CHAPTER - 2

REVIEW OF LITERATURE

Construction is one of the largest economic activities in our country. The scope and volume of construction industry has a direct linkage with the size and population of the country. The population of our country is increasing at an astonishing pace and consequently, the need for housing industry also increases. Now a day, the building construction has become a costly affair. What contribute to this high cost are not only the high cost of materials and the high rates of wages prevailing in our state, but also the insane craze of the present generation for the new fashionable frills and designs. Any way, it is a fact that the rising cost has become a menace in the construction industry. Lot of money is being wasted on account of this high cost of operation which directly affects the construction industry and indirectly the overall economy.

The Literature reviews are presented in the chronological order in the following paragraphs.

Beyer (1965)\(^{24}\) states that house is a bulky, durable and permanent product, which has a fixed location being used only in the place where it is built. Once built, it tends to remain in existence for many years long after it has served its usefulness. It becomes almost a part of the land.

In the opinion of Despande, (1975)\(^{27}\) the acute shortage of housing in urban areas is due to increase in population. House building activity has not kept pace with the increase in population. New houses are not built in
proportion to the increase in population, but on account of refugee influx and industrialisation, the number of old houses have been reduced. Despande further adds that the Increase in population increases the problem of managing the limited space available.

According to Rangwala (1977)\textsuperscript{26}, the magnitude of the housing problem in our country is so heavy, that it will require considerable passage of time for the country to offer a sweet home to every family in our nation. In order to fulfill this objective, the concept of town planning is accepted by our nation and accordingly haphazard development of land is restructured to a certain extent.

Bhaskar Rao (1979)\textsuperscript{28} draws the attention of the public and private sectors to housing conditions prevalent in India, growing housing needs in the country and estimates requirements of building materials, land and man power. He also identifies critical areas where policy changes are needed to meet increasing housing needs.

According to Krishnamachari (1980)\textsuperscript{19} the shelter is a basic human need and as an intrinsic part of human settlement is closely linked with the process of overall socioeconomic development. Though a house is essentially a place of dwelling, it also fulfils many important social needs of the household. Besides providing shelter, it creates employment, generates voluntary saving and creates a conducive condition needed for achieving crucial goals.
In the opinion of Naik (1981)\textsuperscript{20} "housing is an essential element of life for most human beings. The modern concept of housing does not limit the idea of housing merely to the provision of shelter.

Housing constitutes a physical matrix in which human interaction occurs. The house that people live in, touch upon every facet of their lives and the society as a whole as cited by Paul S. (1983)\textsuperscript{21}

Harilal (1986)\textsuperscript{29} presents a study on the labour process in the building industry in Kerala. It shows the characteristic features of the transition of the building Industry from the pre capitalist to the capitalist mode of production.

Laurie Baker's Book (1986)\textsuperscript{30} on reducing the cost of buildings is the product of his vast and varied experience. The techniques have been discussed by Baker in the book with suitable explanatory sketches and diagrams. He says that Building houses is a costly business these days. A lot of the expenditure on building houses is on unnecessary fashionable frills and designs. Much money could be saved merely by using common sense along simple, established, tried building practices. Every item that goes to make up a building has its cost. So, one has to be careful about deciding not to do any work that is unnecessary to him.

According to Satyanarayana (1987)\textsuperscript{22} housing is an element of material culture, is one such devices to overcome threats against physical elements or security to lives and serves as an important purpose by making the provision of shelter. It provides a place for the operation of many
human activities. Irrespective of place and time man is using a place of accommodation which is called a house. It helps people to interact within the family and with the outside world.

According to Florman, Samuel (1987)\textsuperscript{8} Civilizations are built by construction efforts. Construction had its rudimentary beginning in the non-literate ages of human antiquity when humans built their first shelters. Each and every civilization had a construction industry that fostered its growth and quality of life. Before steam locomotives and the rail roads, what humans could carry over land was limited to what they could pack onto their backs or mules. This made the engineers to devote their attention for enhancing better modes of transportation. This led to enhance the water transportation system initially, as canals were the primary mode of commerce. Later, construction of rail roads, highway systems, airports etc. have been emerged as civilization improved. Afterwards engineering innovations came together such as safe elevators, steel framing, fireproofing etc. which are new building materials and systems and new construction techniques. As a result, taller buildings began appearing around the country.

As stated in India year Book (1988)\textsuperscript{23} a certain minimum standard housing is essential for healthy and civilized existence. Housing activity serves to fulfill many of the fundamental objectives.

The engineering efforts of humans are recorded by constructed systems to the population of a city. The purpose of those built systems and
structures is to support our civilization. Follett, Ken (1989)\(^9\) says so. Up to and through the renaissance, the engineer or architect was the builder. Engineers in ancient times received their training through apprenticeships and work experience. Very few had any formal education in engineering subjects. Most were artisans or practical craftsmen from humble homes and lacking formal education. Through their work experience they gradually became masters in their profession. The masons with expertise grew to the level of master builder and the master builder answered to the owner and was responsible for both the design and construction of a structure. It was the master builder’s responsibility to hire the other trades and satisfactory completion of a construction.

Wilson and Aslam (1991)\(^{31}\) highlight the problem of housing especially in Kerala. They made an attempt to assess the outflow of money from the state for construction. The financial problems for salaried individuals in relation to investment in housing are also analysed. They suggest a solution to these problems by means of economic house building technique which can bring down cost by 30%.

Kaul (1994)\(^{32}\) deals with a number of building materials and technologies which came up as a result of continuous Research and Development efforts in the country such as utilisation of fly ash, sand, lime bricks, soil stabilized blocks, ferrocement, precast roofs, floors and walling components and use of plastics. He argues that by adopting such
innovative methods of construction, cost of construction will come down and speed of construction will increase.

Narayanan and Mohankumar (1994)\textsuperscript{33} presented a paper analyzing the housing problem from the resource base point of view and attempts to highlight need for evolving contextual technologies that use locally available materials that can act as alternative to the presently popular building materials.

According to C.V. Ananda Bose and K.T. Augusty (1995)\textsuperscript{51} Research Institutions in cost effectiveness have made notable contributions to develop low cost technologies as well as methods and techniques of converting industrial and agricultural waste into useful building materials. Their efforts to popularize low cost techniques and building materials include experimental projects and encouraging low cost building material industries. Such efforts do not seem to have succeeded significantly in creating confidence in the common people about the usefulness of low cost techniques of construction using cheaper materials produced or obtained locally. However in order to transfer the cost effective techniques from lab to field dissemination of information on their usefulness, cost effectiveness and durability should be adequate enough to reach the potential beneficiaries.

According to Sengupta (1995)\textsuperscript{34} agro wastes can very well be utilized for the construction of buildings in order to reduce the costs. He introduces some building materials and composites from agro-wastes. He
also stresses the point that techno economic feasibility of manufacturing and building materials or components from agro wastes depends largely on the collection and delivery system adopted.

Zacharia George and Parameswaran Nair (1995)\textsuperscript{35} opine that Cost effectiveness and friendliness to environment are mutually interdependent. At the same time, the cost effective technologies should be adopted in such a way that the buildings remain structurally safe for a long period. The depict a detailed picture of various alternative cost effective building techniques and materials like 30cm rubble masonry, rubble filled concrete blocks, soil cement blocks, Cavity wall construction technique, ferrocement door and window frame, filler slab etc... which are being used for the construction of buildings and which are developed by continuous research and development.

According to Lelithabhai K.N (1995)\textsuperscript{45} the massive volume of housing activity in Kerala has an impact on the wider economy, ecology and society. The impacts of the construction boom in the environment are increasingly manifest in the ecology of the region. The soil erosion and landslides have become regular features in the highlands during the monsoon season. A significant portion of the exploitation of nature owes its origin from the demand of the housing sector for timber. The unregulated sand mining in the mid and low land regions has caused heavy damage to the river eco system. Likewise, the clay mining deprives agriculture of fertile soil and thereby causes water logging and related problems.
Production of tile, ceramics and kiln burnt bricks requires large amount of firewood, a commodity in short supply. All these evidences prove that the increased rate and changed pattern of house building has resulted in the overuse of natural resources.

As stated by Sweta Misra (1996)\textsuperscript{25} the importance of housing was universally recognised from the dawn of history. With the advancement of knowledge and civilisation man became particular about sanitation, environment, privacy and location of the house. He became conscious of better facilities which make his life easy and comfortable.

Managerial Planning and Decision making are also the two aspects which the top level management should pay increased attention for better Human Resource Management, especially in building construction industry. Fisher, Schoenfeldt & Shaw (1997)\textsuperscript{7} also share the same opinion. According to them, Planning is very important even at the time of formulation of project. The appraisal and reward system that emphasize quality which is made by HR practitioners is necessary in order to support the competitive strategy. They argue that HRM improves performance wherever there is close vertical fit between HRM practices and the company’s strategy.

Till the recent past, all the Civil Engineering projects were labour intensive. In those days management laid emphasis on the proper utilization of labour force to get optimum progress in the construction in the most economical manner. Though due to technological advancements,
new dimensions have been added to the construction industry by mechanization, the influence of Human Resources aspects in the generation of output in the construction industry cannot be neglected. Rao & Narayana (2000)\textsuperscript{3} says that Human Resources are the most important resources in any organization. If an organization is lacking competent and conversant people at the Managerial as well as operational levels, it will be extremely difficult to achieve the preset goals and even the existence of the organization will become doubtful in the long run. It is the Human Resources that run the organization with their work, talent, creativity and drive. Human Resource Management (HRM) is the strategic and coherent approach to the management of an organization's most valued assets. The people working there individually and collectively contribute to the achievement of the objectives of the business. Human Resource Management (HRM) can be considered as a more innovative view of workplace management than the traditional approach. Its techniques force the managers of an enterprise to express their goals with specificity so that they can be understood and undertaken by the workforce and to provide the resources needed for them to successfully accomplish their assignments. People are in fact the vital resources in any organization whether they are at the managerial level or operational level. The HRM techniques when properly practiced are expressive of the goals and operating practices of the enterprise as a whole.
In order to increase the knowledge and skills for doing a particular job, training is needed. It bridges the gap between job need and employee skills, knowledge and behaviours. According to V.S. P. Rao (2000)\textsuperscript{38} training is the act of increasing the knowledge and skills of an employee for performing a particular job. The major outcome of training is learning. A trainee learns new habits, refined skills and useful knowledge during the training that helps him to improve performance. Training enables an employee to do his present job most efficiently and prepare himself for a higher level of job.

According to a study of SEWA (2000)\textsuperscript{13} the female construction workers had no job security. Coupled with this, their occupational risk factor was extremely high due to innumerable accidents resulting in temporary or permanent disabilities. They were doubly affected due to lack of insurance coverage along with loss of wages for the entire period of disability recuperation. Their wages are low and they are even being exploited by the contractors. The majority of the construction workers are not organized; and the local construction labour suffered from chronic unemployment due to the availability of large numbers of migrant workers who are willing to work at lower wages.

The study revealed that the majority of women workers work as head loaders on construction sites; 90\% of women workers surveyed were unskilled labourers, while a nominal 10\% work as semi-skilled labourers, mostly assisting the male masons.
The women workers said they did 9 main types of work on the construction site whereas their male counterparts were engaged in 21 different construction related types of work. A key finding of the study was that almost all the women workers were engaged in unskilled jobs like manually carrying/transferring construction materials.

Bhattacharya and Deepak Kumar (2002)\textsuperscript{41} opine that rewards both financial and others are of obvious importance to employees and employers. One of the central changes that HRM has brought about in management thinking is that it is no longer enough for employers to think in terms of the old common law principle of a fair day's pay for a fair day's work. Despite some interruptions of motivation theory that seem to play down money as a motivating factor, at work, most organizations behaves as if they believe that money certainly does motivate people. Most of the modern management experts are viewed as the leading advocates of the view that money is not a motivator.

For any organization it needs to pay keen attention to the human resources aspects for better performance and output especially for an organization engaged in building construction. According to Man Mohan Prasad (2003)\textsuperscript{5} the management of human resources is very important in any modern organization because management can achieve organizational objectives only with the co-operation of the people working in that organization. The predetermined objectives can be achieved only by the right kind of people. If the people do not work in an efficient and effective
manner, the management will not be able to accomplish the desired objectives. The formulation of an effective HR policy and managing the policy in the right way is one among the basic requirements of any organization. Man Mohan Prasad also says that if an organization adopts certain best practices in HRM, it will result in better organizational performance. The best practices for achieving competitive advantage through people are providing employment security, selective hiring, extensive training, sharing information, self managed teams, high pay based on company performance and reduction of status differentials. The basic premise of the academic theory of HRM is that humans are not machines; therefore it is essential to have an interdisciplinary examination of people in the workplace.

As M.C. Shukle,(2003)\textsuperscript{6} rightly said that Management means getting things done through other people, it is obvious that in order to be successful in operation, an organization must ensure a consistent supply of sufficient number of capable employees. Allocation of human resources is arranged under the staffing function in Human Resource Management. The HRM function includes a variety of activities, and key among them is deciding what staffing needs to have and whether to use independent contractors or hire employees to fill these needs, recruiting and training the best employees, ensuring they are high performers, dealing with performance issues and ensuring the employees personnel and management practices confirm to various regulations. Regardless of the
size of an organization, or the extent of its resources, the organization survives and thrives because of the capabilities and performance of its people. The organization should take all steps to maximize those capabilities and performances of its employees in order to achieve its goal. Those activities are the responsibility of all people in the organization. Thus the future of any business depends more on the people in it than on any other single element.

According to Vankar Purshottam (2005) building or other construction worker’ and ‘building worker’ are defined widely. “Building or other construction work” means the construction, alteration, repairs, maintenance or demolition of buildings, streets, roads, railway, tramways, airfields, irrigation, drainage, embankment and navigation works, flood control works, oil and gas installations, tunnels, bridges, aqueducts, pipelines and such other work as may be specified in this behalf by the appropriate Government, by notification but does not include any building or other construction work to which the provisions of the Factories Act, 1948 (63 of 1948), or the Mines Act, 1952, apply. Whereas, ‘Building worker’ means a person who is employed to do any skilled, semiskilled or unskilled manual, supervisory, technical or clerical work for hire or reward, whether the terms of employment be expressed or implied in connection with any building or other construction work but does not include any such person – who is employed mainly in a managerial or administrative capacity.
K. Aswathappa (2006) says that Human Resource Management (HRM) is a management function that helps managers recruit, select, train and develop members for an organization. HRM is concerned with the people’s dimensions in organization. The scope of HRM is indeed vast. All major activities in the career life of a worker or manager – from the time of his or her entry into an organization until he or she leaves – come under the purview of Human Resource Management. The term Human Resource Management (HRM) has largely replaced the term Personnel Management (PM). HRM differs from PM both in scope and orientation. Human Resource Management (HRM) views people as an important source or asset to be used for the benefit of organizations, employees and the society. It is emerging as a distinct philosophy of management aiming at policies that promote mutuality-mutual goals, mutual respect, mutual rewards and mutual responsibilities. Personnel Management (PM) has a limited scope and an inverted orientation. It viewed labour as a tool, the behaviour of which could be manipulated for the benefit of the organization and replaced when it was worn out. Personnel function was treated as a routine activity meant to hire new employees and to maintain personnel records.

According to Bittel and Ramsey (2006), Training and Development makes a demonstrative difference in the ability to meet the new competitive standards. Its impact can be measured at several levels in the economy, the organization and the employee. The Training and development is
essential to cope up with and even surpass the challenge posed by the environment. So that organization can remain competitive and survive. Training and development programmes are needed for organization of all sizes, all types and all levels. Training and development is essential to organizations that seek to gain a competitive advantage through a highly skilled and flexible workforce, and are seen as a major element of high productivity and quality performance.

Employee reward is about how people are rewarded in accordance with their value to an organization. Armstrong Michael (2006) is concerned both financial and non financial rewards and embrace the philosophies, strategies, policies, plans and process used by organizations to develop and maintain reward system. Michael Armstrong says that an employee reward system consist of an organisation’s integrated policies, processes and practices for rewarding its employees in accordance with their contribution, skill and competence and their market worth. It is developed within the framework of the organisation’s reward policy, processes. Practices, structures and procedures which will provide and maintain appropriate types and levels of pay, benefits and other forms of reward.

Reward for incentive wages have been defined as the extra compensation paid to individual for all production over a specified magnitude which stems from his exercise of more than normal skill, effort or concentration when accomplished in a predetermined way involving
standard tools facilities and materials. Chaudhari K.K. (2007) says that wage incentives are extra financial motivation designed to stimulate human effort by rewarding the person over and above the time rated remuneration for improvement in the interest of targeted results. A reward plan may be redesigned to provide extra pay for extra performance in addition to regular wage for a job.

Raymond A. Noein (2007) asks a relevant question “Is this the way to manage human resources?” He explains that traditionally, the formal performance appraisal system was viewed as the primary means for managing employee performance. Performance appraisal was an administrative duty performed by managers and was primarily the responsibility of the human resource manager. Managers now view performance appraisal as an annual ritual. Most of the managers and employees dislike performance appraisal. The major reason for this dislike includes the lack of ongoing review, lack of employee involvement, and lack of recognition for good performance.

According to G. Subramanyam, V. Krishna Mohan and V.V. Varaprasad, (2008) career planning is the process of deciding the future course of action by the fulfillment of set objectives, both short term and long term in order to realize the ambition of an individual. Career begins with education and career planning begins with the selection of the course of study for a prosperous career. It helps the individual to explore, choose and strive to derive satisfaction with one’s career objectives. Career
planning thus includes assessment of occupational and career choice, self assessment and individual development, if necessary, through formal training and development programme.

According to B.L. Gupta and Amit Gupta (2008)\(^1\) the construction activity has taken the shape of an industry of multiple activities. A single individual cannot do all the activities, so he joined hands with other people to achieve his goal. As time passed by, the idea of organized management gradually evolved. Thus, Management is an organization in which different class of people work together to produce qualitative and economical products with the available resources such as capital, material and equipment.

Management is an art of arranging various activities and group of people to achieve a common goal. Hence, Management is a sort of administration, whose function is to plan, organize, control and coordinate the use of resources to achieve the desired goal. As the construction is critical to improve the standard of living of the people, it needs to be faster, active and cost and quality conscious. In the recent past, construction activities have increased manifold, becoming progressively more complex and capital intensive. Thus the expected growth of construction work demands sophisticated managerial talent to manage projects effectively.

As per a report of the Behavioural Science Centre, Ahmedabad(2009)\(^{11}\) the labour studies have started differentiating between labours (unskilled or semi skilled) and workers (skilled) based on skills,
wages earned, working hours, temporary nature of work, ability and opportunity to negotiate wages in existing the market. The term building worker incorporates different types of workers – skilled and unskilled engaged in different works like construction, loading and unloading, masonry, plastering or decorating with plaster of paris (PoP), colour work and so on. To know about their living conditions, it is important to cover different types of workers at different places with their ability as skilled or unskilled workers and the wages earned.

S. Seetharaman (2009)\(^2\) says that the present day construction projects are becoming more complex and costly as compare to the previous times. This complex nature places a heavy demand on the management skill of those involved in every phase of the management of construction work. Such management skill is rarely a part of an Engineer’s early education or training. Present day Engineering education doesn’t orient the engineers to the many aspects of construction sector. It doesn’t touch upon any management subjects such as management of resources, management of equipment etc. This situation has to be changed. A civil engineer should be trained not only in the concerned engineering realm but also in the management areas also in order to have proper coordination between different agencies engaged on the work. The knowledge in Construction Management also helps to effect economy in the cost of construction by adopting new techniques of construction and supervision, to check the wastage of materials and labour, to arrange the completion of
the work in the minimum possible time duration, to improve the quality and speed of work by adopting modern equipment and machinery. It goes without saying that proper construction management education provided to young engineers will go a long way in increasing the efficiency of the construction industry in the years to come.

Tapomoy Deb (2009)\textsuperscript{37} says that training and development ensures that the organization has a people with the correct mix of attributes, through providing appropriate learning opportunities, motivating people to learn and enabling them to perform the highest level of quality and service. Thus, the particular objectives of training are to develop the competence of employees and improve their performance.

As per a study of CWC (2010)\textsuperscript{15} a majority of construction workers are unskilled, migrant, casual and male with long working hours, wages below the legal minimum, late or even non payment of wages. There were inadequate amenities of sanitation, water, canteens, and crèches on site. Across the sites, on an average one toilet was available for 114 workers. There were a lot of compromise on safety equipments, procedures and awareness.

The product required by any construction contract is a manufactured product: a building, road, factory, church or office building built in response to the needs of the customer. Knutson, Schexnayder, Fiori & Mayo (2011)\textsuperscript{10} are of the said opinion. The argument that the construction industry is a service industry is not true. Contractors must serve the
needs of their customers, but the product of construction is not a service, it is a product, properly built in accordance with the plans, specifications and expectations of the owner. Every one is impacted by the construction industry. All citizens need the construction industry. One cannot manufacture products such as computer chips outdoors on in temporary facilities. One needs offices, hospitals, manufacturing facilities and stores, roads and bridges, airports, water supply and communication facilities and other facilities that make up the built environment. Thus construction has significantly changed the quality of every one’s life. The construction industry can be visualized to be organized into four categories of construction; residential, commercial/institutional building, industrial and heavy civil and high way. The major participants in the industry, in addition to the owners of the projects, are the general and specialty contractors, designers, construction managers, trades people, insurance companies and materials suppliers. Thus construction is a team endeavour and the people skills are the key to success. The accomplishment of the great civil engineering works requires the massing and management of large labour forces.

According to Mobile Creches (2011)\textsuperscript{14} in India, the construction industry is the second largest employer, after agriculture. It consists of largely unorganized workforce (89%), of whom majority (3/4th) is unskilled. In terms of national investment, almost 40 to 50 per cent of the National Plan outlay is on construction. The industry contributes to 20 per
cent of the GDP. The booming construction industry and real estate market provides a sharp contrast to the plight of the workforce involved in construction. The boom 'pulls' a large number of workers into the cities. The workers, mainly distress migrants, with low level of literacy and skill are organized by labour contractors called jamadars whose motivation is a daily commission from the wages of workers he is bringing to the city. The migrants are approached by the jamadars or by other villagers and family members through informal information networks. The migrants continue to migrate in groups and most of them with the same or a different jamadar. The first time migrants are from villages, but after that they migrate from one city to another or from one site to another site within a city.

According to Ella Abbott (2011)\textsuperscript{16} Housing shortages is one of the most difficult and challenging issues we are facing these days. Most of the people cannot hope to afford even the cheapest houses available in the markets. There has been tremendous activity in the housing front both in the public as well as in the private sectors. But these housing programmes are hampered by a number of limitations. The lack of adequate finance for keeping pace with the growing demand for shelter is one of them. People are keeping some sort of prejudices towards certain materials like cement, steel and bricks. These materials consume lot of energy, which again is a scarce item in the state. Increasing demand made on these materials not only leads to the scarcity of materials but also resulted in steep prices. To reduce the problem of housing, measures
have been taken to develop alternate, cheaper and durable building materials based on locally available resources and conditions. Since the application of these technologies and use of locally available materials depend chiefly upon their acceptance, the co-operatives as well as individuals and groups should play an active role in their promotion.

According to Ham Singh O. & P.R. Sreemahadevan Pillai (2011)\textsuperscript{17} Cost effective technology means, from the given resources of funds, materials, land and skills, one should be able to build the maximum number of houses of good quality at an affordable cost. Various research organizations such as Nirmithi Kendra, COSTFORD, CBRI, RRI have made notable contributions for developing low cost technologies such as fly ash bricks, sand lime bricks, cellular concrete, dry - hydrated lime pozzolona and rice – husk ash pozzolana as binding agent which are not only cost effective and eco friendly as most of them are produced from industrial wastes.

Suvarna S. Lele (2011)\textsuperscript{18} says that about half of total investments in our country goes to construction sector. About 90% of investments in this field come from private sector. Construction costs in India are increasing around 50 percent over average inflation levels. This cost increase is due to increase in costs of essential building materials such as steel, cement, bricks, timber and other inputs as well as cost of labour. Economically weaker, low income groups and lower middle income groups cannot afford these increased rates. It becomes necessary to
adopt the use of alternative building materials and construction technologies to save the scarce resources. This may be done by upgradation of local technologies using local resources or by application of modern materials and techniques. As per thumb rule about 80% of cost of a typical house is on material component and balance 20% is labour component. This ratio needs to be changed as targeted population can spend more on labour but less on materials. Hence an approach is required where people can be trained to construct their own houses by using self help or their own labour.

Kumar Suneel (2011)\textsuperscript{44} finds that there is significant difference between level of motivation among management teachers, engineers, chartered accountants, marketing executives and other knowledge workers working in different occupations and organizational set ups. The research concludes that perception of job characteristics, importance of job characteristics and satisfaction with job characteristic are positively correlated to each other. These three variables are further positively associated with the level of motivation significantly. It is evident from the study that the level of motivation among different groups of knowledge workers is dependent upon one or more combination of variables namely perception of job characteristics and importance of job characteristics. Total motivation of an employee is based on intrinsic and extrinsic motivation taken together. The magnitude of motivation can change in accordance with changes in any of these two.
Muhanna Shamon (2013)\textsuperscript{46} says that there are large amounts of materials used and energy consumed during the construction and operation of an average building. So, one of the growing areas of interest for many environmentalists is the implementation of green technologies when constructing new facilities in order to make buildings that are more energy efficient and have less impact on the nature environmentally during operation. The World has much to gain from exploring green concepts in the design and construction of buildings with the goal of decreasing the world’s demand on energy and non renewable resources. One of the major benefits of green buildings is that they require less energy to operate. This has the effect of lowering energy costs and reducing dependence on the local utility. Some technologies may have a higher initial cost than the conventional alternatives, but the increased efficiency of a green building can offset this cost over the lifetime of the building.

Chittaranjan Nayak (2013)\textsuperscript{47} opines that providing affordable housing to people is a challenge around the world, especially in developing countries. Local soil has always been the most widely used material for earthen construction in India. Approximately 55\% of Indian homes still use raw earth for wall constructions. Compressed or compacted earth blocks overcome the limitations of mud wall like water penetration, erosion of walls at plinth level, attacks by termites and pests, high maintenance requirement and low durability. Mechanical compaction of soil improves the block density. Compressed Stabilized earthen block is compressed
block of mixture of sand, cement, gravel with soil and locally available materials. Using of Compressed Stabilized Earthen Blocks has the advantages of technical benefits such as minimizing the need for importing building materials, reducing transportation cost and ensuring product availability, social benefits such as application of existing or easily transferable skills, avoidance of costly training, minimizing displacement of labour, economic benefits such as reduced dependence on outside sources, ensuring low cost alternatives and requiring limited capital investment.

According to Krishna Bhavani Siram & Arjun Raj (2013) a Green Building is an environmentally sustainable building, designed, constructed and operated to minimize the total environmental impacts. The Green Building Index is recognized green rating tool for constructions to promote sustainability in the built environment and raise awareness among various groups in construction industry and the public about environmental issues and our responsibility to the future generations. It is claimed that 5% of the world’s carbon di oxide emission is attributed to cement industry, which is the vital constituent of concrete. Due to the significant contribution to the environmental pollution, there is a need for finding an optimal solution along with satisfying the civil construction needs. Apart from normal concrete bricks, Foam concrete is a new innovative technology for sustainable building and civil construction which fulfils the criteria of being a Green Material. Foam Concrete can be an effective
sustainable material for construction and it can be used as a building material in comparison with Clay Brick for better cost effectiveness. Prajakta Deshmukhi & Attar (2013)\(^4\) state that there is utter need of development of suitable low cost housing system so that people can satisfy their shelter need. As low income group people can not bear to satisfy cost of conventional construction system, there is necessity to decrease cost of construction with the help of an eco-friendly as well as affordable construction system. Considering all these problems, bamboo is suitable solution. As bamboo is naturally available material, it can be traditionally used by mankind. Due to lack of technology and awareness about bamboo, people are not using bamboo in construction of houses. Nowadays, construction industry has many burning issues like disposal of construction waste, wastage of material which causes financial loss, labour problem etc. As bamboo is traditional and an eco-friendly material, it has zero waste and it does not require skilled labour therefore, does not arises problem of disposal of waste and requirement of skilled labours. Bamboo housing is very economical as well as necessary in the present day scenario. Therefore, while thinking about affordable housing, bamboo is an important source of raw material which can be cultivated by local farmers. Bamboo requires less energy for production as compared to material such as steel, plastics etc... Also bamboo is useful for reduction of green house effect as well as it has highest growth rate up to 90
cm/day. Bamboo absorbs maximum percent of carbon from an environment.

Sushil Nikam & Attar (2013)\textsuperscript{50} say that the shortage of housing in developing countries motivates the search for low cost materials that can be applied in the construction of affordable houses for poor people. Many researchers have been studying the application of the locally abundant natural materials as building materials such as mud blocks, natural fibers reinforcing soil or cement etc. In recent years the demand for structural wooden products for building materials has increased with increasing construction of housing. On the other hand, the quantity and quality of wood resources from the forest have been decreasing. Consequently, the search for substitute materials in place of the traditional uses of wood has been renewed by Bamboo. In particular, is considered a promising alternate material because of its fast growth rate, short rotation age, and high strength.

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