

Poor Quality Cost Estimation : Loss Estimation Due to Poor Quality Product

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ABSTRACT

Generally every customer's objective is to have defect free product/service at a reasonable cost and almost every company's objective is to remain competitive, satisfy its customers and maximize its profits by producing at a minimum cost.. It can only be achieved by producing efficiently using TQM and keeping the Poor Quality Cost Estimation (PQCE) to minimum level. Built- in quality in products and services is now a prerequisite to remain competitive and thus no longer a differentiator in today's cut throat competitive business climate. The PQCE can substantially increase the cost of production/service including inflicting loss to reputation, good will and business. PQCE is inversely proportional to profits. Conventionally it includes appraisal, prevention and failure costs (internal & external). PQCE remains hidden and cannot be determined or identified from current accounting practices and therefore mostly remains unattended. It is a new concept in the developing countries especially for public sector due to which most of the business persons/managers do not realize the adverse effects of PQCE on their investments and returns. Most of the research so far carried out has mainly focused on the Poor Quality Cost Estimation in private sector born by the client, contractor and customer. The project had a direct link with the public inconvenience because; it disrupted the traffic and created environmental problems along with other issues pertaining to COPC during the construction phase. PQCE is required to be identified measured and eliminated from all phases and processes of construction projects that is from project inception, defining objectives, planning, designing, procurements, execution, controlling and monitoring etc along with minimum disturbance to environment and general public. Results of this research would help the public sector organizations to reduce the PQCE in their future construction projects especially keeping in view the indirect PQCE due to public inconvenience.

Keywords : Poor Quality Cost Estimation, Appraisal Cost, Prevention Cost, Failure Cost, Public Sector Project, Public Inconvenience

I. INTRODUCTION

A project, irrespective of its size or magnitude, must be completed under three constraints, *cost, time and scope* often referred to as the Triple Constraints of Project Management.

The fourth dimension can be Quality; it is arguable whether quality can actually be a constraint of a project. In order to remain competitive Quality has to

be made a constraint. According to Mohandas and Sankara (2008), Quality is the degree to which a specific product/or service satisfies the wants of a specific consumer. Any change in one constraint is likely to trigger change in others too.

Completion of construction projects within the specified triple constraints and quality are signs of successful project management. It has been generally observed that in most of the public sector projects in

developing countries, objectives and deliverables are not clearly defined which adversely affect the project planning, designing and execution, as a result, the projects over run the scheduled triple constraints cost, time and scope. Therefore, the Poor Quality Cost Estimation (PQCE), starts right from project inception and definition of its objectives/deliverables. Poor project management does not address the causes of induction of PQCE which enhances the project cost.

Poor Quality Cost is the cost faced due to production of poor quality products and services. There are four categories of costs; prevention costs (costs incurred to keep failure and appraisal costs to a minimum), appraisal costs (costs incurred to determine the degree of conformance to quality requirements), internal failure costs (costs associated with defects found before the customer receives the product or service), and external failure costs (costs associated with defects found after the customer receives the product or service).

This research is focused on public sector projects of developing countries, where PQCE is a new concept and therefore ignored in project planning and execution. The PQCE cannot be traced or identified from the existing accounting reports and auditing system. The Management only understands the language of numbers and figures especially the financial effect, PQCE cannot be extracted from the traditional accounting system, and therefore gravity of its adverse effects is not realized by most of the project manager.

Causing inconvenience to public and creating environmental problems during project execution can be considered violation of human rights and environmental laws, which are not given due priority in developing countries. The implementation and observation of municipal and environmental laws is not very strong as witnessed on the project under study. Due to these reasons, the PQCE on the part of project executing agency is also born by the general public.

II. LITERATURE REVIEW

Cost of Quality

Most suitable definition for Quality in the construction industry, according to David L. Goetsch and Stanley B Devis is that, it is a dynamic state associated with products, services, people, processes and environment that meets or exceeds customer expectations and contract requirements/standards or Quality can be defined as conformance to the standards and fitness for purpose.

Cost of quality is a measure of costs associated with achievement or non-achievement of required outcome of a project, as agreed in contract between a contractor and its employer (Nat R Brisco and Frank M Gryna). Juran (1951) has suggested that the cost of quality can be understood in terms of the economics of the end-product, quality or in terms of the economics of the conformance to standards. Quality and profitability are directly proportional; high quality level in procedures, processes, input materials, human resource and management etc results in lowering of overall cost (no rework, no wastage), it thereby increases profitability. Quality should be built in, as they say do it right the first time!(Carl Spetzler et al-2006).

Cost of Quality (COQ) analysis enables organizations to identify, measure and control the consequences of poor quality. The major goal of a COQ approach is to improve the bottom-line by eliminating poor quality (Mohandas and Sankara-2008). Understanding the cost of quality concept is extremely important in establishing a quality management strategy. Quality costs are not simple arithmetic sum of factory operations. The support processes like maintenance and human resources are also major contributors. The major quality costs are contributed by incapable support processes. Such costs are hidden in the standards and can be avoided but the problem is that no clear responsibility has been fixed for action to

reduce them. COQ, after its recognition can be reduced through structural. Costs of quality are defined as the sum of costs over the lifecycle of a product. Customers prefer high quality products or services at a reasonable price. Firms should invest on prevention and appraisal costs to ensure that customers would have value of their money by receiving good quality products or services. It is a tradeoff between the prevention & appraisal costs and the failure costs to achieve a quality output. Thus, quality conformance is inversely proportional to failure costs (Mbinira Munthali).

Cost of Quality measurement

According to Deming (1986) the objective of never ending improvement in TQM could not be achieved without measurement. Osman and Abdul –Razek (1996) have contended that

you won't be able to manage what you cannot measure. It is the measurement which triggers the improvement processes. However, Deming (1986) has stated that cost analysis for quality is not effective and that measuring quality costs to seek optimum defect levels is an evidence of failure to understand the problem. Quality costs need to be measured not for management control, but for the development of quality thinking within the organization. The more popular approach is that of Juran (1951), he advocated the measurement of costs on a periodic basis as a management control tool. Measurement of the PQC includes following steps:

- a. Identify the problems and defects in the output of each process.
- b. Identify all activities that exist only because of poor quality. Conduct a brainstorming session with project team members having first-hand knowledge of the process to capture all possible causes and process deficiencies to remedy quality problems.
- c. Identify the organizational area where the cost of each activity is being experienced. These costs

might appear in one or multiple areas.

- d. Determine the method which will be used to calculate the Poor Quality Cost Estimation.
- e. Collect the relevant data and estimate the costs.

Use of the total resources method would require identification of the total resources consumed in a category and the percentage of those resources used for activities associated with remediating the effects of poor quality. The unit cost method would require identification of the number of times deficiencies occur and the average cost for correcting the deficiency. Small companies can estimate the Poor Quality Cost Estimation easier than large firms. The smaller number of personnel and fewer lines of communication in small firms make it easier to trace and determine costs of events that lead to poor quality. The optimum level of investment on quality improvement can be determined from the information of quality costs. The cost of quality is not manageable unless it is measured.

Poor Quality Cost Estimation (PQCE):

It is the cost associated with providing poor quality product or service. There are three categories of quality costs: prevention costs (costs incurred to keep failure and appraisal costs to a minimum), appraisal costs (costs incurred to determine the degree of conformance to quality requirements) and failure costs (internal failure costs, associated with defects found before the customer receives the product or service and external failure costs, associated with defects found after the customer receives the product or service)

It is the least cost, less time consuming, and least troublesome approach to achieve high quality output. Prevention activities kill expected problems before they actually appear to affect the quality. Investment in prevention processes yields tremendous savings on account of appraisal and failure costs. Roberts (1991) found that by spending 1% more on prevention efforts, the failure costs of construction can be

reduced from 10% to 20%. For example execution of a building work based on poor quality design can lead to loss of life, property & reputation of the builder, along with redoing the whole project.

Appraisal costs

Appraisal cost is associated with the outcome of project activities, whereas prevention cost is associated with managing the intent. Prevention and appraisal costs are unavoidable, to ensure delivery of a quality product/service within the given time, scope and cost. Providing quality control in construction requires an expenditure ranging from 1% to 5% of total project costs.

Failure costs

Failure costs are incurred to rectify the variation/defects cropped up after execution of a work or rework an unsatisfactory job to achieve the required specifications. This cost can be divided into internal and external costs. Internal failure costs are those costs associated with product failure before its delivery to the internal or external customer, such as scrap, rework, material, labor wastage, and overheads associated with production.

Reducing PQC

In any quality improvement exercise, the journey to reduce PQCE should begin by evaluating the extent of the challenge. The recommended process for reducing PQC includes brainstorming and investigation to identify the problem areas/causes, data collection, analysis, and action plan of an improvement strategy. A major by-product of PQC evaluation is the identification of those vital few segments, which contributes most to PQC.

Considering the size and nature of objective, the investment may be required for identification and analysis, training, redesign of products, re-engineering of processes, testing and experimentation,

and replacement/improvement of equipment. Surprisingly, most of the improvement projects require little or no costly equipment or facilities. The investment is mostly in the analytical work. The concept of minimizing Poor Quality Cost Estimation includes preventing the failure costs and minimizing the appraisal costs. This concept paves a way to create processes with a defect free philosophy.

III. CONCLUSION

When we talk of quality, most people take it as quality of finished product/project delivered by a contractor. Providing work quality as per required specifications is one aspect but the quality in other factors like defining project objectives, designing, planning, decision making, team building, selection of contractor, consultants, contract documents, coordination among the major stake holders & agencies is also essential to reduce the PQCE.

In order to improve the quality of output and reduce the failure costs, the Poor Quality Cost Estimation concept has evolved. It comprises of prevention cost, appraisal cost and failure costs (Internal and external customers). Investment is required in the prevention and appraisal costs to reduce the expensive failure costs. We cannot improve the system unless we are able to measure the failure costs. Identification of customer requirements, causes of failure and problem areas in the work processes and thereby improvement/revision in the product design, project planning and work process would improve the work quality. It would also reduce the wastage, reworks and COPC, along with improving the productivity, business and profits.

Area for future research

The area of future research is designing of a process for reporting and recording of PQCE during execution of construction projects. It would support

the management for taking timely decisions and remedial actions to check the drain of valuable resources. Re-engineering of accounting process would eliminate the concept of hidden costs of PQCE.

IV. REFERENCES

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