A LITTLE BIT ABOUT BUSINESS

YOU, ME & BUSINESS

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LUCKY IDIOT

YOU, ME & BUSINESS – ISSUE -1 – CEMENT

1. What is cement?

1.1. Meaning

"A powdery substance made by calcining lime and clay, mixed with water to form mortar or mixed with sand, gravel, and water to make concrete."

"The material which binds particles together in sedimentary rock"

"Cement is a fine mineral powder manufactured with very precise processes. Mixed with water, this powder transforms into a paste that binds and hardens when submerged in water."

1.2. Why do we need to use cement?

"Cement is typically the bonding agent or glue of the concrete which keeps all the different elements of concrete together. In addition to that cement also helps in giving strength to mix. Higher grade cement give more strength"

To get concrete, one mixes water, sand, and gravel. When cement is mixed with water and sand, the outcome is cement plaster, yet when cement is mixed with water, lime and sand, the result is mortar.

Cement works like a binding agent when it gets to mix with the water which helps us to bind other construction material. When we mix it with the water then chemical process into it will start occurring which eventually converts the material into the stone-like material.

1.3. History of cement

As per the Rumford –

The Assyrians and Babylonians used clay for a binding purpose, and the Egyptians advanced to the discovery of lime and gypsum mortar as a binding agent for building such structures as the Pyramids.

The Greeks made further improvements and finally, the Romans developed a cement that produced structures of remarkable durability.

In 1824, Joseph Aspdin, a bricklayer and mason in Leeds, England, took out a patent on a hydraulic cement that he called Portland cement because its color resembled the stone quarried on the Isle of Portland off the British coast.

1.4. How to manufacture cement?

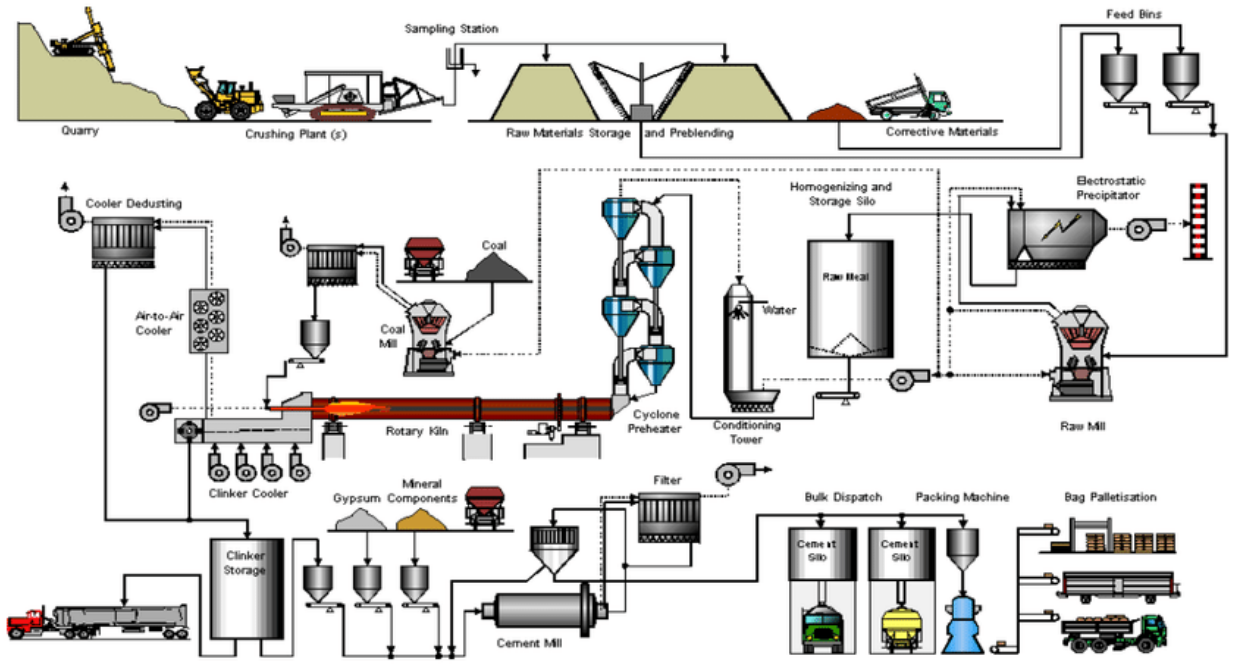
1.4.1. Manufacturing process

Cement is a commodity which is not able to pass on prices easily. Cement production has a two process - 1) Dry and 2) Wet.

The dry cement production process is cheaper and widely used by around 97% production into India.

Cement Manufacturing Process

Raw Material Extraction → Proportioning, Blending & Grinding → Pre-Heating Raw Material and Kiln phase → Cooling and Final Grinding → Packaging and shipping



A process from limestone quarry to final cement manufacturing, we show it in details.

Phase – 1 – Raw material extraction

Main raw material getting used for the manufacturing of cement is Limestone, clay, and sand. Limestone is for calcium, sand & clay fulfill the need for silicon, iron, and aluminum.

First, need to do an investigation regarding the existence and quantities of stone at the site. Limestone getting extracted through the blast. After the blast, limestone getting into the various size of the rock. And through a crusher, those rock transfer into the small stone which is suitable for transportation.

1 tonne of clinker requires approximately 1.5 tonnes of limestone.

Madhya Pradesh, Chhattisgarh, Andhra Pradesh (16% of the total production), Rajasthan (14% of the total production), Gujarat (10% of the total production), Karnataka (8% of the total production) are the states where limestone mining is available at a huge quantity. Madhya Pradesh - Chhattisgarh produces 27% of total production.

One of the companies who is into the mining explosive manufacturing is solar industries. And few other players into the industrial explosives are Orica, Gulf Oil Corp, IBP Company, Premier Explosives, Keltech Energies Limited, Ideal Industrial Explosives Ltd, Blastec India Pvt. Ltd and Indian Explosives Ltd.

Blast furnace slag, lignite ash, coal ash, concrete crusher sand, aerated concrete meal, corresponding fractions from demolishing wastes or lime residues from sugar industry are alternative raw materials. However, the extent to which such alternatives can be used is governed primarily by:

- The composition of the conventional raw materials at the considered plant;
- Local availability and cost of decarbonated raw materials;
- Their composition and particularly their silica, alumina, magnesia, sulfur, VOC or trace materials content;
- Possibilities to improve the qualities of raw materials by further processing.

Alternative raw material reduces the usage of electricity, reduces cost and also CO2 emission get reduced. So those cement companies using alternative raw material improves with cost efficiency.

Fly ash is a combustion by-product generated in coal-burning power plants. Ash is composed of vitreous silica, alumina, iron oxide, and lime. We can see that many of the cement producer companies having their captive power plant which help them to source Fly ash as well as reduce the power cost.

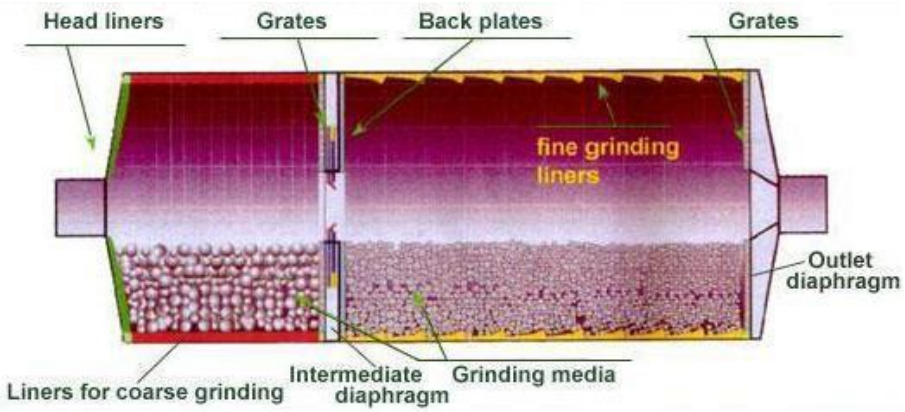
Ground granulated blast furnace slag is produced in a blast furnace where iron ore is converted into iron.

Condensed silica fume is a by-product of the smelting process in the silicon metal and ferrosilicon industry.

Phase – 2 – Proportioning, Blending & Grinding

After the crushing and getting transport of raw material, raw material reaches to the cement plant. At the cement plant, raw material gets analyzed and decide the proportion of the raw material to be used for manufacturing cement. In the general case, limestone is ~80-90% and the remaining is clay. There will be changes to the proportion of raw material as the type and purpose of cement get changes.

After the decision of the proportion of the raw material, those raw material transfer for the grinding.



Tube mill use for grinding of raw material to the fine powder. Liners use for moments of grinding media. The diaphragm is work as a gate for transfer of raw material in and out to and from tube mill.

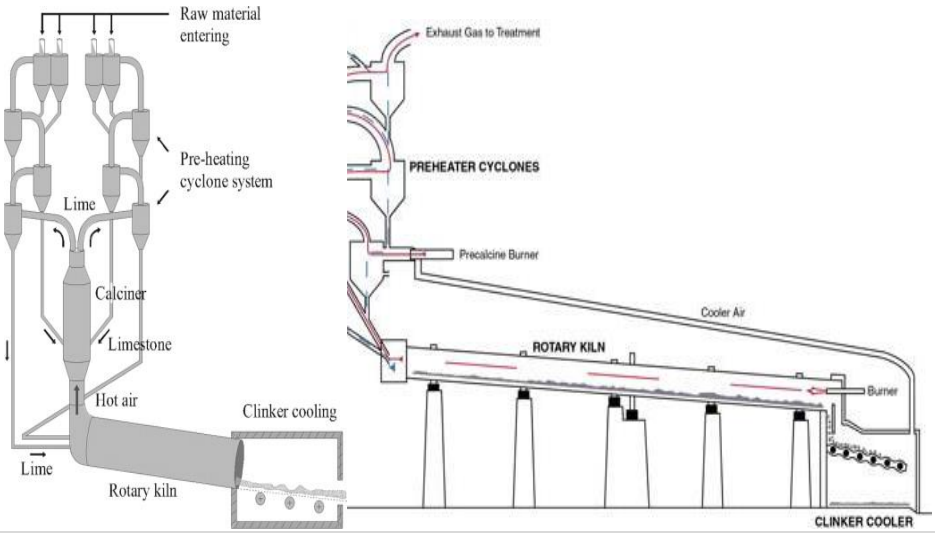
For the grinding of raw material, grinding media, a liner is required which is manufactured by AIA Engineering, Magotteaux, Metso, RGP Balls, Shree Balaji, etc.

Roller crushes the material to a fine powder and finishes the job. Raw mix is stored in a pre-homogenization pile after grinding raw mix to a fine powder.

Phase – 3 – Pre-Heating Raw Material and Kiln phase

Now, powder of raw material is getting entered into the preheating chamber. It has a vertical cyclone system where raw material gets entered. This process saves energy and makes the process environmentally friendly. These chambers get attached with the rotary kiln and rotary kiln flows hot air towards the pre-heating cyclone system. This hot gases slowly heat the raw material before it enters the rotary kiln. After that chamber, raw material enters to the Rotary kiln area whereas temperature is around 1450^0c. Raw material gets heated at such a higher temperature and due to high temperature, chemical reaction getting the start which is known as decarbonation (releases the carbon dioxide). The series of chemical reactions between calcium and silicon dioxide compounds form the primary constituents of cement i.e., calcium silicate. A kiln is heating up from the exit side by the use of natural gas and coal. When the material reaches the lower part of the kiln, it forms the shape of clinker.

This heating of raw material mainly limestone eject gases such as carbon dioxide, sulfur, nitrogen, etc which also affects the environment. So that fly ash can be a partial alternative of it.



Phase – 4 – Cooling and Final Grinding

After the raw material formed as a clinker, those clinkers get cool down through force of air. Clinker releases heat and that heat reuse into the kiln process which helps to save energy. After the clinker gets cold down, those clinker enters to the tube mill for grinding process. During the grinding process, gypsum also getting added into the smaller portion. Now, this process also involves grinding process and for the grinding of material, grinding media, a liner is required which is manufactured by AIA Engineering, Magotteaux, Metso, RGP Balls, Shree Balaji, etc.

Phase – 5 – Packaging and shipping

After the grinding of the clinker, those clinker transfer into the powder forms and that powder is packed to the different size of bags. And customers who require a bulk cement quantity, then directly getting transport it through a truck, rail or ships.

Cement manufacturing process

There are companies which are engaging into the providing various solutions at the various stages or to entire plant into the cement industry which are Schneider Electric, Siemens, FLSmidth, ABB, ThyssenKrupp Industrial Solutions, Walchandnagar Industries, Voith, Ashoka Machine Tools Corporation, Kawasaki Heavy Industries, GBM,

The Japan Steel Works Ltd., AMCL Machinery Ltd, KHD Humboldt Wedag International, Bosch Rexroth, ISGEC Heavy Engineering Ltd., etc.

1.4.2. The cost associated with the manufacturing process

Major costs and inputs affect the costing of cement

- Freight and handling cost - as cement is heavy in weight and bulky so transportation of it and properly keep it requires a huge cost. Freight cost can be reduced to set up a plant near to customer segment. The company either set up clinker to the area where limestone is available and make cement which shipped to consumer market or clinker plant near the area to limestone and making cement near to consumer market. But if both limestone and consumer both available at closer area then freight cost will reduce.
- Crude oil, Coal & Power - Freight cost also varies with prices of fuel. Power generation is done through the use of coal so that prices of coal and availability of it also can create an issue for the company.
- Petcoke - It is a substitution for coal which is cheaper in price but also reduces the life of the plant so that CapEx will increases. Around 45% of Petcoke is getting imported which has an adverse impact due to dollar-rupee movement.
- Limestone - it is getting extracted from mines so a distance of plant and mines increases cost, availability of limestone is also affecting. Clinker is getting converted by heating limestone. More than 65% of India's limestone comes from five states of Madhya Pradesh, Rajasthan, Andhra Pradesh, Gujarat, and Chhattisgarh. Mines are auctioned by the government and given to the company for the lease of 99 years. Limestone reserve in the mines & quality of it also affect the prospects of the company. Mines reclamation expenditure will be incurred after completion of extraction of limestone from Mines. The actual expenditure may vary based on the nature of reclamations to be carried out. Limestone is not tradable so that companies which do not own limestone mine, they cannot produce clinker.
- Heat - it requires a heat of 1450.c which get from coal or petcoke so prices & availability of coal impacts the cost.
- Gypsum - It is also getting extracted from mines. Its need to mix up with the clinker to prepare cement.
- Flyash (Byproduct of power plant) or Slag (Byproduct of steel plant) - It is getting used instead of limestone but strength provided by limestone so for infra projects limestone is highly needed. And for routine home building, a lower portion of limestone also considerable.

	Per tonne	Per 1 kg	Per bag of 50kg	% wise	Per tonne	Per 1 kg	Per bag of 50kg	% wise		Per tonne	Per 1 kg	Per bag of 50kg	% wise
	Higher EBITDA/tonne									Lower EBITDA/tonne			
Realisation (Rs.)	**6727**	**6.73**	**336.36**		**9750**	**9.75**	**487.49**			**3502**	**3.50**	**175.08**	
EXPENDITURE :	**4555**	**4.55**	**227.75**	**68%**	**8155**	**8.15**	**407.73**	**84%**		**3305**	**3.30**	**165.24**	**94%**
Total Raw Material per tonne	1124	1.12	56.19	17%	1138	1.14	56.92	12%		805	0.80	40.24	23%
Power & Fuel Cost per tonne	900	0.90	45.01	13%	2048	2.05	102.42	21%		1138	1.14	56.92	33%
Employee Cost per tonne	447	0.45	22.37	7%	625	0.62	31.25	6%		251	0.25	12.54	7%
Other Manufacturing Expenses per tonne	325	0.32	16.23	5%	1480	1.48	73.98	15%		171	0.17	8.54	5%
Packing Material Consumed	165	0.17	8.25	2%	331	0.33	16.57	3%		0	0.00	0.00	0%
General and Administration Expenses per tonne	87	0.09	4.37	1%	190	0.19	9.52	2%		17	0.02	0.84	0%
Selling and Distribution Expenses per tonne	1516	1.52	75.81	23%	2204	2.20	110.21	23%		761	0.76	38.04	22%
Advertisement & Sales Promotion	111	0.11	5.56	2%	67	0.07	3.37	1%		0	0.00	0.00	0%
Freight and Forwarding	1344	1.34	67.19	20%	2609	2.61	130.43	27%		723	0.72	36.15	21%
Miscellaneous Expenses per tonne	155	0.16	7.77	2%	468	0.47	23.42	5%		162	0.16	8.11	5%
EBITDA (Excl OI) per tonne	**2172**	**2.17**	**108.61**	**32%**	**1595**	**1.60**	**79.77**	**16%**		**197**	**0.20**	**9.84**	**6%**
Depreciation per tonne	503	0.50	25.14	7%	504	0.50	25.22	5%		282	0.28	14.12	8%
Consolidated PAT per tonne	**1378**	**1.38**	**68.89**	**20%**	**627**	**0.63**	**31.36**	**6%**		**-404**	**-0.40**	**-20.18**	**-12%**

*Data were taken on the basis of 24 cement companies.

1.4.3. Prices of cement

Prices of cement decide on the basis of capacity utilization, input cost, and demand and supply scenario. India having a different capacity utilization and demand and supply scenario over a different region which makes differences for the prices of cement. So that

1.5. Different types of cement and its usage

Cement	Raw Material	A proportion of Raw Material	Usage
Ordinary Portland Cement	Clinker and Gypsum	95% Clinker + 5% Gypsum	High rise buildings, Commercial & Industrial complex, Roads, Flyovers, Heavy defense structures
Portland Pozzolona Cement	Clinker, Gypsum, Fly ash, Slag		Plaster & Brickworks, Marine works, Mass Concrete works, dams, dikes, retaining walls, foundations, and sewage pipes
Oil Well Cement	Limestone, Iron ore, Coke, Iron Scrap, clinker of Portland cement, the cement that has been hydraulically blended		Cementing work in the drilling of oil wells where they are subject to high temperatures and pressures
Portland Slag Cement	Clinker, Gypsum, Fly ash, Slag		Marine structures, coastal areas where excessive amounts of chloride and sulfate salts are simultaneously present

White Portland Cement	China clay is used, together with chalk or limestone		Non-structural, decorative use, flooring, general architectural purposes, such as mosaic tiles, decorative concrete wall paintings, and special effects

2. Global cement industry

Global cement industry growing at ~2% of growth rate for the last five years with the production of ~4.2billion tonne and China is producing approximately half of the global production. But the majority of cement production of China getting consumed within the country.

3. Indian cement industry

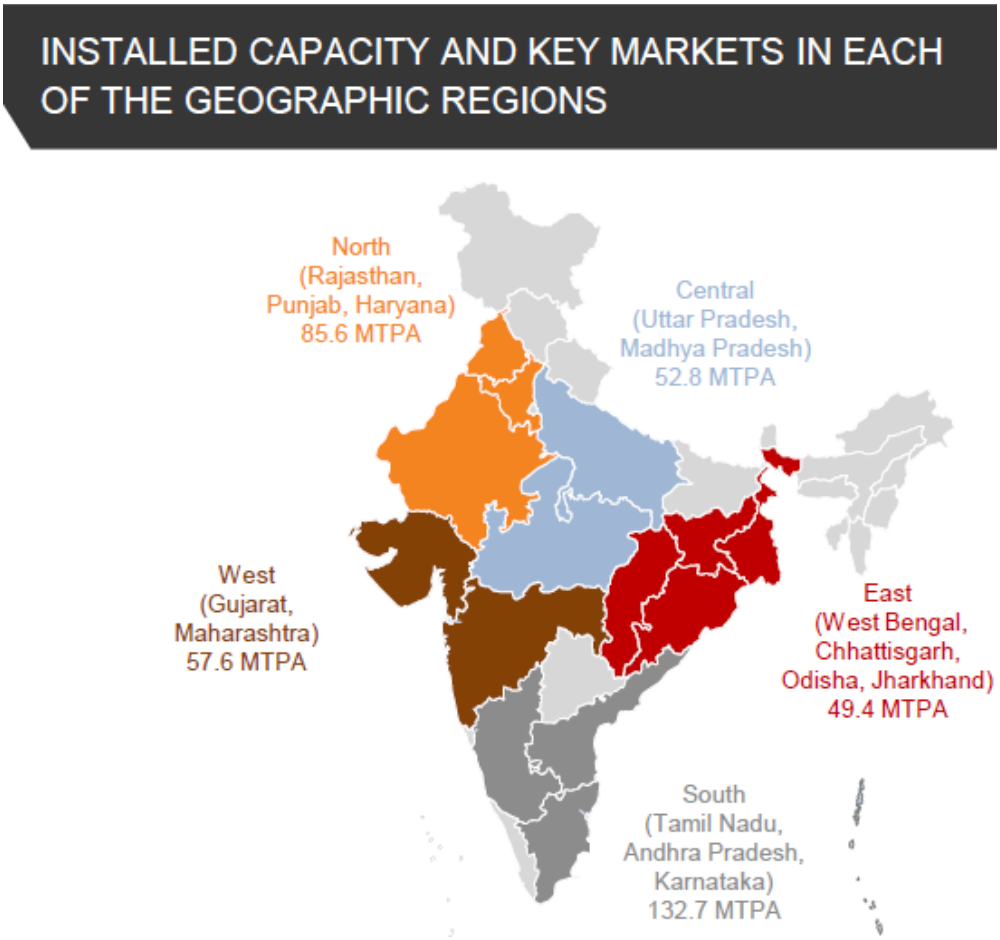
3.1. Introduction

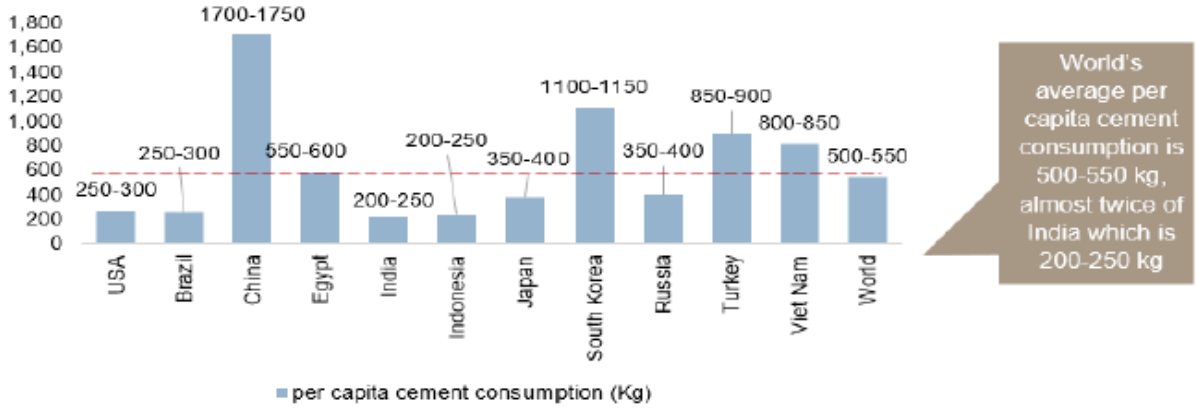
As we have seen that Cement is a commodity which is not able to pass on prices easily. India is the second largest cement producer and consumer followed by China. The Indian cement industry is competition compared to the global cement industry. India commands around 6% market share into the world after the 52% market share by China.

Top 20 companies into India account for 70% of the market share. 210 large cement plants account for the accumulative installed capacity of over 410 million tonnes, while over 350 mini cement plants have an estimated production capacity of nearly 11.10 million tonnes. Out of the total 210 large cement plants in India, 77 are situated in the states of Andhra Pradesh, Rajasthan & TamilNadu.

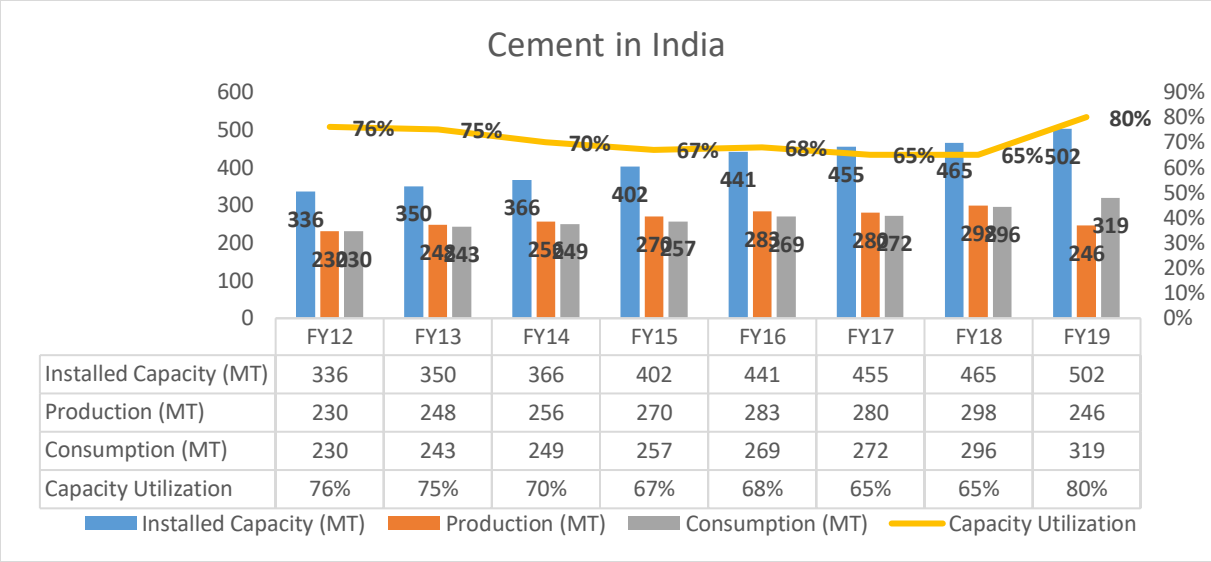
Cement production capacity in India is around 502 million tonnes per annum which expected to reach 550 MTPA by 2025.

India has joined hands with Switzerland to reduce energy consumption & develop newer methods in the country for more efficient cement production, which would help India meet its rising demand for cement in the infrastructure sector.





The per capita consumption of cement in India still at a substantially lower level at less than 200 kg when compared with the world average which stands at about 500 kg. In the case of China, it is over 1,000 kg per head. This shows huge growth potential available with the industry.

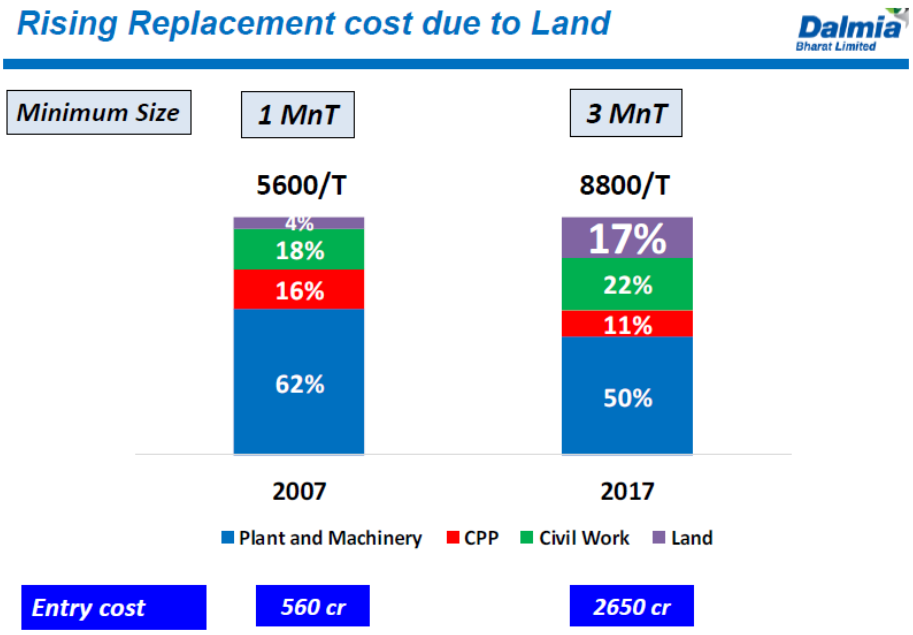


	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19
Installed Capacity (MT)	336	350	366	402	441	455	465	502
Production (MT)	230	248	256	270	283	280	298	246
Consumption (MT)	230	243	249	257	269	272	296	319
Capacity Utilization	76%	75%	70%	67%	68%	65%	65%	80%

(Rating) (IBEF, Feb-2019)

We can see that installed capacity is increasing but production is not increasing at the same peace. Also, demand also not increasing at the same rate. Capacity has been increased by 6% CAGR and consumption has been increased by 5% CAGR for the last eight years. This higher supply situation pressurizes prices and lowering realization per tonne.

Growing demand in the cement sector has evidently made a mark on its logistics providers. Cement deliveries are the second largest revenue source for the Indian Railways, contributing US$ 1.3 bn per annum in freight revenue in FY17-18. The Indian Railways recorded its highest ever total cement and clinker loading of over 114 MTA and highest ever incremental loading at 9.6% in FY17-18.



So that replacement value of the entire Indian cement industry can be around 441760 cr (8800/tonne * 502MTPA installed capacity). But as per the few industry reports, a current set up cost available at the lower level which can be around Rs10000 per tonne.

Company Name	Capacity crTPA	EV/Tonne
Ultratech Cement Ltd.	10.2750	12474
Ambuja Cements Ltd.	2.9650	12951
ACC Ltd.	3.3023	7818
Shree Cement Ltd.	3.7900	17124
Odisha Cement Ltd.	2.5000	11427
Dalmia Bharat Ltd.	2.5000	11840
Birla Corporation Ltd.	1.5500	5184
The India Cements Ltd.	1.5739	3983
JK Cement Ltd.	1.0500	7839
The Ramco Cements Ltd.	1.6450	10876
JK Lakshmi Cement Ltd.	1.3300	4612
Orient Cement Ltd.	0.8000	3834
Heidelberg Cement India Ltd.	0.5400	8083
Star Cement Ltd.	0.4300	11143
Mangalam Cement Ltd.	0.4000	2558
Sagar Cements Ltd.	0.2350	7904
Sanghi Industries Ltd.	0.4100	4444
Saurashtra Cement Ltd.	0.1500	1722
Deccan Cements Ltd.	0.2300	2531
Gujarat Sidhee Cement Ltd.	0.2510	780
Andhra Cements Ltd.	0.2600	4153
Shree Digvijay Cement Company Ltd.	0.1200	2487
Udaipur Cement Works Ltd.	0.1191	8757
Anjani Portland Cement Ltd.	0.1200	2948
Barak Cement Ltd.	0.0383	2613
Shri Keshav Cements & Infra Ltd.	0.0402	4597
Burnpur Cement Ltd.	0.0740	3837
Shiva Cement Ltd.*	0.0132	33694

*Shiva cement has announced expansion plant so that after adjusting expansion capacity, EV/Tonne comes at Rs.1711

Few of the companies are traded above the replacement cost which can be due to efficiency, brand recognition, wide penetration, lower production cost, captive power plant or speculative market condition.

Capacity set up the cost of the company is Rs.8800/tonne and average EBIDTA/tonne is Rs.800/tonne to 1200/tonne. So that approximately it takes 7-11 years to pay back the investment of Rs.8800/tonne if the company operates on full capacity. If a company acquire a facility which is available at ~Rs.4000/tonne then payback period reduces to ~3.5-5 years.

On average, energy costs form 35% to 50% of the total manufacturing cost of cement in India. While plants in India consume 75 to 80 kWh of electrical energy for producing 1 tonne of cement, the older plants consume 80 to 100 kWh of electrical energy. In terms of thermal energy, India's cement plants need 700 to 750 kcal to produce 1 kg of clinker on an average. In order to reduce these costs, most manufacturers opt for captive power generation for cement production as the cost of such power is substantially lower than that sourced from the grid. In some cases, the cost of captive power can be less than ₹ 4 per kWh. Additionally, in recent times, companies have started to opt for waste heat recovery systems which utilize

the excess heat generated during clinker production to generate electrical energy. As per a report published by the Confederation of Indian Industry and the Cement Manufacturer's Association in 2015, waste heat recovery systems can reduce specific energy consumption by as much as 22 kWh/tonne which potentially amounts to 20% to 25% of a manufacturer's power consumption. This translates into substantial cost savings.

Stiff Competition among the top players because they are commanding a major part of the industry. These players can affect the pricing and sentiment of the entire industry. Such events have happened into the past and Competition Commission of India has penalized companies who have artificially keep prices high through cartel. Giant Cement companies are becoming more giant so that they will keep on going to dominate the industry.

3.2. Timeline of evolution of Indian Cement Industry

- The first cement factory in India was set up in the year 1904 at the Madras with a small manufacturing facility and after that in the year 1914 at the Porbundar in Gujarat, the Indian Cement Company Ltd. Has started manufacturing of cement with a capacity of 10000 tonnes.
- Majorly India imports cement from Europe during that period
- In the year 1925, the first association of the cement manufacturers was formed as "Cement Manufacturers Association".
- In the year 1927, the Concrete Association of India was set up for creating awareness among the public regarding the use of cement.
- In the year 1936, all the cement companies except one i.e. Sone valley Portland Cement Company agreed and formed Associated Cement Companies Ltd. (ACC).
- During the year 1956, the cement industry has a government control for prices and distribution to established fair prices for consumer as well as manufacturer.
- After a few years, the government introduces a three-tier pricing system with different pricing on cement produced in high, medium and low-cost plants.
- In the year 1982, the government of India has introduced a quota system where 66.60% quota of selling cement to the government and small real estate players and remaining 33.40% allow to sell into the open market.
- In the year 1989, complete freedom was given to the cement industry.
- In the year 1991, the industry was de-licensed which has to boost up growth into the cement industry.

3.3. Government regulation for the cement industry

The government has an intervention to the cement manufacturer in terms of regulations such as -

The Mines & Minerals (Development & Regulation) Act, 1957

Auction-based mines allotments and granted for the 50 years of a lease.

FDI policy

100% FDI allows through the automatic route.

National Mineral Exploration Policy (NMEP, 2016)

Under this policy, about 100 blocks have been identified by GSI for auctioning on revenue sharing mechanism for regional exploration to encourage private participation.

Competition Act of 2002

Competition Commission of India control the acts of the company which restrict the free competition into the market.

Environmental protection Act

The limit of sulfur dioxide is 100-1000 mg/Nm^3 and a limit for nitrogen oxide is 600-1000 mg/Nm^3. These limits are still lenient compared with China, China has a limit of 200 mg/Nm^3 and 400-800 mg/Nm^3 for sulfur dioxide and nitrogen oxide respectively.

3.4. Players who manufacture cement

		Per tonne (Rs.)											
Company Name	Sales CrT	Realisation (Rs.)	Total Raw Material	Power & Fuel Cost	Employee Cost	Other Manufacturing Exp.	General and Administration Exp.	Selling and Distribution Exp.	Miscellaneous Expenses	EBITDA (Excl OI)	Depreciation	PAT	CFO
Ultratech Cement Ltd.	5.9330	5294	891	1068	305	392	70	1409	130	1036	311	375	655
ACC Ltd.	2.8370	5217	822	1058	311	447	162	1433	263	721	213	536	394
Ambuja Cements Ltd.	2.4180	9750	1138	2048	625	1480	190	2204	468	1595	504	627	1420
Shree Cement Ltd.	2.2500	4370	309	880	261	486	39	1213	83	1099	400	615	835
Odisha Cement Ltd.	1.6960	5060	925	828	364	1218	150	154	274	1147	715	172	875
Dalmia Bharat Ltd.	1.6960	4366	759	577	359	348	143	824	233	1121	355	203	1013
The India Cements Ltd.	1.1176	4631	843	1109	344	143	326	1228	18	620	229	90	419
The Ramco Cements Ltd.	0.9312	4732	806	783	326	1341	153	106	35	1182	314	597	1195
JK Lakshmi Cement Ltd.	0.8520	4005	914	934	276	186	32	1176	5	483	210	99	536
Birla Corporation Ltd.	0.7948	7215	1039	1652	450	1164	254	1612	28	1015	418	194	1013
JK Cement Ltd.	0.7880	5826	981	1129	413	520	80	1572	166	965	236	434	1002
Orient Cement Ltd.	0.5746	3868	455	1011	241	356	74	1124	75	531	220	77	486
Heidelberg Cement India Ltd.	0.4653	4061	780	954	258	250	173	831	33	781	217	286	826
Mangalam Cement Ltd.	0.2767	3925	702	1082	318	186	190	1063	73	312	160	41	310
Sanghi Industries Ltd.	0.2502	4102	265	971	216	307	129	1347	5	863	289	373	886
Star Cement Ltd.	0.2400	6727	1124	900	447	325	87	1516	155	2172	503	1378	1753
Emami Cement Ltd.	0.2303	4234	1947	256	210	294	169	1072	64	222	391	-341	236
Sagar Cements Ltd.	0.2005	5178	721	1653	256	473	105	1217	14	739	267	131	748
Deccan Cements Ltd.	0.1468	3885	403	1155	165	362	37	1164	18	582	155	263	497
Gujarat Sidhee Cement Ltd.	0.1460	3674	325	1409	245	501	76	834	58	226	65	228	249
Saurashtra Cement Ltd.	0.1440	3984	205	1103	288	762	150	1017	111	347	123	434	342
Udaipur Cement Works Ltd.	0.1074	3502	805	1138	251	171	17	761	162	197	282	-404	224
Shree Digvijay Cement Company Ltd.	0.1022	4044	870	1172	264	418	120	695	46	461	224	131	991
Anjani Portland Cement Ltd.	0.0927	3885	407	1234	189	302	49	997	66	641	202	253	707
Shiva Cement Ltd.	0.0064	3933	949	1952	581	524	432	681	114	-1299	1236	-4840	-7830

3.5. Concern for growth

- **Environmental issues for production of cement**
  Cement production releases CO_2 which is harmful to the environment. Cement plants account for 5 percent of global emissions of carbon dioxide, the main cause of global warming.
- **Lower availability of sand**
  Sand is one of the materials for construction activities. To construct 100 square feet of built-up area, 33 bags of cement of 50kg each and 117 cubic ft of sand, among other raw materials are required.

Concrete production is the process of mixing together the various ingredients—water, aggregate, cement, and any additives—to produce concrete.
Lower availability of sand can affect the construction activities which is one of the major growth drivers for the cement industry. Sand availability has become an issue in the states of Uttar Pradesh, Madhya Pradesh, Tamil Nadu, and Telangana. Shortage in sand availability has led to a spike in sand prices and this has led to illegal mining. Availability of manufactured sand (M-Sand) can again helpful to boost up construction activities.

- Restriction on a material used for Power and fuel
  The government has made a ban on using a petcoke as fuel to generating heat at the kiln plant which makes compulsion to the cement companies to use coal. Usage of coal will increases the cost of power and fuel of the cement companies. Petcoke contains more sulfur than the coal which also harmful to the environment. Each tonne of cement produced requires 60 to 130 kilograms of fuel oil or its equivalent, depending on the cemented variety and the process used, and about 110 KWh of electricity.
- Act for construction or real estate activities
  - RERA, demonetization – having a short – medium-term impact on real estate sector
- Excess capacity
  India having an excess capacity of cement which creates a pricing pressure and that led to a lower realization.

3.6. Growth drivers of the cement industry

- The revival of government spending for infrastructure (contributing 22-25% to cement sector revenue)
  - Smart cities
  - The government expected to spend around Rs.6 trillion on infrastructure
  - Construction of road and highways
    - Bharatmala
    - Gram Sadak Yojana
    - 83677 km of road construction is announced which enhance demand of around 180MT.
  - Port, Bridges, and connectivity
    - Sagarmala
    - Renovate 600 railway stations
    - Airport development
- The revival of real estate housing (contributing 63-65% to cement sector revenue)
  - Government initiatives
    - Pradhan Mantri Avas Yojna
    - Housing for all will enhance around 400MT of cement demand
    - Affordable housing
    - The government expected to spend around Rs.645 billion
  - Nuclear families
  - Rapid urbanization
- Commercial and industrial development (contributing 10-12% to cement sector revenue)

3.7. Cyclicity into the cement industry

The cement industry is cyclical into nature. Cement prices, utilization, a new addition to capacity, etc depends on the demand, economic activities. This is a core sector which has a direct link with the GDP and economic growth.

Raw material and other material used for producing cement are also in the cyclical nature, prices of material have an impact on the cement companies. Cement companies cannot able to pass on the prices as cement is an undifferentiated product.

3.8. Consolidation among the players

The country's cement sector is passing through a phase of aggressive consolidation with the Central Government ensuring that companies unable to service their debt obligations are getting sold off to companies who can pay back debt, driving sectoral consolidation.

Many of the small companies do not afford to run their plant on the full capacity due to higher costs, competition from the large players, unavailability of funds, etc. Few of the small players are available at the below replacement value (EV/Tonne < Rs.8800) which can attract the giant players to make an acquisition of them. Also, if giant players go for expansion then it will cost them higher with 4-5 years of time for Greenfield expansion. Stressed balance companies also sell their business at a cheaper valuation.

Cement companies require around Rs.150 to Rs.465 per tonne of working capital along with the other capitals as per the size of the company (I have not considered debt which companies have taken for funding capital requirement). Also, companies require an Rs.2200 to 6200 per tonne of invested capital (including working capital). If the company is not able to run efficiently then working capital will reach Rs.600+ per tonne.

Valuation at few acquisitions competed –

- Reliance Infrastructure sold its cement subsidiary to Birla Corp for Rs 4,800 crore which has a capacity of 5.5 MTPA. So that valuation of the deal is Rs.8727 EV/tonne.
- UltraTech Cement has completed the Rs 16,189 crore acquisition of Jaiprakash Associates' six integrated cement plants and five grinding units, having a capacity of 21.2 million tonnes. So that valuation of the deal is Rs.7636 EV/tonne.
- Nirma has acquired Lafarge India's assets, which consist of three cement plants and two grinding stations with a capacity of about 11 million tonnes a year at Rs.9400 Cr. So that valuation of the deal is Rs.8545 EV/tonne.

4. What is the alternative of cement?

Bitumen and engineering plastic can be an alternative to cement. But for Bitumen - The Central Government decided to replace bitumen with cement in the construction of new road projects on account of durability and economy, escalating demand for ready-mix concrete.

5. Conclusion & view

Factors to look for Cement Companies

- The cement industry is CapEx heavy business so that (Balance sheet)
    - We need to check that whether the company can able to generate good ROA or not?

  - Assets turnover ratio should be higher
  - The company has made capex or need to make capex in the near future
  - Capex for the plant is high so that whether a company has a huge debt or not? How they fund the capex?
  - The industry is capital intensive and if working capital management is also not proper than company face problem to survive or has to bring much borrowing. Working capital crossing Rs.300-350 per tonne and invested capital crossing Rs. 2800- 3000 per tonne indicating alert sign.
- The cement industry is CapEx heavy business so that (Cash flow)
  - +ve CFO over a period of time, if the company runs efficiently then CFO per tonne can be in the range of Rs.800 to 1200 (for giant) and Rs.400 to 600 (for smaller players).
  - +ve FCF over a period of time
  - CFO and FCF should have enough cover on interest and depreciation
- Reduce costs
  - Presence over multiple areas which resulted in the freight costs reduction
  - The major cost is power and fuel cost so using cheaper source help to reduce cost
  - Captive power plant reduces power cost as well as generate fly ash which can be useful to cement production
  - Presence over multiple areas which creates brand recognition
  - Higher capacity utilization
- Government intervention
  - A ban on sand mining
  - RERA Act which affects the real estate
  - Environmental emission norms
  - Government spending on infrastructure
- Pricing and realization
  - Prices of cement depend on the demand into a particular region
  - If cement demand and prices improve to the particular region, then companies dominated to those particular regions get a better realization
- A suitable period for Investment
  - Higher supply of cement
  - Lower capacity utilization
  - Region demand forecast and suitable to make an investment to regional concentrated companies
- Valuation
  - Good balance sheet
  - Good working capital management
  - Near or below the replacement cost (EV/tonne)
  - Available at around 10%+ yield on average of last 10 years of PBT, CFO and FCF (as the company is into cyclical and commodity nature of business). For smaller players – thrice of AAA bond rate, for mid players – twice of AAA bond rate and for giant players – on AAA bond rate

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