

GOOD ENOUGH QUALITY: MULTIPLE QUALITY CULTURES IN A SWEDISH REGION

Christian Koch¹ and Martine Buser

Department of Construction Management, Chalmers University of Technology, Gothenburg, Sweden

Despite decades of efforts, the construction sector is still haunted by defects and impaired quality. The Swedish investments in buildings and infrastructure is impressive and counted in billions of euros these years. Yet the investment costs have not achieved concrete improvements and the quality of the realized infrastructure and buildings is at least controversial. The actors involved are despite their efforts unable to deliver an excellent quality, but merely a quality on an acceptable level. This paper aims at analysing the context which produces such a low-quality drawing on the concept of organisational culture inspired by Alvesson 's adaption of Geertz 's work. Organizational culture is here described as bearing multiple forms and occurring in complex constellations. As in construction, the projects and their interorganisational features are important, we cautiously choose to think of quality culture within a single urban region, assuming that projects and companies operate in the same shared environment. Out of the literature we have selected four major aspects of quality culture: The concept of quality, the formal legal quality control system, the relation between production and quality and the guiding micronarrative. The empirical material consists of 27 interviews of professionals of the sector and projects documents analysis. The results show that these four aspects unify and separate characteristics of quality cultures. Quality is assigned different meanings creating several quality cultures. Moreover, the formal quality control system is unable to bridge the major decalage between project and headquarters producing instead alternative set of quality cultures. The constellations of quality cultures in construction are thus in internal contradiction and continual instability. The resulting antagonistic dynamics resembles that of an orchestra of dissonances.

Keywords: quality culture, symbolic interactionism, urban regions

INTRODUCTION

The lack of attention to quality in projects is a recurrent issue (Basu 2017). During the production, time and cost are often the focus, whereas quality is “relegated to mere ‘lip service’ and ‘tick box compliance’ (Basu 2017:1). Deming (1986) posited that quality is defined by the satisfaction of the customer. However, in the construction industry waiting for the customer satisfaction to judge of the quality would be very expensive as a number of defects occur during the production that leads to costly rework and may seriously lower quality at delivery (Mills *et al.*, 2009, Aljassmi and Han 2012). Usual explanations to account for quality issues are related to design failures, redesign, multiplicity of actors during production or uniqueness of projects. Here, however, we propose to address the topic by revisiting the discussion on quality

¹ christian.koch@chalmers.se

culture using a symbolic interactionist approach. The quality culture concept stems from Total Quality Management (TQM) and focuses on the "values and beliefs that foster total quality behaviour" (Kanji and Wong 1998). In TQM it is believed that quality culture is something that can be planned, installed, and managed. The symbolic interactionist approach, however, enables us to look at culture analytically through the shared meanings, symbols and narratives expressed by the interviewees when they discuss quality work. The empirical material draws on a research project aiming at mapping and analysing the status of the Swedish "self-control" system. This legally enforced system, obliges

building projects to plan, monitor and complete quality control. Our explorative research project gathered material from seven interviews with key actors in the industry and five case study of building projects taking place in the Gothenburg region: four new built dwelling and one retrofit. Here, we focus on the participants' own interpretation of their work with quality. Previous studies in this region report a level of quality commonly recognized as acceptable yet not excellent, the cost of defects averaging at 5-10% of the final product price. Our contribution lies in the identification of different quality cultures, and their combination which may form different constellations at and across building sites and adds to the rare studies of quality control in Sweden and departs from previous contributions identifying single quality culture (Cheng and Lui 2017, Tang *et al.*, 2009).

METHODOLOGICAL APPROACH

The paper adopts a qualitative interpretive sociology approach (Alvesson 2003) to its research questions and aims, theoretical framing, empirical material and analysis. We felt that behind the legal frames, engineering tools and other functional elements a more interpretive approach was missing such as offered by symbolic interactionism (Alvesson 2003, Hatch and Cunliffe 2013).

The Unit of the Urban Regions Building Industry

Adopting quality culture is not unproblematic in a context where projects are central locus of quality (Basu 2017, Coffey 2010). Projects gather members of multiple organisations, who are constantly substituted and may be active in several projects simultaneously. So, we choose here to focus the urban region of Gothenburg. We assume that the organisations are active in related projects and networks. The notion urban region is tentative and used to underline the focus on the industry operating close to or in the regional main city. Thinking of driving distance for subcontractors the area is roughly 50 km times 50 km. Other studies have indirectly documented the same area (Bröchner *et al.*, 2002, Carlsson 2017, Styhre 2011). At a more pragmatic practical level, operating in this urban region mitigated the present study's limited resources, closeness and access was important. This delimitation is not implying however that we necessarily assume that the culture is different in other regions, but our empirical field work has covered this region only.

Empirical Material

The key actors, companies and building sites were selected using the researchers' local network, based on the access possibility and included different types and sizes of companies: Architects, consulting engineers, material suppliers, large contractors, medium and small contractors. Four dwelling construction sites and one retrofit site of a public institution were selected. As such the sample cannot be seen as representative however it does support an explorative and illustrative aim.

Twenty-seven semi-structured interviews and the analyse of 12 audits and quality-control plans documents were carried out. The interviews of key actors include a building materials supplier, an architect, a consulting engineer and two quality managers in contractors' headquarters and two control inspectors, who were part of the regulative setup. For the five case studies, we visited the building sites and carried out interviews with the five site managers, one foreman, one quality manager on site, one representative of 13 sub-contractors, of which seven were technical installation companies. The 12 audits on the five sites were in some cases carried out together with the sub-contractors and in other cases with site managers. The content of the inspection and test reports present on site were examined critically.

Initially, the analytical strategy followed an abductive approach (Alvesson and Sköldbberg 1997). As visits and interviews were carried out elements of quality cultures emerged. The interview framing was kept semi-structured, but with inspiration from ethnographic interviewing (Heyl 2001). All interviews and audits were taped, and, selectively transcribed sorting out of passages that appeared interesting at the outset. The first analytical round examined each key actor and building site in isolation. The interview transcriptions were revised to include more recorded passages. During the second round, actor-oriented interpretations of quality and the quality control system emerged, more specifically company-, site manager- and craftsman-oriented. In a third round of analysis adopting the symbolic interactionist culture lens, common, distinct and ambiguous elements emerged across the company representatives, sites and actors. It has been chosen to not enter references in Swedish as they are too numerous for a conference paper.

THEORETICAL FRAMEWORK

Culture and Quality Culture

Studies claiming that culture is a national feature has been spearheaded by Hofstede (1991). His approach also has followers in quality culture, pointing at tensions between science and craft, and local conflict solving practices avoiding independent auditing (Bröchner *et al.*, 2002). Organizational culture studies on the other hand have been dominated by two main paradigms (Hatch and Cunliffe 2013): functionalism (Schein, 2016) and interpretivism, including symbolic interactionism, Geertz, 1993, Alvesson 2003. Although other with more instrumentalist approaches such as the competing values model (Cheng and Lui 2007, Liu *et al.*, 2006, Panuwatwanich and Nguyen 2017) have been adopted for studying quality culture. Symbolic interactionism posits that society and its phenomena are socially constructed by people and reproduced by the networks of shared symbols and meanings making shared action possible (Alvesson, 2003, Hatch and Cunliffe 2013). Symbols can be expressed verbally, physically and by actions. The rare culture studies informed by symbolic interactionism are usually related to a specific setting such as a production or an organization (Alvesson 2003). In this perspective quality culture would be viewed as a focussed aspect of the organizational culture. Thus, we define quality culture as the shared and learned meanings, experiences and interpretations of production and quality --expressed partially symbolically--which guide people's actions towards quality, quality control and the balancing between production and quality. Quality culture is shaped by people in the structures and social relations within and outside the organization. Building project are central producers of quality (Basu 2017), but in building projects members are constantly substituted. It is therefore possible and needed in an explorative manner to delimit to study of quality culture to a unit of a regional building industry.

Culture with a Symbolic Interactionism Approach

The symbolic approach culture encourages a reduction of the role of the organizational boundary as it perceives organizations as constructed and reproduced by peoples shared meaning. Alvesson (2003) uses the terms cultural traffic and social fields to understand how grander cultures and organizational cultures interact. Apart from symbols, other central concepts are that of a root metaphor and metaphors, shared meaning, narratives, myths and ceremonies characterizing the culture. In the development of organizational culture theory controversies about the way to conceptualize and analyse culture (Hatch and Cunliffe 2013, Martin 2002). Rather than taking a one-sided position in these debates, Meyerson and Martin's (1987) suggestion of a three-perspective analysis including integration, differentiation and ambiguity is followed to which we add the concept of multiple configuration proposed by Alvesson (2003). This allows the scholar to handle quite complex cultural patterns and avoids falling into the monolithic trap of waiting for a unitary concept to emerge.

Integration

The integration perspective underlines that culture is the shared understandings in a given organization. There is a consistency across cultural manifestations (Meyerson and Martin 1987). Schein is probably the most significant scholar within this perspective, (Hatch and Cunliffe 2013. Culture in this perspective is thus an integrative mechanism, labelled as the social glue between its members (Coffey 2010, Schein 2016, Alvesson 2003). In Schein's version, the common basic assumptions are the consistently shared element. Some representatives of the integration perspective clearly link it with managerial prerogatives and attempts at top-down control and change of the culture. Within this position, diversity is rarely recognised. If so, it is interpreted as a signal of weakness, or one culture is assigned the dominant role, whereas others are represented as subcultures. As Parker (2000) argues, it is often a matter of perspective what is subordinated and what is superior.

Differentiation

This perspective focuses on the lack of consensus between interpretations, experiences and assignments of meaning in specific context. A typical example is opposition to a leader, researchers adopting the differentiation perspective paying attention to non-leader-centred sources of culture (Hatch and Cunliffe 2013, Parker 2000). These researchers differ, however, in their analyses of units of differentiation by which to characterize the field. Several authors' analyses see culture as a product of such social structures as countries, regions, enterprises, departments, professions and groups (Alvesson 2003). These different groups and cultures coexist in the studied organization. Moreover, it is often argued that some cultures are superior to others, the "others" being seen as subcultures Parker (2000). Other studies, like Alvesson's, focus on the everyday work practice producing local cultures, cutting across social structures and advocating a more cautious approach in the interpretation of differentiation in cultural manifestations; arguing for an analysis that discriminates social structural differences from cultural. Panuwatwanich and Nguyen (2017) work illustrates the differentiation perspective. Although, Vietnamese construction firms are dominated by clan and hierarchy cultures, organisations characterized by either clan or adhocracy cultures are assumed favourable for TQM, whereas those characterised by both market and hierarchy cultures are less favourable (Panuwatwanich and Nguyen 2017).

Ambiguity

Already seen from the differentiation perspective, cultural manifestations may seem ambiguous. Potentially, there are differences in meanings, interpretations of symbols etc., which are incommensurable and irreconcilable leading to fragmentation (Alvesson 2003, Hatch and Cunliffe 2013). Moreover, in the continual process of creating and recreating meaning, members of different cultures may orient themselves differently at different times (Parker 2000). This perspective acknowledges the uncontrollable uncertainties that provide the texture of contemporary life (Martin 2002); however, Alvesson (and Parker) warns against too easily assigning cultural phenomena to ambiguity, thus pointing out that ambiguity might originate from social structures or social practises (Alvesson 2003). Although ambiguity is an important aspect of culture, Alvesson (2003), Hatch and Cunliffe (2013) and others point out that despite this, groups and organizations must develop at least some degree of mutual understanding of how to deal with problems in order to make cooperation possible. Alvesson (2003) talks about bounded ambiguity. Even if culture does not produce clarity and consensus throughout an organization, it can offer guidelines for coping with ambiguous meanings and how to deal with tricky issues. Bounded ambiguity may also be seen in switches between different social circumstances, legitimising various ideas and meanings.

Multiple Configuration

Whereas the dominant view among culture study scholars is integrationist, few are differentiating, and even fewer attempt to synthesise these approaches (Martin 2002). Parker and Alvesson both try to offer a way of at least juxtaposing the three perspectives. Alvesson stresses level differences; that is, whether cultures are macro cultures for example, national or local. He suggests that cultures potentially overlap and interact. Parker suggests overlapping, subordinating, subordinated cultures (Parker 2000). Comparably, Alvesson introduces the multiple cultural configuration view (Alvesson 2003). It assumes that organizations can be understood as shaping local versions of broader societal and locally developed cultural manifestations in a multitude of ways. People are to different degrees connected with an organization, sub-organizational unit, profession, gender, class, ethnic group, nation etc. This explains his observations of cultural overlap in an organizational setting, which is rarely tightly connected to the social structures of the organization. Alvesson's central argument for introducing multiple configuration is to combine the insights of the above-mentioned approaches. Thus, he recognizes the role of grander cultures, local cultures and possible integration and unity, but their mixture and overlapping character is a central observation.

Quality Cultures - A Summary

Summarizing the symbolic interactionist view, quality culture is shaped by people in the structures and social relations within and outside the organization. To examine the possible quality cultures, we use the analytical schema of integration, differentiation and ambiguity organising in diverse constellations.

The five projects under production each involved a similar range of players such as a main contractor, around twenty sub-contractors and suppliers of the building elements. All interviewed participants acknowledged a certain number of defects on sites and assessed the quality as good enough. None evaluated themselves as having excellent performance. The following are some examples of the mentioned defects: Pillars wrongly placed in the underground parking facility for a dwelling, electrical boxes

wrongly placed in prefabricated concrete walls, decommissioning meeting revealing that production had not started in several rooms which should be quality controlled.

At the same time, however, we recorded a large variation of quality handling and celebrated performance and a considerable variation in practices to obtain good quality using the quality control system. Three of the participating companies thus exhibited attempt to link projects and production with business aims and explicit quality management, whereas more than 25 companies, especially the subcontractors did not appear to prioritize quality as part of their business. Three of the building sites were characterized by a strive for "order and neatness" and two others had a practice different from the company. The site managers seriously engaged in self-control taking a leading role in the process. There was however also an ambiguous relationship to the quality control routines. The routines are viewed as necessary, but it is their formal aspects, "they need to be carried out" rather than their efficiency that are put forward by the respondents.

ANALYSIS

The Integration Perspective

The "good enough" position shared during interviews and site visits implies the impossibility to reach high level quality under the present fragmentation and price-oriented contracts. As none of the companies or building sites identified themselves as excellent, and a common assignment of meaning to quality level as of "good enough" performance is in play. The "good enough" notion is supported by the limited repercussions of Swedish law and regulations failing in practice to fully demand compliance with building specifications and regulation. This is accompanied by norms and values, which refer to and accepts as legitimate up to about 10% of the building costs as a defect and insufficient quality cost range. Quality deviances are then an issue of pragmatic negotiations with the customer. The other central common factor was the consensus and collaboration among the actor: "we are locking arms here" (site manager) (see also Bröchner *et al.*, 2002). The design and production had priority over quality, underpinned amongst other by price-based contracting. It should finally be noted that we do not find strong underpinning for a boundary of the urban region, but rather a mixture of local, regional, national, professional and corporate influences.

The Differentiation Perspective

Three main different quality cultures were found: quality as business, site manager as central and craftsmen can do it by themselves.

1. Quality as business

Three companies employ an active quality practice. They work systematically to connect business and quality, involving an active external network. The company "takes care of quality" and communicates this to potential customers and collaboration partners. It can even be said that these companies present a window exhibition of quality and quality control (for example on their websites). What distinguishes the companies with an active quality strategy from the others, is that they appear to take quality seriously in their design and production processes. One example is a large contractor. The quality managers from the headquarter play an active role on site maintaining a focus on quality throughout the building project. They also follow up on the quality control system. The architect firm visited described how they had carried out an extensive appropriation of the quality certification systems ISO 9000 and ISO 14000. Via simplification and several revisions, they developed a system

that is strongly embedded in the design processes. The company's representative asserts that through this simplified system, they do things more correctly to start with, and can perform a more efficient design with fewer defects. This leads to an improved business: Central employees thus developed the system through simplification and sifted out the important parts. The system has now been in use for several years and been revised three times. The company also hired an external auditor to scrutinize the system. Nevertheless, a side effect of this effort has been that public clients have evaluated the company lower in tendering, because of the lacking certification.

Table 1: *Quality as business*

Dimension	Culture: Quality as Business
Quality definition	Quality is value for the customer. High quality is a business parameter
Legal quality control system	Law compliant, but not essential
Relation production - quality	Attempting to find a balance, actors on site more production oriented than quality employees
Guiding micronarrative	High quality is a business parameter

2. "Site manager as central" culture

On three sites, site managers were enthusiastically working for quality and quality control. They took upon themselves the role of leading quality control activities from the first meeting with the craftsmen and sub-contractors. When this practice functions best, quality control is an efficient tool for early discovery of defects and implies that efforts can be initiated. The site managers' way of working also involves an element of decency that strives for order and neatness in the processes on-site. This way of working, however, is not something any of the investigated companies support. It is therefore identified as an at least somewhat distinct quality culture. It has been found elsewhere, that site managers are carriers of particular norms and ideals (Styhre 2011). The identified quality culture is in correspondence to this, meaning that site managers can draw on a shared system of symbolic meaning (i.e. the project manager as king), when they require that sub-contractors should participate actively in the quality control exercise. And this creates space for leadership; however, the order and neatness approach can be interpreted as ambiguous, when it gives way to the craftsmen quality understanding, upon which the site managers are directly dependent. Moreover, a function of corporate repair, i.e., legal and contractual support, might also be needed to underpin local practice, if something goes wrong.

Table 2 *Site manager as central*

Dimension	Site manager central figure
Quality definition	Craft based
Legal quality control system	Order and neatness We work in a legal manner
Relation production - quality	Project manager as king – His priorities are the active ones.
Guiding micronarratives	No help from the corporate office

3. *Craftsmen can do it by themselves*

Finally, outspoken scepticism towards formal quality control was found on two sites. The craftsmen felt that their craft competences assure an inner quality, even if this does not lead to excellent quality in the building as such. This craftsman position is also embedded in formal crafts education and certification (for example, electricians

and plumbers). Since these craft-based norms and ways of working stand in an oppositional position to the formal, legal quality control system, it is interpreted as an independent quality culture. As mentioned above, the craftsmen can draw on a culturally embedded set of norms regarding their practice in quality work. And their craft identity is also a rich source of legitimacy. To this, it can be added that the direct interaction with materiality serves to underpin, but also to a certain extent challenge, the craftsmen's quality culture. In this culture we also find narratives myth on quality control papers being filled out "post festum" with an array of pens and back dating them to make believe they were done during the process. We have not witnessed such a ceremony, but the narrative/myth about the symbolic event were active. The central role of craftsmen in the Swedish building process thus has characteristic consequences for the production of the building, quality, and the quality control system.

Table 3: *Craftsmen can do it by themselves*

Dimension	Craftsmen can do it by themselves
Quality definition	Quality grows out of competences and direct practices
Legal quality control system	Quality regulation irrelevant – a paper system
Relation production - quality	Production the most important, quality grows naturally out of it
Guiding micronarratives	Craftsmen's pride

The Constellation of Cultures

Having identified the four quality cultures, the attention now turns to the second part of the research question: if/when characteristically quality culture is found, what are the relationships between them? The four cultures analysed above are not substitutions for each other, nor can each be expected to dominate a building project and/or company. Rather, they stand in a somewhat complementary relation to each other. Even if site managers are often assigned considerable power on site in the studied region (Styhre and Josephson 2006), their practices and norms are folded out within the governance frame of a *laissez faire* company strategy. Moreover, the site managers are dependent on the craftsmen and their culture. But it is not possible to imagine a building realized only on the basis of the craft-based quality culture, even if the culture were superior or dominant within the domain of the single sub-contract. The four quality cultures are grouped in a constellation of co-existing competition and cooperation, a multiple configuration (Alvesson 2003). It is also characteristic that the cultures are spatially separated and temporally co-existing, due to the distance between the numerous building sites and companies' offices. The craft-based culture also involves a negative choice in insisting on being in opposition to the official quality control system. Finding an oppositional culture is frequent in the differentiation perspective (Alvesson, 2003). The constellation of quality cultures as such serves to legitimize the present "acceptable quality" regime in the region.

DISCUSSION

Using a symbolic interactionist culture analysis lens reveals some important explanations of the present status of quality practices in Swedish construction, even if on a modest and geographically limited research basis. One of the central tensions that run through the material is the practitioners' cultures (craftsmen and site managers) versus formal quality systems and business. This contrasts Bröchner *et al.*

(2001) identification of tension between craftsmanship and applied science traced back to German master masons coming to Gothenburg in the 1850s. The present study appears to show how quality control systems supported by regulation can influence the production of quality only up to a point. It could be assumed that the business potential would be a sufficient motivation for quality production, but few contractors in the study seem to believe so. Companies find it more attractive to let their site managers and (contracted) craftsmen be responsible. When site managers take the lead, it leads to compliance with the quality control system. The relation between company headquarters strategy and quality, site managers' quality work, and the craftsmen's practice forms a constellation of quality cultures can be described mutually supportive yet maintaining a "good enough" level of quality. It is a state of ambiguous responsibility or irresponsibility. The common acceptance in the industry of the good enough quality is supported and underpinned from several positions in the region. This culture constitutes a barrier to change of the routines and legal framework. The "quality is business" culture is rare and counter to the good enough culture. The differentiation perspective reveals that assigning meaning to quality and quality control systems cuts across the groups of professionals and companies. Quality is not related to one professional group even if the craftsmen believe so.

CONCLUSION

This paper set out to analyse quality culture in the urban region of Gothenburg. First, it established a theoretical frame of understanding, viewing practices, shared norms and procedures of quality as quality cultures. This draws on symbolic interactionist theory on culture viewing quality culture as a focussed aspect of organisational culture. Quality cultures is understood as shared meaning about what quality is, how to control it through a quality control system, the balance between production and quality and involving a guiding micronarrative. Counter to mainstream organisational and corporate culture studies the main unit of production of quality, culture, and quality culture is considered to be the projects, that are interorganisational in character. Construction professionals frequently change projects. Therefore, the creation of shared meaning, narratives and ceremonies are done on a larger arena and more interorganisational than organisational culture concepts would sensitize us towards the urban region. The study finds an overall integrative "good enough" quality culture and three differentiated quality cultures: quality as business, site managers' quality work, and the craftsmen's practice. These four forms a constellation of quality cultures that can be described as stalemate in maintaining a "good enough" quality, they cannot deliver excellent quality. It is a state of ambiguous responsibility. The constellations of quality cultures are thus in internal contradiction and continual unrest. The resulting antagonistic dynamics resembles that of multiple instruments playing different tunes simultaneously, an orchestra of dissonances.

REFERENCES

- Aljassmi, H and Han, S (2012) Analysis of causes of construction defects using fault trees and risk importance measures, *Journal of Construction Engineering and Management*, **139**(7), 870-880.
- Alvesson, M (2003) *Understanding Organizational Culture*, London: SAGE.
- Alvesson, M and Sköldbberg, K (2009) *Reflexive Methodology New Vistas for Qualitative Research Second Edition*, London: Sage.

- Basu, R (2017) *Managing Quality in Projects, New Edition*, Burlington, VT: Gower.
- Bröchner, J, Josephson, P-E and Kadefors, A (2002) Swedish construction culture, management and collaborative quality practice, *Building Research and Information*, **30**(6), 392-400.
- Carlsson, V (2017) *SME Contractors on the Stage for Energy Renovations? a Dramaturgical Perspective on SME Contractors' Roles and Interactions with House Owners*, PhD Thesis, Chalmers University of Technology, Gothenburg, Sweden.
- Cheng, C W and Liu, A M (2017) The relationship of organizational culture and the implementation of total quality management in construction firms, *Surveying and Built Environment*, **18**(1), 7-16.
- Coffey, V (2010) *Understanding Organisational Culture in the Construction Industry*, New York: Spon Research.
- Deming, W Edwards (1986) *Out of the Crisis*, Cambridge, MA: MIT Press.
- Hatch M J and Cunliffe A L (2013) *Organization Theory: Modern, Symbolic and Postmodern Perspectives 3rd Edition*, Oxford: Oxford University Press.
- Heyl, B (2001) Ethnographic interviewing, In: Atkinson, K, Coffey, A, Delamont, Lofland, J and Lofland, L (Eds.) *Handbook of Ethnography*, London: SAGE, 369-384.
- Hofstede, G (1991) *Culture and Organizations: Software in Mind*, Maidenhead: McGraw-Hill.
- Josephson, P E and Saukkoriipi, L (2007) *Waste in Construction Projects Call for a New Approach*, Chalmers University of Technology, Gothenburg, Sweden.
- Kanji, G K and Wong, A (1998) Quality culture in the construction industry, *Total Quality Management*, **9**(4/5), S133-S140.
- Liu A, Zhang S and Leung M (2006) A framework for assessing organizational culture of Chinese construction enterprises, *Engineering, Construction and Architectural Management*, **13**(4), 327-342.
- Mills A, Love, P and Williams, P (2009) Defect costs in residential construction, *Journal of Construction Engineering and Management*, **135**(1), 12-16.
- Panuwatwanich, K.; Nguyen, T T (2017) Influence of organisational culture on total quality management implementation and firm performance, *Management and Production Engineering Review*, **8**(1), 5-15.
- Parker, M (2000) *Organizational Culture and Identity: Unity and Division at Work*, London: SAGE.
- Schein, E (2016) *Organizational Culture and Leadership 5th Editon*, San Francisco: Jossey Bass.
- Styhre A (2011) The overworked site manager: Gendered ideologies in the construction industry, *Construction Management and Economics*, **29**(9), 943-955.
- Tang, S L, Aoieong, R T M and Tsui, C S L (2009) Quality culture auditing for engineering, *Consultants Journal of Management in Engineering*, **25**(4), 204-213.