of funds. All estimates are at current rates.

#### 13.1 Investment

Based on the plant layout and the process flow sheet, the total investment required to complete the project, has been worked out to 171.90 Mio.USD. The capital cost of this project is proposed to be funded as given below:

- Promoter's contribution - 34.38 Mio.USD
- Term loan from financial institution - 137.52 Mio.USD

#### 13.2 Buildings

Cost of major plant structures & buildings for Main plant are shown in **Annexure –13.3.**

#### 13.3 Plant and Machinery

Costs for plant & machinery have been worked out on the basis of budgetary offer given by an internationally reputed machinery supplier.

Cost of plant & machinery, in line with the equipment shown in the flow sheets, has been presented in **Annexure – 13.4.** This includes the cost of electrical package, captive power plant, mining equipments, electric motors, refractories, grinding media etc. The cost of equipment considered along with duties; taxes, freight etc. are given in the above Annexure.

Erection and commissioning charges have been considered @ 8% of FOB cost.

#### 13.4 Mining Equipment

## **TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000 TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 13 – CAPITAL COST ESTIMATE**

Requirement of mining equipment based on the local geology, raw material requirement has been worked out in **Chapter - 4**.

### **Stores & Spares**

For plant and machinery, stores and spares have been considered @ 5% of cost of plant and equipment. These percentages have been considered in accordance with customary norms and the consultant's experience in similar plants.

### **13.5 Technical Know-how Fees**

Technical know-how fee has been considered on the assumption that complete detailed engineering of the plant and other services rendered by a reputed International Consultancy Organization.

### **13.6 Miscellaneous Fixed Assets**

These include office furniture, vehicles, water supply, laboratory, workshop, fire-fighting equipment, weighbridge etc are given.

### **13.7 Preliminary and Capital Issue Expenses**

The cost for these has not been considered at present.

### **13.8 Pre-operative Expenses**

Preoperative expenses include establishment cost, rents, taxes, traveling expenses, interest during construction and insurance during construction. These have been assumed on the basis of the consultant's experience and some details submitted by MCCL.

### **13.9 Provision for Contingency and Escalation**

Provision for contingency and escalation has been made against different cost heads.

### **13.10 Margin Money for Working Capital**

## TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000 TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 13 – CAPITAL COST ESTIMATE

Based on the requirement of inventories of raw materials and utilities, the working capital requirement has been worked out. The margin money required for working capital for the project is worked out as 3.65 MUSD.

### 13.11 PROJECT COST

ESTIMATED COST OF THE PROJECT		
SN.	PARTICULARS	ESTIMATED COST (In Mio. USD)
1.0	Land & Site Development	6.00
2.0	Buildings	29.14
3.0	Plant & Machinery	111.21
4.0	Technical Know How & Engineering services & Expenses on Foreign Technicians	1.5
5.0	Miscellaneous Fixed Assets	2.56
6.0	Pre-operative Expenses	9.83
7.0	Provision for Contingencies	8.01
8.0	Margin Money	3.65
<b>9.0</b>	<b>Total</b>	<b>171.90</b>

**CHAPTER – 14**

**COST OF PRODUCTION AND PROFITABILITY**

## CHAPTER – 14

### COST OF PRODUCTION AND PROFITABILITY

#### 14.0 INTRODUCTION

In this chapter, the total annual cost of production of cement has been worked out taking into consideration the following:

- Capital cost estimates as detailed in **Chapter – 13**
- Landed cost of raw materials viz. Limestone, Additives and Gypsum.
- Cost of other inputs viz. power, water, stores and spares, salaries and wages and plant over head expenses etc.

#### 14.1 ASSUMPTIONS

##### Cement Production

Based on the above installed capacity of the plant and anticipated plant operating efficiencies, the annual production of cement during different years of operations have been assumed as given in **Table – 14.1**

**Table –14.1**  
**Anticipated Cement Production**

Year of Operation	Operating Efficiency, %	OPC+ PLC Production ( Tons)
1 <sup>st</sup> Year	80.00 %	914110
2 <sup>nd</sup> Year	90.00%	1028374
3 <sup>rd</sup> Year onwards	100.00%	1142638

#### 14.2 RAW MATERIAL COMPONENTS

Based on the process described already, the consumption of various raw materials is considered as given in **Table – 14.2**

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**Table – 14.2**  
**Consumption of Raw Materials for cement**

Raw Material	Consumption per Tons of OPC	Consumption per Tons of PLC
Clinker	95%	85%
Gypsum	5%	5%
Limestone	-	10%

For the purpose of cost of production and profitability the figures as indicated above have been considered.

**14.3 LANDED COST OF RAW MATERIALS**

Landed cost of various raw materials have been calculated based on their sale costs at source and adding freight and other relevant input costs viz. handling charges etc., as applicable presently. The landed costs are shown in **Table – 14.3**.

**Table – 14.3**  
**Cost of Raw Materials**

Sl. No.	Raw Materials	Landed Cost (USD./T)
1.	Limestone	2.7
2.	Red Soil	3.5
3	Clay	2.7
4	Gypsum	95

- The specific power consumption has been considered as 65 units per tons for clinker, 45 units per tons of OPC and 40 units per tons for PLC.
- Cost of water has been considered at 0.05 USD per ton of cement.

## TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000 TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 14 – COST OF PRODUCTION AND PROFITABILITY

- Consumable stores and spares and maintenance costs have been considered @ **5.0 USD per ton of cement**.
- The total salary and wages for the employees has been considered as **5.34 MUSD per annum**, an escalation @ 5% per annum has been provided on the same.

### 14.4 FACTORY OVERHEADS

- Insurance on factory assets has been considered @ 1% per annum.
- Provision for rent, rates and taxes on factory assets and miscellaneous factory expenses has been suitably provided.
- The Project has been considered on **4:1** Debit-equity ratio based financing has been considered.

### 14.5 SELLING PRICE OF CEMENT

The selling price per ton of cement in the Target Market region for MCCL has been considered as given below:

Target Region	Selling Price USD / bag (OPC/PLC)
Mamba	7.0

### 14.6 PACKING EXPENSES (BAGS)

Packing expenses have been considered @ **4.0 USD per ton** of cement within Tanzania.

# TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000 TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 14 – COST OF PRODUCTION AND PROFITABILITY

## 14.7 SALES & DISTRIBUTION EXPENSES

Sales & Distribution expenses have been considered @ **3.0 USD per ton** of cement within Tanzania.

## 14.8 TRANSPORT EXPENSES

Transport Expense has been considered @ **150 USD** and @ **15 USD** per ton of cement for a distance from plant 2000 km and 200 km respectively.

## 14.9 COST OF PRODUCTION

Based on the above parameters, the annual cost of production and profitability for 10 years has been worked out in **Annexure – 14.3**

## 14.10 DEPRECIATION

Incidence of depreciation has been worked out in **Annexure – 14.4** and **Annexure – 14.5** on Straight Line Method (SLM) and Written down Value (WDV) respectively. For the cash flow straight line method is considered whereas for calculation of corporate taxes WDV method is utilized. The expenses towards interest during construction are capitalized with 3 major heads considered for depreciation. The rate of depreciation considered is as follows -

	Depreciation Rate under SLM	Depreciation Rate under WDV
<b>Buildings</b>	3.34%	10%
<b>Plant &amp; Machinery</b>	5.28%	25%
<b>Misc. fixed assets</b>	5.28%	25%

## 14.11 INTEREST CALCULATION

The details of interest calculation and schedule of repayment of long term loan has been shown in **Annexure – 14.6** and **Annexure- 14.7**.

**TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000 TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 14 – COST OF PRODUCTION AND PROFITABILITY**

**14.12 CORPORATE TAXES**

Corporate Tax has been considered at the rate of 30%.

**14.13 PRELIMINARY EXPENSES**

Preliminary Expenses is not Considered.

**14.14 DIVIDENDS**

Dividend has been not considered.

**CHAPTER – 15**

**FINANCIAL ANALYSIS AND RECOMMENDATIONS**

## CHAPTER – 15

### FINANCIAL ANALYSIS AND RECOMMENDATIONS

#### 15.0 INTRODUCTION

In the foregoing chapters the technical concept, capital and operating costs and profitability for the proposed Cement Plant has been considered. The various financial indicators for the project have been presented in the following paragraphs:

#### 15.1 INVESTMENT ANALYSIS

##### PAY BACK PERIOD

The estimated payback period for the project works out to be 7 years excluding construction period as shown in **Annexure – 15.1**.

#### 15.2 WORKING RESULTS

The estimated production and sales for 10 years of operation have been worked out and given in **Annexure – 15.2**.

#### 15.3 DEBT SERVICE COVERAGE RATIO (DSCR)

The average **DSCR** is 2.26. The Debt Service Coverage Ratio has been worked out and given in **Annexure – 15.3**.

#### 15.4 BREAK-EVEN POINT

The break-even analysis has been made for the 3rd year of operation as furnished in **Annexure – 15.4**. The calculated break-even points are as follows:

BREAK-EVEN POINT	
Break - Even Point (Project)	63.12%
Break - Even Point (Cash)	51.98%

#### 15.5 INTERNAL RATE OF RETURN

The Internal rate of return works out to 23.81% as detailed in **Annexure – 15.6**.

**TECHNO-ECONOMIC FEASIBILITY REPORT FOR 1.0 MTPA (3000 TPD) CEMENT PLANT IN BAGAMOYO, TANZANIA – CHAPTER 15 – FINANCIAL ANALYSIS AND RECOMMENDATIONS**

**15.6 CASH FLOW & BALANCE SHEET**

The cash flow during the first 10 years of operation and the projected balance sheet for the project is shown in **Annexure – 15.7** and **Annexure – 15.8** respectively.

**15.7 RESULTS OF FINANCIAL ANALYSIS**

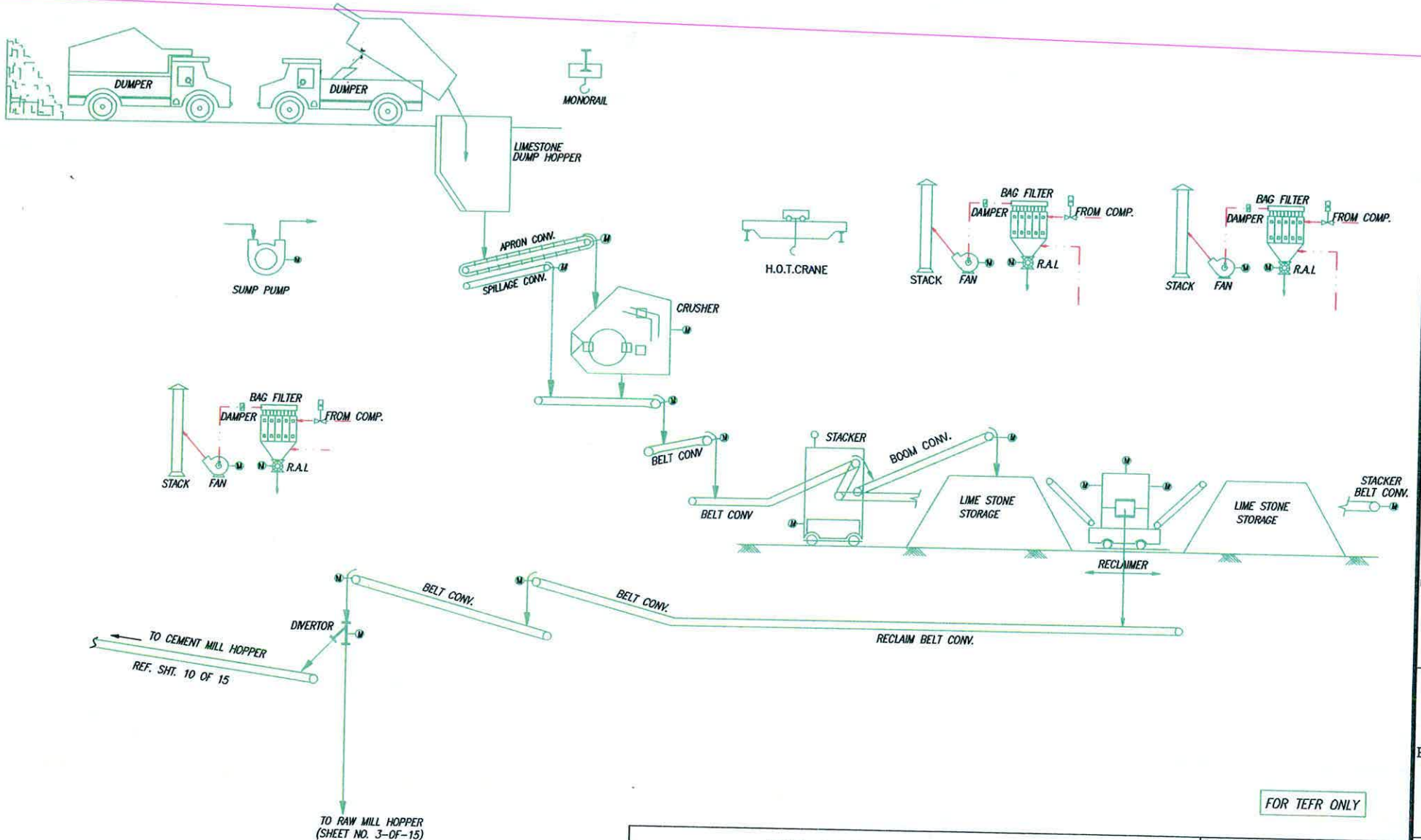
Based on the present parameters, the project appears to be technoeconomically Viable.

Sl. No.	Particulars	Value
1.0	<b>Project cost (in Mio. USD)</b>	171.90
2.0	<b>IRR (%)</b>	23.81%
3.0	<b>Average DSCR</b>	2.26
4.0	<b>Pay back period in years</b>	7
5.0	<b>Break Even points:</b>	
	- Project (%)	63.12%
	- Cash (%)	51.98%
6.0	<b>NPV before Tax</b>	141.80
7.0	<b>NPV after Tax</b>	110.65
8.0	<b>Specific Investment</b>	150.44


## MANPOWER REQUIREMENT AND SALARIES &amp; WAGES

Sl. No.	Designation	No of person	Individual Monthly Salary (USD)	Annual Gross Salary (USD)
<b>A</b>	<b>MINES STAFF</b>			
	<b>EXECUTIVE STAFF</b>			
1	Manager ( Mines )	1	3500	42000
2	Dy Manager (Mines)	3	3000	108000
3	Minning Engineer	2	2500	60000
4	Mechanical Engineer	1	2500	30000
5	Geologist	1	2200	26400
6	Surveyor	2	2200	52800
	<b>JUNIOR STAFF</b>			
7	Foremen ( Mines )	2	2000	48000
8	Foremen ( Mechanical )	2	2000	48000
9	Foreman(Electrical)	2	2000	48000
10	Store keeper	2	2000	48000
11	Explosive Magazine Incharge	2	1500	36000
12	Clerical / Administration / Computer Operator	2	1500	36000
13	Blasters	3	1500	54000
14	Store Clerk	1	1200	14400
	<b>MINES WORKERS</b>			
15	Skilled HEM Operator	12	1500	216000
16	Electrician	3	1800	64800
17	Skilled Drivers ( HCV + LCV )	6	1500	108000
18	Skilled Mechanics	5	1000	60000
19	Semi Skilled (Helpers)	5	500	30000
20	Unskilled	10	300	36000
	<b>Sub Total</b>	<b>67</b>		<b>1166400</b>
<b>B.</b>	<b>PLANT STAFF</b>			
1	General Manager(Production & Maintenance)	1	5000	60000
2	Production Manager	1	3500	42000
3	Quality Control Engineer	1	2500	30000
4	Process Engineer	3	2500	90000
5	Manager ( Mechanical )	1	3500	42000
6	Mechanical Engineer	4	2500	120000
7	Manager ( Electrical )	1	3500	42000
8	Electrical Engineer	3	2500	90000
9	Instrumentation Engineer	4	2500	120000
10	Civil Engineer	2	2500	60000
11	Production Engineer	4	2500	120000
	<b>JUNIOR STAFF</b>			
12	Sr. Chemist	1	3000	36000
13	Shift Chemists	4	2500	120000
	<b>PLANT WORKER</b>			
14	Tester	4	1500	72000
15	Gauger	2	1500	36000
16	Weigh Bridge Operator	3	1500	54000
17	Crusher Operator	3	1500	54000
18	Raw Mill Operator	4	1500	72000
19	Kiln Attendant	4	1200	57600
20	Cement Mill Operator	4	1500	72000
21	Packer Attendant	3	1200	43200
22	Fitter	4	1500	72000
23	Welder	4	1500	72000
24	Mechanic	4	1500	72000

25	Electrician	4	1800	86400
26	Lab Boys	4	1000	48000
27	Instrument Technician	4	1000	48000
28	Front End Loader Operator	3	1200	43200
29	Draftsman	2	500	12000
30	Diver/Peon	8	300	28800
31	Unskilled workers	10	300	36000
	<b>Sub Total</b>	<b>104</b>		<b>1951200</b>
<b>C</b>	<b>ADMINISTRATIVE &amp; SUPERVISORY STAFF</b>			
1	General manager(Administration)	1	5000	60000
2	Manager (sales)	1	2500	30000
3	Administrative Officer	1	1500	18000
4	Security Officer	1	3000	36000
5	Manager (Finance)	1	3000	36000
6	Accounts Officer	2	3000	72000
7	Accounts Clerk	4	1200	57600
8	Sales/Mktg. Officers	3	3000	108000
9	Sales Staff	3	2200	79200
10	Clerk/Time Keeper	6	500	36000
11	Driver, Peon	6	500	36000
12	Store Incharge	4	1500	72000
13	Store Attendant	4	1200	57600
	<b>Sub Total</b>	<b>37</b>		<b>698400</b>
	<b>Total</b>	<b>208</b>		<b>3816000</b>
	Annual perquisites @ 40%			<b>1526400</b>
	Salary including perquisites			<b>5342400</b>
		<b>Say</b>	<b>Mio. USD</b>	<b>5.34</b>
	Annual increase in salaries and wages @		5%	
	Cost of contract labour (USD Per tonne of Cement)		0.50	

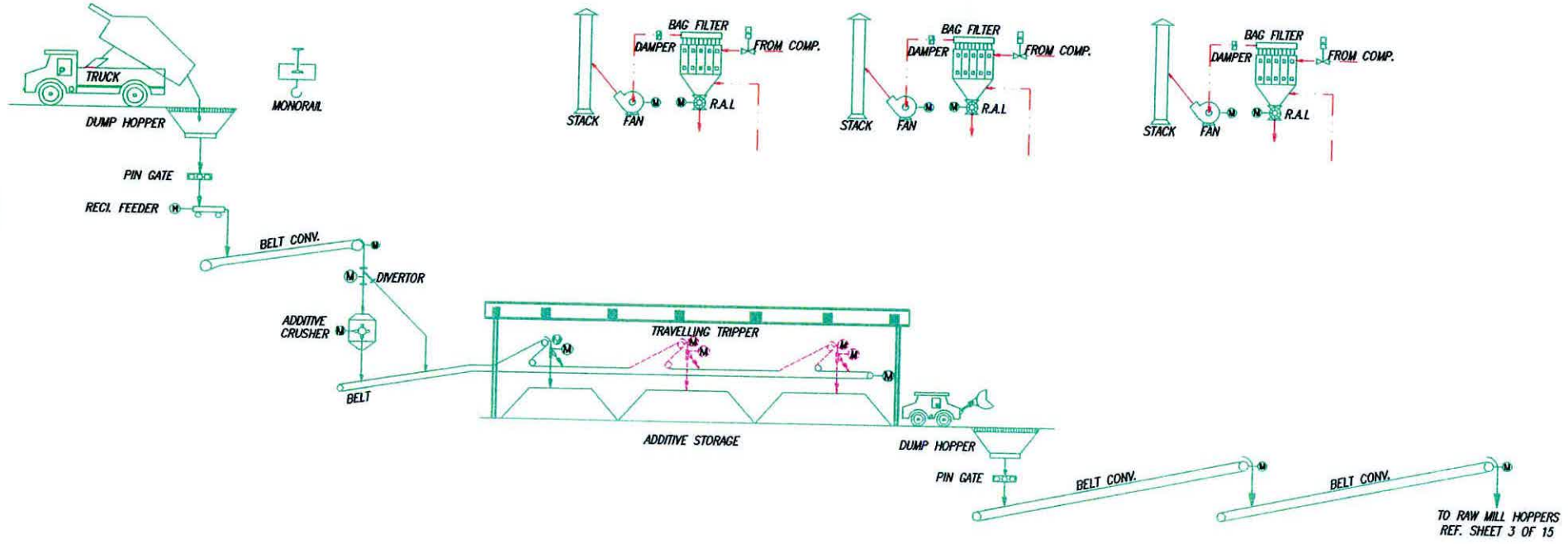


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						PROJECT 2391 CAD FILE NO. FS-01-RO.DWG TITLE 3000 TPD FLOW SHEET FOR LIME STONE CRUSHING, STORAGE AND HANDLING	
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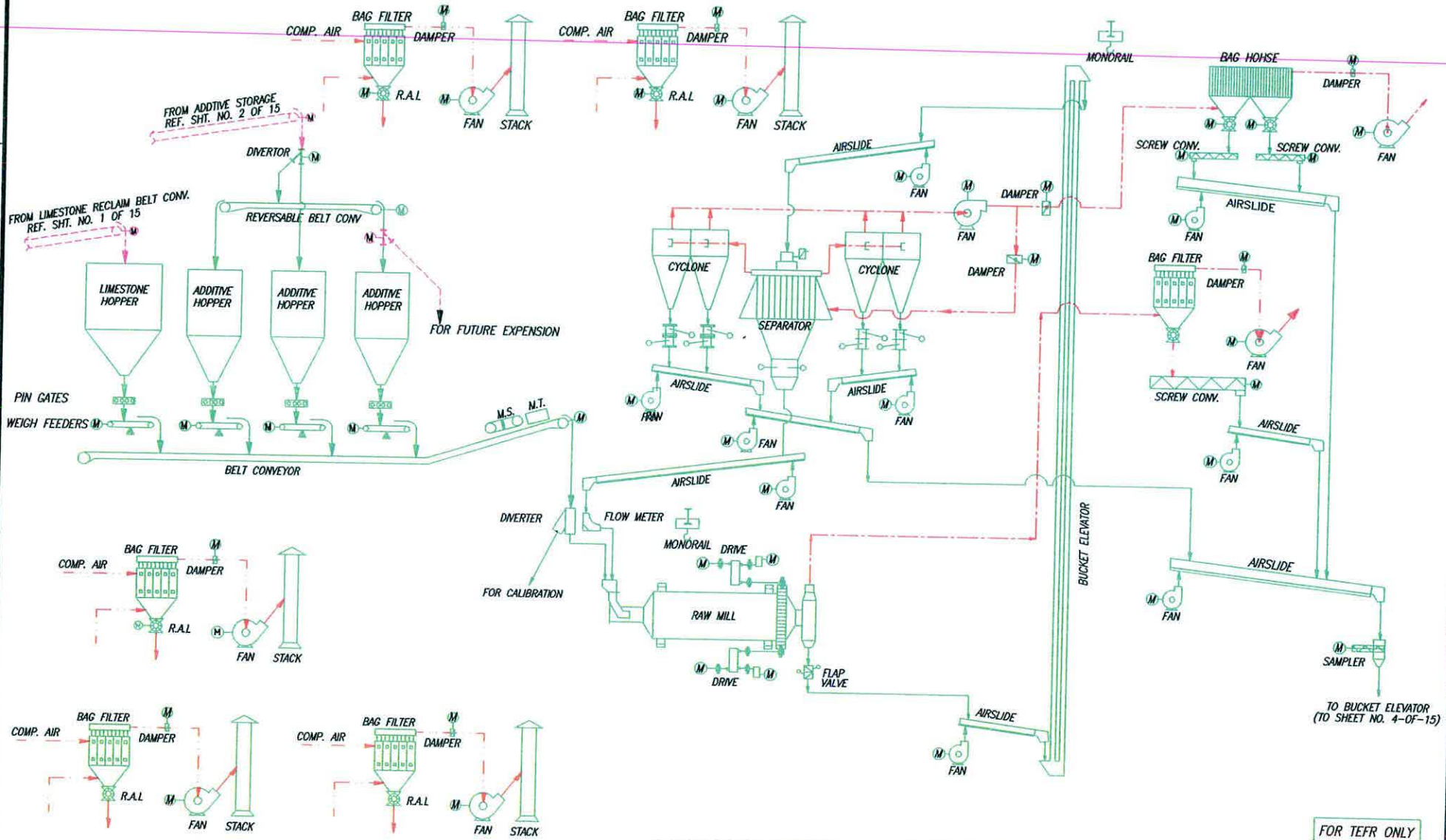
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						PROJECT 2391							
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TITLE 3000 TPD FLOW SHEET FOR ADDITIVE CRUSHING, STORAGE AND HANDLING													



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- MILL BRG. LUB. UNIT (HP&LP)
- MILL BRG. LUB. UNIT (HP&LP)
- MILL GEAR BOX LUB. UNIT
- GIRTH GEAR GREASE SPARY SYSTEM WITH STAND BY BARREL PUMP



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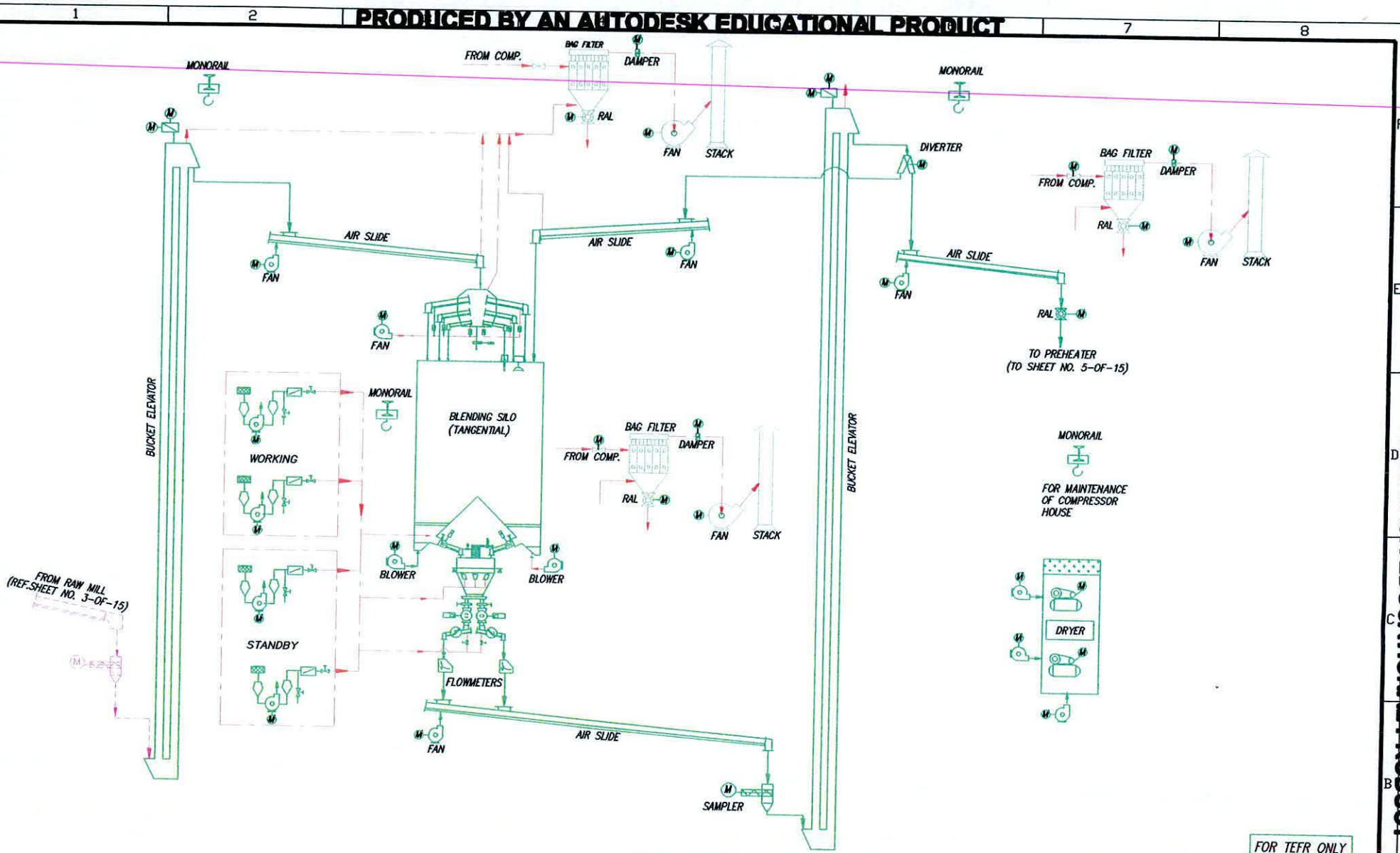
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3000 TPD  
 FLOW SHEET FOR  
 RAW MATERIAL GRINDING

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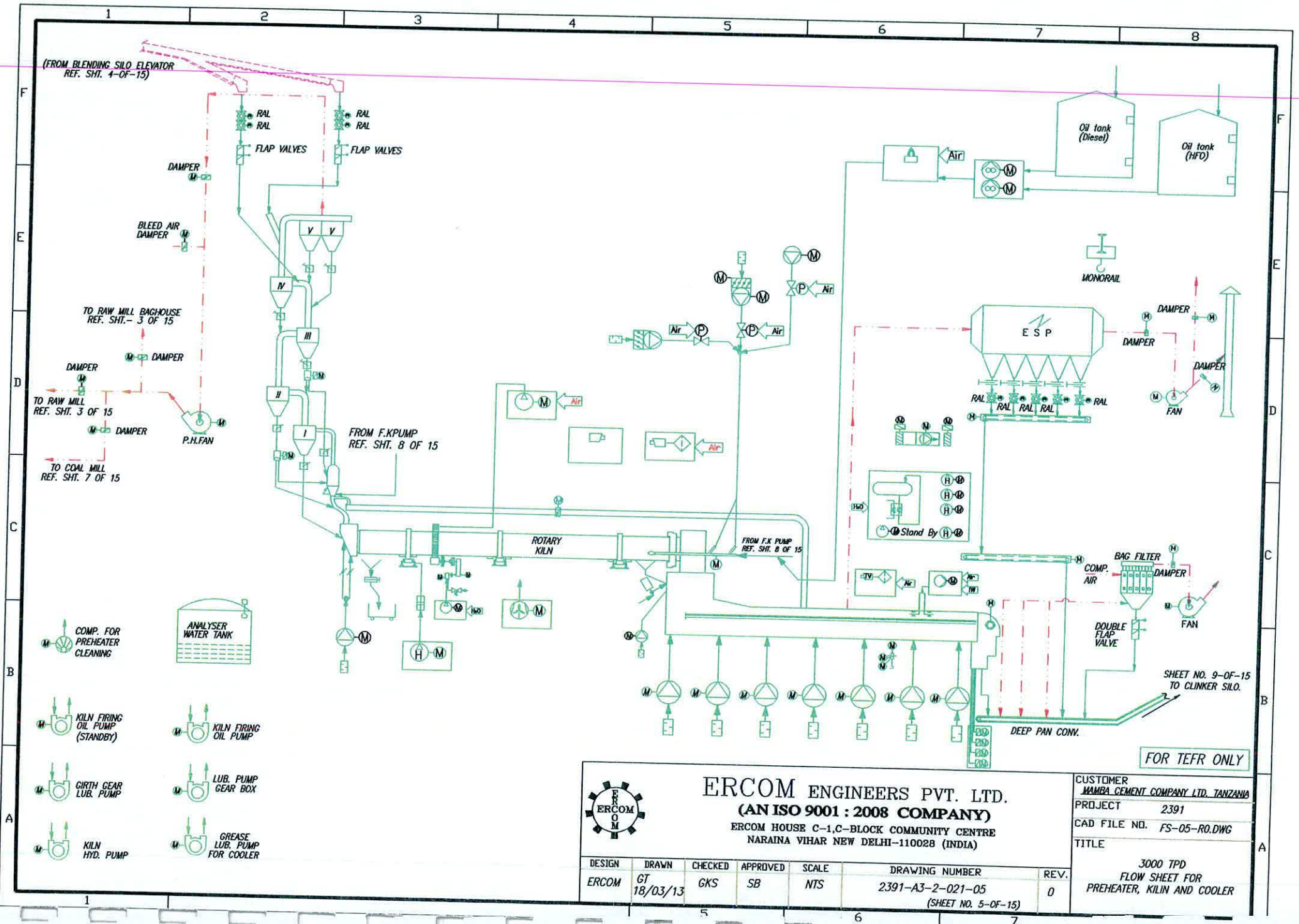


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CUSTOMER  
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 PROJECT 2391  
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DESIGN	DRAWN	CHECKED	APPROVED	SCALE	DRAWING NUMBER	REV.
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3000 TPD  
 FLOW SHEET FOR  
 BLENDING AND STORAGE SILO



(FROM BLENDING SILO ELEVATOR  
REF. SHT. 4-OF-15)

TO RAW MILL BAGHOUSE  
REF. SHT.- 3 OF 15

TO RAW MILL  
REF. SHT. 3 OF 15

TO COAL MILL  
REF. SHT. 7 OF 15

FROM F.K.PUMP  
REF. SHT. 8 OF 15

FROM F.K.PUMP  
REF. SHT. 8 OF 15

SHEET NO. 9-OF-15  
TO CLINKER SILO.

COMP. FOR  
PREHEATER  
CLEANING



KILN FIRING  
OIL PUMP  
(STANDBY)



GIRTH GEAR  
LUB. PUMP



KILN  
HYD. PUMP



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CUSTOMER  
**MAMBA CEMENT COMPANY LTD. TANZANIA**  
PROJECT 2391  
CAD FILE NO. FS-05-RO.DWG  
TITLE

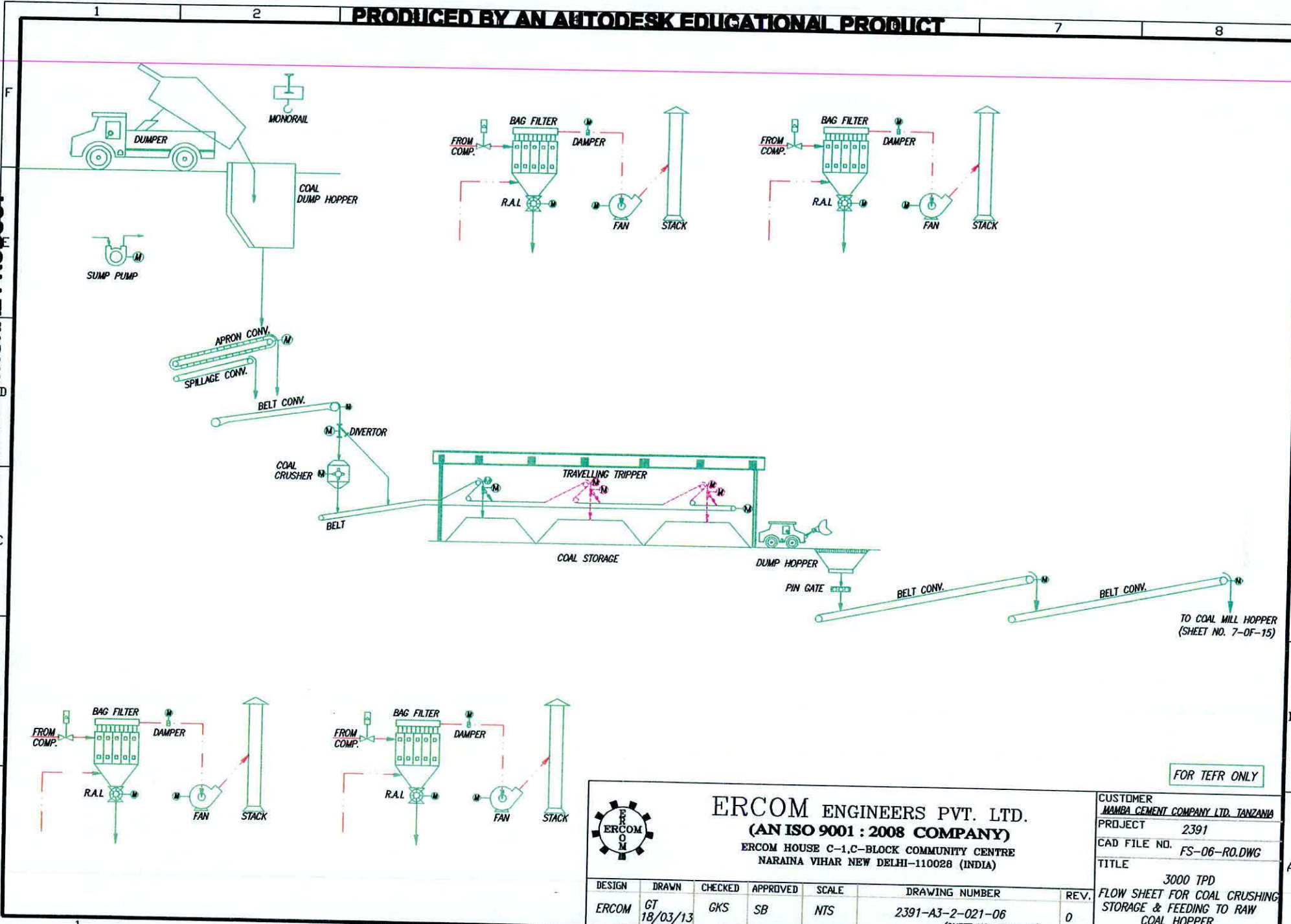
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3000 TPD  
FLOW SHEET FOR  
PREHEATER, KILN AND COOLER


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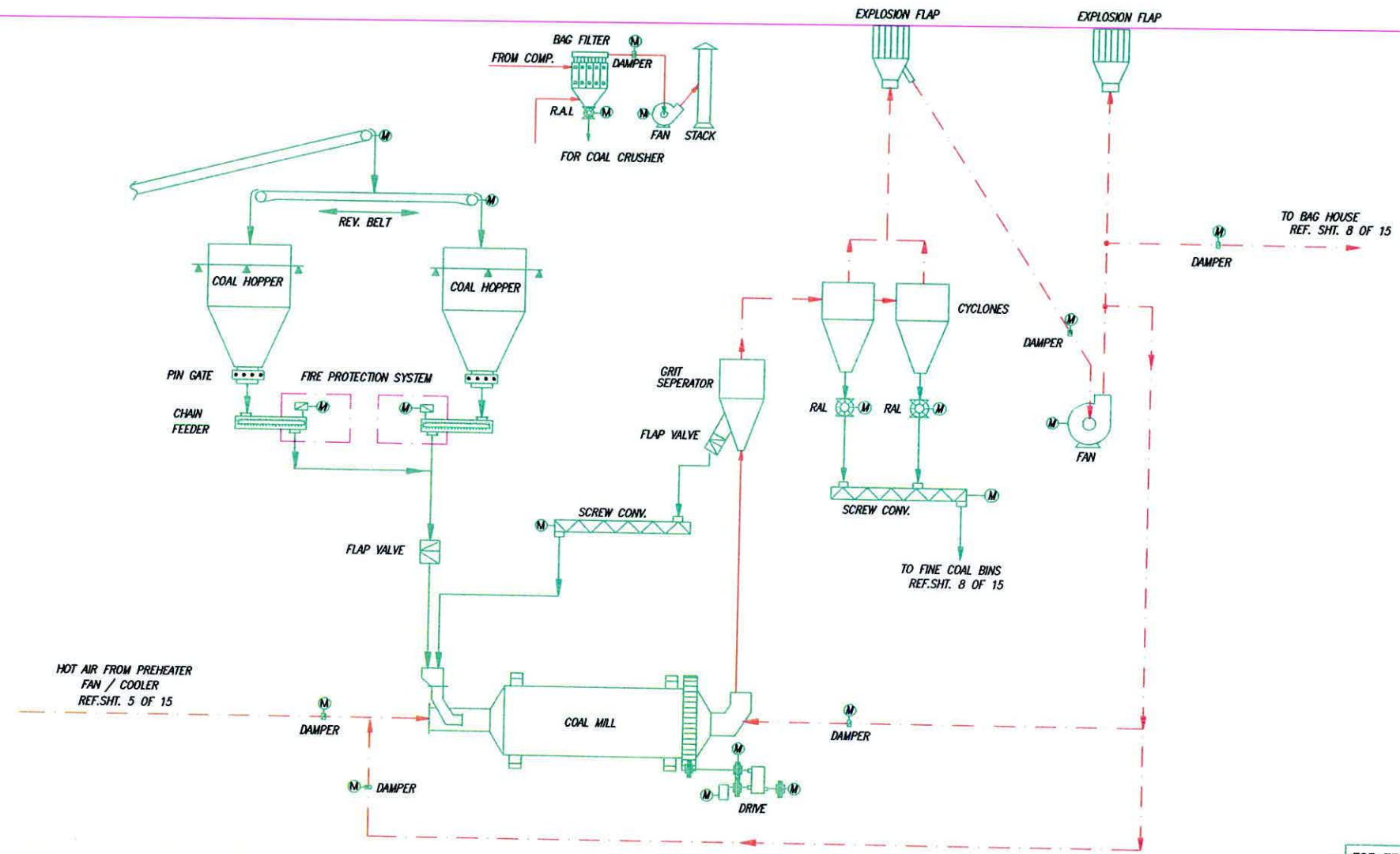
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**MAMBA CEMENT COMPANY LTD. TANZANIA**

PROJECT  
2391

CAD FILE NO.  
FS-06-R0.DWG

TITLE  
3000 TPD  
FLOW SHEET FOR COAL CRUSHING  
STORAGE & FEEDING TO RAW  
COAL HOPPER

DESIGN	DRAWN	CHECKED	APPROVED	SCALE	DRAWING NUMBER	REV.
ERCOM	GT 18/03/13	GKS	SB	NTS	2391-A3-2-021-06 (SHEET NO. 6-OF-15)	0




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- OIL HEATER
- SLIDE SHO BEARING LUBRICATION SYSTEM (HP+LP)
- SLIDE SHO BEARING LUBRICATION SYSTEM (HP+LP)
- GIRTH GEAR LUBRICATION SYSTEM
- GEAR BOX LUBRICATION SYSTEM(1W+1S)

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CUSTOMER  
**MAMBA CEMENT COMPANY LTD. TANZANIA**

PROJECT 2391

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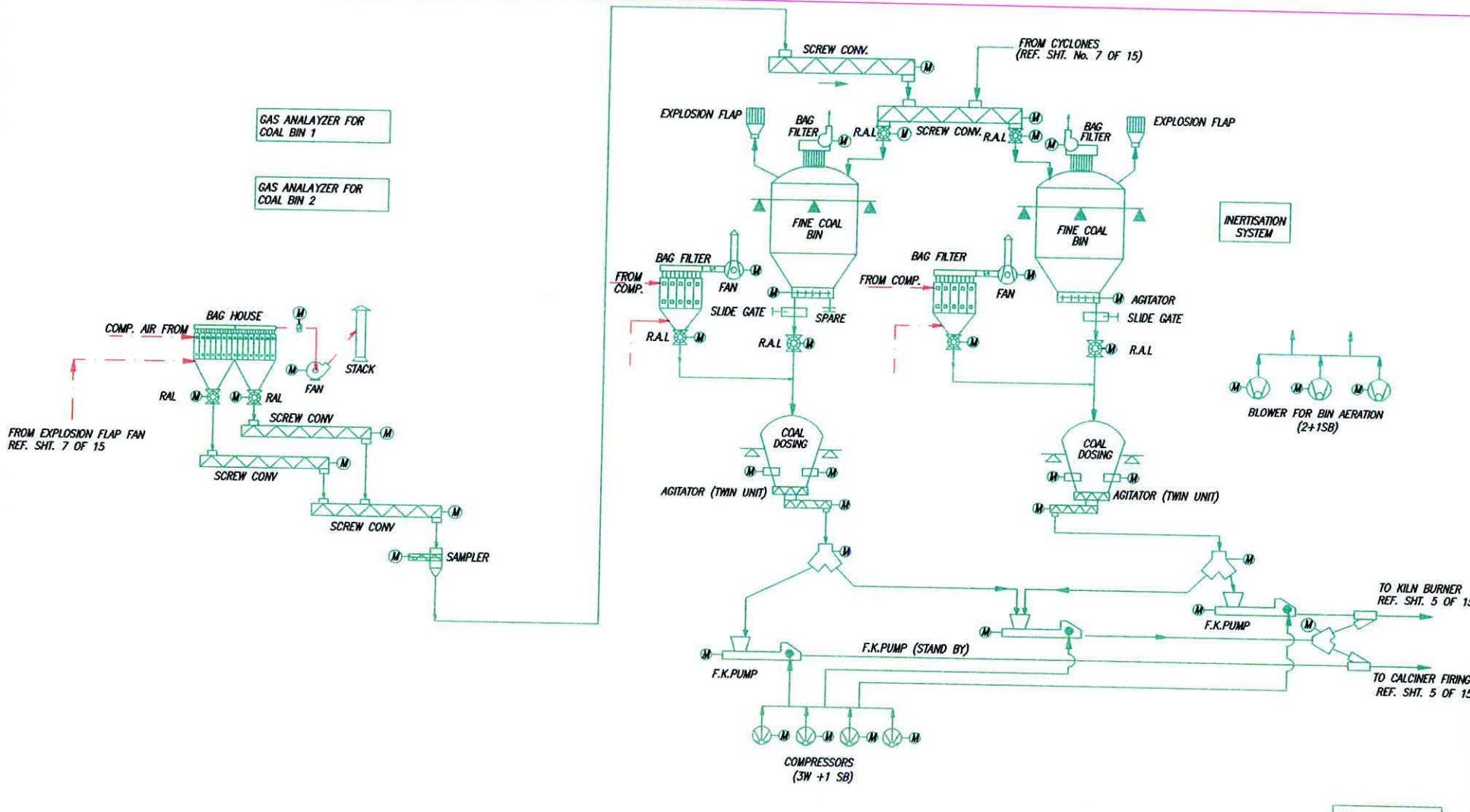
TITLE

**3000 TPD  
FLOW SHEET FOR  
COAL GRINDING**

DESIGN	DRAWN	CHECKED	APPROVED	SCALE	DRAWING NUMBER	REV.
ERCOM	GT 18/03/13	GKS	SB	NTS	2391-A3-2-021-07 (SHEET NO. 7-OF-15)	0

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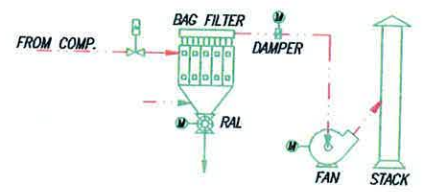
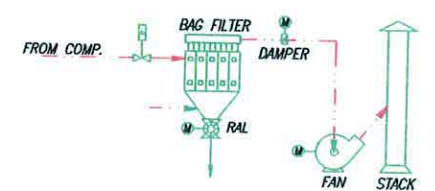
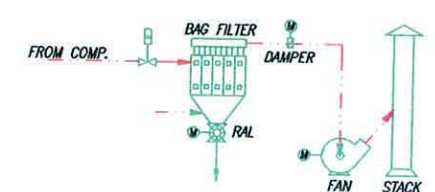
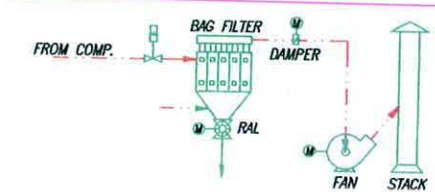
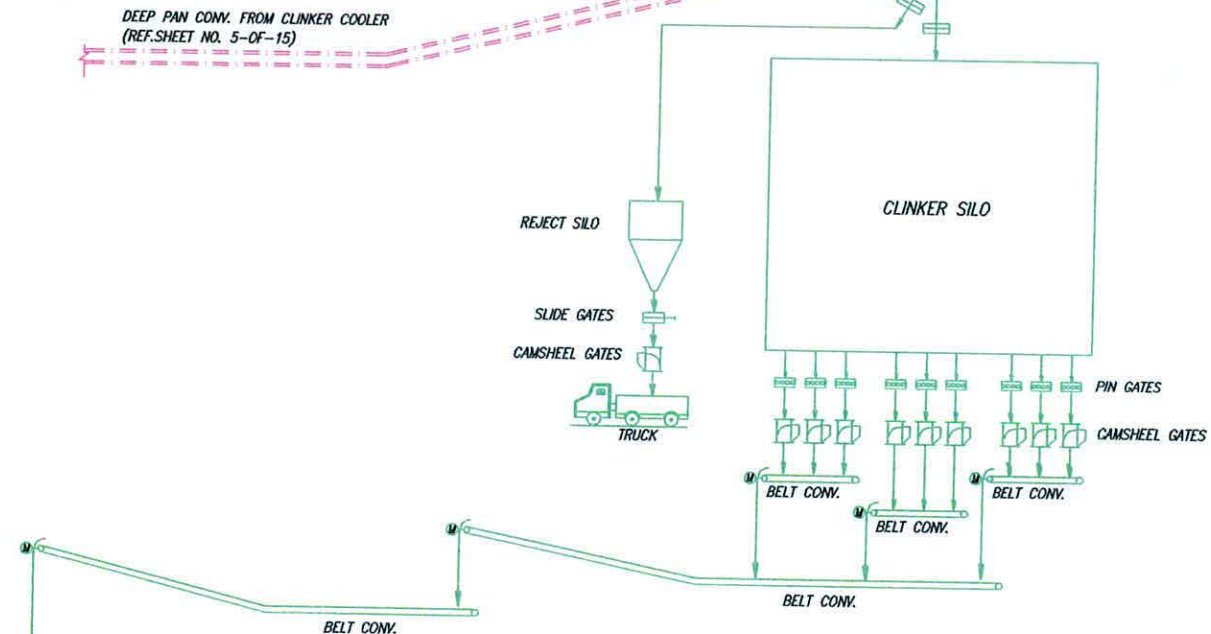
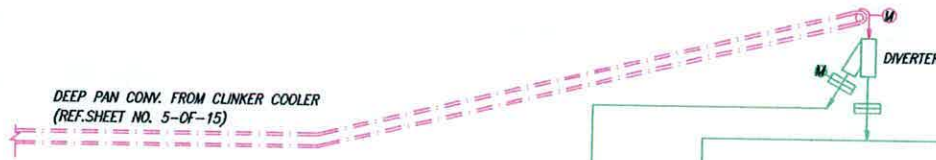
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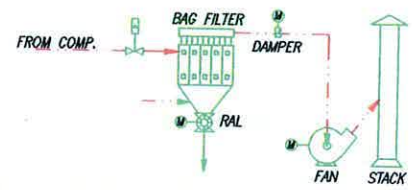
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PROJECT: 2391  
CAD FILE NO. FS-08-RO.DWG  
TITLE: 3000 TPD FLOW SHEET FOR COAL DOSING

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TO CEMENT MILL FEED CLINKER HOPPER  
(SHEET NO. 10-OF-15)



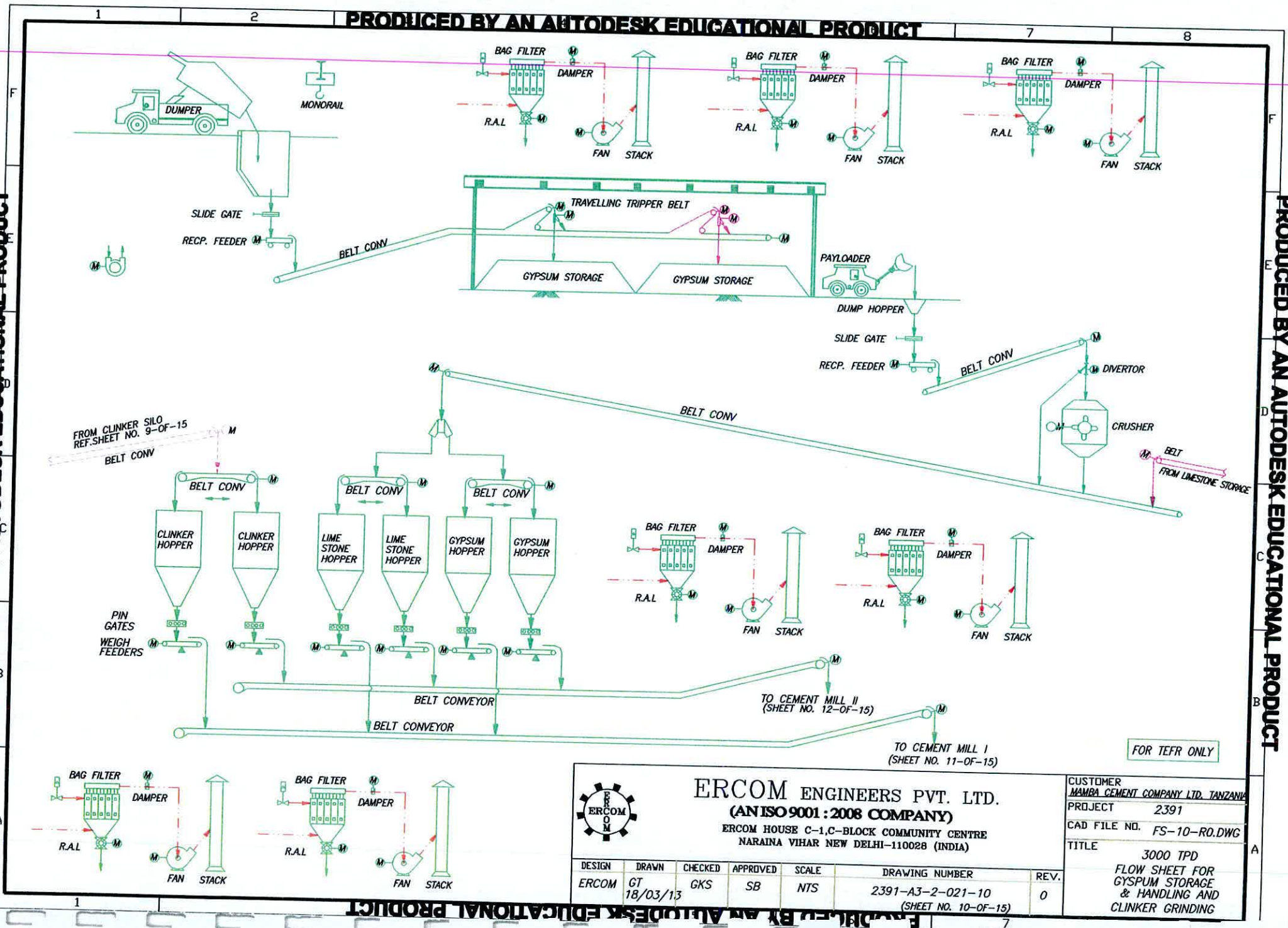
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						PROJECT 2391	
DESIGN ERCOM						CAD FILE NO. FS-09-R0.DWG	
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APPROVED SB						DRAWING NUMBER 2391-A3-2-021-09 (SHEET NO. 9-OF-15)	
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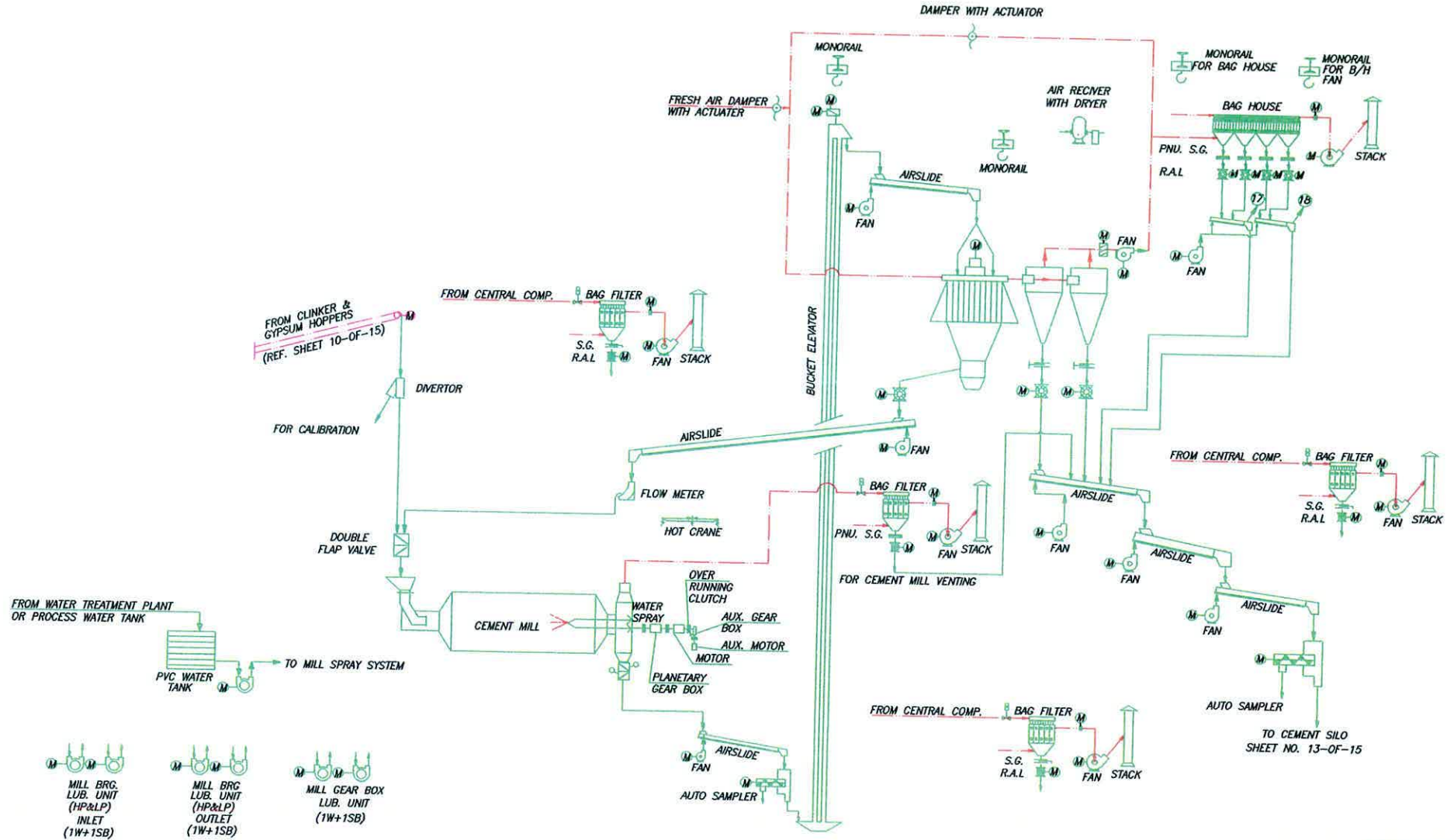


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DESIGN	DRAWN	CHECKED	APPROVED	SCALE	DRAWING NUMBER	REV.
ERCOM	GT 18/03/13	GKS	SB	NTS	2391-A3-2-021-10 (SHEET NO. 10-OF-15)	0

CUSTOMER	MAMBA CEMENT COMPANY LTD. TANZANIA
PROJECT	2391
CAD FILE NO.	FS-10-RO.DWG
TITLE	3000 TPD FLOW SHEET FOR GYPSUM STORAGE & HANDLING AND CLINKER GRINDING

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 NARAINA VIHAR NEW DELHI-110028 (INDIA)

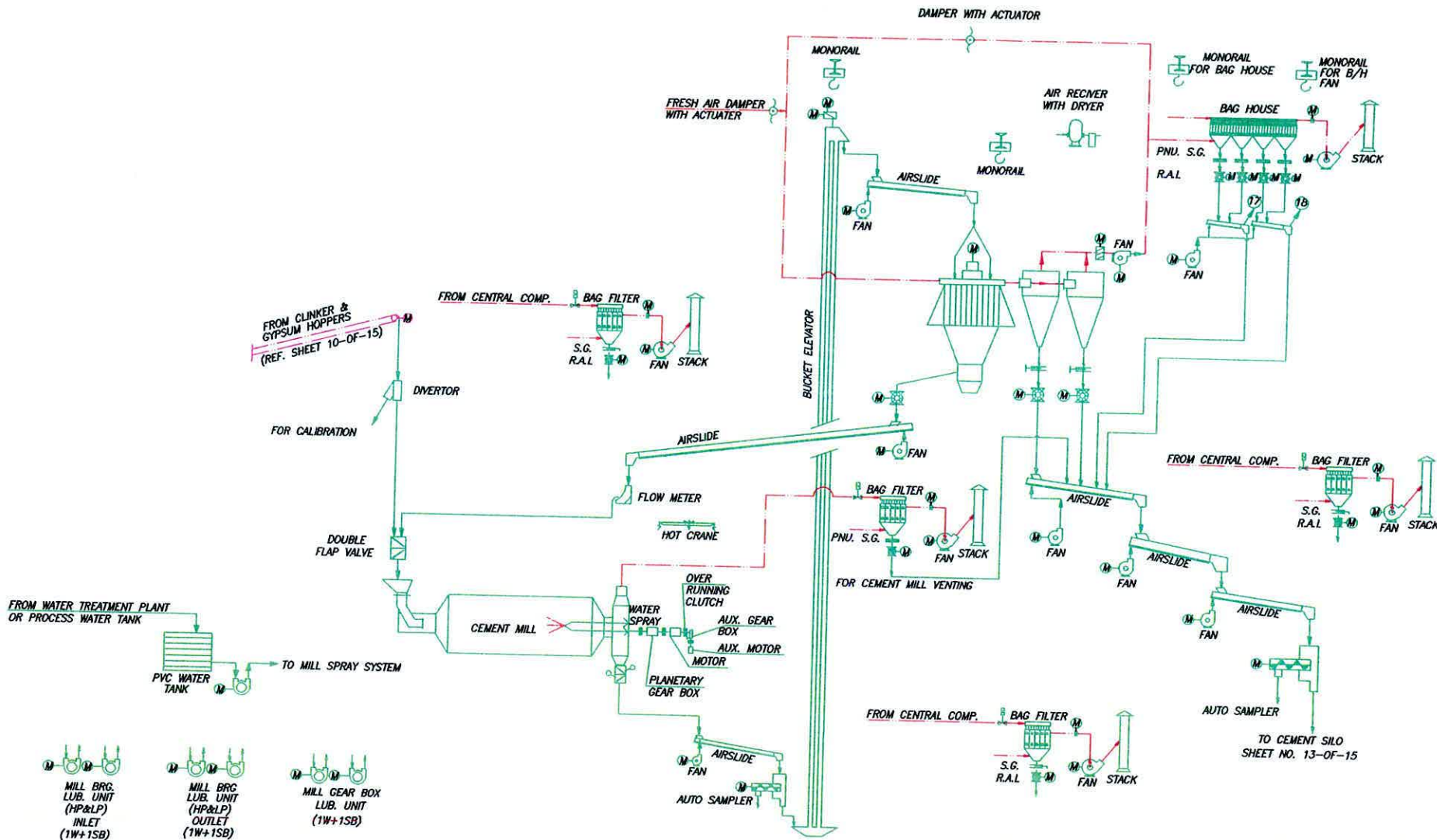
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3000 TPD  
 FLOW SHEET FOR  
 CEMENT MILL-1

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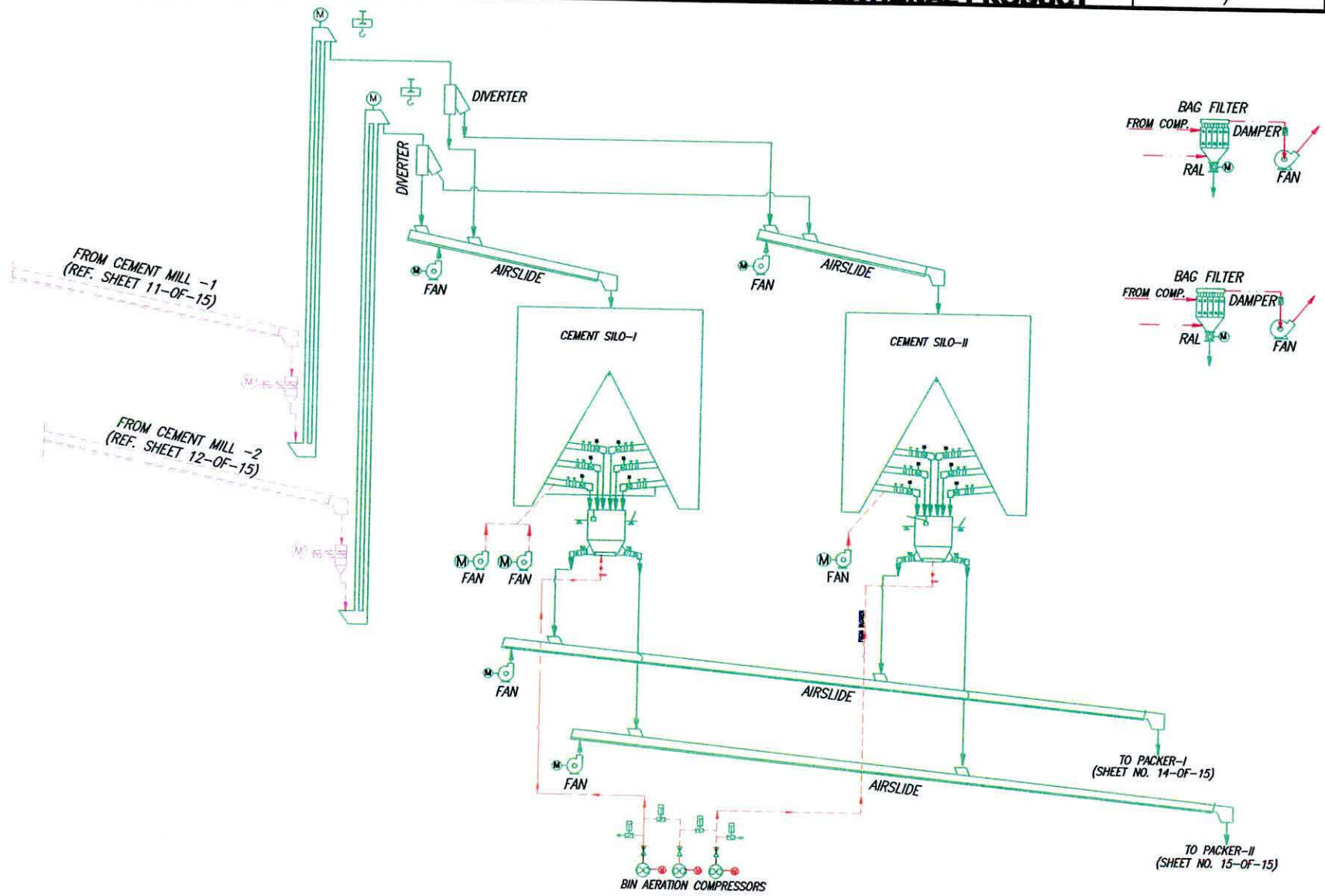
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CUSTOMER  
**MAMBA CEMENT COMPANY LTD. TANZANIA**  
 PROJECT 2391  
 CAD FILE NO. FS-12-RO.DWG  
 TITLE  
**3000 TPD  
 FLOW SHEET FOR  
 CEMENT MILL-1**

DESIGN	DRAWN	CHECKED	APPROVED	SCALE	DRAWING NUMBER	REV.
ERCOM	GT 18/03/13	GKS	SB	NTS	2391-A3-2-021-12 (SHEET NO. 12-OF-15)	0

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 NARAINA VIHAR NEW DELHI-110028 (INDIA)

CUSTOMER  
**MAMBA CEMENT COMPANY LTD., TANZANIA**  
 PROJECT 2391  
 CAD FILE NO. FS-13-RO.DWG

TITLE  
**3000 TPD  
 FLOW SHEET FOR  
 CEMENT STORAGE  
 AND TRANSPORT**

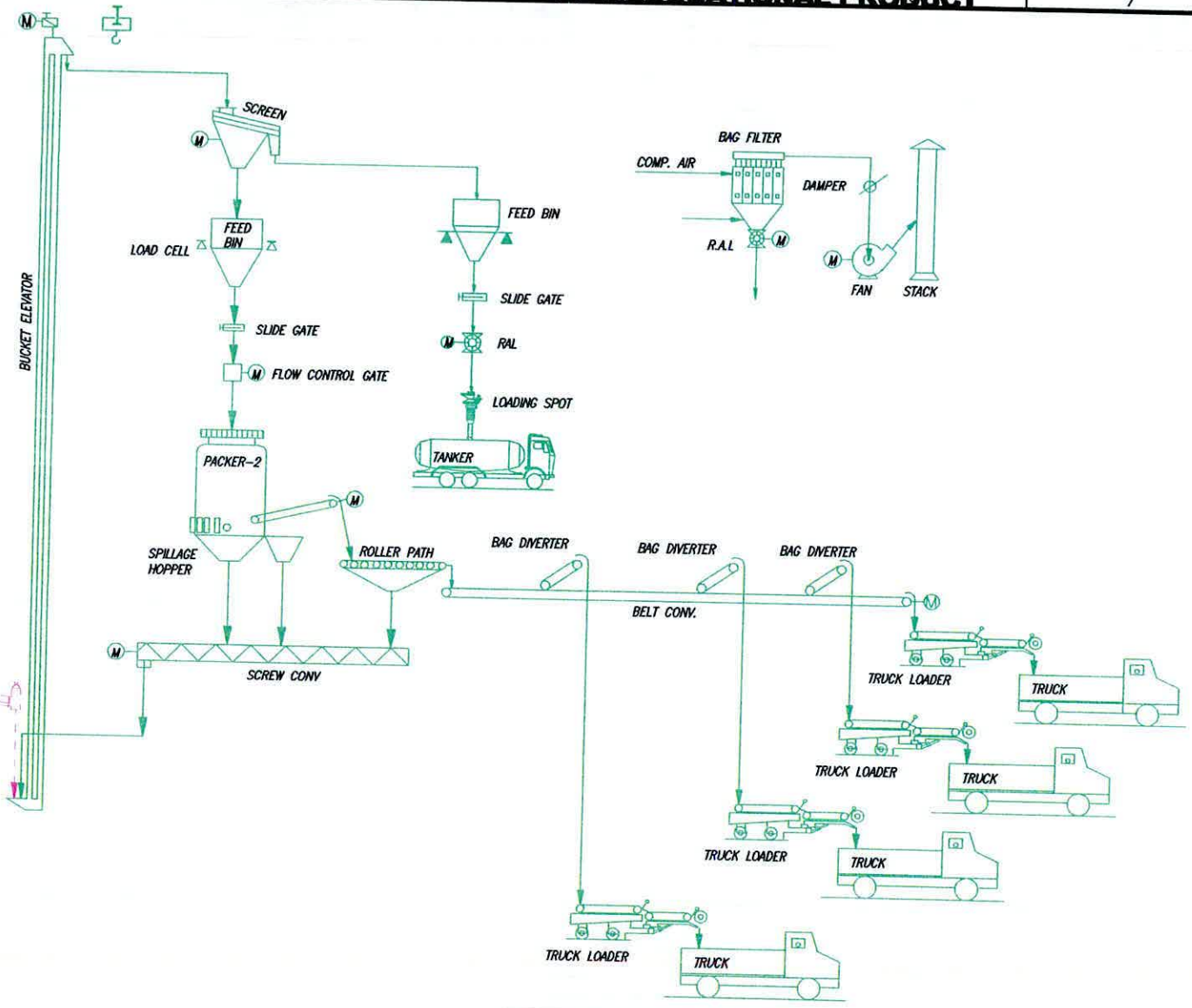
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PACKER UNIT-1

AIR SLIDE FROM CEMENT SILO-1  
(REF. SHEET NO. 13-OF-15)



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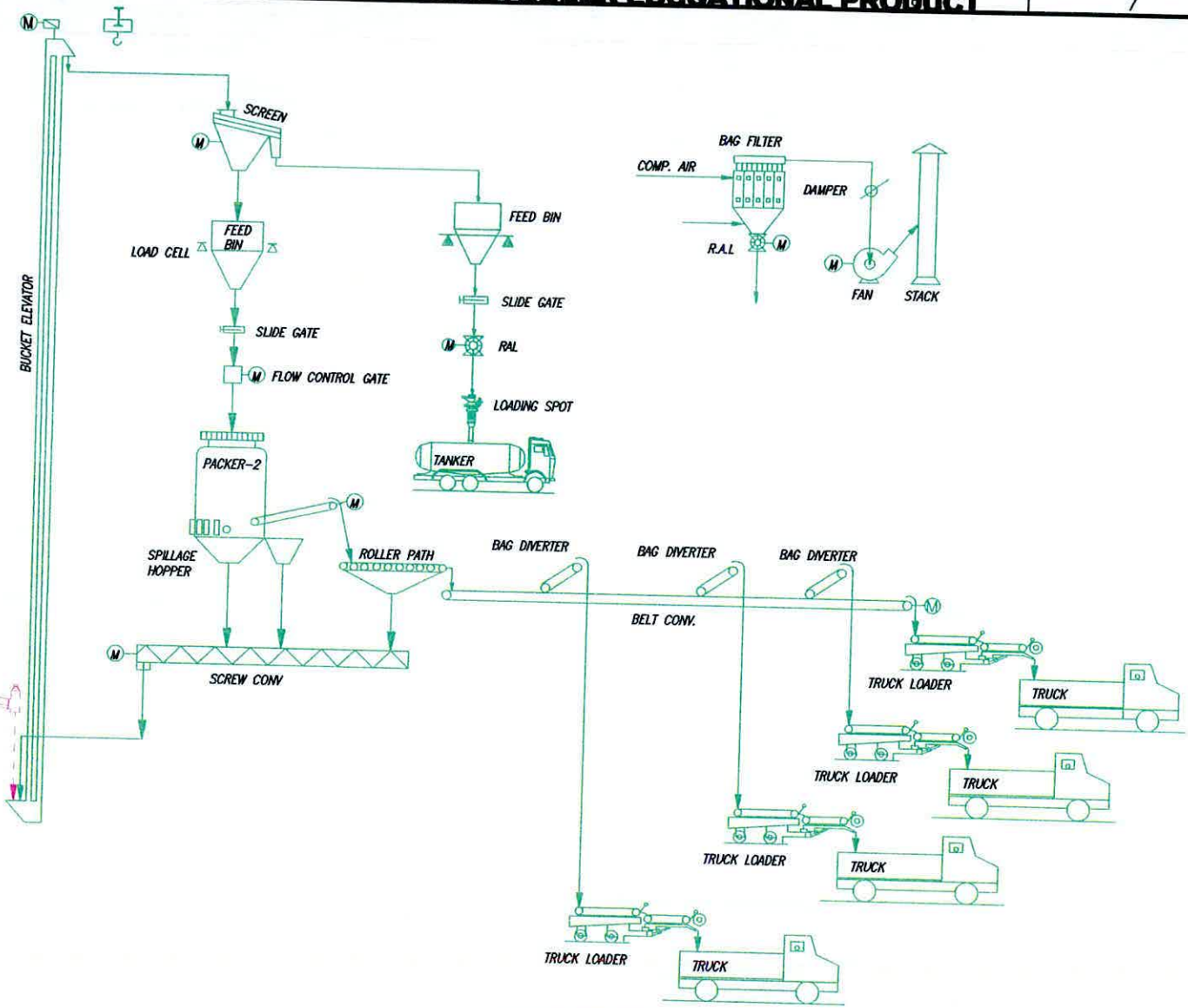
**ERCOM ENGINEERS PVT. LTD.**  
(AN ISO 9001 : 2008 COMPANY)  
ERCOM HOUSE C-1,C-BLOCK COMMUNITY CENTRE  
NARAINA VIHAR NEW DELHI-110028 (INDIA)

CUSTOMER  
**MAMBA CEMENT COMPANY LTD. TANZANIA**  
PROJECT 2391  
CAD FILE NO. FS-14-RO.DWG  
TITLE

DESIGN	DRAWN	CHECKED	APPROVED	SCALE	DRAWING NUMBER	REV.
ERCOM	GT 18/03/13	GKS	SB	NTS	2391-A3-2-021-14 (SHEET NO. 14-OF-15)	0


3000 TPD  
FLOW SHEET FOR  
CEMENT PACKING PLANT

PACKER UNIT-2



AIR SLIDE FROM CEMENT SILO-1 (REF. SHEET NO. 13-OF-15)

FOR TEFR ONLY

		<b>ERCOM ENGINEERS PVT. LTD.</b> (AN ISO 9001 : 2008 COMPANY) ERCOM HOUSE C-1,C-BLOCK COMMUNITY CENTRE NARAINA VIHAR NEW DELHI-110028 (INDIA)			CUSTOMER HANBA CEMENT COMPANY LTD. TANZANIA	
					PROJECT 2391 CAD FILE NO. FS-15-RO.DWG TITLE 3000 TPD FLOW SHEET FOR CEMENT PACKING PLANT	
DESIGN ERCOM	DRAWN GT 18/03/13	CHECKED GKS	APPROVED SB	SCALE NTS	DRAWING NUMBER 2391-A3-2-021-15	REV. 0
(SHEET NO. 15-OF-15)						7

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## SWOT ANALYSIS OF THE CEMENT PLANT LOCATION IN TANZANIA

