

## **IMPLEMENTATION OF ISO QUALITY MANAGEMENT SYSTEM IN CONSTRUCTION COMPANIES OF MALAYSIA**

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### **Abstract**

ISO 9001 Quality Management System is one of the ISO 9000 set of standards that provides a series of guidelines on how to establish a quality system to manage the processes that affect its product or services. There are many benefits offered by ISO but it does not mean if a company managed to secure the certification, they will be able to experience all the beneficial outcomes. Construction companies that wish to implement the system should be prepared for the upcoming obstacles that may be encountered during the process. The objectives of this research are to identify the benefits of implementing ISO 9001 Quality Management System in the Malaysian construction companies, to identify the problems faced by construction companies in implementing ISO 9001 Quality Management System and to identify the strategies adopted by the ISO certified construction companies in overcoming or minimizing the implementation problems. Case study approach has been selected to collect data for this research. For the purpose of the case study, five construction companies were selected to be interviewed. One representative from each company is interviewed in order to get more information from their perspective regarding the benefits, problems and strategies for the implementation of ISO 9001 QMS. The research findings concluded that improved company's management & work efficiency as the most important benefit from the implementation of the system while lack of awareness on the system among staff is the most significant problem. It is suggested training and audit (internal and external) need to be enhanced to overcome those implementation problems.

**Keywords:** *ISO, Quality Management System, benefits, problems, strategies.*

## **1.0 Introduction**

ISO 9001 Quality Management System is one of the ISO 9000 set of standards that provides a series of guidelines on how to establish a quality system to manage the processes that affect its product or services. It was first developed in 1987 which aimed at promoting the quality of services and goods provided by different sectors of the industry (Chin et al., 2003). Since the establishment of ISO 9000 quality system by the International Organization for Standardization (ISO), it has been gradually adopted by all industries worldwide. It can be said that ISO 9000 is the most successful standard in ISO history because there is over 500000 registrations with registrants in over 100 countries from all continents, including USA, UK, European countries, Japan, Korea, Taiwan, Hong Kong, Singapore, and Malaysia (Lee, 2006).

## **2.0 Problem Statement**

The issue of quality has become a serious concern within the construction industry. Gui (2007) mentioned that considering the significance of construction industry to Malaysian economy and with its rapid development, the issues of quality are rapidly gaining attention from the public. Among the common issues debated are inferior quality of construction materials, building defects, construction delays, high accident rates, and environmental impact issues. Because of these incidents, public's confidence towards the image of the construction industry has greatly reduced. That is why the implementation of ISO 9001 QMS is essential to overcome these problems.

The implementation of ISO 9001 QMS should not be considered as an easy task. There are many challenges that will obstruct its implementation. Love et al. (2000) claimed that many organizations in the construction industry have started out with the best intentions regarding the use of certification, but the documentation requirements of the ISO standards have proved to be extremely onerous and bureaucratic. Besides that, staff motivation may become a serious problem since they tend to review certification will change the normal procedure of their work and this change is a burden to them (Love et al., 2000). Furthermore, Low et al. (1998) pointed out that organization politics, leadership style, employees' resistance to change and conflict within organization can severely affect the implementation and maintenance of a quality management system. This is a reality which should not be ignored if quality systems are to be managed effectively.

There are many benefits offered by ISO but it does not mean if a company managed to secure the certification, they will be able to experience all the beneficial outcomes. Kam (2000) mentioned in his study that the overall benefits gained by construction companies in Hong Kong as a result of implementing ISO were small and it is indicated that the level of improvement was far below their original expectation. That is why most construction companies hesitate to implement the system since they are unsure whether the system implemented is worthwhile especially when a huge spending were invested in implementing the system.

Even after the organization manage to obtain certification, maintaining it also required a great participation from all parties. Rohayah et al. (2004) agreed that many organizations have failed in maintaining their certification and it is reported that more organization will be terminated of their certification. This is a critical issue that needs to be addressed by all organizations that wish to adopt ISO 9001 certification.

Therefore, it seems that all construction companies that wish to implement ISO 9001 QMS should be prepared for the upcoming obstacles that may be encountered during the process. However, it is important to note that the quality of a construction projects will not necessarily improve even if the contractor is forced to set up a quality management system. This is because the attitude of the contractor towards quality improvement is the important factor which governs the successful implementation of the system.

Therefore, the purpose of this research is to find out the benefits achieved by the Malaysian contractor after implementing ISO 9001 QMS and to evaluate whether the achievements met their original expectation. This study also will identify the problems encountered by the Malaysian contractors in implementing ISO 9001 QMS with the strategies adopted in overcoming and minimizing the problems.

### **3.0 Objectives**

The objectives of this research are:

1. To identify the benefits of implementing ISO 9001 Quality Management System in the Malaysian construction companies.
2. To identify the problems faced by construction companies in implementing ISO 9001 Quality Management System.
3. To identify the strategies adopted by the ISO certified construction companies in overcoming or minimizing the implementation problems.

### **4.0 Literatures Review**

#### **4.1 Benefits Gained from Implementing Quality Management**

There are many benefits that can be achieved through ISO. Low et al. (1997) through the survey of construction companies in Singapore found that among the benefits gained by the contractors are:

1. Common language for communicating quality assurance.
2. A general guideline for an organization in any industry to develop a quality management system.
3. Facilitates and promotes third party auditing and certification.
4. Increase client confidence.
5. Increase competition for better quality products and services.
6. Increase client satisfaction on quality.
7. Reduces quality and corrective costs.

Low et al. (1997) meanwhile classify the benefits achieved by construction companies in Singapore into two categories which are internal benefits and external benefits.

1. Internal Benefits: Enhanced company communication, improved documentation, improved method of working, improved quality of work done, greater client focus, improved employee morale, improved performance appraisal and increased efficiency and productivity.
2. External Benefits: Access to domestic market, better competitive edge, higher perceived quality of work done, improved profitability, access to overseas market, having a valuable marketing tool, improved client satisfaction, improved supplier relations.

Hareton et al. (1999) has divided his finding on the benefits experienced by the ISO 9000 registered companies in Hong Kong into three categories which are benefits to staff, benefits to operation and benefits to business.

1. Benefits to staff: Improved team spirit, clearer working procedure, less staff conflicts, lower staff turnover rate, more suggestion from staff.
2. Benefits to operation: Reduced wastage of materials, increased efficiency, improved quality of product or service, better control of sub-contractors, reduced operational costs, and increased quantity of production.
3. Benefits to business: Increased sales with existing customers, more new local customers, less complaints, increased profits, more new overseas customers.

Beattie et al. (1999) in Liang et al. (2007) claimed that the main strategic benefit that ISO 9000 certification provides is an improved relationship with customers which lead to an increased market share. The main operational business benefit is the documentation of operational procedures which strengthen employee capabilities and allow the company to respond more quickly to changes in market demand.

Kumaraswamy et al. (2000) added that ISO 9000 QMS also gives positive implications on shorter project completion time, better risk management, and reduced problems in defects liability period. Tang et al. (1999) meanwhile agreed that ISO 9000 QMS could benefits in increased certainty of achieving contract requirements and deadlines, trimmed the onerous procedures to simpler version and improved efficiency and productivity, more agreements or contracts and, improved administrative system between site and head office

Based on the literature review, the benefits achieved by the ISO certified companies can be divided into two categories which are internal benefits and external benefits.

Internal benefits refer to benefits that gain from within the organization that are useful for staff and internal operation of the organization. Examples of benefits gained from an internal perspective are enhanced company communication, improved documentation, improved method of working, improved quality of work done, improved employee morale, increased efficiency and productivity, and reduced wastage of materials.

External benefits refer to benefits that can be seen from a customer viewpoint which is useful for the business itself. An example of benefits gained from an external perspective are enhanced company's corporate image, increased profitability, increased sales with existing customers, improved supplier relations, more new local customers, reduced problems in defects liability period, on-time completion of project, more agreements or contracts, and access to domestic market.

## **4.2 Problems Encountered from Implementing Quality Management**

The path to ISO 9001 QMS certification is seldom pleasant and smooth. There are many researches on quality management system that address this issue which clearly shows that the implementation of an effective quality system is not an easy task. Among the implementation problems that have been identified by the previous researchers are:

1. Resistance to change

Resistance to change is one of the serious problems mentioned by Kam (2000), Chew et al. (1996) in Mohammad (2000), Abdulaziz et al. (1999), Lee et al. (2001) and Halim et al. (1999). Halim et al. (1999) stated that resistance from employees is the most critical factor that become a barrier for the

successful implementation of ISO 9001 QMS since the burden of its operation and maintenance will be transferred to the employees who must follow every changes made prior to certification. Therefore, this is the real challenges most company needs to confront in implementing ISO 9001 QMS. The reasons for resistance are as follow:

- Change is threatening. It creates uncertainty and displaces one from a position of comfort as one's knowledge and skill is no longer adequate. The acquisition of new knowledge and skills has become a necessity.
- Change involves additional work. The implementation process involves additional works such as documentation, training, and filling in form.
- The benefits associated with the change may not outweigh the costs involved. Employees may fear that the additional effort and time spent in planning and implementing ISO 9001 QMS will not bring benefits to the company.
- They are too busy with the existing work and do not have the time to implement a new effort like ISO 9001 QMS. In fact, some organization has to plan and implement ISO without additional staff.

## 2. Lack of top management commitment

Lack of management commitment is one of the major problems encountered during the implementation mentioned by Chew et al. (1996) in Mohammad (2000), Abdul Rahim et al. (2004) and Al-Asiri (2004). Chew et al. (1996) in Mohammad (2000) stated the reason of the problem was due to lack of awareness of the benefits of the quality system. Tan (2010) observed that many top management of companies do not place quality as the priority against the factor of time and cost.

## 3. Difficult to interpret the standard and requirement of quality system

Chew et al. (1996) in Mohammad (2000), Tang et al. (1999), Al-Asiri (2004), Lee et al. (2001), Rohayah (2004) and Abdul Rahim et al. (2004) discovered that the standard and requirement of the quality system is hard to understand. It is said that the concept of ISO is being too abstract and difficult to comprehend. Lee et al. (2001) mentioned that translating the standards into the corresponding action require full understanding of the concept and philosophies behind the ISO standards. Without full understanding and the appropriate actions, the required standard of quality is hard to achieve.

Chew et al. (1996) in Mohammad (2000) agreed that some difficulties were encountered when trying to interpret the requirements of the standards within the context of construction industry. Rohayah (2004) however found that it is difficult to understand the requirements of ISO 9001 due to lack of knowledge and resources. Low (1994) otherwise claimed that the terminology used in the quality manuals was confusing, causing some of the procedures specified in the quality manual not properly adhered to.

## 4. Perceived increased in paperwork.

Lee et al. (2001) stated that implementing ISO 9001 means to cope with more documentation work during the implementation stage. Chew et al. (1996) in Mohammad (2000) meanwhile stated that ignorance or lack of clear understanding of the documentation's fundamental requirements are the cause for the generation of a huge amount of paperwork which is difficult to use and control. However, at some situation, this may have been the original shortcoming of most organizations that they may not have kept sufficient records or information necessary for monitoring, analyzing and reviewing the firm's performance (Lee et al., 2001). Similar problem were also addressed by Tang et al. (1999) and Kam (2000).

5. Lack of training for management and employees.

Training is important to give understanding and familiarity with the concept of ISO 9001. Lee et al. (2001) found out that this problem could be due to the reluctant of management to commit time and expenses to train their staff. Chew et al. (1996) in Mohammad (2000) also mentioned that some organization perceived that what ISO 9000 is all about is to merely document their quality system and ignored the importance of training employees. Tan (2011) stressed that lack of training as one of the problems in implementing quality management.

Moreover, Low (1994) argued that lack of training among site staff caused them to rely heavily on quality manager who has clear understanding on the ISO 9000 concept. Consequently, they will merely listen to the instruction given and then perform accordingly without actually knowing why they are doing it. This created an unhealthy reliance on the quality manager, thus caused the quality concept appeared to become a 'one man' show.

6. High foreign labour content and shortage of skilled labour

Low (1994) found that acute labour shortage caused most domestic sub-contractor such as bar benders, brick layers, plasterers and tillers have engaged foreign labour to carry out most of the work with the supervision of one or two skilled workers on site. Therefore, it is hard to expect these sub-contractors to produce good quality product and services under the Quality Assurance concept.

7. Lack of control or co-operation from nominated sub-contractor

Since nominated sub-contractor was predetermined by the client, the degree of control the main contractor had over the nominated sub-contractor limited. This problem become more critical when non-conformance is detected and correction need to be taken. Co-operation from nominated sub-contractors can at times be difficult (Low, 1994).

8. High implementation and maintenance cost

Abdulaziz et al. (1999) and Abdul Rahim et al. (2004) agreed that a quality system require high implementation cost. Because of this, many organizations hesitate to implement ISO 9001 QMS since they are unsure whether the benefits gain will cover the cost involved.

However, many organizations misunderstand the cost of quality since they often perceive that the implementation is an extra cost. Actually, it is not the quality is costs but the non-conformance to quality is more expensive. This can be associated with the cost of correcting error, rework, and reacting to customer complaints. (Sia et al., 2006)

9. Insufficient time

Some study also reported that insufficient time became a hindrance to the successful implementation of an effective quality system. Khalid (2005) mentioned that this problem was due to poor planning thus causing delay since the company failed to meet the propose deadline. Rohayah (2004) meanwhile found that insufficient time to implement was due to lack of capital and human resources.

10. Poor communication

Kam (2000) stated that poor internal and external communication also being an obstacle to the successful of the implementation of an effective quality system. Rohayah (2004) found that weak

communication in the organization was due to limited information and resources, lack of experience and training. Abdulaziz et al. (1999) meanwhile point out that there is a communication problem between personnel because of language differences and cultural differences within the workforce.

11. Lack of participation from consultant

Even though the contractor has implemented a quality management system, the performance of contractor is often affected by the consultants who did not practice Quality Assurance even though they have put much effort on quality improvement. For instance, the discrepancies that always occur in the drawings and specifications have caused delay in construction thus reduce the effectiveness of Quality Assurance (Low, 1994).

12. Lack of participation from client

There is lack of participation from client during the implementation process. If there is support from client, implementation is made only to meet client's requirement. The organizations are forced to implement ISO 9001 since it becomes a condition precedent for their services to the client. Tang et al. (1999) added that client requires the consultant and contractor to have ISO certification but they themselves do not have such quality knowledge.

13. Poor quality system design

The organization may fail to recognize or comprehend the fundamental requirements of quality management. Thus, it will lead to uneconomic, bureaucratic and high paper generating system (Khalid, 2005). Kam (2000) also mentioned that among the problems during the implementation process is absence of well structured quality system and procedures.

14. Lack of technical expertise and skills

The appointment of quality consultant is important. Without their expertise or inappropriate consultant involvement, it will be a hindrance to the successful implementation (Mohammad, 2000). Gopalakrishnan et al. (1996) also claimed that failure to appoint quality consultant could lead to unnecessary delays, initial rejection by external registrars and employee dissatisfaction. Tan (2011) explained low competency among staff has contributed to implementation problems of quality management.

15. Lack of resources

Rohayah (2004) mentioned that lack of resources for implementing and maintaining the quality system is due to weak quality work culture, lack of knowledge, and insufficient learning level. She also argued that lack of resources in terms of capital and human resource has caused delay in obtaining ISO 9001 QMS certification. Tan et al. (2009) stated that human resources limitation as one of the human-related problems in quality management in building construction projects.

16. Other problems

Abdulaziz et al. (1999) concluded that among the various problems identified by the contractor that discourage successful implementation of ISO 9000 standards in their companies are loss of productivity of the workforce due to effort exerted in learning and implementing the new system, limited

liability of personnel, remote job site making it hard to control and track quality system implementation in all sites.

Kam (2000) mentioned that most organization aims at maintaining the ISO 9001 certification as a 'work permit' but not seeking for further quality improvement. He also mentioned that it has been a problem whereby site staff is used to work under supervision rather than to follow procedural manual and QMS is not applied to sub-contracting system.

Based on the literature review, the problems encountered by ISO certified companies during the implementation process can be summarized into two categories which are human-related problems and technical-related problems.

#### 1. Human-related problems

Problems in this category are caused by people involved in the implementation process. It may occur during the operation of construction, management at the site as well as work procedures at the site. Examples of problems fall under this category are lack of top management and employees' commitment, poor communication, lack of training for management and employees, resistance to change, and lack of participation from client and other consultant.

#### 2. Technical-related problems

Problems in this category are caused by an external factor which directly are not caused by human behaviour. This kind of problems may reflect the disadvantages of the quality system itself which makes it difficult to be implemented. Examples of problems that fall under this category are high implementation and maintenance cost, lack of resources, difficult to interpret the standard and requirement of quality system, increased in paperwork and remote job site making it hard to control and track quality system implementation in all sites.

## **5.0 Methodology**

Case studies are used when the researcher intends to support his or her arguments by an in-depth analysis of a person, a group of persons, an organization or a particular project (Naoum, 2007). The case study approach is adopted for this research. The technique used for data collection is in-depth interviewing. Boume (1998) mentioned that in-depth interview provides greatest opportunity to find out what someone thinks or feels, and how they react to various issues. The form of interview used was semi-structured which uses a combination of 'open' and 'close-ended' questions (Naoum, 2007). This technique is used in order to give flexibility to the researcher and the interviewee during the interview session.

The reasons for conducting a case study for this research are to look into details the benefits achieved, problems encountered and the strategies used by ISO certified contractors in overcoming the implementation problems. Case study approach allow researcher to answer the 'why' and 'how' questions when the respondents is required to provide justifications on the selected matter.

### **5.1 Selecting the interviewees**

For the purpose of the case study, five construction companies were selected. One representative form each company is interviewed in order to get more information on the benefits, problems and strategies for the implementation of ISO 9001 QMS. The interviewees for the case study are the person

in-charge for the ISO implementation and for the reason of confidentiality, the names of the respondents and the construction company are kept anonymous. Particulars of the construction companies interviewed are shown in Table 1 to Table 5.

**Table 1: Construction Company A**

1	Name of company	Anonymous
2	Interviewee name	Anonymous
3	Designation	Contract Manager
4	Area	Taman Melawati, KL
5	Type of business entity	Body Corporate
6	Number of employees	25
7	Year of company establishment	Before 1985
8	Bumiputera status	Yes
9	Year of receiving ISO 9001 certification	2001
10	Public listed	No
11	Time taken to obtain ISO 9001 certification	Below 18 months
12	Years of implementing ISO after certification	8 years
13	Method of certification	CIDB DIY Scheme
14	Approximate implementation cost	RM 10,000.00

**Table 2: Construction Company B**

1	Name of company	Anonymous
2	Interviewee name	Anonymous
3	Designation	Quality Manager
4	Area	Taman Melewati, KL
5	Type of business entity	Body Corporate
6	Number of employees	More than 90
7	Year of company establishment	1988
8	Bumiputera status	Yes
9	Public listed	Yes
10	Year of receiving ISO 9001 certification	2003
11	Time taken to obtain ISO 9001 certification	Below 18 months
12	Years of implementing ISO after certification	6 years
13	Method of certification	Consultant
14	Approximate implementation cost	RM 50,0000.00

**Table 3: Construction Company C**

1	Name of company	Anonymous
2	Interviewee name	Anonymous
3	Designation	QS / ISO committee
4	Area	Danau Kota, Gombak

5	Type of business entity	Body Corporate
6	Number of employees	55
7	Year of company establishment	1996
8	Bumiputera status	Yes
9	Public listed	No
0	Year of receiving ISO 9001 certification	2008
11	Time taken to obtain ISO 9001 certification	Below 18 months
12	Years of implementing ISO after certification	1 year
13	Method of certification	CIDB DIY Scheme
14	Approximate implementation cost	RM 40,000.00

**Table 4:** Construction Company D

1	Name of company	Anonymous
2	Interviewee name	Anonymous
3	Designation	General Manager
4	Area	Setiawangsa, KL
5	Type of business entity	Body Corporate
6	Number of employees	35
7	Year of company establishment	1998
8	Bumiputera status	Yes
9	Public listed	No
0	Year of receiving ISO 9001 certification	2008
11	Time taken to obtain ISO 9001 certification	Below 18 months
12	Years of implementing ISO after certification	1 year
13	Method of certification	Consultant
14	Approximate implementation cost	RM 20,000.00

**Table 5:** Construction Company E

1	Name of company	Anonymous
2	Interviewee name	Anonymous
3	Designation	Project Engineer
4	Area	Taman Melati, Gombak
5	Type of business entity	Body Corporate
6	Number of employees	10
7	Year of company establishment	1996
8	Bumiputera status	Yes
9	Public listed	No
0	Year of receiving ISO 9001 certification	2006
11	Time taken to obtain ISO 9001 certification	Below 18 months

12	Years of implementing ISO after certification	3 years
13	Method of certification	Consultant
14	Approximate implementation cost	RM 10,000.00

## **6.0 Findings**

### **6.1 Construction Company A**

The company was established in 1985 with a total of 25 employees. The company received ISO 9001 QMS certification in 2001 and have been implementing it for 8 years. The method of certification adopted by the company was CIDB DIY Scheme with the approximate total implementation cost of RM 10,000.00.

#### **a) Benefits achieved after implementing ISO 9001 QMS**

The major change that brings benefit to this company was the company management. This company consists of five main departments which are administration, account, project, contract, and purchasing department. With the implementation of ISO 9001 QMS, each department was able to focus more on their objectives which were not happened before implementing the quality system.

Furthermore, with a proper management, communication of all employees between each department has improved. This is because they understand whom they should refer or ask during the execution of work. Consequently, everyone in the company realized their roles and functions that need to be performed.

The company agreed that having a proper quality system indirectly enhance their company's corporate image. Client has more confidence to use the company expertise since they already know the company in terms of its management and operation. However, even though the company is recognized after being certified with ISO, it does not have significant advantage on the increase number of project undertaken by the company. In fact, at the moment the case study was conducted, the company was still struggling to win tender on a few projects since there were no running projects at that time.

Besides that, most projects undertaken by the company was delivered on time. With a proper supervision of work by the supervisor and project manager on site, all construction work was done according to the drawing and specification. All the labour was trained based on their skills and a strict supervision was carried out by the site supervisor to ensure all the work is done properly. Therefore, there are fewer problems on site and this contributes to cost and time saving through avoidance of mistakes and reworks and less defects of construction work.

However, the company agreed that sometimes the project was delayed even though they strictly follow the work schedule. This is because the nature of the project itself was complicated and the delay was caused by other parties. For example, the hospital project undertaken by the company having problems with the supply and installation of the medical equipments and this directly affected the overall project duration.

#### **b) Implementation problems and strategies adopted to overcome or minimize the problems**

During the initiation process of getting certification, the most serious problem encountered by the company is to adapt with the changes caused by ISO. Since ISO is a new thing, all employees have to

change their old way of doing things in order to fulfill the standards and requirements of ISO. For example, every time they did their work, they need to fill up a standard form as a record to be approved by the person in-charge. This procedure is very tedious at first and sometimes they forgot to fill up the form.

In order to overcome this problem, the company provides necessary training for their employees in order to ensure the smooth implementation of ISO 9001 QMS. The training attended by the employees is either provided by CIDB or other private bodies that offer a certain type of training which is suitable for the company. Through a sufficient training, the performance of the employees has considerably improved. However, even though training is sufficient there is a problem on the lack of input since only representatives was sent for the training. Therefore, this created problems for the company during the Quality Manual preparation.

There are no problems with the top management commitment since they are the one who initiate the system and wanting their company to be certified. Similarly, all employees have given their full commitment for the implementation of ISO. However, the problems lies with the new employees that entered the company since most of them have no experience in doing things the way required by ISO in their previous company. Some of the new employees also tend to do their work in their own way and neglects the requirements needed. Therefore, all new employees were given induction during their employment to make sure they understand how the company operates under the ISO implementation.

The company also encountered problem with the participation of client and consultant. For example, the company usually conducted a feedback survey with the people they work with. Unfortunately, the response for the survey was quite disappointing. Apart from that, the company understand that high foreign labour content in their construction projects make it hard to implement ISO properly on site. So, the company emphasizes two things on construction site which are safety and workmanship. For safety, it is important for all labour to comply with the rules and regulations such as wearing the safety helmet, safety boot, and proper attire while doing work. Meanwhile, for workmanship, a job sheet is prepared by the clerk of work for the site supervisor to check all the work done by the labour complies with specification required.

In order to ensure that the system is working properly, internal audit was carried out once a year by the contract manager. External audit was also conducted by SIRIM every year to ensure that all work is done following the ISO standards.

## **6.2 Construction Company B**

The company was established in 1988 with a total of more than 90 employees. The company received ISO 9001 QMS certification in 2003 and have been implementing it for 6 years. The method of certification adopted by the company was consultant with the approximate total implementation cost of RM 50, 0000.00.

### **a) Benefits achieved after implementing ISO 9001 QMS**

The most significant benefit achieved by the company is better documentation control. For example, when the top management request for a certain files, the retrieval process was easier as compared to before. The company used a manual filing system where all the files are kept in the filing room, but the company is in the process to digitize all the filing system into the company server.

The company's management of work after implementing ISO has improved whereby each department is aware of their responsibilities thus making the operation of work became more efficient.

Besides that, client satisfaction on the overall performance of the company also has increased after implementing ISO. The company carried out client satisfaction evaluation in two stages, when the construction works reach 50% and 100%. The evaluation not only focuses on the quality aspect but on the overall performance of the contractor. Fortunately, the evaluation results and the comments given by the client were always good and they did satisfy with the company performance. With a good reputation, the number of projects undertaken by the company also has increased and at the moment, the company has seven on-going projects around Peninsular Malaysia, including Sabah and Sarawak.

In order to ensure smooth running activities on site, the quality unit carried out request for inspection where all the consultants will check whether all the activities on site follow the requirements stated in the Project Quality Plan (PQP). Every month, quality data analysis is presented to the management to inform the current status of the projects. The quality unit will also produce progress report and client complaint to be presented as well. As a result of this action, the number of defects has considerably decreased and the company was able to deliver the project to the client on time.

b) Implementation problems and strategies adopted to overcome or minimize the problems

The most serious problem encountered by the company is awareness problem among the employees. This always happen especially during the setup of a new site and when the company hired new employees. Installing the ISO system at the new site has been a great challenge for the site staff during the initial stage since it was very tedious. However, when the foundation of the system is already there, complying with the requirements has become a routine for the site staffs. In this situation, the project manager was responsible to monitor the implementation of the system on site and the quality unit also will come to the construction site every month to check the current status of the system.

The company also having problems with the employees' commitment at the company level because some of them does not understand what ISO is all about and it is hard for them to follow the working procedure mentioned in the Quality Manual (QM). The problem also extends to new employees since they do not have the experience and are not familiar to work under the requirements of ISO. In order to overcome the problems, the company provides necessary training to the employees and the training consist of internal training conducted by the company and external training by other organization such as CIDB.

The company does not have any problem with the top management commitment. They describe their top management as a supportive and active who are willing to spend more time and resources for the implementation of the quality system. The management allocate around RM 50,000.00 per year for the quality department and most of the budget is used for training and auditing. The top management was actively involved during the implementation process thus it gives motivation for the employees to put their full effort for the successful implementation of the system.

Apart from that, the company experienced fewer problems with the sub-contractor. This is because most of them have been working with the company for a quite long time, so they are very familiar with the company's way of doing things. The company will never hesitate to provide necessary guidance if the sub-contractor having problems with their work. Furthermore, internal training also was conducted at site level which will involve the project manager, sub-contractor, site engineer, and site supervisor. The purpose of the training was to discuss any work-related matter and by sharing information, it will make easier for them to work together under the ISO requirements.

Since there are two projects located at Sabah and Sarawak, the company agreed that it is quite hard to monitor the quality system there. Therefore, the company take action by allocating one of the quality unit staff there to monitor the project. All documents that need to be submitted to the head

quarters were sent by courier and the problems in terms of traceability are under control. In order to ensure that the quality systems are working, the company carried out internal audit once a year at the company and project level. At the project level, the company conducted cross auditing whereby construction site A will carry out auditing for construction site B and vice versa. This can save time instead of having one auditor to audit all the construction sites.

### **6.3 Construction Company C**

The company was established in 1996 with a total of 55 employees. The company received ISO 9001 QMS certification in 2008 and have been implementing it for 1 year. The method of certification adopted by the company was CIDB DIY Scheme with the approximate total implementation cost of RM 40, 0000.00.

#### **a) Benefits achieved after implementing ISO 9001 QMS**

The company claimed that the benefits of implementing ISO are more on the company level instead of the project level. The most obvious benefit gained by the company was the systematic filing system. Before implementing ISO, the company having problems in retrieving the old files, but having a proper quality system enable all employees and even the new employees to easily retrieve any files requested.

The company thinks that having certified does not brings big impact on the increase of company's corporate image. The company did not really bother whether there are recognize by the industry or not because the main reason of having certified was because of CIDB requirements. However, being recognized could be a bonus to the company and maybe it will take times because the company was just implementing the system for one year.

On the project level, having a Project Quality Plan (PQP) make all the work procedure became easier as compared to before. If before, some works was done based on individual understanding, but with a clear working procedure, there are standard procedures that need to be followed by all site staffs. In relation with the quality of workmanship of the project, site supervisor was responsible to check all the work done and a proper monitoring has improved the quality of the project with less defects and excessive material wastage.

#### **b) Implementation problems and strategies adopted to overcome or minimize the problems**

The first problem encountered by the company during the initial stage was forming the steering committee team. At first, the managing director asked a few persons who were willing to be the ISO committee, but the respond was very disappointing. Hence, the managing director has decided to appoint two persons from each department to be the ISO committee.

As the implementation process started, the company having second problems when a few of the ISO committee resigned. Therefore, a new steering committee needs to be formed again and because of this situation, the implementation process was pending for about one month. After the second steering committee was formed, the company started to work on producing the Quality Manual. The preparation of the Quality manuals was a great challenge for the company since the employees' understanding on ISO was very low at that time and the commitment given was not encouraging.

Therefore, the most successful strategy adopted was by appointing a consultant who is responsible to provide guidance on the preparation of the Quality manual, work procedure and Project quality Plan. The company also used the team-working approach so that all employees in every

department have discussion to combine their information and understanding in producing the documentation required. Due to the insufficient of human resources, key staff from the project department which is based on site were ordered to involve with the documentation process at the headquarters until the certificate awarded to the company. This is to ensure that all employees involved in the implementation process and aware of the new changes that happened at the company.

When the implementation of the system took place after finishing the documentation, the biggest problem lies on employees when they did not follow the work procedure because all the changes caused by ISO are hard to adapt. Therefore, the company provided necessary training for all employees hoping that they can fully adapt with new culture. In fact, the company has allocated eight hour training every year for every employee. The ISO committee also was responsible to monitor all the work was done according the procedures.

The company does not have any problem with the client and consultant since they give full cooperation and participation towards the company. However, the company did have problems with the sub-contractor because sometimes they were always late in ordering construction materials which caused the main contractor to did the ordering and filling any form required for them.

#### **6.4 Construction Company D**

The company was established in 1998 with a total of 35 employees. The company received ISO 9001 QMS certification in 2008 and have been implementing it for 1 year. The method of certification adopted by the company was consultant with the approximate total implementation cost of RM 200,000.00.

##### **a) Benefits achieved after implementing ISO 9001 QMS**

The most obvious benefits gained by the company after implementing ISO 9001 QMS was the smooth operation of business due to improved process of work from pre-construction to post construction activities. ISO standard requires all works to be done according to the procedures mentioned in the Quality Manuals and it must be documented. By having quality manual, all the works have been carried out systematically following the standards required. For example, in recruiting new employee, the whole process involved needs to be documented, so it will make the process of recruitment easy for the Human Resource department.

Similarly, for the work on site, the Project Quality Plan (PQP) documented all the procedures to be used before, during and after the construction completed. Besides that, all activities that have been carried out during construction need to be recorded in the prescribed form. For example, when a labour laid a concrete, they need to record which batch the concrete came from. If during inspection, it is found out that the concrete used is not complying with the standard required, it will be easy for the inspector to identify which concrete batch to be rejected.

Besides that, having ISO certification has increase client's confidence towards the company. Before getting certification, there was a project undertaken by the company whereby the client tends to bother much on the company's operation during the construction period as it look like the company cannot be trusted. However, after being certified, the troubles with the client's involvement have reduced since they are more confident with the company's capability in delivering the project following international standards such as ISO. The company's corporate image also has increased which results in repeated business with the same client and this clearly shows that the client were satisfied with the company's performance.

Furthermore, communication within the company also has improved. All instruction or information from the top management was given directly to the head of departments whom are responsible to inform their subordinates. This will ensure that there is a clear command from the top management to all employees.

b) Implementation problems and strategies adopted to overcome or minimize the problems

The company claimed that the process of getting certification was not very difficult but it is more challenging to implement and monitor the quality system. The most critical problems encountered by the company were the attitude of the employees who are not ready to accept the changes brought by ISO. Most of the employees experienced some difficulties to follow all the procedures since they have been doing their work following their own way or preference. Hence, implementing ISO in the daily routine really need them to change their old ways of doing things.

In order to overcome this problem, the employees were sent for training which were conducted by the ISO consultant hired by the company. There are two training provided by the consultant which are the awareness course and audit training. However, the training does not involve all staff but only the head of each department or its representatives. This could be disadvantageous for the company since there is a lack of input for the head of department to convey the message to their subordinates.

Furthermore, the company suffers lack of human resources during the implementation process. The documentation process requires all employees' involvement to prepare them. However, since most of the employees were based on site, they have to fully mobilize all the employees at the office as well as the key staff on site to finalize the documentation.

The company does not have any problem with the top management commitment. The General Manager gives full support and cooperation during the process of getting certification. He will ask for progress report periodically from each department to ensure that all the works done following the ISO standard. In fact, a meeting will be conducted every week in order to address any problems that arise on site or company level.

In ensuring the successful implementation of ISO 9001 QMS, the company took the initiative to launch a quality campaign. The campaign was conducted by hanging a banner, poster, and articles at the main office and construction site. The objective of the campaign was to inculcate quality culture within the organization and as a reminder to all employees and site worker the importance of quality in construction.

## **6.5 Construction Company E**

The company was established in 1996 with a total of 10 employees. The company received ISO 9001 QMS certification in 2006 and have been implementing it for three years. The method of certification adopted by the company was by consultant with the approximate total implementation cost of RM 10, 0000.00.

a) Benefits achieved after implementing ISO 9001 QMS

After implementing ISO 9001 QMS, there was a major improvement on the company management. The company management has become more systematic with a clear job function of all employees and there are less confusion occurred between functional departments. Communication between employees also has increased as they know whom they should ask or refer during the execution of work. For example, if employees from human resource department require financial data, they will

know what department responsible of holding such information. Hence, it has made easy for all employees to do their work.

The company contended that ISO is all about documentation. Each work carried out must be documented for future reference. Without a proper documentation, it can be one of the causes of losses to the contractor. For instance, the contractor buy 500 bags of cement but the transaction is not recorded. Thus, when the contractor wants to claim the amount of expenses from the client, he may fail to provide the evidence that he has bought such amount. Thereby, the company believed that a proper documentation has prevented them from losses.

Besides that, ISO requires all works to be carried out following the Quality Manual. For example, before a concrete is delivered to the site, it must be tested its strength. By following this procedure, the company was able to prevent losses from rejection of materials if it does not comply with the required standard. Apart from that, by having all the works to be executed following the Quality Manuals and documented in a standard form, it also gives positive impact on the employees' performance. Employees have become more discipline and focus in their job, fewer mistakes was found in their work and the proper documentation of each works allows them to easily retrieve any files required when needed.

Furthermore, the company found out that having ISO certification has increased the company's reputation in the industry where clients are more confident to work with them. However, the company argued that increased in reputation does not have impact on the increased of projects warded. This is because it only gives advantages to the company during tender bidding especially for government projects.

b) Implementation problems and strategies adopted to overcome or minimize the problems

Similar like other ISO certified construction companies, the company claimed that awareness is the most critical problems that need to be eliminated. During the initial stage, all employees felt that ISO was a burden to them and they keep complaining about the extra works that need to be accomplished. In overcoming this problem, they company sent all their employees for awareness training which were conducted by CIDB and ISO consultant hired by the company.

During the preparation of the Quality Manuals and it's supporting document, the company having problem with the insufficient of manpower since they have only 10 employees. Consequently, all the employees have to sacrifice their time in order to prepare them. However, the company adopted teamwork approach with intention that all the works can be done faster and this could help employees sharpen their knowledge through sharing information.

Besides that, the client and consultant commitment and cooperation was very disappointing. Even though the company has informed that they are implementing ISO, these parties tend to do the works their own way which cause troubles to the company. For example, one of the company ISO policies was to deliver all projects on time. There was a problem with the structural design in one project undertaken by the company which needs to be revised. Unfortunately, the design was submitted very late which results to one month delay for the project.

Apart from that, the company claimed that they are having problem in monitoring the quality system at remote construction site. Hence, all the problems relating to quality on site will be settled by the project team themselves unless if it is a huge problem, main office should be informed for further action. The company also conducted a post mortem for every project in order to identify problems on site. A site meeting will be conducted every week while client meeting is carried out twice a month. At the company level, meeting will be conducted on a monthly basis to address any problem at the office.

Table 6 shows summarization of the respondent's view which answers all the research objectives. All the answer has been organized according to the respondent's company

**Table 6:** Summarization of Findings

	COMPANY	A	B	C	D	E
<b>BENEFITS</b>						
1	Improved company's management & work efficiency (Clear job description )	/	/	/	/	/
2	Improved communication	/			/	/
3	Better documentation control		/	/	/	/
4	Increase client satisfaction	/	/		/	
5	Enhanced company's corporate image	/	/		/	/
6	Improved quality of work done (reduce wastage and less defects)	/	/	/		
7	On time project completion	/	/			
8	Increased number of projects undertaken		/			
9	Cost and time saving through avoidance of mistakes and reworks	/				/
<b>PROBLEMS</b>						
1	Awareness	/	/	/	/	/
2	Lack of employees' commitment	/	/	/	/	
3	Insufficient of human resources to implement			/	/	/
4	Difficult to monitor quality system at remote site		/			/
5	Lack of participation from client and consultant	/				/
6	Lack of co-operation from sub-contractor			/		
7	Poor planning of the system			/		
8	High foreign labour content	/				
9	Increased paperwork	/				
<b>STRATEGIES</b>						
1	Training	/	/	/	/	/
2	High participation of top management	/	/			
3	Internal and external audit	/	/	/	/	/
4	Strict supervision on site	/	/			
5	Establish feedback system	/				
6	Frequent steering committee meeting		/	/	/	
7	Team-working approach		/	/		/
8	Involvement of all employees in the documentation process			/	/	
9	Launch quality campaign				/	

## 7.0 Conclusions

In this section, all the findings from all companies is summarized in order to know the similarity or differences of their views on the benefits and implementation problems as well as the strategies adopted by their company. This section will discuss the common benefits, problems and strategies identified in the findings from the previous section.

## **7.1 Benefits**

### a) Improved management and work efficiency

All companies agreed that implementing ISO 9001 QMS in their company makes the management of work becoming more systematic. There are clear working procedures that need to be followed by all employees. In fact, each department is able to focus on their objectives and there is less confusion on job distribution between departments. Therefore, all employees have clear understanding on their job functions in the company and this enable them to work more efficiently.

### b) Improved communication

As the management of work has becoming more systematic, company A, C, D and E found that the communication among employees has considerably improved. Since everyone knows what their responsibility is, they are able to carry out their work efficiently and they would know whom they should refer or ask if they need assistance from other department. Furthermore, a clear communication channel and distribution of information was established when all instructions from the top management is given to the head of department who is responsible to inform their subordinates.

### c) Better documentation control

Company B, C, D and E claimed that among the significant benefits of implementing ISO is the systematic filing system. Under the requirement of ISO, all activities or works done must be recorded in the company's standard form. This is important as evidence if clarification is needed when any problems arise and this prevent the contractors from any losses caused by mistakes. Besides that, having a proper documentation of all works enable employees to easily retrieve any files required when needed.

### d) Increase client confidence and satisfaction thus increased company's corporate image

Company A, B, D and E agreed that having ISO certification has increased client satisfaction on quality. Client is more confidence on contractors' capability since they know that these companies operated following the procedures required under the ISO standards. These companies also claimed that their company's reputation also has increased since clients are satisfied with their performance and this directly enhances their corporate image. However, company C disagreed that their image has increased after getting certification. Maybe it is due to company's new experience with ISO since they were just obtained the certification in 2008. In fact, they do not really bother with it because the main reason of getting certification was due to government' enforcement on G7 contractors.

### e) Increased number of project undertaken

Only company B claimed that the number of project undertaken has increased after implementing ISO. However, company A and E are against it and mentioned that being certified does not bring much impact on the number of project undertaken by them. In fact, company E clarified that having ISO certification only gives advantages for the company to tender new contract especially government project.

### f) Improved quality of work done on site

All companies agreed that after implementing ISO, the quality of work at construction site have improved. There are two factors that proved this statement. Firstly, all the works executed under the ISO requirements must be done following the procedures mentioned in the Quality Manuals and Project

Quality Plan (PQP). By strictly following these documents, contractors are able to avoid any mistakes such as rejection of sub-standard materials. Hence, this results to cost saving through avoidance of mistakes and rework.

Secondly, all construction activities were strictly supervised by the site supervisor, site officer as well as project manager. This is to ensure that construction workers carried out the work following the correct process, to the quality of workmanship required while complying with the safety requirements. Thus, the quality of work was secured with less defects and wastage of materials and accidents on site.

g) On-time completion

Company A and E argued that systematic management of work under the ISO standards did benefits them by enable the construction project to be delivered on time. However, in some project, there are unexpected events occur that hinder the projects to be completed in desired time even though they carried out the work following the requirements.

## **7.2 Problems and Strategies**

a) Awareness and employee's commitment

All companies agreed that awareness is the most critical problem encountered during the implementation of ISO 9001 QMS. There are several reasons mentioned by the respondents on why this problem occurred.

- Involvement of employees is very crucial for the successful implementation of ISO 9001 QMS. However, most employees do not know what ISO is all about and it is hard for them to accept the concept.
- ISO involves major changes in the company management and operation. Employees think that it is difficult to adapt to the new changes caused by ISO. For example, following the working procedures mentioned in the Quality Manuals and Project Quality Plan (PQP).
- Implementing ISO means to cope with extra work and employees think that extra work is a burden to them since they are already busy with their existing work and have not time to do it.

All the reasons mentioned above was due to lack of awareness on how ISO can benefit the company and its employees. Even if the employees are aware and understand how ISO works and benefits them, the commitment among employees was very disappointing. They said that they know and implement it, but they did not follow all the procedures mentioned in the Quality Manual and Project Quality Plan (PQP).

In order to overcome this problem, all respondents mentioned that their company sent all employees for training. Usually, there are two major training given which are the awareness course and auditing training. These training are either conducted by the ISO consultant hired by the company, CIDB or other external bodies. Apart from that, the team working approach mentioned by company B, C and E in performing task is a wise strategy whereby employees are able to share their knowledge, interests and experiences to solve problems and this is effective to increase their commitment towards the job.

b) Lack of cooperation from client, consultant and/or sub-contractor

Company A and E encounter problems with their client and consultants who did not give full cooperation towards them even though they know that the contractors are implementing ISO. Some of the client and consultants that they are working with tend to do the works their own way. In contrast, company C mentioned that they get full cooperation from their client and consultant but they have problems with their sub-contractor who failed in meeting the ISO requirements such as recorded transaction made in buying materials.

c) Difficult to monitor quality system on remote site

Both company B and E agreed that it is difficult to monitor the quality system at remote site. In overcoming this problem, company B allocates one of their quality unit staff to monitor all activities there. They also carried out cross auditing between site which results in time and cost saving to the company. Meanwhile, for company C, if the problems cannot be sorted out by the project team on site, main office should be informed so further action can be carried out.

d) Lack of resources

Except for company B, company A, C, D, and E experienced insufficient of human resources in implementing ISO especially during the documentation preparation. Since this company is classified as a small and medium sized company, they need to mobilize all of their employees including the employees based on site.

e) Internal and external audit

All companies that have been interviewed conducted internal and external audit in order to ensure that the system implemented are working properly. Corrective action will be made if there are mistakes done in implementing the system. It also will help contractor to identify if any resources are required to be used for the implementation.

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