

# **Assessment of Deming's Philosophy for Implementing Total Quality Management in U.S. Construction**

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## **ABSTRACT**

The main focus of the paper is to assess the state of implementation of Deming's 14 points for achieving quality in the construction industry. In the initial phase of the study, Deming's 14 points have been thoroughly understood with the help of literature study from different publications and the book "Out Of Crisis" written by Deming himself. In the next phase, to better understand the implementation of the 14 points in the construction industry, a structured survey has been conducted targeted to major construction industry stakeholders. After the analysis of the results, it has been found that although most companies have their quality goals, their systems and processes do not completely relate to Deming's 14 points. As a conclusion, companies are recommended to relate their quality implementation ideas with Deming's 14 points in order to achieve Total Quality Management to the maximum extent.

**Keywords:** Total Quality Management, Deming's 14 points, Shewhart Cycle.

## **1. INTRODUCTION**

Construction industry is ever changing, unique and complex in nature. The differing needs and priorities of the clients, differing sites and surroundings, and differing views of designers on the best design solutions is making the nature of each building or facility as "one-of-a-kind" (Warszawski, A. 1990). The implementation of total quality management (TQM) has become very important in the present construction industries.

A common mistaken notion about TQM is that it does not readily apply to construction because every site is different, and that construction is a one-time-only industry. This notion is not true because the plain fact is that whatever you work, the processes are the same, and so are the methods and techniques (PHCC Educational Foundation 1996).

Many construction organizations are implementing Deming's principles to become pioneers in their field. The name "Total Quality Management" was coined by the U.S. Navy in 1985 (Walton 1993). TQM has been widely used in different organizations, particularly in the manufacturing industry. There are a variety of models available to transform a current enterprise into an organization focusing on total quality management (Metri 2006). The foundations of TQM are rooted in the teachings of Dr. W. E. Deming (Burati et al. 1991). His 14-point model, which has been practiced successfully in Japan and the United States (Walton 1993) is being considered for the construction industry. TQM for construction firms can be defined as: keeping the company running smoothly with continuous input from owners/ customers (PHCC Educational Foundation 1996). Process improvement in construction industry could begin in the areas such as administration, project management, logistics and construction.

Construction productivity lags that of manufacturing. The safety conditions are also very bad when compared to the manufacturing industries. There are work force shortages in many countries due to the inferior working

conditions (Koskela 1992). The quality of construction is considered to be insufficient. Providing customer satisfaction is a primary objective of quality management. Contractors who are the suppliers of construction services must address owner/customer requirements if they are aiming for success. Customers are seeking for high quality, better value and lower cost services. Implementing total quality management/continuous improvement in managing everyday construction activities is relevant to all those who participate in and contribute to the construction process (PHCC Educational Foundation 1996). Many studies have focused on the implementation of Deming's principles in the manufacturing industry but very few studies have focused on its implementation in the construction industry.

## **2. BACKGROUND STUDY**

Deming's 14 points are the basis for transformation of American industry. The 14 points apply to both small and large organizations. They are explained below (Deming 1993):

1. Create constancy of purpose toward improvement of product and services, with the aim to become competitive and to stay in business, and to provide jobs. Resources should be allocated to long term planning. Construction companies generally do not have a clear idea about their future business; their plans are influenced by the construction market. Construction companies having a long term goal to keep abreast with the technology, equipment, machinery etc. (Huda 2008).
2. Adopt the new philosophy. Mistakes, defects, outdated training, inadequate and ineffective supervision, job hopping in management should be avoided. As per the study done by Huda (2008), 82% of the clients of the construction industry (in Pakistan) have become more demanding in terms of 'quality'.
3. Cease dependence on inspection to achieve quality. Eliminate the need for inspection on a mass basis by building quality into the product in the first place.
4. End the practice of awarding business on the basis of price tag. Instead, minimize total cost. Move toward a single supplier for any one item, on a long-term relationship of loyalty and trust. Awarding tenders and contracts to the lowest bidder should be avoided. Quality should be given first importance.
5. Improve constantly and forever the system of production and service, to improve quality and productivity, and thus constantly decrease costs. Construction industry should evolve as per the requirements of the present times and should be able to face the challenges of the future.
6. Institute training on the job. Training is very important for the individuals in the construction industry. Training program must begin with upper management, and then training must be provided for the remaining management, and the in-house trainers and facilitators.
7. Institute leadership. The aim of supervision should be to help people and machines and gadgets to do a better job.
8. Drive out fear, so that everyone may work effectively for the company.
9. Break down barriers between departments. People in research, design, sales, and production must work as a team, to foresee problems of production and in use that may be encountered with the product or service.
10. Eliminate slogans, exhortations, and targets for the work force asking for zero defects and new levels of productivity. Such exhortations only create adversarial relationships, as the bulk of the causes of low quality and low productivity belong to the system and thus lie beyond the power of the work force.
11. Eliminate work standards (quotas) on the factory floor. Eliminate management by objective. Eliminate management by numbers, numerical goals. Substitute leadership.
12. Remove barriers that rob the hourly worker of his right to pride of workmanship. The responsibility of supervisors must be changed from sheer numbers to quality. Remove barriers that rob people in management and in engineering of their right to pride of workmanship.

13. Institute a vigorous program of education and self-improvement.
14. Put everybody in the company to work to accomplish the transformation. The transformation is everybody's job.

According to a study done by PHCC Educational Foundation (1996), the characteristics that are common to the construction companies that successfully implemented TQM in their daily operations are as follows:

- Strive for owner/customer satisfaction and employee satisfaction.
- Strive for accident free jobsites.
- Recognize that the owner/customer provided the revenue while the employees are responsible for the profit.
- Recognize the need for measurement and fact-based decision making.
- Arrange for employees to become involved in helping the company improve.
- Train extensively.
- Work hard at improving communication inside and outside the company.
- Use teams of employees to improve processes.
- Place a strong emphasis on the right kind of leadership, and provide supervisors with a significant amount of leadership training.
- Involve subcontractors and suppliers, requiring them to adopt TQM.
- Strive for continuous improvement.

### **3. OBJECTIVES AND SCOPE**

The focus of the research was to determine the state of implementation of Deming's philosophy in the construction industry. The main goal was to identify the level of implementation of Deming's 14 points. To do that, the research team isolated each point and probed to determine what truly made people want to work a certain way.

The scope of the research was relatively modest. The tool used in our research method was group compiled survey. The survey consisted of a total of 20 questions (closed-ended) based on the Deming's 14 points.

The participants were project managers, engineers, construction managers and superintendents. The sample wasn't in one particular construction sector but spanned across the following: commercial, retail, residential, and public works.

### **4. METHODOLOGY**

For the research, following methodology was adopted:

- Literature study
- Questionnaire development
- Online research
- Analyses of findings
- Proposed action plan
- Conclusions and Recommendations

Literature study of the Deming's philosophy implemented by the different industries was done. Later, the focus was narrowed to the construction industry. The questionnaire method of survey is implemented in order to get the information with ease and accuracy. Questions were formulated on the basis of literature study and the personal experience of the individuals conducting the survey. Questionnaires were administered to the individuals working for the construction industry.

The closed ended questions were given on a measurable scale (1 to 10) with the highest number representing the highest level of satisfaction. The questionnaire was prepared keeping in view the 14 points so that the responses would be very much related to the points and the organizations level of implementation. The questionnaires have been sent to over 100 construction companies.

The other method used was to go to the construction company's websites and look for their philosophy, vision and mission statements for an indirect understanding of the ideology of the companies in implementing quality within their organization.

## **5. ANALYSIS OF DATA AND FINDINGS – DEMING'S 14 POINTS IN RELATION TO US CONSTRUCTION**

### **1. Constancy of purpose**

The recognition of Constancy of purpose by each and every employee is very important for long term goal achievement. Mission becomes the first step towards TQM. 80% of the companies are having a very clear mission statement about their continuous improvement plans as per the survey and online research. The companies have responded that their employees have a good understanding of the company's mission and goal. It is also found that the companies are in the progressive path of continuous improvement. They are trying to adopt new technology while keeping their conventional way of management.

### **2. Adopt the new philosophy**

The research team has mainly found two categories where the construction companies can be segregated - one is the family originated style and the other is partnership style. The family oriented style already consists of a predefined management system and the partnership style is formed between a group of people working together. The companies are found to be reluctant to change their philosophies from their original traditional system. The partnership style already tends to be having a system where everyone has a say in the management.

High no. of recurring customers may seem to be profitable and encouraging for present scenario but may be deceiving to forecast the future customers and prospects.

### **3. Manage the process not the outcome**

Companies are inspecting every stage of the project like foundation, scaffolding or substantial completion but after the task are completed. The inspection of the equipment is also not being given a high priority as well. The supervision is also provided but may not be sufficient to make sure the construction process is flawless.

For quality control, many companies have created a separate quality management department, which look after the services and products but they are still falling behind to ensure perfect quality keeping in view the complexity of the industry or project every time.

### **4. Look at the total cost not the price tag**

The general tendency of selecting the suppliers still seems to be "the low bid is the best". In survey the research team found that the company's are not very frequent in changing their suppliers. These two statements look controversial with regards to selection of suppliers. There could be many assumptions like the suppliers are always the low bidder or might the best quality supplier. 50% companies are considering only the low bidders for selection, and the others are considering both quality and price.

### **5. Improve service quality and THUS decrease costs**

The research team understood from our survey that the companies might want to implement quality in everything, but have misconception that quality costs a lot. What they don't understand is that once the quality is improved the ultimate cost of the project can be reduced.

6. Institute training on the job

Deming insists on training and retraining of each employee. He believes that training will reduce the variation in the process.

In spite of knowing the importance of training, only 65% of the companies responded that they provide training or retraining to their employees.

7. Institute leadership

Leadership is misunderstood in most of the cases. Although the managers and supervisors are always there on job but leadership is one of the factors missing in US construction companies especially on job site. It is often seen that the managers do not understand the role and responsibility as a leader.

8. Drive out fear

It's surprising yet it is the reality that every employee in the middle management and workforce has in the back of their mind a fear of losing their job or their command or being harassed or unappreciated.

While in changing situations, people tend to have fear of uncertainty about the kind of change and its consequences.

9. Break down Barriers

Online research and survey feedback have revealed that more than 70% of the companies have very good interdepartmental relations. The companies take it as a pride to mention it in their profile. They make it their priority that each department is sure about its work and has everything documented, so that the customer has clarity about the project. In this way the companies ensure the satisfaction of internal customers.

10. Eliminate Slogans

This point of Deming has been controversial since it has been proposed. The 80% companies that gave the research team feedback believe that slogans are really important and strengthen this same controversy. They believe that slogans remind the employees about their goals.

11. Eliminate Quotas (work standards)

Whenever the numerical targets are made to complete the task employees generally focus on achieving the target and subsiding the value of achieving the quality. This results in defective products and lower productivity.

The survey shows that the companies are equally divided, in favor of and against, on the issue of putting up numerical targets to the employees. The management takes the pressure of producing the targeted quantity with quality, but the workforce generally does tend to bother about the quantity only.

12. Remove Barriers

This barrier is created with the appraisal system that the company has. Having an appropriate appraisal system is very important within the company to avoid any conflicts. It is seen that 60% of the companies have individual appraisal system. Deming advocates that there shouldn't be any sort of appraisal system and manage by objective.

13. Institute programs of education

Companies have different opinions about encouraging education and also about their contribution to facilitate the employees for more education. Some companies provide monetary help to their employees

and conduct their own educational programs. Others might be more inclined to hire who are well equipped with latest technology and highly educated and/or more experience.

#### 14. Accomplish the Transformation

Quality flows from top to bottom of the organizational hierarchy (Huda 2008). Deming cautions that quality cannot be achieved unless the top management is fully committed. Every company, giving the research team the feedback either through survey or online research, had inclination to implementing and producing quality services to their customers. Quality had become a buzz word for the most of the companies preparing their mission statement. Companies should understand the actual importance and long term benefits of implementing quality.

### 6. PROPOSED ACTION PLAN

Deming has provided a seven point action plan as follows:

1. Management takes pride and develops courage for the new direction.
2. Management explains to the people in the company why change is necessary.
3. Divide every company activity into stages, identifying the customer of each stage as the next stage. Continual improvement of methods should take place at each stage, and stages should work together towards quality.
4. Start as soon and as quickly as possible to construct an organization to guide continual quality improvement. Deming advocates the Deming or Shewhart Cycle as a helpful procedure for improvement of any stage.
5. Everyone can take part in a team to improve the input and output of any stage.
6. Embark on construction of organization for quality (Deming sees this as requiring the participation of knowledgeable statisticians).

Keeping in view the Deming's action plan along with the analysis of the survey and online research the research team proposed the following plan:

- Construction organizations need to make changes in the conventional management system, it is appreciable in that they are in the process, but ultimately its better they make changes in mgmt.
- Sitting back satisfied with the long term customer would not be advisable, but should take care that they would not become stale in providing services better than their best. Also there might be other reasons for recurrence of the customer like customer not interested in researching for a new contractor.
- Customers criteria of selecting a company might be not going through new research
- It's not only the responsibility of the department of quality control to maintain quality but should be part and parcel of each employee's job. The supervision and quality assurance of the process is also important rather than just the final product.
- Companies should understand that implementation of TQM would reduce the cost.
- There is a new concept coming up "learning organizations" – where the companies provide frequent training and retraining to their employees. It is recommended that the companies qualify as a learning organization.
- Managers should understand that as a leader they are supposed to provide help and to facilitate their employees with appropriate equipment and materials.
- In changing situations, companies should facilitate their employees with proper information about the change and leaders should be capable of driving out their fear through effective communication. When

employees are well informed, they will be confident about their position and there will be a smooth makeover.

- The management needs to break down barriers and find ways for effective interaction especially on construction sites.
- The appraisal system should be in such a way that everyone in the team can use their right to pride on their own workmanship. Management should avoid individual appraisal so as to check the aggressive or depressive situations amongst employees.
- The companies encouraging education for employees exhibit their adherence to continuous improvement.

## 7. CONCLUSIONS

Whenever the research team talks about quality in the organization it is the job of the top management to have commitment to it. Quality culture cannot be developed without the initiative of the top management. They are the ones who can create the environment and the employees tend to adapt to it. There are many ways to motivate and involve the employees in the implementation of quality. Finally top management must not view the implementation of a quality management system as an end to quality initiative.

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