



PRODUCTION EFFICIENCY OF INDIAN CEMENT INDUSTRY

Dr. Y Kesava Reddy

Professor, Department of Management, GATES Institute of Technology, Gooty, Anantapuramu, Andhra Pradesh, India

ABSTRACT

Cement is an essential component of infrastructure development and most important input of construction industry. Particularly in the government's infrastructure and housing programs, which are necessary for the country's socio-economic growth and development. The consumption of cement is an indicator of the country's prosperity, development and construction activities.

In India the cement era commenced, in fact with the establishment of small cement factory at Washermanpet in Chennai in 1904 by South India Industries Limited. This plant could not succeed and hence failed. But the real beginning of the cement industry was made in 1914 on establishment of a cement unit at Porbandar in Kathiwar by the India Cement Company Limited in Gujarat with an installed and production capacity of 100000 tons. This initial attempt could cause the establishment of two more plants, one unit at kathi in 1915 in Madhya Pradesh and another at Lakheri in 1916 in Rajasthan by Kathi Cement Limited and Bundi Cement Limited respectively. The following decades saw an increase in number of plants, installed capacity, production of cement. Thus this movement is called "Emerging Phase" of Indian Cement Industry. The following decades saw an increase in number of plants, installed capacity, and production. This period can thus be called the Nascent Stage of Indian cement industry. Many cement plants started to exploit the limestone reserves in the scattered pockets and remote areas.

The cement industry plays a pivotal role across the world as its products are vital to the construction industry and makes vital contribution to the nation's GDP. It is a capital intensive, energy intensive and capital-intensive industry. The present paper made an attempt to appraise retrospective of Indian cement industry, to examine the cement industry production efficiency in terms of capacity utilization and also to suggest remedial measures to improve the capacity utilization.

Key words: Cement industry, production Efficiency, capacity utilization, performance, control period, partial decontrol and total control.

Cite this Article: Y Kesava Reddy, Production Efficiency of Indian Cement Industry, *International Journal of Management (IJM)*, 11(11), 2020, pp. 2731-2737.

<https://iaeme.com/Home/issue/IJM?Volume=11&Issue=11>

1. INTRODUCTION

Cement is an essential component of infrastructure development and most important input of construction industry. Particularly in the government's infrastructure and housing programs, which are necessary for the country's socio-economic growth and development. The consumption of cement is an indicator of the country's prosperity, development and construction activities.

The cement industry plays a pivotal role across the world as its products are vital to the construction industry and makes vital contribution to the nation's GDP. An industry which is the major and oldest indigenous manufacturing product well-endowed with all essential raw materials, skilled manpower, machinery, technology and know-how in the modern sector of Indian economy is cement industry. It is a capital intensive, energy intensive and capital intensive industry. The present paper made an attempt to appraise retrospective of Indian cement industry, to examine the cement industry performance in terms of capacity utilization and also to suggest remedial measures to improve the capacity utilization.

2. OBJECTIVES OF THE STUDY

- To examine retrospective of Indian cement industry
- To examine the production efficiency of Indian cement industry terms of capacity utilization.
- To suggest remedial measures to improve capacity utilization.

3. METHODOLOGY

The present paper is focused and confined to appraise the retrospective of the industry and installed capacity of the industry. In this study the secondary data were used to appraise the retrospective of the industry and Chi-square test is used to examine the capacity utilization critically as well as analytically.

4. EMERGING PHASE OF INDIAN CEMENT INDUSTRY

In India the cement era commenced, in fact with the establishment of small cement factory at Washermanpet in Chennai in 1904 by South India Industries Limited. This plant could not succeed and hence failed. But the real beginning of the cement industry was made in 1914 on establishment of a cement unit at Porbandar in Kathiwar by the India Cement Company Limited in Gujarat with an installed and production capacity of 100000 tons. This initial attempt could cause the establishment of two more plants, one unit at kathi in 1915 in Madhya Pradesh and another at Lakheri in 1916 in Rajasthan by Kathi Cement Limited and Bundi Cement Limited respectively. The following decades saw an increase in number of plants, installed capacity, production of cement. Thus this movement is called "Emerging Phase" of Indian Cement Industry. The following decades saw an increase in number of plants, installed capacity, and production. This period can thus be called the Nascent Stage of Indian cement industry. Many cement plants started to exploit the limestone reserves in the scattered pockets and remote areas.

The problem of supply outstripping demand was significant in early period of the industry. Problem of disposal of cement was aggravated by the prejudice with which indigenous cement was regarded. This was followed by a price war between the producers where they resorted to cutting down of prices and selling at below production cost. This situation forced many companies into liquidation.

It was then when the government of India intervened into the market and referred the cement industry to the Tariff Board. The board recommended protection by government and cooperation among existing cement units. All these events resulted in formulation of Cement

Manufactures Association in 1925 whose main function was to regulate prices in the industry. In 1927, Concrete Association of India was formed whose two main objectives were to educate public about the use of cement and to play an active role in popularizing Indian cement. The next step in the direction of rescuing cement industry was the formation of Cement Marketing Company of India Limited in 1930 to promote and control the sale and distribution of cement at regulated prices. After all these initiatives, the sales increased along with more plants. In 1936, eleven companies, except Sone Valley Portland Company Limited, merged to Associated Cement Company Limited (ACC). In 1937, Dalmiya Jain Group set up five factories with installed capacity of 575000 tones and added four more plants. With all these expansions, price war again started off which resulted into a significant decrease in prices. But in the post world war period, setting up of Department of Planning and independent of the country provided fresh impetus to the industry.

The price and distribution control system on cement, implemented in 1956, aimed at ensuring fair prices to producers and consumers all over the country, thus reducing regional imbalances, and at reaching self-sufficiency within a short time period. Although due to slow growth in capacity expansion and rising cost in the industry, the government had to increase the fixed price several times. However, these prices increase as well as financial incentives to enhance investment, showed little effect on the industry. In spite of the fact that government exercised no control over the Indian cement industry all through the third five year plan (1961-66), growth was low due to inadequate retention price and lack of adequate financial resources to the existing companies.

5. CONTROL PERIOD (1969-1982)

The government of India has put the strict controls directly on the production, installed capacity and distribution of cement, while indirect intervention took the form of price control between 1969 and 1982. Though many cement units started to exploit the limestone reserves in the scattered pockets and remote areas; and also at places where it is find difficult to set up the large-cement plants on viable basis. Still, the growth was not seen at the desired rate. The Government's imposition of uniform prices has substituted by a three-tier prices system as low, medium and high production cost plants in 1979. However, this system resulted in artificial shortage, extensive black marketing and corruption in the civil supply department of government.

6. PARTIAL DECONTROL (1982-1989)

On account of the above mentioned difficulties in the cement industry the government of India introduced a system of partial decontrol in 1982 through levy quota of two-thirds of sale to the government and small house builders and the balance of one-third of sale to the public in the free open-market with a ceiling on its price in order to protect consumers from unreasonable high pricing of cement. Under the system of partial decontrol, freight pooling has no longer covered the non-levy cement. Furthermore, the specific mini-cement units were completely free from the price and distribution controls. Although overall profitability increased substantially immediately after the introduction of partial decontrol, profits obtained through non-levy sales decreased with greater availability of cement in the market and continuously rising input costs.

To sustain an accelerating course, the government subsequently introduced changes in levy obligations and retention prices regularly. As a result, in 1988 the levy quota was as low as 30% for units established before 1982 and the retention price had increased substantially. In 1987, the CMA and government decided that there was no further necessary for maximum price ceiling.

7. TOTAL DECONTROL (1989 ONWARDS)

Finally in 1989, the cement industry was considered to be prepared for free market competition, and prices and distribution controls on sale of cement were withdrawn. The system of freight pooling was abandoned and a subsidy scheme to ensure availability of cement at reasonable prices in remote and hilly regions of the country was worked out. The industry was de-licensed in July 1991 under the policy of economic liberalization. By removing all controls on the cement sector the government hoped to accelerate growth and induce further modernization and expansion investments. It was after decontrol that the Indian cement industry moved towards globalization, with increasing emphasis on the exports.

The industry is experiencing a boom on account of the overall growth of the Indian economy primarily because of increased industrial activity, flourishing real estate business, growing construction activity and expanding investment in infrastructure sector and the industry under different policy regimes, truly establishes that decontrol of the industry and liberalization of the economy has led a remarkable improvement in Indian cement industry in the indicators such as installed capacity, capacity utilization, per capita consumption and exports.

8. PERFORMANCE OF CAPACITY UTILIZATION

The capacity refers to the efficiency in resource allocation of raw material, skill manpower, entrepreneur's ability, etc., for securing better capacity utilization of plant and machinery. The capacity utilization in any manufacturing industry is the basic factor on which reaping optimum production can be achieved, which in turn reduces the cost of production and supply of it at the economic price. The term capacity has plethora of meaning and is used in a number of ways like installed capacity, licensed capacity, average installed capacity, rated capacity, available capacity, designed capacity, attainable capacity, targeted capacity, maximum capacity, and so on and so forth. The following table reveals the performance of capacity utilization and annual growth rate of production and capacity utilization.

Table 1

Year	Installed Capacity (million tons)	Production (million tons)	% Capacity Utilization (U=P/ICx100)	Annual Growth Rate of Capacity	Annual Growth Rate of Production
1950-51	3.56	3.33	93.54		
1960-61	9.35	8.05	86.09	16.26	14.17
1970-71	17.61	14.40	81.77	8.83	7.88
1980-81	27.92	18.66	66.84	5.85	2.96
1990-91	63.96	48.76	76.23	12.91	16.13
2000-01	130.40	97.61	74.85	10.39	10.01
2010-11	323.00	215.98	66.89	14.77	12.13
2011-12	336.10	230.49	68.57	4.02	6.72
2012-13	349.60	248.49	71.10	3.86	7.80
2013-14	366.00	255.23	69.74	4.48	2.72
2014-15	390.00	270.30	69.30	6.55	5.90
2015-16	441.00	295.47	67.00	12.78	9.31
2016-17	470.70	310.20	66.00	6.73	4.98
2017-18	502.00	342.36	68.20	6.65	10.36

Source: Cement Manufactures Association, Cement Statistics, New Delhi

9. TEST OF CAPACITY UTILIZATION

Data given in table 1 for the study period pertaining to the installed capacity and actual production at an estimated optimum level of 85 percent of the installed capacity, it is found that the utilization of installed capacity in the fifties and sixties was more than the optimum level or near the optimum level. It was only in late sixties and thereafter the capacity utilization has gone much lower than the optimum level. It also conforms the fact that the capacity utilization percentage goes down with increasing utilization of the plant and machinery installed capacity in the cement industry. The attainment of 85 per cent optimum level is not difficult as it was done in fifties and sixties.

Let assume that optimum level of capacity utilization would be 85 per cent and thus the un-utilized capacity of cement plants in India would be 15 per cent. The 'fo' is observed frequency which is the calculated on the basis of the production capacity to the installed capacity while 'fe' is the expected frequency at 85 per cent.

10. CHI-SQUARE TEST

The installed capacity of cement plant and its cement production are attributes as the former is being determined by the capacity of plant and machinery which depends on the amount of investment and the latter is dependent upon the other input-factors accessibility and availability in right time. These two factors i.e., installed capacity of cement plant and production of cement are independent in characters and as such their independent of attributes being examined by the use of "Test for Independent of Attribute" of Chi-Square Test through 2 x 2 Contingency table is appropriate to draw conclusions scientifically. So, the author has developed Null Hypothesis on the installed capacity of cement industry thus:

Ho = The capacity utilization is under-utilization

H1 = The capacity utilization is 75 per cent which is optimum

The formula of Chi-Square test is as:

$$X^2 = \sum_{i=1}^n [(fo - fe)^2 / fe]$$

The details for computation of Chi-Square test value are presented in the following table.

Table 2 Capacity Utilization and Optimum Capacity

Year	Capa. Uti. (fo)	Capa. Non. Uti. (fo)	Expec. Uti. (fe)	Expec. Non-Uti. (fe)	Capa. Uti. (fo-fe) ² /fe	Capa. Non-uti (fo-fe) ² /fe
1950-51	93.54	6.46	80	20	2.292	9.167
1960-61	86.09	13.91	80	20	0.464	1.854
1970-71	81.77	18.23	80	20	0.039	0.157
1980-81	66.84	33.16	80	20	2.165	8.659
1990-91	76.23	23.77	80	20	0.178	0.171
2000-01	74.85	25.15	80	20	0.331	1.326
2010-11	66.89	33.11	80	20	2.14	8.59
2011-12	66.57	33.43	80	20	2.25	9.01
2012-13	71.10	28.90	80	20	0.99	3.96
2013-14	69.74	30.26	80	20	1.32	5.26

Production Efficiency of Indian Cement Industry

2014-15	69.30	30.70	80	20	1.43	5.72
2015-16	67.00	33.00	80	20	2.11	8.45
2016-17	66.00	34.00	80	20	2.45	9.80
2017-18	68.20	31.80	80	20	1.74	6.96
					19.899	79.084

Source: Cement Manufactures Association, Cement Statistics, New Delhi

11. RESULT ANALYSIS

Chi – square value $(19.899+79.084) = 98.984$ and Critical value (at 15 degrees of freedom at 0.005) = 24.99. The calculated value of Chi-Square is 98.983 whereas the critical value of it is 24.99. Hence, null hypothesis is rejected. It means the capacity utilization is ‘under-utilization’ or the capacity utilization of cement plants is not up to the optimum level of 80 per cent but less than it. Assuming that 80 per cent capacity utilization, 3.50 million tons of cement production can be done for every one per cent in installed capacity.

12. PROBLEMS FOR UNDERUTILIZATION OF CAPACITY

The table and statistical analysis reveals that the capacity utilization of the Indian cement industry is not optimum level and it is less than 80 % of the capacity. Due to this industry is suffering with so many problems like high cost of production, poor profits, The major cause for under-utilization of capacity is by and large well-known of which most significant contributing refers to the insufficient physical infrastructural facilities like power, coal, railway-wagons various problems-issues. This naturally affects their working results resulting in meagre profit or loss and impairs the business operations in the long-run.

13. CONCLUSION

The Indian cement companies have to be adopt some strategic measures to fillip production of cement which are (i) set up of high capacity integrated plants and more number of grinding units, (ii) increased use of fly-ash (iii) use of world's latest and best technologies, (iv) established coal based captive power plants and (v) wastes heat recovery plants. Further, the cement plants would need to encourage for diversification of product as blended cement and masonry cement utilizing the industrial wastes/mine ejects. In line of this, some measures that would need to take up are:

Enhance Capacity - Review the installed capacity of cement plants from time to time considering the advancement of technology in support of making them economically viable; in particular the mini-cement plants while meeting the norms of pollution control and energy efficiency and raise the installed capacity.

Technology - The cement plants needs to be spread spatially throughout breadth and width of Indian Union and their set up in the initial stages need immediate attention in the area of technological up-gradation covering plant and machinery, process control, instrumentation, etc. because a number of technological developments have taken place both in the case of rotary kiln as well as vertical shaft kiln.

Marketing - The service of market penetration is of immense felt need to the cement plants. Their marketing of more cement needs integration with the large cement plants, or combining with each other.

Financial Support - The extension of financial support suitably to the cement plants for becoming stronger and healthier so that their - participation in the financial institutions; which are averse to extend financial assistance to them. To conclude that for attaining the level of

excellence in terms of optimum production, capacity utilization, earning profits, eco-friendly, cement plants would require to

- Use optimum capacity vis-a-vis technology
- Reduce energy consumption level
- Reduce emission level
- Upgrade the skills of manpower
- Minimize production cost with product diversification

REFERENCES

- [1] Indian Economy, Datt & Sundharam, S. Chand Publishing, 68th revised edition, 7361, Ram Nagar, New Delhi-110 055.
- [2] Impact of New Economic Reforms on Indian Cement Industry, Dr Y Kesava Reddy, Serials Publications, Ashwin – Anoka Press, New Delhi, 2014.
- [3] Development of Cement Industry in India, Dr Y Kesava Reddy, An International Journal of Development Economics: Indian Development Review, Volume 11, number 2, July – December 2013.
- [4] Vijay K. Seth, Capacity Utilization - Theory and Evidence. New Delhi: Deep and Deep Publications, 1999, p.3.
- [5] Government of India, Report of the Committee on Public Undertakings. 1973, pp.66- 68.
- [6] Nayanar N.P., and Kanbur M.G., "Measurement of Capacity Utilization in India Manufacturing Industries," Indian Journal of Economics. Vol. LVI, No. 225, October 1976, pp.22-24.
- [7] Relative performance of Cement industry during post and pre New economic reforms in India, Dr Y Kesava Reddy, International journal of Economic research, Volume 10, Number 2, July-December 2013,
- [8] Internet, magazines and news papers.