

# **ASSESSING AND PROPAGATING WORKERS SAFETY AND HEALTH IN FLOOD DISASTER: AN EXPLORATORY STUDY IN THE PERLIS, NORTHERN MALAYSIA**

**By**

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Flood disasters that hit Kedah, Terengganu, Kelantan, Pahang and Johore States of Malaysia recently were due to unusual weather conditions. One of the major cause of the flood in the aforesaid states is the continuously non stop raining for between 3 to 4 days has risen the river water level. The unprecedented rising of the water level has brought about floods. In any flood disasters, workers which may include core emergency services (SMART Team, Fire and Rescue Department, Malaysian Armed Forces, Royal Malaysian Police) are call up to response to flood disaster. The response phase includes the mobilization of the workers into the disaster area. Workers who must respond to flooded disasters will be most at risk. Workers can expect to find safety and health hazards throughout the flood zone. Some of the hazards related, just to mention a few examples, with working in flood disasters are exposure to hazardous materials, stress, and electrical hazards etcetera. In discussing the topic of workers safety and health in flood disaster the Occupational Safety and Health Act (OSHA) 1994 will be used as the term of reference. This specific law is to ensure the safety, health and welfare of all persons at the workplace. The OSHA 1994 requires employers to comply with specific safety and health standards when employing their workers in flood disasters. A survey using risk analysis matrix

will be conducted to ascertain what the hazards are which affects the workers safety and health when responding to flood disasters with the recent flood disasters in Kedah/Perlis as reference. So this paper endeavors to propagate to the workers on the importance of understanding of the hazard which effect their safety and health when responding to floods disasters with a guideline on “Workers Safety and Health in Flood Disasters”

*Keywords: response, flood disaster, safety and health hazards, risk analysis matrix*

## **1.0 Introduction**

In any disaster situations such as flash floods to major catastrophes which involve life saving and rescue work, the members of the public will call for aid or help. In an emergency situation, all the caller need to do is to dial 999. Callers to the emergency call centre can expect their calls to be answered within 10 seconds or after four rings. There are a total of eight emergency call centres in the country. TM Berhad operates these emergency services centres nationwide 24 hours a day, seven days a week. The centre is man by specially-trained professionals to handle the emergency calls. The Centre would handle all emergency calls and reroute them to the emergency service providers. The calls would then be handled by the respective emergency service providers like the police, ambulance, fire stations and civil defense rescue units. These units are the first responders in emergency situations. The first responders who must respond to disasters will be most at risk to safety and health hazards throughout the flood zone.

## **2.0 Aim**

The aim of this paper is

- a. To highlight the safety and health issues of first responders in flood disasters.
- b. To highlight the relevant laws with regards to worker safety and health at the scene of disasters.
- c. To suggest safety and health guidelines in respect to safety and health for the first responders.

### **3.0 Problem Statements**

Malaysia has not encountered nation wide disaster situations. Malaysia has from time to time experience flood disasters. However the disaster scenario is localized in nature in that it happens in certain states. When disaster situations such as flood disaster take place, call for assistance will be receive by the relevant authorities. The first action taken is to deploy emergency workers who are the first responders to the disaster scene. Usually these responders move to disaster vicinity at immediate notice. Casualties on the part of these workers employed in the disaster zone prevail and were taken lightly as routine accidents. The laws required the employer to report all accidents. This is seldom done. The law also requires the employer to conduct Occupational Safety and Health (OSH) Risk Management at the workplace to ensure favorable working environment which in this scenario is the Risk Management of flood disaster. Consequently the law also requires the employers have to provide fundamental requisites which befit the job being undertaken. This is to prevent work related accident at the workplace. However most government agencies have overlook in carrying out such a requirement. In consequence these hinder and cause danger to the responders in carrying out the assign tasks.

### **4.0 Definitions**

**"Hazard"**: is the potential to cause harm to a person or to the natural environment.

**"Risk"**: means a combination of the severity and likelihood of harm arising from a hazard.

**"Risk assessment"**: is the process of evaluating the severity and likelihood of harm arising from a hazard.

**"Risk control"**: is the process of implementing measures to reduce the risk associated with a hazard. The control process must follow the control hierarchy. It is important that control measures do not introduce new hazards, and that the ongoing effectiveness of the controls is monitored.

**"Risk control hierarchy"**: ranks risk control measures in decreasing order of effectiveness:

- a. Elimination of hazard;
- b. Substitution of hazardous processes or materials with safer ones;
- c. Isolation hazard associated with it so that staff are physically separated from the hazard
- d. Engineering controls;
- e. Administrative controls; and
- f. Personal protective equipment.

The risk control measures implemented for the hazards identified should always aim to be as high in the list as practicable.

## 5.0 Identifying Workers Involve In Flood Disasters

All disaster such as floods that takes place is distinctive in its own ways. Nonetheless, there are four phases of emergency management framework that are common to all disasters: response, recovery, mitigation, and preparedness.

Workers who are involve in any flood disasters are the first responders made up of the Army, Police, JPA 3, emergency medical services personnel, and other public safety officials. They focused on saving lives and protecting public health, safety, and property. Within minutes of a flood occurrence, responders are dispatched to the affected areas. At the same time, based on its diversity, relief organizations and volunteers might be dispatched as well.

The recovery phase usually begins during the response phase and involves meeting the food, shelter, clothing, and medical needs of individuals affected by the disaster. Recovery also involves cleanup and repair to property and infrastructure and can extend for many months after the disaster occurs.

During the third phase of emergency management, governments focus on measures that can be implemented to minimize or eliminate hazardous conditions that can affect the municipality and its citizens. Such measures might include relocating residents from flood plains, elevating housing, and designing flood barriers. The final phase of emergency management takes place continually and involves preparedness

Workers undertaking their duties faced a variety of hazards. There are the obvious unsafe act and unsafe work conditions couple with a number of categories of insidious dangerous hazards including chemical hazards, physical hazards, biological hazards, psychological hazards, and ergonomic hazards. Therefore, the working environment should be safe and healthy. At the moment, at hand is the specific act and regulation i.e. “Occupational Safety and Health Act and Regulations 1997” which deals with the safety at the workplace. Occupational Safety and Health

Act 1994 applies throughout Malaysia. The Act specify the sectors of the industries which it applies i.e.<sup>34</sup>

- a. Manufacturing.
- b. Mining and Quarrying.
- c. Construction
- d. Agriculture, Forestry and Fishing
- e. Utilities – Electricity; Gas; Water; and Sanitary Services
- f. Transport, Storage and Communications
- g. Wholesale and Retail Trade
- h. Hotels and Restaurants
- i. Finance, Insurance, Real Estate and Business Services
- j. Public Services and Statutory Authorities

The aim of the Act<sup>35</sup>:

- a. To secure the safety, health and welfare of persons at work against risks to safety or health arising out of the activities of persons at work;
- b. To protect persons at a place of work other than persons at work against risks to safety or health arising out of the activities of persons at work;
- c. To promote an occupational environment for persons at work which is adapted to their physiological and psychological needs;
- d. To provide the means whereby the associated occupational safety and health legislations may be progressively replaced by a system of regulations and

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<sup>34</sup> Occupational Safety and Health Act 1994 Section 1

<sup>35</sup> Section 4, OSHA 1994, MDC Publication Sdn. Bhd. 2004, page 191 – 192.

approved industry code of practice operating in combination with the provisions of the Act designed to maintain or improve the standards of safety and health.

## **6.0 Workers Safety And Health At The Workplace With Regards To The Law The Laws**

Preventing people from work related accident and diseases at the workplace requires the collaboration and participation of both employers and workers in health and safety programmes. It begins with the employer providing fundamental prerequisites at the workplace. These basic requirements are such as proper safety equipment, safety and health training, safe systems of work, environmental control and etcetera. The lists are numerous.

. The equipment provided must benefit the job being undertaken. This is to prevent work related accident at the workplace. There are various types of safety equipments depending on the type of job being undertaken.

Employer must provide PPE to his employee in relation to assign jobs so as to prevent occurrence of accidents at the workplace. The equipment supplied must be in the right quantities – there should not be sharing of these equipments. The employer must ensure that the PPE supplied meets the stipulated specification of safety requirements and approved for used. Some of the common PPE that must be supplied by the employer are “Safety helmets, safety gloves, safety boots, hearing aids and goggles.

Section 15 (1) OSHA 1994 states that *“it shall be the duty of every employers and every self employed persons to ensure, so far as is practicable, the safety, health and welfare at work of all his employees.”*

Section 24 defines the duties of every employee's whiles at work. The employees are required by law<sup>36</sup>:

- a. To take reasonable care for the safety and health of himself and of other persons who may be affected by his acts or omissions at work;
- b. To co-operate with his employer or any other person in the discharge of any duty or requirement imposed on the employer or that other person by this Act or any regulation made there under;
- c. To wear or use at all times any protective equipment or clothing provided by the employer for the purpose of preventing risks to his safety and health; and
- d. To comply with any instruction or measure on occupational safety and health instituted by his employer or any other person by or under this Act or any regulation made there under.

## **7.0 Mechanism in Handling Flood Disaster in Malaysian Environment**

### **7.1 Mechanism in Handling Flood Disaster**

“On receiving a flood disaster report”, from the victims of flood disasters or from the “Jawatankuasa Kemajuan dan Keselamatan Kampong” (JKKK), 2 stratum of command and control, based on the diversity of the flood disasters, is being activated that is the Disaster Operations Control Center and the Onsite Control Post. The main task of the command and control centre is to supervise and coordinate all activities involving rescue operations and the management of the operations' information centre. The Disaster Operations Control Center (DOCC) is managed by the District Police Chief as Commander with the District Fire Chief as the Deputy Commander

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<sup>36</sup> Section 24, OSHA 1994, MDC Publication Sdn. Bhd. 2004, page 200.

## 7.2 Organizations Engage in Flood Disasters

The DOCC will coordinate rescue operations involving the Royal Malaysian Police, RELA, the Military, Civil Defense Department (JPA3) and the Fire and Rescue Department who will conduct the search, rescue and evacuation of flood victims from the affected areas to the nearest flood relief centres. The flood victims will be rendered the appropriate assistance by the respective parties and agencies during and after the incident. The flood victims on the other hand are required to give their fullest cooperation to rescue personnel and follow the orders issued to ensure the safety of all parties. The JKKK too has a responsibility to perform that is will to inform the victims of the disaster about the flood relief centres and victims are required to evacuate based on the instructions issued. The Health personnel will carry out health screening of the victims to prevent the spread of any disease during and after the flood disaster incidence. The Welfare Department or Jabatan Kebajikan Masyarakat (JKM) will provide assistance to the victims in the form of facilities and suitable equipments such as mattresses, blankets, food and others.

## 7.3 Conducting Occupational Safety and Health (OSH) Risk Management

Workers undertaking their duties in flood disasters faced a variety of hazards. What are the vulnerability encounters by workers responding to flood disasters? Hence, OSH Risk Management is being carried out to develop better understanding on the vulnerability of workers responding to flood disaster. The abbreviation for the components of OSH Risk Management is HIRAC. The basis components of OSH Risk Management are:

- a. Hazard identification – sport the hazard

- b. Risk Assessment – assess the risk by calculating or estimating the
  - i. Likelihood of occurrence, and
  - ii. Severity of hazard;
- c. Risk control – decide if risk is acceptable, make the change and apply control measures
- d. Monitoring and review.

### **7.3.1 Hazard Identification**

The aim of hazard identification is to draw attention to those tasks which cause significant risks to the health and safety of workers in flood disaster operations and at the same time to take into consideration of those hazards cause by working conditions or activities performed. Hazards can be classified into five main groups:

- a. Chemical hazard includes chemical substances such as acids or poisons and those that could lead to fire or explosion, cleaning agents, dusts and fumes from various processes such as welding.
- b. Physical hazard such electrical, mechanical, excessively loud and prolonged noise, vibration, heat and cold, poor lighting, ventilation, air quality.
- c. Psychosocial Hazard such workplace stressors arising from a variety of sources.
- d. Biological hazard such as includes bacteria, viruses, mould, mildew, insects, vermin.
- e. Ergonomic hazard such as poor work stations, repeated exposure to abnormal postures and abnormal movement.

Several of the methods that can be applied in Hazard Identifications are through Discussion and Interviews, Work Place Inspections and Audits, Analyzing Statistics of Accidents at the Workplace.

A picture is worth a thousands words. Via the method to hazards identification mention aforesaid and the photograph attached at **Picture 1**, showing workers performing their duties in flood zone, wading in flood waters and also evacuating victims to relief centres, workers can expect to face a variety of hazards. Their tasks of Search and Rescue for example, necessitate working in flood waters that are often contaminated with sewage, chemicals and pesticides. They also encounter physical hazards such as submerged or floating and displaced animals, reptiles and even insects bites. The result after undertaking the Hazard Identification process faced by the workers in flood disasters is shown at **Table 1**.



Rescuers helping Felda Selancar settlers to cross Sungai Selancar by boat in Kuantan yesterday. — NST picture by Nordin Abdullah

**Figure 1. Rescuers Undertaking Tasks of Search and Rescue**

### 7.3.2 Risk Assessment

#### 7.3.2.1 Determining Risk.

Risk can be measured using qualitative, semi quantitative and quantitative analysis. Risk is the combination of the likelihood and severity of a specified unsafe event taking place. It correlates to the possibility of injury, damage or loss as a result of a hazard. The main areas to consider in risk assessment are:

- a. **Likelihood** – that injury, illness, damage or loss will occur.
- b. **Severity** – that of potential injury, illness, damage or loss.

Another factor that should be taken into consideration is the Exposure Factor that is the number of people who may be exposed to the hazard. Thus, Risk can be measured by the equation -

$$\text{Risk} = \text{Likelihood} \times \text{Severity}$$

#### 7.3.2.2 Ranking of Risk Factors. Risk factors can be rank as shown in Table 2.

Table 2: Ranking of Risk Factors

Ranking Risk Factors By Likelihood		Ranking Risk Factors By Severity	
Very Likely	Could happen frequently	Fatality	May cause death or loss of a facility
Likely	Could happen occasionally	Major	Severe injury or illness, or major property damage
Unlikely	Could happen but only rarely	Minor	Minor (usually reversible) injury or illness resulting in days off work, minor property damage
Very Unlikely	Could happen, but probably never will	Negligible	Minor injury, possible first aid

### 7.3.2.3 Methods of conducting Risk Assessment

A qualitative analysis uses words to describe qualitative or descriptive scale for likelihood and severity of risk factors. Due to 4 level ranking of likelihood and 4 level ranking of severity, hence 3 degree or scale is observed that is “HIGH, MEDIUM and LOW” as

Diagram 1. Qualitative Risk Table

Severity	Likelihood			
	Very Likely 4	Likely 3	Unlikely 2	Highly Unlikely 1
Fatality 4	High	High	High	Medium
Major Injuries 3	High	High	Medium	Medium
Minor Injuries 2	High	Medium	Medium	Low
Negligible Injuries 1	Medium	Medium	Low	Low

show in Diagram 1 beneath. This technique needs proficient knowledge and experience to determine likelihood and severity category.

In semi-quantitative analysis, qualitative scales such as those described in the Qualitative Risk Table are given values. Hence, semi-quantitative analysis uses numerical values for both likelihood and severity. The result of the Quantitative Risk Assessment will be numerical estimate of the risk as shown in Diagram 2.

Diagram 2. Semi-Quantitative Risk Table

Severity	Likelihood			
	Very Likely 4	Likely 3	Unlikely 2	Highly Unlikely 1
Fatality 4	High	High	High	Medium
Major Injuries 3	High	High	Medium	Medium
Minor Injuries 2	High	Medium	Medium	Low
Negligible Injuries 1	Medium	Medium	Low	Low

The hazard identified is further evaluated to determine its “Risk” to the workers performing their tasks in flood zones. All the information obtains via Hazard Identification and Risk Assessment of workers involve in flood disaster zone through the process as mention above are summarized in **Table 1**.

**Table 1-Hazard Identification and Risk Assessment**

<b>Organization and Activities in Flood Zone</b>	<b>Hazard Identification</b>	<b>Risk Assessments</b>
<b>Organization and Agencies:</b> <ul style="list-style-type: none"> <li>▪ Malaysian Fire and Rescue Department</li> <li>▪ Royal Malaysian Police</li> <li>▪ Malaysian Armed Forces</li> <li>▪ SMART Team (Special Malaysia Disaster Assistance and Rescue Team)</li> <li>▪ Emergency Medical Services</li> <li>▪ Atomic Energy Licensing Board</li> <li>▪ Civil Defence Department</li> </ul>	Electrical Hazard: <ul style="list-style-type: none"> <li>• Electrocution Due To Exposed To/Contact With Electric Current</li> </ul>	<ul style="list-style-type: none"> <li>• Burns</li> <li>• Death</li> </ul>
	Physical Hazards From Submerged Or Floating Debris	<ul style="list-style-type: none"> <li>▪ Bodily Injury</li> </ul>
	Biohazard <ul style="list-style-type: none"> <li>• Contaminated With Sewage</li> <li>• Dead And Displaced Animals, Reptiles And Even Insects</li> </ul>	<ul style="list-style-type: none"> <li>▪ Diseases Such As Tetanus</li> </ul>
	Fall From Height	
<b>Activities/Task :</b> <ul style="list-style-type: none"> <li>▪ Search and rescues</li> </ul>	Struck By Falling Object	<ul style="list-style-type: none"> <li>▪ Bodily Injury</li> </ul>
	Fire Due To Incorrect Usage Of Alternative Equipment Such As Generators	<ul style="list-style-type: none"> <li>▪ Bodily Injury</li> <li>▪ Burns Or Maybe Death</li> </ul>
	Chemical Hazard <ul style="list-style-type: none"> <li>• Exposed To/Contact With Hazardous Materials/ Substance</li> <li>• Lpg And Underground Storage Tanks</li> <li>• Chemical Containers May Break Away And Float Downstream And</li> </ul>	<ul style="list-style-type: none"> <li>▪ Bodily Injury</li> <li>▪ Burns</li> <li>▪ Bodily Injury</li> <li>▪ Death In Acute Cases</li> </ul>

Causing Hazard  
From Their  
Released

Musculoskeletal Hazard

- Heavy Equipment Operation
  - Over-Exertion Or Strenuous Movements
  - Over-Exertion In Lifting Object
  - Over-Exertion In Pushing Or Pulling Objects
  - Over-Exertion In Handling Or Throwing Objects
  - Strenuous Movement
- Bodily Injury
  - Death
  - Bodily Injury
  - Exhaustion
  - Dehydration
  - Exposure
  - Cold/Hypothermia

Exposure To heat and cold

Drowning

**Organization and Agencies:**

- Emergency Medical Services
- Malaysian Armed Forces
- Red Crescent Society Malaysia
- St John Ambulance

**Activities/Task**

- Management of emergency treatment
- Management of forensic services
- Management of public health

Physical Hazard

- Struck By Falling Object
- Person Falling From Height
- Person Falling From The Same Level
- Over-Exertion Or Strenuous Movements
- Over-Exertion In Lifting Object
- Over-Exertion In Pushing Or Pulling Objects
- Over-Exertion In Handling Or Throwing Objects

- Bodily Injury

- Strenuous Movement
- Exposure To Heat
- Exposure To Cold

**Organization and Agencies**

- District Office
- Municipal/Town Councils
- Tenaga Nasional Berhad
- Syarikat Telekom Malaysia Berhad
- Malaysian Armed Forces
- Royal Malaysian Police
- Public Work Department

**Physical Hazard**

- Stepping On, Striking Against Or Struck By Object Falling Object
- Stepping On Objects
- Striking Against Stationary Objects
- Striking Against Moving Objects
- Struck By Flying Object
- Over-Exertion Or Strenuous Movements
- Over-Exertion In Lifting Object
- Over-Exertion In Pushing Or Pulling Objects
- Over-Exertion In Handling Or Throwing Objects
- Strenuous Movement
- Exposure To Heat
- Exposure To Cold

- Bodily Injury

**Activities/Task**

- Logistic support
- Communication and other assistance for smooth control of operations and overcoming of disaster

**Organization and Agencies**

- Welfare Department
- Emergency Medical Service
- Red Crescent Society
- St John Ambulance
- RELA

- **Caught In Between Objects**
- Caught In Objects
- Caught Between A Stationary And Moving Objects
- **Over-Exertion**

- Bodily Injury

**Activities/Task**

- Evacuating victims
- Preparing food for victims/duty officers
- Providing/managing places for evacuations
  
- Providing first aid and counselling services

**Or Strenuous Movements**

- Over-Exertion In Lifting Object
- Over-Exertion In Pushing Or Pulling Objects
- Over-Exertion In Handling Or Throwing Objects
- Strenuous Movement
- Exposure To Heat
- Exposure To Cold

**Organization and Agencies**

- Royal Malaysian Police
- RELA

**Over-Exertion Or Strenuous Movements**

- Over-Exertion In Lifting Object
- Over-Exertion In Pushing Or Pulling Objects
- Over-Exertion In Handling Or Throwing Objects
- Strenuous Movement
- Exposure To Heat
- Exposure To Cold

- Bodily Injury

**Activities/Task**

- Provide control at scene of accident
- Conduct investigation
- Facilitate communication

The process of Hazard Identification and Risk Assessment has established the hazards and risk faced by workers in the flood disaster zone as mention in Table 1. However to determine the Likelihood and Severity, the details in Table 1 are further analyze into Risk Matrix Worksheet Table. This can be prepared by using the qualitative, semi quantitative or the quantitative analysis. To assess the safety and health of workers in the flood zone disasters, this

paper will use the format of Risk Matrix Table that has been apply by Occupation Safety and Health Unit, UniMAP to implement Risk Management in the university.

There is a long list of hazard and risk that is being mentioned above in Table 1. However, this paper will only focus on 4 examples on how to use the Risk Matrix Worksheet Table. The hazard and risk that will be discussed are:

No	Activity	Hazard	Consequences	Reference
1	Search and Rescue	Exposure to over heat and over cold	Can cause of minor injuries such as exhaustions, dehydrations, hypothermia	Appendix 1
2	Search and Rescue	Musculoskeletal disorders	minor injury such as back pain, muscle strain, ligament	Appendix 2
3	Search and Rescue	Electrocution due to contact with electric current.	cause of deep burn, death	Appendix 3
4	Search and Rescue	Peck by poisonous snake and rodent bite	Swelling of body parts, paralyse, death	Appendix 4

### 7.3 Risk Control

Where a risk to health and safety has been recognized, controls must be introduced to eliminate or minimize it. The risk control process must follow the control hierarchy as shown in Diagram 1. The most effective risk control measure is elimination.

This process eliminates hazards or unsafe work practice at the workplace. This is followed by a fairly effective control measure that is Substitution. This is done through substituting the unsafe work practice with one that is less dangerous. If the unsafe work cannot be substituted, it should be isolated.

If however hazards cannot be eliminated, substituted or isolated, the next control measure is Engineering Control. Engineering Control will involve modification to equipment and tools used. Other aspects which can be considered are Mechanical hard stops, Barriers, Interlocks and Presence sensing devices etc.

The next control measures that can be considered are Administrative Control. The measures that can be considered include Training, Job rotation, Off Shift Scheduling Work, Safe Job Procedures, Safe equipment inspections and Lockout/tag out etc. The last control measure if also fails to be materialized is the use of Personal Protective Equipment (PPE). Aspects included in this control measure is protection of the head and face, eyes and ears, respiratory, body and skin, hands and legs etc.



Diagram 1: The hierarchy of Risk Control

#### **7.4 Monitoring and Review**

Review the hazards and control measures to ensure that no new hazards have been introduced and that the process is working effectively to identify the risks and control the hazard.

#### **7.4 HIRAC Worksheet Table**

The processes of Hazard Identification and Risk Assessment have facilitated the set up of the Risk Matrix Worksheet Table. However, to have an overall knowledge on the impact and the status of hazards, risk and control measures to be taken in the flood disaster zone necessitate the HIRAC Worksheet Table to be institute. All the results established in the Risk Matrix Worksheet Tables are summarized in **HIRAC Worksheet Table at Appendix 5**. From the HIRAC Worksheet Table, it is established:

- a. Those workers in flood disaster zone face a variety of hazards in the flood disaster zone.
- b. The impact and status of hazard and risk is recognized.
- c. Control Measures to address hazard and risk are formulated.

#### **8.0 Propagating Workers Safety and Health in Flood Disaster**

The employers and the employee have both social and legal commitment towards ensuring a conducive, save and healthy work environment at the workplace. What are the

requirements and the best techniques to be employ to propagate OSH programmes and awareness to employer and employees at the workplace?

A team of researcher from UniMAP has conducted a study on the how to propagate safety and health programmes to be implemented by the employers at the workplace. Ninety percent of the respondents feel that their trainings and OSH Programme at their workplace ought to put emphasis on “General Safety Training”. The respondents too wants their employer to carryout “Hazard Identification and Risk Control” at their workplace and training on “Handling hazardous material and waste disposals<sup>37</sup>”.

On the technique to propagate awareness of OSH Programmes at the workplace, 91.25% of the respondents feels OSH Programme is be propagate through “in-house training” which is to be done at their place, while 87.50 percent of the respondents prefer seminars and the other 40 percent of the respondents choose workshops and the remaining of 28.75 percent of the respondents pick “Group discussion”<sup>38</sup>. This study however would like to propose the initiatives proposed by the said team to be reconsider for implementation.

## **9.0 Conclusion**

This paper has look at the safety and health issues of workers responding in flood zone. Risk Management is being carried out to assess the safety and health issues of workers in flood disaster zone which encompass the processes of Hazard Identification through Discussion and Interviews, Work Place Inspections and Audits, Analyzing Statistics of Accidents at the

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<sup>37</sup> Lt Kol (B) Azuddin Bin Bahari, Evawaynie Valquis Binti Md. Isa, University Malaysia Perlis (UniMAP) As An Agent In Propagating Occupational Safety And Health Programmes Among Small Business Units In Perlis Vis-À-Vis Occupational Safety And Health Act 1994, 10<sup>th</sup> Conference And Exhibition On Occupational Safety & Health at Genting International Convention Centre (Gicc), Genting Highlands, 20 - 22 August 2007.

<sup>38</sup> Ibid

Workplace, Risk Assessment and Control. All the finding is recorded in the Risk Matrix Table. The HIRAC Worksheet Table is introduce to have an overall knowledge on the impact and the status of hazards, risk and control measures and the priority of action to be taken to address the hazard. All hazards that are categorized as “HIGH” must be concentrated immediately.

Workers employed by the relevant government agencies in flood disaster zone are confronted by various hazards and risks. The study has also look at the relevant laws that is the OSHA 1994. The OSHA 1994 requires the head of department to comply with the specific safety and health standard at the workplace i.e. the flood disaster zone. The Act applies throughout Malaysia in all sectors of the industries including the Public Services and Statutory Authorities. The Act is to ensure safety, health and welfare of all persons at the workplace.

The study has look on the need of OSH Programme and the methodology of implementations. Lastly, based on the above study, the paper has put forward some recommendations and guideline to be implemented by workers responding to emergency situations.

## **10.0 Recommendations**

Based on the discussion aforesaid, to enhance the safe and healthy of workers in disaster zone the following measures are suggested:

- a. To propagate on the need to adherence of OSHA 1994 among the government agencies.
- b. The government ought to intensify its campaign especially among the government agencies on OSH awareness.

- c. Establishment of a close cooperation with universities and other related agencies.

The following officers of the office of the Occupational Safety and Health Unit,

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- d. Apart from that, the following measures are proposed on the usage of the right Personal Protection Equipment (PPE) and clothing for disaster relief workers:

- i. Use electrically insulated and waterproof boots.
- ii. Make readily available safety glasses with face shields.
- iii. Protective head gear to be worn.
- iv. Hearing protection to be made readily available.
- v. Heavy, waterproof cut-resistant gloves should be worn where is applicable.
- vi. Long pants and long-sleeved shirts or coveralls to be worn

- vii. Approved respirators (breathing protection) may be required in some circumstances
  
- e. Other recommendations are:
  - i. Wash hands with soap and clean water before eating and drinking.
  - ii. Drink bottled water and take frequent rest breaks.
  - iii. Use insect repellent and sun block (where applicable)

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# BORANG PENILAIAN RISIKO

UNIT KESELAMATAN DAN KESIHATAN PEKERJAAN  
UNIVERSITI MALAYSIA PERLIS

Tingkat 2 Bangunan KIK, Lorong Meranti Paya, Off Jln Bukit Lagi 01000 Kangar Perlis

## A. Maklumat Umum

- i. Bangunan / Makmal : **Flooded area** :
- ii. Butiran aktiviti : **Search and Rescue**
- iii. Kumpulan Penilai : **Lt. Col. (rtd) Azuddin Bin Bahari, Faridah, Tunku Salha**

## B. Hubungan Risiko dan Tugas, Proses atau Situasi

- i. Hazard yang dikenalpasti : **Exposure to over heat and over cold,**
- ii. Situasi risiko : **Exposed to extreme weather in long time of period during search and rescue activities**
- iii. Bilangan pekerja yang mendapat risiko : **A group of people from Search and Rescue Team**
- iv. Langkah Kawalan Semasa : **Personal Protective Equipment**

## C. Penilaian Risiko

(Apakah .....jika.....)

Hazard dan Risiko Mengikut Keutamaan					
AKIBAT	Kemungkinan				
		Kemungkinan Besar (4)	Berkemungkinan (3)	Kurang Berkemungkinan (2)	Sangat Kurang Kemungkinan (1)
	Maut (4)	Tinggi ( ) 16	Tinggi ( ) 12	Tinggi ( ) 8	Sederhana ( ) 4
	Kecederaan Besar (3)	Tinggi ( ) 12	Tinggi ( ) 9	Sederhana ( ) 6	Sederhana ( ) 3
	Kecederaan Kecil (2)	Tinggi ( ) 8	Sederhana (✓) 6	Sederhana ( ) 4	Rendah ( ) 2
Kecederaan boleh diabaikan (1)	Sederhana ( ) 4	Sederhana ( ) 3	Rendah ( ) 2	Rendah ( ) 1	

Sila tandakan pada petak yang sesuai

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**D. Rumusan Penilaian**

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- i. Butiran Kemungkinan : **3 - Likely to happen on every task of search and rescue operation.**
- ii. Butiran Akibat : **2 – Can cause of minor injuries such as exhaustions, dehydrations, hypothermia and so on**
- iii. Penilaian Aras Risiko: **6 – Risk assess as Medium**
- iv. Ukuran kawalan risiko yang dicadangkan : (Pilih yang terbaik)
  - a. Tindakan kawalan dilakukan segera
  - b. Tindakan kawalan dilakukan dalam tempoh tertentu
  - c. Risiko disemak semula

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Tandatangan Kumpulan Penilai

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Tarikh Dinilai :

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## BORANG PENILAIAN RISIKO

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UNIVERSITI MALAYSIA PERLIS

Tingkat 2 Bangunan KIK, Lorong Meranti Paya, Off Jln Bukit Lagi 01000 Kangar Perlis

### A. Maklumat Umum

- i. Bangunan / Makmal : **Flooded area**
- ii. Butiran aktiviti : **Search and Rescue flood victims**
- iii. Kumpulan Penilai : **Lt. Col. (rtd) Azuddin Bin Bahari, Faridah, Tunku Salha**

### B. Hubungan Risiko dan Tugas, Proses atau Situasi

- i. Hazard yang dikenalpasti : **Musculoskeletal disorders**
- ii. Situasi risiko : **Due to activities such as lifting or pulling heavy object during search and rescue activities**
- iii. Bilangan pekerja yang mendapat risiko : **A group of people from Search and Rescue Team**
- iv. Langkah Kawalan Semasa : **Tools and equipments & PPE**

### C. Penilaian Risiko

(Apakah .....jika.....)

Hazard dan Risiko Mengikut Keutamaan					
A K I B A T	Kemungkinan				
		Kemungkinan Besar (4)	Berkemungkinan (3)	Kurang Berkemungkinan (2)	Sangat Kurang Kemungkinan (1)
	Maut (4)	Tinggi ( ) 16	Tinggi ( ) 12	Tinggi ( ) 8	Sederhana ( ) 4
	Kecederaan Besar (3)	Tinggi ( ) 12	Tinggi ( ) 9	Sederhana ( ) 6	Sederhana ( ) 3
	Kecederaan Kecil (2)	Tinggi ( ) 8	Sederhana ( ) 6	Sederhana ( ) 4	Rendah ( ) 2
Kecederaan boleh diabaikan (1)	Sederhana ( ) 4	Sederhana ( ) 3	Rendah ( ) 2	Rendah ( ) 1	

Sila tandakan pada petak yang sesuai

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**D. Rumusan Penilaian**

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- i. Butiran Kemungkinan: **3 – Likely to happen on every task of search and rescue operation.**
- ii. Butiran Akibat: **2 – Can cause of minor injury such as back pain, muscle strain, ligament sprain and so on**
- iii. Penilaian Aras Risiko: **6 – Risk assess as Medium**
- iv. Ukuran kawalan risiko yang dicadangkan : (Pilih yang terbaik)
  - a. Tindakan kawalan dilakukan segera
  - b. Tindakan kawalan dilakukan dalam tempoh tertentu
  - c. Risiko disemak semula

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Tandatangan Kumpulan Penilai

:

Tarikh Dinilai :

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## BORANG PENILAIAN RISIKO

UNIT KESELAMATAN DAN KESIHATAN PEKERJAAN  
UNIVERSITI MALAYSIA PERLIS

Tingkat 2 Bangunan KIK, Lorong Meranti Paya, Off Jln Bukit Lagi 01000 Kangar Perlis

### A. Maklumat Umum

- i. Bangunan / Makmal : **Flooded area** :
- ii. Butiran aktiviti : **Search and Rescue**
- iii. Kumpulan Penilai: **Lt. Col. (rtd) Azuddin Bin Bahari, Faridah, Tunku Salha**

### B. Hubungan Risiko dan Tugas, Proses atau Situasi

- i. Hazard yang dikenalpasti : **Electrocution due to contact with electric current.**
- ii. Situasi risiko : **Exposed to the danger of electrical current due to snap submerge electric able**
- iii. Bilangan pekerja yang mendapat risiko : **A group of people from Search and Rescue Team**
- iv, Langkah Kawalan Semasa : **Search and rescue operations conducted after TNB has switch off power supply (Standard Operating Procedure)**

### C. Penilaian Risiko

(Apakah .....jika.....)

#### Hazard dan Risiko Mengikut Keutamaan

A K I B A T		Kemungkinan			
		Kemungkinan Besar (4)	Berkemungkinan (3)	Kurang Berkemungkinan (2)	Sangat Kurang Kemungkinan (1)
	Maut (4)	Tinggi ( ) 16	Tinggi ( ) 12	Tinggi ( ) 8	Sederhana ( ) √) 4
	Kecederaan Besar (3)	Tinggi ( ) 12	Tinggi ( ) 9	Sederhana ( ) 6	Sederhana ( ) 3
	Kecederaan Kecil (2)	Tinggi ( ) 8	Sederhana ( ) 6	Sederhana ( ) 4	Rendah ( ) 2
	Kecederaan boleh diabaikan (1)	Sederhana ( ) 4	Sederhana ( ) 3	Rendah ( ) 2	Rendah ( ) 1

Sila tandakan pada petak yang sesuai

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**D. Rumusan Penilaian**

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- i. Butiran Kemungkinan : **1-Highly Unlikely to cause electric shock**
- ii. Butiran Akibat: **4 – Can cause of deep burn, death**
- iii. Penilaian Aras Risiko: **4 – Risk assess as Medium**
- iv. Ukuran kawalan risiko yang dicadangkan : (Pilih yang terbaik)
  - a. Tindakan kawalan dilakukan segera
  - b. Tindakan kawalan dilakukan dalam tempoh  tertentu
  - c. Risiko disemak semula

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Tandatangan Kumpulan Penilai : Tarikh Dinilai :

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**A. Maklumat Umum**

- i. Bangunan / Makmal : **Flooded area** :
- ii. Butiran aktiviti : **Search and Rescue**
- iii. Kumpulan Penilai: **Lt. Col. (rtd) Azuddin Bin Bahari, Faridah, Tunk. Salha**

**B. Hubungan Risiko dan Tugas, Proses atau Situasi**

- i. Hazard yang dikenalpasti : **To be peck by poisonous rodent and snakes**
- ii. Situasi risiko : **Fooding cause poisonous snakes and rodent to come out from their hiding and their presence is difficult to be detected.**
- iii. Bilangan pekerja yang mendapat risiko : **A group of people from Search and Rescue Team**
- iv. Langkah Kawalan Semasa : **Personal Protective Equipment**

**C. Penilaian Risiko**

(Apakah .....jika.....)

**Hazard dan Risiko Mengikut Keutamaan**

A K I B A T		Kemungkinan			
		Kemungkinan Besar (4)	Berkemungkinan (3)	Kurang Berkemungkinan (2)	Sangat Kurang Kemungkinan (1)
	Maut (4)	Tinggi ( ) 16	Tinggi ( ) 12	Tinggi ( ) 8	Sederhana ( ) 4
	Kecederaan Besar (3)	Tinggi ( ) 12	Tinggi ( ) 9	Sederhana ( ) 6	Sederhana ( ) √ 3
	Kecederaan Kecil (2)	Tinggi ( ) 8	Sederhana ( ) 6	Sederhana ( ) 4	Rendah ( ) 2
	Kecederaan boleh diabaikan (1)	Sederhana ( ) 4	Sederhana ( ) 3	Rendah ( ) 2	Rendah ( ) 1

Sila tandakan pada petak yang sesuai

**D. Rumusan Penilaian**

- i. Butiran Kemungkinan : **1- Highly Unlikely to happen**
- ii. Butiran Akibat: **3 –Swelling of effected parts, paralyze or death**
- iii. Penilaian Aras Risiko: **3 – Risk assess as Medium**
- iv. Ukuran kawalan risiko yang dicadangkan : (Pilih yang terbaik)

a. Tindakan kawalan dilakukan segera

b. Tindakan kawalan dilakukan dalam tempoh tertentu

c. Risiko disemak semula

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Tandatangan Kumpulan Penilai

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Tarikh Dinilai :

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**BORANG HIRARC**  
(Hazard Identification, Risk Assessment and Risk Control)  
**UNIT KESELAMATAN DAN KESIHATAN PEKERJAAN**  
**UNIVERSITI MALAYSIA PERLIS**

MENGENAL PASTI HAZARD			PENAKSIRAN RISIKO IMPAK DAN STATUS RISIKO				ANGGARAN RISIKO			PENILAIAN RISIKO	KAWALAN	
Kawasan	Aktiviti	Hazard	Kesan	Kawalan Semasa	Kemungkin an	Alibat	Aras Risiko	Keutamaan Risiko		Cadangan Kawalan Keselamatan dan Kesihatan		
1	Flooded area as shown in Figure 1.	Search and Rescue victims	1	Musculoskeletal disorders	- Back Pain - Muscles strain - Ligament sprain	Appropriate tools and equipment	3	2	6	1	Moderate risk	Enhance the tool and equipment efficiency
			2	Patukan binatang berbisa	- Bengkak anggota - Lumpuh anggota - Maut	Personal Protective Equipment	1	3	3	4	Moderate risk	
			3	Exposure to over heat and over cold	- Exhaustion - Dehydration - hypothermia		3	2	6	2	Moderate risk	
			4	Electrocution due to contact with	- Deep burn - death	Standard Operating Procedure	1	4	4	3	Moderate risk	

electric  
current

materials

\*\* Tiga kategori risiko adalah : Risiko Rendah (1-2), Risiko Sederhana (aras 3-6), Risiko Tinggi (8-16)