

Quality management implementation in hong kong construction essay



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In this chapter, how QM is implemented in housing projects of Hong Kong and Mainland, China, will be discussed and examined based on previous researches and surveys. Factors that impact quality management in both regions will be emphasized and problems in practice will be explained. Differences of QM between them will be summarized as the final part of this chapter.

5. 2 Quality management implementation in Hong Kong housing projects

5. 2. 1 Background

Quality management is not a new concept to the Hong Kong construction industry. In 1960s, there was a great demand for public housing to accommodate new immigrants. Much of the public housing established at that time, though in a large quantity, had been at the expense of quality, resulting in 26 housing blocks for 70, 000 people needed to be redeveloped in 1986 (Kam & Tang, 1997). The cost in remedial work was enormous and the Hong Kong Housing Authority (HKHA) completely recognized the concept of QA- “ getting it right first time, every time”. Hence, emphasis on quality shifted from the “ detection of mistakes”-so called QC to the “ prevention of mistakes”- so called QA.

In March 1990, the Hong Kong Government held a “ quality awareness campaign” and the HKHA took the initiative by striving for an improvement in the quality in the construction of all public housing works. The HKHA, being the largest developer for residential buildings in Hong Kong, required all its construction contractors to be ISO 9000 certified before 31 March 1993. Otherwise, the contractors would be removed from the list of

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tendering for HKHA's projects (Chan, Wong, et al., 2006). The HKHA further introduced a performance assessment scoring system (PASS) to monitor public housing quality. In addition, since 1996 the Hong Kong Government works Branch required all its engineering, architectural associated consultants to be certified to ISO 9000 (Tang, Ahemd, et al., 2005). In December 2000, a new edition of ISO 9000 was published as mentioned in Chapter 2. The Hong Kong Government required all construction organizations in Hong Kong to obtain re-certification to this new edition by the middle of December 2003 before they could submit tenders for public jobs. Until now, clients of the Hong Kong construction industry have succeeded in getting the construction contractors accredited to ISO 9000 standards. QA has penetrated into the whole Hong Kong construction industry (Lau & Tang, 2009).

Although some benefits were experienced by contractors after the implementation of the quality system, studies have indicated that many problems and difficulties are still encountered by them (Ahmed et al., 1998). It is not unusual that most studies arrived at the same conclusion that: "client-led drive was the main motivation for certification". The main benefits generated by certification contain clearer work procedures, better documentation and competitive advantages (Tam, 1996; Tang et al., 2005). Another survey conducted by Kumaraswamy and Dissanayaka (2000) examined both positive and negative outcomes of ISO 9000 certification as perceived by contractors. Based on this survey, the top two negative aspects were "more paperwork" and "more time spent on management"; while the top two positive aspects were "more systematic record keeping" and "

improved internal communication”. In the following pages, the specific elements that influence quality of Hong Kong public housing projects will be discussed and problems that exist in current PQM practice will be examined and analysed.

5. 2. 2 Factors affecting Project quality in Hong Kong

Based on the review and comparison of previous surveys and research results of Hong Kong public building projects, there are mainly seventeen underlying factors that affect the project quality. Among them, six factors were found to be extremely significant associated with the quality performance measure (PASS score), which can facilitate creating higher quality of projects and higher PASS score for contractors. This conclusion is also found by Low & Tan, 1996; Abdel-Razek, 1998; Arditi & Gunadydin, 1998; Chan & Tam, 2000; and Chan et al, 2006. These six factors are presented as followed:

Appointment of a competent and experienced project manager in running public housing projects;

Adopting proactive quality culture;

Enhanced comprehensiveness of subcontracting inspection system;

Increased usage of skilled labour;

Better competency of site labour;

Increased client’s emphasis on quality, safety and environment.

From the empirical findings, project manager's experience in running public housing project has the highest coefficient with project quality and success (Chan et al, 2006). Project manager's knowledge on dealing with the PASS assessment can contribute to get higher PASS score. Since 1990s, the HKHA has applied standardized design for constructing public housing, where contractor project managers can build up the necessary experience and therefore can contribute to better construction quality. According to the research of Chan et al (2003), "the more experienced project managers are, the lower proportion of rework there will be". This indicates that there is a positive relationship between the project manager's experience and quality performance.

Change of existing behaviour is a major obstacle to the implementation of a quality system on site and to appeal an organization/project toward quality management (Abdul-Rahman, 1996). In addition, most employees in Hong Kong tend to consider QA process as another "additional routine" in which a lot of unnecessary paper works have to be done (Low & Goh, 1994).

Consequently, changing the perception of QA and cultivating a proactive culture for quality improvement are an essential step to QM (Chan et al., 2006). Furthermore, the management commitment was advocated by many researchers and practitioners as an important factor affecting quality (Low & Goh, 1994; Chan & Tam, 2000). These researchers concluded that motivation by the main contractor's senior management is essential to promote quality and their findings provided powerful support to the importance of establishing a proactive quality culture among the organization/project.

In Hong Kong construction industry, 80 percentages of contractors' works are sub-contracted, so labour sub-contracting plays a major role in the work organization. Although this system produces many benefits, including specialization and professionalism, it also has serious drawbacks in the coordination of work and achievement of quality standards (Fan, 1994). The excessive layers of subcontracting tend to reduce the quality of workmanship because of the lower profit margin as subcontracting pyramids down (Loh & Ofori, 2000). With reference to CIRC (2001), the multi-layered sub-contracting practice constraints the main contractors from exercising supervision of work and the combination of main contractors and various types of subcontractors cause a high degree of fragmentation, which exacerbates the problem of communication, cooperation and management. Notwithstanding, the main contractors have the responsibility to the employers for any breach of the subcontractors. Under these conditions, it is clearly in the interest of the main contractors to establish a comprehensive inspection system with specific unambiguous instructions as well as to monitor and control checkpoints in order to ensure quality of workmanship and materials (Chan et al, 2006). At present, as for reducing the burden of main contractors, CIRC (2001) has amended legislation to require subcontractors responsible for site issues and has established a voluntary registration scheme for qualified subcontractors.

In Hong Kong only few large-scale contractors directly employ their own skilled labour and as mentioned above mostly of the construction work is sub-contracted. The temporary nature of the construction work force and frequent switch of the work for construction workers from one site to another

site, make it more difficult to train workers, particularly the craft labour (Arditi & Gunaydin, 1998). In this situation, the main contractors should conduct training activities for their own employees and increase the usage of direct skilled labour.

CIRC (2001) addresses that human resource is the most valuable asset in the construction projects so the construction workers' skills are significant to the project quality. The proper training and widening experience for site labour are necessary. Arditi & Gunaydin (1998) point out that inculcating basic quality concept in craftsmen and site managers can improve project quality. In this situation, the HKHA and Hong Kong Construction Industry Training Authority have set up extensive programmes in training, testing and certifying skilled workers. At the same time, a code of practice has set up requiring all workers to take skills tests regularly.

Clients have a major influence on the outcome of project quality (Abdul-Rahman, 1996). Cost, time and quality are always a triangle relationship for projects. Each is restricted by the other two. For the most of projects in Hong Kong, costs and time parameters are the main pre-occupying factors for assessing success (Chan et al., 2006). Project quality is often taken for granted and inadequate emphasis has been given to this parameter (Rad & Kjosrowshahi, 1998). The result found by Chan and Tam (2000) indicates that the degree of client's emphasis on quality has an impact on project success. Chan et al. (2003) agree that monitoring work by the client is a very important task to ensure quality.

In view of these six significant factors, a predictive model for quality performance assessment (PASS) on public housing projects has been established by HKHA, details in Appendix IV.

5.3 QM implementation in real estate projects in Mainland, China

5.3.1 Background

Since the reforming and open door policy started in the end of 1970s, China has experienced a tremendous change from a rigid plan-oriented economy society to a market-oriented economy society. It is worthwhile to note that one characteristic of this reform is the dual-track transition, in which state plans remained while private market emerged at the same time. During this transitional period, the economy of China developed at an amazing rate, which was regarded as an important economic force in the world (Liu et al., 2004). Construction industry of course contributed to the accelerated development and has achieved extraordinary growth and dramatic development in the past thirty years.

However, there were no independent professional PM companies in construction industry until 1988. At that year, project supervision system was introduced to the construction field and construction supervision (CS) as an independent professional project management companies were involved to take the duty of PM on behalf of the client. In order to cope with the changes and bring it in line with international practice, a series of laws and regulations were enacted by the Chinese Government in the early 1990s to improve the construction industry in China. These included the Government Standard Form of Contract in 1991; the Client Responsibility Ordinance in <https://assignbuster.com/quality-management-implementation-in-hong-kong-construction-essay/>

1992; the Client Construction Supervision Ordinance in 1995; and the Tendering and Bidding Administration Ordinance in 1995. The current engineering quality management model in construction industry is presented below (Figure 5. 1).

The owner, being the sponsor, is responsible for proposing the overall quality standards. Survey and design units are responsible for the quality design of the project. Construction supervision unit are on behalf of the owner to conduct a comprehensive quality management, including monitoring the work of the contractors or subcontractors, inspecting and testing materials and equipments. Contractors through specific projects implement the project quality plan and the project suppliers provide the materials and equipment in accordance with defined requirements. The inspection unit is a recognized body which is authorized by the government to inspect and test materials such as concrete, steel, etc. The government engineering quality supervision (EQS) department represents the government to regulate and oversight the project quality management. A serial of activities launched by this government department is to ensure the construction market a healthy and ordered development, to protect national laws related to construction, safeguard national and public interests and improve the safety and health environment for the project. Overall, under this model, each unit has to coordinate and cooperate with each other in order to achieve the quality requirements and meet the owner expectations.

At present, although the gradual implementation of mandatory supervision system had gradually improved construction housing project quality, there are numerous problems existing in practice. Therefore, factors that influence <https://assignbuster.com/quality-management-implementation-in-hong-kong-construction-essay/>

quality management and problems that occur in practice will be discussed with reference to the results and analysis of previous empirical studies.

Yung and Yip (2010) state that the availability of resources, including machinery, labour and capital, is taken for granted in developed economies. Management issues are usually found in many studies to be the most important factors that influence construction quality. However, these conclusions are not applicable to underdeveloped economies, like mainland, China. According to the studies of previous researchers, there are several key factors that affect project quality.

Belassi and Tukel (1996) agree that availability of resources (human, financial, raw materials and facilities) is important to the project quality. Ling et al. (2004) point out that the “adequacy” of a contractor’s plant of equipment was one of the most influential factors affecting the quality of building elements in design-build projects. In recent situation of Chinese construction projects, both availability of materials and the mobility of labour are the matters serious enough to affect quality. The empirical statistics produced by Yung & Yip, reveals that the power of machinery per labourer is a better measurement of the impact of equipment on quality than the book value of the machinery per labourer. In addition, the use of more plants or machinery per m² of floor space will increase construction quality, while the use of more labourer per m² will decrease construction quality.

People living in China 30 years ago were satisfied if they could keep warm and satisfy their hunger. The primary function of residential properties was to protect people from the weather. At that time most people were poor with

low purchasing power, so the demand for high quality housing was rare. However, with the accelerated development of China's economy, more and more people could afford high quality housing and then the quality performance of projects were gradually be emphasized. As a result, the authority had to increase the quality standard for housing assessment and the high quality of project became a strategy for competitive advantage. Consequently, the high demand for better quality housing determines the quality in construction projects.

The adoption of mandatory construction supervising arrangements has improved construction quality in China. Clients are the final users of the housing and bear the quality of housing, but they have little control and information on the quality their buildings than developers or contractors. Hence, the mandatory institutional arrangements can better improve the construction quality than simply leaving the market to price the differentials in quality in the case of positive transaction costs (Yung & Lai, 2008; Yung & Yip, 2010). This argument is consistent with the corollary of the Coase Theorem (Coase, 1937; Lai et al., 2008).

As mentioned above, one characteristic of transitional economy is the emergence of both state-owned Enterprises (SOEs) and non-SOEs. The SOEs obviously received resources and capital much more easily than non-SOEs, because if not all of them, are include in the state plans. Although it was clear that the extent of state planning for construction materials gradually decreased after 1993, it is very unlikely that manufacturers succeeded in finding new buyers (Yung & Lai, 2009). In other words, it is easier for SOE contractor to obtain resources and funds than non-SOEs. Researchers have <https://assignbuster.com/quality-management-implementation-in-hong-kong-construction-essay/>

found that the construction quality of SOE contractors' work tends to be better than that of non-SOEs (Chen, 1998), though the general construction project quality is poor in China (Chan et al., 1999; Chen, 1998; Lam & Cheng, 2004). Furthermore, the result of study performed by Yung & Yip (2010) indicates that higher labour productivity tends to have a positive correlation with better construction project quality.

5. 4 Findings and Discussion

At present, the concept of QA has penetrated into the whole Hong Kong construction industry, though, many problems and obstacles occur in the practice of QM in a real situation of project. The typical problems will be reviewed and discussed below based on the empirical studies.

According to Au & Yu (1999), when selecting contractors less attention was given to the tenders' performance in providing specified quality documentation. Fewer tenderers' submission comprised all required quality documents as stated. The proportion for the submitted documents that are adequate for clients to assess the tenderer's quality system is relatively low. Furthermore, the " quality ranking" has little effect on the decision of final contract award. It was generally agreed that " cost ranking" and " technical ranking" are still the management's only consideration in the current practice.

It is mandatory requirement that contractors have to submit quality plans and records regularly after signing the contract. According to the findings (Au & Yu, 1999), the quality manuals and plans submitted by most contractors may not embrace all activities of themselves and their sub-

contractors of any tier. Monthly progress reports and appraisals on the performance of the quality mostly may not be submitted as required.

Controlled quality documents may not maintained throughout the duration of contract.

From the survey, there is a unanimous agreement that the current judgement of awarding interim payments is biased towards the construction progress of the contract, rather than the quality of completed work. In other words, the current regulation of money payment, being regarded as the most effective incentive, is unable to motivate the contractors to achieve the required level of performance and focus on QA issues.

It is worthwhile to notice that the quality personnel assigned by the contractors are not very competent and skilled. The qualified and experienced quality representative are nor appointed for ensuring QMS requirements, such as the verification of design and the implementation and maintenance of audit activities. This indeed has a close relation to the contractor's commitment in the assurance of their own system.

Another issue in practice is that it is difficult or even more impossible to monitor sub-contractors' construction work on site. Although the contractual requirements have provisions for controlling contractors in the selection of sub-contractors for the work, there was a lack of involvement in the next tier from the sub-contractor to the sub-sub-contractors. In addition, there are no proper rules and regulations in the local construction industry to control the multi-tiers of sub-contracting.

The current engineering quality management model of China works on the monitoring of the construction engineering quality to certain degree, but there are still some problems in practice.

The current management model in China focuses on supervision afterwards rather than pre-control, therefore, it cannot prevent the occurrence of some engineering quality risk. Furthermore, the engineering supervisor lacks quality assurance awareness and nonconformities prevention has not become the core of supervision. Government directly manage the engineering quality by administrative intervention rather than economic methods. Due to large amount of projects and limited supervision force, most of the EQS become a mere formality; it may even result in rent-seeking behaviour and corruption.

Many of the clients can not clearly define their requirements of project quality and criteria against which the work completed will be measured. Some clients especially for private ones, who usually have one-off projects, are unable to bear specific quality management skills and quality awareness (Dallakoti, 1997). When selecting contractors, the client's emphasis and attitude are more cost-oriented or schedule-oriented, rather than on quality. The capacity of risk handling is usually ignored but an approach of "all-risk-to-contractor" is adopted in the contract.

Client's misunderstanding of the role and responsibility of CS companies is a key problem that obstacles the enhancement of project quality. Liu et al. reveal (2004) that clients do not clearly understand the position and responsibility of CS companies in construction quality management. Clients

only focus on CS engineer's technical skills rather than their management skills and clients often treat them as "quality controllers" or "site watchers". The cause of this false perception and misunderstanding illuminated by Chan (1999) may derive from the traditional construction management system. Another issue is that the time of appointing CS companies is too late to allow them to exert their function on the success of a project. Clients in China commonly appoint CS companies after inception and design stages and before the commencement of construction stage. In other words, they prevent CS companies from joining the early stages of a project and therefore restrict CS companies' contribution to the project quality management.

CS companies mostly focus on the inspection of work against with set requirements, which does not involve the concept of prevention. Almost of the project CS companies are just "construction supervision" which means they are not carried out related supervision on inception stages. The result of this phenomenon is the defects in the survey and design stages beyond pre-control and then affects the quality of subsequent project stages.

The lack of competent and experienced CS practitioners is a vital obstacle for project quality improvement. Edum-Fotwe and McCaffer presents that a project manager in construction generally has to accumulate at least 10 years' working experience to obtain that position. However, given the relatively short history of CS in China, it tends to be an inevitable problem with local companies. Furthermore, the low salary of CS practitioners in the market cannot attract the competent personnel from other relevant

professions, although it is an appropriate approach to alleviate the serious
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shortage of experienced practitioners. A tacit issue is that a small proportion of employees in some CS companies assigned to them by their state-owned companies are unqualified and incapable of completing CS tasks.

Apart from the shortage of experienced CS practitioners, the limited knowledge and skills borne by CS practitioners is considered an important constraint factor. Based on the survey of Liu et al., the majority of practitioners in China, although are competent in technical aspects, lack adequate knowledge and skills in management, finance and communications. It has been argued by a number of researchers that practitioners in project management need to learn non-engineering knowledge and skills in order to complement their traditional engineering-oriented knowledge. The continuous training is also needed to develop competency of CS practitioners for successful project management in the long-term.

Most of the Chinese contractors are “trade” contractors, which mean that the contractors obtain high quality education and have sufficient technical knowledge in trade. However, most people at work level are unskilled and most of them are not stable construction workers and not regard construction as their career. As a result, the quality of work is often not guaranteed. Moreover, construction managers of the contractors are often not given enough authority by top management to make decisions and have no responsibility for profit and loss of projects. Consequently they often lack motivation to carry out the work in the most cost-effective way.

In addition, unlike contractors in Hong Kong, contractors in China normally do not have good cooperative relationships with each other. They rarely take into account of the needs and expectation of other trades. Therefore, this may lead to abortive or poorly coordinated sequence of work. Furthermore, the testing and commissioning mechanisms for a project is not operated effectively, as the contractors have established good relationships with the government construction departments. Hence, the approval of construction completion can be obtained easily from the government construction departments, without the project being properly completed and all minor defects rectified or even noticed.

Due to the history and culture, Hong Kong has developed a mature market-economy and established more complete system of laws and regulations, compared to Mainland China. Of course, this differentiation creates the gap in construction quality management between these both regions. According to above discussion and analysis of QM, the differentiations between Hong Kong and Mainland are summarized in the below.

From the comparison, it can be found that the key factors that affect quality management in Hong Kong are more related to management issues, while in Mainland the availability of resources and capital is the main factor which is taken for granted in Hong Kong. In addition, although there are significant differences of problems occurred in Hong Kong and Mainland, the shortage of competent and experienced project managers and staffs is the common obstacle for quality management met by both places. Therefore, the need for continuous training and education on QM are urgent and indispensable.