Hwang, K.K. 1998. Guanxi and Mientze: Conflict resolution in Chinese society. *Intercultural Communication Studies* 7(1): 17–42.
Imahori, T.T. & Lanigan, M.L. 1989. Relational model of intercultural communication competence. *International Journal of Intercultural Relations*. 13(3): 269–286.
Karim, A.U. 2003. A developmental progression model for intercultural consciousness: a leadership imperative. *Journal of Education for Business* 79(1): 34–39.
Levin, R. & Norenzayan, A. 1999. *The pace of life in 31 countries*. Journal of Cross-Cultural Psychology 30: 178–384.
McGregor, D. 1960. *The human side of enterprise*. New York: McGraw-Hill.
Misumi, J. & Peterson, M.F. 1985. The performance-maintenance theory of leadership: review of a Japanese research program. *Administrative Science Quarterly* 30: 219–223.
Ralston, D.A., Gustafson, D.J., Cheung, F.M. & Terpstra, R.H. 1993. Difference in managerial values: a study of US, Hong Kong and PRC managers. *Journal of International Business Studies* 24: 249–276.
Ralston, D.A., Holt, D.H., Terpstra, R.H. & Yu, K. 1997. The impact of national culture and economic ideology on managerial work values: A study of the United States, Russia, Japan and China. *Journal of International Business Studies* 28(1): 177–207.
Rowlinson, S., Ho, T.K.K. & Yeung, P.H. 1993. Leadership style of construction managers in Hong Kong. *Construction Management and Economics* 11: 455–465.
Rubin, I.M. & Berlew, D.E. 1984. The power failure in organizations. *Training and Development Journal* 38(1): 35–38.
Scarborough, J. 1998. Comparing Chinese and Western Cultural Roots: 'Why East is East and....*Business Horizons*. November/December: 15–24.
Thomas, D.C. 2002. *Essentials of International Managers. A Cross-cultural Perspective*. CA: Sage.
Trompenaars, F. 1994. *Riding the waves of culture: understanding cultural Diversity in business*. London: The Economist Books.
Wong, J.K.W., Wong, P.N.K. & Li, H. 2006. The adjustment of leadership styles in intercultural workplace – some evidences from the multinational construction companies in Hong Kong, *HKIE Transactions* 13 (2) June: 31–40.
Yoo, S.H., Matsumoto, D. & LeRoux, J.A. (in press). The influence of emotion recognition and emotion regulation on intercultural adjustment. *International Journal of Intercultural Relations,* in press.

Innovations in Structural Engineering and Construction – Xie & Patnaikuni (eds)
© 2008 Taylor & Francis Group, London, ISBN 978-0-415-45755-2

ISO9001:2000-advantages and obstacles in the Portuguese construction business

N.M. Cachadinha
Department of Civil Engineering, Universidade Nova de Lisboa, Portugal

ABSTRACT: This article aims at outlining the major obstacles and advantages of implementing Quality Management Systems in Portuguese construction companies today, as well as discussing solutions to a successful implementation compliant with ISO 9001:2000. The overall present situation in the Portuguese construction business is described, and the major difficulties to swift and successful implementations are identified. Each issue is discussed based on its roots and solutions are proposed.

1 INTRODUCTION

Quality has been a subject of rich and abundant discussion. Its necessity is quite consensual, but its own definition is not. Having been turned into a *buzz word* and a distinction flag, quality and the process of achieving it still enable and encourage structuring processes, vital for the progress of the Portuguese construction industry and of Portugal.

The creation of Quality Management Systems (QMS) has gathered the attention in both the industry and the academy sectors during the 80s and 90s. Total Quality Management was favored and largely implemented in the USA. International Standard Organization's (ISO) answer was the ISO 9000 set of norms, published in 1987. This set of norms was soon defining the industry standard in certification of QMS in Europe. Although the certification of QMS in several European companies, including Portugal, has been concluded, that period has mainly served to consolidate the accreditation networks and certification bodies. Critics to the 1994 version of the ISO 9000 set of norms included excessive complexity of procedures and excessive bureaucracy, without correspondence in terms of the quality of the final product and of customers' satisfaction.

ISO addressed these issues by publishing a revised and comprehensive version of the ISO 9001 norm in the year 2000. ISO 9001:2000 focuses on continual improvement/customers' satisfaction, based on the cycle process "*Plan – Do – Check – Act*". This new version set forth an important paradigm shift. The new version of the norm replaced the traditional *a posteriori* quality control by a *during the process* quality assurance approach. The principle was "the right production process cannot yield wrong products".

2 PRESENT PANORAMA

The new version of the norm proved to be a success. The new, simplified document management system and the expediting of the norm led to a clear increase of the number of companies with certified QMS. The real coverage of industry sectors was also expanded to economy sectors, company types and sizes that had previously stayed out of this process. The certification of QMS generalized itself. At present, certified QMS can be found in companies of all sizes and economic sectors in Portugal.

However, the national companies of reference in the construction business only recently concluded their certification processes. This economic sector is still today underrepresented in the whole of the companies with certified QMS. Just as Ganner & Johnson (1997) state in their analysis of an implementation in a software organization, "First, it can be difficult to interpret how the requirements of the ISO 9001 standard apply to a software organization. The standard was originally developed for manufacturing organizations and understanding how the requirements apply in a software organization is not always straightforward" (p.606). Construction companies face similar challenges in their implementations, and it is not an easy task to transfer these requirements to such a *sui generis* industry like construction.

3 MAJOR DIFFICULTIES TO OVERCOME

There are significant reasons for this. The construction industry carries out its production in ever changing locations, and its work teams, equipment, fringe conditions and interfaces are always different. The built object itself is unique, with a specific dimensioning

and design. Never before has another identical object been built, and it is unlikely that it ever will in the future. In the ideal situation where all the recourses, the concept and design are identical, at least the soil where the object will be built upon will be different.

3.1 *Systematization*

This reality makes efforts towards systematization, standardization and process automation particularly difficult. Although a significant amount of technology has been added to the equipment and materials utilized, the production process in the construction industry still maintains more similarities with crafts production than with industrial production. This is probably the industry sector where new practices, techniques and trends arrive latest. Certification of QMS is not an exception. However, the substantial increase in recent years of the number of companies that concluded their certification processes indicates that this is a stabilized reality that cannot be ignored.

3.2 *Management*

Besides the specific physical and technical characteristics of its sector, construction companies also have particular management practices. The author is presently researching on this field and further articles on this subject are expected to be published soon.

The greatest challenges that construction companies face while implementing a QMS can be gathered in six areas:

- Systematization and structuring
- Document control
- Defining and maintaining procedures
- Clients' satisfaction - evaluation, analysis and action
- Interaction between quality and production sectors
- Assignment and costs of manpower

The first point is not the most visible challenge, but it is probably the most important one. To implement a QMS it is necessary to clarify and often delegate authority and responsibility.

The systematic and comprehensive definition of the function records and of the respective function matrix is a structuring task that formalizes in a binding way the function record, its functional ties, the superior functions it reports to and the minimum and preferred competences to be met in order to execute the function. Formalizing an organization chart is essential for process systematization.

The staff assigned to the monitoring and management of the QMS has an uneasy, misunderstood job. They are perceived as unproductive, often even a hindrance by the production staff. This image has been created by the assignment of people with insufficient production background to jobs related to quality. In many implementations of QMS employees recent to the business or to the company have been assigned to Quality related jobs. Staff with a mainly administrative profile has often been preferred, in order to cope with the increased volume of documentation. This also happened in order to avoid excessive complicity between the quality and production departments, which could lead to an incomplete and inaccurate verification of the procedures to be implemented. Therefore, the staff assigned to quality functions that interact on a daily basis with the production department should originate from the "field", thus having earned respect by the production department's staff.

4 ADVANTAGES AND PERSPECTIVES

Achieving an ISO9001:2000 certified QMS has undeniable advantages in various fields, as it opens new perspectives for the company. Some of the most important are:

4.1 *Image and client relationship*

A certified QMS is a prestige factor. The company proves vitality, commitment to modernization, awareness to the current concept of quality and capacity to operate important and positive changes in its structure. This alone is already a factor for increased confidence by the customers. The latter have also added guarantees to the mandatory and predefined processing of claims. The assessment of the customers' opinions and the commitment to continuous improvement bring the costumers and the company nearer. The costumers' opinions are heard and taken into account.

4.2 *Restructuring and modernization*

As portrayed above, the process of implementation of a QMS is a significant opportunity to restructure and modernize an organization. It is an external, widely accepted motive to change functions, procedures and old habitudes in the organization. This effort would otherwise be considered an unnecessary and unjustified extra effort.

It is also an excellent opportunity to introduce new tools and work techniques, thus restructuring the organization not only to achieve the certification but also to make it more effective and rational.

4.3 *Systematization, equipment and process control*

The certification of a QMS by ISO 9001:2000 norm is demanding in what concerns:

- creation, maintenance and tracking of records concerning the measurement and monitoring of processes and products (section 8),

- verification, calibration and maintenance of MMDs (section 7),
- control and preventive maintenance of production equipment (section 6).

This level of demand has been criticized for increasing the process bureaucracy. However, it brings about the adjustment of the structure to a new, more structured *modus operandi*. In some companies this means being exposed for the first time to written procedures and to the creation of records on a continuous, everyday basis.

It also demands from production personal at all levels recorded intermediate verifications of their work, enhancing self control and responsibility on a wider range of functions. This represents an opportunity to change mentalities and work procedures, focusing of self control, responsibility, measurement and monitoring.

It is particularly important to avoid that the QMS is seen as one more obligation that can be fulfilled in a compressed manner right before specific milestones, maintaining the *modus operandi* unchanged during most of the year. The most important of these milestones will surely be the yearly auditing by the certification body. In such a context, this audit will be preceded by a strenuous, but time limited effort. This is a tempting deviation from the spirit of the norm and should be fought against.

4.4 *Clarification of functions, tasks, responsibilities and hierarchy*

The implementation process leads to the clarification and recording of what is expected from each function in the organization and the specific skills required to carry it out. It also requires a clear, unambiguous definition of each employee's responsibilities. This requires a reassessment process that enables conclusions about ambiguous border areas. Another important aspect is the clear statement of the hierarchical chain, thus clearly outlining each employee's responsibilities and scope of authority.

4.5 *Quality standard and continuous improvement*

Rather than guaranteeing a high level of production/services quality in the immediate post-certification phase, implementing a QMS guarantees a quality standard with lower dispersion. It also commits the organization to continuous improvement, thus gradually raising this standard.

4.6 *Change in mentality*

The implementation of a QMS implies planning, defining, verifying and updating processes and procedures. This is defined in the ISO 9001:2000 norm as the "*plan-do-check-act cycle*". It encourages a change of mentalities from a reactive to a proactive attitude. Planning and prevention gain ground to daily solving of unexpected urgent problems.

5 CONCLUSIONS

The certification of a QMS represents an important opportunity for modernization and paradigm shift for construction companies. It is particularly important for the small and medium sized companies in the business, due to the restructuring and work habit changes it brings about.

The difficulties, obstacles and challenges inherent to this process have been portrayed above and should not be underestimated. Nevertheless, the advantages clearly compensate the inconveniences and the investment of resources involved.

Furthermore, it is crucial that the stakeholders, particularly the top management, are fully aware of the ramifications and changes that a QMS involves. The organization will necessarily undergo permanent changes that, when previously unknown, may drift from the initial expectation. A well informed, planned and systematic approach to the implementation phase avoids severe situations and reduces its duration, thus faster achieving stable operation and the desired benefits.

REFERENCES

International Organization for Standardization ISO 2000. *NP EN ISO 9001:2000 Sistemas de Gestão da Qualidade – Requisitos* 2000. Caparica: Instituto Português da Qualidade (IPQ).

Ganner, M. & Johnson, M 1997. Lessons learned implementing ISO 9001 in a software organization. Innovation in Technology Management - The Key to Global Leadership. *PICMET '97: Portland International Conference on Management and Technology 27–31 July 1997.* Portland: PICMET.

International Organization for Standardization ISO 2006. ISO 9000 and ISO 14000 – In the beginning *http://www.iso.org/iso/en/iso9000-14000/understand/basics/general/basics_2.html.* Geneva: International Organization for Standardization ISO.