

PRELIMINAR STUDY FOR ANALISIS, CORRECTION AND UPDATING OF DATA

CEMENTOS SAN ANTONIO, S.A., 2010

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1. Introduction

The generation of the Cementos San Antonio, S. A. project idea emerge as a consequence of the unsatisfied needs of cement in Guatemala.

The cement industry and other concrete made of cement is one of the business more profitable in the world, especially in Latin America where the sales duplicate every 10 years as consequence of the high demographic growth rate (Ornelas, 2005)

The cement is one of the most important construction materials in the industrialization process in the country. The planning studies of new plants or for the extension of the existing are based on the housing needs and nationally infrastructure, the cement constitutes one of the key element in the growth and development of the country, moreover it is the high construction growth in general in Guatemala. (27% in 2006)

The Guatemalan economy has been happening for stable stages till recessive and inflationary processes as at the present. However, in global terms the economy keeps growing in a rhythm of 2.5% annual, 4.6% in 2006 (PIB). The construction grows in rhythms of 23% annual in case of Central America and Guatemala has the mayor growth in 2006 with 29.6% and in 2007 projected an increase of 8% more than the last year, therefore the cement demand intensifies to such a grade that has been importation of it, of Cemento Cruz Azul of Mexico, Dominican Republic , Cemento Maya and CESSSA of Salvador, hence the Guatemalan Government defined a politic consisting of 10% tax of the imported cement.

Due to the sismic characteristics of the Central American region the type of construction in Guatemala is characterized by the use of rigid material construction. Dominate the constructions of reforzed masonry with concrete of reforzed cement with iron and the concretes, and reforzed cement with iron for high buildings. This generates that the population growth, the industry, the trade and the demand increases constantly to fill the new construction needs that every day emerge in the country no matter the economic crisis for what is happening.

Actually the construction industry in Guatemala is supplied of Portland cement type of two local factory and eventual importers of cement that participate in the market when the macroeconomic conditions allow them. The market actually reaches the 3.5 million of Cement tons per year, growing an anual minimum of 5%.

When the market is not supplied completely by Cementos Progreso, has been supplied with cement importations. Cementos Progreso also imports special bulk cement, packed locally, but this are part of its participation in the market. We can also find in the market cement Tolteca, produced in Mexico, with a participation of the market approximately 200,000 tons of cement per year, which is a 9% of the market.

2.1 Backgrounds

Guillermo Morales Ortega as a legal representative of the Enterprise known as Cementos San Antonio, S. A. which has an area of 230 blocks, located in 68 kilometer, ruta al Atlantico, Tierra Blanca Village, Guastatoya El Progreso. (see General Plane of the zone and boundaries map in the annex). Mr. Morales continues demonstrating that his intention and immediate desire on is an estate is for the use of exploitation of calcareous material to supply a cement factory that will be built by national and foreign investors. Such factory prioritizing the local sale and cement exportation to the United States of America and Central America or as the investment associates agree.

The estate mentioned before has 430 millions cubic meters of reservations approx of limestone. The limestone reservation or carbonate of calcium existing in its quarry it's one of the mayor quality as for his chemical composition. The quarry is rich in mineral, So much quantitatively like qualitatively, with available mineral to supply a factory for more than 1 million meter tons per year of cement for decades. The road known as Ruta al Atlántico, nowadays in process of extension it passes for the boundaries of the estate and joins the cardinal city with the littoral of the Guatemalan Carib.

One possesses sufficient workforce(manpower) for the not specializing labors, so much in the departmental head-board as in the neighboring (similar) villages.

The quarry possesses already licenses for 25 years, renewable for the same quantity of years, to the date one of the licenses is 15 years old. Other licenses will be initiating its period of validity in the next 12 months. The chemical analysis reveals that the limestone has a 96% purity and 98% carbonate of calcium. Two lines of electric power of 69 kw, and of 34.5 kw go on to shore of the road. It has water galore according to births and wells located in the long shot. The studies of environment are in step and outposts in 50 % in the department of environment. To see current condition of the Study of Environmental Impact in Annex. Territorial extension, 1, 610,711.32 square meters. To see specific plane in Annex. Permissions of mining exploration make a file ON SCT 38A. To see Copy in Annex. Permissions of mining exploitation (development) make a file ON SCT 38A. To see Copy in Annex. Coordinates: 811240 East and 1642620 North. To see Map of the Zone in Annex.

2.2 Justification

a) The generation of currencies for the country, which begins with the foreign investment.

b) The project in if it is a source of work on a large scale, the captation of foreign investment, the creation of a new industry in the country and the possible captation of currencies derived from the exports, is of mentioning that the geographical area,

where the plant will function is one of those of major poverty, the social and economic impact performs national importance.

c) The incorporation of foreign investors, it performs vital importance and the economic contribution might range between 50 % and 75 %, (that includes in a great percentage the equipment technology and contingencies) additional offers are analyzed and the whole this investment calculated in American Dollars

d) The cement demand is very much major that the offer, for what the national cement plant does not give itself supply to cover the market, which is in constant growth.

e) The cement might sell placed in the plant to any client, with which the costs of the buyers would decrease, since they will use the most suitable transport or his interests.

f) A fundamental object of the economic politics of the country in the last years has been of reducing the government bond in the economy and promoting a major participation of the economic private agents.

2.3 Objectives

a) To construct a plant with capacity of production that might range between 900,000 thousand and 1.2 million metric annual tons, for processing of dry cement in the quarries Juan Minero of Cementos San Antonio S.A. in White Earth, Guastatoya's municipality, in the Department of the Progreso, Guatemala.

b) To achieve that between 60 % and 80 % of the production there could be absorbed by the domestic market, new market and not satisfied, that nowadays it exceeds 2 million annual TM.

c) To establish concrete plans and projected for the exportation of the whole or rest of the production, principally as dross, of happening the seclusion of the sale of the production of the plant, on the local market.

2.4 Characteristics of the Cement Used in Guatemala.

The cement is an inorganic material finely pulverized, that on water having added him, already is alone or mixed with sand, piedrin or other similar materials, has the property of setting even under water, by virtue of chemical reactions during the hydration and that once hardened, its resistance and stability preserves, when the cement is mixed by water and sand forms mortar, and when it is mixed by sand and piedrin, forms an artificial stone called concretly.

The Portland cement is an input that has very specific characteristics that turn it into a product difficultly substitutable. Some margin exists to replace different specifications of cement: products of better quality (more wide cycle of life) and major price they can substitute others of minor quality and minor price, or vice versa. The international trend and inside the Central American region it is of standardization of the technology of production and of the quality procedure of the product. The gray cement is a combination of limestone, clay, sand and plaster. The first three inputs constitute the base of production of the clinker, which in turn they shape 95 % of the Portland cement.

Inside every category of cement, but specially in the Portland category, the quality is uniform enough inside the Central American one and, in general, it expires with international procedure, as those of the American Society for Testing and Materials (ASTM). Only in some cases a cement very similar to the Portland exists, since it is the case of the Supernic of Nicaragua, which is a substitute very near to the latter and a bit cheaper (about 3 % less than the Portland).

The cement, on the other hand, is a costly product of transporting, of prompt caducity (only it lasts about one month, depending on climatic conditions and dampness of the environment, between others) and, therefore, on difficult storage. His international and enclosed national trade is strongly determined by such characteristics.

2.4 Objective of the market research

The market research will serve to have a clear notion of the consumers' quantity that there will be acquire the cement and derivatives that are thought, to produce and to sell, inside a definite space, during a period of certain term and to what price they are ready to obtain it. Additional, the market research is going to indicate if the characteristics and specifications of the cement that correspond to which the client wants to buy. Will say to us equally what type of clients are the interested parties in our product, which will serve to orientate the production of the business. Finally, the market research will give us the information it brings over of the price adapted to place our product and to compete on the market, or to impose a new price for some valid reason.

2.6 Determinant factors of the location

Though it is true that the location consists of the location of the project, there exist factors that ultimately can influence the final decision:

- The tributary politics of the government. (Duty-free zone)
- The existence of road links.
- The existence of urban infrastructure (water, outlet, light and telephone)
- The existence of unsatisfied markets and nearby potentials.

- municipal Dispositions
- available Workforce
- Cost of the transport
- Etc.

2.7 Determination of the raw materials

In any productive process the use of raw materials is a basic part for such a motive it is necessary to determine or to quantify in this case the volumes in metric tons of raw material that allow to carry out the manufacturing process of the product and in any planning process is important to foresee and consequently to determine the needs of raw material, during the temporary horizon of the project.

2.8 Productive process

It is the process that allows to carry out the production of the cement of an efficient way that allows a constant flow of the raw material efficiency in the use of the time, order, etc. For such a motive it is important to design the subprocesses inside the process of production in such a way that one could give an ideal process in the manufacture of the product.

3. Studies related to the project

CEMENTOS SAN ANTONIO S.A. PROJECT IS DIVIDED IN :			
MARKET STUDY	TECHNICAL STUDY	FINANCIAL STUDY	ORGANIZATION STUDY

3.1 The market research

1. The Cement market.
2. Structure of market and relevant market.

On having analyzed the conditions of competition of the market of the cement in the countries of Central America we will approach the production and the distribution of the gray cement, or Pórtland cement.

In Central America there exist 11 producing companies of gray cement (besides other types of cement and other materials of construction), with a whole of 17 plants and an annual capacity of production of more than eight million metric tons of all kinds of cement in 2003. The distribution of the product also is concentrated and in many cases it is in hands of the producing companies.

In Guatemala Cementos Progreso, S.A. is the most ancient local manufacturer on the market, relies on the leadership in the same one and beside producing cement type Pórtland imports special cements that complement the range of products needed by the market. His strength is in being the producing local only one on the market, possessing own system of distribution of concrete and mortars premezclados humid and dry, in addition it realizes offices of bulk cement for medium and big consumers. His evident weakness is in not possessing own system of distribution, depends on one of unionized transporters who concern his discretion the price of the cement. Its process of production is complete, from quarry to finished product, also it commercializes by-products lime, drosses and piedrines.

The domestic market is covered mainly by Cementos Progreso, S.A. Those who recently have effected studies in the municipality of San Juan Sacatepequez where there was realized an investment of US\$. 350 millions in a new plant with capacity for 2 million tons per year and that will be in functioning from the year 2009, though nowadays it has been late for the existing problems in San Juan Sacatepequez due to the dissent of the neighbors of the region who are opposed to the installation of the above mentioned plant.

In addition also there have opened opportunities themselves for cement factories foreigners who have brought his products to cover the national demand, such as " Cementos Cruz Azul " and " Cementos Tolteca ", which market is in the main the south west of the country due to his nearness with Mexico, as well as also " Cemento Maya " and "CESSA" of El Salvador and Industry Cementera Hondureña "INCEHSA", for the south - east.

On the other hand, though with different names, Cementos Progreso there gives the service of mixture of concretly, which also is another form of competition.

Another local producer is a company of cardinal Spanish - Guatemalan named Cemento Quetzal, S.A. who with an initial investment of US\$.35 million, it will have capacity estimated of producing 500,000 annual TM under the brand " Cementos Quetzal ", which they estimate to export in its most to the neighboring, such countries as Mexico, Central America and the Carib, of recent incursion on the market, nowadays its presence is not perceptible for the low levels of production that it is bringing for problems in the supply of raw material. Its weakness is in the process of production, which initiates in the grinding of clinker. This forces him to matter clinker or to buy it with local supplier who nowadays would be Cements Progress, S.A. what makes depend his(her,your) price of sale of the supplier of Clinker. The participation of market that it(he,she) tries to reach is 300,000.00 Ton Año this production is given on having been producing 100 %, with supply of constant Clinker, his(her,your) plant(floor) is in the Parceling Arizona, Department of Kid, to surrounding areas of the Port Quetzal.

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According to the Chamber of the Construction, the current demand(lawsuit) in Guatemala is 2.4 million Tons of cement and though the national output is increasing, also they have increased the imports, which amount came to US\$.24.9 million in 2003.

In addition, the population deficit Guatemalan exceeds to the date 2 millions, which is a level difficult to resolve in the short term and the exigency of the fulfillment of the Peace agreements, they involve an increase in significant form of the construction of roads and projects of electrification, by what there is foreseen that in the next years there will be an unsatisfied demand bigger than the one that exists up to the moment. With the object to provide major information for the best comprehension of information there is included table of statistical information of the Cepal of the year 2006 by information until 2003 later:

Since it appreciates in the picture 1 until 2003, Guatemala was the major producer of cement in the region.

CENTROAMÉRICA: ^a PRODUCCIÓN DE CEMENTO, 1999-2003

(Miles de toneladas)

País	1999	2000	2001	2002	2003
El Salvador	1 031	1 063	1 174	1 323	1 391
Guatemala	1 885	...	1 974	2 061	2 039
Honduras	1 211	1 254	1 317	1 224	1 268
Nicaragua	501,6	539,8	552,7	359,3	485,3
Panamá	996,4	849,2	863,5	911,5	948,3

Fuente: CEPAL (2005), Schatan y Avalos (2003) y Entrevistas con personeros de Cementos Progreso (2005)

^a Se exceptúa Costa Rica.

The picture that continues reveals that, three giants of the cement industry on the world markets, Lafargue, Holcim and CEMEX, have as a whole a great presence in Central America, in a context of strong competition that these three multinationals have exercised to be consolidated on the markets of the region. This way, the group Holcim proposed to acquire in the year 2005 between 79 % and 100 % of the stock capital of the cement factory CESSA of El Salvador, as part of his strategy of growth in the short term.

**ISTMO CENTROAMERICANO: PARTICIPACIÓN DE EMPRESAS MULTINACIONALES
EN LA INDUSTRIA DEL CEMENTO, 2004**

País	Holcim-Apasco (Holcemca)	CEMEX	LAFARGUE
Guatemala	Cuenta con 20% de las acciones de Cementos Progreso		
El Salvador	Dispone del 20% de las acciones de CESSA desde 1998. Holcim prevé para 2005 comprar el 80% restante		
Honduras	Cuenta con el 24% de las acciones de Cementos del Norte		Está asociada a INCEHSA, luego de la privatización de esta cementera en 1991
Nicaragua	Es propietaria de CEMENIC	Es propietaria de la cementera CANAL	
Costa Rica	Cuenta con el 65% de las acciones de INCSA	Compró a Cementos del Pacífico, S. A. en el año 1999	
Panamá	Dispone del 100% de las acciones de Cemento Panamá, S. A.	Compró Cemento Boyado, S. A. en el año 1994	

Fuente: Elaborado con base en Ornelas, 2005 y Schatan y Avalos, 2003.

Finally, must be underlined that the increasing presence of multinational companies in industries and strategic services of the economies of the region, not always has involved competition in prices, which is stated in case of the cement in Central America. In the matter, after the privatizations and the dismantlement of the controls of prices in the region, happened towards ends of the eighties, the price of the cement and of other materials of construction as the concrete one, tended to rise from the decade of 1990, in spite of that the strong presence of three big giants of the industry of the cement on a worldwide scale: Holcim, Lafargue, and CEMEX. To see following picture:

Precios Cemento
(dólares por TM)
2000

País	US\$/TM
México	110
Gran Bretaña	86
Guatemala a/	77
Estados Unidos	75
Brasil	74
Francia	70
Alemania	67
Grecia	62
España	62
Filipinas	53
Egipto	51
Italia	51
Tailandia	50
Malasia	46
Polonia	33
Indonesia	38

Fuente: Latin America, Building Materials, Deutsch Bank, septiembre, 2000.

a/ Información proveniente de Cementos Progreso de Guatemala.

In the matter, the imports and exports that realize the Central American countries are quantitatively marginal as for the whole of commercial flows that the same ones have to the interior of the Isthmus and with the rest of the world.

From this optics it is notable to state first that, the value of the cement imports in case of Guatemala was in the equivalent year 2003 to only 0,37 % of the whole of imports of goods, at the time that the exports of this product were minor to 0,1 % of the totality of external sales of goods realized by the country in this year.

Secondly, it is necessary to emphasize that 48,4 % of the imports of Guatemala came in the year mentioned of remaining Dominican Republic and 4 % of the imports they originated from Mexico. These numbers contrast with previous years when the major volume of cement imports of Guatemala was coming from Mexico. Nevertheless, it is necessary to emphasize that the principal exporting company of Mexico to Guatemala,

CEMEX, is the principal producer of cement in Dominican Republic, to see following picture:

CENTROAMÉRICA: EXPORTACIONES E IMPORTACIONES DE CEMENTO PORTLAND SEGÚN PAÍS, 2003

C1<1zemento	Importaciones			Exportaciones			Principales países de origen de las importaciones
	Valor (dólares)	Volumen (toneladas)	Proporción ^a (%)	Valor (dólares)	Volumen (toneladas)	Proporción ^a (%)	
Guatemala	24 897 782,00	323 504,98	0,37	705 154,00	2 983,26	0,03	República Dominicana, 48,4%; Costa Rica, 46,03%; México, 4,1%
El Salvador	7 274 021,00	81 421,69	0,17	3 414 003,00	69 188,02	0,27	Costa Rica, 52,7%; Nicaragua, 29,8%; México, 7,85%
Nicaragua	4 968 503,00	105 136,61	0,26	1 426 282,00	26 893,12	0,24	Costa Rica, 94,9%; México, 2,3%
Honduras	4 777 721,00	53 792,97	0,14	1 454 074,00	24 090,11	0,15	Japón, 36,59%, El Salvador, 30,8%; Guatemala, 11,56%
Costa Rica	770 272,00	4 573,25	0,01	12 523 460,00	341 307,46	0,22	México, 28,28%; Bélgica, 27,7%; Estados Unidos, 22,4%

Fuente: Elaborado con información de SIECA, 2004.

^a La proporción se refiere al porcentaje que representan del total de exportaciones e importaciones de bienes de cada país.

In Guatemala, a vertical integration exists between the cement plant Cementos Progreso and the distribution, which in 70 % is realized across the National Coordinator of Transport. It is necessary to mention that there are companies of transport independent from the cement factories that, in turn, exercise a strong market power.

The strongest barriers at the entry are of natural type. The most important is the geographical one so, due to the characteristics of the product, of great weight, his transport is very costly. This feature results in a limited marketing worldwide and also it generates a fertile area for the collusion between cement companies the market of agreement to be distributed to his territorial location, preventing this way the incorporation of new producers. Between the geographical barriers there is the need of the producing companies of cement to have access to deposits of limy near to the industry.

Not all the countries have deposits of this type inside his borders, so that in several cases there is imported the limy one of contiguous countries. The difficulty of having access to this raw material in a not very distant radius to the industry processor of cement is an important barrier for the new rival potentials on the market.

3.1.1 In force duties

CENTROAMÉRICA: TARIFAS VIGENTES DEL SISTEMA ARANCELARIO CENTROAMERICANO SEGÚN TIPOS DE CEMENTO

Tipos de cemento	Código arancelario	Arancel (%)		
		Intracentro-americano	Resto del mundo	TLC con México
Gris (Pórtland)	25239000	0 ^a	10 ^b	10 ^c
Clinker	25231000	0	5	5
Blanco	25232100	0	5	5

Fuente: Sistema Arancelario Centroamericano (2005).

^a A partir de junio de 2004 Costa Rica eliminó el arancel de 1% que aplicaba a sus importaciones provenientes de países del Istmo.

^b La última revisión y las enmiendas respectivas del SAC redujeron a partir de junio de 2004 la tarifa arancelaria para terceros países de 15% a 10% con objeto de equipararla con la tasa de la OMC.

^c En el TLC con México fueron excluidos todos los tipos de cemento, por lo que la tasa arancelaria es igual que las aplicadas para el resto del mundo.

There exist some components of the costs of the cement that raise the prices over those of other countries. First, the fact that the auto construction is an important destination of the cement which needs that this material sells in sacks, process that puts up the price of the final product.

In fact, the sale of the product in sacks across distributors represents 75 % of the cement demand of the private sector. In the industrialized countries, on the other hand, the cement sells in bulk (since the works of construction in these countries are principally of infrastructure and public projects). The second element that puts up the price relatively of the cement of the region is the transport of the cement in conditions of road deficient infrastructure and a rough geography.

Until beginning of the nineties the price of the cement was controlled by the State in most of the countries and even after the companies of the State be privatizing the price continued deciding on the part of the authorities of the public sector. In Guatemala the liberalization of the price happened in 2000 when the Governmental Agreement repealed Not 517-90 that there was establishing a price of sale of the Pórtland cement type I. Furthermore in spite of important technological innovations having got in the cement industry, Specially in the cases in which the private national industry associated or was bought by CEMEX, Holderbank or Lafarge, this has not met reflected in the prices. On the contrary, these have tended to increase. The information about cement prices from the privatization of companies and deregulation of prices is scanty but for the countries for that he arranges of a series of prices, it is possible to estimate that from the deregulation of the prices these have tended to increase.

In Guatemala in what the price goes of the year 2007 it is in:

Value in position of sale until April, 2007: Q. 46.6

Value or price suggested to the public until April, 2007. Q. 45.8

3.1.2 Economic analysis

3.1.2.1 Size of the Market

It is necessary to define our current market taking in consideration the conditions of globalization in which one finds the Central American region nowadays. The target market that wants to be reached we define it as the sum of the markets of Guatemala, Belize, Honduras, Salvador, Nicaragua and the South of Mexico. This leads us to having to establish a primary market, which will be Guatemala and the secondary one shaped by the remaining countries. The current market of this Guatemala coming approximately to a size of 3.5 million tons of cement per year. We think that the market in the rest of our target region it reaches 9 million tons per year and doubles every 10 years.

In case of the primary market, Guatemala, there is estimated a growth of the market per year, progressive of 2.5 equivalent % to 87,500 tons for year of growth in the demand. We estimate the growth of the secondary market in a 1 % per year.

A fenced growth will be had for 40 years. Based on the growth per year of the market, 2.5 %, plans that every ten years it must be implemented a line of production equivalent to the initial. This to support the market share and on the basis of managing to identify the brand with the final consumer, to support a growth in the participation of at least equally to the growth of the market. Seeking to be in the long term a brand recognized in the market.

3.1.2.2 Market share

A production of 900,000 plans to reach thousand to 1.2 million tons of cement per year. This production considers to place it in 70 % on the local market and 30 % distributed in the secondary market, or depending on the conditions of market, principally Belize and Honduras. By means of the assembly of plants of embasado in the place, doing business in bulk from the plant, it is important to highlight that the International market is potentially attractive since a strong demand exists worldwide.

Indirectly, market share will be had by means of Cementos Quetzal, whom one considers providing with Clinker, in about 200,000 tons of Clinker a year. This with the purpose of supporting a healthy market with participants' variety.

3.1.2.3 Strategic principal plan.

As strategic priority, there is established the need not to enter conflict directly with other local participants. What is prosecuted is to take part of the market, covering the increasing need of the same one. One does not glide to compete with strategies of price, to avoid the economic wear that it carries.

The price of sale it establishes the price established in the market by other participants. What is looked is to differentiate the product, by means of the identification of the brand thanks to the social projection that is planned, as well as with the introduction of a packing of major capacity that of the competitors giving a percentage of bonus to the final consumer.

3.1.2.4 Initial strategy.

- to assure 30 % of the production, already an alliance has been established by Cementos Quetzal. With the company of a commitment of supply, Clinker's supply will be guaranteed to the cement mill Quetzal. Establishing a price equivalent to that of the international market, US\$ 45.00 \$ (plus additional costs in advantages / products put in Guatemala) for ton delivered in the plant of Cementos San Antonio, S.A guaranteeing to Cementos Quetzal his raw material.
 - · to place 70 remaining % of the production, as finished product, one proposes the direct sale to the distributor from the beginning of operations. With base in the observation of the leader, we notice that the weakness of his(her,your) system of sale is in the intermediaries' existence between(among) the manufacturer and the distributor. The price of market, it(he) is controlled by the intermediaries and not by the producer.
- In consequence, strategic alliances will be established by distributors, giving priority to the distributors of the area near to the plant, during the montage of the factory. The distributor will buy directly to the factory the product, gathering the same one in plant with his transport. With this there is looked that the distributor handles the variables of transport and margin of retail, establishing a margin of major utility for him and competitive prices of sale for the final consumer.
- During the functioning of the factory Cementos San Antonio, S.A. will be kept a campaign of identification of the brand. Media of massive communication will not be in use for placing the brand Cementos San Antonio, S.A. as preferred of the final consumer. If the programs of health will be kept, with the implementation of medical days in the clinics, these and the regional hospital supported by the brand and international entities that need facilities adapted to develop them.
- The foundation of technological institutes, emphatically in the opportunities that every region presents, to achieve the development decentralized of the country. Supporting students in all the educational levels, and promoting programs of protection not to limit the scope of the program to the capacity destined by Group San Antonio for the development of the same one.

3.2 The Technical Study.

The principal object is to design the processes of production of the cement, across the following points:

- Location of the company and facilities of the project.
- Location of quarries of raw material and complementary materials.
- Machinery and equipment and processes.
- qualified and not qualified Workforce.
- Costs brought near initially.
- Processes of production.
- social Projection.

3.2.1 Location of the company and facilities of the project

Due to the fact that determinant factors exist in the ideal location of a cement plant, such as: the supply of the raw materials and the consumer markets, the final studies of engineering there will join the costs that were demonstrating the ideal location of Cementos San Antonio, S.A.

The factory will have to establish near the bank of materials though it is seemingly far from the market, which is the case of Cementos San Antonio, S.A. The banks that they find present special characteristics so of the mineralogical analysis that was done it turns out to be an abundant qualitative and quantitatively. The limestone, the oxide of aluminium and the oxide of iron.

The plant will be located inside the areas of the quarries of Cementos San Antonio, S.A. that possesses in force licenses of exploration and exploitation and that they will give the necessary material for what the transport and managing of the same ones will be of very low cost.

The location turns out to be strategic for the plans of exportation that are had, since the plant will be to 250 kilometers of the ports in the Atlantic Ocean and to 150 kilometers of the Pacific Ocean. Also it is necessary to think that the borders with the neighboring countries are not at any more than three hours of terrestrial transport. (Honduras, San Salvador).

Taking in it counts before exposed, the factory Cementos San Antonio, it will be located in the solar one of four apples located to the vicinity of the quarry of limy. The quarry nowadays handled by Cementos San Antonio S.A. possesse (430, 000,000 m³). Four hundred thirty million sufficient cubic meters of material for the capacity of the plant for 100 years.



The quarries of plaster and other minerals, they are in a minor radius to 50.00 kilometers of the location of the plant. They are quarries members of Group San Antonio with that already agreements of exclusivity were established to supply the factory Annex x.

The extracted materials generate up to the double of volume in thread, this makes its managing costly if the material is tried to take to a plant removed from the quarry. This cost of transport is diminished by the use of moving belts of great length, which were implemented by the constant quarry to the industrial plant.

3.2.2 Location of quarries of raw material and complementary materials

In order to find the location most adapted for the quarries of raw material the following activities must be realized:

- Geological Studies
- Calculate of the volume

3.2.1.1 Geological studies

Independent from these characteristics, it will be necessary to carry out the investigations in the geological order, with analyses proven or established with certainty, where they could be established basically:

- The average thickness of it on cap.

- To determine the physical nature of the bed, to establish if it is a deposit which material that there one finds, possesses the chemical propitious characteristics determined by the Finnish thing to whom the final product should be destined.
- To determine the relative quantity of the different caps that shape the bank, and the average thickness.
- To determine the course and azuzamiento of the cap.
- Field trials to determine the quantity and quality of the limy one or the material that this being exploited.

The tests are realized sampling inside the bank, the gathered material, to calcine it in small quantities, establishing the quality of the possible product, carrying out also the chemical analyses of the laboratory, to establish qualities and impurities.

When in the quarry, the exploitation is realized by industrial ends, it will have to have necessarily the notable characteristics but principally the considerations will have to be born in mind on the volumes of existing and exploitable material.

A project increases his possibilities of profitability depending on that the volumes of exploitation allow that the quarry 20-year-old minor should support a satisfactory level of production not.

3.2.1.2 I calculate of volume in cement quarries San Antonio S.A.

The calculations that later you present were taken in agreement to the official planes of the quarry. In order to realize this calculation 36 measured so called courts took, each of which possesses the following quantity of volume of raw material in cubic meters.

N° DE CORTE	VOLUMEN EN M3
1	330454.00
2	1162055.00
3	1471865.00
4	2514118.50
4a	1564522.00
5	4102882.00
5a	1016779.00
6	6678510.00

7	7890745.00
8	9557413.00
9	10795977.00
10	11923451.00
11	12748695.50
12	14182466.00
13	15310592.00
14	18337569.00
15	22036596.00
16	20943836.50
17	21980506.50
18	21765910.50
19	18804637.50
20	22046283.50
21	19787888.00
22	20752124.00
23	19132817.50
24	17143350.00
25	15378957.00
26	10637061.00
27	10336510.00
28	11701295.00
29	12990892.00
30	12383220.50
31	3281343.00
32	2596434.50
33	2410504.50
34	6034993.50
35	8573526.50

36	10520398.50	
TOTAL	430,827,180.00	19796

3.2.1.3 Unripe materials and raw material

In view of the big quantities of raw materials that there consumes the industry of the cement and industries based on this one, they will have to be planned and studies of the raw materials to be executed from the quantitative and qualitative point of view, in order to avoid possible problems of production.

To obtain a good raw material it is necessary to have the following components: oxidize of calcium (CaO), between 60 % and 67 %; silicon oxidize (SiO₂) between 19 % and 24 %; oxidize of Aluminium (AL₂O₃) between 4 % and 9 % Oxidize of Iron (Fe₂O₃) between 1 % and 6 %.

Of the unripe materials needed for the manufacture of cement, the stone of lime, clay and sands are in the properties of Cementos San Antonio, S.A. In big quantities. Only the plaster and the mineral of iron will have to be bought initially, so the above mentioned minerals are in other quarries and there have been done agreements corresponded with suppliers of the necessary raw material. annex x.

The quarries property of Cementos San Antonio S.A. are an enormous deposit of limestone of excellent quality, which spreads to great depth that has not been determined completely. The probable and calculated reserve are sufficient to support the plant in production for more than 100 years, additional two deposits of clay of excellent quality are available of immediate form.

The sand also is available in big quantities in the whole area. Though only a deposit of volcanic sand has been proved, this is more than 100 years of supply, but the high levels of alkalinity in this area of deposits it suggests that the investigations were done of other potential sources of dioxide of silica, specifically sand of river, which has a low content of alkalinity.

Since the sand is going to be used to increase the content dioxide of silica of clay, the quantity of needed sand will be small, typically 1 %. Wide quantities of needed sand one has checked that are in the immediate area.

Though the deposits of minerals of iron have been brought reported near the plant, no information is available to allow the evaluation of qualities, quantities and costs of exploitation. Consistently the plant initially will have to buy these materials of the same sources that they give to the companies of existing cements.

3.2.1.4 Other necessary minerals and complementary materials

a) Iron - Hematita

The principal zones of occurrence of Oxide of Iron are located in San Jose the Ploughing and other bordering localities to Chiquimula's city and other deposits of importance exist in Jocotán-Camotán's mining district, which they have come exploiting to cover the demand of the cement industry of Guatemala, El Salvador and Honduras.

b) Plaster

One possesses abundant deposits, which are located principally in Uspantán's localities (The Quiché), St Kitts Verapaz (Alta Verapaz) and Chiquimula. Its principal use is like an attaché of the cement, also in the ceramic industry, chemical industry, fertilizers, etc...

c) Limy

Our country possesses very good quantity of reserves, which show in 60 % of the national territory, though the best quality is in Guastatoya's region. Its utilization is one of the most important in the industry of the construction in Guatemala, being used principally in the industry of the cement, for the manufacture of lime and as an attaché of the cement, in the production of concrete.

d) Unripe materials

Of the unripe materials needed for the manufacture of cement, the stone of lime, clay and sand they find in the properties of Cementos San Antonio, S.A. in big quantities. Only the limy and the mineral of Iron will have to be bought initially, so the above mentioned minerals are in other quarries.

e) Paper bags

The paper bags to pack cement, are made in Guatemala.

f) Fuel

The plant will operate with crude oil bought any petroleum one that operates in the country.

g) Electricity

The electric power will be bought the local supplier who will provide the lines of transmission.

3.2.1.5 Extraction of the raw material.

The quarry is the place wherefrom the material is extracted for be calcined or accused; its location performs a lot of importance for ends of profitability of a project of processing of the cement, this is independent from the quality of the material that there it could extract. The suitable characteristics are:

i) The select lot must be immediate to the place of crushing of the material.

li) The access to the quarry will have to be easy and that the heavy traffic does not spoil with rapidity the exit ramps; and

lii) The material of extraction is of easy managing, that is to say the minor effort on having extracted it from the bank and montage to the washbowls of transportation.

3.2.3 Processes of Production

In case of having big blocks, the extraction is impeded in quarry, the transport becomes complex and less profitable, since minor quantity of material moves. The material put in the industry in the shape of big blocks is of difficult maneuverability, for what to have the material fragmented from the origin is better, nevertheless, the blocks of major diameter, again they will occupy major space and with a high degree of difficulty though it is a primary crushing by what it is proceeded to fragment and later to crush, without coming to the phase of pulverization, which would be too costly, for work of the machines used for the effect.

In the quarries of Cementos San Antonio, S.A. the material is fragmented, which facilitates and diminishes considerably the costs of extraction. The principal crushing is realized until obtains a grain of not major diameter of 2 inches, which allows to reduce the space occupied by the emptinesses and be easily workable. It places in promontories and it will have to be in sufficient quantity to feed the oven if it needs from this process or to the secondary crushing from time to time.

The manufacturing process needs a crushing that carries out in similar circumstances that the raw material used for the lime. The raw material is the limy one, The mixing or stage of dosing turns out to be one of the most delicate of the whole process and has to be done under strict control of laboratory.

The burnt one is done in horizontal rotary ovens, similarly to the used one with the lime, with superior temperatures to 1,400 centigrade degrees, the material that goes out of the oven is of greenish dark color, in the shape of grains of diverse size and it knows with Clinker's name. The difference with the baked one of the lime, is that the temperature is lightly major, as the revolutions of the oven, for what the speed of tour of the material for the cylinder to do cement is very much major, an increase being obtained in the volume out of the oven, but there being increased also the expense of fuel of calcination.

The ground one and the mixing, carries out once cooled the Clinker, and it is proceeded to grind in big rotating mills, being added simultaneously a small quantity of plaster that is approximately 5 % of the whole of the product, this mixing that must be perfectly homogeneous needs special facilities to make it effective..

3.2.4 Social projection

· Plan of social projection. As base of the establishment of the brand, S.A glides to implement programs of social benefit, under the cement patronage San Antonio. Previous to initiate the montage of the factory, one will present a program of scholarships to qualify settlers of the area near to the plant to possess workforce qualified in the moment to initiate production. As

well as the constriction of a regional hospital of pediatrics to attend to the municipalities near to the factory.

clinics will be established in the settlements with which one seeks to stimulate programs of sanitary and nourishing education.

· Inside The program of training, there will be constructed a center of regional training, where one glides to develop trainings not only for personnel of the factory, but alliances will be established by organizations dedicated to qualifying communities in areas of health, nourishment, agroindustry, ecological maintenance and education.

To promote the Cement producers' Labour union, this from the third year of taking part of the market. As a response to the challenges that the included world presents, one will propose to other producers of cement the creation of a Cement producers' labour union. This with the purpose of supporting gentlemen's agreements for the maintenance of the local market, as well as to allow that it should be the market in the first plane and the own capacity of every participant, who establishes the participation of each one on the market. Also it will be allowed that the members of a guild should present a front jointly opposite to the incursions of foreign producers, who as the conditions of his native lands could have advantages on the places.

· Others.

3.3 THE FINANCIAL STUDY.

Here the important thing is demonstrated: is idea profitable? To know it three budgets are had: sales, investment, expenses. That went out of the previous studies. With this it will be decided if the cement project is viable, or if one needs changes, as for example, if it is necessary to sell more, a secondhand or new plant, or if the general expenses must be optimized.

Initial investment that will have impact on the general project was deciding in the process of general research.

The investment in the montage of the cement factory, as that of any productive project that wants to develop must divide of the following way.

1. Preinvestment.

1.1 Profile of the Project US\$ 40,000.00 (Executed)

1.2 Technical Studies US\$ 1,500,000.00

Study of social impact. (In process). US\$.100,000.00

· Studies of environmental impact. (In process) US\$. 100,000.00

· financial Study. US\$. 100,000.00

· Study of marketing. US\$. 200,000.00

· Geological Study of the quarries. US\$. 500,000.00

· Mechanical Design of the plant. It comes with the plant.

· Design of Civil Work. US\$. 150,000.00

· Design of operation and maintenance. US\$. 100,000.00

· unforeseen Additional expenses. US\$. 350,000.00

Montage of the Plant US \$ 0,000,000.00

· Purchase of quarries and areas. (Executed)

· Purchase of equipment of plant.

· Construction of infrastructure.

· Montage of equipment.

· Putting in march for tests.

· Beginning of final production.

4. Cost of Plant... .. US. \$.

5. · New Plant US\$.

6. · Secondhand Plant US\$.

San Antonio Group owns the quarries that were providing the raw materials. The investment already realized nowadays reaches the US \$ 6, 000,000.00. In addition the geological studies already have been carried out to establish the size of the seams of available mineral.

In the following tabulation one presents a detail of the whole to investing in the project. Also one presents the whole of invested to the date by Cementos San Antonio, S.A. in the project of the cement factory.