CHAPTER 2 QUALITY MANAGEMENT IN CONSTRUCTION INDUSTRY

This chapter discusses the literature on Total Quality Management (TQM) in construction industry. This includes the impediments in implementing TQM in construction industry. Problems faced by the Indian construction sector in this area are also examined.

2.1 INTRODUCTION

The significance of quality of work in construction industry has been highlighted in recent years. The finished product in any industry should be manufactured to a required standard - One that provides customer satisfaction and value for money. The need for achieving quality of the finished product in the construction industry is no less than in any other industry. The high cost of building makes it necessary to ensure quality of finished product.

Traditionally, businesses performance was judged on a singular measure - Profit. This outlook can create long-term problems if sufficient attention is not given to the main enabling factors such as resources, processes and people. As a result of the management concentrating upon this single measure (profit maximisation), it may neglect to invest time and money in the development of these key success factors. For obvious reasons, managements should think of adopting a much broader stance which accommodates focusing upon the enablers and the integrity. These, will then ensure the achievement of the desired end result. This broader perspective is provided by Total quality Management (TQM).

2.2 CONSTRUCTION INDUSTRY IMPEDIMENTS.

Within the construction industry, there exists a set of resistance factors which may be perceived as specific to the construction industry’s adoption of holistic TQM. This dysfunctional set may be considered as containing five broad sub-headings 8

1. Product Diversity – This deal with the nature of finished product i.e. each building constructed is unique. Juran’s duality of quality9 may prove to be an implicit barrier to TQM’s success within the construction industry. Quality is seen
as consisting of those product features, which meet the needs of the customers and thereby provide product satisfaction, supplemented with a provision of freedom from deficiencies. The construction industry's customer needs are primarily a basic necessity i.e. provision of units of shelter or production facilities. Therefore product satisfaction is a highly personalised subject to various definitions and of course, susceptible to time. The freedom from deficiency has to be quantified depending on context. i.e. deficiencies in construction of a dwelling unit is realms apart from the deficiencies of products manufactured in a controlled and continuously monitored factory process.

2. Organisational Stability – This is supported by the consistently high number of organisational collapses in the construction industry primarily due to poor cash flow management. The entire relationship between the construction organisation’s head office and the site(s) may also act as secondary force on organisational stability. The life of the site is directly limited by contractual obligations and teams specially framed for the project may cease to exist with the end of that contractual obligation. Other relationships with vendors, subcontractors, in-house human resources are all subjected to review at project completion. No such dramatic change occurs at head office where the emphasis has shifted towards securing other projects.

3. Holonic Networks and Change- This implicit in the very nature of construction industry. Projects are seldom situated in the same location and still predominantly labour intensive, work force tend to be transient and demand fluctuations subject to the client’s perception of the value of the construction project. Also planning of future output is a haphazard affair and prone to cyclical trends which are in themselves heavily influenced by the forces outside of the control of the construction organisation and industry eg. Govt, policies. The procurement systems derive the generation of holonic networks which are short lived, the repeated creation of new networks for each project diminishing the value of learning experiences gained in previous projects.

4. Contractual Relationships: Majority of the projects executed within the construction industry will be carried out under some standard form of contract.
The building will not be free from defects nor of the highest possible quality, only acceptable to the persons inspecting. The contractor is placed under the financial obligation to make good these defects in order that retained monies may be released. However, many contractors fail to make good the defects, simply writing off the retained sums as being lower than return costs. This practice reinforces the perception that quality costs. Baden Hellard\textsuperscript{11} argues that the cost of quality may be considered as the sum of the costs associated with conformance to requirements and costs associated with non-conformance to requirements. Thus the construction industry's costs are being compounded by prevention and appraisal costs coupled with non-conformance costs.

5. Teamwork and Management Behaviour - This is the more cogent factor in establishing the success of TQM in the industry. The execution of project obligations demands that human resources be brought together to form the semblance of a coherent team. These teams are formed at both conception and execution stages of the project and thus their very nature is constrained by the life span of the project. While teamwork may lead to the determination of many key issues, it is vital in the management of continual improvement. Generally teams go through four stages: forming, storming, normalising and performing. In the construction industry we see a fifth stage: mourning. Mourning for the success which has gone before. Without teamwork, conflict situations may be more common or pronounced- this lack of teamwork being reflected in the finished artifact.

Projects in the construction industry are affected by time and cost overruns. As a result, the industry has become an adversarial business. Changes can be effected through the effective implementation of TQM. However, organisations in construction industry have eschewed implementing TQM practices because short-term benefits are relatively minimal.

Construction industry is project based and comprises highly differentiated, fragmented and loosely coupled supply chains. These can make the management of quality a difficult and arduous task for all. Every organisation that contributes to a project is a customer. Consequently, improvements in project performance may can
occur only if all involved in the supply chain (customers) become quality focused. The organisations in the supply chain include main contractors, architects, quantity surveyors, engineers, sub contractors, suppliers and the client.

Company wide quality management has become a serious concern for business all over the world. However, in the construction industry, the application of quality management concepts and tools has been more difficult due its reactive nature and the complexities of the construction process. While implementing the QS process cultural and operational barriers were observed. Some of these could not be surpassed and notably affected the success of the processes.

**Fig. 2.1 Quality Management in Construction Industry - Barriers**

The most important barriers faced by the contractors are:

1. Concepts of total Quality System are sometimes not familiar to the contractor’s personnel. It is essential that the contractor’s personnel at all levels are imparted proper training and they are convinced of the benefits of implementing QS.

2. In several cases it is seen that the objectives of the system are not properly communicated to all levels of the organisation. As a result, personnel at certain levels are seen seldom committed to these concepts.
3. Several organisations have their controlling office situated far away from the work site. Hence there is possibility of unlinked implementation of process between the main office and the site.

4. It is often necessary that organisations implementing QS function in a structured manner. Lack of a well-defined organisational set up will make it difficult for the proper implementation of the process.

5. Any quality system to succeed needs real commitment, leadership and interest of the company’s top management. This is found lacking in several organisations. It is often seen that although the QS has been implemented in the organisation there exists lack of interest and commitment of the site personnel. This reflects in the overall successful implementation of the process.

6. Construction projects are known for its size and variety. As such, the scope and definition of the QS should be clearly spelt out in each case. Often, due to inexperience only general scope is defined. This applies limitation in the success of the system.

Barriers faced by the project managers at the construction site:

1. Due to the insufficient knowledge of project documents, the project managers have to face various problems during the implementation of the project. This includes improper handling of the inventory, supplies as well as late detection of design quality problems. This leads to an impaired output/product.

2. There seems to be shortage of qualified personnel on quality and QS in the construction market. This shortcoming is very much significant at all levels of the stakeholders of the construction market.

3. Involvement of personnel at different levels of the organisation is a must during the preparation of quality manuals. Absence of the above is found to cause deficient knowledge about the different operational as well as administrative procedures. Proper implementation of the process implies the involvement of designers, suppliers and sub-contractors in the same. But lack of awareness about QS in the construction market makes it difficult for the smooth conduct of the project.
4. In certain cases, it is seen that all the site personnel are not fully supporting the implementation of the quality system in the project. Bad attitudes towards the system’s application have a bad impact on the successful completion of the project.

5. It is a common phenomenon of the human beings not to accept a new system from the conventional system due to the presumption that it may require extra efforts. So there is the possibility of natural rejection of the system due to the extra efforts that its implementation may call for.

6. Normally, the procedures are systematically laid down in the company’s quality manual. Each and every person has to have thorough knowledge about these procedures.

7. Any quality system based project focus mainly on cost, quality and above all – time. Projects are required to be completed in the stipulated time at the minimum cost. In the above situation the project manager often tend to let loose the quality procedures.

The barriers faced by the owner’s staff:

1. It is imperative that the procedures as per QS have to be abided by the owner’s staff as well. But, often it is seen that the owner’s personnel reject the implementation of the system possibly in fear of high cost or time over run.

2. It is seen that due to the lack of knowledge about QS there exists improper management of changes and supplies. This in turn affects the owner/contractor relationship.

3. For the proper implementation of the process, there has to be teamwork. This is seen evidently lacking due to the improper training given to the contract administration team.

4. Although the main parameters of project management namely quality, time and cost are well defined, failure to impose efficient control over these parameters ultimately hinders the process.

5. There has to be clear-cut objectives and procedures laid out in the quality manual. When this is not properly defined or communicated within the organisation, there occurs misinterpretation of objectives. Sufficient rapport has to be ensured.
between owner and contractor. In many cases, a sufficiently good relationship does not exist between the owner and contractor.

2.3 INDIAN CONTEXT

The activities of Quality Assurance in most of the Indian construction companies have been limited only to meet the technical specification of the final product with a strong dependability on the owner’s inspection. However this approach is changing rapidly and several owners are now transferring the responsibility for quality assurance to contractors. This situation has forced construction companies to make efforts to implement quality systems in their projects.

Therefore several shortcomings have to be overcome in the management of quality in project implementation in India\textsuperscript{13,14}. These include

1. The practice of changing the drawings, specifications, etc. throughout the period of the project.

2. Incomplete specifications developed / specified during the tender stage, causes changes to be made later on, which results in escalation in cost and changes in work organisations ultimately leading to failure of quality control systems.

3. The concerned personnel are not fully conversant with the quality parameters, its documentation and techniques. This will affect effective control and supervision.

4. There also exists unstructured information systems and reporting systems, non co-ordination of consultants, poor rapport between client and contractor, and lack of formal communication systems.

5. It is seen that within the management team of the client and between the project team and of the contractors, there is unclear delegation of responsibilities.

6. No training is being given to the supervisors, engineers, technicians, contractors, operators and labourers on quality systems.

The construction quality expectations of Indians vary in a very wide spectrum. This country with a variety of culture, language, religion and taste exhibits this variety in quality expectations as well. The quality system designed should take care of these regional imbalances and variety. Development of quality plan for each region calls for extensive studies on the quality expectations of the people (clients) in that particular
sector. Organisations in the field of construction/housing like the Nirmithi Kendra need to take special care of this aspect for their continued survival.

2.4 PROBLEMS FACED BY INDIAN CONSTRUCTION SECTOR

While we say about the tremendous scope of the construction sector, it is felt appropriate here to mention the problems as well faced by this sector. The problems identified are as under.

1 Sector - unorganised/Scattered

No specific qualification is required to start a construction business. A little bit of grit and connections gives birth to a contractor taking up independent jobs. It is scattered in the remotest areas wherever construction is required. The major portion of this sector is therefore unorganised and scattered through the country.

2 Regulatory framework

There is no regulatory framework or entry barrier for construction though during these days infrastructure activity has caught Government attention where major portion involved is construction.

3 Non-availability of data/cost indices

Non-availability of data/cost indices is basically due to the activity being unorganised and scattered. Some efforts have been made by agencies like NICMAR but there exist apprehensions regarding its authenticity.

4 High financial cost

With the opening up of economy, Indian construction companies have to compete with multinationals both at the Indian soil and foreign soils to win contracts. The multinationals have access to cheaper funds at rates as low as 3 to 4% against high interest rates prevailing in India. The bank guarantee commission is very low (1%) in most of the foreign countries whereas this is about 3% in India. It is welcome that the trend is gradually changing in India as well.

5 Inadequate finance by banks and institutions

The quantum of finance provided by the banks and financial institutions to the construction sector is comparatively low and quite inadequate.

6 Inadequate professionally trained staff
Modern construction activity is complex and requires trained and qualified staff. Even though technical training facilities are being established at larger pace, facilities to infuse professionalism are still lacking.

7 Low level technology and mechanism

In India only a very few companies have been able to acquire the latest technology and state of the art construction equipment to compete with multinationals. These companies also face problems due to under-utilisation of equipment, non-availability of trained operators, and high cost of equipment, spares and maintenance. Another factor is tender system of awarding contracts on lower cost basis. Thus the contractor often prefers cheap labour than machinery and equipment.

8 Litigation/arbitration

The longer gestation periods and the absence of standard terms and conditions of agreement documents leads to litigations and delays in the completion of projects and escalation of cost of construction.

9 Documentation and legal framework

The clauses in the contract documents often are heavily loaded in favour of the owner. The standard clauses include penalty payments by contractors for delays and non-observance of agreement clauses, but failure on the part of the owners in compliance of the contract clauses does not attract any penalty. Similarly there is no separate legal framework for litigations arising between the owner and contractors to take fast decisions. With the result, the construction work is either delayed or is held up leading to cost escalation.

10 Industry status

Almost 95% of the total investment in construction sector at present is in the unorganised sector. Industry status to the construction sector will now help in regulating and organisation of this vast sector.

2.5 CONCLUSIONS

For many construction organisations, QA according to a recognised standard is not sufficient to bring about the major increase in productivity and performance needed to render competitive advantage. Moreover QA has no facilitation for structural and cultural change but rather establishes objective descriptions, training
system and ensures work routines which comply with recognised procedures. While QA accreditation is necessary to give the confidence of the market, and its clients, it cannot in isolation generate enough benefit to change an organisation’s long-term competitive standing unless it is part of a broader TQM strategy. Traditional organisational structures, policies and management practices are considered to be inadequate to support the demands being posed on the construction industry. In fact many construction organisations in India are inflexible and have a management hierarchy unable to apply the integrity needed to address the recommendations made by the Government. Some construction organisations, however, seek alternative ways of enabling a learning culture within which they can empower employees and thus make a contribution to decision making. If the industry is to improve, construction organisations must integrate learning with day-to-day work process in such a way that they not only share knowledge and continuously improve but also operate efficiently and effectively in response to their changing environment. The Indian construction industry has started showing signs of moving in this direction.

In the next chapter literature review on the study of TQM is extended and various constructs pertaining to implementation of quality management in the construction industry are identified.