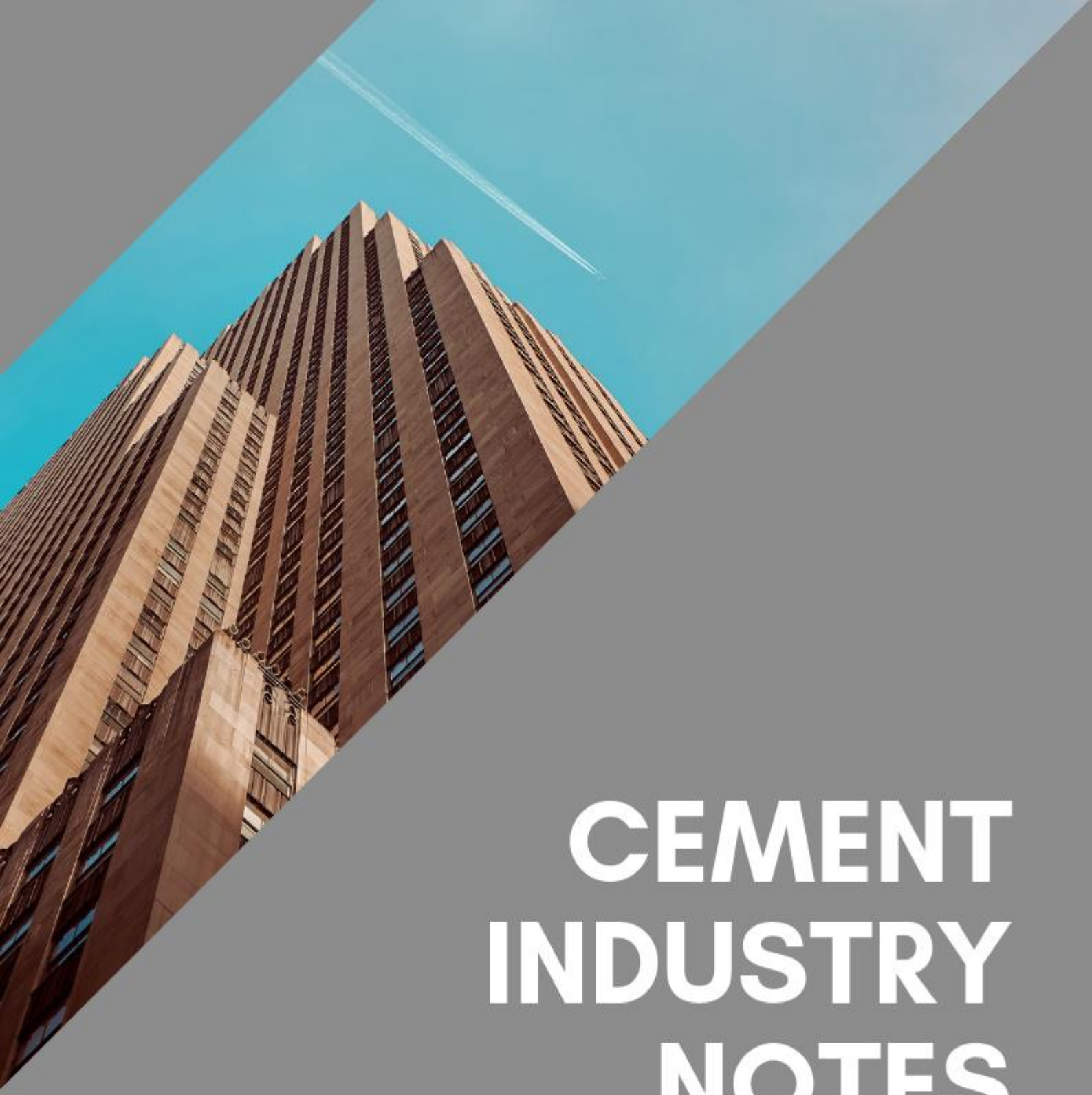


CEMENT INDUSTRY NOTES

Prepared by Smart Sync Investment Advisory Services

Introduction

The cement industry is one of strategic and vital importance for every growing economy. The humble commodity of cement is used everywhere from construction or renovation of a standalone home to building giant skyscrapers and sea bridges which serve as testaments to human ingenuity and progress. Cement is the most widely used material in existence and is the 2nd most consumed resource on Earth after water.

Technically speaking, cement is a substance used for construction which sets, hardens and adhere to other materials to bind them together. Cement can be classified into two types - hydraulic and non-hydraulic, based on whether water is required for it to set. Hydraulic cements make up the majority of the cement produced by the industry today.

The Egyptians were the first to discover the binding properties of lime and gypsum mortar which was used extensively to build their famous pyramids. The Greeks made further improvements and eventually the Romans were the ones who developed the ancient precursor of cement by using various crushed materials like volcanic ash (pozzolona), powdered brick and crushed tiles along with lime to build many structures in Rome including their city's aqueducts which are still functional today. Eventually it was John Smeaton in England who is commonly referred to as the father of civil engineering who made concrete for the first time in 1759 by adding pebbles and gravel as a coarse aggregate and mixing powdered brick to form cement at that time. It was commonly referred to as Portland cement due to the resemblance to the rocks found in the region of Portland in South England.

Portland Rocks

History of Cement in India

The first licensed cement manufacturing unit in India was setup by India Cement Company Ltd in Porbandar, Gujarat in 1914. Up till that time there had been a few attempts to make cement by other companies but none of them were successful. Cement had to be imported from England which made it prohibitively expensive. Thus once the industry took root in 1914, it grew quickly to almost 20 times its initial capacity in 10 years. World War I also contributed significantly to the demand for cement in this period. In 1936, all the existing cement companies except for one came together to form *Associated Cement Companies Ltd* (ACC) which is still one of the largest cement makers in India. The cement industry saw price and distribution control system put into place by the Government in 1956 to ensure a fair price model for both consumers and manufacturers. Then in 1977, the government authorized new plants and existing units going for capacity expansion to put a higher price to their products. In 1979, the government introduced a three tier price system for plants depending on their costs.

ACC Cement: The oldest cement maker in India today

But even so, this price control did not have the desired effect and led to higher costs and reduced margins for the industry. Then in 1982, the government put a quota of 66.6% of all cement to be sold to the government directly and to small real estate developers. For new units and sick units, the quota was at 50%. The rest of the products could be sold in the open market. This helped bring the industry up until the end of the decade when the industry was totally de-licensed due to the impending policy of economic liberalization.

Current Situation

The cement industry has gone through a slew of mergers and acquisitions since liberalization. The most prominent of these deals are:

1. Ultratech Cement merged with Samruddhi Cement in 2010 to form India's largest cement company.
2. LafargeHolcim, one of the world's biggest cement manufacturers owns more than 61% of Ambuja Cements and a management stake in ACC Cement, thus making it responsible for the biggest pie in the Indian Cement industry.
3. Brazilian Cement maker Votorantim Cimentos owns 75% of Shree Digvijay Cement.

The cement industry is highly fragmented with the top 20 companies controlling 70% of total production. The total industry capacity as of 2018, stood at 502 million metric tons per year. Correspondingly, the amount of cement produced is significantly below full capacity with the annual production in 2017-18 coming at 298 million tons which brings the capacity utilization for industry to just under 60%. This slack is mainly from smaller players as major players like Ambuja and Ultratech are consistently operating at capacity utilization above 80%.

Some of the biggest cement brands in India today

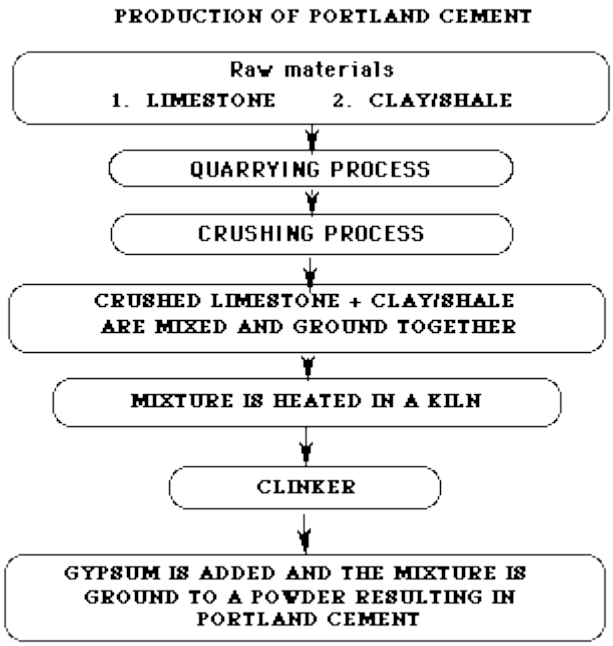
How is Cement Made

The first important commodity required to make cement is called *'clinker'*. Clinker is made by heating limestone with small quantities of additives like clay or powdered brick to 1450 degrees Celsius. It basically looks like small lumps.

Portland Clinker

This clinker is then mixed with different quantities of other additives like gypsum and clay and crushed to form the basic cement that we use. There are basically 3 main varieties of cement made from this clinker. They are:

1) **OPC (Ordinary Portland Cement):**
   This is made by using 95% clinker and 5% gypsum. This is the most widely available and used form of cement in India. This is because the setting and curing for OPC is the fastest enabling it to be used in speedy constructions.

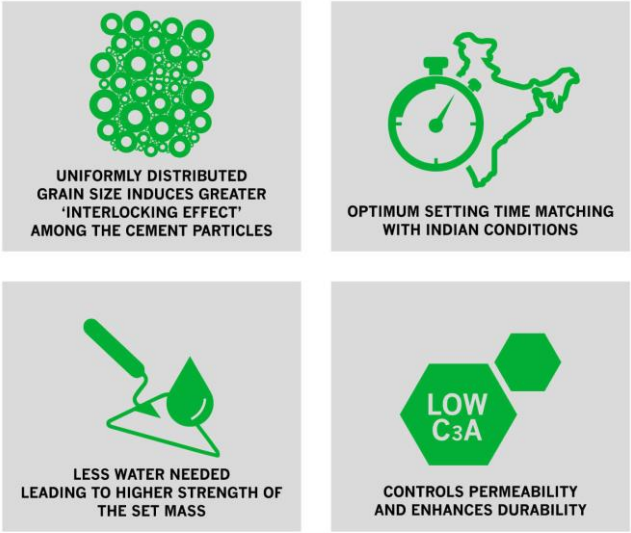


OPC Production Process

2) **PPC (Portland Pozzolona Cement):**
   This is made by using 65% clinker, 5% gypsum and 30% volcanic soil or fly ash residue from thermal power plants. PPC is cheaper to make than OPC because of the use of

cheap additive of fly ash. It is also much sturdier than OPC but has a longer setting and curing time. Thus, it is mainly used for making public structures like bridges, etc.

3) **PSC (Portland Slag Cement):**
This is made by using 45% clinker, 5% gypsum and 50% slag, the non-metal by-product is created in the blast furnace while refining pig iron from iron ore. Similar to PPC, PSC is cheaper than OPC because of the lower ratio of clinker in the mix. PSC is similarly sturdier than OPC and is also more resistant to erosion than PPC. Thus it is mainly used make water retaining structures, flyovers, etc.



Advantages of PSC Cement (Source: Lafarge)

Other than the traditional 3 varieties of grey cement (OPC, PPC and PSC), the last decade has seen the rise of ready mix concrete (RMC). RMC is mainly used to forgo the labour intensive task of mixing sand and gravel with grey cement before adding water to make the concrete mix by the consumer himself. Here the sand and gravel is already mixed in a predetermined ratio in order to ensure a specific quality and this ratio is different for products with different quality and purpose. For example, a waterproofing RMC mix is different from a standard RMC mix. The RMC is stored in silos and mixed with water in mixers mounted on trucks which then transport the ready to lay mixture to the customer site immediately. RMC usage has been steadily rising over the years and it has risen to command a separate category on its own. RMC is a whole product lie that opens the door for cement companies for even more tailored construction solutions depending on the user requirement and the mix ratio of the product.

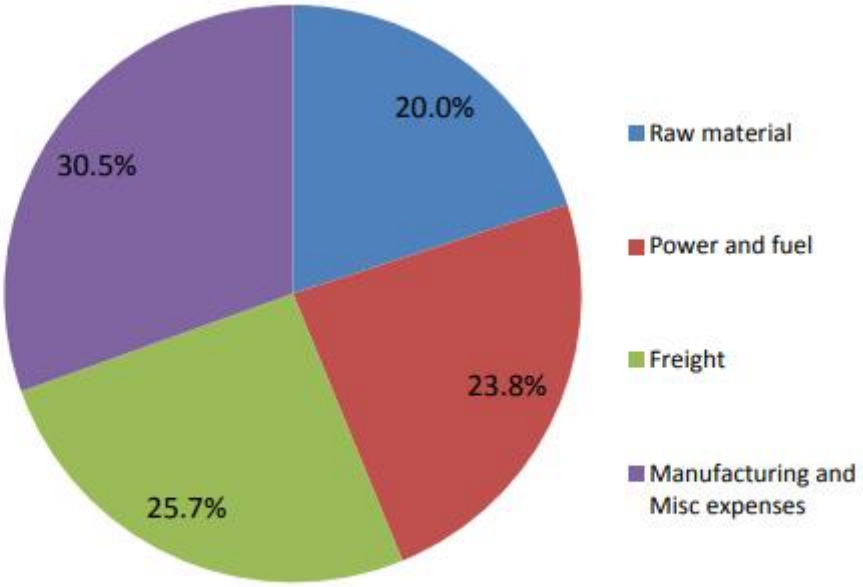
RMC being loaded onto a mixer from a silo

Thus, as we see here, limestone is of paramount importance to making cement. Limestone cannot be traded so cement companies have to possess their own limestone mines or they have to buy clinker from another company in order to make cement.

Limestone Belts in India

More than 65% of limestone deposits in India are located in Madhya Pradesh, Rajasthan, Andhra Pradesh, Gujarat and Chattisgarh. Many cement companies are based out of these states or own clinker making units in these states. Many companies set up integrated units in these states for local sales and consumption and establish grinding units in faraway states for grinding and assembling all the ingredients to be sold locally.

Cost drivers for Cement Industry



Compiled by CARE Ratings Source: Aceequity

Rough Cost Breakup for the Cement Industry

Cost is of paramount importance to the cement industry and its players. This is because the sales price of cement is largely dynamic and out of the seller's control. At most, established brands can charge a premium over market price but overall the final selling price is changeable depending on supply and demand characteristics. Thus the only way to ensure greater margins is to control and reduce costs as much as possible. Although the price of raw material is mostly out of control of the cement companies and these companies try and keep manufacturing and other expenses as low as possible, there are still two other major cost drivers that these companies focus on. They are:

1) **Fuel and Power:**

Fuel and power costs account for almost 1/4th of the total costs for any cement maker. The making of the key material of clinker require a lot of power to maintain the core temperature of 1450 degrees. In most clinker making units, petcoke is used as the fuel. Petcoke is a fuel source which is cheaper than regular coal but it is much more polluting and it also reduces the life of the plant in the long run. Around 45% of petcoke requirement for the cement industry is imported and the rest is made domestically. Thus, the price of cement is heavily affected by the price of petcoke and the recent rupee depreciation makes the large import requirement even more expensive for cement makers.

Facts about Pet Coke

Thus, a major focus area for cost savings and addressing environmental concerns for cement companies is fuel. Many cement majors have been trying and testing alternate fuel sources to promote cost savings and reduce their already high carbon footprint from their units. Some of the most prominent examples are:

a. Madras Cement uses coffee husks and cashew nut shells as an alternate fuel in their Alathiyur plant which helps them save more than $1.7 million in fuel costs annually.

b. India Cements uses Low Sulphur Heavy Stock (LSHS) sludge as alternate fuel which has provided annual cost savings of around $ 6500 approximately.

c. Ultratech Cement uses tyre chips and rubber dust as alternate fuel in their Gujarat Cement Works facility which helps them reduce around 30,000 tons of carbon emissions annually.

d. Larfarge has started to substitute 10% of their coal used with rice husk to lower their emissions and induce cost savings.

2) **Freight & Logistics**

Considering the high use of cement and the heavy nature of the commodity, logistics costs involved account for a big chunk of the total costs to cement makers. Thus cement makers establish final assembling plants as close as they can to the input sources. For example, JSW Cement makes a large quantity of PSC cement because their cement plant has been established close to their JSW Steel plant, thus facilitating easy access to slag for formation of PSC cement. Similarly, many PPC plants would

located close to or nearby power plants or volcanic regions to conveniently source fly-ash or volcanic ash to assemble PPC.

Similarly, all the fully integrated cement plants would be located close to limestone mines and deposits. To supply far off regions with no limestone deposits, companies would first make clinker in regions with limestone deposits and then ship it to a grinding unit in the sales region for final grinding and bagging of the final product. Despite all of this efforts, logistics remains a big cost driver for the industry and thus the industry will be affected every time diesel prices go up. Thus all cement companies keep a close eye on diesel prices as they can easily eat into their hard earned profits when the prices go up.

A special storage tank for transporting cement

Demand Drivers for Cement Industry

Demand for cement is driven primarily by 3 sectors. They are:

- Real Estate Development
- Infrastructure Development
- Commercial and industrial development

The real estate segment is estimated to drive around 63% to 65% of overall demand for cement. This segment is driven mainly by rural and urban housing. The biggest driver for this segment currently is the Pradhan Mantri Awas Yojana (PMAY) under which the Government of India has allocated more than Rs 27,500 Cr in subsidies for both rural and urban housing. Thus with the implementation and completion of the affordable housing targets for the next few years, there should be a steady and rising demand for cement from this initiative.

	2017-18	2018-19
	Budgetary support	*Budgetary Support*
PMAY-Grameen	Rs. 23,000	Rs. 21,000
PMAY-Urban	Rs. 6,043	Rs. 6,500

All figures in Rs. crores Source: Budget 2018

Gross Budgetary Support for Affordable Housing Initiative

Infrastructure development is estimated to drive around 23% to 25% of the demand for cement. There are many public infrastructure projects going in the country like Pradhan Mantri Gram Sadak Yojana (PMGSY), the proposed industrial and freight corridors, National Highway Grid, the various metro networks in State Capitals throughout the country, etc should provide a high and steady demand for cement for the next few years. Other than these national level undertakings, there are also state like Andhra Pradesh which will have high demand for cement due to all the public infrastructure development in the new capital there. Thus this segment is also expected to be providing steady demand for cement going forward.

Construction of an overhead metro line in a state capital in India

The Cement consumption per capita for India is just 210 kg which is the lowest among developing nations. The world average is at 580 kg which shows that the demand for cement has still not reached its full potential and there is a lot of room for the industry to grow. Long term demand growth rate for cement is estimated to be around 1.2 times the GDP growth rate. Thus the cement industry can be expected to be on the rise while the Indian economy rises.

Risks associated with the Cement Industry

1. **Oil and Fuel Price Risk**
   The cement industry is very energy intensive and most cement companies build their own power plants near their manufacturing facilities for internal use. But all of these power plants are based on non-renewable resources like petcoke thus making it vulnerable to fuel price shocks. Logistics also forms a major portion of expenses for the cement industry and thus it is also vulnerable to oil prices.

2. **Key Sector Risk**
   Real estate sector accounts for more than 65% and the infra sector accounts for almost 25% of cement consumption. Thus the growth of cement sector is highly correlated to the real estate and infra sectors and any risks to these sectors would also indirectly be affecting the cement industry as well.

3. **Foreign Exchange Risk**
   Around 45% of petcoke requirement for the cement industry is imported and the rest is made domestically. Thus the industry players who are dependent on imported petcoke are vulnerable to foreign exchange risks due to rupee depreciation.

4. **Environmental Risk**
   The cement industry is a highly polluting industry due to its high energy requirements and the manufacturing process of clinker which is a fundamental and unavoidable part of operating process. Thus the industry is vulnerable to carbon taxing and other measures that the government may take to curb industrial pollution.

5. **Raw Material Risk**
   The industry is dependent on mineral deposits of limestone. Thus the industry would be at risk if the limestone reserves in the country run out.

Observations on the Cement Industry

The cement industry is of vital importance for the economy. This is the reason why the government had kept close control of the domestic cement industry till 1990 and had tried various measures to help it grow and develop to the state that it is today. Here are some characteristics of the cement industry that make it unique:

- Cement prices are not fixed but are determined based on supply and demand. Thus it follows a dynamic pricing mechanism where the top players have little pricing power.

- Cement makers with higher retail sales percentage would have comparatively higher margins as compared to cement makers with low retail sales and greater infra sales.

- Cement is a highly taxed commodity with excise duty and other indirect taxes on it which limits the end margins earned by the manufacturer. Also, the pricing power in this industry is quite low so most players engage in discount and incentive schemes to boost sales which further restricts margins in the industry.

- Since cement is a bulky commodity it is difficult for cement companies to compete in all regions for market share. Thus sales and distribution network becomes even more important as they determine the reach and potential market size for each cement manufacturer.

- Cement making is very dependent on mineral resources (Limestone) and so companies have to make huge bids for mining rights. In most cases these rights bids are reflected in the balance sheet as intangible assets similar to goodwill and are amortised accordingly.

- Cement business is cyclical and it closely follows economic and climate cycles. For example, the lowest selling months for cement industry will be from June to September due to the monsoon season and its aftermath while March to June are mostly the highest selling months.

- Cement industry is a fixed asset heavy business and thus it is important to note how much cash flow is being generated by the business and whether it is enough to service existing debt or any new debt issue that the company has raised to fund their expansion.

- Being an asset heavy business, one of the best metrics to gauge operational performance for here would be return on assets ratio. This would help analyse whether the company's facilities are up to date or legacy units which cause wastage of raw materials and are expected to be replaced in some time.

- Since the cement business is essentially driven by volumes, the best indicator of a company's relative performance and pricing power should be sales realization per ton. This helps understand whether the company can command a premium for its product or not and how good the operating performance of the company is.

- In the cement industry, capacity utilization is also a key metric which helps identify how high is the demand for a company's products and consequently this is indicates marginal pricing power for the company.

- Cost optimization is the most consistent path for profit generation for cement companies. Thus any consistency of reductions in major expenses like fuel, logistics or manufacturing expenses should indicate better operating performance on part of the company and thus higher returns on assets and equity for the company.

Brief Profile of Top Players in the Cement Industry

1) **Ultratech Cement**

Ultratech is the biggest cement company in India. It is part of the Aditya Birla Group and a subsidiary of Grasim Industries. The company is the dominant player in the cement industry with more than 23% market share and a pan India sales presence.

OPERATIONAL METRICS

5,041.78 Rs/MT (as of Mar 19)	94.80 MMTPA (as of Mar 19)	72 % (as of Mar 19)
Realization / Tonne - Cement	Manufacturing Capacity - Cement	Capacity Utilization - Cement

2) **ACC Ltd**

ACC is the oldest surviving cement company is India. It has over 50 plants around the country. ACC is part of the LafargeHolcim Group which is one of the biggest cement manufacturers in the world. The company enjoys a market share of 9% and a pan India sales presence.

OPERATIONAL METRICS

4,783 Rs/MT (as of Jun 18)	33.30 MMTPA (as of Jun 18)	90% (as of Jun 18)
Realization / Tonne - Cement	Manufacturing Capacity - Cement	Capacity Utilization - Cement

3) **Ambuja Cement**

Ambuja Cement is another well-known name in the Indian cement industry. It is also a part of the LafargeHolcim Group. The company enjoys a market share of 7% and a pan India sales presence.

OPERATIONAL METRICS

4,596 Rs/MT (as of Jun 18)	29.70 MMTPA (as of Jun 18)	86.60% (as of Jun 18)
Realization / Tonne - Cement	Manufacturing Capacity - Cement	Capacity Utilization - Cement

4) **Shree Cements**

Shree Cements is the leading cement maker in North India. The company has 5 plants in Rajasthan and 1 plant each in Uttarakhand, Haryana, Uttar Pradesh, Bihar and Chhattisgarh. It is the 2nd largest cement company in India by market cap. The company enjoys a market share of 7%.

OPERATIONAL METRICS

4,225 Rs/MT (as of Mar 19)	37.80 MMTPA (as of Mar 19)	68.70% (as of Mar 19)
Realization / Tonne - Cement	Manufacturing Capacity - Cement	Capacity Utilization - Cement

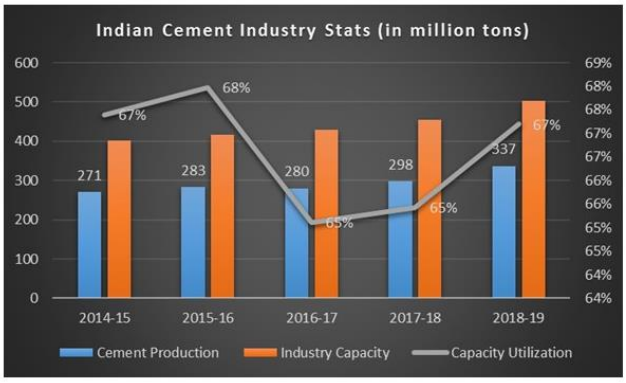
5) **India Cements**

India Cements is a leading cement maker in South India. The company has the majority of its operations in Tamil Nadu and Andhra Pradesh which account for 83% of revenues. The company enjoys a market share of 28% in South India.

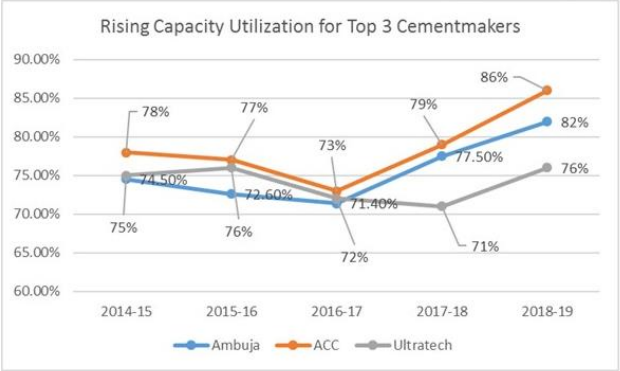
OPERATIONAL METRICS

4,697 Rs/MT (as of Mar 19)	15 MMTPA (as of Mar 19)	84% (as of Mar 19)
Realization / Tonne - Cement	Manufacturing Capacity - Cement	Capacity Utilization - Cement

Conclusion



Source: RBI, CARE Ratings



Source: Company Annual Reports

The cement industry has seen a bounce back from industry stagnation in 2016-17 but production has surged more than 20% since then. It is widely expected to stay on the rise for the next 3-4 years as the country pushes for its biggest ever infrastructure and real estate expansion with the various government initiatives like PMAY and 100 Smart Cities by 2022.

Considering the earlier fact that Indian consumption of cement per capita is still the lowest among developing nations, the demand for the humble cement is only set to rise. This is in line with the expectations of major industry players like Ultratech, Ambuja Cement and Shree Cement who are currently scrambling to expand their capacities to cope with rising demand which is evident in the rising capacity utilization rates for most players in the industry. Thus, it is safe to say that the cement industry is in for a good time for the next few years.

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