Integrating buildability in ISO 9000 quality management systems: case study of a condominium project

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Abstract

Productivity and quality are two inter-related issues of utmost importance in the construction industry. The buildability concept and ISO 9000 quality management systems are used to help raise productivity and quality standards in construction. However, both buildability principles and ISO 9000 quality system elements are frequently considered separately in many consulting and construction firms. Many of these firms have also developed and implemented ISO 9000 quality management systems in their organisations. To achieve synergy, this paper argues by means of a case study of a private condominium project that buildability principles can be integrated within ISO 9000 quality management systems.

1. Introduction

With the need for better buildable designs, the implementation of ISO 9000 quality management systems can help to enhance the buildability of a project. The ISO 9000 standard establishes the policies and procedures that require proper documentation for a minimum level of management commitment to quality. Hence, with documented procedures which consider and ensure conformity of buildability in building processes, as well as encourage buildability reviews and corrective actions, firms can be made more aware of buildability principles which will, in turn, lead to improved buildability of a project. With improved internal communications, feedback and training, the ISO 9000 standard can help to enhance a company’s confidence in its ability to consistently deliver buildable designs and construction methods.

This paper does not suggest that the linkage between quality and productivity is an entirely new consideration. The linkage was already considered to synergise the relationship between quality and productivity in a generic sense [10,15]. Buildability, which can help to raise both productivity and quality standards, deals however with separate, albeit closely related, issues. It is believed that the integration of buildable concepts with ISO 9000 quality system elements is dealt with for the first time in this paper.

As more consulting and construction firms obtain certification to meet the ISO 9000 standard, this paper proposes that the ISO 9000 quality management system can serve as an important working platform for achieving buildability. The thrust of this proposition is shown in Fig. 1. There is currently no study on the application of ISO 9000 on buildability nor any research work which evaluates the effectiveness of using ISO 9000 quality management systems in enhancing the buildability of a project. While the buildability concept is now slowly making an inroad into the construction industry, there is still a lack of understanding of this concept and its underlying principles. While more and
more firms are being certified to meet the ISO 9000 standard, many are still blissfully unaware of the usefulness and effectiveness of ISO 9000 quality management systems in achieving and enhancing the buildability of a project. The objectives of this paper are therefore:

1. To briefly present the buildability concept.

2. To briefly highlight the application of ISO 9000 quality management systems in the construction industry.

3. By means of a case study, to examine the relevance of using ISO 9000 quality management systems for integrating buildability principles at the design and construction stage of a project.

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### Buildability Principles

- Investigate thoroughly
- Consider access at the design stage
- Consider storage at the design stage
- Design for minimum time below ground
- Design for early enclosure
- Use suitable materials
- Design for the skills available
- Design for simple assembly
- Plan for maximum repetition and standardization
- Maximise the use of plant
- Allow for sensible tolerances
- Allow for a practical sequence of operations
- Avoid return visits by trades
- Plan to avoid damage to work by subsequent operations
- Design for safe construction
- Communicate clearly

### ISO 9000 Quality System Elements

- Management responsibility
- Quality system
- Contract review
- Design control
- Document and data control
- Purchasing
- Control of customer-supplied product
- Product identification and traceability
- Process control
- Inspection and testing
- Control of inspection, measuring and test equipment
- Inspection and test status
- Control of nonconforming product
- Corrective and preventive action
- Handling, storage, packaging, preservation and delivery
- Control of quality records
- Internal quality audits
- Training
- Servicing
- Statistical techniques

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Fig. 1. Theme of paper.
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