PERCEPTION OF CONSTRUCTION COMPANY ON QUALITY ASSESSMENT SYSTEM IN JOHOR BAHRU

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PERCEPTION OF CONSTRUCTION COMPANY ON QUALITY ASSESSMENT SYSTEM

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Thesis submitted in fulfillment of the requirements
for the award of the
Bachelor Degree in Civil Engineering

Faculty of Civil Engineering and Earth Resources

UNIVERSITI MALAYSIA PAHANG

DEC 2017

ACKNOWLEDGEMENTS

I would like to express my sincere appreciation for those who contributed in helping me in the success of completion on this report. First of all, I would like to express my gratitude to my supervisor for this research, Dr Doh Shu Ing in his patience, guidance, and effort in advising me throughout the research.

Secondly, I would like to thank all the respondents that have participated in the questionnaire, pilot study as well as communicated with me throughout the survey as their respond formed the basis for data analysis in this research.

Last but not least, I would like to express my appreciation to the people around me that supported and advised me in this research. These includes parents that showing continuous support in my study all this while, friends in giving moral support and helps, lectures, senior and course mates that shared their experience and leading the helping hand.

ABSTRAK

Terdapat banyak faktor yang boleh menyumbang kepada kejayaan menghasilkan produk berkualiti untuk projek pembinaan di Malaysia. Salah satu faktor yang dianggap sebagai penyumbang ialah dengan menggunakan senarai semakan pemantauan yang sah sebagai penilaian. Di Malaysia, Sistem Penilaian Kualiti dalam Pembinaan (QLASSIC) telah dilaksanakan sejak tahun 2007. Menurut produk bangunan, kualiti adalah perkara penting yang sentiasa menjadi perhatian oleh pembeli rumah, pelabur, kontraktor dan pemaju. Semua kualiti produk bangunan bergantung kepada bagaimana kontraktor atau pemaju membinanya dan bagaimana mereka mengawal pengurusan kualiti. Setiap pembeli berharap bangunan yang mereka beli mencapai tahap standard yang sepatutnya. Oleh itu, kajian ini memberi tumpuan kepada persepsi Syarikat Pembinaan mengenai Sistem Penilaian Kualiti dalam Pembinaan. Tujuan kajian ini adalah untuk mengkaji persepsi Syarikat Pembinaan mengenai Sistem Penilaian Mutu di Johor Bahru. Objektif kajian ini adalah untuk mengenal pasti persepsi menggunakan Sistem Penilaian Mutu di kalangan syarikat pembinaan di JB, untuk mengenal pasti penubuhan syarikat pembinaan di Sistem Penilaian Mutu yang melaksanakan, dan mencadangkan langkah-langkah yang sesuai untuk menggalakkan penggunaan Sistem Penilaian Mutu dalam industri pembinaan. Soal selidik telah digunakan sebagai metodologi penyelidikan utama untuk mendapatkan data yang berkaitan. Borang tinjauan yang terdiri daripada tiga bahagian disediakan untuk para peserta. Bahagian pertama adalah profil demografik responden, seperti profesion, tahun pengalaman dan pengalaman yang berkaitan. Maklumat ini dapat membantu mengetahui tahap pelaksanaan dalam industri pembinaan. Bahagian kedua borang tinjauan adalah soalan tertutup yang meliputi soalan utama, pertanyaan penting, pertanyaan pemilihan dan soalan Skala Likert. Pada akhir seksyen 1 dan seksyen 2, seksyen 3 mengandungi satu soalan terbuka yang mana responden dibenarkan menambah pendapat mereka sendiri mengenai Sistem Penilaian Mutu di Malaysia. Terdapat kira-kira 100 salinan soal selidik yang diedarkan kepada responden yang disasarkan terdiri daripada kontraktor utama, subkontraktor, perunding dan pekerja yang terlibat dalam bidang pembinaan. Dengan tarikh yang singkat, penyelidik berjaya mengumpul 50 soal selidik yang boleh digunakan daripada responden. Secara ringkas, soal selidik itu menyerlahkan tiga aspek utama yang penting dalam kajian ini. Berdasarkan maklum balas responden, isu utama adalah mengenai pengetahuan mereka mengenai sistem ini.

ABSTRACT

There are many factors that may contribute to the success of producing quality product for construction project in Malaysia. One of the factors that consider as the contributor is by using legitimate monitoring checklist as assessment. In Malaysia, Quality Assessment System in Construction (QLASSIC) had been implemented since year 2007. According to building product, quality is an important matter that always concerned by house buyers, investor, contractor and developer. All the qualities of building products depend on how the contractors or developers build it and how they control quality management. Every buyer hopes the construction that they purchase achieved the standard character. Hence, this study focused on the perception of Construction Company on Quality Assessment System in Construction. The aim of this research is to study the perception of Construction Company on Quality Assessment System in Johor Bahru.The objectives of the study are to identify the perception using Quality Assessment System among construction companies in JB, to identify the set back of construction companies in Quality Assessment System implementing, and to propose suitable measures to encourage the use of Quality Assessment System in the construction industry. The questionnaire had been used as the main research methodology in order to obtain those relevant data. Survey form that consists of three sections is prepared for the participants. The first section is the demographic profile of the respondent, such as profession, year of experience and related experience. This information can help to find out the level of implementation in the construction industry. Second part of the survey form is the closed ended question which includes leading questions, important questions, selection questions and Likert Scale questions. At the end of section 1 and section 2, section 3 consists of one open ended question where the respondents are allowed to add to their own opinion on Quality Assessment System in Malaysia. There were about 100 copies of questionnaires were distributed to the targeted respondents consisted of main contractors, subcontractor, consultant and personal that involved in the construction field. By the cut off date, the researcher managed to collect back 50 useable questionnaires from the respondents. In summary, the questionnaire highlighted three main aspects that important in this research. Based on respondents' feedback, the main issues are on their knowledge about this system.

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AHU	Air-Handling Unit
BCA	Building Construction Authority
BQA	Building Quality Assessmnet
CIDB	Construction Industry Development Board
CONQUAS	Construction Quality Assessment System
HBA	House Buyers Association
JB	Johor Bahru
MP	Malaysia Plan
QLASSIC	Quality Assessment System in Construction

LIST OF ABBREVIATIONS

AHU	Air-Handling Unit
BCA	Building Construction Authority
BQA	Building Quality Assessmnet
CIDB	Construction Industry Development Board
CONQUAS	Construction Quality Assessment System
HBA	House Buyers Association
JB	Johor Bahru
MP	Malaysia Plan
QLASSIC	Quality Assessment System in Construction

CHAPTER 1

INTRODUCTION

1.1 Introduction

This study is described about implementation of the Quality Assessment System in the construction industry. Some basic information about the study, including background of study, problem statement, research objective, research question, the scope of the study, the significance of the study, expected outcome and definition of the term.

1.2 Background of Study

Construction is an activity consists of erecting a building or other structure which starts from the process of planning, clearance of land, excavation, constructing a structure, to its completion stage which then associated with other related works such as maintenances, renovations and demolitions. In Malaysia, the construction industry is one of the main industries which make a significant contribution to the economy of the country (Hamid & Kamar, 2010) as well as to meet the needs of every individual in the society to achieve the standard of living.

On the other hand, constructions provides shelter, protection and suitable environment for every individual to conduct their daily activities, According to CIMP (2007), range from residential, non-residential, social amenities and infrastructure, construction is undeniably the prior requirement for all the activities to be carried out. Hence, it is apparent that contribution industry plays an important character in both developed and producing nations.

In Asia, as globally, the impetus for adopting ISO standards will affect the industry. The standards relating to construction are ISO 9000 (Quality assurance and Business standards) and ISO 14000 (environmental management). They have, perhaps accidently but indeed increasingly, become trade barriers in different countries, Companies seeking opportunities must therefore. To adhere to such regulations if they wish to compete successfully in international markets. There were more than 250 organizations with ISO 14001 accreditation in Malaysia. Of that figure, however, not one was from the construction sector where the ISO 14001 had been obtained on a voluntary basis (John Raftery, 2004).

In Malaysia, CIDB is a government agency established to assist in carrying out related functions in the construction industry. Therefore, with the help of the Ministry of Works Malaysia through the Construction Industry Development Board Act 1994 (Act 520), CIDB has issued its own assessment system for evaluating the quality of construction in Malaysia. QLASSIC or Quality Assessment System in Construction is a system used to measure and ensure the quality of the balance of construction in Malaysia. Malaysia and Singapore with QLASSIC and CONQUAS systems of quality assurances have been successfully running an indigenous quality assurance mechanism.

1.3 Problem Statement

In accordance with The Rider Levett Bucknall (1999), Building Quality Assessment (BQA) service addresses this need with a standardized method for evaluating and quantifying building quality based on standard criteria across a number of predetermined categories.

Quality can be defined as 'the measurements of excellence or state of being free from defects, deficiencies and other variations' (Business Dictionaru, 2010). The quality of the construction product refers to the goodness and the level of satisfaction to the consumers (HBA, 2008). Thus, quality is very important to the client and buyers and it depends on the developer and contractor how they would determine and control this.

Growth in the construction, services and manufacturing is expected to rise in the 11th Malaysia Plan (11MP) to drive Malaysia towards developed nation by the year 2020. The construction sector is becoming increasingly important due to the increasing

demand for modern and efficient infrastructure, in line with the goal of developed countries. The government will introduce the Construction Industry Transformation Program 2016-2020 to accelerate industrial development to meet market demand. In the 11MP, efforts to transform the construction sector will be based on four strategies, including drive productivity through increased use of technology and modernization construction methods (Unit Perancangan Ekonomi, 2015).

Hence, this study focused on the perception of Construction Company on Quality Assessment System in Construction. QLASSIC assessment is one of the popular methods for measuring the quality of workmanship. CONQUAS is more widely recognized and accepted by developers as well as contractors in Singapore, Hong Kong and United States.

1.4 Research Aims and Objectives

The aim of this research is to study the perception of Construction Company on Quality Assessment System in Johor Bahru.

The objectives of the study are as follows:

1. To identify the perception using Quality Assessment System among construction companies in JB.
2. To identify the set back of construction companies in Quality Assessment System implementing.
3. To propose suitable measures to encourage the use of Quality Assessment System in the construction industry.

1.5 Scope and Limitation

This study focuses on the perception of Construction Company on Quality Assessment System based on the point of view of Construction Company and to identify the problem of implementation of Quality Assessment System in Johor Bahru using questionnaires. Only selected person and company are chosen to involve in this survey due to time limitation.

1.6 Significant of study

This study is to contribute to the effort of implementing Quality Assessment System in the construction industry. By identifying the perception and problem based on the opinion of the correspondent such as project manager and contractor, it will be knowledge and advantages about this system in Malaysia.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction of Quality Assessment System

According to building product, quality is an important matter that always concerned by house buyers, investor, contractor and developer. All the qualities of building products depend on how the contractors or developers build it and how they control quality management. Every buyer hopes the construction that they purchase achieved the standard character.

Ho (1999) defined building evaluation as 'the systematic assessment of building performance relative to defined objectives and requirements'. An effective quality assessment system should be able to detect and measure all types of defects and capture all aspects of construction quality that affect the performance of buildings. The quality assessment can be carried out by measuring the constructed works against workmanship standards and specifications. Such measurements have to be comprehensive, straightforward, consistent and effective. Furthermore, the assessments have to be carried out systematically and within reasonable cost and time frame (Council for Scientific and Industrial Research, 2005).

Comprehensive quality standards alone do not assure the effectiveness of the quality assessment system. The integrity of the test and inspection methods are as important as the quality standards, such as measurements without proper and accurate tests and detection methods, defects cannot be detected (Low, 2001).

2.2 Definitions of Quality Assessment

Quality assessment system in the construction industry is a system or method to measure and evaluate the quality of workmanship of a construction work based on the relevant approved standard. This assessment sets out the standard for quality of workmanship on various construction elements of building and infrastructure construction work. The quality of workmanship of a construction worker is assessed according to the requirement of the relevant standard, and marks are awarded if the workmanship complies with the standard, (CIDB, 2011).

According to Wong, (2007), one of the hallmarks of a developed construction industry is in the output of quality buildings and structures. It is therefore critical to inculcate among professionals, contractors and end-users the awareness of quality products and good designs, not only to raise the standard of the industry's products, but also to reduce wastage arising from rework. The Quality Assessment System in Construction (QLASSIC) developed by CIDB is an independent method to measure and evaluate the quality of workmanship and finishes of construction works based on objective comparison through a sampling and statistical approach. The Malaysian construction industry stakeholders are looking forward to action plans by CIDB in implementing QLASSIC with incentives as has been the case for the Construction Quality Assessment System (CONQUAS) in Singapore.

Mahmood. et al. (2010) stated the quality management system is being increasingly applied to the construction company to solve quality problems. The implementation of this system required a culture change and change in management behavior. The organization needs to shift from their current culture to a quality management system culture that focuses on quality as a key strategy. A review of literature identifies ten important culture elements that contribute to successful implementation of quality management system, which include leadership and top management commitment, customer management, training and education, teamwork, people management and empowerment, supplier partnership, quality planning and strategic, process management, rewards and recognition and effective communication.

2.3 Classification of Quality Assessment System in Constrution

Each building material, ingredient, and assembly should be analyzed with regards to its quality, compatibility, and interactions with its adjacent materials and parts. So to effectively ensure conformance of quality of the entire scheme, quality assessment tools should be used.

The contractor can implement the any of quality control system software such as Quality Assessment System in Construction Industry Construction (QLASSIC) and Construction Quality Assessment System (CONQUAS) into the project to assure the quality of the construction work and to deliver a quality product.

2.3.1 QLASSIC

Quality Assessment System in Construction (QLASSIC) was developed by the Construction Industry Development Board of Malaysia (CIDB) in co-operation with construction related professional bodies, associations and certification bodies in 1999. It is a method used to measure construction quality and to benchmark the level of quality achieved in the construction process. It is intended to compliment the normal contractual drawings and specification in a project. It was developed to achieves the following objectives: to evaluate the quality of workmanship in the construction project based on the approved standards and specification, to have a standard quality assessment system for the construction industry, to compare quality between projects, to evaluate a contractor's performance and, finally to be used for data compilation for statistical analysis in estimating the quality of workmanship and the productivity level of the construction industry (Takim, Akintoye and Kelly, 2003).

QLASSIC assessment covers 3 major components in building construction:

- Structural works
- Architectural works
- External works

Assessments of workmanship are done, based on some standards that are set out, and points are awarded if the workmanship complies with the standards. Forty percent of the classic point are allocated to the standard of structural work, fifty percent for the standard of architectural works and ten percent for the standard of external works.

a. *Structural work* covers the structural aspects of the building. Quality assessment includes the quality of:
    - Workmanship
    - Construction material for both concrete and steel structure works

    The concrete structure standards encompass the:
    - Frameworks
    - Reinforcement
    - Concrete works

    The quality of material is based on standards of:
    - Aggregates
    - Cement
    - Properties of the finished concrete
    - Steel reinforcement

b. *Architectural works* deal mainly with the finishes and fittings of the building. The QLASSIC assessment elements that are covered by architectural activities include internal and external:
    - Wall
    - Floor
    - Ceiling
    - Roof
    - Plumbing and sanitary fittings
    - Door and windows
    - Building components
    - Quality of material

c. *External works* cover the general external work elements in building construction such as the:
    - Aprons
    - Drains
    - Roads and footpaths
    - Turfs
    - Fences and gates

QLASSIC is primarily based on workmanship standards and specifications achieved and it does not cover design specifications. For example QLASSIC does not assess any design inadequacies like poor ventilation or narrow corridor.

Assessment is conducted on the three components and points is summed up to give a total score, called the QLASSIC score for the building. The assessment of structural work is done during the construction process, while both the architectural and external works are conducted after the completion of the project, before handing over to the client. A team of assessors from Construction Industry Development Boards of Malaysia (CIDB) carries out the assessments. QLASSIC evaluations are done for superstructure components of a building and do not cover substructure works, mechanical works and electrical services. Assessment samples are determined at random and represent the entire project. The strength of this model is that it is very simple to implement. However, a major weakness is that assessment of architectural and external work is not conducted until the project is completed (Construction Industry Development Boards Malaysia, 2006).

2.3.2 CONQUAS

CONQUAS have introduced in Singapore since 1989, serve as a standard assessment system on the quality of building projects. A defector national yardstick of the industry, CONQUAS has been periodically fine-tuned to keep pace with changes in technology and quality demands of a more sophisticated population. In 1998, BCA introduced a number of new features to CONQUAS resulting in the launch of CONQUAS 21. Such refinements make CONQUAS scoring more comprehensive and customer oriented. The latest CONQUAS 8th edition was launched on 31 October 2012 to promote design and materials which support both high qualities.

The Construction Quality Assessment System or CONQUAS was developed by the Building and Construction Authority (BCA) in conjunction with major public sector agencies and various leading industry professional bodies, organizations and firms to measure the quality level achieved in a completed project. CONQUAS was designed with three objectives:

a) To have a standard quality assessment system for construction projects.

b) To make quality assessment objective by:

- Measuring constructed works against workmanship standards and specification.

- Using a sampling approach to suitably represent the whole project.

c) To enable a quality assessment to be carried out systematically within reasonable cost and time.

CONQUAS is an independent assessment, unless it states specified in the building contract to use CONQUAS, project engineers or architects should not use it to decide if the building or parts of the building project are acceptable.

The CONQUAS assessment is divided into three main components:

a) *Structural works*

The structural integrity of the building is of paramount importance as the costs of failure and repairs are very significant. The assessment of Structural Works comprises:

i. Site inspection of formwork, steel reinforcement and finished concrete during construction. The assessment shall include structural steel and pre-stressed concrete if each constitutes more than 20% of the total structural cost. Precast elements will also be assessed if the precast concrete volume exceeds 20% of total structural concrete volume.

ii. Laboratory testing of compressive strength of concrete and tensile strength of steel reinforcement.

iii. Non-destructive testing of the uniformity and the cover of hardened concrete.

b) *Architectural Works*

Architectural Work deal mainly with the finishes and components. This is the part where the quality and standard of workmanship are most visible. The assessment covers:

i. Site inspection of internal finishes, roofs, external walls and eternal works at the completion stage of the building. Internal finishes include floors, internal walls, ceiling, doors, windows and components.
ii. Material & functional test such as window water-tightness, wet area water-tightness and adhesion of internal wall tiles. There also in-process assessment on installation of waterproofing for internal wet areas.

c) *Mechanical & Electrical (M&E) Works*

The quality of M&E Works is important in view of its increasingly high cost proportion and its impact on the performance of a building. The assessment covers Electrical Works, Air-conditioning & Mechanical Ventilation Works (ACMV), Fire Protection Works, Sanitary & Plumbing Works and basic M&E fittings. The stages of the assessment include:

i. Site inspection of installed works before they are embedded/concealed. Such items include ACMV ductworks, electrical conduits, concealed pipes, etc.
ii. Site inspection of final installed works such as the Air-Handling Unit (AHU), cooling towers, fire alarm control panel, etc.
iii. Performance test on selected works such as Water Pressure Test, Earthling Test, Dry riser Test, etc.

The building is assessed primarily on workmanship standards by the assessors from the BCA on site using standard score sheets. The assessment is done throughout the construction process for structural, mechanical and electrical works and on the completed building for architectural works. Moreover, CONQUAS is considered as an independent assessment. All of the CONQUAS assessments can be only assessed by the BCA Singapore officer, means only the officer of BCA Singapore can become the assessor. The CONQUAS are using the sampling system as their assessment system. Sampling system means that only few samples will be randomly chosen by the assessor for inspection to represent the quality of the whole project, not every unit will be assessed (The National House Buyers Association (HBA), 2009).

There are exceeding 2,238 private and public construction projects have been inspected by BCA after the CONQUAS have been introduced since 1989. The analysis stated that cost of more than 81.9billion Singapore dollar is the total cumulative contract value of the assessed projects (Building and Construction Authority, 2006). In these recent years, construction filed at the Malaysia start to adopt CONQUAS 21 assessment system into the construction projects.

CHAPTER 3

METHODOLOGY

3.1 Literature Review

In the effort to achieve the aims and objectives of a research, literature review is the first stage in this research which is to analyze, summarize, evaluate, clarify, integrate, and recognize of the information about the journals, articles, and books which related to this research.

The research methodology is the method that used to find, collect, analyze data and therefore giving result based on observation. The proper planning and detail study to the flow of the research methodology is crucial in order serves as a guide in order to achieve the objectives and scopes of the study. This chapter shall further discuss in detail the research procedures, about how the data are collected till how it is processed and analyzed to achieve the objectives and scopes of the study.

This chapter aims at elaborating the methodological process that used to carry out the research based on the objectives of the study. This is including the literature review and also the preparation of the questionnaire in order to obtain the input that are required.

3.2 Data Collection

3.2.1 Survey Questionnaire

Data collection through survey questionnaire is conducted in this research. This method is used due to its benefits of versatility as different types of questions can be included and able to provide a clearer picture and answer for them. The survey questionnaire is done based on open ended question. The open ended questions are meant to collect subjectives, insightful ad true answer while the close ended questions are designed for the ease of calculation of statistical data and percentages in the data analysis.

Survey form that consists of three sections is prepared for the participants. The first section is the demographic profile of the respondent, such as profession, year of experience and related experience. This information can help to find out the level of implementation in the construction industry. Second part of the survey form is the closed ended question which includes leading questions, important questions, selection questions and Likert Scale questions. Likers Scale is an appropriate choice for measuring the adoption such as barriers and probable drivers (Khan et al., 2009). The barriers that will be listed for the respondent to choose from are referred to the previous literature reviewed and add on with the factors which have not yet been reviewed. Each statement is regarding the perception of quality assessment system in Malaysia based on various aspects are prepared for the respondents to know and estimate if they used this software in the industry. At the end, there is an additional column provided for the respondents to provide their own opinion besides those listed.

3.2.2 Sampling of Data

There were about 100 copies of questionnaires distributed to the targeted respondents. Respondents to the questionnaire in this research are from construction company grad G1 until G7, in Johor Bahru.

Handing out questionnaire is an approach to determine the perception of Construction Company on Quality Assessment System that have been practiced among the construction players in Malaysia. It was designed to gather and verify the

information from the literature review. The method of distribution and collection of the questionnaire survey encompasses the following:

- By mail and returned via mail through stamped self-addressed envelope
- By conforming through telephone calls and dispatching the questionnaire.
- By hand distributions for selected respondents

3.2.3 The Design of Questionnaire

Questionnaire is an effective way designed to gather and verify the information which from literature studies. However, the limitation of the questionnaire is that it is subjected to the willingness and cooperation of the respondent in completing the questionnaire. Therefore, it is necessary to design the questionnaire as straight-forward as possible to obtain information related to the objectives of the study. Another important criterion when designing the questionnaire is the time to complete it. It should be designed to be completed in the shortest time possible for the convenience of the respondent as the workload of the respondents is usually heavy.

The questionnaire consisted of three parts – general information of the respondent, a survey on their experience and knowledge about Quality Assessment and their opinion and suggestion. The information gathered was as follows:

Section A: General information of the respondent

- Profession
- Working Experience
- Company Grad
- Type of work

Section B: Experience and knowledge about quality assessment in Malaysia.

- Knowledge about quality assessment system in Malaysia
- Using what type of quality assessment system
- Experience with quality assessment system
- The benefits of this system.

Section C: Opinion and Suggestion

- The respondent gives their own opinion.

3.3 Pilot Study

Pilot study is the small testing to test the feasibility of the study before the research is carried out (Thabane et al.,2010). It gives the preliminary idea of the research. Before the questionnaire survey is carried, a pilot study is done by interviewing with contractors from the construction site. This procedure is to test the feasibility of the questionnaire such as understanding of the meaning of the words and relevant information on the survey. Besides that, according to Thabane et al. (2010), Pilot Study can also test on the steps needed to be taken into the main study.

3.4 Research Methodology

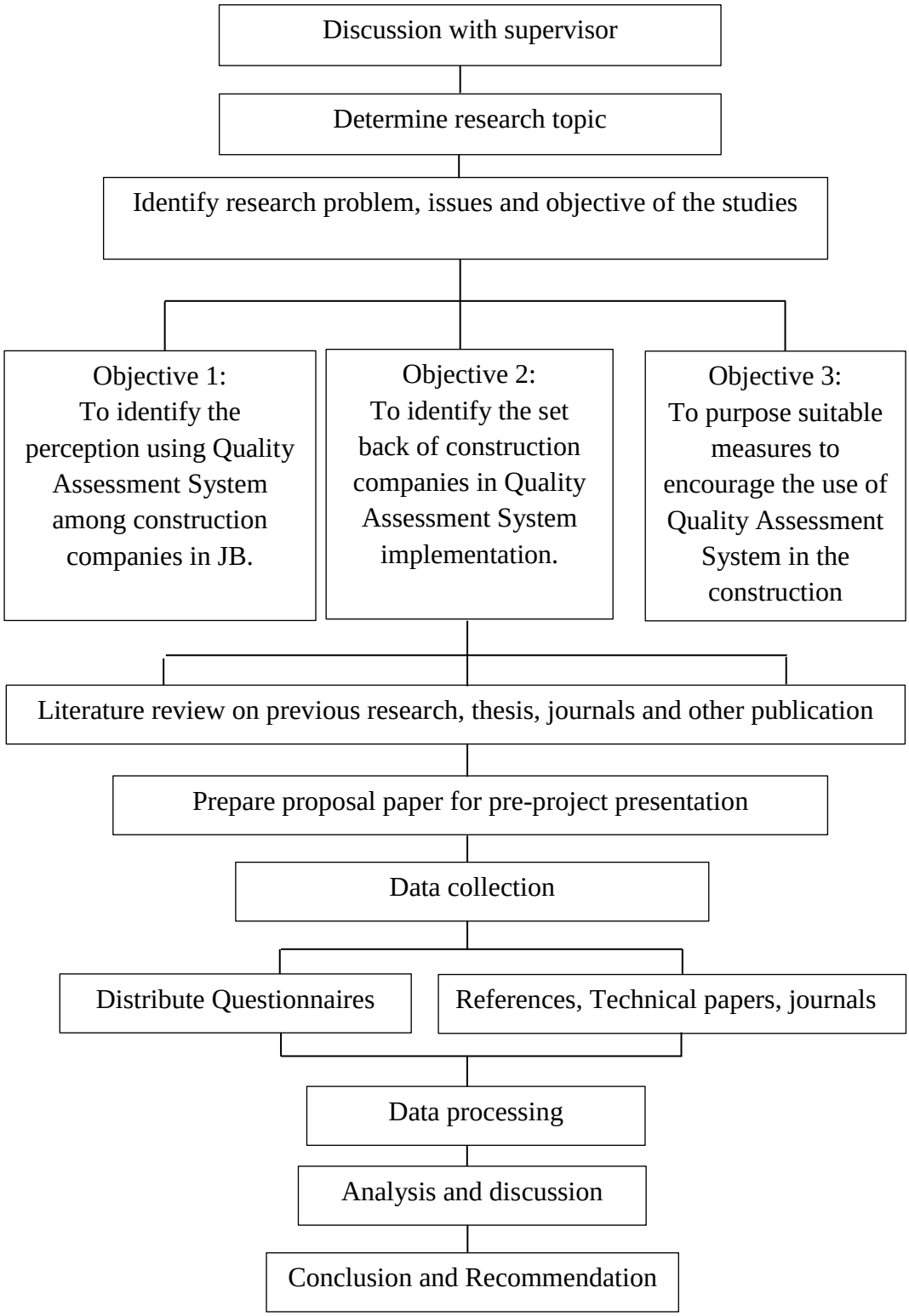

Figure 3.1: Research flow chart

3.5 Methods of Analysis

The information and data gathered through questionnaire were compiled and processed using the average index method in relation to the objectives and scope of the study. Two statistical methods were applied, namely descriptive statistic and inferential statistics. Result from the findings will be presented in the form of graphs, histogram and pie chart for easier understanding.

3.5.1 Average Index

Average index is being calculated based on the formula of:

$$\text{Average Index} = \sum a_i x_i / \sum x_i$$

Where,
a = constant, weighing factor for i,
x = frequency of respondent
i = 1, 2, 3… n

A scale of 5 categories has been used for the average index method in order to show priority. The scales of 5 categories are:

1	Least Agreed	1.00 to 1.50
2	…	1.50 to 2.50
3	Moderate	2.50 to 3.50
4	…	2.50 to 4.50
5	Mostly Agreed	4.50 to 5.00

3.6 Summary of Chapter

This chapter describes in detail the flow of the study from the initial stage to the end in achieving the objectives. The choices of the methods used highly depended on the study. For this study, questionnaire survey is used to gather the data of the study and percentage analysis are used to analyze the data collected.

CHAPTER 4

DATA ANALYSIS AND DISCUSSION

4.1 Introduction

This chapter focuses on analyzing the results gathered from the respondents through interview and questionnaire. Since time allocated for the distribution and collection of the questionnaire is very limited, the distribution of the questionnaire is limited to the respondents within the coverage of the researcher only.

The data collected were converted into more meaningful, useful and informative formats that are in the form of tables and figures. The data also were expressed according to the suitability of the analysis itself. The questionnaires were distributed in different parts enables the analysis be done systematically and reflects a logical result.

4.2 Distribution and Return of the Questionnaire

There were about 100 copies of questionnaires were distributed to the targeted respondents consisted of main contractors, subcontractor, consultant and personal that involved in the construction field. By the cut off date, the researcher managed to collect back 50 useable questionnaires from the respondents. This constitute of a sum of 30 percent response rate. According to Fellows *et al* (1997), the normal expected useable response rate is ranging from 25 percent to 35 percent. Therefore, the total response received is considered sufficient for the purpose of this research.

In this research, the data collected by using email and self collect method secure a higher return rate than other distribution method. Questionnaires were sent by email to respondents who worked in the construction industry. Besides that, the researcher also

makes a few visits to construction firms around the local area to distribute the questionnaire by hand. This method is slow as the distribution is limited and the distance from one to another place is far. However, the distribution of the questionnaire by postal have an even lower response rate than the other method.

4.3 Question Structure

The sample of the questionnaire can be referred in Appendix A. The questionnaire is divided into three sections as described in Chapter 3. The first part of the questionnaire which is Part A built out of demographic questions. The second part of the questionnaire which is Part B consists of closed format questions where Likert scale (1= strongly disagree, 2= disagree, 3= neutral, 4= agree, 5= strongly agree) will be provided for each questionnaire based on the experience and knowledge about Quality Assessment System in Malaysia.

At the end of Part A and Part B, Part C consists of one open ended question where the respondents are allowed to add to their own opinion on Quality Assessment System in Malaysia. However, this is optional for the respondents where their non-responding will not affect the analysis of the Likert scale questions.

4.4 Respondent Information

This analysis is the section where the responds of the respondents based on the question presented in graph format to illustrate the numbers of respondents and percentage of total respondents that respond in the particular question with particular answer. In the graph itself, the numbers of respondents are shown while the percentage and further description are stated in the descriptions above the graphs.

4.4.1 Demographic Profile

4.4.1.1 Respondent Distribution

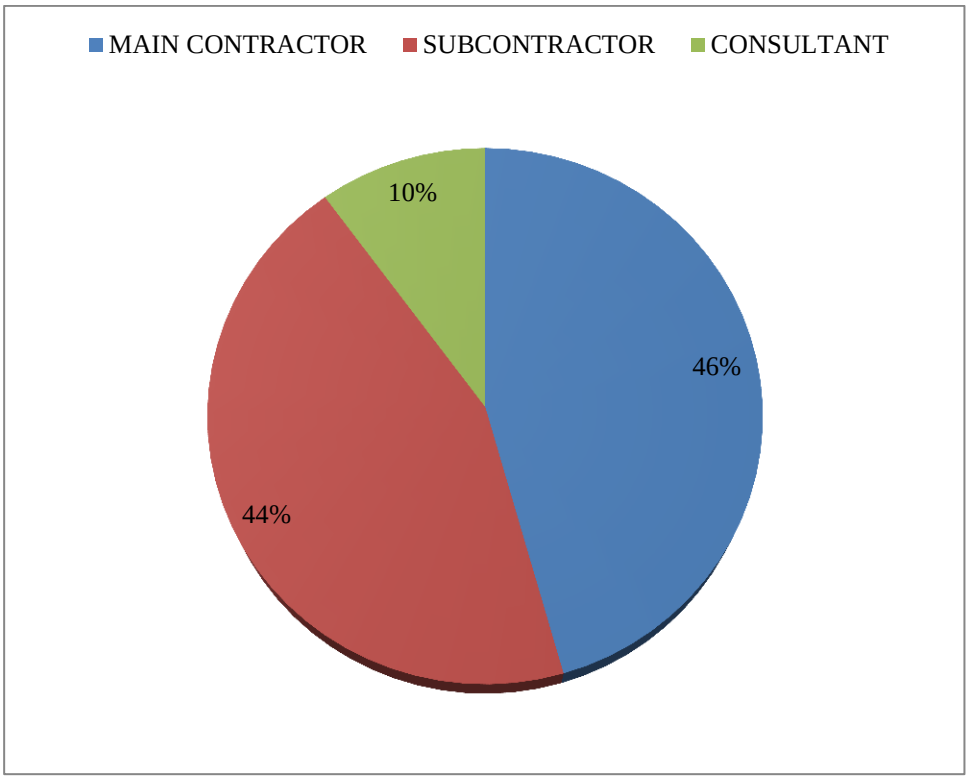

Figure 4.1: Professional of respondents in construction industry

Figure 4.1, shows the returned useable questionnaires of the different types of respondents in the construction industry. 46 percent out of 50 useable questionnaires were from the main contractor, which represent the largest groups of response in this research. This followed by subcontractor with the percentage of 44% and the last one is consultant by 10%. Contractors provide valuable information as they are those who deal with the front line of the construction. They are those who face problems in this competitive construction industry.

4.4.1.2 Respondent Experience in Construction Industry

From Figure 4.2, there are 20 respondents (38%) are of category of 1 to 5 years of experiences. For category of experience in range of 5 to 10 years consists of 18 respondents (34%) while for experience of more than 10 years, it is of the total number of 12 respondents (24%). There are only 2 respondents (4%) out of all that has been in industry for lower than 1 years.

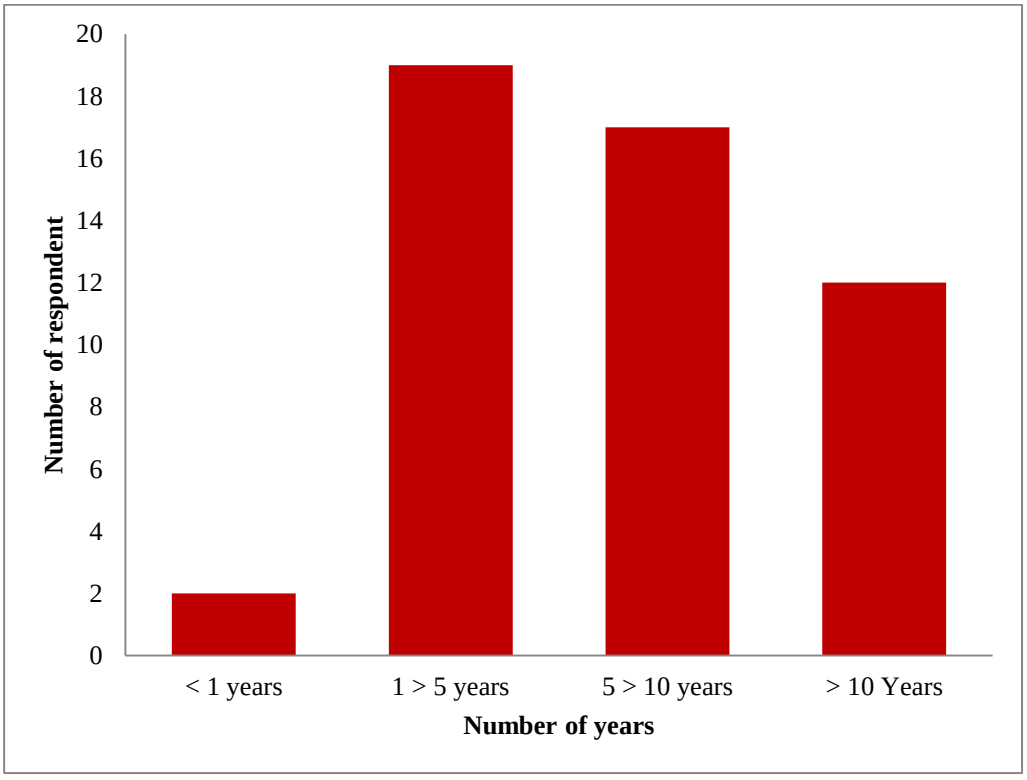

Figure 4.2: Years involved in the construction industry

4.4.1.3 Company Grade

From figure 4.3, it shows that 8 respondents out of 50 is from company grade G7 (16%). The highest is 10 respondents from grade G4 (20%) followed by G3 (16%) consists of 8 respondents. The lowest is G1, G2, G5 and G6, they has 6 respondents each (12%).

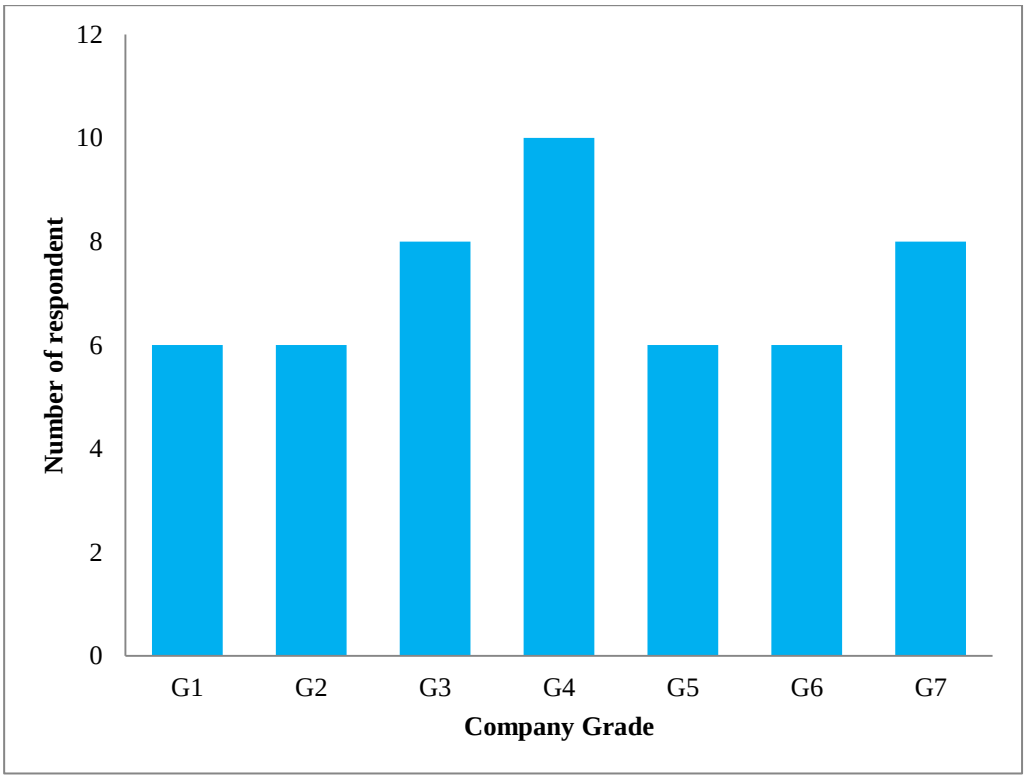

Figure 4.3: Company Grade

4.5 Perception about quality assessment system

This section covers on objectives 1 and 2 on this research. It consists of two parts of question, part A is for general question on Quality Assessment System and part B about the perception of the Quality Assessment System. In part A, it consists of basic question about their knowledge about basic Quality Assessment System.

4.5.1 General Information

4.5.1.1 Have you heard of Quality Assessment System.

The analysis shows that 90% of the respondents have heard and 10% haven't about Quality Assessment System as shown in Figure 4.4. This question does not explain the level of understanding of Quality Assessment System of the respondent; it is purely on the awareness of the existing on Quality Assessment System to enable them continue the survey below.

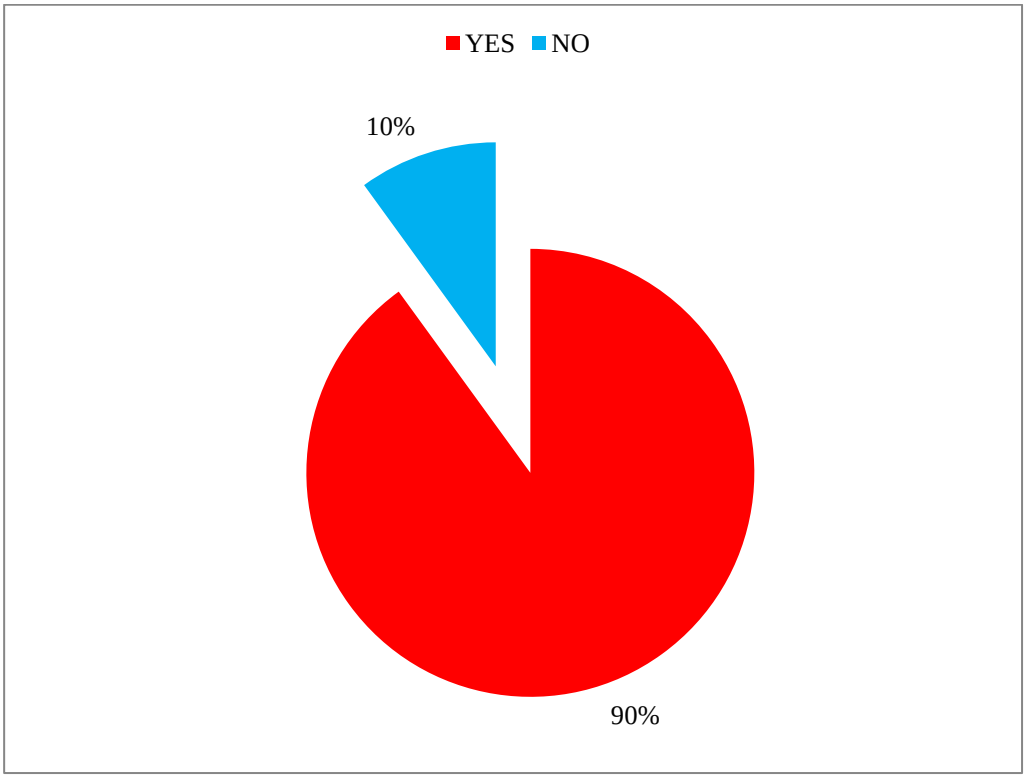

Figure 4.4: Have You Heard Of The Quality Assessment System

4.5.1.2 Experience in using Quality Assessment System in Construction

Figure 4.5 illustrates the experience of the construction company in using this system. The analysis shows that from 50 respondents, just 40% (20 respondent) are experienced in handling this system, and 60% (30%) not used it yet.

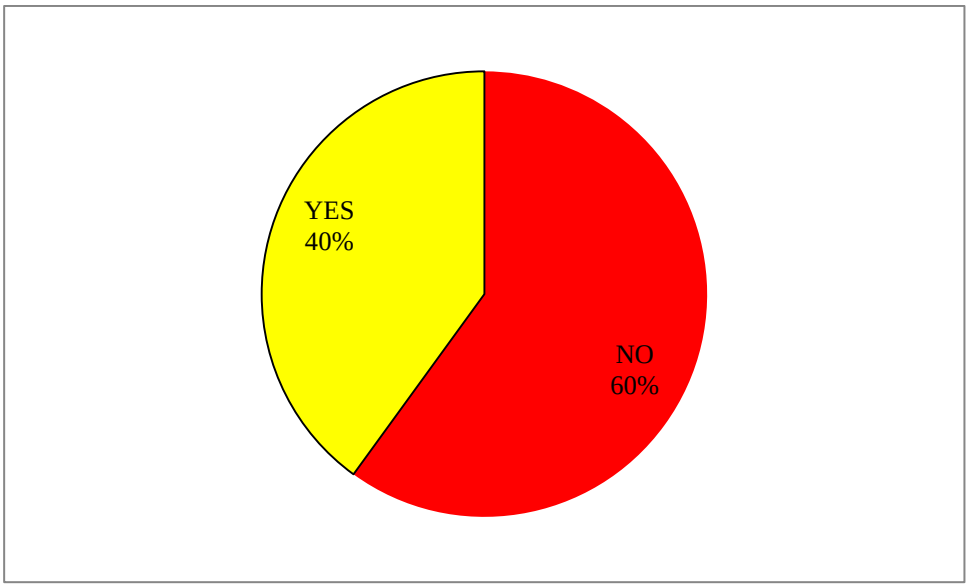

Figure 4.5: Experience in using Quality Assessment System.

4.5.1.3 What system that you used

Figure 4.6 shows the type of system that they're used by respondents current projects. One respondent may already use many types of system, but this research will just focus on two which is QLASSIC and CONQUAS. Respondent can choose more than one, up to what they want. The highest systems used is QLASSIC by 85% (17 respondent) and CONQUAS just 75% (15 respondent). Based on the graph below, 12 respondent used both system and others just used one system only.

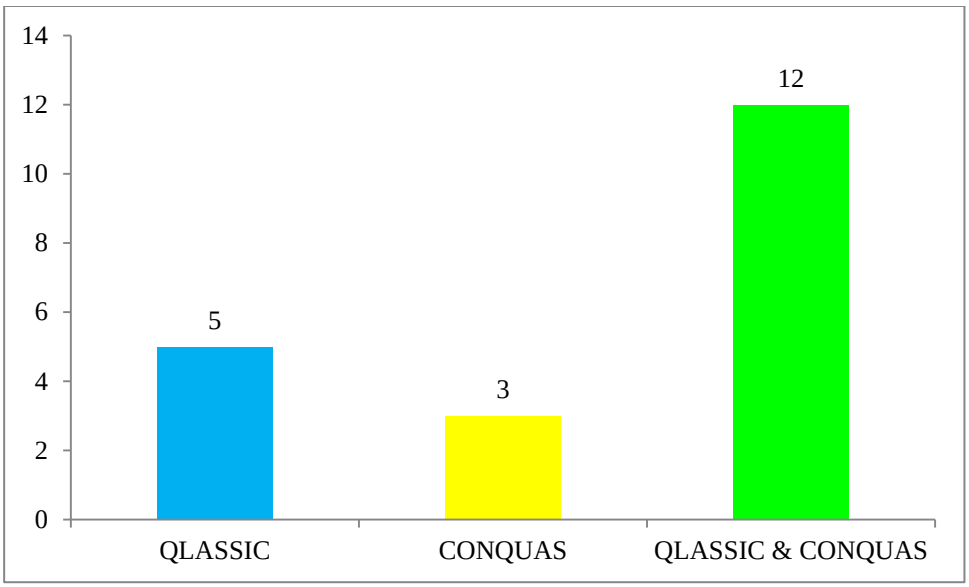

Figure 4.6: Systems that being used

4.5.2 Perception of Quality Assessment System

4.5.2.1 Knowledge, Awareness Aspect

The first question is to identify their knowledge with the terms of Quality Assessment prior of this research. Meanwhile the second question is to identify the awareness of this system in education level. Other than that, in this section, the researcher will ask respondents about their opinion on the access and procedure in this system.

Table 4.1: Analysis of Knowlegde Awareness aspect

No	Knowledge Awarness	Frequency Analysis					Average index	Rank
		1	2	3	4	5		
1	Limited resources and information about Quality Assessment System	0	2	8	28	12	4.000	4
2	Minimum level of exposure to Quality Assessment System in education level	0	1	12	14	23	4.180	2
3	Limited related programs available	0	1	10	25	14	4.040	3
4	Restricted access by CIDB	0	0	7	22	21	4.280	1
5	Simple procedure during assessment	0	5	23	19	3	3.40	5

Table 4.1, shows the ranking of perception by respondent on knowledge awareness aspects has been carried by using the frequency analysis. The item with the highest mean will be ranked as first which is the most important item and so on.

Between the five aspects, it shown that restricted access by CIDB is the highest of 4.280. It happened because the respondent agrees that restricted access is the main reason of the limited knowledge and awareness about this course or system (86%). The second aspect is on minimum level of exposure to a quality assessment system in education level (74%). The respondent chooses this aspect because the lack of course or exposure in higher education level. Graduate student or new worker that wants to involve in this field doesn’t know anything about this system. Third and forth aspect has the similar type of aspect, about limited resources, information and related

programs available. Because of the restricted access by CIDB, the resources and related programs on this system also limited. The last aspect is on the simple procedure during assessment, just 44% of the total respondent agree on this aspect. It shows that the procedure is not simple and easy, and not every contractor ready to be evaluated.

4.5.2.2 Cost Aspect

This aspect more focus on cost. The first question is mainly about the availability this system for any project. Next is about fee and expenses to use the system, is this system economical or not. Other than that, the researcher also asks about the readiness and acceptance of this system on respondent. Will this system brings problem for the ongoing project or not.

Table 4.2: Analysis of cost aspect

No	Cost Aspect	Frequency Analysis					Average Index	Rank
		1	2	3	4	5		
1	Available for big project only	2	0	33	5	10	3.420	2
2	Expensive	2	0	30	9	9	3.460	1
3	Less economical	0	1	35	9	5	3.360	5
4	Lack of continuity assurance	0	0	38	8	4	3.320	-
5	Delay in construction work during assessment	0	2	30	15	3	3.380	4
6	Effect cost production	0	1	36	6	7	3.380	3

Based on the table above, it shows the ranking of perception on the cost aspect. On contractor perception, the quality assessment system is quite expensive to be used which has the highest average index level 3.46. The second highest is 3.42 on available for big project only. Based on respondent perception, this system is suitable for big projects that usually on grade 6 and 7 level. Because of that, for a company that level lower than that, this system are not suitable for them. This is followed by effect cost production that has the average index of 3.380.

Other than that, this system will affect the cost production on delay in construction work during the assessment. This system also less economical and respondent or contractor is lack of continuity assurance in using this system. For those who used it, this aspect is important for them. Most of the respondents just choose neutral in this aspect.

4.5.2.3 Player in the Industry Aspect

In this aspect, researcher focus on the respondent's point of view as a contractor or the personnel that will be evaluated. The evaluation is based on respondent perception on the aspect listed. The first aspect is about respondent knowledge, and their willingness to be accessed and evaluate.

Table 4.3: Analysis of player in the industry aspect

No	Player in the Industry Aspect	Frequency Analysis					Average Index	Rank
		1	2	3	4	5		
1	Less/no knowledge	3	12	18	13	4	3.060	5
2	Less willingness to be accessible	0	15	21	10	4	3.060	-
3	Low reputation(low score)	3	10	28	4	5	2.960	-
4	High reputation (high score)	0	0	19	22	9	3.800	1
5	Increase quality	0	0	19	26	5	3.720	3
6	Increase value of production	0	0	22	25	3	3.620	4
7	Confident of project	0	0	18	25	7	3.780	2

Table 4.3 shows the result of frequency analysis on player in the industry aspect. Based on the result, respondent agrees on the mark given aspect with high reputation if given a high score is important which average index achieve 3.800. This followed by confident of project as second rank and increase quality on the third rank, with average index 3.780 and 3.720. From the researcher's view, the first four highest rank is related and connected with each other. If the contractor wants to get a higher mark, a contractor must confidence in their project. Also, with the evaluation of progress it will make the quality increase.

Other than that, less willingness to be accessible is one of the reason contractor not using this system. They afraid to be evaluated or the project get low score then low reputation. Less or no knowledge about this system also the reason contractor doesn't know what this system about and not using it.

4.5.2.4 Benefits of using the Quality Assessment System

In this research,benefits of using the quality assessment system are being listed and respondent needs to choose between the nine points to pick best.

Table 4.4: Analysis of the benefits of using the Quality Assessment System

No	Benefits of using the Quality Assessment System	Frequency Analysis					Average Index	Rank
		1	2	3	4	5		
1	Describe the construction and the conditions of the property	0	0	9	20	21	4.240	1
2	To identify any problems that need urgent attention or are serious	0	1	10	18	21	4.180	3
3	To show up potential issues and defects before any transaction take place	0	0	17	14	19	4.040	-
4	To tell you about problems that may be hazardous	0	0	21	11	18	3.940	-
5	To outline repair options and give you a repair timelines	0	0	11	22	17	4.120	5
6	Ability to manage risk	0	0	11	21	18	4.140	4
7	Increase the quality of work	0	1	12	17	20	4.120	-
8	Increase the value of the product	0	0	21	12	17	3.920	-
9	Quality and standards of workmanship	0	0	12	17	21	4.180	2

For this aspect, it shows the benefits of using a quality assessment system in construction. In this category, the most identifiable point that respondent chooses is a quality assessment system can describe the construction and the conditions of the property, which represent average index of 4.24. After that, quality and standards of workmanship are second rank by 4.180 tied white can identify any problems that need urgent attention or are serious. The third point is the ability of managing risk which has an average index of 4.140. The least beneficial aspect is to increase the value of the product which of 3.920.

4.6 DISCUSSION

There are many complications in the implementing of Quality Assessment System in Constrution in the current state of the construction industries. Although QLASSIC has been introduced by CIDB since 2007, however the contractor still don't use it frequently. Therefore, there must be a strategy formulated to encourage the application of Quality Assessment System in the local construction industry. Following are some discussion based on the analysis of the study.

4.6.1 Knowledge, awareness aspect

In whatever that we do, knowledge is the main things that we must has and practice to gain and maintained our performance. In Malaysia, we have CIDB as our main head in construction and it provides rules and regulation for contractor and construction to follow. QLASSIC is being introduced as Quality Assessment System in Construction to the contractor. It's such a great system, but doesn't get enough attention from contractor to use it. Lack of knowledge and exposure about this system need to be improved and repaired.

4.6.2 Cost Aspect

These researchers point out that this system is suitable for big project only because they expensive. Usually, big company that's doing project millions ringgits is using this system because they want to prove their project quality. This also the main reason why other contractor doesn't use this system. They don't want to be evaluated by the evaluators.

4.6.3 Players in the industry aspect

In this aspect, researcher want to know respondent perception about this system truly. All the aspect that being ask is based on respondent own opinion to answer it. It shows that this system can bring honor and shame into the company. All related to what the result of the assessment and it such a nightmare to some contractor. Some of them not willing to be accessed for this assessment and some of them not. They trusted their team and willing to be assessed.

4.6.4 Benefits of using the Quality Assessment System.

All respondents agree that this system can describe the construction and the conditions of the property properly after evaluated. This is one of the benefits that this system gives to the contractor. Second benefits are the quality and standards of workmanship is in a good state. Next, it can identify any problems that need urgent attention or are serious inside the project. Other than that, it has the ability to manage risk for future purposed. It also outlines the repair options and give the contractor a repair timelines.

For the open ended questions, only eight respondent given their own opinion in for a recommendation and suggestion. One of them stated that Quality is more important for any construction to get a good of a product and can increase the quality and company name. Also the Quality standard of something as measured against other things of a similar kind; the degree of excellence of something. So, this assessment teaches us the importance of quality in construction field.

CHAPTER 5

CONCLUSION

5.1 Introduction

This chapter concludes on the findings that have been analyzed and discussed in detail in chapter 4. It explains on the summary of the study and further recommendation on the future study are provided in order to cover related issues not studied in this research.

5.2 Summary of study

5.2.1 Objectives 1: To identify the perception using Quality Assessment System among the construction companies in JB.

This objective is to identify the perception of using a quality assessment system in construction. From the findings, the contractor has limited knowledge and access to this system and that is the reasons of lower usage of system in the construction industry. Other than knowledge aspect, cost and honesty aspect one of the reason this system not getting attention. All the aspect above is solely based on the respondents' experiences since they are involved in the construction fields. There are many other aspects that can be considered as more aspects contribute to the more refined results in the analysis.

5.2.2 Objectives 2: To identify the set back of construction companies in Quality Assessment System Implementing.

The barriers of adopting Quality Assessment System in construction industry mainly due to lack of exposure and introduction of this system and lack of support from government. Many of the contractor don't know anything about this system can do. They just know the name of it, but doesn't know how it work and what it does. The least most influential barriers are marketing strategies.

5.2.3 Objectives 3: To proposed suitable measurement to encourage the use of Quality Assessment System in the construction industry.

The strategic management process does not end when the strategy has been decided to pursue and therefore must be translated into the strategy into action. There must be a commitment and the strategy implementation effort by all the parties involved such as CIDB in Malaysia. The authorities must take action by adding more courses and seminars to inform the contractors of the benefit of this system. Apart from courses and seminars, the authorities can also use the online system and improve the busy customer service system. Nowadays, online learning has become increasingly popular and widely used.

In summary, the questionnaire highlighted three main aspects that important in this research. Based on respondent's feedback, researchers can bring out the set back and problem based on respondent perception. From three objectives above, the main issues are on their knowledge about this system.

5.3 Recommendations

Based on this research done and the previous literature reviewed, there are few recommendations available for future study which might be able to contribute to the enhancement of Quality Assessment System usage and also improvement in the related issue.

First of all is the detailed study on the effect of cost in Quality Assessment System implementation. From the study that has been carried out at contractor point of view, it shows that this system only available for big project only because it's too expensive. Hence, cost has always been a crucial issue that construction practitioners deal with all the time. From its planning to its completion, cost incurs in many ways which is what burdens the practitioners beside time and quality aspect. Hence, a detailed study on cost aspect can be conducted, specifying the cost imposed for the system implementation. This can be further equipped with the result and comparison of each aspect.

Another recommendation of future study is on the Qlassic Score components. The detail on the score calculation based on each component can make the contractor understand more about the qualification and evaluation. There are several elements that the assessor can determine on the standard of quality that are implemented by their client or contractor. Hence, the assessment will depend on the package of assessment required. Therefore, a detailed study on the component can be a light in construction life.

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APPENDIX A
PERCEPTION OF CONSTRUCTION COMPANY ABOUT QUALITY ASSESSMENT SYSTEM IN JOHOR BAHRU

SECTION A: DEMOGRAPHIC PROFILE

**Please tick (√) on the appropriate choice that best suit with you

1. Profession in the construction industry:

Consultant		Main Contractor	
Client		Subcontractor	
Etc... Please specify			

2. Working experience:

< 1 years		10 – 15 years	
1>5 years		>15 years	
5 – 10 years			

3. Company Gred:

G1		G2		G3	
G4		G5		G6	
G7					

4. Type if construction work involved (tick more than one)

Building		M&E Engineering	
Civil Engineering		Facility Management	
Others, please specify….			

SECTION B: PERCEPTION ABOUT QUALITY ASSESSMENT IN MALAYSIA

i. General Information

**Please tick (√) on the appropriate choice that best suit with you

1. Have you ever heard of Quality Assessment System?

☐ YES ☐ NO

2. Where do you gain your knowledge about Quality Assessment System in Construction from:

Exhibitions/ Seminars/ Conferences	
Written Materials (Journal, Article, Book)	
Education (Course, Training)	
Electronic Material (Online learning material, Website, Forum)	
None	

3. Do you have experience in using Quality Assessment System in Construction?

☐ YES ☐ NO

4. What type of system that you used?

☐ QLASSIC ☐ CONQUAS

ii. Perception of Quality Assessment System.

You are to choose one number per question based on the extend you agree or disagreed with each statement below regarding the perception of quality assessment system in Malaysia based on various aspects. Each statement comes with 5 Likert scale response framework to choose from [1= strongly disagree; 2=disagree; 3= neutral; 4= agree; 5=strongly agree].

Knowledge, Awareness

No.	Questions	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	Limited resources and information about Quality Assessment System					
2	Minimum level of exposure to Quality Assessment System in educational level					
3	Limited related programs available					
4	Restricted access by CIDB					
5	Simple procedure during assessment					

Cost Aspect

No.	Questions	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	Available for big project only					
2	Expensive					
3	Less economical					
4	Lack of continuity assurance					
5	Delay in construction work during assessment					
6	Effect cost production					

Player in the Industry Aspect

No.	Questions	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	Less/no knowledge					
2	Less willingness to be accessible					
3	Low reputation (low score)					
4	High reputation (high score)					
5	Increase quality					
6	Increase value of production					
7	Confident of project					

Benefits of using the Quality Assessment System

No.	Questions	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	Describes the construction and condition of the property					
2	To identify any problems that need urgent attention or are serious					
3	To show up potential issues and defects before any transaction takes place					
4	To tell you about problems that may be hazardous					
5	To outline repair options and give you a repair timelines					
6	Ability to manage risks					
7	Increase the quality of work					
8	Increase the value of the product					
9	Quality and standards of workmanship					

SECTION C: SUGESSTION & OPPINION

***Please fill all the blank space.**

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