

BUSINESS PLAN
FOR
ASPHALT CONCRETE MAKING AND PROCESSING PLANT

FOR

ZHEJIANG COMMUNICATIONS CONSTRUCTION
GROUP CO., LTD

Business Overview

Asphalt concrete is a combination of two primary ingredients: aggregate and asphalt cement. Typically, the aggregate constitutes 90–95% (w/w) of the total mixture and the asphalt cement (asphalt binder) constitutes 5–10% (w/w) of the total mixture to form the asphalt concrete.

The demand for asphalt making is continually increasing mainly due to the fact there are few substitutes for asphalt making and those available aren't sufficient enough to shift people's interest to it. Another factor that has seen the growth of the asphalt making industry is the rise in Gross National Income.

Executive Summary

Zhejiang Communications Construction Group Co., Ltd is a company incorporated in Tanzania and granted Certificate of Compliance as per the Companies Act. The company engaged in the business of civil and building works and they are interested in further expanding their business by establishing an Asphalt making and processing plant.

Having effectively studied this market, we are confident that our laid down strategies will enable us to be able to compete favorably with other construction companies in the area and even around the world. Besides civil and build works, we intend to offer other services that will give us an edge over our competitors and attract customers to us.

Our goal is to be among the top three top brands in Tanzania as a whole. This we will do by not only offering the best services but also getting the best equipment.

Zhejiang Communications Construction Group Co., Ltd intends to set the pace for how asphalt manufacturing companies should be run. This we would do by constantly upgrading our machinery and providing continuous training to ensure that our staffs get updated on new technologies and innovations.

We intend to provide excellent customer service to all our customers so as to keep having repeat businesses with them. We would ensure that we listen closely to their complaints and resolve them in a timely manner. We would also listen to suggestions and tips that would move our business forward. We would also keep in touch with our customers and ensure that we keep them informed of new services and products from our stable.

Our Products and Services

Zhejiang Communications Construction Group Co., Ltd intends to not only focus on civil and building works but also produce asphalt and processing plant and other items that are closely related to civil and building works as well.

Raw Materials

The raw materials used to form asphalt concrete are asphalt cement and aggregate. Asphalt cement is a highly viscous liquid form of petroleum. It acts as the glue that binds the aggregate (small rocks) together to create a tough and flexible material. Asphalt pavement is usually composed of 5% asphalt cement and 95% aggregate. Typically, in the lower levels of a pavement layer, aggregate particles are larger and slightly less angular; in the surface levels, the particles are smaller and more angular. Very small aggregate particles called "fines" may be mixed in to extend the life of the pavement. In addition to asphalt cement and aggregate, manufacturing companies might add certain chemicals to the mixture such as hydrated lime for a tighter bond, or polymers for improved flexibility. Ingredients may vary somewhat depending on the climate of the location the asphalt pavement is to be applied. Asphalt for warmer climate sites is made harder for withstanding hotter temperatures, and asphalt for colder climate sites is made softer.

The Manufacture Process

Asphalt concrete are typically manufactured at a plant. All ingredients must be precisely measured to suit the type of project and the climate of the project site. Then, the thick asphalt cement must be made thinner in order to be able to mix it with aggregate and other components.

Methods for thinning the asphalt include dilution by applying a solvent, emulsification in water or application of heat. Heating is the most common method. Aggregate must be cleaned, dried and heated. When both the aggregate and the asphalt have been raised to the correct temperature, they are blended together in either a drum or pug mill, which are different types of mixing machines that produce a homogeneous mixture.

Choosing the correct temperatures for the process is crucial – manufacturers must adjust temperatures based on the time it will take to transport the pavement mixture from the plant to the construction site, how thick the asphalt cement is to start with and how long it will take to compact the mixture once applied.

The following are steps on how to make asphalt concrete enclosed below

Excavation and transportation

Use heavy machinery to dig out large blocks of rocks, and then transport them by truck to a paving plant which is right on the quarry site.

Crushing process

The volume of the rock is too large, it is necessary to use crushers to reduce it into small pieces of material.

The crushing process is mainly divided into three levels:

Primary crushing:

The huge-block should be crushed into smaller than 20 centimeters by crusher, when it's time to make the crushed rocks travel via a conveyor belt from the storage area to a screening building to be classified by size, there the rocks tumble downward over a series of incline screens whose largest holes at 10 centimeters across.

Secondary crushing:

Pieces which is still large are drop through and go to a secondary crusher like impact stone crusher or cone crusher that reduces the rocks to 10 centimeters or smaller.

Tertiary crushing:

Then send rock of secondary stage to a third or tertiary crusher that further reduces them to 2 centimeters or smaller. Rock which is already small enough to pass through the screen, bypass the secondary crusher and go directly to the tertiary crusher.

After the last crushing stage, the largest stone size is about 2 cm. Materials smaller than 5mm, 5-10mm, 10-14mm are separated by conveyor belt after screening.

Drying Process

Then the material of a specific size is sent to the dryer through conveyor belt. The main purpose is to reduce the humidity of the material a better bond with the asphalt during the period. Then, the screening equipment can screen the materials again to meet people's more precise needs.

Mixing Process

The dried material should be fully stirred in the mixer, which is designed for the surface layer, and then pumping into the hot asphalt. This fine mix is less permeable and keeps water from penetrating down and causing cracks to form.

Asphalt Paving Mixtures

Since asphalt cement is a major constituent used in road paving, the following is a brief description of how asphalt paving mixtures are produced. Asphalt paving mixes made with asphalt cement are usually prepared at an asphalt mixing facility. There are two types of asphalt mixes: hot-mix and cold-mix. Hot-mix asphalt (HMA) is more commonly used while cold-mix asphalt (generally mixes made with emulsified or cut-back asphalts) is usually used for light to medium traffic secondary roads, or for remote locations or maintenance use. Hot-mix asphalts are a mixture of suitable aggregate coated with asphalt cement. The term "hot-mix" comes from the process of heating the aggregate and asphalt before mixing to remove moisture from the aggregate and to obtain sufficient fluidity of the asphalt cement for proper mixing and work-ability.

Our Vision Statement

Our vision is to be among the top three asphalt making and processing plant manufacturing brand in the country.

Our Mission Statement

Our mission is to ensure that we do not lose sight of our vision. This we would do by getting the best machinery possible and ensuring we meet the needs of our existing as well as potential clients.

Our Business Structure

To have a strong structure on ground, we Zhejiang Communications Construction Group Co., Ltd intend to ensure that we start on the right footing by getting the right employees to carry out the defined tasks that will make the company grow and make profit. We intend to invest in their welfare so that they could remain focused on growing the company.

We intend to partner with our distributors in such a way that we would both benefit from the relationship. Our distributors would be carefully selected for their wide reach, and other benefits to us. We would constantly make sure we work at perfecting the relationship and listen to their complaints and suggestions on the way forward for the company.

We also plan to offer other products and services at Zhejiang Communications Construction Group Co., Ltd and to this effect, we know we would need more hands to be able to ensure that the business grows and expand smoothly in achieving our business objectives. Listed below are those we believe will build Zhejiang

Communications Construction Group Co., Ltd

Chief Executive Officer

Asphalt Plant Manager

Project Manager Construction

Asphalt Operator

Human Resources and Admin Manager

Accountants

Truck Drivers

Customer Service Executives

Security Guard

Roles and Responsibilities

Chief Executive Officer

- Provides a clear strategic direction for the organization and communicate these strategies to appropriate channels
- Has an experience with the budgets as well as allocate resources appropriately
- Ensures that the right professionals are hired into the management team
- Builds corporate culture that would influence employees' attitude and decision

Asphalt Plant Manager

- Supervise and coordinate activities of workers engaged in asphalt production
- Ensure strict compliance with all health and safety rules and country regulations
- Participates in the hiring of new employees for plant section and also create and keep work and manufacturing schedules
- Carries out constant monitoring of the manufacturing equipment to ensure that it is in working order
- Coordinate the execution of general plant operations activities
- Monitor quality, inspect, & troubleshoot material
- Formulate plans and executive preventive maintenance procedures

Project Manager Construction

- oversee all aspects of the building process
- working closely with engineers and architects to develop plans
- establish timetables, and determine labor and material costs
- ensuring the project is completed on budget and within scope
- Hire and manage subcontractors and employees, gather permits, and ensure all aspects of the project are up to code.

Plant Operator

- Oversee plant operations.
- Monitors and operates process control equipment, including valving, and engineering. Interprets plant procedures.
- Monitor and troubleshoot operating equipment.
- Ensure plant adheres to safety and environmental rules.
- Conceptualize, design, and implement plant improvement projects
- Control and operate equipment such as loaders, drills, tractors, trucks, crushers, excavators, fork lifts, bulldozers and cranes.
- Observe gauges, dials, or other indicators to make sure a machine is working properly.
- Perform calibration check of scale accuracy at the beginning of each work shift.

Human Resources and Admin Manager

- Ensures the development, management as well as implementation of personnel policies
- Recruits, retain and terminates staff appropriately
- Ensures that office practices are adhered to and in line with employment related laws
- Ensures that the administrative systems are constantly reviewed with an aim to being proactive instead of reactive
- Ensures that staff welfare and incentive.

Accountants

- Ensures that tax returns are prepared and that tax requirements, preparation and reporting are complied with
- Works with management and report all the finances regarding Zhejiang Communications Construction Group Co., Ltd.
- Ensures that budgets are developed, and maintained periodically and also compare budgeted costs to actual costs
- Prepares and analyzes of accounting records, financial statements and reports in order to determine accuracy and conformance with accounting standards
- Carries out analysis of business operations including costs and revenues and use this to not only project future income and expenses but to proffer advice as well.

Truck Drivers

- Ensures that cargoes are loaded and unloaded at the appropriate times
- Ensures that all traffic laws are followed
- Inspects truck before and after every trip, and report any major defects found to the appropriate department
- Carries out light repairs and maintenance on trucks as at when due
- Ensures that clients get their products on time

Customer Service Executives

- Ensures that they answer calls that deal with complaints, orders, and inquiries professionally
- Processes orders and applications for clients
- Ensures that records of all customer interactions as well as transactions with the company are well kept
- Follows up on inquiries and complaints to ensure that appropriate actions had been taken by the company

Security Guard

- Protects the property of the asphalt manufacturing company
- Prevents security problems that are likely to arise during the course of carrying out security duties
- Responds to security issues that might crop up
- Enlightens employees by providing security tips

SWOT Analysis

Having a SWOT analysis is very important as this would help us know what our chances of succeeding in this market are and how well we can improve on our weakness while eliminating totally or reducing threats to the barest minimum. In carrying out a thorough SWOT analysis, we hired a reputable business consultant who has several years of experience in helping start-ups with carrying out this analysis.

The aim of the SWOT has also helped us determine if this is a business that we should pursue or not. We are glad to say our strengths and opportunities were in high percentages and that the threats posed to our business is few and our weaknesses will be worked on.

Here is what the SWOT analysis carried out by an expert on behalf of Zhejiang Communications Construction Group Co., Ltd revealed;

Strength:

Our strength lies in our up-to-date technologies and machineries deployed to produce asphalt. We also have the right and dedicated professionals that will handle these machines to ensure maximum output. Another strong suit of ours lies with our excellent customer service that is dedicated to ensuring that customers' complaints are promptly taken care of without excessive delays.

We also have a Chief Executive Office who does not only believe in having the right professionals in the right positions but also has a robust and vast experience in the field that would ensure that the Zhejiang Communications Construction Group Co., Ltd does all the right things at the right time.

Weakness:

The asphalt production market is one that already has many players in the field in Tanzania. This has made it seem like the market is saturated as the entry requirements into this market are low. However, we intend not to allow this deter us as we have strategies in place to ensure we become a brand to be reckoned with.

Opportunities:

There is however several opportunities that abound in this field which stems from the fact that asphalt are used often, which shows the market is there. Also, because of our approach to producing quality, we will help new business start-ups by giving them franchises that would elevate their business to great heights.

Threats:

Every business is faced with threats, and so the threats that would face us in this area include having to compete against already established asphalt making and processing plant manufacturing companies, and also unfavorable government policies.

The Project Promoters

The project is being promoted by Zhejiang Communications Construction Group Co., Ltd, a limited liability company incorporated under the laws of the Republic of Tanzania whose shareholders are as follow;

S/N	NAME OF SHAREHOLDERS	PERCENTAGE OF OWNERSHIP	NATIONALITY
1	Zhejiang Communications Technology Co., Ltd	99.99	CHINESE
2	Zhejiang Iron Jiangshan	0.01	CHINESE

	Chemical New Material Co., Ltd		
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MARKET ANALYSIS

Market Trends

While the asphalt market is regarded as a stable one, asphalt manufacturing companies have to sometimes come up with strategies that would differentiate them from their competitors. This can be in the production of high-premium asphalt.

Another trend is in ensuring that we not only produce asphalt making but also other related building materials products as well; and also create avenues for our customers to be aware of what new products we are offering.

Lastly, we intend to use technology as a means of marketing our asphalt and processing plant manufacturing company and also increasing its awareness as well. Besides, technology, we also intend to use the internet in reaching out to our various existing as well potential clients.

Our Target Market

Our target market is basically everyone in Tanzania. This is why part of our expansion strategy is to have strategic locations in different states of the country.

Asphalt products are required for road and driveway construction. There are a significant number of roads and driveways which need to be paved each year. Thus, there is a significant niche to be filled.

Gravel and rock-related products are a necessary ingredient to road building in the area. There are a significantly large percentage of roads which need to be re-graveled each year. In addition, there is a significant percentage of the population who have "retired" to the area, and are engaged in remodeling and making their new homes more accessible.

Also, the previously-described "window of opportunity" and the vulnerability of competitors to a customer-oriented operation are significant. The average end-user is more concerned with customer service than with price.

Due to several authentic statistics and market researches, we know exactly who and where our target markets are, and what they expect from us. We intend to engage in wholesale distribution to retail stores that will cater to the following group of people:

Municipalities

Schools

Business Places

Construction and private companies.

Government Institutions

Educational Institutions

Every person/entity not listed

Our Competitive Advantage

Since we intend to survive in the asphalt production business for a long time to come and also be among the top leading brands in Tanzania, we have drafted competitive advantage strategies that will ensure that our vision and mission statement is achieved.

We know how important our customers are to the business, and so one of our competitive advantages is to ensure that our customer retention strategies remain very high. This can be achieved by promptly attending to the complaints of our clients and giving out incentives regularly.

Another of our competitive advantage is in the hiring of competent employees who have a vast experience in the field and are attuned to our vision and corporate culture, and also understand the need to have a strong distribution network as well as excellent customer culture while also positively promotion.

Another part of our competitive advantage is in ensuring that our competent employees have fair welfare packages, which would be the best in the industry. This would then ensure that they improve on their productivity, which would to a greater extent improve our bottom line.

Lastly, we would ensure that our pricing policies are not only favorable to our customers but also to us as well. This we would do by critically evaluating the right price that would be fair to us as well as our numerous clients.

SALES AND MARKETING STRATEGY

Sources of Income

Zhejiang Communications Construction Group Co., Ltd is being established with the purpose of generating revenue and invariably making profit in Tanzania. To ensure that we have a healthy bottom line, we intend to ensure that we have other sources of income for our business.

Zhejiang Communications Construction Group Co., Ltd will generate income by selling

the asphalt;

Since there are no close substitutes or alternatives for asphalt, the sale of asphalt have come to stay and is even regarded as an essential commodity.

At Zhejiang Communications Construction Group Co., Ltd, we are not only well positioned to take on the available market that exists in Tanzania, we are also quite confident that we will generate enough revenue in our first year of business to cover all operations and overheads, so much so that the business will begin to pay itself and then invariably grow and expand.

Our confidence stems from the fact that we have critically evaluated this industry especially the production and distribution line and our chances are strongly positive. The sales projection we have carried out is based on information that was gathered on the field and some of the assumptions are based on factors that are peculiar to start-ups in Tanzania.

Below are the sales projections for Zhejiang Communications Construction Group Co., Ltd, which is based on where we are located as well as other factors that is intended for the growth of our business.

First Fiscal Year-: \$ 500000.00

Second Fiscal Year-: \$ 700000.00

Third Fiscal Year-: \$ 900000.00

N.B: It should be noted that the sales projection above is based on the assumption that all favorable factors will remain constant and that there won't be any change. However, as time changes, there the projections might be lower or higher.

Marketing Strategy and Sales Strategy

Every business man knows how important marketing is to a business and how deploying the right marketing strategies will help the companies generate income as well as boost its own profile as well. After a thorough research on what marketing strategies would be best for us to not only penetrate the market but also compete favorably with other leading brands as an upcoming company, we were able to come up with reliable data and information that will ensure our business is marketed effectively in Tanzania.

Also, knowing the importance of marketing to our business, our sales and marketing executives have been empowered to deliver our corporate sales goals so as to shore

up our revenue base while also positively promoting the company's image.

We also know how important technology is in these times especially when it comes to marketing and so we have perfected plans to develop an app that will bring us closer to our existing and potential clients. We would also make our social media platforms as active as possible for our audience.

We intend in summary to leverage on the following approaches to market our products and services at Zhejiang Communications Construction Group Co., Ltd;

Advertise our tiles manufacturing company via local newspapers, national newspapers, and radio stations and on television.

Encourage our loyal customers by giving out incentives for referrals

Engage in word-of-mouth marketing

Engage in direct marketing through our sales and marketing executives

Ensure our business is listed in Yellow pages and other local directories as well as online directories

Use our website to sell our products and services

Make use of our social media platforms to actively promote and sell our products and services.

Regardless of the fact that our brand is a well-known one that has a high standard, we know how important creating awareness for a business is. Every business established for the purpose of making profit and competing favorably with other leading brands must have good publicity and advertising strategies laid out, and this we have in place.

Zhejiang Communications Construction Group Co., Ltd intends to explore all available means of publicity in Tanzania. Our publicity strategies will ensure that we not only promote our products and services but project our image positively to intending and existing clients.

Listed below are the platforms we intend to leverage on in promoting our Zhejiang Communications Construction Group Co., Ltd;

- Ensure that we introduce our asphalt making manufacturing company to commercial offices around us
- Provide distribution benefits to all our distributors and partners
- Place adverts on print media (local newspapers as well as relevant magazines) and electronic media (radio stations and televisions)

- Use our social media platforms – such as Facebook, Twitter, and Instagram to seriously engage our existing and potential clients and promote our brands
- Sponsor social shows such as community pageants and educational fairs
- Distribute our handbills and fliers in various target areas
- Install our billboards in various strategic locations around Tanzania
- Give our distribution trucks an attractive color that will visibly show and promote our products
- Our Pricing Strategy

Asphalt products are regarded as essential commodities and will always be purchased no matter what. Our pricing module will however not be too different from that of our competitors, as we would during the first six months of operations offer our products at a little less price than that of our competitors; we might however raise the prices a bit after our brand has become well known. We would never offer prices that are below our cost of production as well as overheads as we intend to be in business for a long time.

Payment Options

Because we know how an easy payment option will keep more of our customers with us, at Zhejiang Communications Construction Group Co., Ltd, we have crafted a payment policy that will ensure our customers find it easy to pay. We also have different payment options for various clients.

Our payment options below are available for most of our clients;

Check payment via banks

Online bank transfer

Payment via Point of Sale

The banks that we have partnered with for this payment options are those that will ensure that customers will have a smooth experience without hitches when making payments.

Start – Up Expenditure (Budget)

Starting a standard asphalt manufacturing business is not the easiest of tasks as most of one's start-up capital has to go into ensuring that hitches and glitches are reduced to the barest minimum. The bulk of this capital usually goes into equipment and machinery purchase, utility bills and employee salaries at least up to a certain period of time.

INVESTMENT COST - FINANCING PATTERN

The Total development cost is estimated at USD\$ 2,030,000.00 a summary of the breakdown is as indicated in the table below

Item	US\$
Business incorporation fees and other legal expenses in Tanzania	\$ 50000.00
Obtaining of licenses and permits	\$ 50000.00
Operational cost for the first six months (payment of utilities, employee salaries)	\$ 200000.00
Insurance coverage (General Liability, workers' compensation, property liability)	\$ 200000.00
Marketing and publicity promotion expenses for launching as well as for six months of operations	\$ 100000.00
Asphalt concrete mixing equipment	\$ 1000000.00
Cost of inventory (raw materials)	\$ 100000.00
Cost of hiring a business consultant	\$ 5000.00
Setting up a storage facility plus equipment	\$ 5000.00
Cost of asphalt distribution truck	\$ 200000.00
Cost of administrative start-up expenses (computers, printers, stationeries, phones)	\$ 10000.00
Cost of launching an official website –	\$ 5000.00
Miscellaneous	\$ 5000.00
Sub Total	\$ 1930000.00
Initial working capital	\$ 100000.00
GRAND TOTAL	\$ 2030000.00

From the above requirements, we would need an estimate of \$ 2,030,000.00 to successfully start and operate our asphalt production company in Tanzania. This amount can successfully cover our first six months of operations.

Sustainability and Expansion Strategy

Every entrepreneur knows how important it is to sustain a business. A business can be sustained through various factors such as increasing the retention rate of your loyal customers. Ensuring the efficiency of our employees by hiring the right people and giving them regular training, and also having the right business structure so that the company can continue to exist for as long as possible.

Byproducts

Environmental protection laws have developed stringent codes limiting water flows and particulate and smoke emissions from oil refineries and asphalt processing plants. Not only dust but sulfur dioxides, smoke, and many other emissions must be rigorously controlled. Electrostatic precipitators, primary dust collectors using single or multiple cone cyclones.

Secondary collection units consisting of fabric filter collectors commonly called "bughouses" are all required equipment to control emissions. Hydrocarbons formed in asphalt production, if unchecked, create odoriferous fumes and pollutants which will stain and darken the air. Pollutants emitted from asphalt production are controlled by enclosures which capture the exhaust and then recirculate it through the heating process. This not only eliminates the pollution but also increases the heating efficiency of the process.

Higher costs of asphalt cement, stone, and sand have forced the industry to increase efficiencies and recycle old asphalt pavements. In asphalt pavement recycling, materials reclaimed from old pavements are reprocessed along with new materials.

The three major categories of asphalt recycling are

- i. Hot-mix recycling, where reclaimed materials are combined with new materials in a central plant to produce hot-mix paving mixtures
- ii. Cold-mix recycling, where reclaimed materials are combined with new materials either onsite or at a central plant to produce cold-mix base materials.
- iii. Surface recycling, a process in which the old asphalt surface pavement is heated in place, scraped down or "scarified," remixed, re-laid, and rolled. Organic asphalt recycling agents may also be added to help restore the aged asphalt to desired specifications.

Because of solvent evaporation and volatility, use of cutback asphalts, especially rapid cure cutback asphalts which use gasoline or naphtha, is becoming more restricted or prohibited while emulsified asphalts (in which only the water evaporates) are becoming more popular because of cost and environmental regulations.

Quality Control

The quality of asphalt cement is affected by the inherent properties of the petroleum crude oil from which it was produced. Different oil fields and areas produce crude oils with very different characteristics. The refining method also affects the quality of the asphalt cement. For engineering and construction purposes, there are three important factors to consider: consistency, also called the viscosity or the degree of fluidity of asphalt at a particular temperature, purity, and safety.

The consistency or viscosity of asphalt cement varies with temperature, and asphalt is graded based on ranges of consistency at a standard temperature. Careless temperature and mixing control can cause more hardening damage to asphalt cement than many years of service on a roadway. A standardized viscosity or penetration test

is commonly specified to measure paving asphalt consistency. Air-blown asphalts typically use a softening point test.

Purity of asphalt cement can be easily tested since it is composed almost entirely of bitumen, which is soluble in carbon disulfide. Refined asphalts are usually more than 99.5% soluble in carbon disulfide and any impurities that remain are inert. Because of the hazardous flammable nature of carbon disulfide, trichloroethylene (TCE), which is also an excellent solvent for asphalt cement, is used in the solubility purity tests.

Asphalt cement must be free of water or moisture as it leaves the refinery. However, transports loading the asphalt may have moisture present in their tanks. This can cause the asphalt to foam when it is heated above 212°F (100°C), which is a safety hazard. Specifications usually require that asphalts not foam at temperatures up to 347°F (175°C). Asphalt cement, if heated to a high enough temperature, will release fumes which will flash in the presence of a spark or open flame. The temperature at which this occurs is called the flashpoint, and is well above temperatures normally used in paving operations. Because of the possibility of asphalt foaming and to ensure an adequate margin of safety, the flashpoint of the asphalt is measured and controlled.

Another important engineering property of asphalt cement is its ductility, which is a measure of a material's ability to be pulled, drawn, or deformed. In asphalt cements, the presence or absence of ductility is usually more important than the actual degree of ductility because some asphalt cements with a high degree of ductility are also more temperature sensitive. Ductility is measured by an "extension" test, whereby a standard asphalt cement briquette molded under standard conditions and dimensions is pulled at a standard temperature (normally 77°F [25°C]) until it breaks under tension. The elongation at which the asphalt cement sample breaks is a measure of the ductility of the sample.

The Future

Increasing economic and environmental needs will bring many new technical refinements to recycling old asphalt pavements, such as using microwaves to completely break down the pavement. Microwaves heat the crushed rock in asphalt pavement faster than the surrounding cement, which is then warmed by the radiant heat from the rock. This method prevents the asphalt cement from burning.

Alternative sources of raw material are being researched, such as the production of synthetic asphalt from the liquefaction of sewage sludge. To ensure consistent product quality, new methods are being developed for manufacturing modified asphalts and emulsions. Many new tests are being developed to help characterize asphalts, such as high-performance gel-permeation chromatography (HP-GPC), which allows many properties to be studied and the results compiled in only a few minutes. New processes, more efficient mixing and milling units, in-line liquid mass flow meters, on-line monitoring systems, and new safety equipment are some other areas being investigated for improvement.

Polymer-modified asphalt crack sealers are gaining in popularity, and many other asphalt modifiers are being developed. Modifiers are added to control pavement rutting, cracking, asphalt oxidation, and water damage. Some commercially available asphalt modifiers are polymers, including elastomers, metal complexes, elemental sulfur, fibers, hydrated lime, Portland cement, silicones, various fillers, and organic anti-strip agents. Many of these modifiers have not been extensively used and are being researched for further development. It might even be possible one day to have "smart asphalt cements" by mixing in certain asphalt friction modifiers which would allow it to change characteristics depending on whether moisture was present. In conjunction with antilock brakes, automatic traction controls, and airbags, this could serve to save many lives on our nation's highways.

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
Incorporation fees and other legal fees	3,800	3,952.00	4,104.00	4,256.00	4,408.00
Obtaining of licenses and permits	23000	23690	24380	25070	25760
Operational cost	49050	51503	53955	56408	58860
Insurance coverage	5200	5252	5304	5356	5408
Marketing and publicity promotion expenses	7800	7878	7956	8034	8112
Hiring cost - Business consultant	10000	10100	10200	10300	10400
Setting up manufacturing facility and Equipment	534180	536180	538180	540180	542180
Raw material and packaging cost	200000	240000	280000	320000	360000
Distribution cost	50000	78000	106000	134000	162000
Administrative cost	8000	8320	8640	8960	9280
Miscellaneous cost	9000	9360	9360	9720	10440
Total Cost	900,030	974,235	1,048,079	1,122,284	1,196,848

Project Income statement In USD						
		Year 1	Year 2	Year 3	Year 4	Year 5
Revenue		52,000,000,000	66,000,000,000	78,000,000,000	92,000,000,000	106,000,000,000
Incorporation fees and other legal fees	3,800	3,952.00	4,104.00	4,256.00	4,408.00	
Obtaining of licenses and permits	23000	23690	24380	25070	25760	
Operational cost		49050	51503	53955	56408	58860
Insurance coverage		5200	5252	5304	5356	5408
Marketing and publicity promotion expenses	7800	7878	7956	8034	8112	
Hiring cost - Business consultant	10000	10100	10200	10300	10400	
Setting up manufacturing facility and Equipment	534180	536180	538180	540180	542180	
Raw material and packaging cost	200000	240000	280000	320000	360000	

Distribution cost		50000	78000	106000	134000	162000
Administrative cost		8000	8320	8640	8960	9280
Miscellaneous cost		9000	9360	9360	9720	10440
Profit after Tax						

Project Cash Flow In USD					
	Year 1	Year 2	Year 3	Year 4	Year 5
Cash Inflow	1,350,030	1,525,534	1,579,535	1,620,036	1,660,537
Equity	1,350,030	-	-	-	-
Revenue	52,000,000,000	66,000,000,000	78,000,000,000	92,000,000,000	106,000,000,000
Total Cash Inflow	52,002,700,060	66,001,525,534	78,001,579,535	92,001,620,036	106,001,660,537
Depreciation	0	1,280,800	1,410,303	1,024,484	1,270,773
Total Cash Outflow	51,957,700,060	65,493,025,034	77,475,079,035	91,461,620,036	106,001,107,037
Net Cash Flow	450,000	508,500	526,500	540,000	553500
Cum. Deficit / Excess	450,000	958,500	1,485,000	2,025,000	2,578,500