

# Construction Quality Management: Issues and Challenges before Construction Industry in Developing Countries

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**Abstract - In the era of open economy, quality has emerged as important parameter that determines the success or failure of an organization. Quality, though an elusive attribute, has always been an important issue in construction. It is an integral concept that provides a competitive edge to one organization over the other. The quality movement that emerged in post-industrialization era primarily addresses the concerns of enhancing product quality in a controlled industrial environment. The construction industry being unique in nature often defies the guiding principles of quality that apply to manufacturing industry. Construction being complex and heterogeneous process needs a quality assurance plan that evolves around the factors specific to construction industry. In the current scenario of globalization, the construction industry in developing countries is facing a stiff competition from multinational construction companies. Superior organization structure and manpower, state of art technology and sound financial conditions provide an edge to MNCs over the local construction firms. Of late, construction firms in developing countries are seemed to be under compulsion to seek some kind of quality tag for their respective organizations. ISO 9000 is one such certification that many construction firms are opting for, despite the fact that ISO quality system does not adequately address the needs of construction industry. This present paper aims to discuss the factors having bearing on the construction quality management in developing countries.**

**Key Words: Construction industry, Quality Management, Globalization, ISO9000**

## 1. Introduction

Construction industry is one of the most important economic activities worldwide with annual output of \$ 3000 billion. It accounts for 10 per cent of world's gross domestic product (GDP). With 111 million workforce which amounts to 7 per cent of total employment world wide, the construction industry is considered to be the world's largest industrial employer. It is significant that 20 percent of all employment is directly or indirectly linked to the construction activity.

### 1.1 Construction Industry in Developing Countries:

Construction sector is vital to any economy. In case of developing countries it provides not only the infrastructure, but also offers employment to large population of skilled and unskilled manpower. The developing countries are responsible for 23 per cent of world's total construction out put (Engineering News Record, 1998).

The importance of construction sector to the economic development of country like India can be gauged by the fact that 44 per cent of India's gross fixed capital formation (GCF) is contributed by the construction industry. It contributes around 6 per cent to gross domestic product (GDP). Currently the Indian construction industry is growing at the rate of 10 per cent per annum and it is estimated that it would soar up to the value of \$ 120 billion by 2012 from its current size of \$ 70 billion. The industry at present employs around 30 million skilled and unskilled workforce and it is estimated that by 2012 construction sector's manpower requirement would rise to 97 million.

The construction sector in Pakistan contributes little under 2 per cent to the national GDP. Currently at \$ 3.8 billion, the industry is expected to grow at the rate of 8 per cent over 2006-10. It employs 2.5 million people amounting to 7 per cent of Pakistan's total employment. Construction sector in Nepal is a major contributor to country's development. It accounts for country's 9 per cent GDP and 45 per cent of total development investments. 15 per cent of Nepal's working population is employed with the construction industry.

The approximate contribution of construction industry to the GDP of some of the developing countries is as follow:

China	6.5%	Nigeria	7.0%
Malaysia	3.0%	Tanzania	4.9%
Mexico	3.0%	Zimbabwe	4.0%

## 2. Concept of Quality

The concept of quality control in manufacturing sector is a less than a century old phenomenon. Feigenbaum (1983) identifies it as the *Foreman quality control period*, the second phase in the era quality control that began with industrial revolution in 1920s. However, the quality of products and services has been monitored by both the producers and users, since time immemorial. In the present era of globalization the philosophy of quality has emerged as the mantra for the success of all business endeavours.

Quality philosophy has revolutionized the concept of business. Quality programs are now integral to all corporate business strategies. Quality policies have been effective in bringing down the production cost and increasing the competitiveness.

### 2.1 Definitions of Quality

According to Oxford dictionary *quality* means the *degree of goodness or worth* or the *degree of excellence of a thing*. The notion of quality has been defined in different ways by different experts and institutions. Juran (1974) defines quality as “*fitness for use*”. A more widely definition was proposed by Crosby (1979), accordingly, “*Quality is conformance to requirements or specifications*”.

### 2.2 Quality definitions relevant to construction industry

Definitions of quality have subtle differences in their scope and intent. However it is appropriate to look at some definitions that are endorsed by institutions associated with construction industry. American Society for Civil Engineers (ASCE) defines quality as “*Conformance to predetermined requirements*”. Whereas, the definition proposed by Construction Industry Institute (CII), quality means “*Conformance to established requirements*”. It is important to note the use of word “predetermined” in ASCE definition and word “established” in CII definition. Both the words convey the notion of firmness or certainty in the nature of information used to define the requirements.

### 3. Need for Quality Management in Construction

Until the emergence of globalization, the construction industry in most countries was sheltered from international competition. In the absence of direct international competitive pressure there was little motivation for the domestic construction industry to strive for quality improvement. But during last few decades there has been a significant rise in customer awareness towards the quality. Open economy that provided access to goods and services of international quality standards, also educated the customers about the quality. Feigenbaum (1983) identifies the following three key factors responsible for raising the customers’ expectations for quality.

- i. Customers are increasing their quality requirements sharply
- ii. As a result of this increased demand customers expect higher quality products and services
- iii. In the era of competitive business, the companies have no option but to evolve and implement an effective quality management system

The above stated factors stand valid for construction industry across the world. Thus management of quality in construction projects becomes one of the most important aspects that can contribute to the success of the industry.

### 3.1 Current Status of Quality Management in Construction

The construction industry in developing countries is often characterized with low productivity, lack of standards and poor quality. It is also criticized for not taking the lead from the manufacturing industry that has successfully implemented the philosophy of quality in all spheres of its activities. However, before making any attempt to draw parallel between the two industries it is important to examine the kind of environment under which they operate. Manufacturing industry operates under a closely monitored environment where it is possible to control all variables that have bearing on product quality. Construction on site is not an automated process and unlike engineering goods, it is the people rather than the machines and technology that influence the project outcome. Construction is a very complex process that involves multiple parties and interests, ranging from owner, architect, consultants, contractors and vendors. The very nature of construction appears to be the real barrier to quality management success (Lowshine, et al., 2002). Several studies on construction industry conclude that its fragmented nature, lack of coordination and communication between parties, adversarial contractual relationships, and lack of customer focus inhibit the industry’s performance (Love and Li, 1998). The quality management system needs to evolve around the specific characteristics of the project and its environment. Traditional quality management systems are often unrepresentative of workforce and, are usually preoccupied with instruments of control and its administration rather than the outputs that are important to the customers (Thomas, R. et al., 2002). The ISO based generic approaches to quality management are more bureaucratic in nature. These methods are generally abstract and more concern with the management system than with the control of the work process.

### 4. Factor Affecting Construction Quality Management

There are several factors that impede the management of construction quality in developing countries. These factors can be classified as internal factors and external factors.

#### 4.1 Internal Factors

The challenge in managing and ensuring the construction quality is posed by many critical factors that stem from the internal shortcomings of the industry.

##### 4.1.1 Contractual Provisions

Decades old tendering and contracting procedures prevailing in most developing countries lack focus on quality. It is interesting to look at the weightage assigned to various capabilities of a bidding firm by an Indian public sector organization while evaluating the pre-qualification criteria:

- |   |            |
|---|------------|
| A. Financial strength:  | 20 marks   |
| B. Experience in similar nature of work:  | 20 marks   |
| C. Performance of work*   | : 40 marks |
| *Quality of work, financial soundness, technical proficiency, resourcefulness and general behaviour |            |
| D. Personnel and establishment:   | 10 marks   |
| E. Plant and equipment  | 10 marks   |

The above criteria indicate that the whole procedure of awarding the contract assigns little importance to quality. Apart from the pre-qualification criteria, the following also have serious implications on quality:

- Award of contract to the lowest bid (L1)

- Inadequate compensation to contractor against escalation
- Unrealistic time schedule
- Unachievable specifications

Thus, it is imperative for the construction industry to design an effective system of tendering and contract that can enforce the quality.

#### **4.1.2. Organizational Structure**

Barring few corporate firms, most construction companies lack the well defined organizational setup. The Indian construction sector comprises of approximately 250 corporate firms as against 7.2 lakh Class A contractors and sub- contractors who execute 90 percent of construction jobs. Most contractors operate with skeletal and have an adhoc approach towards resource mobilization. Quality management through sound organizational setup is still an alien concept to these firms.

#### **4.1.3. Lack of Technical Expertise**

Construction industry in developing countries needs to equip itself with technical capabilities, both the human and nonhuman, to ensure effective quality assurance on and off the construction sites. Most contractors lack the financial capabilities to support such kind of in-house facility. The staff responsible for implementation of quality is inadequately trained and in most construction projects on-site quality checks are carried out by relatively less experienced supervisory personnel.

#### **4.1.4. Slow pace of Mechanization**

Construction in developing country is a labour-intensive activity that provides extensive employment with little investment. Like any other labour-intensive industry, the construction industry is also characterized by low productivity and poor quality. Mechanization of construction activities could be a solution to overcome the limitations of labourers that are involved in onsite operations. The level of mechanization of construction industry in developed countries is about 60-70 per cent, compared to 15-20 per cent in Indian construction industry (Times Journal of Construction and design, Dec.2003). The slow pace of mechanization of construction industry in developing countries can be attributed to the high investment and low turnover. Smaller firms which execute 90 per cent of total work, usually opt for hiring the equipment as owning the expensive machineries is not a viable proposition. The imminent reflection of mechanization will be seen on the construction quality as it eliminates the human error.

#### **4.1.5. Lack of Training and skills**

Construction sector in developing countries provides employment to those with little education or skill. A study of construction workers in five major cities India reveals that 73 per cent of workforce did not have any schooling (Vaid, 1999). The situation in China is very similar where 50 per cent of construction workers in Beijing received no more than primary education (ILO, 2001). These facts may support the popular notion that one can do a construction job without much schooling.

The objective of improving the construction quality can be realized by upgrading the skills of workforce. Thus training becomes vital in meeting the skill requirements of the construction industry. Unlike manufacturing industry which meets its requirement of skilled workforce through large number of vocational training institutes, the construction industry in most developing countries, relies on informal and traditional apprenticeship where labourers learn the trade skills from the master craftsmen. However, such training may not satisfy the demand for higher quality. The developing countries need to have an institutional framework to impart quality oriented training for construction sector.

#### **4.1.6 Limited Financial Capabilities**

To match the requirements of prevailing competitive environment, it is crucial for the construction industry in developing countries to enhance the capabilities of its human and nonhuman resources. The available capital is not adequate to meet the resource requirements. The industry and governments need to evolve a mechanism to allow the flow of funds to the construction industry. The banking sector may be encouraged to develop lending norms that could address the requirements of the construction industry. The Contractors' Credit Cooperative Bank established in the Indian state of Karnataka is one successful example of specialized financial institution that caters to the needs of the contractors

#### **4.2 External Factors**

Internal reforms within the construction industry alone will not yield the desired results with regard to the construction quality unless the industry also addresses the issues stemming from the other fronts. Though, these factors are external to construction industry yet critical to quality and its management.

##### **4.2.1 Technological Developments in Allied Industries**

The construction sector has major linkages with the building material industry since material accounts for 58-60 per cent of construction cost. These materials include cement, steel, building blocks, roofing material, fittings/fixtures, glass, paints, chemicals etc. Bulk of these materials is manufactured in the unorganized sector using low-grade technology. The quality of materials is critical in ensuring the construction quality; ironically the locally produced materials are characterized by lack of quality and standards. The building material industry in developing countries suffers with obsolescence. It is imperative that the industry invests into technology upgradation of building material industry. The industry needs to have sound research and development facilities to equip itself with the state of art technology. It obviously requires a huge investment that most developing countries may not afford.

##### **4.2.2. Globalization**

Emergence of globalization provided the multinational organizations with opportunities of extending their business operations in developing countries. Construction is one sector where globalization made a significant impact. Consequently, one can see the presence good number of foreign construction firms in developing countries. While investigating into the implications of globalization on Asian construction industry, Raftery et al (1998) identified three important trends: a) greater private sector

participation in infrastructure projects; b) increased vertical integration in the packaging of construction projects; and c) increased foreign participation in domestic construction.

Equipped with superior technical and managerial capabilities, the international firms can deliver the projects within stipulated time, cost and quality. The dominance of foreign firms will continue until the local industry acquires the capabilities and expertise to handle large and complex projects without compromising the quality. On the positive side of globalization can be seen as an opportunity to upgrade the local industry through technology transfer and skill enhancement of the construction manpower.

#### 4.2.3 Quality Certification:

With the emergence of new trade regime under WTO, companies are being persuaded to adopt quality management systems in order to meet the demands of customers in a globalized market. During last two decades, ISO 9000, a series of international quality standards, has emerged as a system that can be applied to different types of business organizations to obtain improvements in quality procedure and product. The appropriateness of ISO 9000 to construction industry is still a matter of debate since the end product of construction process is not a repetitive unit but an endeavour that may be unique in its design and composition. International construction firms operating in developing countries pursuing ISO certification as it is increasingly becoming mandatory for bidding on projects funded by national and international agencies.

#### 5. Conclusion

As highlighted in this paper, the construction industry in developing countries suffers from several inherent problems. The challenge of resolving the issue construction quality and its management lies in seeking the long lasting solutions to the problems facing the construction industry in these countries. The focus of the industry need to be on capacity building, both the human and nonhuman, through a strategically devised approach. It is imperative for the industry to bring radical changes in outdated contractual provisions and technical specifications. At organizational level every action must guided by a well defined quality policy. The concept of total quality management can be suitably modified to meet the requirements of the construction industry.

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