

THE IMPLEMENTATION OF ENVIRONMENTAL MANAGEMENT SYSTEM (EMS) ISO 14001 AMONG CONSTRUCTION COMPANIES IN MALAYSIA

**Shamzani Affendy Mohd Din and Basyirah Riduan
International Islamic Universiy Malaysia**

ABSTRACT

Today, with the deteriorating and unpredictable world climate, the need to preserve the environment is crucial in preventing rapid environmental deterioration. Sustainable development requires a balance between economic growth, social expansion and environmental protection. In order to pursue sustainable development, the construction industry itself has to be sustainable and gives emphasis on environmental matters, in addition to economic gains and social obligations. The ISO 14001 is a set of international standards for voluntary environmental management that has the potential to significantly impact the activities in construction to industry. This study aimed to investigate the level of awareness on the EMS 14001 among construction companies and to seek any obstacle or problems that obstruct the implementation of ISO 14001 in construction industry in Malaysia. Questionnaire-based interview was done on selected Grade 7 contractors in Selangor and Wilayah Persekutuan to achieve the objective of this study. Frequency Statistical Analysis and Average Index Analysis were used to measure the questionnaire done. Seven construction companies were successfully interviewed of which three of them are contractors who have not yet implemented the EMS ISO 14001 and the other four are companies that have applied the system. Based on the findings and analysis, it is found that level of awareness of non-certified construction companies about ISO 14001 is still very low compared to the certified companies. Ten barriers also have been identified to be the problems which obstruct the implementation of EMS ISO 14001 in Malaysia Construction Company. Among them are the lack of government pressure, lack of client support and weak environmental culture among other competitors. In conclusion, several strategies including compulsion from government to make EMS ISO 14001 a compulsory requirement and support from the government have been proposed based in interviews and other countries' action to facilitate the adoption of environmental management system (EMS) ISO 14001 in Malaysia Construction Industry.

Keywords: *Sustainable Development, Environmental Protection, Construction Company, Lack of Understanding and Knowledge, Government, Environmental Management System (EMS) 14001.*

INTRODUCTION

Malaysia has enjoyed remarkable growth over the last decades with industrialisation, agriculture and tourism playing leading roles in its achievements. The construction industry is also one of the major parts that contributes to the booming development which increased from the value of RM58.96 billion in 2006 to RM78.55 billion in 2007 and RM87.97 billion in 2008 (CIDB, 2009). However, the industry also created problems and have substantial impact on the environment. Apart from taking economical aspect into consideration, environmental issues on how to protect the natural ecosystems, minimise waste, conserve water, prevent pollution and sustain a healthy environment have to be in the list.

Hence, Environmental Management System (EMS) has been introduced in 1996 by the International Standard Organization which uses a standard process to identify current activities, establish goals and implement plans to meet the goals, determine progress, and make improvements to ensure continual improvement (USEPA, 2009). According to Malaysia Standard (2008), it is shown that only 29 organisations out of 780 are certified under EMS ISO 14001 in construction sector. This illustrates that Malaysia has not implemented the system widely compared to other developed countries such as Hong Kong, Japan and Europe.

The aim of this study is to propose strategies in promoting the implementation of EMS ISO 14001 in construction practices among companies in Malaysia. The objectives of this study are to:-

1. Understand the acceptance on the concept of EMS ISO 14001 among construction companies in Malaysia
2. Identify the barriers in implementing EMS ISO 14001 among construction companies.
3. Propose strategies to facilitate the adoption of EMS ISO 14001 in Malaysian construction sector.

THE RELATIONSHIP BETWEEN CONSTRUCTION INDUSTRY AND ENVIRONMENT

A construction in broadest sense is always connected with and responsible for the built environment which donates densely inhabited land (Carpenter, 2001). It is also defined as installation of any machinery or equipment which includes ones built-in at the time of the original construction, as well as installation of machinery or equipment after the original construction but which requires structural alteration in order to install (CIDB, 2007).

All construction processes contribute to environmental problems such as deforestation, land, air and water pollution, erosion and siltation to the discharge of hazardous toxic waste (Nor Hafizah Buari, 2007). Ofori (2009) had distinguished the impacts of construction activities towards environment which are:

- Competition for land with other activities such as agriculture;
- Adverse effect on the plots of land which are developed and their environment such as changing their ecological characteristics;
- Substantial consumption of both renewable and non-renewable resources;
- Production of substantial volumes of waste;
- Consumption of large amounts of energy during the processing of materials, the construction process and in the use of constructed items;
- Contribution to air pollution from the dust and substances, including some toxic ones, which are released during the production and transportation of materials and in some construction operation; and
- Disruption of lives of the people living in the vicinity of the projects through traffic diversions, noise pollution and others.

It is clearly shown that constructions confer/have negative enormous contribution to the environment, thus a vital action needs to be adapted to minimize the impact towards environment.

ENVIRONMENTAL MANAGEMENT SYSTEM (EMS) ISO 14001

EMS is a set of process and practices that enables an organisation to minimise its environmental impacts and increase its operating efficiency (Casio, 1998). It is a management system that helps an organisation in identifying, controlling, and monitoring the activities of the company whether in products, services and processes that could affect the environment either in short term or long term.

According to Walker (2003), a typical EMS is built on the “Plan, Do, Check, Act” cycle. The cycle forms the structure of EMS to continually improve upon itself. The plan means identifying environmental impacts and establishing goals to address those impacts. After all necessary identification has been made; the implementation stage will then take place. Implementation of EMS begins with a comprehensive evaluation of organization’s operations and activities to determine how it would affect the environment. In other words, EMS build on organizational processes and features that have been put in place to help them meet business goals, such as goal setting, work practices, employee training, records management, emergency preparedness, organizational structure, and continuous improvement.

The main benefits of EMS is environmental performance can be improved as the systematic identification of the organisation’s activities’ potential environmental impacts and the on-going setting of goals to control those impacts are important parts of an EMS. Many of the goals will likely involve energy and waste reduction and pollution prevention. Achieving these goals will ultimately lead to improved performance and a better environment. In addition, EMS helps the organisations measuring social, economic, and environmental benefits of their environmental control programs.

An EMS also can show where upgrades and other environmental improvements best fit into overall business strategy, and help the company to evaluate costs and benefits of changes so that well-formed decisions can be made. Furthermore, U.S Environmental Protection Agency (EPA) (2002) agreed by applying EMS, the market can be more competitive and help

organisation to secure access to certain markets. In other words, EMS facilitates company to obtain 'green' image.

In view of the fact that there is no specific method needs to be applied in applying EMS, the International Organization for Standardization (ISO) had come out with ISO 14001. ISO 14001 is one of the standard or tool created for an organization to be used as a guide in implementing an EMS. The idea of this standard is to produce a single framework for any EMS which can accommodate varied application all over the world. It is a standard that harmonizing environmental management practices and requirements around the world (DEQ, 2003).

As with EMS, ISO 14001 also gives/provides many benefits to an organization especially in both business and social responsibility. Apart from complying with environment legislation, increase cost effectiveness, increase reputation and competitiveness among other organizations, the application of EMS ISO 14001 also enhances the nation's wellness as a whole. A study done by Srivinas and Yashiro (1999) showed that the benefits gained by the implementation of EMS ISO 14001 can be divided into two parts which are internal benefits and external benefits.

The internal benefits that accumulate to the government give a substantial saving of everyday resources that they use for their operations by putting in place an EMS that lays at the core of ISO 14001 certification (Srivinas and Yashiro, 1999). The processes involved a complete review of existing activities and understanding their impacts on the environment.

Cities can also cut costs on several fronts, due to the environmental review process that identifies overuse or wasteful utilization. Besides, with an effective EMS that covers all aspects of an urban government's day-to-day operations and activities, it also improves staff commitment and morale, highlighting their contribution to 'saving the earth' (Srivinas and Yashiro, 1999).

It aims at removing negative impacts and strengthening positive impacts, leading to improved efficiency in operation, and better integration in day-to-day activities. Since a lot of data on an urban government' activities need to be collected, and inter-linkages identified, it also helps in developing a more effective information management system.

The external benefits achieved from EMS ISO 14001 that accrued to the city as a whole demonstrates a city's 'green face' to its citizens and also helps in emphasizing the need for greater environmental action on the part of urban stakeholders at the local level with growing prioritization of the global and local environment. A city's acquisition of ISO certification also helps in serving as a model for other urban and regional governments to emulate and replicate (Srivinas and Yashiro, 1999).

Additionally, an urban government that has obtained ISO certification can, from a position of strength, promote replication of acquiring ISO Certification from other stakeholders in the city, particularly private sector businesses and industry, where a properly and strategically implemented EMS can have far-reaching and long-term impacts. It emphasizes the concept, 'environmental-action-starts-at-home', where local and immediate actions at the grassroots have long-term global implications (Srivinas and Yashiro, 1999). The key difference with acquisition of ISO 14001 is that urban governments have to take action themselves in-house and from within, demonstrating environmental sensitivity to the residents and all sectors of the city, and promoting replication.

The implementation of EMS ISO 140001 in construction industries have been applied aggressively in other countries since its introduction in 1996 especially in developed countries (Srivinas and Yashiro, 1999). Some of the countries has made the implementation of EMS ISO 14001 as mandatory for every construction company involved in construction activities and became one important self-regulating tool for the construction company to ensure they follow all the regulation imposed in construction activities as well as to preserve the environment. The acceptance of three countries which are Japan, Hong Kong and Malaysia of the application of EMS ISO 14001 will be discussed further as below.

Since the establishment of the ISO 14001 environmental management system in 1996, Japanese facilities have led the world in numbers of certifications. In construction industry, the construction contractor under the supervision of Ministry of Infrastructure, Land and Transport (MILT) implemented various environmental measures such as promotion of recycling and

environment-friendly river planning. However, results achieved were not fully as expected. Hence, MILT has increased further environmental considerations such as application of EMS ISO 14001 to public works since 1995. A model project was started in 1997 and up to 2004, the model project has been implemented at 29 work sites. In year 2003, a total of 1,155 construction companies registered for ISO 14001 in Japan (Taguichi, 2004).

According to Tse (2001), the implementation of ISO 14001 in Hong Kong's companies is increasing from time to time. The number of ISO 14001 firms in Hong Kong is now approaching 100 compared to 35 in 1999 which are dominated mostly by the manufacturing firms. However, interest from Hong Kong construction firms has been fairly slow (some are doing it now). Some of the construction firms certified in Hong Kong are architects, including the Architectural Services Department.

The construction industry in Hong Kong was the first commercial sector to look for ISO 9000 certification as a result of the decision made by Hong Kong Government who is the biggest housing developer to tackle the problem of sick buildings by enhancing a quality management system in the construction industry. The prerequisite made by the government to have the ISO 9000 certification in order to enter bidding for any Housing Authority project is the major reason for many construction firms wanting to obtain it.

On the other hand, the construction sector has not been very concerned with the environmental issues as many environmental management activities were not addressed in the construction industry (Tse, 2001). Moreover, a self, voluntary initiative for the construction firm to implement ISO 14001 certificate make it not so popular among the contractor to use it. Thus, environmental management has been neglected by the contractor since contractors with poor environmental performance are still eligible to be awarded a contract as the ISO 14001 has not been a criterion for the selection of tenderers.

Nevertheless, there is a need for construction companies to adopt the ISO 14000 EMS since most environmental influences tend to be brought by the construction processes in Hong Kong. One of it was noise pollution produced by the use of piling without permission. A case has been reported in 1955 which

caused a high penalty, US\$22,500 need to be paid by the construction company for using powered mechanical equipment for construction work without permit (Tse, 2001). Besides, Tse (2001) also stated another common problem occurred during construction process is the material wastage. He mentioned that Hong Kong construction industry produced about 37,100 tonnes of waste each day accounted for about 44% of the total waste disposed of landfills in 1999.

Hong Kong had been expected to run out of landfill space before 2010 if nothing is done to solve it. So, there is an urgent need to reduce waste loads. Hence, the ISO 14001 is one of the best approaches that can be used to manage material waste by recycling it. Although it involves cost in managing material waste recycle, the costs of not using it tend to be higher. For example, Hong Kong government spends US\$16 per tonne for building and operating landfills and construction companies are required to pay only US\$5.5/ tonne for solid waste. Clearly, this is one of the potential incentives if EMS is implemented in the construction industry.

Unfortunately, the achievement of ISO 14001 in the Hong Kong construction industry is not as simple as in the manufacturing sector. The characteristic of the construction which involve unique design, many processes and stages, materials, various groups of people and multifaceted procurement contract make the implementation of ISO 14001 quite difficult for construction companies. A study done by Tse (2001) of 55 major construction firms in Hong Kong shows only 26 companies respond to the questionnaire. 62.5% of the respondents show an intention to pursue ISO 14001 but only 12.5 per cent would establish their own EMS in the near future. The remaining 25 per cent of respondents did not have any plan to pursue the ISO 14000 registration. This number explains that the level of environmental awareness in construction industry is not high and reflects their view on the implementation of ISO 14001.

The Standards and Industrial Research Institute of Malaysia (SIRIM) has introduced EMS ISO 14001 on 21st December 1996 as new scheme for companies who wish to certify their Environmental Management System (EMS). Certification of the Environmental Management System is applicable not only to

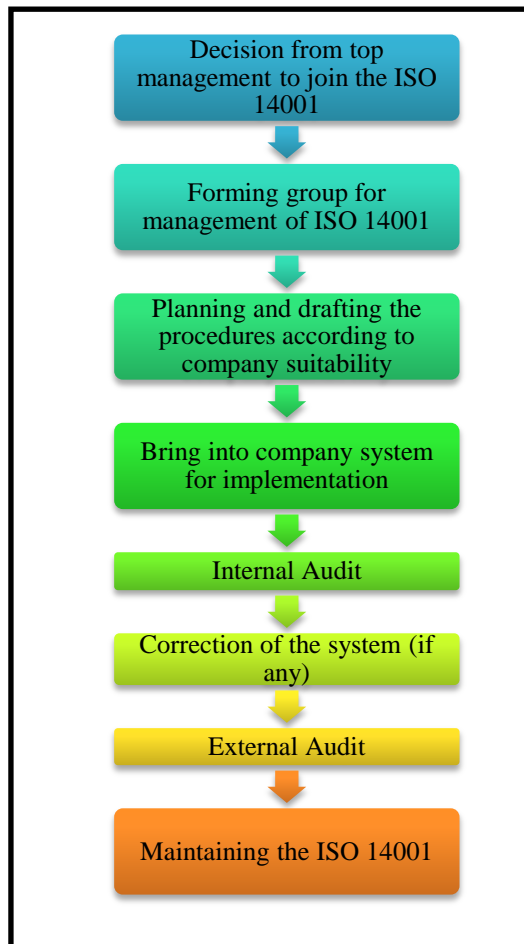
companies in the manufacturing sector, but also to service-orientated companies such as the construction industry and developer (ASEAN, 2009).

In 2002, the government announced that all contract under Public Works Department (PWD) projects must comply with ISO 14001 for sensitive and high risk area. This requirement can enhance the awareness among contractors toward the environment especially in protecting the natural resources such as water and others. Mersing Camp in Johor and the road project between Gua Musang to Kuala Berang have been chosen as the first two projects that will comply to ISO 14001 (Bernama, 2002).

Yet, the implementation of EMS in Malaysia is not popular compared to the other countries especially in construction sector. A study done by the Ministry of Standard Malaysia (2004) showed only nine (9) organisations out of 780 have EMS ISO 14001 certification related to construction works. It can be concluded that Malaysia's construction industry has been left so far behind in terms of awareness level in environmental issues. Most of the construction firms in Malaysia are not interested to participate in protecting the environment.

The process and procedures in implementing EMS ISO 14001 are similar to ISO 9001. The difference is the implementation part in which EMS ISO 14001 requires more work to do as the EMS ISO 14001 needs to deal with environment. Sampling of material and environmental testing must be done for every project involved. The summary of sequences in applying ISO 14001 can be seen in Figure 1.

Figure 1: Procedures in Implementing EMS ISO 14001
(Casio, 1998)



The implementation of ISO 14001 starts from the decision made by top management of the company. Once they decided to apply ISO 14001, the organization in managing the implementation of ISO 14001 will be formed to take charge of all matters pertaining to the ISO 9001. Then this group will plan and draft the system according to the guideline provided in ISO 14001. The system will be adopted in line with the company's policies. Then, survey will be conducted between staff and workers to determine which procedures fit the best to be used in their ISO 14001 system.

After the drafting process is completed, the system will be established and introduced to all staff in the company. At this

time, staff and workers will be sent for training to explain to them on the importance of ISO 14001 and to expose them to in-depth understanding of the system. The implementation part is the crucial part as they need cooperation from all staff in order to succeed. Then internal audit will be conducted. The management team will analyse the system to ensure whether the system fulfills the entire requirement in ISO 14001. Improvement of the system will be done if there is condition which has not been fulfilled yet. External auditor will be called to audit the system and the certification will be released. Lastly, the system must be maintained to achieve the purpose of ISO 14001.

Foreseeing the problems, in order to enhance the quality of environment, Construction Industry Development Board (CIDB) under Strategic thrust 3, CIMP 2006-2015 (Muhammad Awang et.al., 2000) has decided to strive for the highest standard of quality, occupational safety and health and environment practices by targeting the implementation of ISO 14001 to be done by 90% of the construction companies in Malaysia. It is to ensure a balanced environment exists where economic and social goals are in equilibrium. Malaysia also fosters an environmental-friendly culture adopted in construction by the 2015.

Meanwhile, by giving utmost priority in promoting construction companies to adopt ISO 14001 certificates, Malaysian government also encourages external accreditation in quality and environmental management to ensure the ISO 14001 standards are maintained in the industry and enhance credentials for export of construction services. CIDB (2006) has expressed their sense on the significance of the self-regulation to be increased within construction industry by stressing that best regulatory practices can be gained to achieve the performance required by the implementation of self-regulation of the construction company.

As compared to Japan and Hong Kong in terms of implementing EMS ISO 14001, Malaysia construction industry has been left so far in which most of them are not interested to participate in protecting the environment. Nevertheless, Malaysian government has taken some initiatives to ensure a balanced environment exists where economic and social goals are in balance.

METHODOLOGY

The research methodology consists of several elements which are shown below:

- Identifying background of the problem
- Determining the objectives and scope of tasks
- Literature review from various sources
- Questionnaire designation
- Semi structure interview
- Data collection, arrangement and analysis
- Frequency statistical analysis
- Average index analysis
- Evaluation of analysed results and conclusion

The total number of interviewed companies is seven (7) companies including four companies which have been implementing ISO 14001 and three companies which have not yet applied the EMS ISO 14001 but have the ISO 9001 certificates. Only 7 companies were able to be interviewed because of time constraint to do the research and low cooperation from the construction company to accomplish the research study, where Table 1 shows the types of project involved by each interviewed companies.

Table 1 : Type of Project Involved

| No. | Company | Type of Project Involved | |
|-----|---------------------------------|--------------------------|-----------------|
| | | Building | Infra-structure |
| 1 | Teguh Kualiti Sdn Bhd | Yes | Yes |
| 2 | Gabungan Strategik Sdn Bhd | Yes | Yes |
| 3 | Syarqiah Holding Sdn Bhd | Yes | Yes |
| 4 | Asia Baru Construction Sdn Bhd. | - | Yes |
| 5 | Ahmad Zaki Resources Sdn Bhd | Yes | Yes |
| 6 | UEM Construction Sdn Bhd | Yes | Yes |
| 7 | Gamuda Engineering Sdn Bhd | - | Yes |

RESEARCH FINDINGS AND ANALYSIS

The target respondent was divided into categories which are companies who had implemented the EMS ISO 14001 and companies who have not involved in EMS ISO 14001 as calculated all together as seven companies. The companies who had implemented the system are four while the companies who have not yet implemented are three.

All the companies said that they have heard about EMS ISO 14001 before and had aware it implementation in Malaysia construction industry. However, they are not sure on the purpose of the EMS ISO 14001. They know the basic function of EMS ISO 14001 is to preserve the environment but they said that they need in depth explanation on the purpose of it. So, automatically their understanding on the process and procedure to implement ISO 14001 is also limited. Table 2 shows the level of awareness of the companies which had been interviewed.

Table 2 : Level of awareness on EMS ISO 14001

| No | Question | Teguh Kualiti | Gabungan Strategik | Syarqiah Holdings |
|-----------|---|----------------------|---------------------------|--------------------------|
| 1 | Have you heard about EMS ISO 14001? | Yes | Yes | Yes |
| 2 | Are you aware of the implementation of EMS ISO 14001 in Malaysia? | Yes | Yes | Yes |
| 3 | Do you know the purpose or functions of EMS ISO 14001 in construction industry? | Not sure | Not sure | Not sure |
| 4 | Are you aware of the process and procedures in implementing EMS ISO 14001? | Not sure | Not sure | Not sure |
| 5 | Has your staff participated in any training or programmes concerning ISO 14001 in the past? | No | No | No |
| 6 | Will your company try to extend the resource or set up environmental management system according to ISO standards in the near future? | Yes | Yes | Not sure |

Since they are not aware on the function and procedure in applying the EMS ISO 14001, they not so bothered to send their staff to join any training or programme related to ISO 14001 in the past. But, 67% of the companies are interested in setting up the EMS for their companies according to ISO standard in the future especially when the government had announced to bring

Malaysia toward green building. One of the companies also said that the decision to implement EMS ISO 14001 has been put into the top management discussion lately. Compared to one company who was still unsure to join the system, they doubt the system will give benefits to their company as the implementation of ISO 9001 did not really show significant advantages to their company. It shows that the majority of the construction companies are ready to support the environmental management system in their construction activities although they have less idea and knowledge on the EMS ISO 14001.

When they were asked on why construction companies should comply to EMS ISO 14001, most of them say that to fulfill client or government agencies' requirement as well as to minimize construction activities' impact toward environment. Improving company's image to the public also can be their reason why they should apply EMS ISO 14001. One of the respondents also agreed that ISO 14001 can reduce operating cost in a long term effect as all the works will be monitored properly especially for potential activities that highly affect the environment.

Additionally, one respondent said that he will consider using the EMS ISO 14001 when there is demand from the end user because when the end user demands the 'eco-friendly' type project, the developer also will consider the demand as a requirement which they need to follow. Respondent also commented that this system requires voluntary conduct from the construction company. Contractors should have the concern to protect the environment then the system will be successfully applied.

Based on the questionnaires given to them, it is shown that companies who had not yet implemented the system scored lower marks as compared to the one who had implemented the system. All respondents said that they heard about the system but lack of understanding on the purpose of the system in the industry. However, 67% of the respondents are interested in setting up the EMS for their companies according to ISO standard in the future. It reveals that the majority of the companies are ready to support the environmental management system in their construction activities. Some of them are aware that ISO 14001 can reduce operating cost in long term effects as all of works will be

monitored properly especially for potential activities that highly affect the environment.

All of the companies clarified that they have established their own environmental policy which needs to be followed for each project they involved. All of them are focusing on the air pollution control and noise control while three companies applying waste disposal. Both material recycling and energy saving were represented by company no 1 and 2 respectively. Their focus in environmental management policies can be shown in Table 3.

Gamuda Engineering Sdn Bhd applied 100% of the environmental management focus stated by the researcher followed by UEM Construction Sdn Bhd that applied 80% of the focus. Ahmad Zaki Resources Sdn Bhd implemented three environmental focus while Asia Baru Construction Sdn Bhd only focused on two management which are air pollution control and noise control. The implementation of air pollution and noise control in all company shows that it might be the most important area that needs to be focused by the construction industry. Both of the areas are crucial to be focused as the air and noise pollution are worsening in our country. The regulatory body might set up strict rules and regulation toward both of the area.

Table 3 : Environmental Management Focus

| No | Environmental Focus | Asia Baru Const. | AZRB | Gamuda Eng. | UEM Const. |
|----|-----------------------|------------------|------|-------------|------------|
| 1 | Energy Saving | - | - | Yes | - |
| 2 | Air Pollution Control | Yes | Yes | Yes | Yes |
| 3 | Material Recycling | - | - | Yes | Yes |
| 4 | Noise Control | Yes | Yes | Yes | Yes |
| 5 | Waste Disposal | - | Yes | Yes | Yes |

Moreover, to continue the research, the construction companies who already implemented the EMS ISO 14001 were asked the same questions as the other three companies who have not applied the EMS system. As a result, different answers were provided by the companies who had implemented EMS ISO 14001 and the company which have not implemented.

In terms of implementation of EMS ISO 14001, three out of four companies have formed their own Environmental Department which particularly handles matter pertaining to the quality, environment and safety. It is because these three companies are big scale companies which have up to 600 staffs, thus they can afford to have their own department on particular specialization.

All of them agreed that the reason of implementation of the system is to fulfill the client requirement especially government agencies. Plus, by having the system they can enter international tender. Besides, they believe by implementing the system, it can improve their image, build trust from public, and minimize the impacts towards environment as well as to get more projects from government or private firms.

The process and procedures in implementing EMS ISO 14001 is similar to ISO 9001, but the EMS ISO 14001 requires more work to do as it deals with the environment. The process starts from decision made by top management to join ISO 14001, then forming group to manage the system. This group will plan and draft the procedures according to the company suitability and bring into the company's system for implementation. After that, internal audit will be conducted and there will be some correction if any does not comply with the requirement. Before the certification is released, it has to run through external audit in order to maintain the company's ISO 14001.

On the other hand, based on the average index there are some barriers for the companies to implement the system which rank from the highest scores until the lowest scores. Difficulties faced the most by them are lack of government pressure (4.43), lack of specialist manpower (4.29), weak environmental culture among other competitors (4.29), expensive implementation cost (4.00), subcontracting system creates difficulty to manage EMS (4.00), lack of client requirements/supports (3.86), lack of training (3.86), lack of environmental sound technology/ building materials (3.57), no competitor take action first (3.57), complex documentation process (3.43), unsuitable standards (different to interpret in construction industry) (2.86), and lack of training for junior staff (2.86).

Three respondents strongly agreed that lack of government pressure will be the barrier of the EMS ISO 14001 implementation because as a policy maker, government plays an important role in ensuring the success of the system while the other four respondents quite agreed with the barrier.

Lack of worker support and poor awareness in environmental culture among other competitors share the same mark which is the second highest reasons why construction companies are not interested to apply EMS ISO 14001. Most companies find it difficult to get participation from all staff. Some may not want to get involve with the system as they think it is complicated to handle especially old staff who had been working there for a long time. One respondent commented that he has no problems with new staff as new staff will always follow the rules but the old staff will create problems when the company tries to implement any system especially if the system is new because new system will increase their workload and it becomes burden to them. The other respondent also mentioned that to change people mind set needs certain time as it cannot be changed easily.

When there is poor environmental culture among other competitors, automatically there is no awareness for them to do the system as nothing happened to encourage them to implement the system. This reason also represents the culture among the construction company itself. One respondent commented that most of the contractors have been aware of all the environmental problems occurred because of construction activities but their mentality which is hard to change, has become part of their culture for taking the issue lightly.

CONCLUSION AND RECOMMENDATIONS

Based on the result gained from this research, there are several strategies that can be applied to promote the implementation of EMS ISO 14001 in Malaysia construction industry. Government plays important role in influencing the construction company's action as it is a necessity to enforce companies who want to take part in government project must fulfill the EMS ISO 14001 as a mandatory requirement. Besides, the government should provide provision of soft loan or short term subsidies to companies who

decide to apply the system. The incentives may attract them to apply especially to those who run small business such as sub-contractors.

It is very useful that by providing training courses and seminars on the subject of environment management for the management of companies as their environmental awareness is fundamental in adopting EMS. The training should include sharing of experience by the ISO 14001 certified companies so that others can learn through the experience. Additionally, by building a mentor mentee programme, this can help construction companies to understand the process and procedures deeper. Over and above, public participation is one of the main stimulator to influence the companies to be aware of the importance in constructing sustainable development.

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