

**CONTRIBUTING FACTORS FOR
SUCCESSFUL IMPLEMENTATION OF
EROSION AND SEDIMENT CONTROL PLAN
IN MALAYSIA**

ASRI SYAHMI BIN ASNOR

B. ENG (HONS.) CIVIL ENGINEERING

UNIVERSITI MALAYSIA PAHANG

UNIVERSITI MALAYSIA PAHANG

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Full Name : ASRI SYAHMI BIN ASNOR

ID Number : AA15107

Date : 30 May 2019

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EROSION AND SEDIMENT CONTROL PLAN IN MALAYSIA

ASRI SYAHMI BIN ASNOR

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ABSTRAK

Pencampuran air dan tanah dapat memberikan impak yang besar kepada alam sekitar. Oleh itu, Pelan Kawalan Hakisan dan Mendapan (ESCP) adalah perlu untuk mengurangkan kesan buruk dari pengangkutan mendapan dari tapak kerja ke kawasan luar tapak kerja. Kajian ini bertujuan untuk mengkaji faktor-faktor untuk melaksanakan ESCP dengan jayanya di Malaysia dengan menentukan cabaran-cabaran yang lazim untuk melaksanakan ESCP dan mengenal pasti faktor-faktor untuk melaksanakan ESCP dengan jayanya. Cabaran umum untuk melaksanakan ESCP boleh dibahagikan kepada dua (2) iaitu cabaran dalaman dan cabaran luar. Selain itu, faktor kejayaan untuk melaksanakan ESCP boleh dikategorikan kepada empat faktor: fokus strategik, orang, operasi, dan kewangan. Kajian ini akan menimbulkan kesedaran, pengetahuan, dan kepentingan ESCP, meningkatkan kadar kejayaan pelaksanaan ESCP di Malaysia, dan membantu dalam membuat keputusan dan menangani masalah yang berkaitan dengan pelaksanaan ESCP.

ABSTRACT

The mixing of water and soil can give a significant impact to the environment. Therefore, Erosion and Sediment Control Plan (ESCP) is necessary to reduce the adverse effects of sediment transport from on-site to off-site areas. This study aims to investigate the factors for implementing ESCP successfully in Malaysia by determining the common challenges for implementing ESCP and identify the factors for implementing ESCP successfully. The common challenges for implementing ESCP can be divided into two (2) which are internal challenges and external challenges. Furthermore, the successful factor implementing ESCP can be categorized into four factors: strategic focus, people, operations, and finances. This study will create awareness, knowledge, and importance of ESCP, improve the rate of success of implementation ESCP in Malaysia, and help in the decision making and tackle the problem related to the implementing of ESCP.

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LIST OF SYMBOLS

LIST OF ABBREVIATIONS

WEQ	Equation of Wind Erosion
USLE	Equation of Universal Soil Loss
RUSLE	Revised Universal Soil Loss Equation
BMPs	Best Management Practices
ESCP	Erosion and Sediment Control Plan
DOE	Department of Environment
DID	Department of Irrigation and Drainage

CHAPTER 1

INTRODUCTION

1.1 Background Study

Erosion is the detachment of a portion of the soil profile of the soil surface that can be caused by the impact of raindrops or water shear forces flowing through the surface of the soil. Before deposit, soil particles can be transported. Transport and deposition are referred to as sedimentation. Erosion and sedimentation are natural processes that occur every day throughout the country as a result of wind and waters. However, the effect of natural erosion is usually only noticeable on a geologic time scale. The effect of natural erosion is usually noticeable only on a geological time scale, however. Soil or surface disturbance, including activities such as construction, agriculture or logging, can significantly increase the amount of sediment loss from the site as a result of erosion (Price and Karesh, 2000). This change can increase the risk of flooding, alter hydrology and destroy the hydric vegetation. Dislocated soil particles are often stored in depressions in the land, but during storm events can be dislocated. The amount of silt or sediment delivered to water systems through the transmission, transport and deposition processes depends on changes in surface drainage patterns, ground roughness, vegetation and weather conditions. Sediments can also smother fish or amphibians nesting sites or cover mussel beds that filter substantial amounts of water pollutants that eventually become our drinking water (Price and Karesh, 2000).

The prediction of erosion is a powerful tool used since the 1940s by soil conservationists. Most agricultural conservation plans are carried out using the empirical equation of wind erosion (WEQ) and the empirical equation of universal soil loss (USLE) for sheet and rill erosion. The USLE is being extensively revised and updated, leading to a revised RUSLE which available by the end of 1990. The Revised Universal Soil Loss Equation (RUSLE), is used to calculate the amount of soil loss from a site such as a

climate, soil erodibility, topography, and land use. The phasing and sequencing of surface disturbance activities in the workplace reduce total erosion and reduces the amount of sediment to be controlled by other means (Price and Karesh, 2000).

The most variable factors in determining erosion are site topography, ground cover and the implementation of best management practices (BMPs). Erosion and sediment control are controlled by three types of BMPs. The first control is the erosion prevention practices. This type of BMP emphasizes ground cover that prevents any type of erosion. The second type is called runoff management control, which is intended to prevent further erosion in flowing water. The final type of BMPs is sediment control practices that try to prevent soil particles from leaving the site and entering streams or rivers that are already carried in storm waters. It is important to note that a particular BMP can be a practice of erosion prevention or sediment control, or it can serve both purposes at the same time. BMPs can reduce the amount of sediment that leaves the site, but no single practice is 100% effective (Price and Karesh, 2000).

ESCP can be seen as a combination of BMPs and RUSLE equation, consisting of leaving original vegetation whenever possible and restoring vegetative cover as soon as possible, as well as sediment controls, such as clean water diversions, silt fences, and sediment basins, can prevent the loss of sediment from a building site (or any other site) during most storm events.

The erosion and sediment control plan (ESCP) is a plan that details temporary measures to be implemented during the construction phase and may include permanent measures that will remain in place once the development of erosion and sedimentation has been completed. An effective ESCP objective is to prevent controllable erosion and minimize adverse sediment effects of sediment transport from on-site to off-site areas. ESCP consist of three (3) phase which is the planning phase, design phase, and construction phase. In the planning phase, more source of the information needed for the ESCP because this is the first step and the decision making a phase for ESCP is also made at this phase by the normal review process with the Local Authority such as DID. Next, in the design phase, the design should consider for permanent structural water quality control measures are provided in the "Guideline for Erosion and Sediment Control in Malaysia by the Department of Irrigation and Drainage (DID)". This section also discusses how the planning and construction phase can be incorporated with little

additional effort beyond normal project design activities. Finally, the construction phase, during the construction phase, there are three ESCP activities: bidding and mobilization, construction and complete construction.

In Malaysia, it is compulsory to perform the ESCP in any construction and there are the "Guideline on Erosion and Sediment Control in Malaysia" provided by the Department of Irrigation and Drainage (DID) that needs to be followed. This guideline will complement the existing Department of Environment (DOE) Guidelines (1996) in listing out Best management practices (BMPs) and demonstrate their appropriate use in the control of erosion and sedimentation in construction sites. The BMP that have been installed need to be checked periodically and maintained sufficiently to ensure proper performance by implementing the inspection and maintenance plan that has been prepared in the Environment Impact Assessment (EIA) report.

1.2 Problem Statement

There are some issues of implementation ESCP in practice. As an example is the bauxite problems in Pahang, the area around Bukit Goh, Gebeng and Pelabuhan Kuantan are pollutants with bauxite because they not implement ESCP properly. They should construct a wash through section at the site entrance as a remover to dirt and other sediments from the tires of vehicles as they leave the work site.

Moreover, Landslide at Cameron highland due to logging. Logging will make the bond between the soil at the slope being reduce and make the soil exposed to erosion. The landslide occurs because they did not implement the ESCP. They should lay the Erosion Control Blanket to limiting sediment runoff, where will protect the soil from erosion which can cause the landslide.

Next, Flash flood at Kuala Lumpur. In this case, they take the ESCP for granted, so that the sediment from the worksite enters the drainage. Therefore, the drainage becomes shallow and when the heavy rain comes the drainage cannot transport the water effectively and caused a flash flood. They should encircle their site by silt fence. The synthetic, geotextile design of the fence fabric allows for water to seep through, but retain the soil, sediment, and other debris.

In these cases, we see that in Malaysia there a lot of sites that still not implementing ESCP. There is a high probability that serious or material environmental harm may occur as a result of sediment leaving the site. Therefore, we need to find a success factor to implement the ESCP in Malaysia as a solution to counter the problem that we have now from being more serious.

1.3 Research Objective

From the issue in section 1.2, we can see that there are problems in our current industry in implementing ESCP therefore, this study is performed. This study aims to investigate the factors for implementing ESCP successfully in the developing country such as Malaysia by

- i. Determine the common challenges for implementing ESCP
- ii. Identify the factors for implementing ESCP successfully

1.4 Scope of Study

This study is discussed on what is the common challenges that we have in our construction industries today until they have a problem in implementing ESCP in their sites and how to tackle that problem. An interview session with the person that has experience in performing ESCP works will be performed as a method for data collection. This interview is intended to identify the challenges of implementing ESCP and to know what their thought on how to counter that problem based on their experience. The research questions for this study are:

- i. What are the common challenges for implementing ESCP
- ii. What are the successful factor in implementing ESCP

this question is given to the interviewee and the data from the interview session will be analyzed using the thematic analysis. From the data that have been analyzed, we can find the challenges and the success factor for implementing ESCP. Aligned with that, we can find the solution from their problems and create a successful factor in implementing ESCP.

1.5 Significant of Study

This study will provide insight into the implementation of ESCP and the challenges of implementing it. The study on identifying the contributing factor for the successful implementation of erosion and sediment control plan in Malaysia is important to protect the environment while building up Malaysia to be developed countries. These factors can be the solution to tackle the common challenges that have been through in our industries on implementing the ESCP. Effective on-site sediment and erosion control provides many environmental, social and economic benefits to Malaysia. The benefits of the ESCP is it will improved occupational health and safety on the building site, reduce clean-up costs, improved wet weather working conditions, reduce downtime and earlier building completion and improved waterways.

1.6 Summary

The plan for erosion and sediment control (ESCP) is a plan that details temporary measures to be implemented during the construction phase and may include permanent measures that will remain in place once the erosion and sedimentation development has been completed. An effective ESCP objective is to prevent controllable erosion and minimize the adverse effects of on-site sediment transport. In Malaysia, performing the ESCP in any construction is compulsory and it is necessary to follow the "Guideline on Erosion and Sediment Control in Malaysia" provided by the Department of irrigation and drainage (DID). Even though implementing ESCP is compulsory we still have an issue in our practice related to implementing it. Therefore, this study is performed because to investigate the factors for implementing ESCP successfully. Identifying the contributing factor for the successful implementation of Malaysia's erosion and sediment control plan is important for protecting the environment while building up Malaysia to be a developed country. The interview session is used for data collection as an approach to determine the common challenges for implementing ESCP and identify the factors for implementing ESCP successfully. The data that have been provided is analyzed using thematic analysis to create a new theme that can represent the whole data. So that, it will provide insight into the implementation of ESCP and the challenges of implementing it. This factor can be the solution to the common challenges facing the implementation of the ESCP in our industries

CHAPTER 2

LITERATURE REVIEW

2.1 Erosion and Sediment Control

Erosion and sediment is a serious environmental problem that we are facing. Erosion and sedimentation are natural processes that occur every day throughout the country as a result of wind and waters. In Malaysia, we have unique tropical weather all year round, but the climate is often quite humid due to its proximity to water which makes the weather is never too hot and the highlands nevertheless experience cooler temperatures. The unique tropical weather came with two seasons, which is monsoon season and dry season. In the dry season, wind erosion can become a problem when the soil is loose, dry, bare or almost bare and the wind speed exceeds the threshold speed for soil particle movement (Fryrear and Skidmore, 1985). But, during the monsoon season, the high rainfall amounts. Therefore, exercise strong control over the discharge of rivers and consequently the transport of sediments, resulting in major flooding and deposition of sediments which cause by erosion (Bodo and Ramus et al, 2004). Human gets over 99.7% of their food (calories) from the land and less than 0.3% from the oceans and other aquatic ecosystems. Man-made erosion is one of the main factors in environmental problem mostly in erosion and sediment. Shallow (1956) discussed the contrasts between man-affected catchments and those with significant areas of cultivation in the humid tropics in the Cameron Highlands of West Malaysia. Stated that a catchment with 94% of its natural vegetation area had a sediment yield of 21.1 m³/km²/yr, and a nearby catchment with only 64% of the natural forest area had a yield of 103.1 m³/km²/yr. Ground surface disturbance, including activities such as construction, agriculture or logging, significantly increases the amount of sediment loss from the site due to erosion. In Peninsular Malaysia, Steep mountainous land has been developed for agriculture vegetables as well as for tea, floriculture, and fruit (David et. Al, 1996). This will increase

the erosion and sediment problem because of decreases in terrain which can retain the rainfall from directly hit the soil. Approximately 10 million hectares of cropland are lost each year due to soil erosion, reducing the available cropland for food production (David Pimentel, 2006). Moreover, Sediments can also smother fish or amphibians nesting sites or cover mussel beds that filter substantial amounts of water pollutants that eventually become our drinking water (Price and Karesh, 2000).

2.2 Challenges in ESCP

Nowadays, there is a lot of the environment problem such as landslides, flash flood, and river water turning to milk tea. Therefore, this research is done by knowing one of the environment protection systems which is called Erosion and Sediment Control Plan (ESCP). There are a lot of the challenges or problem in implementing ESCP. By J. Harbor in 1999, in his paper about the cutting edge of land disturbance in erosion and sediment control in construction sites. He stated that the lack of an individual economic incentive to control erosion by land developers has limited the voluntary adoption of measures to control erosion and sedimentation. The design and implementation of these measures require an understanding of erosion and sedimentation processes and their effectiveness is often limited by incorrect installation and maintenance.

The scientific knowledge and are not effective in implement the ESCP because there is a test in Michigan on the effectiveness of soil erosion control law but the poor results suggest that scientific knowledge of erosion control cannot be integrated into policy. There also a paper that analysis on economic of sediment control on site by (Lowdermilk Et. Al, 2011) which determine the extent to which sediment controls comply with regulatory installation and maintenance standards. The result shows 62% of ponds and traps were incorrectly installed, improperly maintained or both. The costs of cleaning negatively affect the likelihood of proper maintenance of a sediment pond or trap. Furthermore, the distance between the construction site, the regulatory office of the county and the sale of the plan designer's company positively affect the likelihood of incorrect installation of sediment control and the likelihood that there will be no sediment controls that do not have an emergency spill when necessary.

The researchers from Taiwan Wang Et. Al, 2018 have reviewed the broader literature and 6 case studies in Taiwan was carried out to examine the characteristics,

limitations, costs, and effectiveness of various sediment management strategies. The result shows how the social barriers, technical barriers, and tradeoffs in the efficiency, cost and time efficiency of different sediment management strategies to restore storage capacity. Other than that, the role of human activity in mixed land - use, also will alter the sediment loads in urban development. There is a study on urbanization and infrastructural development shows that the soil erosion associated with a building project at Bukit Kiara in Kuala Lumpur was monitored as a typical illustration and the results showed that over 100,000 tons of sediment were generated over a 2-year construction period from an affected area of 3 km² (Fatt,1985). Moreover, a study in implementation challenges or barriers have been done by Fatt C.S (1985) stated that there are four types of challenges or barriers which are economic challenges, generally, the sediment control measures are expensive. Other than that, institutional challenges. The difficulties arise in identifying specific government agencies responsible for sediment problems, inadequate cooperation between the agencies concerned and difficulty in enforcing legislation effectively. Next, social challenges due to social and political complications normally encountered in the implementation of the project. Lastly, technical challenges related to the shortage or lack of skilled staff and equipment to perform data collection, sediment control work planning, and design.

2.3 Success Factor

Success factor is the combination of important facts that necessary to achieve one or more desirable objectives. John F. Rockart (1989) defined success factor as the limited number of areas where results will ensure successful competitive performance for the organization if they are satisfactory and the activity areas that should receive constant and careful management attention. According to Hofer and Schendel (1978), success factors are those variables that can be influenced by management through decisions that can significantly affect the overall competitive position of the different companies in an industry. In resolving a problem, after we determined the problem we need to identify the success factor. Identifying critical success factors in the application process is a very important step (Leidecker and Bruno, 1984). This success factor can be a key to solve not just the problem like implementing the ESCP it also can be a key to answer any problem related to it.

2.4 Summary

As a conclusion, this section is reviewed the previous paper in term of topics in erosion and sediment control, challenges in ESCP and success factor. In erosion and sediment control, the study stated that erosion and sediment can be categorized into two categories which are natural erosion and man-made erosion. Natural erosion is occurred because of weather and the changing of the season in Malaysia but the common factor of erosion problems are came from man-made erosion. Man-made erosion comes from ground surface disturbance such as construction, agriculture or logging. This erosion problem can give a serious environmental issue such as water pollutants that eventually become our drinking water. Next, challenges in ESCP. it shows that there is a study on challenges in implementing ESCP and the problem that the industry having from management until constructing the ESCP device. Lastly, review the paper of the success factor. This reviewer is done to know the importance of identifying the success factors to tackle the problem that we are facing now, for example, the problem in environmental issues such as erosion and sediment problem. The literature review is done to find the gap and proving that there are no similarities between these studies and others. From this literature review, I found the gap that there is no research about the contributing factor for the successful implementation of ESCP has been done yet in Malaysia. By fill this gap it will add another infrastructure in our current literature and enrich the current literature. This paper will provide insight into tackling problems related to the implementing of ESCP and improvements on the success rate of implementing ESCP.

CHAPTER 3

METHODOLOGY

3.1 Introduction

In this research, an individual interview method is being used in the data collection process and for the data analysis, thematic analysis is being used to analyze the data.

3.2 Targeted Population

The requirement of the target population that is appropriate for my study is

- i. An officer at the Department of Environment
- ii. An officer at the Department of Irrigation and Drainage (Hydrology department)
- iii. An officer at City Hall, City Council, Municipal Council and District Council (Infrastructure department)
- iv. Engineer and Environment Officer at Contractor and Consultant firm that performs ESCP

20 individual that meets the target population criteria has been selected. The selected individual has been experiencing on implementing the ESCP in the projects. There is some research about it, it is important to get 20 individuals in an interview for practical reasons because this can help mitigate some of the bias and validity threats inherent in qualitative research. (Crouch & McKenzie, 2006). (Crouch & McKenzie, 2006).

3.3 Data Collection

The individual interview is performed with the targeted population that professionals with ESCP experience. This method is the best approach to use because there is not enough infrastructure in current literature for the contributing factors for the successful implementation of ESCP. The interview is performed as an open discussion because we want to get the answer from their experience basis. The interview is discussed

- i. What are the common challenges for implementing ESCP
- ii. What are the successful factor in implementing ESCP

The process of this discussion or interview session is approximately around 60 minutes. Before the interview started, the introduction and the objective of the study have been explained, the explanation is not related to the answer to preventing buyers. This is to make sure they understand the topic and give the answer according to the topic, the title of the topic and the question has been printed in A4 paper and been given to the interviewee so that, they can refer it while giving the answer. Other than that the follow-up question has been given to get more details, information and to prevent misunderstanding on their responses. After the interview, the summary of the discussion is being emailed to the interviewee for the confirmation. Therefore, they can check whether there is some misinformation or misinterpretation on the data. I have some additional ideas, advice or correction, the summary will be fixed and send back to them through email until they satisfied with it. There is a lot of qualitative research using the interview as their method to answer their objective for example Comparison of Consumption Patterns and Environmental Awareness in formal and informal communities in Suva, Fiji Islands by Devi and Poonam in 2016. Using this method, they manage to get a positive result in their data which sufficient to answer their objectives.

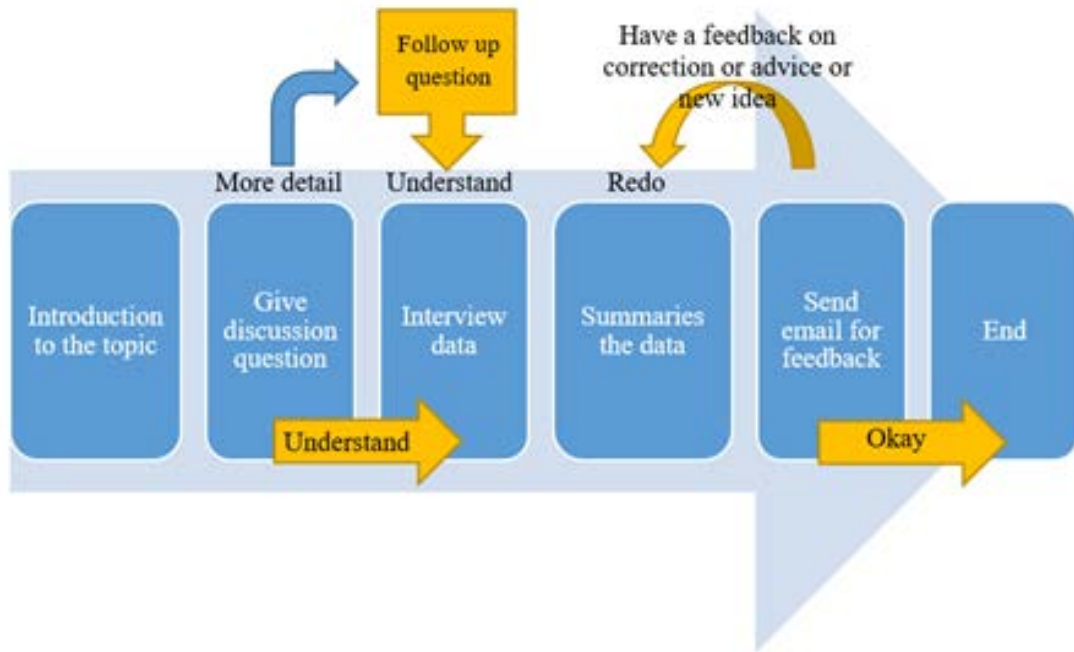


Figure 3. 1 Interview session process flow chart

3.4 Data Analysis

The data from the interview responses result will analyze using thematic analysis. Thematic analysis is one of the most common forms of analysis in qualitative research. This method will emphasize, pinpointing, examining, and recording the pattern or themes within the data. By using this method we can find the pattern from the same data and create new themes that represent the whole data. In this regard, thematic analysis was also adopted by Haraszti, et. al in 2010 to conduct access controlled: The shaping of power, rights, and rule in cyberspace. This paper also the winner of the best qualitative research in 2018.

CHAPTER 4

RESULTS AND DISCUSSION

4.1 Introduction

This section is the discussion on the result provided from the data that have been analyzed using thematic analysis. The result of the common challenges for implementing ESCP and the successful factor implementing ESCP that have been collected during the interview session with the selected individual that meets the targeted population is shown.

4.2 The Common Challenges for Implementing ESCP

The common challenges for implementing ESCP can be divided into two (2) which are internal challenges and external challenges. Internal challenges consist of lack of competency, lack of knowledge, communication, attitude, awareness, planning, design, installation, and maintenance. While, External challenges consist of management, financial, enforcement and communication medium.

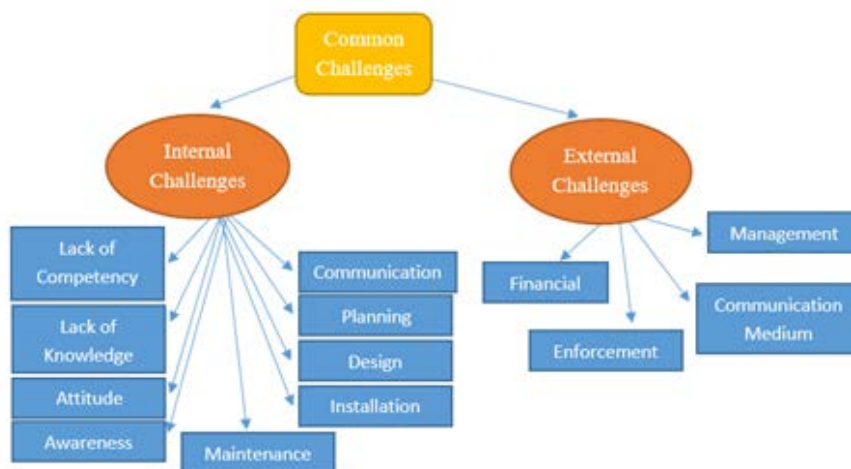


Figure 4.1 The common challenges in implementing ESCP

Individual	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Internal Challenges																				
Lack of Competency	√	√		√		√				√										
Lack of Knowledge		√	√	√	√		√	√		√					√					
Communication			√	√					√	√										
Attitude	√			√			√	√			√									
Awareness											√			√	√					√
Planning			√			√							√				√		√	
Design				√			√	√		√		√	√	√		√	√		√	
Installation						√								√						√
Maintenance									√				√	√				√		
External Challenges																				
Management			√	√	√	√				√			√				√	√	√	
Financial	√	√	√	√	√			√	√			√	√		√	√	√	√	√	√
Enforcement	√	√				√	√	√									√			√
Communication				√					√											
Medium																				
Total Suggestion	4	4	5	8	3	5	4	5	4	5	2	2	5	4	3	2	5	3	4	4

Table 4. 1 The common challenges in implementing ESCP

4.2.1 Internal Challenges

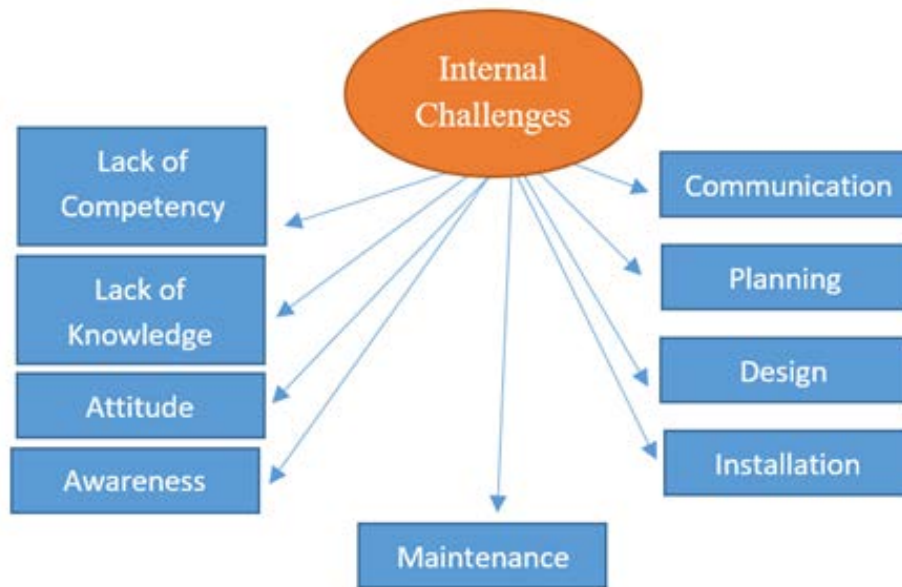


Figure 4. 2 Internal challenges in implementing ESCP

4.2.1.1 Design Challenge

As shown in table 4.1, the most challenges in the internal challenges are designed. According to Tarja Mäki, 2015 stated that nearly 70% of all the problems at the site most active in raising issues related to design. The challenge is they implement the ESCP by not following the specification and the specification study of the plan that have been provided because of to save cost. Besides that, from the consultant views contractor not do their work seriously by, not following and not planning the ESCP properly. They just implementing the ESCP not following the design plan by the consultant. Moreover, every design plan needs to be approved by an individual that has CPESC. From the Authority views, the problem is the competent person with the CPESC just signed the design without check and analyses the report. Other than that, they have washed through in the plan but not construct in the site or have washed through but they did not use it. Furthermore, from the contractor side, he feels that the consultant design the ESCP not based on site but based on theory.

They design it by not following the site condition and the placement of the ESCP is not in place, sometimes have places that cannot Implement the ESCP, or need to adjust the design because the site is not suitable to install with the designated design. There is a

situation that the silt trap is design with 3x2 but cannot installed because the site is too small. The site condition is not the same as the drawing so, to designing the ESCP cannot only see the drawing need also go to the site visit. Designing the ESCP started before the construction start because without the EIA report we cannot get the construction approval the problem is when the time to implement it, the ESCP is not fixing with the site because the planning was too early and the site condition is changing not like the plan that has been proposed. ESCP can be implemented when the preconstruction but after a certain period the design is not suitable with the condition of the site due to site condition is changing. Last but not least, the ESCP method does not suitable for The environment of the project site, for example, the soil is too sandy so that The silt trap tends to erode and when they heavy rain pond failed to operate.

4.2.1.2 Lack of Knowledge and Lack of Competency Challenge

Another internal challenge is the lack of knowledge and lack of competency in Malaysia about ESCP. ESCP is a serious matter but it is challenging because of a lack of knowledge and a lack of competency in performing it. They are a lot of people doesn't have done ESCP for example project manager (PM) lack of knowledge about ESCP and he just focus on how to reduce the cost of the project in this situation they tend to tell not to do the ESCP to cut the cost this is happened because of the PM not take part to construct by following the design or he/she not have knowledge and not so educated. Sometimes PM just has SPM as their qualification. Moreover, labor workers don't have skills or knowledge on constructing ESCP can make the implementation of ESCP become more challenging. Furthermore, the developer or client assign consultant that have less experience and knowledge in ESCP or in the certain condition they just assign the consultant that has a relationship with them such as friends or family which that have no experience in ESCP. It becomes a challenge because of it hard to explain to them that they have no knowledge about ESCP. Other than that, the inspector is not good enough, or not have much experience doing the inspection. Usually, at the site, they will merge the environment officer and safety. But, some of the company assign the safety officer doesn't have any experience in ESCP as an inspector to observe the ESCP progression. As in Malaysia, there is not a lot of research that has been done on ESCP, method the ESCP that been implemented are not up to date because there is a more new method for ESCP but in Malaysia, we still use the old one.

In bidding tender contractors used to put low prices because they don't really know the work scope to implement it. After they get the tender then they realized the high cost in constructing the ESCP. In the contract phases, the person in charge to write the contract need to have knowledge in Environment and waste management so that they not just issued the price without knowing the true cost in implementing the ESCP. One of the reasons why the cost of implementing the ESCP is high is in Malaysia we are lack of expertise on ESCP, therefore they will demand a high price for their work or expertise. The more the demand the higher the price (Alfred Marshall, 1890). Not just that, the design plan for the ESCP needs to approved by the person that has been certified as professional in erosion and sediment control (CPESC). It is hard to get authorization with people has CPESC because a lot of engineers can design the ESCP but we are lack of professional engineer with CPESC. Lastly, Poor field inspection practices or none. In the system, the inspector for the ESCP at the site are not from the government authorities but working under the contractor so that there will be a conflict of interest between the inspector and the contractor. Lack of awareness and lack of knowledge on the impact on the environment due to the failure of ESCP.

4.2.1.3 Communication Skills Challenge

Next, communication skills. This is the important part where either the implementation is a success or not because miscommunication makes things become complicated and hard to succeed. 33 causes and 21 effects were identified that causing by lack of communication between parties (Yaser Gamil & Ismail Abdul Rahman, 2017). Usually, miscommunication between the contractor and the consultant is the common situation that happens, for example, the consultant that designs the ESCP didn't explain about the ESCP clearly that will make the contractor construct the ESCP device incorrectly. Moreover, miscommunication between EO and authorities. EO as the middleman in between contractor or client and the authorities. If they not doing the job properly then there should be a problem and making the work progress harder. One of the developers has stated that one of the projects that he conducted has a problem and needs to be stopped for a week because the authorities have miscommunication with the EO.

4.2.1.4 Attitude and Awareness Challenge

Other than that, attitude and awareness are also one of the internal challenges that have been through in the industry in implementing ESCP. In attitude challenges bribery is the problem in our country, some of them tend to give a bribe to the inspector rather than implementing ESCP. There also had a project that not implementing the ESCP because sometimes the cost for implement ESCP is higher than the penalty. This kind of attitude by some contractor just take for granted about the ESCP can be a challenge or a barrier in implementing it they just do the EIA report and ESCP study just for getting the planning permission from the authority or just to fill the qualification in report, but at the end they not implement the ESCP at their site. As long as they are not inspecting it enough for them to close their eyes on it. In other cases, the owner or developer usually want to avoid the ESCP as possible as they can to reduce the cost. For example, if the requirement to implement the ESCP is 30 hectares they will make it as 29 hectares so that they did not need to perform the ESCP for their project. There is also have some contractor that did not give the cooperation to the inspector or government authorities to do the inspection at their sites by delaying the time, take to another site, or hiding the site that they don't implement the ESCP. Lack of cooperation between the parties in the construction could pose a problem to the project (Chang et al., 2010). There is also have a contractor that analyses the client. If the client is strict then the will perform the ESCP, if not they will just let it slide if the client did not take any serious about it.

We need to know how important is the ESCP that we cannot just take it for granted so it came to the next challenge which is the awareness. Without awareness the possibility that the contractor did not construct following the specification is high, but a consultant that responsible to observe the project just closed the eyes even they did it wrong because they think the environmental issue is a small matter. If the person in charge of the management of the project lacking awareness in protecting the environment they tend to feel wasted in constructing ESCP. The environmental issue in Malaysia is the new issue so that most of the management team in the construction industry still lack in awareness in which the importance of ESCP component is always being taken for granted and not being put as a priority before and during the commencement of earthwork activity.

4.2.1.5 Planning Challenge

Planning is an important part of life, without proper planning everything will go wrong. The benefits of pre-project planning include increased profit, reduced risk, and higher quality (Barker et al. 2004; González et al. 2008; Hanna and Skiffington 2010; Hwang and Ho 2011). Somehow, this is one of the challenges in implementing the ESCP. Some contractors and the consultant failed and don't understand what they need to do. Usually, the contractor feels ESCP is a waste and just focus on the construction objective. The project team does not fully co-operate, they only care about productivity without helping to control the pollution. The contractor just focuses on work progress but not parallel with the ESCP progression by not following the sequences. For example, if the site condition changes, they need to redesign and it takes time but contractor more focus on work progress so they tend to ignore to redesign it. This is because I have any changes we need to do the meeting to redesign again and get the endorsement with the professional with CPESC. The absence of development phasing in which only a portion of the construction site is cleared and graded at any one time. Most of the projects did unnecessary clearing of environmentally sensitive areas, such as stream riparian buffers, steep slopes, wetlands, and seeps.

4.2.1.6 Installation and Maintenance Challenge

Lastly, the internal challenge is installation and maintenance. Research from Lowdermilk et al (2011), 62% of ponds and traps were installed incorrectly, maintained improperly, or both. The common problem in the installations is they did not install it up to the standards and specifications. The common perception that ESCP is all about putting up sediment basin Incorrect installation. An example with the incorrect installation silt fence always collapses. Insufficient manpower, material, and machinery to install/construct ESCP components always be a challenge to implement the ESCP because upper management wants smooth progress but didn't provide enough facilities to it. From the Authority views, the problem is the competent person with the CPESC just signed the design without check and analyses the report. The internal challenge is installation and maintenance. Research from Lowdermilk et al (2011), 62% of ponds and traps were installed incorrectly, maintained improperly, or both. The common problem in the installations is they did not install it up to the standards and specifications. The common perception that ESCP is all about putting up sediment basin Incorrect

installation. An example with the incorrect installation silt fence always collapses. Insufficient manpower, material, and machinery to install/construct ESCP components always be a challenge to implement the ESCP because upper management wants smooth progress but didn't provide enough facilities to it. From the Authority views, the problem is the competent person with the CPESC just signed the design without check and analyses the report.

4.2.1.7 Internal Challenges Conclusion

The most challenge in the internal challenges is designed. The challenge is they implement the ESCP by not following the specification and the specification study of the plan that have been provided because to save cost. From the consultant views contractor not do their work seriously by, not following and not planning the ESCP properly. Furthermore, from the contractor side, he feels that the consultant design the ESCP not based on site but based on theory. They design it by not following the site condition and the placement of the ESCP is not in place and the ESCP method does not suitable. ESCP is a serious matter there is no bribery but it is challenging because of a lack of knowledge and lack of competency in performing it. Moreover, labor workers don't have skills or knowledge on constructing ESCP can make the implementation of ESCP become more challenging. Furthermore, the developer or client assign consultant that have less experience and knowledge in ESCP or in the certain condition they just assign the consultant that has a relationship with them such as friends or family which that have no experience in ESCP. In bidding tender contractors used to put low prices because they don't really know the work scope to implement it. It is hard to get authorization with people has CPESC because a lot of engineers can design the ESCP but we are lack of professional engineer with CPESC. Usually, miscommunication between the contractor and the consultant is the common situation that happens. Other than that, attitude and awareness are also one of the internal challenges that have been through in the industry in implementing ESCP. Attitude by some contractor just take for granted about the ESCP can be a challenge or a barrier in implementing it. Lack of awareness and lack of knowledge on the impact on the environment due to the failure of ESCP. Some contractors and the consultant failed and don't understand what they need to do. Usually, they feel ESCP is a waste and just focus on the construction objective. The common problem in the installations is they did not install it up to the standards and specifications.

From the Authority views, the problem is the competent person with the CPESC just signed the design without check and analyses the report.

4.2.2 External Challenges



Figure 4.3 External challenges in implementing ESCP

4.2.2.1 Financial Challenge

. As shown in table 4.1, the most challenges in the external challenges are financial. Abdul Rahman et al. (2006) pointed out that lack of funds can affect the cash flow of the project and lead to delays in site ownership resulting in delays for the entire project. The cost to implement the ESCP is quite high. It is depending on the method that being use either use silt trap, wash through, sediment trap or basin or etc. Material suppliers and material costs are depending on the place of the project each state has a different price of the material. In addition, transportation costs for the material and for the machinery, labor cost and other additional costs due to changing size also need to be considered. Sometimes they miscalculate the changing of the soil, so they need to do a quick decision either to change the size or change the place of the control system which also can raise the cost to implement ESCP. An interview had explained one situation `As we know every design need to be endorsed by the professional that has competency in the specific field such as ESCP.

To enter the course for Certified Professional in Erosion and Sediment Control (CPESC) is expensive. But, to get the report and endorsement for ESCP using a consultant company also will cost approximately about RM7,000 to RM8,000. But if

based on a judgment, the EO will do everything and just need the endorsement by the CPESC holder it only will cost approximately only RM1,000 to RM2,000. In other cases, they not implementing ESCP because the contractor feels that the consultant overcharges the work cost. That is why most small developers are not willing to spend money or providing cost to provide ESCP components. Usually, if The budget on the contract for the ESCP is too low, the contractor will implement the ESCP with the lowest budget as they can. But if they did not mention the budget in the contract the contractor will not implement it and this will make the construction process become more complicated if the project already started. By the time the client suddenly aware of this issue, then they want to release the site instruction to the contractor so this will give the problem to the project.

Maintenance needs to use the cost provided. Sometimes there is no budget issued in the contract for maintenance budget. In some maintenance situations, they need to rent a backhoe for one day that will cost approximately about RM 400 for maintaining the ESCP device by using a small amount of cost that they provided. This is why most of the contractors that implement ESCP didn't maintain the device. Next, top management tends to cut out the things in the plan and design that they feel not too important due to the budget issues. As being mention before it is hard to implement ESCP due to the budget in BQ usually contract will mention all the budget but most of the BQ is not include the budget on ESCP item. Material for ESCP installation is expensive and in the construction process, it needs to use high cost but no funding or small budget. For example, the size of the sediment basin is 1500m x1000m they don't want to construct it because it's too big and expensive. There is also some contractor who doesn't want to do the ESCP due to limit time management. Moreover, the client providing a budget but the company wants to take profit from it so that they cut the cost for ESCP.

4.2.2.2 Management Challenge

Management is defined as organizing and coordinating a company's activities to achieve defined goals. Usually, EO would advise what they need to have in site but CM or PM does not agree with it with excuses like inadequate allocation of budget for the implementation of ESCP. As management wants to save money and reduce the cost, they usually want to avoid the ESCP. If the requirement to implement the ESCP is 30 ha, they will make it as 29ha. So, they don't need to perform the ESCP for their project. Different parties involved will cause a problem in implementing ESCP. Usually, in the project, the

developer or client will open the tender for every work specification in the project. An example, the client will assign a consultant for planning the ESCP. After the planning is completed the client will send the planning to the contractor. This will make a different opinion, different solutions, and decisions by different parties. Moreover, there will be misinterpretation and misunderstanding between the planning prepared by the consultant and what the contractor will construct. It will result, the contractor constructs different than what the consultant proposed in the plan. It should be the consultant itself that needs to consult with the contractor that will make everything clear and can solve the problems. There also some upper management not providing adequate resources to implement the ESCP. So that, site team cannot be dividing task due to management not providing enough manpower at the construction site. If they did not get any compound for not implementing ESCP they won't implement the ESCP at their sites. But after they received the penalties, compound or stop work then the company will implement ESCP.

4.2.2.3 Enforcement and Communication Medium Challenge

The maximum penalty for not implementing is rm500,000 or jail for 5 years. But, the enforcement for the ESCP is not too strict unless any problem raising. Usually, when having any cases they will take the action if not they just let it be. One of the people that professional in ESCP stated that there will be no action if there is no problem raised or happened. But, if any problem raised then they will tackle the problems. Everything was depending on the surrounding of the development area. There are different EIA report between 2 government authorities, as DID they will use ESCP, and for DOE they use LDP2M2. This will make the person that not have any ESCP background confused with it. ESCP cover from or after the site clearing but LDP2M2 it is cover from before the site clearing. ESCP is more focusing on how to prevent erosion and sedimentation from going to water resources. But, LDP2M2 is the evolution of ESCP which focusing on how to prevent the site from having erosion and sedimentation. There is a lot of projects that government authorities or inspector officer need to inspect. There is some overlooked project that cannot be avoided due to time. Therefore, people surrounding needs to take part like an eye to DID to report about the site that gives the problem to them such as lorries with dirt came out from the site or the site that flow out the water with soil to drain or river. Not just that, large developers have ESCP but they are not perfect. This is because the contractors on the site did not get the correct directions from the consultants.

4.2.2.4 External Challenges Conclusion

The most challenges in the external challenges are financial. The cost to implement the ESCP is quite high. It is depending on the method that is used. Usually, they will choose the one with the lowest price or cost proposed even though they didn't have any experience in implementing ESCP. To enter the course for Certified Professional in Erosion and Sediment Control (CPESC) is expensive. Maintenance needs to use the cost provided. Sometimes there is no budget issued in the contract for maintenance budget. Usually, EO would advise what they need to have in site but CM or PM does not agree with it. As management wants to save money and reduce the cost, they usually want to avoid the ESCP. There will be misinterpretation and misunderstanding. Some upper management not providing adequate resources to implement the ESCP. The enforcement for the ESCP is not too strict unless any problem raising There are different EIA report between 2 government authorities. There is some overlooked project that cannot be avoided due to time.

4.3 The Successful Factor Implementing ESCP

The successful factor implementing ESCP can be categorized into four (4) which is the strategic focus, people, operations, and finances. Strategic focus consists of factors such as management and planning. Secondly, people consist of factors such as knowledge, communication, attitude, and awareness. Next, operations consist of design, construction, enforcement, and maintaining. While, finances consist of budget, design cost, equipment cost, material cost, and labor cost.

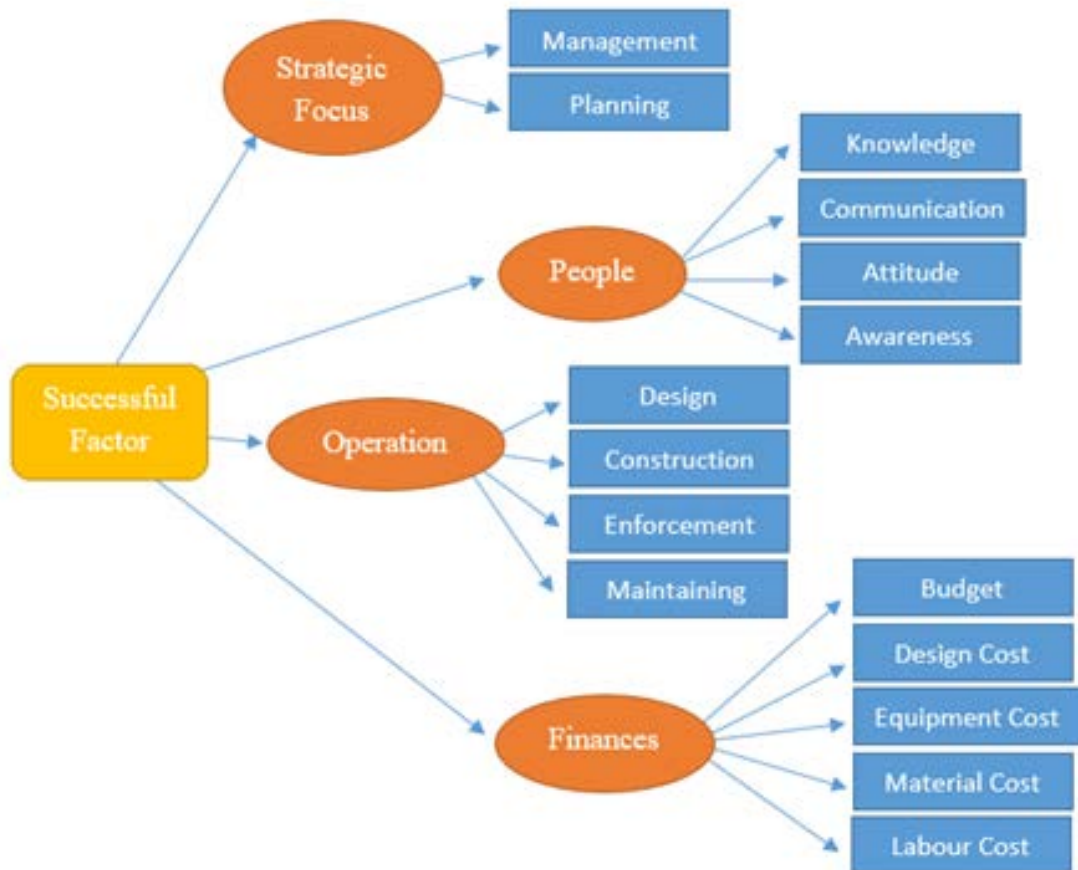


Figure 4. 4 Successful Factor in implementing ESCP

Individual	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Strategic Focus																				
Management	√	√	√	√		√	√	√		√	√	√	√	√	√	√	√		√	√
Planning		√	√									√					√			
People																				
Knowledge	√	√	√	√	√			√	√											
Communication							√			√										
Attitude	√			√							√		√	√					√	√
Awareness				√				√	√		√		√		√	√				
Operations																				
Designing				√			√				√	√						√	√	
Construction				√			√		√				√							√
Enforcement	√		√	√		√	√	√			√		√			√	√	√		√
Maintaining												√				√				
Finances																				
Budget									√						√		√	√	√	√
Design Cost									√						√			√	√	√
Equipment Cost									√			√					√			√
Material Cost									√								√		√	√
Labour Cost									√										√	√
Total Suggestion	4	3	4	7	1	2	5	4	8	2	5	3	7	2	4	4	7	4	6	9

Table 4. 2 The Success factor in implementing ESCP

4.3.1 Strategic Focus

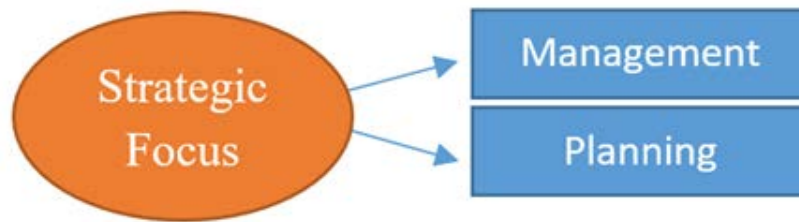


Figure 4. 5 Success Factor in the Strategic focus in implementing ESCP

4.3.1.1 Management Factor

. According to Peter Drucker (1955), the core tasks of management consist of the interlocking functions of creating corporate policy and organizing, planning, controlling, and managing the resources of an organization to achieve the goals of that policy. The developer needs to assign a proper consultant and contractor that have expertise in ESCP. Moreover, the contractor needs to hire someone who has knowledge in ESCP or send their employees to training for ESCP so that they know how to tackle the situation. Get environment officer (EO) that have a qualification with the workload is also important, for example, if need a degree holder for EO position, don't assign diploma holder because the different academic holder has different mindsets and work efficiency. With all of that upper management can form a monitoring team that will ensure the implementation of the ESCP component is according to the approved ESCP specification and regulations. Usually when the project under EIA there is a rule that need to follow which is the contractor need to hire 3rd party audit which is accredited by DOE. Therefore, the inspector that has been assigned need to always monitor the site and always alert on the site condition. Upper management needs to take part to give warning to the contractor if they did not do what the EO has advised.to them if not they will not take the advice seriously. Furthermore, cooperation from management in providing training time to time not only to the environment practitioners but also others representative of the department. Not just that, EO also needs to provide awareness training specifically on the technical part which includes proper and correct installation of ESCP tools and effective flood mitigation measures. If every party have awareness in protecting the environment, then

they will do their own role in protecting the environment. As an EO they need to do documentation all the report because it will make it easier to detect any problem and not implementing ESCP cases. As an example, documentation such as - Daily report and all the inspection reports. Upper management needs to provide an adequate resource for the implementation of ESCP components such as manpower, material, and machinery to make it easier to the site team to do their jobs and speed up work rate at the project sites.

4.3.1.2 Planning Factor

We all have blind spots. We are simply unaware of certain individuals, situations or even our own actions that others see all too clearly or in a totally different light. Planning provides a framework for questions and blind spots to be exposed. Work according to the plan. Furthermore, by providing guidelines and goals for future decisions, planning helps decision makers. If there is no external problem so it can be categories as the planning success. To success in implementing ESCP, it is compulsory to do a proper project scheduling to perform it. ESCP needs to implement it early not in the time construction had started. Moreover, planning daily work activity is important. So that everybody knows their work on that day so that if there any problem we know which task is not being done yet and easy for us to tackle that problem efficiently.

4.3.1.3 Strategic Focus Conclusion

Strategic focus consists of factors such as management and planning. In the management factor, the developer needs to assign a proper consultant and contractor that have expertise in ESCP. Moreover, the contractor needs to hire someone who has knowledge in ESCP or send their employee to training for ESCP. Furthermore, cooperation from management in providing training time to time not only to the environment practitioners but also others representative of the department. Not just that, EO also needs to provide awareness training. Upper management needs to provide an adequate resource for the implementation of ESCP. In planning factor, do a proper project scheduling to perform it and planning daily work activity is important. So that everybody knows their work on that day.

4.3.2 People

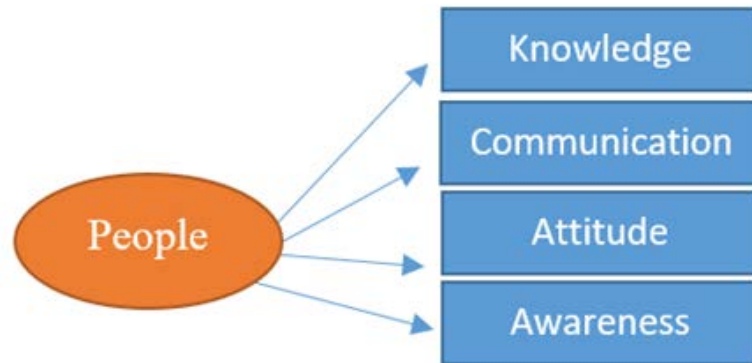


Figure 4. 6 People factor in implementing ESCP

4.3.2.1 Knowledge and Awareness Factor

Knowledge is human faculty based on interpreted information; understanding that results from the combination of data, information, experience, and individual interpretation. Malaysia needs to have more research on ESCP this is because the method being used in implementing ESCP in Malaysia is not too relevant. There is a more new method for ESCP but in Malaysia, we still use the old one. In university they need to put more stress in the ESCP topic this is because ESCP topics usually we can find it as a small subtopic, they should put it as one of the topics in a certain subject that related with it. So that, it will enhance the research on ESCP and can give knowledge to all the future industry personal to ESCP. All parties need to have knowledge about ESCP this is because one of the interviewees said that most of the problem is came from the developer, contractor, and consultant that doesn't have knowledge about ESCP. Only EO has knowledge about ESCP not enough. All the team in the site such as PM, engineer, and EO need to have knowledge in ESCP. So, if the client doesn't want to perform ESCP, the site team can support the EO to change their perception about ESCP. The consultant that assigns for performing ESCP needs to explain when and why ESCP needs to do to the contractor. So, they have knowledge or compatibility regarding ESCP. I need to have more knowledge and awareness about ESCP from the upper person because every decision came from them. Upper management person needs to have more knowledge and awareness about ESCP such as PM. PM needs to be an educated person because every

decision came from him or her. It success if there are knowledge and awareness about ESCP and environment protection in every person that related to the project. The awareness of each party is important for maintaining the water source because with the awareness in every person they will know their role and work scope in protecting our environment.

4.3.2.2 Communication Factor

No misunderstanding between contractor and developer can assure the success in implementing ESCP. EO need to have good communication skill to avoid miscommunication with authorities. All of the parties have their own objectives and agendas but if there are no conflicts in doing the decision so there should be no problem at all. Some cases happen in Pahang which the EO just sends the notice to the authorities but not keep up the information either the authorities receive or not has made the project stopped for a week due to misinformation or miscommunication between them. This will make the project waste their time any money due to the detention and will make the implementing of ESCP become unsuccessful because they need to catch up the timeline to make sure the project finished according to the plan. The consultant needs to take part in consult with the contractor as a middleman between government authorities and the contractor. So that consultant needs to design ESCP by following the specification. Moreover, they need to make sure that the contractor follows the specification given in the plan. Furthermore, Exco or representative from the state needs to take part as a medium to the community to report their problems. Therefore, all the government authorities that responded to it can take action because sometimes there will be overlooking project that they missed.

4.3.2.3 Attitude Factor

The developer or contractor or consultant needs to change their attitude for not taking the small things for granted. Everyone needs to take part in implement ESCP. Cooperate with the inspector to inspecting the site. Not just EO need to know the importance of environment protection or ESCP but everyone needs to have awareness about it. Not just that, cooperation in all parties involved in planning and follow the planning accordingly by giving a commitment to implementing it. Full commitment from developer, consultant, and contractor's top management in ensuring the ESCP component

is the priority before any earthwork activity begins. EO can give a warning and take action such as penalties and compound or Noncompliance records (NCR). One (1) picture in the report will cost approximately RM500 if have more picture the compound will increase. NCR can deduct the claim money made by contractor approximately as much as RM200,000. If the company have ISO 4000, the legal obligation is important to maintain their reputation and ISO accreditation. Usually, nowadays there is no give penalties or compound, they directly bring the issue to the court. Moreover, hired a skilled and experienced supervisor to construct the ESCP can be a success factor in implementing ESCP. All parties need to know that implementing ESCP they can save up their money than need to pay the compound or causing a reduction in their claim. Just implementing ESCP cannot be categorized as success in implementing ESCP they also need to do the maintenance by following the BMP that have been provided in the EIA report.

4.3.2.4 People Conclusion

People consist of factors such as knowledge, communication, attitude, and awareness. Malaysia needs to have more research on ESCP. All parties need to have knowledge about ESCP. No misunderstanding between contractor and developer can assure the success in implementing ESCP. The consultant needs to take part in consult with the contractor as a middleman between government authorities and the contractor. Exco or representative from the state needs to take part as a medium to the community to report their problems. The developer or contractor or consultant needs to change their attitude for not taking the small things for granted. Everyone needs to take part in implement ESCP. Full commitment from developer, consultant, and contractor's top management in ensuring ESCP. Moreover, I hired a skilled and experienced supervisor to construct the ESCP. It is a success if there is awareness about ESCP in every person that related to the project.

4.3.3 Operations

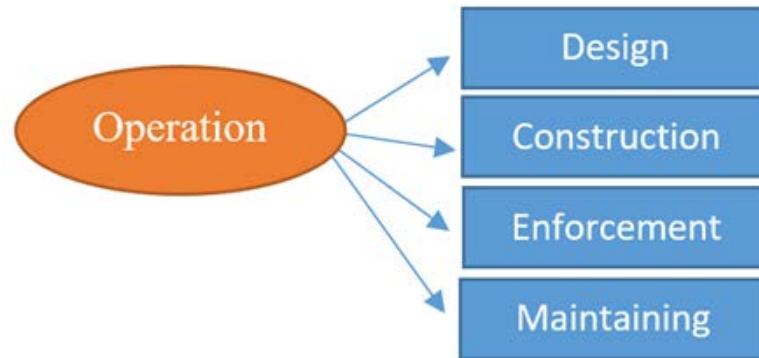


Figure 4.7 Operations factor in implementing ESCP

4.3.3.1 Enforcement Factor

This factor is the most answered that is given in the interview session because there are some misinformation and misunderstanding in enforcing to implementing ESCP. The enforcement should be aware of and inspect all the projects that can cause erosion and sediment problems. The enforcement of ESCP needs to be strict. For example, when the reading of total suspended solids (TSS) is more than the DOE reading, DOE will give the warning first. If still the same then they will give a penalty. In different safety cases, OSHA will directly give the penalty if one of the criteria are not followed by the contractor. There is a problem in the inspection process, which the inspector cannot give the penalty to the contractor they only can tell the contractor to improve the site and cannot tell them what they need to do. Only the government authorities can give the penalty but first, they need to be warned first. If the next period, they still not done any improvement then the penalty will be given. The penalty is not less than RM500,000 fine OR 5 year's jail. Enforcement needs to always be on site observation. Government authorities need to always monitor the site and take the action directly to all projects that perform the earthwork. If there is sediment water going out from the site, the action will be taken directly.

Authorities need to always monitor the site not wait until getting a complaint. Stringent enforcement from local authorities such as do the inspection period can ensure success in implementing ESCP. Usually when the project under EIA there is a rule that

need to follow which is the contractor need to hire 3rd party audit which is accredited by DOE. As an assigned auditor, they need to always monitor the site and always alert on the site condition. Another suggestion, use LDP2M2 on Environmental Protection because it covers all the environmental protection from the start, while and after the construction process is done. Strengthen the enforcement of ESCP and LDP2M2. The Environment Law needs to be like The law in DOSH. If once wrong directly give the penalty without compromise. Issuing NCR for non-compliance evidence in order to keep good records of project progress. NCR/penalties would be issued after 2-3 times warning of rectification.

4.3.3.2 Design Factor

Following the ESCP specification in design and following the design in constructing the ESCP. Follow the planning and the design by following the specification that has been provided by JPS. The consultant needs to be logic in design ESCP. The consultant needs to design to follow the site. They need to do site visits before doing the design to see the actual scenario at the site. Not just design it based on the drawing. Do not prepare the ESCP design too early. Usually, if the project starts in 2019 the ESCP report is done in 2017 because they need to get approval from the government authorities but by then the site condition also changes due time.

4.3.3.3 Construction and Maintaining Factor

It success if they construct by following the ESCP specification in design, following the design in constructing the ESCP and maintaining the ESCP device as being provided in the BMP. Everyone needs to take part in constructing and maintaining ESCP. Adequate resources for the implementation of ESCP components such as manpower, material, and machinery to construct and maintaining ESCP also can ensure the success of it. Moreover, do not move and changing the ESCP devices. Usually, they change the condition of the ESCP devices to make them easier to do the project or cutting the cost by changing the ESCP device to other places even though the project is not completed. As we know if the company have ISO 4000, the legal obligation is important to maintain their accreditation. Therefore, they need to do the maintenance to avoid any problem in the future that can give them a bad reputation.

4.3.3.4 Operations Conclusion

Operations consist of design, construction, enforcement, and maintaining. Enforcement factor is the most answered that is given in the interview session because there are some misinformation and misunderstanding in enforcing to implementing ESCP. The enforcement should be aware of and inspect all the projects that can cause erosion and sediment problems. The enforcement of ESCP needs to be strict. Government authorities need to always monitor the site and take the action directly to all projects that perform the earthwork. Authorities need to always monitor the site not wait until getting a complaint. use LDP2M2 on Environmental Protection. Following the ESCP specification in design and following the design in constructing the ESCP. Do not prepare the ESCP design too early. It success if they construct by following the ESCP specification in design, following the design in constructing the ESCP and maintaining the ESCP device as being provided in the BMP.

4.3.4 Finances

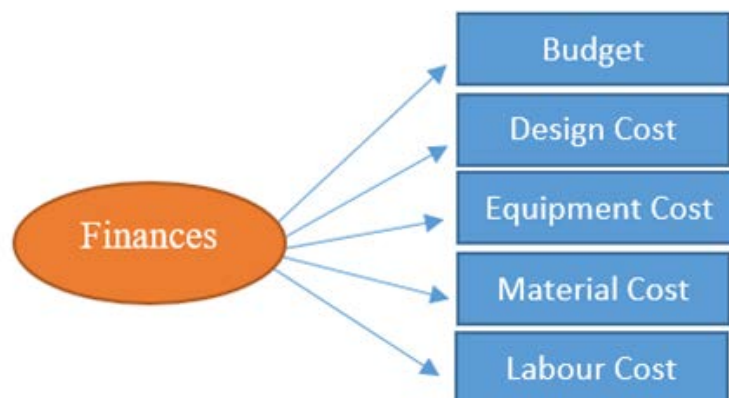


Figure 4. 8 Finances factor in implementing ESCP

4.3.4.1 Budget Factor

It all started from contract, drawing, and design. In contrast, the consultant needs to state the environment and management budget, cost and plan. They need to provide a specific budget just for an environmental issue or other specific issues by not combining into the management budget. This is because implement the ESCP is using a lot of costs, the same as maintaining it. The cost provided is using for the ESCP implementation.

Allocation of budget or financial needs to be logic. The allocation of budget in which to be included all installation and maintenance cost of the ESCP component. It is used to buy the ESCP item such a silt fence even the ESCP report itself is using a high cost.

4.3.4.2 Design Cost, Equipment Cost, Material Cost, and Labour Cost Factor

The consultant needs to purpose ESCP plan from the beginning in term of budget and design. Using method and material that cheap and practicable are usually easy for upper management to approved for the budget. Need to providing costing in installation components and maintenance such as cost for material and machinery not just that labor or manpower also the important part of the construction. Allocation of the budget in which to be included all costing started with design cost, equipment cost, material cost and labor cost for installation and maintenance cost of ESCP.

4.3.4.3 Finances Conclusion

Finances consist of budget, design cost, equipment cost, material cost, and labor cost. It all started from contract, drawing, and design. In contrast, a consultant needs to state the environment and management budget, cost and plan. Allocation of budget or financial needs to be logic. The consultant needs to purpose ESCP plan from the beginning in term of budget and design. Need for providing costing in installation components and maintenance.

CHAPTER 5

CONCLUSION

5.1 Introduction

This study aims to investigate the factors for implementing ESCP successfully in the developing country such as Malaysia by

- i. Determine the common challenges for implementing ESCP
- ii. Identify the factors for implementing ESCP successfully

This discussion can identify, what are the common challenges that we have in our construction industries today until they have a problem in implementing ESCP in their sites and how to tackle that problem. To answer that problem, the individual interview method is being used in the data collection process. 20 individuals that meet the target population criteria have been selected. The selected individual has been experiencing on implementing the ESCP in the projects. Thematic analysis is being used for data analysis to analyze the data is collected through the interview sessions. Using this method, we can find the pattern from the same data and create a new theme that represents the whole data.

5.2 Major findings

5.2.1 Challenges

1. Internal challenges are caused by all the project parties are not performing their rightful and responsibilities because of a lack of knowledge and awareness in environment protection.
2. External challenges are caused by the responsible parties that make the decision and action taking for granted to implement ESCP and thinking it is waste to implementing it.

5.2.2 Success Factor

1. A strategic focus factor can be a success factor if it is managing and planning well with integrity and responsibility.
2. People factor will ensure success if there are knowledge and awareness about ESCP in every person that related to the project
3. The operation factor is a success if they construct by following the ESCP specification in design, following the design in constructing the ESCP and maintaining the ESCP device as being provided in the BMP.
4. The allocation of budget or financial needs to be logic and using method and material that cheap and practicable.

5.3 Implications

1. Create awareness, knowledge, and importance of ESCP
 - This study shows that the problems that came in implementing ESCP are they have no awareness and knowledge about the importance of ESCP. This study will create awareness and knowledge on the importance of implementing ESCP by identifying the challenges in implementing it and determine the success factor in implementing ESCP.
2. Assist industry practitioners to develop strategies that target improvements to the success rate of implementing ESCP
 - This study will help them to identify what is lacking or problems in our industry related to the implementing of ESCP and implementing it with the success factor that has been stated in this study. Therefore, it will improve the rate of success in implementing ESCP in Malaysia.
3. Support policymakers to make the decision in tackling problems related to the implementing of ESCP.
 - The data provided can be used to identify how to implement ESCP successfully and tackle the problem in implementing it.

5.4 Future work

This study can be continuing to be more detailed by performing a questionnaire. The questionnaire will be distributed to the selected developer, contractor, and consultant so that we can identify more challenges and success factors that they being through in the industry. Moreover, the questionnaire also can be done to identify their knowledge about ESCP. This study has stated that all the challenges or barriers are coming from most of the project parties lack knowledge in ESCP. Last but not least, this study also can be continuing by experimenting the interviewee on how they make the decision in implementing ESCP and what makes them not implementing it by using Analytical Hierarchy Proses (AHP).

5.5 Closing remarks

The data in this study are not generalized to all the projects because the targeted person didn't have the same background of studies and experiences but the selected individual is the person that has been experiencing on implementing the ESCP in the projects before. Moreover, the interviewee is not from all states in Malaysia this is because some of the people in certain states don't want to be interviewed. They afraid if they give some sensitive information in the interview. There are not balance in the numbers of the category of the targeted population. Most of the interviewee is from the consultant and the contractor sides. Most of the government personal does not want to be interviewed. Plus, this study only interviewing 20 targeted persons. so that, it does not symbolize all projects in Malaysia. In Malaysia, there is some attitude that they afraid to be an interview or they don't want to contribute to the research. But, this study is to determine the common challenges for implementing ESCP and identify the factors for implementing ESCP successfully. The data from this study, we can find the theme and the pattern on what happened in our construction industry being through know days. Therefore, the scope of the research is still achieved.

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APPENDIX A APPENDIX 1

14/3/2019

1. What are the common challenges for implementing ESCP?
- 1. Site condition
 - ESCP does not suitable for the environment of project site—example the soil are too sandy so that the silt trap tends to erode and when they heavy rain pond failed to operate.
 - 2. Budget
 - Material for ESCP installation are expensive and construction process need to use high cost.
 - No funding or small budget.
 - Contractor don't want to do the ESCP due to limit time management.
 - size 1500x1000—they don't want to construct it because it's too big and expensive.
 - 3. Management
 - usually contractor feels ESCP is a waste and just focus to the construction objective.
 - project team does not fully co-operate—only cares about productivity without helping controlling pollution.
2. What are the success factors for implementing ESCP?
- 1. Management
 - good cooperation between project team—project team give commitment in.
 - hired skilled and experience supervisor to construct the ESCP.
 - 2. Enforcement
 - usually when the project under EIA there is a rules that need to follow which is contractor need to hire 3rd party audit which is accredited by DOL.
 - EO need to always monitor the site and always alert on the site condition.
 - Regulatory cooperation—authorities always monitor.
 - 3. Budget
 - Allocation of budget or financial.

Example of summary of the interview

Individual	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Internal Challenges																				
Lack of Competency	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Communication	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Awareness	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Planning	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Design	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Installation	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Maintenance	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
External Challenges																				
Management																				
Financial	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Enforcement	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Communication	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Medium	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Total Suggestion	4	4	5	8	3	5	4	5	4	5	3	2	5	4	3	2	5	3	4	4

Transferring the data from the excel into the table

APPENDIX B
APPENDIX 2