

What is quality assurance construction essay



**ASSIGN
BUSTER**

ABSTRACT

Quality Assurance (QA) involves establishing project-related policies, procedures, standards, training, guidelines, and systems necessary to produce quality. The aim of this research is to assess the efficiency of Quality Assurance (QA) for Building Services in construction. Quality assurance in construction addresses the overall problem of obtaining the quality of the facility to be built in the most efficient, economical, and satisfactory manner possible. This research will also emphasize on the impact of poor QA on project delays and running cost of the building.

INTRODUCTION

Mostly, the adoption of quality assurance in the construction industry has been mainly client-led. Noting that the implementation of contract in law cannot undo any damage already done, a progressive client, when awarding a contract, tends to take into account, the contractor's capability to do it right at the first time down the hidden philosophy of quality assurance. Besides, there is a general movement towards making the enforcement of quality systems in a contractual requirement. Most of the government bodies that are responsible for public works and housing have begun to persist on an effective quality system as an obligatory for tendering; perhaps public utilities companies are doing the same thing. [6]The main motive behind this research is to produce a reliable source to identify the need for Quality Assurance during the design and construction stage. Statistics has revealed that poor QA during construction has a direct impact on the overall maintenance cost of systems while in operation. Poor coordination of subcontractor's work, unable to supervise and verification on site, lack of

<https://assignbuster.com/what-is-quality-assurance-construction-essay/>

communication among the design team (Architects, Engineers, Client and Project Managers), design change during construction, subcontractors and material supplies, uncertain instructions and unqualified operators and also misinterpretation of drawings and specifications are the main barriers to QA. These problems can cause frequent delay in project, financial loss and loss of confidence in contractors which in turn impact on the lifetime of the construction.

What is Quality Assurance?

QA in construction involves all those planned and systematic actions necessary to provide confidence that the facility will perform satisfactorily when in service. The American Society of Civil Engineers (ASCE) defines "quality assurance (QA) in its publication " Quality in the Constructed Project" (1990) as " A program covering activities necessary to provide quality in the work to meet the project's requirements. QA involves establishing project-related policies, procedures, standards, training, guidelines, and systems necessary to produce quality. The design professional and constructor are responsible for developing an appropriate program for each project." In its broadest form quality assurance includes quality control as one of its elements. Quality control is the responsibility of the contractor, while quality assurance also includes acceptance. Acceptance involves sampling, testing, and the assessment of test results to determine whether or not the quality of construction is acceptable in terms of the specifications.

What is Building Services?

Building services as expressed by the Chartered Institution of Building Services Engineers (CIBSE) is everything inside a building that makes it safe

and comfortable to be in. [10] They include: energy supply - gas , electricity and renewable sources heating and ventilating water , drainage and plumbing day lighting and artificial lighting escalators and lifts ventilation and refrigeration harnessing solar, wind and biomass energy communications, telephones and IT networks security and alarm systems fire detection and protection air conditioning and refrigeration facade engineering

LITERATURE REVIEW

In 1987, the Building research establishment surveyed the quality problems on Britain's construction sites. They found that half of the faults were design related, and 40% of the problems arose from faulty construction and 10% was product failing. [5]

Design faults

misunderstanding the client's brief to develop the design using information which is incorrect or out of date misunderstanding of the client's expectations of quality standards lack of co-ordination between the designers. Loose or inappropriate specifications

Construction faults

Not building to drawings or specifications poor supervision leading to bad workmanship insufficient management of the quality of construction. In order to eliminate those potential problems many clients have looked to quality assurance to reassure them that they will get the right building without undue quality problems. Quality assurance starts with the client. H. W. Chung (1999) pointed that in order to get the desired quality, i. e. fitness for purpose, the client has to define the purpose of the product in the first

instance. In other words, the architect/engineer, acting as his representative, has to express the requirements unambiguously, explicitly and clearly in the contract drawings and specifications. In a traditional contract, the architect/engineer serves as a supervisor external to the contract, and both parties of the contract tend to accept the judgment of this supervisor as a yardstick of acceptable quality. In a quality assurance based contract, the onus of supervision and verification lies with the contractor, although the architect/engineer usually reserves the right to monitor the verification work through the use of hold points and witness points in the inspection and test plans. Consequently the specifications must be capable of interpretation and application without reference to an external supervisor (Barber, 1992).

Phrases like 'to the satisfaction of the architect' which do not clearly show the desired quality would have no place in the contract. The specifications should also identify the hold points and witness points, and indicate how much prior notice is required. [9][2][http://www. leadership. com.](http://www.leadership.com)

[cn/english/image/commissioning6. gif](http://www.leadership.com/cn/english/image/commissioning6.gif)According to McMahon testing and commissioning of Hong Kong's ultra-modern buildings is routinely undertaken by inexperienced, unqualified technicians. T&C is viewed as a low-class activity, which is largely carried out by contractors for contractors, with problems routinely undetected or deliberately concealed. The potential for long-term substandard performance and energy wastage as a result of poor T&C are obvious, yet the practice as a whole never receives the status and importance that it deserves. McMahon's observation is that project managers rarely approach commissioning in a thorough, co-ordinated manner and instead of being considered and addressed at the design and installation phases, T&C is routinely "squeezed into the latter stages of a <https://assignbuster.com/what-is-quality-assurance-construction-essay/>

project when it is often too late to address the problems that come to light".

[2] Not to commission is to "kick the ball ahead," and defer costs to the future. By this perhaps generous definition, commissioning is not a "real" cost. For two buildings analyzed in detail, one author found that 46% and 62% of the deficiencies identified during commissioning would in the future manifest as higher repair and maintenance costs (Della Barba 2005).

Similarly, 4% and 10% of the deficiencies would have resulted in shortened equipment life, while 13% and 5% would have adversely impacted occupant productivity. [4] In our report we shall review how testing and commissioning can be related to quality assurance and how QA can help to improve the T&C procedures. Quality deviation data are collected from nine fast-track industrial construction projects. The data are collected after the construction phase of the projects and identify the direct costs associated with rework (including redesign), repair, and replacement. Analyses of the data indicate that deviations on the projects accounted for an average of 12.4% of the total project costs. Furthermore, design deviations average 78% of the total number of deviations, 79% of the total deviation costs, and 9.5% of the total project cost. Construction deviations average 16% of the total number of deviations, 17% of the total deviation costs, and 2.5% of the total project cost. These values are conservative because they consider only direct costs, but they are indications of the areas that cause the greatest impact on total project costs. By applying the procedures presented in this paper to its historical records, a company can identify not only its deviation costs, but also the most likely areas on which to focus to reduce these costs on future projects (John L. Burati, Jodi J. Farrington, William B. Ledbetter, 2007).

[12]Several troublesome challenges face the U. S. construction industry:

<https://assignbuster.com/what-is-quality-assurance-construction-essay/>

productivity is down, litigation is up, delays are common and expensive, foreign firms are taking a greater share of the market. The reasons are complex, but one important common factor is quality—or rather, the lack of it. In view of these facts, a quality performance tracking system (QPTS) has been developed to provide for the quantitative analysis of certain quality related aspects of projects, by systematically collecting and classifying costs of quality. By defining quality as "conformance to requirements," the cost of quality becomes measurable. It consists of two main parts, the cost of quality management efforts and the cost of correcting deviations. A total of 15 categories identify the main quality management efforts. When coupled with 24 deviation categories (plus six "repeat" quality management categories), most of the important quality costs can be identified for tracking and analysis. These categories can be easily changed and adapted to meet individual company requirements for design, construction, and start-up (Kent Davis, W. B. Ledbetter, James L. Burati, 2008). [11] According to a survey by Fong et al [3] the principal factors contributed to construction delays were: improper site co-ordination and management of the electrical and mechanical installations, lack of timely decision making by the client, and defects identified during the fire services inspection by local authorities. The factors contributing to the delays included inadequate site management and supervision, workload of the project staff, procedures for equipment approval, and working experience of the parties involved. However, Fong et al have not investigated how the implementation of a proper quality assurance system can help to avoid or reduce delays. The International Organization for Standardization (ISO) has developed a standard related to quality management systems which would be internationally accepted. The <https://assignbuster.com/what-is-quality-assurance-construction-essay/>

ISO 9000 family addresses various aspect of quality management. The standards provide guidance and tools for companies and organizations who want to ensure that their products and services consistently meet customer's requirements, and that quality is consistently improved. ISO 9000 certification is a mandatory requirement for qualification for Public Works in Hong Kong since 1996. However, the same standardization has not yet been applied in Mauritius. C. W. Kam, S. L. Tang, (1997) stated that material suppliers are aware of the importance of quality assurance. The ISO 9000 certification scheme is a proof of their capability to provide expected quality and services, thus strengthening their position in winning contracts. [7] We shall explore in our research how ISO 9000 certification helps contractors in Mauritius in winning tenders and also how the quality of works of these contractors differs from those who do not have the certification. Six Sigma is a process improvement set of tools and strategies, originally developed by Motorola in 1986. Anthony Jiju, (2008) definition of Six Sigma is that Six Sigma seeks to improve the quality of process outputs by identifying and removing the causes of defects (errors) and minimizing variability in manufacturing and business processes. It uses a set of quality management methods, including statistical methods, and creates a special infrastructure of people within the organization (" Champions", " Black Belts", " Green Belts", " Orange Belts", etc...) who are experts in these very complex methods. Each Six Sigma project carried out within an organization follows a defined sequence of steps and has quantified financial targets (cost reduction and/or profit increase). [8]Six Sigma can be very useful to broaden quality concept of construction industry to a more efficient form which should include financial parameters. Obviously, past researches and

<https://assignbuster.com/what-is-quality-assurance-construction-essay/>

applications show that Six Sigma increase quality directly/indirectly considering technical and financial aspects in the construction industry even though it is not adapted properly. Concern is expressed about the quality of the building services industry's product (e. g. a heating or ventilation system in a building) as perceived by the client. From a view that quality control and quality assurance (as defined) should extend beyond the factory produced product into design, installation, commissioning and maintenance a comprehensive analysis is given of the main features requiring attention. Work phases (design, specification, procurement, etc) are defined and discussed in respect of the procedures and responsibilities as they affect quality. A method of defining reliability is suggested leading to the proposal that a client can determine an acceptable cost /reliability relationship. Recommendations for research and development are given leading to the conclusion that such activities related to building services should be coordinated through a 'focal point'. [1]

METHODOLOGY

The method to use will basically base on existing information's, general observation and other internet sources which will be very useful to the topic. Also several sub research questions will be answered through surveys and interviews. The following data shall be collected from past projects in Mauritius for analysis: QA measures which have been setup for the project
Follow up on the QA measures
Number of minor and major interventions encountered during the first year following construction
Causes of construction delays
Maintenance cost during the first year of operation

Research Questions

How is quality control affected by quality assurance in the construction industry? Is Quality assurance related to the scope of Testing and Commissioning for Building Services? What are the problems affecting construction industry as a result of lack of quality assurance? Does a lack of quality assurance cause construction delays? Does a lack of quality assurance has an impact on the Building life-cycle performance? How does poor quality assurance during construction impact of the building maintenance/running cost? How can quality be assured in design stage? What are the barriers to quality assurance in the construction industry?

Research Hypothesis

For the purpose of the study, three hypotheses are formulated to narrow the scope of the investigation. These are: H1: The level of quality control for Building Services in construction projects is not affected by the setup of a Quality Assurance system. H2: Poor/No Quality Assurance does not cause project delays H3: Poor Quality Assurance during construction does not increase the running cost The report will highlight how the data collected support or reject the validity of these hypotheses

RESULTS

Based on previous researches that have been made in Hong Kong, Singapore, UK and the United States, we can expect similar results for Mauritius. However our investigation will bring fact and figures to support the hypothesis that QA reduces projects delays and running cost.

DISCUSSION

From our literature review we have noted that a few researches have been made on the importance and outcome of Quality Assurance in the construction industry. However, a deep investigation of the impact of QA on Building Services and its maintenance cost has not yet been published. The report will highlight the overall effectiveness of Quality Assurance in Building Services and the benefits and outcomes for the client. Quality control is being done in every building project however the percentage of failures is still very high. The causes are often due to the lack of planned and systematic action from the contractors and the consultants. The report shall discuss how QA helps to coordinate design and construction issues to reduce running cost in the Building life-cycle. Quality Assurance can help to reduce project delays. The hypothesis will be tested based on data from previous projects and elaborated. Finally this research shall bring statistical evidence about the QA process in Mauritius, to what extent they are being applied and the outcomes in construction projects.