Cement Industry in India: Trade Perspectives

Introduction

Cement is the glue that holds the concrete together, and is therefore critical for meeting society’s needs of housing and basic infrastructure such as bridges, roads, water treatment facilities, schools and hospitals. Concrete is the second\(^1\) most consumed material after water, with nearly three tonnes used annually for each person on the planet.

Being one of the basic elements for setting up strong and healthy infrastructure, Cement plays a crucial role in economic development of any country. Having more than a hundred and fifty years history, it has been used extensively in construction of anything, from a small building to a mammoth multi purpose project.

The manufacturing process of cement consists of mixing, drying and grinding of limestone, clay and silica into a composite mass. The mixture is then heated and burnt in a pre-heater and kiln to be cooled in an air-cooling system to form clinker, which is the semi-finished form. This clinker is cooled by air and subsequently ground with gypsum to form cement.

There are three types of processes to form cement - the wet, semi-dry and dry processes. In the wet/semi-dry process, raw material is produced by mixing limestone and water (called slurry) and blending it with soft clay. In the dry process technology, crushed limestone and raw materials are ground and mixed together without the addition of water.

The dry and semi-wet processes are more fuel-efficient. The wet process requires 0.28 tonnes of coal and 110 kWh of power to manufacture one tonne of

\(^1\) World Business Council for Sustainable Development (WBCSD) 2002
cement, whereas the dry process requires only 0.18 tonnes of coal and 100 kWh of power.

There are different varieties of cement based on different compositions according to specific end uses, namely, Ordinary Portland Cement, Portland Pozzolana Cement, White Cement, Portland Blast Furnace Slag Cement and Specialised Cement. The basic difference lies in the percentage of clinker used.

- **Ordinary Portland Cement (OPC):** OPC, popularly known as grey cement, has 95 per cent clinker and 5 per cent gypsum and other materials. It accounts for 70 per cent of the total consumption.

- **Portland Pozzolana Cement (PPC):** PPC has 80 per cent clinker, 15 per cent pozolona and 5 per cent gypsum and accounts for 18 per cent of the total cement consumption. It is manufactured because it uses fly ash/burnt clay/coal waste as the main ingredient.

- **White Cement:** White cement is basically OPC - clinker using fuel oil (instead of coal) with an iron oxide content below 0.4 per cent to ensure whiteness. A special cooling technique is used in its production. It is used to enhance aesthetic value in tiles and flooring. White cement is much more expensive than grey cement.

- **Portland Blast Furnace Slag Cement (PBFSC):** PBFSC consists of 45 per cent clinker, 50 per cent blast furnace slag and 5 per cent gypsum and accounts for 10 per cent of the total cement consumed. It has a heat of hydration even lower than PPC and is generally used in the construction of dams and similar massive constructions.

- **Specialised Cement:** Oil Well Cement is made from clinker with special additives to prevent any porosity.

- **Rapid Hardening Portland Cement:** Rapid Hardening Portland Cement is similar to OPC, except that it is ground much finer, so that on casting, the compressible strength increases rapidly.
**Water Proof Cement:** Water Proof Cement is similar to OPC, with a small portion of calcium stearate or non-saponifiable oil to impart waterproofing properties.

**Section I: Global Scenario**

**Global Consumption**

The demand for cement is a derived demand, as it depends on industrial activity, real estate, and construction activity. Since growth is taking place all over the world, in these sectors, the global consumption is also increasing. During the period from 2006 to 2008, total cement consumption grew from 2,568 million tonnes to 2,857 million tonnes, at a Compounded Annual Growth Rate (CAGR) of close to 7%.

The rapid increase in global cement consumption is led by increasing demand for infrastructure in emerging economies, with Asia accounting for 66% of the global demand. China was the world’s largest consumer of cement in 2008 and accounted for 48.7% of total cement consumption.

Studies have shown that there is a direct linkage between cement consumption and global macro-economic growth and contraction. This was also evident during the oil shock of early 1970’s and 1979-80 and also during the East Asian crisis in late 1990s, when the world cement consumption witnessed a sharp decline. At the opposite end of the spectrum, the relatively healthy growth in many economies, in recent years has helped spur cement consumption.

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2 ICR – Global Cement Report 8th Edition
3 ICR-GlobalCement Report 8th Edition
4 K E Daugherty, University of Pittsburgh, in a research paper found that cement consumption has a higher degree of correlation with the gross national product per capita than any other of the indicators examined.
The demand for cement consumption per capita tends to follow a bell-shaped curve. This is because, emerging economies, during their high growth phase, tend to consume large quantities of cement to meet their infrastructure and housing needs\(^5\). In figure I below X-Axis represents the GDP per capita of a country and the Y-Axis represents the cement consumption per capita. The size of the bubble on the other hand represents, the country’s total consumption.

**Figure I**

![Cement Consumption* per capita and GDP per capita (2008)](image)

**SOURCE**: Consumption, exports and GDP data from USGS, ITC and IMF, respectively

* Since, the cement consumption was not readily available, in the calculations above, cement consumption data has been calculated by deducting country’s cement exports from its total cement production.

As visible in figure I, countries with large per capita GDP numbers consume smaller quantities of cement, while countries with the highest per capita cement consumption are part of the emerging economies group.

\(^5\) Global Strategic Management Mini Case Series
Interestingly, amongst all the economies under consideration, India has the lowest level of per capita cement consumption. Even though, the per capita cement consumption in the country has increased from 28 kg in 1980-81 to around 147 kg in 2008-09, it is still relatively low compared to other major economies. Average cement consumption in Saudi Arabia is at around 1,245 Kg, in Japan at 491 Kg, and in United States at around 285 Kg. Even amongst the BRIC economies India has the lowest level of per capita cement consumption, with China's per capita consumption at around 1,040 Kg, 271 Kg in Brazil and 378 Kg in Russia.

This low per capita cement consumption in India and the process of catching up with international averages along with rapid economic growth and increased focus on infrastructure development is expected to drive future growth in the industry, also making it an attractive sector for international investment.

**Global Production**

Cement is produced in 156 countries across the Globe. During 2008, the global production capacity of cement stood at around 2,872 million tonnes with China accounting for approximately 1,400 million tones and India a distant second with total production of 183 million tonnes. The production of Cement is highly skewed with top ten countries together accounting for close to 70% of total cement production. These countries account for close to 70% of total population.
High concentration of cement production may be attributable to high capital costs and long gestation periods in cement industry. Access to limestone reserves (principal raw material for the manufacture of cement) also acts as a significant entry barrier for newer companies.

Regionally, Asia contributed about 67% to world production and included 9 of the 20 leading producing countries. Western Europe had about 8% of total output; the Middle East (including Turkey) and North America, nearly 6% each; Africa, Central America and South America (combined), and the Commonwealth of Independent States, about 4% each; and Eastern Europe, about 2%.6

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6 United States Geological Survey
Global Trade Profile

The global cement consumption data closely mirrors that of cement production, underlying the relatively low\textsuperscript{7} level of international cement trade volumes to world demand. The volume of cement entering world trade has traditionally been low compared to overall production and consumption, typically accounting for about 6\% to 7\% of total cement production (around 6\% in 2008).

Figure III

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{cement_production.png}
\caption{World Cement Production}
\end{figure}

\textsuperscript{7} During 2008 while the world trade grew at a CAGR of 15.5\%, the cement trade increased at a CAGR of 7.5\%.
Low volume of cement trade may be attributable to low unit value of cement, the widespread availability of raw materials (limestone) and the link between economic growth and cement consumption which favours domestic production rather than import dependence. High freight costs is also among the major reasons for low cement trade.

During the period from 2001 to 2008, total cement trade grew at a CAGR of 13% from US$ 4.1 billion to US$ 11.1 billion. During the same period exports increased from US$ 2.2 billion to US$ 5.5 billion (CAGR of 11.6%), while imports increased from US$ 1.8 billion to US$ 5.5 billion (CAGR of 14.5%).

United States is the largest trader of cement in the world, with total trade of US$ 1,396 million during 2008, followed by Germany, Belgium and Netherlands with total trade of US$ 945 million, US$ 744 million and US$ 562 million, respectively.
Despite being the second largest producer of cement in the world, India is not amongst the major traders of cement.

**Major Exporters**

Germany was the largest cement exporter during 2008, with exports of US$ 756 million. Belgium, China and Italy followed Germany with annual exports of US$ 607 million, US$ 507 million and US$ 310 million, respectively. The top ten countries together accounted for 63% of total cement exports during 2008.

**Major Importers**

United States was the world’s largest cement importer during 2008, with imports worth US$ 1,170 million. US rely heavily on imports of cement to meet its domestic cement consumption. This is also reflected in its high cement trade deficit of US$ 944.5 million.
US is followed by Netherlands, France and Germany with annual imports of US$ 409 million, US$ 326.4 million and US$ 189.4 million, respectively.

Figure VI

![Chart showing cement imports by country in 2008.]

SOURCE: ITC, Geneva

Trade situation in emerging markets

The global cement industry has undergone a period of significant change over the past decade, driven by the demands of a globalised economy. While the traditional markets of Europe and the US continue to grow, primarily led by public sector investment, the most significant developments are however to be found in the emerging economies. They have, in recent years become the most significant players in the cement market, in terms of consumption, growth and investment.

In emerging economies from Asia to Eastern Europe, cement has become the glue of progress. Some 80% of cement is made in and used by emerging economies; China alone makes and uses around 50% of global output.
Rapid increase in infrastructural development activity among CIS countries (Commonwealth of Independent States), has led to rapid increase in cement production in both Russia and Ukraine. In Ukraine production is doubling every four years, making it the second largest cement producer in the region after Russia. Infrastructure growth in the CIS is driven by a number of factors such as strong macroeconomic fundamentals; growing business and consumer demand for improved infrastructure services, such as roads, ports, airports and utilities; relative underinvestment in infrastructure since the early 1990s; an acceptance by government authorities of the key role of the private sector in accelerating infrastructure development; recent introduction of legal frameworks designed to facilitate private investment in the sector.

Since the future of the cement sector is so intricately linked with the continued economic growth in emerging economies, the paper assesses the trade situation in emerging markets, excluding India.

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8 The paper uses the World Bank list of emerging economies. The emerging economies as identified in the paper are Ukraine, Nigeria, Vietnam, Egypt, Philippines, Russia, Malaysia, China, South Africa, Thailand, Venezuela, Chile, Singapore, Colombia, Brazil, Argentina, Mexico, and Indonesia.
As per the data available, during the period from 2001- to 2008, while the world cement trade grew at a CAGR of 15.5%, the growth in trade for these economies was around 23.5%. The increased demand for cement in emerging markets may be attributable to rapid economic growth and greater public and private sector investment in these countries.

Ukraine witnessed the highest growth in cement trade, with a CAGR of 55.7%. The rapid increase in Ukraine’s cement trade may be attributable to rapid growth in both cement exports and imports. Ukraine’s major trading partners in cement are primarily Commonwealth of Independent States (CIS), with exports destined to Russia, Kazakhstan, Azerbaijan, and Turkmenistan.

Nigeria, Vietnam and Egypt followed Ukraine with a CAGR of 47.8%, 46.2% and 41% respectively.
China’s cement trade increased at a CAGR of 28.3%, during the period under consideration. This is above the world average but below the trade growth in other emerging economies. Apart from the high base effect, this relatively low performance may be explained by slower growth in China’s cement imports, which increased at 12.4%, compared to exports, which grew at a CAGR of close to 30%.

Figure VIII

Vietnam joined the World Trade Organisation (WTO) in January 2007 and as per the WTO accession clause, it is expected to significantly reduce its tariff levels only by 2012. Consequently, during 2008, Vietnam imposed the highest customs duty of 30%, on cement, among all the emerging economies under consideration.

In Malaysia, on the other hand, relatively high customs duty of 20.7%, during 2008 may be explained by the fact that Malaysia follows a policy of imposing high
customs duty on products, which are also locally produced\textsuperscript{9}. During 2008, Malaysia was among the major cement producers in the world.

Like India, South Africa and Singapore also did not impose any customs duty on cement imports.

**Level of Intra-Industry Trade**

Intra-industry trade arises if a country simultaneously imports and exports similar types of goods or services. The paper uses the Grubel Lloyd Index\textsuperscript{10}, proposed by Grubel and Lloyd in 1975, to determine the extent of intra-industry trade.

If the country only imports or only exports goods or services within the same sector, such that there is no intra-industry trade, value of the Grubel – Lloyd Index reduces to zero. On the other hand if the export value is exactly equal to the import value, Grubel – Lloyd Index takes a value of 1. The Grubel–Lloyd index therefore varies between zero (indicating pure inter-industry trade) and one (indicating pure intra-industry trade).

The graph below shows the level of intra-industry trade in Cement, among major economies of the world, excluding India. As visible in figure IX, China and Singapore have amongst the lowest level of intra-industry trade among all the economies under consideration. On the other hand South Korea and South Africa have the highest level of intra-industry trade.

\textsuperscript{9} Malaysia country report by Egyption Export Promotion Center. http://www.eepc.gov.eg
\textsuperscript{10} The Grubel-Lloyd Index measures the extent of intra-industry trade in a particular industry or an economy as a whole.

For an industry \(i\) with exports \(X_i\) and imports \(M_i\) the index is

\[
GL_i = 1 - \frac{|X_i - M_i|}{(X_i + M_i)},
\]

Where \(X_i\) is the export in a certain line of goods and \(M_i\) – import in the same commodity group. The value of \(GL_i\) index can vary between 0 and 1, whereas the former denotes zero intra-industry trade and the latter corresponds to the situation where all trade is intra-industry.
Since the value of the Grubel-Lloyd Index changes with an increase in deviation in country's imports and exports, low level of intra-industry trade in China may be explained by low level of cement imports compared to exports. On the other hand, low intra-industry trade in Singapore may be explained by low value of exports compared to imports.

While, China and Russia saw a drastic decline in the Grubel-Lloyd Index values during the period from 2001 to 2008, the Index values for US, South Korea, Brazil and South Africa increased.

**Figure IX**

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Values of Grubel Lloyd Index

2001 2002 2003 2004 2005 2006 2007 2008
Grubel - Lloyd Index - Major Economies

USA  Brazil  China  Korea  Russia  Singapore  South Africa  World

SOURCE: ITC, Geneva and CII analysis
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**Section II. India’s Trade Profile and Market Access**

The Indian cement industry is one of the oldest industries. It has been catering to India's infrastructure and housing requirements since its emergence during the
British Raj. Though the majority of players in the Indian cement industry were private sector organisations, the industry was highly regulated.

However, with liberalisation and globalisation of the economy, the cement industry restructured itself to survive with alterations in the global economic and trading system. The industry underwent a period of rapid technological upgradation including modernisation and improvement of plant processes, which helped it in reducing manpower costs\(^\text{11}\). This pursuit of cost efficiency and technological upgradation has made some of the Indian cement companies the most efficient across global majors. The Indian business group, Grasim, is amongst the top ten companies in the world. Indian major, Gujarat Ambuja is one of the most cost efficient firms in the world. Most Indian cement majors in fact compare favourably to the world cement majors in terms of profitability.

Today with a total capacity of 219.2 million tonnes (including mini plants) in March 2009, the Indian cement industry has emerged as the second largest market after China, surpassing developed nations like the USA and Japan.

The rapid growth rate of Indian economy achieved since 1990s, has given a tremendous fillip to the infrastructure\(^\text{12}\) development in the country. The increase in government spending on infrastructure and housing, as well as rapid urbanisation and industrialisation activities by private players has resulted in increased demand for updated quality building material; including cement. During 2008, cement consumption in India increased by nearly 9%. This trend is likely to continue in the coming years.

Cement production in India has increased at a CAGR of 8.1 per cent during the last decade with a production level of around 181 million tonnes at the end of

\(^{11}\) IBEF
\(^{12}\) As per the eleventh five year plan the infrastructure has been defined as road, rail, air and water transport, power generation, transmission and distribution telecommunication, water supply, irrigation and storage.
The cement industry comprises 125 large cement plants (capacity more than 0.198 million tonnes per annum) with an installed capacity of 148.28 million tonnes and more than 300 mini cement plants (capacity less than 0.198 million tonnes per annum) with an estimated capacity of 11.10 million tonnes per annum. The industry worked at an estimated 83 per cent capacity in 2008-09. Small plants, however, work at an installed capacity of around 55 per cent.\(^\text{13}\)

Among the different varieties of cement, India produces Ordinary Portland Cement (OPC), Portland Pozzolana Cement (PPC), Portland Blast Furnace Slag Cement (PBFS), Oil Well Cement, Rapid Hardening Portland Cement and Sulphate Resisting Portland Cement. The share of blended cement in total cement production has increased from 29 per cent in 1997-98 to 54.5 per cent in 2003-04.

However, despite this, the cement industry in India remains somewhat fragmented and merger and acquisition possibilities are strong. Investment norms including guidelines for foreign direct investment (FDI) are investor-friendly. All these factors present a strong case for investing in the Indian market.

**India’s Cement Trade**

Cement has traditionally not\(^\text{14}\) been among India’s major traded products. During 2008, India was the 44\(^{th}\) largest cement-trading nation in the world. However, increased focus on infrastructure development in recent years has led to a splurge of construction activity in the country, resulting in higher cement imports and hence trade.

Trade in cement is also underway with the neighbouring countries and countries in Africa and West Asia. L&T (now a part of Grasim), Gujarat Ambuja Cements

\(^{13}\) Cement Manufacturers Association

\(^{14}\) During 2008, India was ranked 44 among the list of major cement trading nations.
Ltd and Jaiprakash Industries are the top exporters. The western region, due to its proximity to the coasts, accounts for 92.4 per cent of total exports, of which Gujarat holds a share of 76 per cent.\textsuperscript{15}

During the period from 2001 to 2008, India’s cement trade increased from US$ 4.1 million to US$ 44.2 million, a CAGR of 40.3%. The increase in trade was led by rise in imports, which increased, from US$ 0.3 million in 2001 to US$ 37.1 million in 2008, at a CAGR of 91.3%. India’s cement exports on the other hand increased at a CAGR of 9.9%, from US$ 3.7 million to US$ 7.2 million.

China was India’s main source of cement imports, during 2008 with imports worth US$ 13.9 million followed by Italy and Taiwan with imports worth US$ 13.5 million and US$ 2.5 million, respectively. India’s top five import sources together accounted for close to 92% of India’s total cement imports during 2008.

**Figure X**

\begin{center}
\includegraphics[width=\textwidth]{India_Cement_Trade.png}
\end{center}

\textbf{SOURCE: ITC, Geneva}

Malaysia and UAE were the major destinations for India’s Cement exports during 2008. The two countries together accounted for 63% of India’s total cement

\textsuperscript{15} IBEF
exports. These countries were followed by Germany, Maldives and USA, which accounted for 6.8%, 5.7% and 3.6% of India’s total cement exports.

**Figure XI**

![India's Cement Export Destinations - 2008](source: ITCA, Geneva)

India has an immense potential to tap cement markets of countries in the Middle East and South East Asia due to its strengths of location advantage, large-scale limestone and coal deposits, adequate cement capacity and production of world-class quality of cement with the latest technology. However for this Indian cement industry will have to become cost competitive vis-à-vis China. Cement companies in India often complain that the entire gamut of direct and indirect taxes and the freight for transporting cement from hinterland to the port substantially increases the price of cement. Moreover the infrastructure facilities at port to handle bulk/bagged cement are poor leading to delays in exporting cement.
India’s sectoral competitiveness

This paper measures India’s changing pattern of trade specialisation by applying an approach originally adopted in Lafay (1992). The Lafay Index\textsuperscript{16} defines a country’s trade specialisation with regard to a specific good as the difference between the trade balance of that good and the country’s overall trade balance, weighted by the good’s share of total trade.

The Lafay index for the cement sector in India has been computed at a disaggregated level of 6-digit HS classification. The results of which are given below.

Table I

<table>
<thead>
<tr>
<th>HS Code</th>
<th>Sector Classification</th>
<th>Lafay Index Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>681011</td>
<td>Building blocks and bricks of cement, concrete or artificial stone</td>
<td>0.0008385</td>
</tr>
<tr>
<td>681091</td>
<td>Prefabricated structural components of building etc of cement/concrete etc</td>
<td>-0.0002843</td>
</tr>
<tr>
<td>681099</td>
<td>Articles of cement, of concrete or of artificial stone nes</td>
<td>-0.0012448</td>
</tr>
<tr>
<td>681019</td>
<td>Tiles, flagstones &amp; similar articles of cement/concrete/artificial stone</td>
<td>-0.0029027</td>
</tr>
</tbody>
</table>

SOURCE: ITC Geneva and CII staff calculations

As the table I, above shows, despite being the second largest producer of cement in the world, the Lafay Index values for India’s cement sector is zero or close to zero levels, indicating no or low level of comparative advantage in the cement sector for India.

\textsuperscript{16} The Lafay Index is a measure of country's trade specialisation with regard to a specific product. Positive values of the Lafay Index indicate the existence of comparative advantage in a given item and the negative value indicates the point of despecialisation. The greater the value of the index the higher is the degree of specialisation.
Intra-Industry Trade

The values of Grubel – Lloyd Index in figure XII below, show low level of intra-industry trade in the cement sector for India. During the period from 2001 to 2008, after increasing to 0.7 in 2005, the values of the Grubel-Lloyd Index fell to 0.3 in 2008. This may be explained by a rapid increase in India’s cement imports since 2006. Since, the Grubel-Lloyd Index measures the extent of intra-industry when the country simultaneously exports and imports the same good, any divergence between exports and imports results in fall in index values. Since, 2005 while India’s cement imports picked up, the exports could not keep up with the pace and hence led to decline in Grubel-Lloyd Index values.

Figure XII

Grubel-Lloyd Index for the Cement Sector

SOURCE: ITC Geneva and CII Staff Calculations
Section III. The Competitiveness Matrix

Major Inputs and Issues
The cement industry is a highly energy intensive sector. Energy and raw materials (coal and lime stone) together form the most critical component in the production of cement.

Figure XIII

Cement Main Inputs* and their weight in production

SOURCE: MFN and Imports data from ITC; Share of inputs from CSO
*This is not an exhaustive list of inputs. Infact it only shows major merchandise inputs used in the production of cement. The intention here is to show share of various inputs and the customs duties that these inputs attract in India.
Figure XIII above shows the MFN tariffs on various cement inputs and the share of these inputs in the production of cement. As visible in the graph, coal accounts for a share of 10.3% of the inputs used in the production of cement, while limestone accounts for a share of 10%. Structural clay and plastic products account for a share of 6.9% and 6.2%, respectively in the production of cement.

On the import duties front, while the tariff on cement in India was reduced from 12.5% to nil in January 2007 and it continues to be at the same level till date\textsuperscript{17}, the inputs used in the production of cement continue to attract customs duty at the levels close to 10%. The coal and petroleum products attract customs duty of close to 5% and the cement clinkers\textsuperscript{18} attract a customs duty of 10%. As a result the weighted customs duty of various cement inputs, in the production of cement, is at around 6.8%.

This has created an inverted duty structure for the cement sector in India, which acts as a disincentive for domestic cement producer, who has to pay higher price for the raw material while the finished product (cement), can be imported duty free. This may also partly explain the surge in India’s cement imports in recent years.

The Union Budget 2010-11 has also increased\textsuperscript{19} excise duty on cement and cement clinkers. It has also been proposed to impose a new cess, to be called the Clean Energy Cess, on coal and lignite and peat produced in India, which will be collected as a duty of excise from coalmines. This cess would also apply to imported duty as CVD.

\textsuperscript{17} Union Budget 2010-11: An Analysis, CII
\textsuperscript{18} The heat processing of cement elements in a kiln forms cement clinkers. Limestone, clay, bauxite, and iron ore sand in specific proportions are heated in a rotating kiln at 2,770° Fahrenheit (1,400° Celsius) until they begin to form cinder lumps, which are also known as cement clinkers. Cement clinkers are usually ground with gypsum to produce the fine powder later mixed with liquid to produce cement,
\textsuperscript{19} The excise duty on cement has been increased from Rs 230 per tonne to Rs 290 per tonne, while the excise duty on cement clinkers has been increased from RS. 300 per tonne to Rs. 375 per tonne.
Issues

The input costs that primarily control the price of cement are coal, electricity tariffs, railway transport and freight, royalty and cess on limestone. However, interestingly, government controls the prices of all these components. The main concerns that industry faces in using these inputs for cement production are as follows:

- **Coal:** Coal is the main fuel for manufacture of cement in India. The consumption of coal in a typically dry process system ranges from 20-25% of clinker production. This means for per ton clinker produced 0.20-0.25 ton of coal is consumed. The cement industry consumes about 10 million tonnes of coal annually. Since coalfields like Bharat Coking Coal Limited (BCCL), Central Coalfields Limited (CCL) supply poor quality of coal, the industry has to blend high-grade coal with it. However, non-coking coal and petroleum coke attracts a customs duty of 5%, which increases the cost of production in the sector.

- **Electricity:** Cement industry consumes about 5.5 billion units of electricity annually with one tonne of cement requiring approximately 120-130 units of electricity. Since state governments supply electricity in India and since different states have different tariff structure, the power tariffs vary according to the location of the plant and on the production process. As a result, cement plants in different states attract different power tariffs. Another major hindrance to the industry is severe power cuts. Most of the cement producing states such as Andhra Pradesh, Madhya Pradesh experience power cuts to the tune of 25-30% every year causing substantial production loss.

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20 India Infoline Cement Sector Report
21 The Indian coal has a low calorific value (3,500-4,000 kcal/kg) with ash content as high as 25-30% compared to imported coal of high calorific value (7,000-8,000 kcal/kg) with low ash content 6-7%. 
- **Limestone:** This constitutes the largest bulk in terms of input to cement. For producing one tonne of cement, approximately 1.6 tonnes of limestone is required. Since, the plants near limestone deposits pay less transportation cost than others, the location of cement plant is determined by the location of limestone mines. The total limestone deposit in the country is estimated to be 90 billion tones, with Andhra Pradesh enjoying the largest share of 34%, followed by Karnataka, Gujarat, Madhya Pradesh and Rajasthan, with respective shares of 13%, 13%, 8%, and 6.5%. However, cement-manufacturing companies have to shed large sums of money by way of royalty payment to the central government and cess on royalties levied by the state government.

- **Transportation:** Cement is mostly packed in paper bags now. It is then transported either by rail or road. Road transportation beyond 200 kms is not economical therefore about 55% cement is carried by the railways. There is also the problem of inadequate availability of wagons especially on western railways and southeastern railways. Under this scenario, there is a need to encourage transportation through sea, which is not only economical but also reduces losses in transit. Today, 70% of the cement movement worldwide is by sea compared to 1% in India.

**Section IV: Firm level performance**

The performance of the cement industry is directly liked with the performance of the economy. A robust economy with booming construction activities ensures higher cement consumption. The same is true for the Indian cement industry. A look at Figure XIV below shows India’s GDP growth and the growth in Profit After Tax (PAT) of India’s Cement industry closely follow each other.

**Figure XIV**
During 2002-03, when India's GDP growth slumped to 3.8%, PAT of Indian cement industry fell by close to 30% over its level in 2001-02. Similarly when Indian GDP growth increased to 9.7% in 2006-07, PAT of the cement industry skyrocketed to 199%, and the industrial sales jumped to 41.1%.

**Structure of the Indian Cement Industry**

The structure of the industry can be viewed as fragmented, although the concentration at the top has increased, as the top 10 players control around 73% of market share, which was 70% during 1990-91, whereas the other 27% of market share is distributed among 32 players. This is also confirmed by the results of Herfindahl Index\(^\text{22}\) (HI). The HI is a measure of industry concentration equal to the sum of the squared market shares of the firms in the industry and an indicator of amount of competition among them.

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\(^{22}\) The Herfindahl index is defined as the sum of the squares of the market shares of each individual firm. As such, the index can range from 0 to 100, moving from a huge number of very small firms to a single monopolistic producer. Increases in the Herfindahl index generally indicate a decrease in competition and an increase of market power, whereas decreases indicate the opposite. In the paper we assume that total market size in India is the sum of total sales by all the listed Cement companies in India.
Our calculations show a very low value of Herfindahl index in the cement industry in India, indicating a very high competition and a low market power. High level of competition in the cement industry is a result of the low entry barriers and the ready availability of technology.

Figure XV

![Top 10 Major Players in Cement Industry - 2008-09](image)

SOURCE: Prowess, CMIE

Figure XVI
Top 10 Major Players in Cement Industry - 1990-91

<table>
<thead>
<tr>
<th>Rank</th>
<th>Company Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A C C Ltd.</td>
</tr>
<tr>
<td>2</td>
<td>Grasim Industries Ltd.</td>
</tr>
<tr>
<td>3</td>
<td>Century Textiles &amp; Inds. Ltd.</td>
</tr>
<tr>
<td>4</td>
<td>Birla Corporation Ltd.</td>
</tr>
<tr>
<td>5</td>
<td>Cement Corpn. Of India Ltd.</td>
</tr>
<tr>
<td>6</td>
<td>India Cements Ltd.</td>
</tr>
<tr>
<td>7</td>
<td>Heidelberg Cement India Ltd.</td>
</tr>
<tr>
<td>8</td>
<td>J K Lakshmi Cement Ltd.</td>
</tr>
<tr>
<td>9</td>
<td>Shree Digvijay Cement Co. Ltd.</td>
</tr>
<tr>
<td>10</td>
<td>Ambuja Cement Eastern Ltd. [Merged]</td>
</tr>
</tbody>
</table>

SOURCE: Prowess, CMIE

Major Domestic Players

- **Associated Cement Companies Ltd (ACCL):** Associated Cement Companies Ltd manufactures ordinary Portland cement, composite cement and special cement and has begun offering its marketing expertise and distribution facilities to other producers in cement and related areas. It has fifteen manufacturing plants located throughout the country.

- **Birla Corp:** Birla Corp's product portfolio includes acetylene gas, auto trim parts, casting, cement, jute goods, yarn, calcium carbide etc. The cement division of the company has seven plants, with an installed capacity of 57.8 lakh tonnes. The company has two plants in Madhya Pradesh, Rajasthan and West Bengal and one in Uttar Pradesh and holds a market share of 2.8 per cent. It manufactures Ordinary portland cement (OPC), portland pozzolana cement, fly ash-based PPC, Low-alkali portland cement, portland slag
cement, low heat cement and sulphate resistant cement. Large quantities of its cement are exported to Nepal and Bangladesh.

- **Century Textiles and Industries Ltd (CTIL):** The product portfolio of CTIL includes textiles, rayon, cement, pulp & paper, shipping, property & land development, builders and floriculture. Cement is the largest division of CTIL and contributes to over 40 per cent of the company's revenues. The company has an installed capacity of 7.8 million tonnes. CTIL has four plants that manufacture cement, one in Chhattisgarh, two in Madhya Pradesh and one in Maharashtra.

- **Grasim Cement:** Grasim's product profile includes viscose staple fibre (VSF), grey cement, white cement, sponge iron, chemicals and textiles. With the acquisition of UltraTech, L&T's cement division in early 2004, Grasim has now become the world's seventh largest cement producer with a combined capacity of 45.7 million tonnes. Grasim (with UltraTech) held a market share of around 16.7 per cent in 2008-09. It has plants in Madhya Pradesh, Chhattisgarh, Punjab, Rajasthan, Tamil Nadu and Gujarat among others.

- **Ambuja Cements Ltd (GACL):** Gujarat Ambuja Cements Ltd was set up in 1986. In the last decade the company has grown tenfold. The total cement capacity of the company is 18.5 million tonnes. The company has a market share of around 10 per cent, with a strong foothold in the northern and western markets. Gujarat Ambuja is India's largest cement exporter and one of the most cost efficient firms.

- **India Cements:** India Cements is the largest cement producer in southern India with three plants in Tamil Nadu and four in Andhra Pradesh. The company has a market share of 5.4 per cent.

- **Jaiprakash Associates Limited:** Jaiprakash Industries, now known as Jaiprakash Associates Limited (JAL) is part of the Jaypee Group with
businesses in civil engineering, hospitality, cement, hydropower, design consultancy and IT.

- **Madras Cements**: Madras Cements Ltd is one of the oldest cement companies in the southern region and is a part of the Ramco group. The company is engaged in cement, clinker, dolomite, dry mortar mix, limestone, ready mix cement (RMC) and units generated from windmills. The company has three plants in Tamil Nadu, one in Andhra Pradesh and a mini cement plant in Karnataka. It has a total capacity of 10 million tonnes annually and holds a market share of 4 per cent.

**Mergers & Acquisitions**

The globalisation of Indian cement industry has also encouraged many foreign cement manufacturers to engage themselves in agreements and deals with their Indian counterparts to enjoy a share of pie in the rapidly growing Indian cement market. These engagements have been primarily through various mergers and acquisitions deals. Some of the major M&A deals between domestic and foreign cement manufacturers in recent years have been-

- **Lafarge India**: It is a subsidiary of the Lafarge Cement Company of France. It was established in 1999 in India with the acquisition of the Tisco and the Raymond cement plants. Lafarge currently has four cement plants in India: two integrated plants in the state of Chhattisgarh, one grinding station each in Jharkhand & West Bengal. Total cement production capacity of Lafarge in the Indian market currently stands at around 6.5 million tons. The company produces different types of cements like Portland Slag Cement, Portland Pozzolana Cement.

- **Heidelberg Cement - Indorama Cement Ltd**: In March 2006, Heidelberg Cement Company entered into a 50:50 joint venture with the Indorama
Cement Ltd. Heidelberg Cement Company is the leading German cement manufacturing company, which was setup in 1873. It has its operations in various countries across the Globe. The Company has two manufacturing units in India - a grinding plant in Mumbai and a cement terminal near Mumbai harbour.

- **Holcim Cement - Gujarat Ambuja Cements (GACL):** Holcim Cement entered into a strategic partnership with GACL, in 2006, to acquire 14.8% in GACL. Currently Holcim holds around 56% stake in the company. Holcim Cement Company is among the leading cement manufacturing and supplying companies in the world. It is one of the major employers in the world, having a workforce of 90,000. The Holcim Cement Company has units in excess of 70 countries all over the world.

- **Italcementi cement - Zuari Cement Limited:** In 2006, Italcementi Cement Company with the help of the Ciments Français, a subsidiary for its global activities, entered into an agreement to acquire shareholding of Zuari Cement Limited, through a 50:50 joint venture. Italcementi Cement is among the largest cement manufacturing companies in the world. The company entered the Indian market in January 2001 when it acquired 50% of Zuari Cement plant in Andhra Pradesh in southern India.

**Profitability of Cement Companies**

To evaluate the competitiveness of firms in the Indian cement industry, the paper measures the dispersion in the performance of all the public listed cement manufacturing companies in India, on the basis of following parameters

- **Profit Margin:** It measures how much profit does a company earn out of every rupee of sales. It is calculated as PAT/Net Sales.
Interest incidence: Interest incidence measures the burden of interest expenses on total profits of the company. It is used to measure the cost of borrowed capital for a company.

Gross fixed assets turnover ratio\(^{23}\): Gross fixed assets turnover ratio measures how efficiently fixed assets are utilized to generate sales.

These performance indicators have been chosen, since it is possible to compare these indicators across companies, irrespective of their size and years of operation.

**Competitiveness of firms**

In the overall profitability rankings, Grasim Industries Ltd, was the most profitable company in the Indian market, followed by Ambuja Cements and ACC Ltd. Over a period from 2000-01 to 2008-09, the profits of Grasim Industries grew at a CAGR of 17.7%, and that of Ambuja Cements increased by 14.1%. ACC Ltd and Shree Cement Ltd saw the fastest increase in profits among the top five most profitable cement firms in the Indian market. While the profits of ACC Ltd increased at a CAGR of 40.5%, the profits of Shree Cement Ltd increased at a CAGR of 49.7%.

**Profit Margin**

A look at the profit margin of all the cement companies in India shows that the profits per rupee of sales stood in the range of 0.01% and 0.29%, during 2008-09, which was lower than the profit margins during 2006-07, when the cement industry was booming. During 2006-07 profit margins stood in the range of 0.1% and 0.5%. Apart from the decline in cement demand, due to financial crisis, the decline in profit margins may be attributable to excess capacity and decline in cement prices during the period.

\(^{23}\) Gross fixed assets turnover ratio has been calculated as Sales/Gross fixed assets
Interest incidence

The cost of capital, on the other hand, for cement companies declined, during 2008-09, compared to 2006-07, when the interest incidence on profits was in the range of 5% to 70%. Interest incidence during 2008-09 was in the range of 5% to 25%. This could be explained by various liquidity infusion measures that the Reserve Bank of India initiated towards the latter half of 2008 to reduce the cost of credit for Indian industry.
Gross Fixed Assets Turnover Ratio

During 2008-09, the gross fixed assets turnover ratio for Indian cement companies 0% to 2.7%, in the same range as during 2006-07.

Figure XIX
Figure XIX shows a high variation in gross fixed assets turnover ratio among cement companies, which may be attributable to variation in either net sales or gross fixed assets across companies in the cement industry.

**Section V**

**Interview with Industry Representative**

*India is the second largest producer of cement in the world and the increased focus on infrastructure and affordable housing is expected to significantly increase the production capacity of cement in India over the next few years.*

However, before this happens statutory issues related to project execution and greater private and foreign investment, would require to be simplified, says Mr. Sumit Banerjee, Chairman, CII Cement Industry Division & MD, ACC Ltd. Following are the responses received from Mr. Banerjee to a written questionnaire sent to him by CII.
**Ques** Where do you see the industry’s production and demand figures in the next ten years as India enters a high growth phase in infrastructure and housing?

**Ans** The per capita cement consumption in India is approx. 178 kg at present. With the increased focus to augment infrastructure, affordable housing and inclusive growth, we expect the per capita cement consumption to grow up to 350 kgs. This will mean a CAGR for cement consumption of 9% over the next ten years. The cement demand is expected to increase to 450 Mio Tonnes. This will necessitate a capacity of over 500 Mio Tonnes.

While the industry is expected to increase the cement capacity to 350 Mio Tonnes by 2013, new capacities will have to come to take the total capacity to the desired level of more than 500 Mio Tonnes.

**Ques** What are the regulatory issues that the cement industry in India faces, which you think are unnecessary and should be removed by the Government?

**Ans** Issues, which delay project execution, are:

(i) Land acquisition
(ii) Obtaining Mining Rights
(iii) Obtaining Environment Clearances

The entire process of getting the statutory clearances should be simplified and be done in a time bound manner.

**Ques** Countries in Middle East and South East Asia are considered to be potential markets for Indian cement exports. What in your view, should the cement industry do to tap these markets?
**Ans** The Indian Cement Industry must be cost competitive to compete with China to be a significant player in the potential markets of Middle East and South East markets of Asia. The entire basket of direct and indirect taxes and the freight for transporting cement from the hinterland to the port and infrastructure facilities at the port to handle bulk/bagged cement must be at par with China.

**Ques** Are their transport related bottlenecks (cost, availability of adequate transport medium) that is keeping the industry from being a bigger exporter?

**Ans** Except for a few cement production facilities in Gujarat, all other cement manufacturers are located near the limestone deposits which are far away from the nearest ports. The cost of transporting cement from the manufacturing unit to the port, is very high and needs to be subsidized by the Government as is done in Pakistan at present. The industry should get priority allocation for export to meet the international commitments.

**Ques** While trading with any foreign country, does the cement industry face any trade barriers? If yes, please throw some light.

**Ans** Nothing significant is known at present.

**Ques** What steps should the Government take to attract greater private and foreign investment in the sector?

**Ans** Statutory clearances should be simplified and done in a time bound manner.

**Ques** Is the industry aggressively looking at FDI (both Greenfield and acquisitions) to tap foreign markets?

**Ans** Nothing significant as on date.
**Ques** The cement industry is becoming hi-tech. There is a demand for new materials and products. What is the Indian industry doing to move up the production value chain?

**Ans** The demand for hi-tech products will come from the large consumers such as industrial, commercial, infrastructure and realtors. The RMX (Ready Mix Concrete) units and the concrete product manufacturers will service this segment of consumers. RMX and concrete product manufacturers will learn from the developed economies and increase their product portfolios and service capability to move up the value chain.

**Ques** What are some of the key changes you envisage in the industry in the coming decades?

**Ans** The key policy changes, which we envisage in the coming decades, are -
- All plants will be more environment conscious with sustainable construction and development in and around the plant location
- Bulk sales will increase over bag sales
- RMC (Ready Mixed Concrete) and CP (Calcium Phosphate) cement will evolve as a channel for sales
- Increase presence of MNCs in the Indian cement market
- Demand for “Green” products like blended cements to increase
- Increase in number of grinding units near the MIC and consumption centre
- Road quality improvement will lead to increase in road dispatches.
Appendix I

Performance* of all the public listed cement companies (%)

<table>
<thead>
<tr>
<th>S.No</th>
<th>Company Name</th>
<th>Gross fixed assets turnover ratio</th>
<th>Interest incidence</th>
<th>Profit Margin</th>
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<tbody>
<tr>
<td>1</td>
<td>A C C Ltd.</td>
<td>1.1</td>
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<td>5</td>
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<tr>
<td>6</td>
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<td>8</td>
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<td>17</td>
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<tr>
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<td>6.14</td>
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</table>

**SOURCE:** Prowess, CMIE

* Companies sorted on the basis of ascending order