Second International Conference on Construction in the 21st Century (CITC-II)
"Sustainability and Innovation in Management and Technology"
10-12 December, 2003, Hong Kong

From QA to TQM in the Hong Kong Construction Industry

Y.F Man and S.L. Tang
Department of Civil and Structural Engineering
The Hong Kong Polytechnic University, Hunghom, Kowloon, Hong Kong

Abstract

Certification to ISO 9000 quality management system has become a pre-requisite in the Hong Kong construction industry since nearly 10 years ago. However, benefits obtained after certification were found not very significant in previous research studies. Resorting to implementing Total Quality Management (TQM) in the industry has therefore increased. After December 2000, the time of the emergence of the ISO 9000:2000 quality management system, which is closer to TQM philosophy, construction organizations in Hong Kong already certified to the year 1994 version will need to be re-certified to this new year-2000 version before the end of 2003.

This paper reports a research study conducted to identify key successive factors for the construction industry in Hong Kong to upgrade their quality management systems from quality assurance (QA) concept to TQM concept (or upgrading from existing ISO 9000:1994 to new ISO 9000:2000). The respondents' views on the present status of applying both QA and TQM in the industry and their practical experiences have been evaluated through questionnaire surveys

Keywords
ISO 9000, quality management system, construction, quality assurance, total quality management, Hong Kong.

1. Introduction

The ISO 9000 (1994 version) Quality Assurance (QA) system is a systematic approach in satisfying given requirements and providing adequate confidence. While rework, scrap, delivery, delays etc. may be minimised by the adoption of the ISO 9000:1994 system, other defects, for example, unnoticed delays, frustration, redundant internal effort, over control, manpower inefficiency and low morale, which are largely hidden, can only be exposed and cured by the adoption of Total Quality Management (TQM) (Ahmed and Aoieong, 1998). To obtain ISO 9000:1994 certification in the Hong Kong construction industry just for satisfying clients' requirement and improving companies' reputation may not be the best way to improve quality. Nevertheless, ISO 9000:1994 (mainly for QA) may act as a stepping stone, or an integrated first step, to the implementation of TQM.

With the emergence of ISO 9000:2000 version in December 2000, all construction organisations in Hong Kong certified to ISO 9000:1994 will need to prepare themselves for re-certification to ISO 9000:2000. The deadline set by the Hong Kong Government is mid-December 2003. This new version of ISO 9000 is a more generic process-based structure with a Plan-Do-Check-Act improvement cycle (Sung and Au, 1999), which assembles to a large extent prevailing international models of the TQM.

This paper reports a survey study carried out in 2002 in Hong Kong for identifying key factors and finding out necessary actions for a successful upgrading of QA to TQM. It also highlights the difficulties encountered during the upgrading process.

2. Identification of Key Factors and Actions for Successful Transition from QA to TQM

Taylor and Meegan (1997) opined that the leadership of senior executives is likely to play a dominant role during the transition process. In their study, 12 key factors were identified. For this study, however, the authors had modified these factors to suit better the situations of the Hong Kong construction industry, and they then conducted a questionnaire survey. The survey questionnaire contained 11 factors as follows:

(1) Clarifying the understanding of the purpose of ISO 9000 and/or TQM.
(2) Recognizing the real motivations for pursuing ISO 9000 and/or TQM.
(3) The top management's commitment to quality and the comparable extent of their senior colleagues' commitment in other functional areas.
(4) The top management's pursuits of long term financial results and customer satisfaction, their vision and their enthusiasm.
(5) Clarifying the top management's understanding of the ways and behaviours which they need to change to align with a ISO 9000:2000 or TQM culture.
(6) The top management's willingness to undergo such personal change and development.
(7) Clarifying to what degree the top management should recognize about their existing quality personnel who may need to develop new skills and behaviours.
(8) Embracing leadership practices that create an environment conducive to company-wide employee involvement.
(9) Recognizing the need for reward and recognition systems supportive of involvement and empowerment.
(10) Embracing a behavioral orientation which treats quality as a strategic imperative.
(11) Strategic practice that recognizes the value of organizational core competence and organization capability.

The 6 important actions for successful transition were identified, by authors' own experience and also by referring to other people's work (Meegan and Taylor, 1997), as follows:

(1) Compare the ISO 9000:1994 with the 2000 version and/or TQM, and develop a Quality Manual to include some new requirements of ISO 9000:2000 and/or TQM.
(2) Provide sufficient training to everyone of the company including the members of the top management to ensure their quality awareness and advocate personal development.
(3) Set up some tailored recognition and reward systems to promote company-wide employee involvement.
(4) Set up a quality steering committee or the like whose function is to formulate the company policies and strategies on promoting quality/customer satisfaction.
(5) Establish processes, such as customer satisfaction survey, to obtain and monitor information on customer satisfaction and/or dissatisfaction in order to measure the performance of the quality management system.
(6) Set up quality improvement teams to pursue continual improvement to tackle inter and intra functional issues.

3. Questionnaire Survey

A questionnaire survey was carried out in 2002 in Hong Kong. The questionnaire was divided into four parts as follows:

Part (a): General information of respondents.
Part (b): Opinions of the respondents on the 11 key factors as shown in the previous section.
Part (c): Opinions on actions to be taken for successful transition.
Part (d): Opinions on the difficulties encountered made by the companies who have already certified to ISO 9000:2000 or implemented TQM.

The target respondents for the survey were those whose companies were implementing ISO 9000:2000 or TQM programs. There were 21 major construction firms in Hong Kong at the time of the survey that could satisfy the above requirement. All these firms were invited to express their opinions, but only 11 firms out of 21 responded.

4. Survey Results

Part (a)
From the 11 respondents, 4 came from engineering consulting firms, 6 from contracting firms, and 1 from construction material suppliers.

Part (b)
The responses to the 11 key factors (for successful transition from QA to TQM) were rated on a 5-point scale. For the most important factor, it is assigned a score of 5. Similarly, the factor, which is of the least importance, is assigned a score of 1. Fig. 1 shows the survey result graphically.

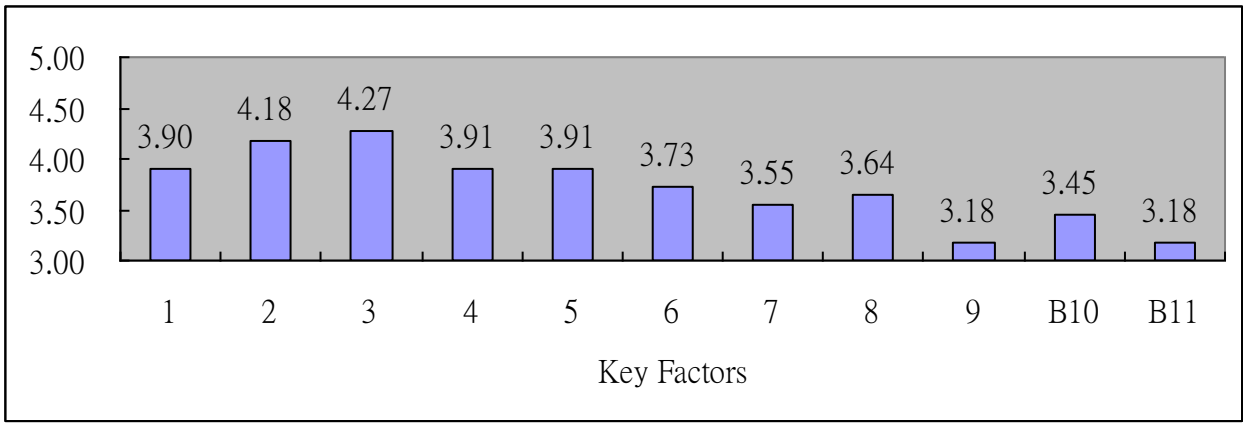

Fig. 1 Mean score of the relative importance of the key factors for successful transition/upgrading from ISO 9000:1994 to ISO 9000:2000 and/or TQM

The above results indicated that the top four important key factors were:
- The top management's commitment to quality and the comparable extent of their senior colleagues' commitment in other functional areas. (Mean = 4.27).
- Recognizing the real motivations for pursuing ISO 9000 and/or TQM. (Mean = 4.18).
- The top management's pursuits of long term financial results and customer satisfaction, their vision and their enthusiasm. (Mean = 3.91).
- Clarifying the top management's understanding of the ways and behaviours which they need to change to align with a ISO 9000:2000 or TQM culture. (Mean = 3.91).

Part (c)
Fig. 2 shows the survey result graphically on the 6 actions to be taken for successful transition. Similar to Part (b), they were rated on a 5-point scale.

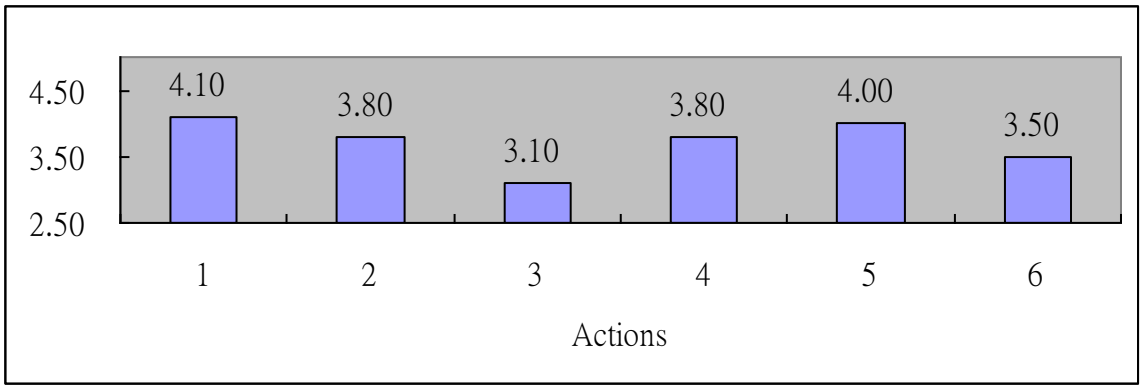

Fig. 2 Mean score of the actions need to be taken for successful transition/upgrading from ISO 9000:1994 to ISO 9000:2000 and/or TQM

The above results indicated that the top four important actions were:

- Compare the ISO 9000:1994 with the 2000 version and/or TQM, and develop a Quality Manual to include some new requirements of ISO 9000:2000 and/or TQM. (Mean = 4.10).
- Establish processes, such as customer satisfaction survey, to obtain and monitor information on customer satisfaction and/or dissatisfaction in order to measure the performance of the quality management system. (mean = 4.00).
- Provide sufficient training to everyone of the company including the members of the top management to ensure their quality awareness and advocate personal development. (Mean = 3.80).
- Set up a quality steering committee or the like whose function is to formulate the company policies and strategies on promoting quality/customer satisfaction. (Mean = 3.80).

Part (d)

For this part of the questionnaire, the respondents were asked to rate on a 12-point scale. The mean score results are shown in fig.3.

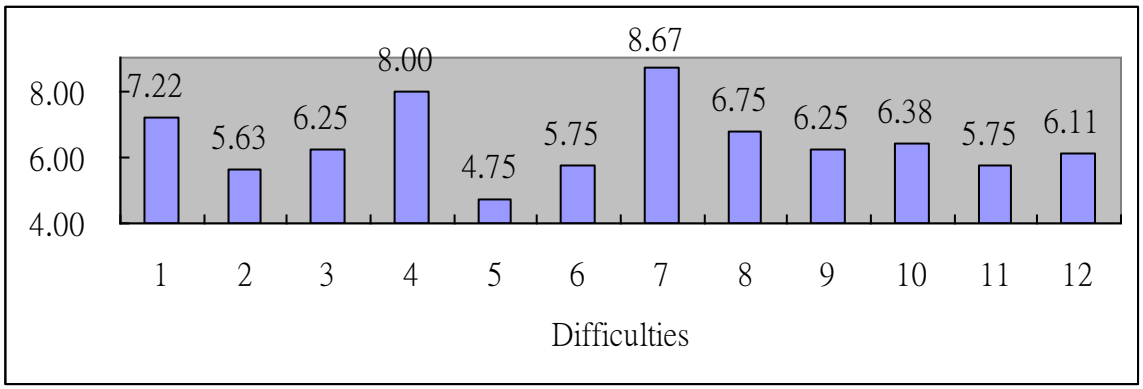

Fig. 3 Mean scores of the difficulties faced during the transition /upgrading process

Legend for Fig. 3:

(1) Lack of strong senior management involvement/support.
(2) Resistance or bad attitude from staff.
(3) Poor internal/external communication.
(4) Not fully understood by staff the requirements of ISO 9000:2000 and/or TQM.
(5) Absence of well structured quality system and procedures.
(6) Too much documentation and records.
(7) Change in culture.

(8) Insufficient quality training for staff.
(9) Quality management system is not applied to sub-contractors.
(10) The clients only require you to have ISO 9000 certification but they do not have quality knowledge.
(11) No cooperation from the client to meet procedures under your project quality plan.
(12) Maintain the ISO 9000 certification as a work permit but not really seek for quality improvement.

The results shown in Fig.3 indicated that the top four difficulties were:
- Change in culture. (Mean = 8.67).
- Not fully understood by staff the requirements of ISO 9000:2000 and/or TQM. (Mean = 8.00).
- Lack of strong senior management involvement/support. (Mean = 7.22).
- Insufficient quality training for staff. (Mean = 6.75).

6. Conclusions

There was little argument that the quality revolution had to be led from the top. Quality gurus and professionals were all in agreement that a successful journey in pursuing of quality was dependent on the degree of commitment exhibited by senior management (Taylor and Meegan, 1997). This commitment would, therefore, determine the success of the quality transition/upgrading from the ISO 9000:1994 to the ISO 9000:2000 and/or the TQM.

Besides, successful transition/upgrading would also depend on recognizing the real motivation for pursing and the understanding of the purpose of the ISO 9000:2000 and/or the TQM. For example, that some construction firms used ISO 9000 as a means of producing paper work to satisfy customers was more likely to be accompanied by a motivation associated with customer pressure. Some construction firms relaxed on their effort in achieving quality once their certification was obtained. For these cases, the quality systems certified were doomed to fail.

In fact, an incorrect motivation and understanding of the ISO 9000:2000 and/or the TQM might hinder an organization from sustaining its quality initiative. Transition/upgrading of quality management systems from ISO 9000:1994 standard to something more superior, such as the ISO 9000:2000 or the TQM, could not proceed until these two prerequisites were satisfied. Success needed that the organization should have a correct understanding of both quality concepts and the need of this transition.

The findings in the study identified the respondents' opinion in relation to the difficulties during the transition/upgrading process from the ISO 9000:1994 to the ISO 9000:2000 and/or the TQM. The major difficulties are listed in the descending order as follows:

Difficulty 1 : Change in Culture

To deal with the likely resistance to "change in culture", two approaches should be considered: (1) Employee Quality Awareness Program, and (2) Recognition and Reward System.

The Employee Quality Awareness Program was designed to let the employees know the reasons behind the change and understand the need for the change, as well as to encourage the employees' contribution to the decision making process and make them to be involved. It was also very important to raise the employees' awareness of quality so that the firm could survive in this very competitive environment. To let employees understand the need for the change, they would recognize and commit to the change too. Consequently, everybody in the firm could follow the firm's objectives, and the resistance to the change could be minimized.

A tailored made Recognition and Reward System might play a significant role in the achievement of company-wide employee involvement. The system should be designed to reassure and encourage

employees during the period of changes and promote intrinsic motivation in order to get them excited, involved, committed, and energized.

Difficulty 2 : Not fully understood by staff the requirements of ISO 9000:2000/TQM

Every employee should have an understanding of the ISO 9000:2000 terminology and TQM philosophy, the requirements of the quality system, and a clear comprehension on his/her role in the quality programme. It was also advisable to conduct training by a top-down approach, and to ensure the top management to understand the system first and be able to solve problems when it moved to the next level. For training to be effective, it needed to be analyzed. Since not all employees needed all quality management skills, so a firm needed to identify the target groups of staff and the types of training they should offer.

Difficulty 3 : Lack of strong senior management involvement/support

Strong support and commitment from senior management were regarded as crucial in this quality transition/upgrading process. It was the driving force to sustain the running of the quality programme. The top management had to generate a conducive environment in order to enhance the development of the system, and had to develop a vision and subsequently a mission statement, which should be communicated throughout the entire organization. This would enable all employees to work towards the same quality goal. The strong senior management commitment/support meant not only providing the necessary means, but also active involvement in all phases of the transition/upgrading process.

To conclude, this transition/upgrading process needed not be one of leaving the ISO 9000:1994 behind to move on to something new or more superior, such as TQM or ISO 9000:2000. Rather, there were other ways in which an organization could build upon the framework provided by ISO 9000:1994 to incorporate the cultural dimensions required by the TQM or the ISO 9000:2000, in particular, (1) moving to a customer focus, (2) moving from compliance to continual improvement, and (3) moving from reactivity to proactively.

7. References

Ahmed, Syed M. and Aoieong, Raymond T. (1998). Analysis of Quality Management System in the Hong Kong Construction Industry. *Proceedings of the 1st South African International Conference on Total Quality Management in Construction, Cape Town, South Africa,* pp. 37-49.

Meegan, S.T. and Taylor, W.A. (1997). Factors influencing a successful transition from ISO 9000 to TQM – the influence of understanding and motivation. *International Journal of Quality and Reliability Management*, Vol. 14, No. 2, pp.100-117.

Sung, Edmund and Au, Ming-Piu (1999). How TQM Practices Help Companies Align to ISO 9000 Version 2000 Standards? *Proceedings of The 4th International Conference on ISO 9000 & Total Quality Management, Hong Kong Baptist University, Hong Kong, 7-9 April 1999, Ho, K. M. Samuel (ed.) HKBU Business School & Authors,* pp. 152-156.

Taylor, W.A. and Meegan, S.T. (1997). Senior executives and the ISO 9000 – TQM transition: a framework and some empirical data. *International Journal of Quality and Reliability Management*, Vol. 14, No. 7, pp.669-686.