CHAPTER VI

SUMMARY, SUGGESTIONS & RECOMMENDATIONS

Cement Industry constitute an important segment of the modern Industrial economy of India. It is purely an indigenous one. It plays a vital role in the economic life of an economy. In view of its crucial position, it's imperative to have a comprehensive study on the cement.

Organizational Development is a newly emerging discipline directed towards using behavioural science knowledge to assist organizations in solving problems and dealing more rapidly with the problems of change. The basic purpose of Organizational Development is not only to help organization become more adapt at self-renewal and survival, but also to ensure that the human values of organizational members are furthered. OD focuses on the planned change of human systems and contributes to organization science through the knowledge gained from its study of complex change dynamics. Organization Development deals with the gamut of "People problems" in organization. These gamut generally are: Poor Morality, Low Productivity, Interpersonal conflict, Inter-group conflict, Unclearly in goals, Inappropriate leadership styles, Poor team performance, Inappropriate organizational structure, Poorly designed tasks, Insufficient attention to external forces, Poor Customer relation, Working at cross-purposes.

Early OD efforts primarily addressed first-order-change-making moderate adjustments to the organization, its people, and its processes. Today, the organizations also demands second-order-change. Organizations are being reinvented, work tasks are being reengineered; the fundamental nature of the organizations is changing.

Organizational Development programme are based on two objectives: i) to improve the functioning of individuals, teams and the total organization, and ii) to impart the necessary skills and knowledge that will enable organizational
members to improve their functioning and prepare for accepting change.

Change in the very essence of business growth — it's inevitable and unavoidable. Stability is an illusion. The rate of change has accelerated over the last decade, external environmental pressures are driving change at an alarming rate and affecting every aspect of our lives, politically, socially, organizationally. Identifying environmental and market changes quickly and opportunistically is part of the key to survival and growth. But managing change has now also become a crucial element of competitive advantage, for it is only by guiding people through change as fast and as painlessly as possible that the organization can hope to respond to market pressures before the world moves on. The start point for managing change comes from helping everyone to understand why change is necessary in the first place. Historical success no longer guarantees future survival and the past can no longer predict the future. *More of the same* does not work anymore; we must map new features and reinvent ourselves. Business goes through predictable stage of evolution and revolution, and need to change at each stage, or go under. Change is continuous, there is no arrival point. But at least we can anticipate and plan for the challenges of each phase of development. Change represents opportunity as well as threat, it can be fun. As the only alternative is to be boiled alive, we might as well as get with it. The start point for change managers is to work with their team in identifying the demands of the environment on the business.

Organizational change portrays how managers maintain viable organizations. One consequence of the need to maintain organizational viability is that the system must be prepared to accommodate itself to changes, since viability requires that the organization adjust itself to alterations in internal and external factors. Furthermore organizational growth which appears to be a major value of our organizational society creates the necessity for change. Most managers today recognize the necessity for anticipating and preparing for change in order for their organizations to survive. They are aware of the dynamic nature of their environment with its continual shifts in technical, educational, and cultural bases. This dynamic environment is constantly requiring their organizations to adjust and
adapt their methods of operation. Six major problem areas exist in any organization, all of which must be resolved if the organization is to develop into a successful and enduring entity. The problem chronicled are: i) Integration, ii) Social Influence, iii) Collaboration, iv) Adaptation, v) Identity, Revitalization. Leavitt* describes a model of the major targets of changes which will lead to the resolution of these problems. Leavitt identified the major areas of changes Technology; structure and people.

6.1 DEVELOPMENT PROFILE OF CEMENT INDUSTRY IN INDIA:

This vital infrastructure industry is one of the primary drivers of growth. It constitutes an important segment of the modern industrial economy of India. During the period (1990-2000), the cement industry has made phenomenal progress in terms of volume, technology, modernization, quality and capacity utilization. The quality of Indian cements is at par with the best produced anywhere in the world. The cement industry's has shown a cumulative growth of 9-10 percent during the period (1999-2000); and per capita consumption resumed in between 1990-2000 as 100 kg. The correlation between the growth of the economy and growth in the cement industry being 1:1.32. The industry is currently in over supply mode. The installed capacity nearly to be 135 MT's as against the demand of 102 MT's at the end of 2003.

Cement, the wonder material for binding stones and bricks together has contributed to the modern civilization. It is a grayish powder-limestone as the basic material, mixed with clay, calcined to Clinker, gypsum added-ground to a power called cement. When one speaks of today, it invariably refers to Portland cement only. Portland cement had its origin in England, but until 19th Century a mixture of limestone with Pozzolona a type of volcanic earth was known as cement.

India under the foreign British rule, said to be the era of dominant Imports (1914-1924). As such, after the establishment of first cement plant at Porbandar in 1912 proved to be a financial success and attracted investors. Import of the cement

* Leavitt.
declined because of great war and Indian Cement proved to be cheaper than the imported cement. The new plants came into picture to meet internal demands. In 1924, total production resulted to be 267.96 thousand tonnes. This increase in the indigenous capacity did not result in the reduction of imports because of the British Policy. This resulted in a price war among the domestic firm which consequently resulted in losses. The plight was due to a) foreign competition and rate-war; and b) localisation disadvantages.

In the Era of struggle and survival (1924-1941), in order to overcome the above problem, it was proposed to increase the custom duty so that foreign cement outclassed totally from the Indian market. The Industry by forming 'Cement Manufacturer's Association' in 1925. A quota system on the basis of installed capacity of each plant was adopted. This measures worked well and the sales of the industry went up. The 'Cement Marketing company of India' established in 1930, really succeed in eliminating internal competition, reducing transport charges, avoiding over production and increasing the demand for cement by centralized scheme. The persistent fall in the cement imports and cheap availability of cement indicated the healthy sign of the Industry in this era. These years witnessed the establishment of some new plants. However, various problem cropped up in the form of distribution, pricing, underutilization of capacity, uneven economic scales. Hence, after 3 and 4 years CMCI cracked up. During the statemetic situation the great industrialist Sir F.E. Dinshaw made earnest efforts to form a centralized organization; and amalgamated different units to form the Associated Cement Companies Ltd. This was the turning point in the history of Cement Industry in India. The Dalmia-Jain enterprises also planned to establish five cement plants. The rapid growth in 1940's led to a state of saturation and price-war again. The dwindling profit's hampered the development of the Industry; and after realized it they made a price agreement. The agreement determined the share in market of each group of industry. The second-world war enthused a new life and promoted the investors to set up new industry's.

Prior to independence, the country was endowed with 24 cement plants with an annual capacity of 2.7 million tonnes approximately. The economy
entered in planning era and cement Industry emerged as the core of development. The First five year plan envisaged a capacity of 5.4 million tonnes, whereas the industry achieved 5.02 (1956) and production incased to 7.80 million tonnes in the year 1960 compelled the government to look after the distribution system. From 1st July 1956, the Cement came under the provision of Cement Control order. Further, the unexpected fall in demand shocked the entire industry and production brought down. Despite all these problems in 1960's. The industry overcome these and recorded satisfactory growth.

The Third Five year plan envisaged massive construction programmes in different sectors; so that the targets set up to be achieved 15.0 million tonnes. But still the existing distribution and price control system hampered the Industry. The Government w.e.f. 1/01/1966 formed a self-regulating control mechanism called 'Cement Allocation and Coordinating Organization', had to control the Industry in relation to price and distribution system. Unfortunately the new pattern of voluntary control by CACO did not work due to various reasons. The Government, further, introduced the control by a officer designated 'cement controller' w.e.f. 01/01/1968. In Fourth Plan, (1969-74) Government referred those problem to Tariff Commission and allowed to increase the cement price of Rs. 10. per tonne. Fourth Plan envisaged target 18 Million Tonne, where achieved actually 14.76 million tonne. It was aimed to achieve the entire capacity by utilizing Industrial machinery and expansion of public sector. The Public Sector cement corporation of India and U.P. State cement corporation extended its units. Other state governments continued to established units in public sector, but ACC continued to be the largest group. The licensed capacity became more than doubled from 9.5 (1961) to 19.7 MT's as on 01/09/1973.

Government again felt the need to look into the various problems, and referred to Tariff Commission to study in respect of costs, price, location, capacity, freight, pooling etc. The Government accepted some recommendations of the report of Tariff Commission. The Fifth Five year Plan after assuming a post tax return of 12% on net worth, targeted capacity to 24.5 MT's as against actual production was 22.5 million tonnes. After several complaints, the Lav Raj
Committee appointed by Government in 1978, recommended a three tier system of low, medium and high (prices), did not work. Then in 1987, Government received the Ghosh Committee recommendation, which became a milestone in Cement Industry history. The Ghosh Committee recommended "Partial decontrol", and ultimately the Government adopted this system of dual pricing in 1982. At the end of Vith plan (1984-85), the cement production went up 30.13 MT, as partial decontrol played a significant role, and 45.41 MT's at the end of VIIth plan. After 40 years of control, the Government finally decontrolled the cement fully on 1st March 1989. The Government expected to achieve 76 MT's and 87 MT's at the end of 8th and 9th five year plan. The Government delicensed the cement industry on 25th July 1991. It further increased the performance of the Industry. As a result of decontrol (01/03/1989), the Government foresee a capacity of 100 MT's by the end of 2000, and this achieved in this decade, as actual cement production in 2000-01 was 99.61 MT's against 100.45 MT's in 1999-2000. However, annual production was negative (-0.84%) in 2000-01, this was due to demand recession. During the last decade of the Cement Industry has made phenomenal progress in terms of volume, technology and product upgradation. It has shown a phenomenal growth of 9-10 percent during the last decade. The industry is currently in over supply mode. The installed capacity is nearly 135 million tonnes as against the demand of 102 MT's during 2002-03. The cost effectiveness and production of consistent quality products are going to be major determinants of the business viability and its profitability. A plethora of factors like change in technology automation, optimization of power, raw material consumption and manpower requirements influence quality. Currently nearly 95 million tonnes of fly ash and 9 million tonnes of slag is produced in India every year. Now in this decade, cement industry become highly fragmented. There are more than 100 cement plants sits pretty on a capacity of 117 million tonnes in 2000-01, second only to China's 200 MT's. Presently, it happens to be caught up between modernization and tradition. Faced with a multitude of challenges and opportunities, the Indian Cement Industry is at the crossroads.
6.2 ORGANIZATIONAL STRUCTURE OF CEMENT INDUSTRY IN INDIA:

Shaping up to the challenge of the 1990's posed a key dilemma of cement Industry's. The pressures of mass production and the drive to standardization work in the direction of a transnational product, and at the same time, posed customers-orientation and market-orientation a challenge in front of cement enterprises. The structural changes become the obvious choices of cement Industry's in India. The clean trend in the shape of change reflected in the study in duration of 1990-2000 to more from structures with the traditional functional dimensions -marketing/manufacturing/sales-towards structure get closer to the customers, and therefore divided up to reflect different markets rather than different functions. Traditionally, the important flows of information have been up and down the hierarchy. However, the recent focus a total quality and customer responsiveness puts greater emphasis on horizontal process. One of the challenges of the 1990's is to overcome the rigid stratification of the old-style cement organization in increasing fluidity, breaking down internal barriers and discriminating knowledge. 'Networking' frequently manifests itself in the creation of temporary project teams- drawing people from multidisciplinary backgrounds. Few recent organizations yet know how to manage project teams like these. Frequently, their creativity, authority and power are stifled by 'plugging' them to rigidly into formal reporting process to top management, ensuring that the most senior person chairs' the project team and pulling their recommendations, changing conditions demand structural changes in cement corporations. The study noticed that the Cement Corporations planned to bring changes by way to combining departmental responsibilities, removing vertical layers, widening of span of control, standardization, decentralization and freedom of work. When new technologies in the form of dry-process introduced; there are opportunities for job redesign and for organization restructuring. In manufacturing cement, the use of computer aided knowledge systems has resulted in more integrated structures. Widening consumer choice and competitive pressures produce different designs for different markets. These demands can only be met by greater flexibility in
design and change in the manufacturing and distribution processes. With the integration of computer systems increased automation reduces the need for human physical efforts, but increases the need for intellectual ability, for management coordination and for maintenance skills. Effective change mean harnessing the informal as well as formal structure. Reorganization become a powerful lever for change in putting the resource where the organization need it. If the structural change is to be used effectively, it must be used within the context of informal as well as formal structures and within the changing scope of organizations in the 1990s. Lastly to suggest an Alternative model on Corporate Management Structure of Indian Cement Corporations. The study Assessing Structural change in Cement Industry in India: The main concern of the study is with structural change. The study focus on techniques that have an impact on organization's structural system. The seeds of structural change come from an unlimited set of sources. There are no doubts the study found that changes in strategy, size, technology, environment, or power are the source of structural change in cement enterprises. The study noticed some determinants that shadow a light impact on structural transformation in cement enterprises:

i) Cement enterprises objective's change over the year. Cement Companies got new identity and recognition in the new complex business environment. This bring out a major transformation in leading structural change in cement industry; and the cement corporation absorb change to survive and stabilise itself in competitive environment.

ii) Technological advancement in the duration of the period 1990-2000 in the production of cement that increases capital intensity, and standardizes internal process tend to require the cement organization to become more mechanistic in structure.

iii) The cement enterprises face skilled labour shortages. As these professional are in a short supply. They have been able to negotiate a greater voice in decision making, less direct supervision, and fewer rules and regulations. These negotiation with the purpose of retention skilled worker changed the power structure of cement corporation.
iv) The cement enterprises introduced computer added technology or *sophisticated information processing system* after 1990, as directly affect the centralization dimension. The receiving and dissemination of information affected centralization dimensions. How much and to what extent information transmitted to the lower level become a complexity.

v) The new government regulations creates the need to establish new *departments and changes the nature of current departments*. As after fifty years finally, Ist March, 1989, the cement was decontrolled and after this the Cement Industry has witnessed impressive growth. Then *liberalization policy of 1991* changed the entire face of cement industry. The cement corporation after 1991 thinking of globally. They produced the quality of the world level. They want to be global so that the structure requiring new look for this purpose.

vi) In response to *consumer pressure groups*, few organizations have created or expanded their public relations departments, whereas other have upgraded the *authority of personnel in the quality control function*. Market and consumer orientation in duration of 1990-2000 brings a new phase of life in Cement corporation.

vii) *Duplicate functions eliminated and new coordinating positions are typically created. Competition lead to the expansion of boundary spanning roles and an increase in decentralization.*

viii) When cement corporation's profits drop off, management frequently resorts to a *structural shake up*. The personnel have been shuffled, departments added, new authority, relationships defined, and decision-making partners significantly altered. Redesigning of technology of these jobs by *increasing task variety, autonomy, feedback, and the like improve morale*. All these have an greater impact on structural face of cement corporation.

ix) The structural classification noted between 1990-2000 in cement organization in terms of *changes effecting the distribution of authority*
pattern; allocation of rewards; alterations in the chain of command; degree of formalization; and addition or deletion of positions, departments, and divisions.

x) Now the most pertinent questions comes in the study: who initiates structural changes? The study after going through analytical by ways of interviews, materials, annual reports and reviews found that this typically includes senior executives, managers of major units within the organization, internal staff development specialists, and even powerful lower-level employees. It also includes consultants brought in from the outside in few cases.

xi) The types of change that cement enterprises top management seeks to create are varied. The type of change depends on the target. At the individual level, managers attempted to affect an employee's behaviour by way of training, socializing, and counseling. These were the change strategies of cement corporations where the target of change were of the individual. Similarly, cement enterprises used sensitivity training, survey feedback, and process consultation where the goal were to change group behaviour.

xii) The analogy in the cement enterprises consider these two factors: i) the higher one moves in an organization, the closer one automatically moves towards the power core; and ii) it is not necessary to have authority to wield power because one can more horizontally inward toward the power core without moving up. An organization structure majority thinks is the result of those in power selecting a structure that is to the maximum degree possible maintain and enhance their control. In cement's organization, structural choices is made by those who hold power - the group that called the dominant coalition, that is, specially by the senior management faculty. Whereas in private cement enterprises, power vests by holding hierarchies authority, or by controlling resources that are scarce and important in the organization, or by having a central position in the organization. It has been seen further that to enhance control in cement enterprises, management
choose structures that low in complexity and high in both formalization and centralization. It has been found that a CEO's need to achieve - strongly influences structure. The more achievement-oriented CEO, the more he/she centralizes power and imposes high formalization. The structural form allows the CEO to take major credit for, and to carefully monitor and control, the performance of the organization.

The major result/conclusion and suggestions on Corporate Structure of the Indian Cement Industry are as:

1) Broadly speaking, the companies do not prefer to have either a too low or too high number of directors on their boards. Therefore, though the board strength in companies surveyed ranges between 3 and 15, in majority of cases, it lies between 5 and 12. The most popular board sizes are 8 and 9 followed by six directors on a board. The average number of directors in companies studied turned out to be 8.38, the minimum number of directors in cement companies was 3 (adopted by 95 per cent companies) as per Articles of Association, which is also minimum required by law. The maximum number as per Articles of Association in majority of cases is 12 (favoured by 62 percent companies). In some cases, it is 15 (in 21 percent companies). Very few companies have preferred a higher number in this respect. Now after 1990's, the majority of the Company prefer to retain maximum directors in their board, because corporate governance became a major factor in 21st Century. The study suggest to retain maximum number of directors in their board. An important finding relates to the number of vacancies on the boards in Indian Cement Companies, so in practice companies do not fill up all the births. In the study 75 per cent cement companies had vacancies on their boards ranging between 1 to 5 directors in between 1990-2000. It's suggested not to vacate the position long.
2) Going by the evolution of business, one would expect the board size to expand with the age of the company. The reason for this could be to meet the expanding needs of the business, diversification into newer/unrelated areas, reluctance on the part of the aged directors to retire, need for inducting new/dynamic person. The study brought up a mixed picture between the period 1990-2000 with oldest companies 'by and large' having less than 10 directors and newer companies not hesitating to have more than 10 directors on their boards in a few cases. The another conclusion of this study is that large sized companies with a paid-up capital of Rs. 2.5 crores or more utilizes the services of large number of directors (i.e. 5 to 15) than the companies with paid-up less than Rs. 2.5 crs. The study suggest to keep the optimum size of board and no. of directors.

3) It has been generally argued that the changing business complexities demand varied skills and abilities which one-man chief-Executive cannot meet completely. Besides, he enjoys practically absolute power with regard to corporate functioning. So there is a need to modify the present institutional structure. The suggested modification entails formation of committees with board members drawn from various fields of specialization. The board should be judicious mix of executive and non-executive members.

4) The next finding of this study relates to board size and corporate efficiency in cement industry. The corporate efficiency has been measured by turnover ratio and Earning per share. In this study, the board size and turnover ratio were not found related. Likewise, no clear-cut relationship was found between board size and earning per share.

5) One revealing finding of our study pertains to the 'manager as the CEO'; as this is rare in Indian Cement Companies. In most of the cement company, the board of directors appoints one of the board member to do the task of executives in between the period of study. But few of the advanced company appointed manager as CEO. The cement corporation
has now made it as a practice to appoint a skilful and qualified person as a CEO.

6) The cement companies over the last decade only reflect a **shift in one or two functions, or a change in several reporting relationships, or merely a change in the personal occupying the given positions.** The study did not find any major changes in authority and responsibility relationship after the year 1990's. Presently the cement enterprises happens to be caught up between **traditional and modernization setup.**

7) The Indian Cement Industry confronted **many complexities** in the era of globalization, which shadow a great impact on organizational structure. In few cement companies, the **complexity has resulted from self generated expansion,** others it has come about through mergers and acquisition. The interesting finding of the study relates to manage complexity in Indian Cement Industry. Thee element of structural transformation in duration of 1990-2000 are as: i) **Divisionalization/Decentralization,** ii) **Changing Staff Role,** iii) **Group functioning at operating level,** iv) **The role of Chief Executive's Officers**

8) As the Indian Cement companies moved into new paradigm by facing **competition, technological and marketing complexities.** The **Functional-type-Cement companies** well fitted to the production of Cement. Functional organizational structure gained prominence in the period of 1990-2000. The cement company's emphasized on **accessibility to markets, move on different product lines, flexible operations and identification of the areas of cost-saving and profitability.** The changed reflected in cement corporation that after 1990's divisional head have more legitimate authority to use resources. Then Divisionalization proceeded in Indian Cement Industry along functional lines integrated lines.

9) The study revealed newer **corporate staffing responsibility** by greater **decentralization and freedom of work.** The raised a new type of autonomy in working relationship in Indian Cement Industry. The study suggested
to move the working relationship on greater freedom, because it creates a
positive relationship with profitability and efficiency.

10) Growing complexities and competition set a new paradigm in Indian
Cement Corporations to inducted new functional areas, i.e. Product
Development, stock-holder relations, computer Technology/Human
Resource Information System, Market Research. Few of these attributable
directly to divisional operations and few are competitive environment. The
study also found the emergence of corporate staff as a major force in the
planning and controlling to corporate objectives and policies.

11) The study noticed that Divisionalization (geographical/market) in Indian
Cement Companies creates the problem of coordination. With regard to
this problem, the study suggest to fix up the responsibility clearly and
maintain clear-cut authority - responsibility relationships in remote
division. Going by the evolution of business, to meet the expanding needs
of the business and diversification into newer/unrelated areas, etc.; the
Cement Corporation expand the role of executives and committees. Three
committees are advisory in nature, should meet at frequent intervals and
seek to strengthen the present system by minimizing its abuse. The study
has outlived the one-man concept of chief-executive in terms of its utility.
The Indian Cement Corporation's strength lies in its divisions. So it's better
to emphasize and strengthen the division by newer paradigm by clearly
defining roles, authority and positions.

12) The study revealed the following department generally in Indian Cement
Industry's: i) Quarry; ii) Production; iii) Maintenance, iv) Research and
Development, v) Technical vi) Non-Technical. The study reported the
following (more or less same) occupations in Indian Cement Industry; a)
Officers; Administrative, Executive and Managerial Personal; b)
Supervisors (Technical/Non-Technical; c) Skilled Workers; d) Semi-
skilled and unskilled workers; e) Clerical and related workers; and f)
Watch, Ward and Office Attendants. The study suggests to mix up some of
the occupations and department to make more compact and efficient. The
study reported that seventy percent Indian Cement Companies are working this side to identify the areas of cost-cutting and profitability measuring/by fixing the responsibility on lower level.

13) There are certain dimensions on the basis of which the formation of organizational structure of the Indian Cement Industry analyzed: i) Complexities, ii) Formalization, and iii) Centralization/decentralization. The Indian Cement Corporations (both public and private) tasks are broken down on functional lines and drawing the benefits of specialization. Broadly speaking, the Cement Companies work through unit/divisions. These are generally specified as: Manufacturing, Sales, Marketing, Finance, Human Resource, Technical/Non-technical. The Cement Companies reported from 7 to 10 division, and these divisions are further divided into sub-units i.e., 50-70.

14) Span of management of Indian Cement Industry/companies is different from one Company to another depending upon the requirement. It has been found in study that the sampling companies have wide span of control. It has been suggested to make it optimum. Formalization measured in terms of policies - and procedures manual, assessing the number and specify its regulations, reviewing job description etc. The Cement Industry is the high formalized in some aspect. The unit does not choose employees at random. The cement companies fixed a selection process/methods for all the jobs. Role expectations explicitly defined by cement companies. Role of every employees already defined precisely in concrete terms in 62% Cement companies in India. Training and development become one of the priority as already stated in study. The rituals in the Cement companies are defined precisely. The Cement companies developed their own culture and establish cordial relationships between management and union.

15) Decentralization become an important aspect of cement companies. The cement corporations delegated the authority to the lower level to get efficiency and effectiveness. The study noticed that the new technique i.e., workers participation, decentralisation, total quality management,
Reengineering, Quality circles, business processing made an astonishing effect on the functioning of Cement Industry, in this decade, but these are restricted to few companies.

16) The prevailing structure of corporate cement management has been criticised over the years on several counts. Besides being out-dated and not in tune with present day business environment and managerial ethos, its functioning has brought out several bases thereof. In many cases the practices are not in consonance with the intentions of the law. One glaring example, worthacting pertains to the appointment of a Chief Executive officer. While in law, it is the board which appoints and controls the CEO, in reality, it is the CEO who, along with his group, selects the members of the board and whom the board obeys. Whereas management consultants are unanimously against insider dominated boards, Indian Corporate world is rife with instances of such family controlled governing boards. The family governance executive appointed a family member to work as CEO. The majority of the ills effect the corporate management structure in India, broadly speaking, stem from two reasons, namely, lack of independence and objectivity on the part of directors, and absence of control over CEO.

17) Herein under, the study suggest some points of corporate management structure which could enable corporate boards to function in a better way. The most logical structure of corporate management of cement companies keeping in view the need for separating control from execution, would consist of two distinct strata, viz., the executive and the legislative. The former should concern itself with the preparing the corporate plans, programmes and policies, and get these approved by the legislature to run day-to-day administration. The executive function would be the subject-matter of review and appraisal by the legislature, i.e. the board of directors.

18) The study suggests that the chairman of Board and the CEO are to be held by separate persons. The chairman should, therefore, be vested with authority over and above an ordinary director. The Chairman shall be assisted by two statutory committees - the Technical committee and the
**Business Committee.** These committees would comprise of outside/non-executive board members. The Technical committee is expected to act as advisory body for matters pertaining to production, engineering, research and development, and other areas of technical nature, whereas the Business Committee would advise in areas like finance and taxation, accounting, commercial, marketing, personnel, law, etc. The boards would continue to lay down broad policies, and the implementation thereof is to remain the main task of CEO.

19) The study also suggests to have a smooth communication channel between the board and the CEO through the system of statutory committees. The provisions of outside chairman with additional powers of control is meant to enhance the credibility of corporate boards. It is important to highlight that the study does not intend to undermine the importance of CEO. It rather seeks to rationalise his executive role for under the suggestion, the use of committees and their direct link with concerned executives would relieve him of a lot of avoidable pressure timely. The CEO, instead, can concentrate on more important aspect of Corporate functioning. The functioning of the CEO as well as at every level of the Cement Corporations define precisely and allot clearly so that transparency become as an vision of corporate structure.

6.3 TECHNOLOGICAL DEVELOPMENT AND CHANGE IN CEMENT INDUSTRY IN INDIA:

Technology refers to information, equipment, techniques, and processes required to transform inputs into outputs in the organization. As far as cement production is concerned, this is the most sophisticated technology used today. In prehistoric times, clay was used for unifying stones. After that limestone was roasted in hot fire to have a crude form of lime which when mixed with water formed mortar. Today, we speaks about 'Portland cement', originated in England, a mixture of limestone with pozzolana a type of volcanic earth known as cement. The mixture of limestone and clay is burnt (1350C-1450C), and formed tri-calcium silicate, which is the main element for high early strength. For
manufacturing 'Portland cement' i) *First, intimately mixing together calcareous and argillaceous and other silica, alumina or iron oxide bearing materials; and ii) burning them at a clinking temperature, and iii) pulverising resulting clinker to a very fine powder.*

In early years, the wet process gained prominence despite higher fuel consumption. Later, blending of material in the dry state required less fuel consumption developed dry process. In the dry process, limestone and clay are fed into a grinding mill into which hot air passed. The materials are heated dried thoroughly and then reduced to a fine powder called a raw meal, after mixing the raw meal with the aid of compressed air, it is stored in large silos. In the **HUMBOLDT SUSPENSION** pre-heater system by dry process, the raw meal is fed into the topmost of a series of cyclones through which hot exhaust gases are passed through rotary kiln. In modern plants, the pre-calcinatar technology is adopted, wherein part of calcination done before feeding of material into kiln. The clinker is then cooled down and thereafter fed into grinding mills alongwith a small quantity of gypsum and ground into fine powder. Gypsum retards setting time of the cement during placing of concrete and mortar. From the grinding miles, the cement is transported to silos with the aid of compressed air. From silos after 8 to 10 days, cement is delivered to packaging plant. The another form of cement used today, is *'Portland Pozzolana' Cement (PPC)*. The most commonly used materials in Pozzolana are fly ash from thermal power house, burnt bricks, tiles or Pozzolana clay. Pozzolana reacts with water to form calcium silicate hydrate. Pozzolana cement is claimed to be more beneficial compared to ordinary Portland Cement i.e., Pozzolana produces less heat of hydration, resistance to sulphatic water (employed in marine and hydraulic works), more plasticity, more durability, less permeability to water and resistance to alkali soil. The another kind *'Portland Blast Furnace Slag Cement (PBFS)',* a by product of iron ore, mixed with coke and limestone and heated at 1600°C, and resulting in a molten slag, thereafter cooled down rapidly transform into reactive glassy form, called *'Granulated Blast Furnace Slag Cement, PBFS/GBFS generally use in Port Works, Railway tunnels, dam project, marine works and other sulphatic corrosion works.*
The technological changes in manufacturing of cement has been impressive. In 1950, about 97 percent of the total installed capacity was of old wet process technology. In 1990, dry process plants accounted 77% of total cement production, 18% consisted of wet process and 5% of the semi-dry process. This technological setup has changed and in the year 2000; 89% of cement produced through dry-process technology; 9% by way of wet process and 2% by way of semi-dry process.

The cement Industry's has been progressively changing over from wet process to dry process-technology. From 1% cement productivity based on dry process in 1960 to 77% cement produced by dry process in 1990 and 89% cement production on dry process in 2000. The production from the dry process went up from the year 1990 to 2000. As the cement production from the wet process was of 18% in the year 1990; it came down to 9% in the year 2000. It's depicted that cement industry's changed its production technique and adopted heavily dry process technique. The production achieved and went up from 48.9 MT's in the year 1990 to 88 MT's in the year 1990-2000, almost the doubled the capacity of production in between the period of study.

The public sector had 16,800 (TPD) total capacity of production with the total no. of Kilns 19 at the end of the year 1990; and this increased to production capacity 21,400 TPD with total no. of Kilns 24 at the end of 2000. As such the technological break up showed in the study that the public sector had slight inclination towards dry-process technique; but not as such required in this decade. The public sector corporation still produced their major portion of cement through wet process technique i.e., 60-65%; dry process consisted on 20-30% of total cement production and 10% from semi-dry process of total cement production in public sector. Comparatively as the year 1990 to 2000; the cement production in public sector went up due to the orientation towards using of new technology. The study noticed some short comings, which hamper the growth of the adoption of modern technique i.e. shortage of finance, mismanagement govt. policies, non-availability of proper resources and public welfare aspects. It has been found in the study that the technological advancement and changes are more in the private
sector as compared to the public sector. After decontrol phase, the private cements 
industry become more prone to new technology. Birla Group, Associate Cement 
Companies Ltd., Gujarat Ambuja, etc. (Study unit) adopted new technology (i.e. 
pre-clacinator dry process. Now approximately 90% of the production of cement 
has been done by dry process technology in the private sector. India have had 300 
mini-cement plants meet the demands of localised markets use mostly the old 
technology. The study reported that the mini-plants, do not have the capacity to 
absorbs new technique because of shortage of finance, lack of government 
promotion, non-recognition etc. and these plants remained undeveloped during the 
period of study. The study has not found any suitable changes in the functioning 
and technology of these mini plants.

Adoption of modern techniques like photogramatic, remote sensing to 
discover limestone, new process technology in the form of dug, packaging and 
transportation transformed the entire cement Industry. The advance equipment 
like hydraulic excavators, surface miners, large wheel loaders, mobile crushers, 
and adoption of precalcinator technology change the whole gamut of Indian 
cement Industry. Now the Indian cement manufacturing technology are equipped 
with latest process control equipments, double string preheater towers, vertical 
roller mills, high efficiency fans and motors with slip recovery system, vertical 
coal mills, roller press for grinding of clinker and slag and specially designed 
computer software system for raw material evolution or line raw mix control 
system. The management hired the consultant to install the system/new process 
carefully. The technological development and change summarised as below:

1) In Indian cement industry, modern dry plants of large capacity 
incorporating latest precalcinators and others technological advancements 
co-exist side by side with old wet process plants as well as small capacity 
cement plants based on rotary kiln or vertical shift kiln technology. The 
preceding decade has been one of phenomenal growth and technological 
advancements in the Indian cement industry. The installed capacity has 
increased from 48 MT's at the end of the year 1990 to 88 MT's at the end of 
the year 2000. In 1960, the wet process cement plants comprised 94% of
the capacity and dry process only 1.1% and in the year 1990 dry process accounted to 77% of total capacity production; presently 89% of the total capacity and only 9% from wet process at the end of the year 2000. It showed a great technological change and development during the period of study. There are 20 cement plants of capacity of 3000 tpd and higher, constituting 43% of the total installed capacity. In the coming decades, single line capacities of the other of 4500 tpd can be expected.

2) The average capacity utilisation of large plants has been of the order of 85% at the end of the year 1990. At present nearly 40% of the capacity operates at 90% utilization or higher. The specific thermal and electrical energy consumption in cement manufacture are showing down-ward trend, both for the industry as a whole as well as for many cement plants individually. Necessary attention to environmental aspects is being accorded.

3) Because of the market forces, introduction of compulsory certification scheme, as well as the efforts by the producers and technological institutions like NCB, there is a steady improvement in quality. The quality of cement produced in India is at par to and capable of meeting the requirements of most of the international specification.

4) The process technology of modern cement plants being set up in India is more or less similar to that of some of the state-of-art plants overseas, except mainly the high degree of automation and higher level of computerized process controls in case of the latter. Global trend of cement technology are high pressure roll presses, high efficiency air separators, multi-channel burners, low pressure drop suspension preheaters, preblending beds, continuous homogenizing silos, multi-chamber storage silos, electronic packing machine etc. as well as use of computer control and software's for plant operation and management. The level of technology in Indian cement plants has always been contemporary to international level at the time of implementation of the projects. The plants under implementation at present have enhanced features like on-line bulk
analyzers, pre-blending of coal, roll presses, five/six stage low pressure drop suspension preheats, high efficiency air separators, variable speed AC drives, modern electrical drives and power distribution systems, and new generation instrumentation and control systems.

5. **Modern new generation plants** – The beginning of '90's posed challenges and opportunities for the Cement Industry in India. The liberalisation of imports and lowered custom tariffs opened up possibilities of gaining access to state-of-the-art machinery, equipment and systems available abroad. Some new cement projects, based on advanced technology, started taking shape. The new plants being built now are incorporating state-of-the-art technology, the latest in hardware and aim to achieve very low thermal and electric energy consumption, comparable to plants being built elsewhere in the world. Some of the important technological advancements adopted by these plants, over and above the earlier features are:

- **On-line Bulk analysers/sampling stations for control of mining and stockpile formation**
- **Preblending beds for coal**
- **Vertical Raw Mills with external circulation system and High-efficiency Separators**
- **Roll Press for raw material grinding**
- **Low-pressure drop Suspension Preheaters of 5/6-stage**
- **Newer design grate Coolers with higher recuperation efficiency**
- **Vertical Coal Mills with high-efficiency Separators**
- **Explosion-proof design for the coal grinding plant and provision of special safety and fire protection systems**
- **Roll Presses for grinding of slag in finish mode and Clinker in tandem with Open/Closed-circuit Ball Mill, together with high-efficiency Separators**
Vertical shaft/fluidised bed dryer for slag

Energy-efficient and reliable mechanical conveying system for Raw Meal and Cement

Extensive use of variable speed AC Drives of large power ratings

6) The present estimated reserves of cement grade limestone are about 89.5 billion tonnes, 18.4\% of which are of measured category. At the projected rate of consumption, the measured category of reserves is likely to completely exhausted in 45 years or so. The wet process plant in India is more than 35 years old. Inefficient crushing system, energy intensive open-circuit mills for Raw meal grinding, small capacity inefficient Rotary Kilns, open-circuit cement Mills and Cement Packaging plants for low productivity constitute the wet process plant. Automatic Process control systems are non-existence in these plants which result in sub-optimum operation. The operation's are labour intensive. The inherent fuel-inefficient wet-process kilns, coupled with energy-inefficient and low capacity upstream and deconstream, sub-systems, make the operation of the wet process Kiln Plants uneconomical. It calls for intensification of exploration in next plan period. Modern Mining techniques like photogrammetric and remote sensing technique become handy to discover virgin deposits. The depletion of limestone deposits with homogenous quality lead to higher mining costs due to the necessity of removing overburden and the inter bedded waste rocks etc., which calls for cost-effective techniques for selective mining to greater depth.

7) The dry/semi-dry process technology registered its presence in the Indian Cement Industry in the early 1960's. These plants are the first of a series of modern plants based on contemporary technology. These plants have a high degree of instrumentation and centralised plant operation, through PLC's Computer, from the Central Control Room, Specific Computerized software packages, optimization, Refractory Management system, Electrical Energy Management System, etc., have
been adopted by some of the Plants for the optimization of production, energy consumption and improving the quality of product.

8) The new plants under implementation are being designed for a fuel consumption of 700-725 kcal/kg clinker and power consumption of about 90-100 kWh/t cement. According to studies conducted by NCB, for dry process cement plants, the overall energy consumption during 1991-92 was in the range of 750-1050 kcal/kg clinker and average power consumption was of the order of 117 kWh/t cement, which were lower than those obtained in the previous years.

9) If the energy consumption in Indian cement plants is generally higher than in some other countries like Japan or Germany, it is essentially because of poor quality of inputs, specially coal and grid power. Plant and machinery in most cases would have been of state-of-art level when commissioned, but financial constraints due to inadequate invisible funds came in the way of keeping pace with continuous modernization from time to time, as technological development kept taking place. As a result, the various options for energy conservation broadly are: i) Operational improvements, ii) Incorporation of energy efficient equipment's, iii) Technological upgradation including wet to dry process conservation, iv) Cogeneration of power from waste heat, wherever feasible, v) Incorporation of five/six stage preheated, etc. vi) Improvement of quality of coal and power, vii) Beneficiation of high ash coal, viii) Optimum utilization of low grade coal and alternate fuels like lignite, agro-industrial and other combustible wastes, ix) Better energy management including energy audit, monitoring and target setting, manpower training etc. x) Use of industrial wastes like fly ash, slugs, sledges etc. for cement manufacture.

10) The impact of cement plant operation, including mining on environment is local i.e. restricted within 3 to 5 kms, of the installation, in so far as air pollution is concerned. The main problem in Indian context is emission of dust to the atmosphere through stacks and vents and from fugitive sources.
Although cement plants dust is not hazardous, it does constitute a nuisance within the plant and surroundings. Kiln exhaust gases alone contain about 92% of the dust emitted by Indian Cement Industry. The stack emission limits should not be frequently lowered by the statutory authorities for the existing plants, as after installing an equipment designed to meet the limits of say 150mg/Nm³, it may not always be practicable to achieve lower limits of 115 mg/Nm3. The important factors of age of the plant, status of the manufacturing technology, layout of the plant and the need for stringent limits must all be considered in their proper perceptive. In the present day context, the wet process plants constituting do have some inefficient unit operations. The best course is to convert these plants to semi-dry/dry process, wherever feasible. Till that is done, it will be worthwhile only to concentrate on improving operating efficiency in such plants.

11) **Dry process plants are having modern plant and equipment** and the areas which need further modernization include bulk analyzers, pre-blending systems, vertical roller mills, roller press etc. and cooler optimization. Packing, dispatch and transportation systems will also need improvement. Research and Development is needed to provide necessary technological support to the growth and development of the Indian cement industry and to provide the cutting edge for improving productivity, energy conservation, quality and reduction of cost. In general, the research efforts should be directed towards a three-pronged approach;

i) technological developments in the process of cement manufacture and the related plants and machinery and systems design;

ii) operational improvements to ensure cost reduction, environmental protection and quality improvement;

iii) R&D to ensure proper utilisation of cement in constructions and propagate its use for newer applications.

12) **In National Council for Cement and Building Materials (NCB),** the Indian cement industry, has an unique infrastructure for carrying out
research and development work. In-house laboratories of some cement companies are also available for pursuing research projects. The R&D competency available in CSIR laboratories, academic institutions, state government laboratories has also to be pooled in required measures for carrying out the necessary R&D work. The broad area of research may note that improvement of operational efficiency, reduction in energy consumption, environmental protection, utilization of marginal grade raw materials, high ash and alternate fuels and wastes, waste heat recovery, quality improvement, and newer areas of utilization of cement etc. would be major areas for research. In addition, applied research for troubleshooting and other industrial services will be important areas for R&D support. Indian cement industry's spent .21% of its total turnover on R&D in the year 1990; and in the year 2000 spent about 0.35% of its turnover on R&D, which is low as compared to that in some other countries, as well as to the investment by other sectors of industries in India. R&D in cement, therefore, needs a tremendous push-up. Any attempt to reduce the expenditure on R&D for the reason of economy can be counter-productive in the long run. It should 2% of turnover.

13) The incorporation of latest technological developments in general and continuous technology upgradation and modernization even within an existing cement plant demand parallel upgradation of human skills at all levels. The existing facilities for manpower and human resources development available at NCB, ACC, CCI, the RTCs and other peer organizations are considered adequate and these should be further strengthened keeping in view the expected growth in terms of size, modernization and technological developments. A perspective plan on training and human resources development for Indian cement industry should be developed.

14) With a view to monitoring the technology trend, information on working of different cement plants both in India and abroad and that on individual performance parameters should be collected and suitable disseminated to
the industry from time to time, so that all cement plants can benefit from their experience. An investment of about Rs. 5000 crores at current prices would be needed for modernizing the existing large cement plants over a period of 5-6 years up to the year 2005 AD which would result in an additional cement capacity of 10 million tonnes per annum. A number of cement machinery components as well as bought out items especially for million tonnes capacity plant is still imported amounting to 20-25% of the machinery cost. Indian machinery suppliers also need further strengthening of their design and engineering capabilities and expertise in erection and commissioning services for the modern plants as well as repairs.

6.3.1 Recommendations:

1) The cement industry should continue its efforts to improve the level of technology in relation to mining, processes, plant and machinery, as identified in this study, as well as in transportation, handling and distribution of cement, which are being covered in detail and identified.

2) Specific studies should be taken up to identify the technology gaps as well as most optimum route of modernization for plants of different types and vintages e.g. wet process plants, dry process plants set up before eighties, and for those set up later, as relevant under Indian conditions.

3) Within such a framework, depending upon the type of process, age and other considerations of location, raw materials, fuel etc., each cement plant would have to identify specific technological needs for upgradation and optimisation of its operations and formulate its strategic plan for implementation. Such modernisation of operation and upgradation of technology and environmental improvement would in many cases call for imported plant and machinery, spares, other equipment and control systems including related instrumentation and software. Such import should be considered necessary. Desired support in the form of tax and duty relief etc., as recommended should be considered.

4) Each cement plant should have well-worked out schemes for increasing...
energy efficiency. Energy audit studies should be carried out in each plant at regular intervals by expert agencies.

5) Steps requiring the *upgradation in the quality of fuels, improvement in quality and availability of power* and beneficiation of raw materials should receive top most priority. In order to *alleviate infrastructural bottlenecks towards energy efficiency* and smooth operation of dust collection systems, every encouragement should be given for *improvement in coal quality, including setting up of coal washeries* at the pit-head and necessary policy decisions should be arrived at.

6) *Co-generation of electric power by recovery of waste heat* wherever found to be prima-facie viable in the Indian cement industry should be encouraged and taken up. A few pilot projects should be undertaken for demonstration under Indian conditions with necessary financial support from the Government.

7) *Uninterrupted power supply* is important for proper operation of the large size plants including operation of ESPs. Captive power plants are therefore considered necessary and required fiscal incentives may be considered to encourage environmental improvement.

8) *Use of industrial wastes*, e.g. fly-ash, slag etc for manufacture of blended cements like portland pozzolana cement (PPC) and portland slag cement (PSC) should be encouraged. This measure will help in energy conservation, environmental improvement through waste utilisation and resultant cement would render certain desirable properties in the concrete.

9) *Use of combustible wastes* as fuel in cement should be encouraged. Incentives for such schemes should be at par with other non-conventional sources based energy generating system. Modern mining techniques and equipment may be adopted for optimisation of reserves and steps taken to encourage use of low grade raw materials.

10) The presently assigned emission limits for SPM should be frozen to 250/150 mg/Nm³ and reinstate limits for A.P. State to 150 mg/Nm³. Limit
of 150 mg/Nm$^3$ for SPM should be assigned in the case of plants already ordered. The policy of revision of emission standards should be formulated in consultation with the cement industry for future 5-10-15 years and the levels announced at least 3 years before the proposed statutory dates.

11) **SO$_2$ and NO$_x$ levels** - An inventory of existing plants to be carried out in terms of SO$_2$ and NO$_x$ emissions and proposed limits to be then fixed in consultation with the cement industry.

12) **The Ministry of Environment and Forests** vide their Notification dated 29.1.1992 made draft conditions for prior clearance of all new constructions including modernisation, expansion etc and covered cement industry too. CMA has made its recommendation to Government of India and the same may be considered.

13) **Ambient Air Quality levels and limits for SPM** should be fixed only in terms of incremental levels and keeping in view the local factors of meteorology, road conditions, agricultural practices and use of domestic fuels etc. Selection of pollution control equipment should be left to the judicious decision of the industry.

14) **State Pollution Control Boards** should be permitted to consider and approve inclusion of spare parts (for duty concession) presently not appearing in the specified list.

15) **Every encouragement should** be given for meaningful R&D to be carried out in various areas. Necessary funds for research work to be carried out as well as creation of adequate R&D manpower base and infrastructural facilities should be ensured. There should be close interaction between the industry and the research centers for identification of required R&D work.

16) **Indigenous research and development** is necessary for long-term industrial growth and exports. Industry should adopt indigenous technology wherever available. Necessary funds should be earmarked for technology transfer assistance.
17) **Skills of existing manpower** need to be updated with suitable training programmes including simulator based ones and tailor-made programmes. Towards this, a perspective plan on training and human resources development for Indian cement industry covering all levels of human skills should be prepared.

18) **Information on working of different** cement plants and individual performance parameters should be collected by a central agency like NCB or CMA and suitably disseminated to the industry from time to time so that other plants can also take benefits from their experience. Collection of information on the latest technology trend and timely dissemination should receive due attention. NCB with the support of CMA should disseminate information on global technological trends and changes. Means of raising finance have to be looked into to support modernisation schemes proposed.

19) **Cement machinery manufactures** have to further strengthen their design and engineering capabilities and expertise in erection and commissioning commission for the modern plants as well as repairs. The cement Industry's achievement in modernisation and technological upgradation has been quite impressive. In Cement Industry, Modern dry process plants of large capacity incorporating latest precalcinators technology.

20) **New generation plants built in 90's** – The cement industry has come up with new and modern cement plants which have been built in early 90's. A significant difference, however, is the high degree of automation and higher level of process controls with the help of computers. Another visible difference is the measures taken by them to control the air pollution in and around the plant. The following installations are now available for induction progressively by cement plants for further up-gradation: i) **Very large capacity crushers preferably (Mobile/semi-mobile)**, ii) **Low pressure drop suspension preheater (5/6 stage)**, iii) **High efficiency newer design grate coolers with variable speed under compartment fans and hydraulic drives**, iv) **Roll press for grinding of limestone, slag and cement**, v)
Fludised bed raw material dryers, vi) Auto bag applicators for feed of empty bags to packing machines, vii) Auto loading of cement bags in railway wagons and lorries, viii) Bulk cement loading terminals, xi) Waste heat utilisation for power generation, x) Specially designed software system of latest designs for Computerized process control and optimisation, grinding mill optimisation, refractory management, electrical energy management, plant maintenance management, xi) Computerised quarry management, raw mix quality control using Online X-ray analyser, Blaine control for cement quality etc.

6.4 HUMAN RESOURCE DEVELOPMENT:

Human Resource Management is concerned with the "People" dimension in management. Human Resource Development might have existed earlier, but a professional outlook to HRD began only in 1970's. Now in between the year 1990-2000 several public and private sector organizations have HRD departments However, few cement enterprises have implemented and integrated HRD systems, but these are not able to succeed to achieve objectivity. The study revealed that the general climate in Indian Cement Enterprises in regard to HRD are not so encouraging due to general indifference of employees to their own development. The top management in most cement organizations was not making sufficient efforts to improve the quality of work life. As such, the study revealed by and large a positive trend in the use of open appraisal system, improving the training function, encouraging organization development and using employee counseling. However, no major breakthrough were reported in potential appraisal and development, reward administration and promotion decisions. Only 30% cement corporations had formal policy focusing on HRD. All in all HRD appeared to be becoming a significant aspect of work life in many cement organizations in duration of 1990-2000 after 1990's the overwhelming role of human factor in Cement Industry has been realized. A fair attempt has been made in this study to carry out work of HRM in terms of human resource planning, recruitment, selection, performance appraisal and rewards, Industrial relations, communication, participation and human resource information in
relation to cement Industry. The summary/conclusions and recommendation of Human Resource Management are listed below:—

1) **Manpower planning** in cement enterprises are made at *corporate, divisional and plant levels*. Manpower planning at plant level in cement enterprises is carried generally during the period of study by operating committee. In turn, then these are submitted to divisional committee. After integrated with the divisional plans, then this is submitted to corporate committee/levels. Top management after integrate the estimates of division and plant levels; draw corporate manpower planning.

2) The study found that *manpower planning* has not been *regularly* made by cement corporation in the 1990's. The study found change that manpower planning has been done in Cement Industry *regularly at the top level* after 1990. **On the beginning of 1990's** the cement corporations employed the manpower projection in a limited way i.e., *layoff, retrenchment, separation, death, retirement and recruitment policy*. Duration of ten years, the study revealed a total change in the mindset of cement corporations about employing manpower planning. It has been reveled that now in the year 2000, these projection have been used even for *retention, redeployment placement, induction, training and development, redundancy plans* etc. Mini-Plants and small cement Industry did not mention anything in regard to manpower planning. The study suggest to make manpower planning on regular basis.

3) The study revealed that a **total additional manpower requirements** of approximately 5,000-8,000 crs. expected to be generated upto 2003-05 respectively on account of expansions plans. The study found more **additional requirements at the middle level** in Cement Industry in India. Higher level executives and Technicians will be needed 2,000 by the end of 2005. In view of the expansion plans, *Rs. 5,000 crs.* additional investment is likely to be made and additional output worth *Rs. 20,000 lakhs* proposed to be achieved by the end of 2005, which have a direct bearing on additional employment in the coming years. The study suggest
to organize more competent and compact training programs for workers of cement enterprises.

4) After assessing the current manpower resources, it was found that the Cement industries/study units maintained manpower inventory of all categories of employees regularly. The personnel record are kept in the form of service book or by the name of personal files. The cement corporation maintained records regularly. Furthermore, it has been found that these personal records also become the basis of promotional avenues, transfer, retirement and various other uses in the Industry, i.e., rewards, increment, motivational tool, training and development etc. The purpose of keeping records remained same during the period of study. The personnel records were maintained in the year 1990 in the form of personal files, cards and books. Now, there is a change in personnel records keeping; as they are now kept in the form of disc, perforated files, and computer-aided technology.

5) Performance Management become an important tool to evaluate employees performance in Cement Industry in India. The cement corporation's (except mini plants) employed some form of assessment to assess their employees, these are known as confidential Reports, performance Appraisal Reports or Merit-rating records. The Cement Industry, however, used separate forms at different level for different purpose. Generally, performance assessment is carried out once in a year by reporting cement units, but small/mini plants ignored the importance of performance assessment. It has been noticed that 90 percent of cement corporation employed performance appraisal for promotion, increment, transfer, reward, displacement etc., whereas 10 percent reported to employed for training and to find strengths and weaknesses to assess the suitability for the job held time to time. Merit-cum-seniority base has been the most used criteria for promotion in the cement enterprises in the year 2000. Merit assessment has been done on the basis of employees confidential report. The cement enterprises reviewed performance regularly
in the period 1990-2000. But prior to that of 1990, these were analyzed when required. The 360-degree performance appraisal system seems to be in operation in few cement enterprises.

6) The Cement Industry being of **capital intensive** is equipped with **sophisticated technology** having highly skilled and experienced workers. Much efforts are needed to train technicians to handle the job effectively. The Industrial Training Institute and other technical institute imparting training on various treads. The Cement Industry's have emphasized the need of implant training programmes. The study revealed that vestibule training programme have been in operation in Cement Enterprises to provide training to workers. The regional training centre cum class-room designated centre fulfill the training needs of cement corporation in between the period of study. On the job as well as off the job training, both are used by the cement corporations to impart knowledge & skills to the workers. The shortage of external training programmes was particularly felt in rapid expansion in Cement Industry. It was unanimously geared up **Cement Research Institute** to work in this side. **The Implant Training Techniques** are the most appropriate for teaching knowledge and skills within a short span of time. **Various job programmes on the job and off the job** are integrated in different training programmes. As such **Associated Cement Companies Ltd. (ACC)** provide different types of implant programmes: i) Apprenticeship Training, ii) Burners Training, iii) Miller Training, Crane Driver and Heavy operator Training, iv) Non-graduate training program, v) Junior Level Training, vi) Graduate Engineer Training program, vii) Senior level Management Training, viii) Gear Boxes Training, ix) middle level programme, x) PWO course, xi) Charge hand program, xii) Mines Training, xiii) Burner Orientation Program.

7) Cement Industry **hire outside agency/authority** to develop skills and knowledge in their executives. After 1990's, **management development programme by hiring outside agency or expert become prominent** in the cement industry. This brings the major changes and development in the
functioning of executives higher or middle level manager to handle the job effectively. The focus is to develop general behaviour and managing skills. The study notice analytically the engagement of following agency to develop executives:


8) The present level of employment in the Cement Industry is estimated to be around 2,00,000 by the end of the year 2000 and 2,50,000 by the end of the year 2005. Out of this, about 52% of this personnel are under skilled category. This shows the importance of training and human resources development for Indian Cement Industry. Training needs of the Industry are currently met with by the following organizations:

i) National council for cement and Building Materials through to centres for continuing Education and Human Resource Development (NCB-CCE).

ii) Associated Cement Companies Ltd. through its research & consultancy. Directorate Technical and Management Training Division, CRS. Thane.

iii) Cement corporation of India Ltd., (CCI) through its Training Institute at Nayagaon (MP).

iv) Regional Training Centres (RTC's).

9) i) To meet the requirement of training at post entry level, NCB started need based training-oriented refresher course in 1972, and in 1980 widened its training base by setting up a centre for continuing Education and Human Resource Development to cater a variety of training needs of the industry. The Centre also started PG
course in Cement Technology in 1984. Besides these programmes, the NCB-CEB also organise short-term Refresher courses with emphasis on process optimization etc., Tailor-made Contact Training programme on practice-oriented topics, simulator base course, workers development programmes, special group training programmes.

ii) NCB-CCE so far organized 1500 training courses and more than 25,000 participants have benefited - with a view to imparting training. A modern simulation technique has been adopted with the help of M/s F.L. Smith & Co., Denmark, at NCB Hyderabad in 1988. The simulator is one exhaustive mathematical model and State of art real plant control system. This is still imparting training.

iii) ACC's - Technical and Management Training Division Organises refresher courses in the areas of cement and concrete technology and Industrial Relations mainly to cater to the needs of their in-house personnel at their campus at Centre Research Station. Simulator Techniques, Process organizational development, Grid Development etc. are also used but at very low level and scale to impart skills and knowledge to the executives. Recently, four Regional Training Centres were set up by the Cement Industry under World Bank Assistant Scheme at the following Plants, viz., i) ACC, Jamul Works (MP), ii) Gujrat Ambuja Cement, Vervaal, iii) J.K. Cement Works, Nimbahera, iv) Dalmia Cement Works, Dalmiapuram. However, these are especially meant to meet the training needs of the Industry personnel at operative level.

i) Cement Corporation of India Ltd. (CCI) has established a training institute at its Nayagaon unit. The institute mainly meets the in-house training needs of CCI, both at the operative level or executives and managerial level. The main efforts of the institute are towards organizing induction training programmes for executives, management trainees, apprenticeship training etc.
The Cement Industry are experiencing during the period of study the problems of a high rate of movement of technical staff from one plant to another. New talents, therefore, need to be generated in increasing measure, while the existing talents needs to be updated in order to cope with the emerging technologies/developments. The following recommendations to meet the further requirement of the trained manpower prove to be beneficial for cement Industry. The study found a high rate of employee turnover, which become a major problem in this decade for the cement Industries. The study suggest the following measures to over come thee: i) Introduction of Cement specific courses/trades in ITIs under state governments, ii) A Course on "Cement Manufacturing Technology" to be introduced as one of the electives in polytechnics/training in cement plants, iv) Short-term, refreshers courses covering all technical aspects, v) Practice-oriented workshops/seminars, vi) imparting Techniques, audio-visuals, participate learning techniques, process-consultancy methods; etc.

Selection involved a series of steps by which candidates are screened for choosing the most suitable persons for the vacant posts. As far as the cement Industry's are concerned, the procedure of selecting vary from one unit to another. The number of steps in the procedure and the sequence of step also found different. The public sector in the study adopted proper and fixed selection procedure for selection of candidates. These public sector cement units incorporated a proper procedure for selection. But private sector have designed selection procedure which suits their requirement. The study found after conducting survey that almost the following methods have adopted for selection of candidates: i) Officers: Interviews / promotion / grading, ii) Supervisors: Performance/Grading/Interview, iii) Skilled workers: Assessment Tests and Interview, iv) Unskilled workers : Common Tests and Interview, v) Watch/ward/peon: Interview.
12) In the case of officers and supervisors/technicians in the Cement Industry, the recruitment has been done by committee comprising of CEO/MD, General Manager, Secretary and works manager. The skilled workers recruited/selected by the committee in few cement plants, whereas in few units the selection has been made by the respective departments. The Public Sector recruit and selection the workers according to the established norms of Government. The public sector have not any discretion to select and recruit otherwise. Most of the Cement Company have now a HR department and hand over the task to recruit personnel to this Department. After 2000, the company interested only to retain employees at the higher level, whereas they have the interest only to get the job at the operative level. It seems that contract Management once again come into picture soon in the next door in the Cement Industry.

13) i) Recruitment practices differ from one company to another. Few, Cement Corporation of public sector have centralised recruitment process, whereas other organization have decentralized recruitment particularly in the public sector. Every operating department sends requisition or indents for recruitment to the Central Office. The in turn, Central Office select and recruit workers on the basis of requisition sent by departments/units. On the other hand like in few private cement company, each department/unit carry out its own recruitment in decentralised way. But it has been realized in the study that now decentralisation recruitment has gained importance.

ii) It is hard hitting fact found in the cement companies the absence of a properly planned and systematic recruitment policy which is necessary to minimise disruption of work due to changes in employees and to secure equitable distribution pre-planned recruitment policy based on goals-needs-environment; will be needed in Cement Industry to avoid ill-conceived decisions and help to manning properly.
iii) The cement enterprises employed various recruitment sources in the year 1990. The cement corporation showed variation in recruitment sources in duration of ten year of different occupations. The cement enterprises basically employed new ways of searching workers, i.e., internet and web searching. Call services and placement agencies. But still they heavily relied on advertisement and personal search. Today's cement corporation are using different tactics of recruitment of workers for searching the needed skills and qualities.

iv) The Cement organization employed adopted various modes of recruitment, i.e., internal as well as external. Permanent temporary and causal employees already on the pay role are a good source. Vacancies filled up through promotions, transfers, upgrading and even demotion. Retired and retrenched employees are also considered or hired by few units, whereas in same cases, dependents and the relatives of deceased and disabled employees considered on priority basis by public as well as private sector. The Cement companies revealed to use various types of external sources, i.e. Advertisement, Institution Campus, Placement, Labour Contractors, Unsolicited Applicants, recommendations, call centres, web-calling etc. It looked to use mix of both of these sources.

14) Promotional Avenues at each level/occupation together with the average period required for such promotion has been identified in the study. The dead-end jobs (beyond the Promotional avenues do not exist) have been identified in study i.e., Electrical Engineer, Civil Engineer, Geologist, Medical Officer, Supervisor, Horticulturist, Law Officer, Liaison Officer, Security Officer, Head Master, Painter, Carpenter, Mason, Compounder etc. These are required some promotional practices for motivate employees at these levels; which are not provided by cement companies. As the study concerned, the Cement Company's adopted different criteria of Promotion, the most prevailing base found in the study i.e., seniority cum merit basis.
The result of the study are as: i) **Merit-cum-seniority is the prominent base for promotional.** ii) **Determination of seniority accepted as an important base for promotion among employee next;** iii) **assessment of merit determination found to be next;** iv) **any quota or other factors are not found to be considered for promotion.**

15) **The pay scales in the cement Industry are governed by the Central Wage Board's Award.** The study found that average salary of different occupations in between the period of 1990 to 2000 increased 50 to 100% depending upon the nature of jobs and positions. In between 1990 to 2000, the study also noticed that the cement enterprises put a greater value on jobs and employed **job-based compensation structure** in salary administration. This is the major breakthrough in few cement enterprises. At this time, the pay scales are determined and given according to the prevailing **Central Wage Board's recommendation.** At least, 73 per cent wages and salary are awarded to the **Wage Board's recommendations.** The Grades of the remaining 27 per cent **are fixed by the management.** It has been found a lot of differences in grades between private and public sector specially at managerial levels. It is being suggested that Grades and salary are being revised after every two or three years and the Government of India should have to make a clear policy on wages and Salary Administration in Cement Industry.

16) **The strength of any organization lies in its human resources.** The Indian Cement Industry has a unique record of harmonious industrial relations between labours and management. **Two Wage Board's award in the sixties, two voluntary Arbitration Awards in seventies and eighties and bipartite settlements in 1989 and 1992** have continuously improved the service conditions and emoluments, as the number of employees rise from **about 26,000 in 1960 to 1,35,000 in 1990, 1,50,000 in 1997, 2,00,000 in 2000 and 2,50,000 by the end of 2005.** The increasing strength of personnel over the year showed the importance of development of human resource in Cement Industry.
17) *The industrial safety* gained importance in Indian Cement Industry in the pursuit of an improved *quality of life*. The key to industrial safety lies in designing and effective execution of safety programmes. The Indian Cement Industry are exposed to *health hazards and diseases*, and these are arisen due to *chemical substances, biological hazards, environmental hazards and atmospheric conditions*. The Indian Cement Industry took a note on these and took *preventive* as well *curative measures* against these occupational hazards. It has been required that Indian Cement Unit should have a proper policy and programme to maintain the good health of its employees. This should be required i.e., Adequate emergency care and hospitalization facilities, reasonable first aid treatment, employment of professional physicians and nurses, proper medical examination, health information system, preventive measures' effectiveness etc.

18) The concept of *quality of work life* in Indian Cement Industry has been operationalised through various systems such as job enrichment, worker's participation in management, quality circles, employers welfare etc. while some of these schemes have been successful in improving the quality of work life. These are used to some extent by cement enterprises after 1990 and yielded good results.

19) *Workers spend* a great deal of their *time in Industrial settings*. In Cement Industries, workers are exposed to various types of health hazards. It is essential to ensure favourable *working conditions*, so that the workers can perform their tasks without experiencing physical or mental strain. In recent years, the Cement Industries are paying more attention to industrial health and safety due to the pressure from trade unions, labour laws are enlightened attitudes of employers. the study has found that *working conditions in Cement Industries* improved strategically in the last ten years. The study noticed that the industry has made proper arrangements for proper disposal of Industrial waste. Drinking water, toilets, restaurant and canteen facilities have been provided to the workers. Cement enterprises have been provided adequate and proper lighting for proper
working. The cement enterprises also established a system of proper ventilation and temperature, freedom from Noise, dust control and proper seating arrangements. The cement corporations of today formulated and implemented a policy and programme to maintain the good health of its employees. The study noticed these steps are taken by Cement Enterprises to maintain the good health of its employees:

i) Inoculation and after programmes for the prevention of communicable diseases, ii) Maintenance of adequate medical records, iii) Health education; iv) Proper medical examination; v) Medical check up exposing occupational diseases; vi) Emergency care and Hospitalisation facilities, and vii) Maintenance and supervision of satisfactory sanitation and hygiene conditions in factory/plants,

20) Industrial Workers are exposed to reveal types of hazards and accidents. It is being predicted that every year approximate 20,000 employees are injured in cement plants. Industrial safety measures prevent accidents and ensure regular flow of work. Surveys and studies revealed that whenever safety measures are good, labour productivity is high. Moreover, rules and regulations prescribed under labour laws required cement enterprises to provide certain minimum safety measures to the employees. The cement enterprises formulated and implemented a safety policy. It has been noticed that safety policy of cement enterprises reduce the number of hazardous factors. Cement Industries Workers are exposed to reveal various types of accident due to rapid industrialization, mechanical, electrical and radiation. The sudden spurt in accidental cases took a great toll of cement industry. It should require a clear-cut policy on safety and precautionary structure to avoid accident.

21) Employee welfare involves adjustment of an employee's work life and family life to the community or social life. These measures are also known as fringe benefits and services. These help to counteract the negative effects of the plant. Welfare facilities like housing, medical and children's education, recreation, etc. help to improve the family life of employees.
The Central Government has made elaborate provisions for the health, safety and welfare of factories under the **Factories Act, 1948 and Mines Act, 1952.** The Cement enterprises provide for canteens, creches, shelters, rest rooms, lunch, room and washing facilities, etc. Statutory Welfare Funds have been set up in Cement Industries and mines to provide games, housing, hospitalization, educational, maternity, child care and recreational facilities. This is the new beginning in the era of 1990. Until recently, cement enterprises divided over for the welfare of workers barring a few exceptions. But the situation has considerably improved since them and well-equipped hospital, school gymnasiums, clubs, canteens, crèches and co-operative societies are being provided. The general impression is that welfare amenities in Cement Industry's have not been properly and adequately provided except in the concerns managed by top cement enterprises. Compliance with statutory welfare provisions is half-hearted and inadequate, and welfare standards are distinctly poor.

22) **Social security** is an essential part of public policy in a welfare state like India. The basic purpose of social security is to protect people of small means from risks or contingencies. These contingencies include sickness, maternity, old age, invalidity, unemployment, death, etc., which impair a person's ability to support himself and his family. The cement enterprises also provide in terms of cash or employment to affected persons to compensate for contingencies. The main cement entrepreneurs like, ACC, CCI, Birla, J&K. etc., provided medical care, sickness benefits, retirement benefits, accidental benefits, Family benefits to the employees. These are provided through the following labour laws: i) **The workers Compensation Act, 1923**, ii) **The Employee's State Insurance Act, 1948**, iii) **The Employees' Provident Fund and Miscellaneous Provisions Act, 1952**, iv) **The Maternity Benefits Act, 1961**, v) **The Payment of Gratuity Act, 1972.**

23) The efficiency of employees depends, to a great extent, on the environment in which they work. If the work environment is congenial; fatigue, monotony and boredom are minimised and work performance can be
maximised. The Cement Industries took certain steps as the study noticed for maintaining a great light on working performance in the Production of Cement. The changes and development in this concern are as: i) Counseling have been made to help workers solve their personal problems; ii) unnecessary and wasteful movements of workers have been identified and eliminated with the help of time and motion studies; iii) Design and layout of machines and equipment improved and arranged, iv) working conditions made comfortable in terms of temperature, humidity and noise, v) Rest pauses introduced after certain hours of work.

24) It is essential to promote and maintain discipline for higher productivity and Industrial Growth. Discipline improves morale and labour relations and promotes cooperation among employees. It has been seen in the study that statutory provisions concerning discipline like Industrial Employment (standing orders) Act, 1946, The Industrial Disputes Act, 1947; and the Payment Act have relevancy to maintain discipline. But these code by itself cannot maintain discipline unless the parties subscribing have full faith in it and make an determined bid to observer and follow it. It has found in the study that cement enterprises do not show any concern to these code of conduct.

25) Grievance arises only when an employee feels that injustice has been done to him. This reflects dissatisfaction or discontent or a feeling of injustice; if not redressal timely tend to lower morale and productivity. The Cement enterprises have a procedure for handling employee grievances. In small cement enterprises; the grievance procedure consist of two or three steps whereas in big cement enterprises there are five or six steps. If the grievance remains unsettled it is referred to an outside arbitrator for redressal. Grievances handling procedure or redressal cell in the cement industry only established for show purpose; these are not meeting the true objective of providing justice to employees. It has been noticed in the study that the adequate attention has not paid to handling grievances in cement
enterprises. This should required an honest attempt to handle grievances by the cement enterprises.

26) The **attitudes, feelings and emotions of employees** play a vital role in determining their performance and behaviour. **Morale** building is a difficult exercise as it involves removing misconception, changing attitudes and dealing with emotions. The Cement enterprises took the following steps, which looked to be helpful in improving employee's morality. This is a great attitudinal change in the last decade; these are as: i) **proper work environment**; ii) **Job Security**; iii) **Compensation system**; iv) **promotion policy**, v) **job environment**, vi) **Grievance procedure**; vii) **employee counseling**, viii) **worker's participation**, ix) **social welfare**.

27) **One of the efficiency** means of resolving industrial disputes and deciding the employment conditions in **collective bargaining**. Collective bargaining has not made much headway in Cement Industry in India due to the some reasons; these are as: i) **Lack of strong and Cental trade Unions**; ii) **excessive dependence on compulsory adjudications for the settlement of industrial disputes**, iii) legislation and regulatory bodies like wage boards have reduced the arce of collective bargaining, iv) **multiplicity of unions, inter-union rivalry, political dominance and poor leadership have resulted in weak trade union movement**, v) **conditions of work and life differ widely in country like India**. It has been noticed in the study that collective bargaining only restricted to matters concerning of their interests. It's better to take certain measures to make collective bargaining more effective in Cement Industry.

28) **Participation and involvement** of workers in the management of Industry is practiced in most countries of the world. The study noticed some methods in India, i.e., suggestions scheme, workers committee, Joint Management Councils, Workers-Directors. Few cement enterprises have made arrangement workers representatives to some way, but this is not so successful. In 1983, the Government of India a introduced a new scheme of Participation in Central Public Sector undertakings. But it failed to make
much progress. India, labour laws regulate virtually all terms and
conditions of employment at the work place. Workers do not feel the urge
to participate. There has been lack of initiative on the part of both
employers and Trade Unions. Employers have by an large resisted
worker's participation in decision-making. Mere legislation cannot make it
successful. A true spirit of mutual cooperation and commitment should be
required.

29) The study revealed some impediments in the way of progress of HRD; i) 
India's traditions bound family management and authorization culture
stress profit maximization such as Dalmia Group, Birla Cement Group
etc., Human Resources are viewed as a cost rather than an asset.
Employees are treated still as adversaries not as a partner or
shareholders. This function did not have much importance, ii) The legal
status of Human Resource Manager require them to work mainly in the
areas of welfare, day to day personnel administration and industrial
relations. Personnel Manager cannot have adequate authority to
implement his decision. As the study noticed the HR Manger have only
suggested ways to the top management to deal more effectively workforce
and their proper utilization, iii) HR Personnel officers is Cement
Industry in India have spent a major portion of their time in attending to
disputes and grievances, due to plethora of labour laws and excessive
legalistic approach to labour problems, iv) In Indian Cement
Industry, the personnel executives often adopt a short range perspective
and a rigid attitude. Human Resources approach to personnel
management has not fully developed and changed due to abundance of
cheap labour, technological backwardness, lack of professional
management, politicized Trade Unions, authoritarian culture, traditional
management system etc.

30) The study suggested to develop personnel management in India or to speed
up the growth of HRM in cement or to speed up the growth of HRM in
Cement Industry. in India. Firstly, the institutions such as National
Institute of Personnel Management Calicut, Xavier Labour Relations Institute, Shriram Centre for Industrial Relations and Human Resource
New Delhi, Cement Research Institute, etc. should develop the right values and attitudes for the growth of Human Resource. Secondly, Cement Organization's structure should be so designed as to promote interdependence and mutuality. This calls for a new organizational relationships and different personnel techniques. In many cement corporations, organization hierarchy is lengthened to accommodate professional aspirations of staff. As a result jobs are downgraded and employing professional workers and advanced technology dilutes responsibility, or on the other hand need flat rather tall structure. Thirdly, human relations and managerial roles should adequately supplement the legal and welfare role of personal manager. HR Manger should enlarge their perception about their role. They should consider and function as change agents rather than conventional roles of personnel manager.

In India as well in Indian Cement Industry, the origin of human resource management traced to the concern for the welfare of workers. During 1960's the Personnel function widened beyond the welfare aspect. Three major areas of practice viz., labour welfare, industrial relations and personnel administration emerged as a complimentary part of personnel management. In the 1970's concern for welfare shifted toward higher efficiency. During 1990's the overwhelming role of human factor in industry has been realized. Growing awareness about the significance of human side of organization has led to the development of human resource as a distinct discipline. Now focus on human values and a philosophical approach are likely to provide this discipline a different status.