

THE SIGNIFICANCE OF PREPAREDNESS PROGRAMME AND EMERGENCY RESPONSE TOWARDS OIL SPILL PREPAREDNESS AND RESPONSE: A CASE STUDY OF LUMUT, MALAYSIA

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ABSTRACT

This research determines the successful factors of oil spill preparedness and response from the management perspective. An oil spill can be regarded as a release of liquid petroleum hydrocarbon into the marine environment that is primarily caused by human activities, resulting as a form of water pollution. Due to high customers' needs and demands around the globe, shipping activities is increasing and leading to a growing risk of marine pollution. In the shipping industry, the oil spills occur from various sources such as release of crude oil from tanker, drilling rigs and wells; as well as spills of refined petroleum products into the sea. Millions of dollars need to be spent in recovery and it takes several months or even years to recover and clean up the polluted waters. Failure in taking appropriate actions after the occurrence of the oil pollution leads to a serious damage to the environment and human health. This research focuses on two important elements from the management perspective towards the successful factors of oil spill preparedness and response, which are preparedness program and emergency plan. A questionnaire survey was used and distributed to two different companies in Lumut, Perak. In this research, 53 respondents have participated which comprises of 30 respondents from a government agency and 23 respondents from an oil & gas company. Correlation results show that the management perspective of preparedness program and emergency response have a strong correlation towards the oil spill preparedness at 0.764 and response at 0.647.

Keywords: Marine Pollution, Preparedness, Response, Marine Environment, Oil Spill.

INTRODUCTION

A danger to marine life comes in different forms, including exploitation of marine resources, ocean dumping, contamination and invasive species at open sea. Oil pollution is one of the serious threats to the marine environment. An estimated 31.5 billion gallons of oil are being transported at sea across the globe. Throughout history, various oil pollution incidents were reported with bad impacts to marine species and resources. Since the oil production and transportation are still in demand, proper precaution and plan have to be taken to preserve the marine environment from serious oil spill incidents such as Torrey Canyon and Exxon Valdez. Torrey Canyon was known as the worst oil spill incident, which has killed marine life for decades and polluted the beautiful Cornwall Beach. Frequent oil spills or leakage accidents lead to severe pollution, especially in soil and groundwater (Yanxun, Yani, Hui & Yuan, 2011). Several major oil pollutions have been reported since 1907 worldwide, which accumulated to more than 7 million tonnes of oil and around 140 of the incidents are large spills (Etkin & Welch, 2011). The incident of Deepwater Horizon has discharged around 700 thousand tonnes of crude oil to the marine environment. Even though several national legislations have been enforced to prevent marine pollution, the law is still found as not comprehensive and still threatens the marine environment, affects marine resources and human security (Abdulrazaq & Kader, 2014). It is undeniable that the risk of oil pollution is high in Malaysia due to a high demand of industry supply growth, population growth and positive economic growth,

which leads to the enormous supply movement of raw materials in meeting the current demand (Khalid, 2013). Therefore, the study of the preparedness and response of the maritime industry players needs to be conducted to make sure the import and export of the resources are properly and safely conducted.

INTRODUCTION

Definition of Oil Spill

The oil spill is characterized as a release of a fluid oil, hydrocarbon into the earth, especially in marine region, caused by human action and a form of contamination. The oil spill may also occur on land, even though the explanation of the term of oil spill is commonly used for marine environment. The release of oil and other oil related poisons in the water body and the land causes extreme harm to fisheries and farmlands posturing genuine danger to economic activities, and social well-being. The occurrence of oil spills seemed to be on the rise because of the release of waste or collision of crude oil tankers, as well as spills of refined petroleum products (for example petrol, diesel), offshore platforms, drilling rigs and wells, and the usage of heavier fuels by large ships for instance the bunker fuel, or the spill of any oily refuse or waste oil (Oyebamiji, 2014). The oil pollution from land-based sources, mainly the effect of industrialization and urbanization alongside coastal areas, has been discovered as the dominant contributor towards marine pollution (Sholeye, Salako, & Ayankoya (2012) and Mustafa & Ariffin (2011). The oil spills may also occur for

numerous reasons such as equipment failure, disasters, deliberate acts, or human error (Anderson and LaBelle, 2000). 12% of oil pollution incidents are due to maritime activities such as oil wells, storage tanks, pipelines, vessels cleaning out tank, and shipping accidents (Potters, 2013).

Table 1. Definition of Oil Spill

Author/Year	Descriptions
Doshi, Repo, Heiskanen, Sirviö, and Sillanpää, (2017)	Oil slicks are the huge wellsprings of hydrocarbons entering in the accepting seagoing condition.
Ajide, and Isaac (2013)	Oil is a general term used to denote liquid petroleum products which mainly consist of hydrocarbons. The release of oil into the natural environment is termed as an oil spill.
Potters (2013)	Any kind of form contamination that is found in an ecosystem resulting devastating harmful impact towards the organisms in the particular ecosystem and interrupting the growth rate and plant or animal reproduction or by interfering with human comfort, health, property values and amenities.
Sholeye, Salako, & Ayankoya (2012) and Mustafa and Ariffin, (2012)	Any types of oil that has been released into the natural environment and pollution from land-based sources, mainly as after effect of industrialization and urbanization alongside coastal areas, has been discovered as the dominant contributors towards marine pollution.

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Causes of Oil Spill

Natural Disasters

A natural disaster is one of the factors that caused the oil spills. Natural disasters are natural events that are out of human influence causing phenomena such as earthquakes, hurricanes, adverse weather conditions, etc. These natural disasters causing sailing vessels at sea to have a limited sight, lost of the ability to maneuver efficiently and causing multiple accidents such as collision, structure failure, hogging and sagging of vessel, which contribute to the oil spills. The natural disaster can be very damaging, caused the oil spills and affecting the ecological and environmental systems, especially on species of plant, a wide embellish of animals, human kind, which resulted in the alteration of the coast development for the purpose of tourism and recreations (Wang, Zhang, Li, and Klassen, 2011).

Human Error

Human error or negligence is defined as something which is inevitable or a norm of human being that results in a malfunction or system error. It is away from direct intention, desire or expectation (Hansen, 2006). Most of the time, the oil pollution occurs when there is human's negligence or carelessness. The errors include neglected maintenance, tiredness, poor handling of maneuvers, lack of communication between crew members, an inadequate response to a minor incident, or insufficient checking of systems causing it from bad to worse and lead to major accidents.

Shipping Activities

The shipping industries has grown so fast in meeting the high demand of materials and supply of consumers. There are a number of universal controls that disallow express dumping of every single distinctive sort of waste over specific levels. Moreover, the small scale of the oil spills originated from shipping activities have generally happened due to human blunders during routine operations particularly during loading and discharge. As crude petroleum is comprised of an extensive variety of hydrocarbon particles with various sub-atomic weight and properties, it is difficult to give a compact perspective of the aggregate harm by a coincidental spill.

Table 2. Causes of Oil Spill from Shipping
(Source: Causes of Oil Spill from Shipping (GESAMP, 2001; NRC, 2003; ITOFF, 2011)

Causes of Spills	Small and Intermediate Spills (in tonnes)	Larger Spills (in tonnes)
Different Sizes	Less than 700	More than 700
Groundings	19	34.2
Collisions	25	28.4
Loading/discharging	28	8.6
Hull failures	7	12.4
Fires and explosions	1	8.6
Bunkering	2	0
Other operations	5	0.3
Unknown	13	7.5

Table 2 shows the result of shipping activities that lead to major oil pollution at sea. It is undeniable that the main cause of the oil pollution occurs at sea is originated from the shipping activities. The oil spill in the ocean experiences a progression of concoction, natural, and physical procedures and prompt the contamination of the oil (Wilhelmsson et al., 2010). The speed of these procedures is dependent to a huge degree on the character of the oil, the encompassing temperature, and the other natural conditions. Meanwhile, overwhelming oils, for instance, oils with a high bid of hydrocarbons with a high sub-atomic weight, lead to debase more gradually than the lighter oils. The high temperatures and the contamination process quickly cause the oil spill as compared to the low temperatures.

Oil Spill Preparedness and Response

An effective marine oil spill combat operation relies on the prompt reaction from the time the oil slick is distinguished. An accident involving the oil spills would be catastrophic towards the environment, depending on how bad it is and subject to the other factors such as oil control and prevention of the oil from spreading (Al-Majed, Adebayo and Hossain, 2012). The oil spills relying upon the correct hydrocarbon substance and type includes typically broad zones of film on the ocean surface, a reality which decreases water unpleasantness and can permit the recognition by Synthetic Aperture Radar (SAR) images (Sipelgas, L., & Uiboupin, R., Keramitsoglou, Cartalisa, and Kiranoudis, 2007). Each type of chemical tankers carrying every type of chemical cargo shall have a specific carriage documentation, safety practices, and specific operational and safety-related precautions and loading/discharging at certain conditions since the properties of chemical cargo are very different than bulk cargoes. In addition, the chemical represents the critical and controversial issues of health and safety hazards. Sea mode transportation is mainly suitable transportation in chemical logistics to carry very large volumes of liquid chemicals (Aslan and Er, 2008). The oil spill response requires a viable reconciliation of the physical and substance properties, transport, and weathering of spilled oil, choice of cleanup strategies, arranging of seaside security operations, climate and ocean conditions and booking of cleanup offices (Zhong and You, 2011). When the oil spills occur on the ocean surface and experiences the different forms, for instance; re-emerging, evaporation, spreading, scattering, vanishing, emulsification, photograph oxidation, sinking, tar ball development, and biodegradation (Berry et al., 2013; Zhong and You, 2011; and Dnan and Balas, 2010). When the changing process of properties occurs, it could definitely make the cleanup process more complex. Thus, the degree of the harm caused by the oil spill and the simplicity of a tidy up relies on upon how rapidly the tidy up reaction produce results. The energy of these procedures depends to a great extent on ocean conditions and the meteorological condition (Al-Majed, Adebayo and Hossain, 2012). At the point when a huge oil spill happens, a fast, prompt and compelling reaction is crucial with a specific end goal to limit the monetary effect and harm to the nature and human life.

Legal Instruments Governing Oil Spills Incidents

Malaysia is a party to several international conventions regarding marine pollution as follows:

1. United Nations Conventions on the Law of the Sea 1982 (UNCLOS 1982)
2. International Convention for the Prevention of Pollution from Ships 1973, as modified by the Protocol 1978 (MARPOL 73/78)
3. International Convention on Oil Pollution Preparedness, Response and Co-operation 1990 (OPRC 1990)
4. International Convention on Civil Liability for Oil Pollution Damage 1992 (CLC 1992)
5. International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage 1992 (Fund Convention 1992)
6. International Oil Pollution Compensation Supplementary Fund 2003 (Supplementary Fund 2003).
7. International Convention for Compensation for Bunker Oil Pollution Damage 2001 (Bunker Convention 2001)

Between all the conventions, the OPRC 1990 is the main convention that focuses on the oil pollution preparedness and response. Ships, offshore units, sea ports and oil-handling facilities are required to provide an oil pollution emergency plan and report the discharge of oil promptly to the related authorities. Besides that, each state party has to cooperate with the shipping industries, port authorities and other relevant authorities to combat the oil pollution incidents. The UNCLOS 1982 and the MARPOL 73/78 cover on the general regulation. The UNCLOS 1982 covers of all aspects and uses of the oceans and their resources, including delimitation, environmental control, marine scientific research, economic and commercial activities while MARPOL 73/78 focuses on different types of marine pollution. The types of the marine pollution are enumerated in six annexes as shown in Table 3:

Table 3. MARPOL 73/78 Annexes (Source: International Maritime Organization (IMO), 2017)

ANNEX	Functions
Annex I	Regulations for the prevention of pollution by oil
Annex II	Regulations for the control of pollution by noxious liquid substance in bulk
Annex III	Regulations for the prevention of pollution by harmful substances carried by sea in packaged forms, or in freight containers, portable tanks or road and rail wagons
Annex IV	Regulations for the prevention of pollution by sewage
Annex V	Regulations for the prevention of pollution by garbage from ships
Annex VI	Regulations for the prevention of air pollution from ships

The liability of the ship owner that causes the oil pollution is subject to the CLC 1992 for the spillage of hydrocarbon oil carried as cargo and the Bunker Convention 2001 for the oil spill from the bunker. Bunker Convention 2001 covers in one-tier compensation, the CLC 1992 supplements a three-tier compensation, which the first tier is on the ship owner, the second tier provides under the Fund Convention 1992 while the third tier provides under the Supplementary Fund 2003. In the Malaysian context, there are several legislations governing the oil pollution. The main legislation enacted specifically to deal with the marine pollution issue is the Merchant Shipping (Liability and Compensation for Oil and Bunker Oil Pollution) Act 1994. Adopted by the CLC 1992 and Bunker Convention 2001, this legislation regulates on the liability of the ship owner that cause an oil spill from tanker and all other types of marine pollution. The main legislation for merchant ships, Merchant Shipping Ordinance 1952 lists out the regulation on oil pollution in Part VA of the Ordinance that include regulations on the prohibition of discharge of oil or harmful substance, report and investigation of maritime casualty. The legislation also highlights the power of local authorities, Director of Marine and Minister. Meanwhile, the general rule on preserving a sound marine environment can be found in Exclusive Economic Zone Act 1984 and Environmental Quality Act 1974.

RESEARCH OBJECTIVES

This research focuses on the oil spill preparedness and response from two management perspectives. The objectives of this research are as follows:

1. To analyze the relationship between preparedness program and oil spill preparedness.
2. To evaluate the relationship between emergency response and oil spill response.

RESEARCH METHODOLOGY

This research focuses on the oil spill preparedness and response among the management officers from two maritime organizations which involve government agency and non-government organization which is oil and gas organization operates in Lumut, Perak, Malaysia.

Population, Samples, Respondents

The population for this research is 190 people involving employees and staff in the government agency and the oil and gas company. The samples selected were 85 people with 53 respondents participated in this research, where 30 from government agencies and 23 from oil and gas company.

Theoretical Framework

The theoretical framework determines the relationship between independent variables and dependent variables. The two management perspectives towards the successful factors of oil spill preparedness and response, which are preparedness program and emergency response as shown in Figure 1.

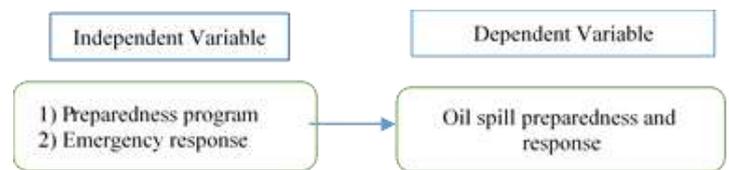


Figure 1. Theoretical Framework

DATA ANALYSIS

Respondents Background

Demographic study shows the background data from each of the 53 respondents that were randomly selected for this survey. This analysis is important to learn more about a sample characteristic in order to determine the suitability of their response towards this survey and further explain the result. Table 4 shows list of selected respondents' background, such as gender, age, race, highest education and working experiences. This selected background are according to their relevancy towards oil spill preparedness and response. From 53 respondents there were 31 male and 22 female respondents (which are 16 male respondents and 15 female respondents from government agencies and 14 male respondents and 8 female respondents from an oil and gas company). There is a difference in gender as the oil and gas company is involved in a heavy engineering industry, which requires more male manpower and in general, female staff is involved in administrative matters. The age range is about five years, which refers to the age range of the staff of the selected companies. The age group is determined after considering several factors such as their positions and working experiences. In the age range between 31-35 years old, shows the highest feedback which is at 37.8%. This value is enough to represent all the samples. The majority staff who is included in this age are holding positions from middle management to top management. This category is related to the position and experience to counter the issue towards the oil spill preparedness and response. In terms of the race characteristic, the majority race of the respondents involved in this survey is Malay stated at 88.7% as compared to other races. The location of the government agency and the oil and gas company are located in Malay residential area in Lumut, Perak. The surrounding areas are also surrounded by the Malay community within the radius of between 10 km to 25 km, which supported why the Malay population is the highest and affected in this research.

There is not much difference for the academic qualification among respondents. Only 56.6% respondents holding Diploma as compared to Bachelor Degree with 43.4%. In the scope of the research required at least staff with Diploma to carry marine operation daily tasks at ports. Besides that, this research shows that the majority of the respondents with working experiences of between 11 to 15 years. The experienced staff who are especially involved in marine operation are an asset to the organization particularly in covering issues related to the oil spill. It is because experienced staff is highly knowledgeable and capable to handle big incidents and the employers have taken an appropriate decision in recruiting

them. The duration of 11 to 15 years of working experience is sufficient to measure the capability of their work and this is supported by Wiesenfeld, B. M., Reyt, J. N., Brockner, J., & Trope, Y. (2017) that states that, experienced workers gained a lot of experience on working situation and meet the standard quality of work parallel with the salary gained.

Table 1. Respondents Backgrounds

	Descriptions	Respondents	Percentage
Gender	Female	22	41.51
	Male	31	58.49
Race	Malay	47	88.7
	Indian	3	5.6
	Chinese	3	5.6
Age (years)	20-25	4	7.5
	26-30	12	22.7
	31-35	20	37.8
	36-40	13	24.5
	41-50	4	7.5
Highest Education	Diploma	30	56.6
	Bachelor	23	43.4
Working Experiences (years)	<5	6	11.3
	6-10	15	28.3
	11-15	23	43.4
	16-20	2	3.8
	21-25	7	13.2

Questionnaire Survey Method Distribution

The questionnaires were distributed during working hours from 8 a.m. till 5 p.m. starting from Monday to Friday. 85 sets of questionnaires were distributed. The questionnaires were collected from 30 respondents at 56.6% from government agency and 23 respondents at 43.4% from the oil and gas company. The response rate is at 62.35%, which required the respondents to answer a number of questions according to the sections that were constructed in order to achieve the research objectives.

Correlation Analysis between Two Management Approaches Towards the Oil Spill Preparedness and Responses

Table 5. Correlation Two Management Perspective Towards The Oil Spill Preparedness and Responses

Management Approaches	Pearson Correlation	
	Preparedness	Responses
Emergency response	0.783	0.641
Preparedness program	0.745	0.658

** . Correlation is significant at the 0.01 level (2-tailed).

**Sig. (2-tailed): at 0.000

The objective of this research is to examine whether there is a significant relationship between preparedness and response towards two elements that is represented as the management perspective. These two elements have been analyzed as the independent variables that influence the result of preparedness and responses towards the oil spill. The main reason to apply the correlation is to identify the significant relationship and is used as an indicator that affected the other variables either increasing or decreasing. Using the analysis of the Pearson correlation method, based on 53 respondents revealed that there was a significant and strongest correlation between two management perspectives towards preparedness and response, respectively. Table 5 shows the correlation result between two management perspectives with preparedness and shows coefficient correlation (r) range from 0.658 to 0.745 at the significant at 0.01 level. This result is supported by Zhong and You, (2011), and Al-Majed, Adebayo and Hossain, (2012). The contribution of management perspective towards the oil spill preparedness is significant. Indeed, the management perspective is vital in the case of oil spill or the oil pollution prevention and control. It is concluded that these two elements of management perspective are significant and indicate the strong association between the elements in measuring the preparedness activities towards oil spill at ports. From the list of these two elements of management perspective shows that the emergency plan indicated the highest correlation coefficient towards the preparedness in an oil spill. The result shows that respondents agreed that the emergency plan is a vital and crucial indicator to be considered and taken seriously by a related organization. Generally, this emergency plan can be declared as relevant feedback from required authorities, whether in terms of suggestions, complaints, and signals from the operating team. The staff involves in the oil spill should know this indicator as a start-up point in predicting the incidents occur from oil spill and immediately required a strategic preparedness program and action. Indirectly, it represents the other elements in the management approaches in creating an effective and efficient preparation. A responsive response team is needed at the port and currently this task is handled by the safety officer.

Meanwhile, the relationship between the management approaches and response shows a significant and strongest relationship. A Pearson correlation coefficient of the range 0.641 to 0.783 was obtained and it was concluded that the two sets of independent variables and dependent variables were significantly correlated. This was confirmed from the result to show the evidence that the efficient response in the oil spill incidents is explained by management approach. Between these two elements of the management perspective, the emergency plan contributes the highest and strongest relationship towards preparedness. The preparedness program comprises of various awareness activities in responding to the critical issue of the oil spill. Besides that the frequent updates from response teams towards any rising issue in the oil spill can be graded as a tool to craft future activities related to the responses. Other than that, this will be used as a tool and a precaution measurement in dealing with the responses in the oil spill supported by Zhong and You,

(2011), Al-Majed, Adebayo and Hossain (2012), Fingas (2011) and Kasmin, (2010). Thus, the large value of the preparedness program is associated with the strongest relationship towards responses. According to Kasmin (2010), the prompt and correct response is essential during the oil spill or oil pollution scenario, where decision making was made by the management and other supportive parties involved. The contribution of management perspective is substantial, especially in the aspect of the oil spill response, which demands an absolute response as supported. The contribution of management perspective towards the oil spill preparedness and response is significant and vital and become the fundamental element in the case of an oil spill or oil pollution prevention and control (Fingas, 2011).

DISCUSSION

The outcomes are reviewed based on the objectives of the research, which have been successfully achieved in this research. The outcomes were based on 53 randomly selected respondents. The two management perspectives towards the success factors of the oil spill preparedness and response which are; emergency plan and preparedness program. The management perspective is very important in oil spill preparedness and response. From the response, it was found out that the best management practices are the emergency plans. In any response of an organization towards the oil spill, the emergency plan covers a collaboration across all departments and units to support the response team effectively. This emergency plan generally comprises of procedures and guidelines towards the oil spill, which has been established and endorsed by the required parties. It also covers the current technological and development programs that have been reviewed periodically and appropriately updated. The emergency plan must be in place, well equipped and the required response team must be trained on how to minimize the impact of a small or large spill. In addition, a crucial decision making determines the successful rate of oil spill control and prevention. A prompt reaction time and sufficient resources during decision making will increase and has a higher rate of success in oil spill preparedness and response (Zhong and You, 2010). However, if the response organization is lacking in regular training and simulation, it leads the emergency plan to fail in terms of its implementation, even though proper documentation has been conducted effectively.

The relationship between the preparedness plan in management practices to the oil spill shows a strong relationship. A proper preparedness plan in terms of the accuracy of the contingency plan, a response rate towards the incident, a proper identification of planning and provisioning of the scenarios with an accurate scales and a degree of complexity is necessary. Additionally, application of an updated and relevant devices in order to minimize the oil spill accidents, the response and fast action by the response team, an effective communication to ensure instructions are complied, a development of robust and detailed emergency preparedness plan for the worst oil spill incidents, an enhanced understanding about the level of risk from the oil spill incidents and a

continuous review process of the contingency preparedness plan are also important.

This research is beneficial to give a positive impact to port management, ship owners and coastal state by listing and emphasizing on oil spills control practices that can be applied in order to efficiently control and prevent the oil spill and minimizing the complications by examining the effectiveness of the response practices. It shows a strong relationship between the management practices to the oil spill response. Through the response exercised by the port management, ship owners and coastal state become more alert in preparing and facing the possibility in oil spill incidents. It also delivers beneficial and major impact especially to the port management and other heavy maritime industries on oil pollution control in order to curb with and minimize the effects of oil spill by applying the effective response methods. Among the important and crucial responses in oil spill include a prompt reaction, weather conditions, initial safety deployment, wave and sea water condition, severity of oil slicks, efficient and effective response methods and a proper cleaning up techniques. It is agreed that, the prompt action resulted from an effective series of trainings and simulations lead to improvement in the management practices towards the oil spill. Nevertheless, even with a proper training, if the response team are still afraid of the danger and risk from the oil spill recovery towards themselves, it will not assist them to work out effectively. Thus, the support from management practices is crucial and important to combat issues in oil spill. This research provides benefits to educators in the teaching and learning session especially related to marine pollution courses since it also provides an in depth knowledge of the oil spills problems faced in a real situation including the inclusion of the best practice methods or strategies, which can be applied to overcome the oil spill problems.

RECOMMENDATION

The water pollution, especially in the marine environment has highlighted several major and bad effects towards the human, animal, mangroves, marine lives, marine ecosystem, economic and social lives. Thus, the cooperation and contribution from all related bodies are required to combat this national and international issue immediately. To combat this oil spill incident the recommendations are as follows:

Firstly, to continue the efficient cooperation given to active private organizations known as oil spill response organizations that are available in Malaysia with the collaboration supported by the government agencies such as the Department of Environment, Marine Department, Maritime Enforcement Agency (MMEA), to solve issues on oil spill problem. Secondly, the response team members are required to be available at the port and currently this task is handled by the safety officer who is capable and available to respond at any time, which could lead to solve the oil spill incidents effectively and efficiently. Thirdly, the current preparedness programs comprise of various awareness activities such as: regular meeting, audit of SOP, exercise the real simulation of oil spill accidents and proper equipment checklist updates in

responding to the critical issue of the oil spill are equally crucial and important. For example; in audit activities conducted by the government agency such as DOE on the equipment is conducted almost every week. On top of that, the fire and ship simulation is held every month, especially while on-board ship will provide better exposure and increase the readiness level among response team. Frequent updates from the response team can be graded as a great tool to craft future activities related to the oil spill. Fourthly, the prompt and correct response is essential during the oil spill incidents. For instant; once the oil spill has happened, it must be reported to the nearest DOE within 5-10 minutes of the incident. Failure to report immediately could not assist the response team in responding fast and therefore the spill may spread to other areas. Finally, a solid preparedness and emergency response activities will help us to overcome serious effect from the oil spill issues in the future.

CONCLUSION

Since the successful management practices in minimizing the proper preparedness and oil spill response, it is imperative for the maritime industry to have a solid contingency plan. The contingency plan emphasizes on the whole plan which includes prevention, current event and post event of the oil spill. The main maritime industry players, including the legal and government authorities such as Marine Department, Department of Environment (DOE), Ministry of Transport (MOT) and the National Oil Spill Control Committee (NOSCC) are incorporated to ensure the maritime industry complies with the international conventions and the requirement in minimizing the oil spill accidents. Sufficient trainings for the response team with adequate knowledge regarding to the oil spill preparedness and response will help to increase the success rate of the oil spill accidents covered. In conjunction with preparedness and response, the high technology application, especially in a sensitive map is useful in preventing and controlling the oil spill cases. An immediate reaction is the essence to successful rate in combating the oil spill. Even though, as for now it shows that we have not suffered from a massive oil spill that could be devastating to the environment, oil spill is a very serious issue in the maritime industry. This research shows that management practices contribute to the preparedness and response towards the oil spill. The effective preparedness and response are the key elements to control future oil spill accidents in the marine environment, which could trigger marine pollution and undesirable effects to society and human health.

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