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This is the author's version of a work that was submitted/accepted for publication in the following source:

[Coffey, Vaughan](#) (2011) Quality management in construction projects. *Construction Management and Economics*, 29(12), pp. 1244-1246.

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<http://dx.doi.org/10.1080/01446193.2011.645492>

Book Review

Quality Management in Construction Projects

Abdul Razzak Rumane, CRC Press, Boca Raton, FL, 2011, 434 pp, ISBN 978 1 4398 3871 6, US\$90.00

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Issues of quality management, quality control and performance against specification have long been the focus of various business sectors. Recently there has been an additional drive to achieve the continuous improvement and customer satisfaction promised by the 20th-century ‘gurus’ some six or seven decades ago. The engineering and construction industries have generally taken somewhat longer than their counterparts in the manufacturing, service and production sectors to achieve these espoused levels of quality. The construction and engineering sectors stand to realize major rewards from better managing quality in projects. More effort is being put into instructing future participants in the industry as well as assisting existing professionals. This book comes at an opportune time.

The Introduction outlines the perspective of the author, i.e. the design and construction phases of projects, and the relationship of quality management to many of the issues facing the modern construction industry. This is followed by a very brief history of quality assurance and quality management, as well as an introduction to other concepts addressed within the book, such as TQM, Six Sigma, TRIZ and related strategic systems and philosophies. A somewhat controversial statement in this section is that because of the non-repetitive nature of construction projects it is not possible to compare actual performance of one project with another. This view is debatable in that while designs of buildings may differ, the building processes utilized in the construction of many buildings are similar, as are many of the construction systems used. These certainly can be compared in terms of determining what does and what does not contribute to good quality.

Chapter 1 begins with a historical overview of the quality movement starting at the Stone Age and meandering through various examples of early quality management in China, Scandinavia and Europe in the Middle Ages. Factory-manufactured quality (which was largely ‘inspected in’) during the time leading up to and including the Industrial Revolution

is covered, as is the contribution of the defence and armaments wartime efforts that did much to establish early versions of the quality standards which today sit under the ISO 9000 series. The work of Kerzner (2001) and Pyzdek (1999) are usefully summarized to give a brief chronological overview of the last 100 years of quality concept development. This section ends with a timeline describing ‘the birth of total quality’. The chapter continues with a definition of ‘what quality is’. Descriptions of quality inspection, control, assurance, engineering and management are given. The section on quality control has a description of many of the ‘tools and techniques’ of control made popular, but covered in a lot more detail, in many other quality management books (Keraminiyage *et al.*, 2004; Delgado-Hernandez and Aspinwall, 2005; Tang *et al.*, 2005). This chapter contains several quite lengthy quotations from other writers on quality and quality history and in that sense is a useful reference source for anyone wanting to have a quick overview of how the quality movement developed over the period since World War II. A potted history of the ‘quality gurus’ is then provided. This leads to the changing views of quality that have led to the TQM philosophies and principles that have endured and found their way into the modern quality systems and strategic quality practices. Two useful tables developed by other authors are included in the chapter. One compares the different philosophies and approaches of Crosby, Deming and Juran. The other compares the approaches to quality improvement of Deming, Juran and Crosby. The second half of the chapter examines the elements of TQM and some of the systems that have prevailed to ensure the development of improved quality processes. These include quality function deployment (QFD) and Six Sigma in a variety of industries. It is in this latter section that, for the first time, we get some connection with the construction industry as we read about the potential use of Six Sigma tools within a construction context. TRIZ problem-solving, BIM and CAD techniques are briefly covered. The chapter ends with a useful run through value engineering methods and where they are typically used in construction design and planning. On the positive side, this chapter provides a great resource for academics and students as a text to describe the history and importance of quality

management and process control systems. On the downside it is, until the latter half, fairly subjective and generic with little or no deeper connection to the construction industry. However it is important to remember that this is the first chapter and therefore acts as a foundation for what follows in the rest of the book.

Chapter 2 is entitled 'Integrated quality management' and the development of the ISO 9000 quality management standard series is examined. This includes the documentation and certification involved and the chapter then seamlessly describes the integration of this standard with ISO 14000 (environmental management) and OHSAS 18000 (occupational health and safety) standards. The value of this chapter is that we are clearly shown why the integrated standards are important in the construction industry and have become the *de rigueur* approach in most regulated building sectors around the world, as a way to handle the combining of auditing, documenting and implementing these three important standards in the most cost effective and business efficient manner.

Chapter 3 is specifically directed at introducing the concepts of quality applied in the construction and related manufacturing industries. Construction projects are defined and once again we are given a short history of how they developed around 5000 years ago through their transformation within a construction industry that during the last 100 years has become a major contributor to GDP in most countries. Parallels are drawn between the construction and manufacturing industries in terms of their different and similar project characteristics. The costs of prevention, appraisal and correction of non-conformance are examined. The derivation of project life cycles and the contributory phases are related to systems and life cycles. The chapter ends with a table summarizing the construction project life cycle indicating the different processes. The shortness of this chapter is deceiving because it covers a lot of useful ground and firmly establishes the context (i.e. construction) in which the succeeding chapters of the book will cover a specifically contextualized view of quality.

Chapter 4 is a robust chapter, and is really the 'meat' of this book. Therefore, it is apt that its title is similar to that of the whole book, 'Quality in construction projects'. The first three chapters of the book are of interest to those construction management academics and students looking for a general grounding in some of the seminal literature introducing concepts within the quality space. This chapter is of considerable use to the reading practitioner, or for those studying the topics surrounding quality management with a view to applying them out in the 'real-world' arena. The chapter opens with a walk

through various views on the importance and role of quality in construction, drawing from a wide range of sources such as various University of Texas CII publications (1990–92) to the more recent writings of Oberlender (2000). Roles within the industry that contribute to, or interface with quality efforts are covered in some depth, as are the different popular procurement methods. These are also specifically related back to their alignment with quality management systems. As one might expect from an author with his biography, he concentrates heavily on the role of quality in all of the design and specification stages of a construction project. These chapters balance some exhaustive checklists of components, processes and quality planning elements with readings and references from professional bodies, a few researchers and, of course, the 'gurus'. The topics then move from planning and design to site establishment practices and into more hardcore building processes and procedures. These sections of the chapter contain a wealth of sample forms, checklists, flow diagrams and some impressive charts. These demonstrate the means to facilitate the control of progress, variations and cost by applying quality assurance and control techniques to assist in keeping construction projects within established parameters that will ultimately please the client or owner. The chapter ends, predictably and correctly, with the handover and acceptance stages of a typical contract, which forms a smooth bridge into the next chapter that looks at facilities operations and management.

Chapter 5 is a brief look at the phases of post-construction operation and maintenance of a built project, although there is a short foray into some basic theoretical thinking in the US, Europe and the Middle East about facilities management and its benefits and potential evolution in future.

The final chapter is concerned with assessment of company quality systems through the usual devices of auditing and management review. But it also covers the need for the construction industry to benchmark against the marketplace. There is also a very short paragraph encouraging companies to consider what quality culture they actually possess and what their preferred quality culture in future might be. This light encounter with the complex concept 'culture' in the construction industry, in any new edition of the book could be expanded to provide a connection across to the related the work of Coffey (2010) and others (Willar *et al.*, 2010; Ankrah and Langford, 2011; Tjihuis and Fellows, 2011) on the relationship between organizational culture strength and type, and its effects on a variety of strategic variables, including quality, in construction and infrastructure projects. However, this chapter still forms a good platform for other

researchers (including me) to take up and run with the deeper examination of the culture and quality perspective in future. The last page of the chapter looks at the popular types of self-assessment of quality capability and maturity, e.g. the Malcolm Baldrige National Quality Award, European Quality Award, etc.

The intended audience of the book could be quite wide given the balance between short descriptions of the relevant literature and the substantial practical information it contains. However, I believe it to be more useful to the construction or engineering student who wants a very general grounding in three areas. First, the history of how quality management has developed. Second, how it has been absorbed into construction management systems. Third, how it can be useful among a range of other techniques and project management practices to be applied to facilitate the smoother running of successful projects.

The major strength of the book is its detailed inclusion of so many of the useful artefacts and tools found within well-structured and organized quality management systems. These are usefully related back to the established construction and engineering management systems that many people in the industry are already familiar with. They are well supported by Tables and Figures; for this the author should be given credit. Limitations of the book really are few. It would be easy to criticize the lack of a comprehensive review of the literature in the field, but then I do not believe that this was ever a major aim of the author and such literature that is described is relevant and may not have otherwise been brought to the notice of most undergraduate or even some postgraduate students of construction and engineering management.

The format of the book is fairly standard, as one would expect from this publisher. If it were to be marketed as a textbook for university or other tertiary courses, it should be made more engaging and user-friendly. It would also require an instructor's manual and some online resources to assist its use as a teaching resource. In the current format, the price is probably not so attractive to many students but if released in a more reasonably priced e-book format, it would probably attract a healthy readership among those sectors already mentioned.

So to conclude, this book has a place in the literature in the field of quality management in construction, mainly due to its practical and pragmatic approach to address the concerns of those in the

construction industry that actually want to know what is needed to manage and control their projects for better quality outcomes. An academic research study this book is not, but then it does not ever appear to have set out to address that specific space.

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