



Original article

Evaluation of Occupational Safety and Health Issues Among Traditional Fisherman in Seberang Takir, Terengganu

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Abstract

This study was undertaken to assess the occupational safety and health of fishermen community in Seberang Takir, Terengganu. The aims of this study was to evaluate current state of the occupational safety and health for fishermen at Seberang Takir, Terengganu and to create the prevention measures for occupational safety and health. The scope area of the research is Seberang Takir village, Kuala Terengganu, which is separated by a river and estuary. This research covers all fishermen and community at the Seberang Takir, Kuala Terengganu. The target population includes two groups of workers within fishermen and seller. Tools for this study is using HIRARC (Hazard Identification, Risk Assessment and Risk Control) form, along with hazard identification, a quantitative risk assessment as methodology has been done to prioritize the risk control management. The study reveals that during working (routine activity) was exposed to some hazards during handling of transfer the fish container to the collection point. Out of 7 identified hazard, 2% posed low level, 4% posed medium level and 1% posed high level. Secondly, an activity of fishermen during fishing was selected for this study to evaluate the occupational safety and health risk on board. Out of 6 identified hazard, 1% posed low level, 2% posed medium level, and 3% posed high level. This includes ergonomic, biological, physical, psycho-social, and natural. Overall the highest level of risk is ergonomic hazards. The result of risk matrix ranking based on the HIRARC survey of Occupational Safety and Health for fishermen Seberang Takir was conducted to determine the hazards and to improve the safety and health at the workplace. There are have several prevention measures are applied such as engineering control, administrative control and usage of personal protective equipment to reduce or prevent the hazards. The results of the current study can be utilized in the design of effective prevention measure in accordance with Malaysian Occupational Safety and Health Act.

Keywords: Malaysian Occupational Safety and Health Act, HIRARC, Seberang Takir Terengganu

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1. Introduction

Occupational safety and health is one of the most important things to employee, especially in the sector fisheries, fishing, aquaculture and inland fisheries for ensuring that they work in the better condition. This is because working as a fisherman always exposed to the danger and risk during at work or at sea. Additionally, fish is largely a necessity by the community and the fishery industry is also a source of employment for those living in the coastal areas especially for fishermen at Seberang Takir, Terengganu. This research also to evaluate the current state of the occupational safety and health among fishermen. Other than that, understanding the problem statement and to create the prevention measure for occupational safety and health issues for fishermen is also part of the rationale in this research. Primary data involved in this research to observation data which is used HIRARC (Hazard Identification, Risk Assessment and Risk Control) form and samples of fishermen was selected in this research as the important resources to provide the information. This control measures, will improve the safe work practice as well as give benefits for both parties, employer and employee and reduce or minimize the number of injuries and accidents. While the development of the fisheries sector improves, workers safety and health cannot be neglected caused by accident and injuries should be reported by fishermen while at work or at sea.

2. Literature Review

2.1 Occupational Safety and Health

According to the Health and Safety Authority (HSA, n.d.) was defining the occupational safety and health is to reduce human suffering and loss due to deaths, accidents and ill health at work. While Occupational Safety and Health (OSH, 1994) states it is an act to make further provisions for securing the safety, health and welfare of per

sons at work, for safeguard others against risks to safety or health in relation with the activities of persons at work, to construct the National Council for occupational safety and health, and for circumstance connected therewith. According to Alli, B. O. (2008) occupational safety and health (OSH) is normally defined as the science of the anticipation, recognition evaluation and control of hazards arising in or from the workplace that could harm the health and well-being of workers, taking into account the possible effect on the surrounding communities and the general environment.

2.2 Hazard Identification, Risk Assessment and Risk Control (HIRARC)

HIRARC which is the fundamental of occupational safety and health (Department of Occupational Safety and Health Ministry of Human Resources Malaysia, 2008). Meanwhile, M. O. Agwu (2012) define it is a construct approach for identifying, evaluating and controlling hazards in the workplace a view to obtain better organizational performance of no harm or damage to people, assets environment and reputation. Assoc. Prof. Dr. Shamsul Bahari Shamsudin (n.d) define HIRARC is a fundamental used in workplace to manage safety and health. All the definition above was shown that proper management about safety and health by using HIRARC can build a safe workplace, organization can be world class standard, and increase return investment such as money and time.

2.3 The Current State of Occupational Safety and Health

Fisherman often exposed to the risk of hazards during fishing or after fishing because of long hour at sea. In the issues of occupational safety and health has a several hazards that will be discussed in detail such as Ergonomic Hazards, Physical Hazards, Biolo

gical Hazards, Natural Hazards, and Psycho-social Hazards among fisherman. Next, type of hazards under issues of occupational safety and health was shown how the risk can give an impact to the fisherman life.

2.3.1 Ergonomic Hazards

Fisherman activities such as carrying fish baskets that affect their body with exposed due to ergonomic hazards. Ergonomic hazards are physical factors in the environment that threaten the musculoskeletal system (Comcare, 2018). Ergonomic hazards such as repetitive movements, handling manuals, workplace, job, task design, uncomfortable workplaces and weak body positions. Meanwhile, Rosnah Mohd Yusuff et al., (2008) responds these injuries have an impact on muscles, nerves, tendons, ligaments, joints, or spinal discs, bending, twisting, kneeling, reaching, and stretching in particular are stress on the low back and influence how the worker suffer after finishing a challenging task.

Meanwhile, Paulo Gilvane Lopes Pena and Carlos Minayo Gomez (2014) ergonomic risks give an effect to the spinal column, caused by carrying weights, harmful postures and excessive repetitive movements. Besides that, the ergonomic hazards arising from overwork with an excess of movement and repetitive effort, demanded by the work rhythms and to maintain their work energy.

Furthermore, the fisherman must know the correct working posture to ensure work is conducted with proper posture, increasing the efficiency, productivity, and safety to health and environment. Pesco MS et al., (2006) believes that increased postural self-awareness to correct poor posture as potentially functional means for reducing upper back and neck pain due to repetitive stress, overwork, and stiffness.

In conclusion, ergonomic hazards can be worse effect to the fisherman such as musculoskeletal disorders if they do not have self-awareness to correct posture during working or at sea. They should concern towards their safety and health during working so that the risk of ergonomic hazards injuries can be reduce and more energize.

2.3.2 Physical Hazards

Physical hazards is one of the factor through environment that can hurt body without automatically touching it (Comcare, 2018). Example of physical hazards includes slips, trips, falls and unguarded machinery, working from heights, vibrations, and exposure to loud noises. Every occupation places certain strains on a worker's body. Besides, physical hazards also has two risk that fisherman will face such as during fishing and after fishing.

According to Shibaji Mandal et al., (2017) said fishermen often dizziness during fishing because of the ocean waves, they face fever during fishing and could occur due to the all-time direct contact with ocean and rain water. Due to long hour working, fisherman face a problem after fishing that is a different health hazards. Fisherman have eye problem after arriving at home, to reducing the visualization power of eyes is using eye drop during fishing and avoid contact of raindrop into the eyes (Shibaji Mandal et al., 2017). Therefore, according to Anna J. Woodhead et al., (2018) (as cited in Frantzeskou et al., 2012) points out the combination of involving health risk factors such as poor diet, smoking, and alcohol consumption, and occupational risk factors such as a pressure working environment, hazardous, and stressful working conditions, this led to other physical health problems including cardiovascular, respiratory, and dermatological conditions.

In conclusion, physical hazard become worse if

fisherman not aware about their occupational safety and health during or after working. This is because the physical hazard involves internal and external body and if this health problem are continuously it will cause a fisherman to be difficult in their daily activities at sea.

2.3.3 *Biological Hazards*

Activities such as a fisherman is cleaning the fish before being taken home and some are brought to a nearby restaurant to be cooked and eaten as dinner dinners with friends. It will effecting their body with exposed to biological hazards. Biological hazards are organic matter that threatened to the health of humans and other living organisms. Example Biological hazards such as blood or other bodily fluids, animal care, insect bites, bacteria or viruses. The biggest threat to worker health and safety is their work environment. According to Driscoll et al., 2005; OSHA 2007 (as cited in Comcare, 2018), Worldwide, estimated that around 320 000 workers die each year caused by work-related exposures to biological hazards.

Meanwhile, Dr.David Goddard (2012) states occupational exposure to human body fluids have a higher risk of exposure to biohazard such as those who work with animals and health care workers. Furthermore, people who works with live animal or animal product (blood, tissue, milk, eggs) like fisherman are exposed to animal diseases and infections and also can infect humans such as flu, fever and others. According to the Crespigny, 2011, p. 1 (as cited in Dr. David Goddard) says most industry that will report exposure to biological hazards such as workers in the health and community services and the agriculture, forestry and fishing industries.

Thus, every workers should be aware about safety and health through their scope of work especially

in industries fisheries such as fisherman. As fisherman mostly works with live animal so, they have to wearing personal protective equipment by using glove, protective clothing, eye protection, face protection, and respiratory protection. Dr Fleur de Crespigny (2008) responds effort should be made to raise the level of knowledge about biological hazards. It means general lack of information on biological risks among workers.

2.2.4 *Natural Hazards*

Natural hazards are naturally occurring physical phenomena caused by atmospheric, geologic and hydro-logic origins on global, regional, national and local scales. They include earthquakes, volcanic eruptions, hurricanes, landslides, tsunamis, floods, drought and epidemics. Natural disasters give an impact natural hazards. It is represent a serious breakdown in sustainability and disruption of economic and social progress. Other than that, occupation as fisherman facing long hour working on vessel with an uncertain weather and the challenging through this journey is natural hazards.

Safety and health among fisherman will be effected due to natural hazards especially when global warming, heavy rainwater, storm, and others is happened. This is because when fisherman working during global warming it will caused sunburn hazards. Moreover, disasters also lead to social, economic, and environmental losses. Firstly, the social impacts of disasters among fisherman include the loss of life, injury, disease outbreaks, problem of social services and lack of food. Secondly, economic losses include the loss of livelihood, capital such as vessel and live stock, infrastructure and communication, interruption on fisherman activities. Thirdly, the environmental losses is a huge problem because as the fisherman generally depend on a healthy environment for their livelihood.

Natural hazards become a natural disasters is a n act of god which is human beyond control. to red ucing the risk of natural hazards should find the alt ernative and sustainable risk management. According to Bonn Recommendations for Action 2001 (as cit ed in Jan Sorensen et al., 2006) suggests initial war ning systems should become an fundamental part of water resources development and planning. These s ystems also can be used for cyclone shelters and it is very useful to the communities of fisherman.

2.3.5 Psychosocial Hazards

Pryor, P., Capra, M. (2012) psycho-social haza rds refer only to hazards created by work and the work environment. Meanwhile, Leka, Giffiths & Co x as cited in Leka & Cox, 2008 (as cited in Pryor, P., Capra, M. 2012) observe psycho-social risks relat ed with duty of job and management of work and its social and organizational circumstances that have the possibilities for causing psychological physical h arm. Stress, bullying or harassment, occupational vio lence and fatigue also include in psycho-social hazar ds. Otherwise, stress also can improve performance and motivation but extreme stress or long hour expo sure to work stress can have negative effects on hea lth and well-being.

Workplace factors such as how work is organiz ed, work that involves high output demands, long h ours or workload peaks are psycho-social hazards th at can give an impact on psychological health and s tress for example (Health and Safety Authority (n.d). Fisherman also experiencing emotional reaction due to stress in their working lives. It can produces qui ckening heartbeat, higher pulse rate, sweatiness, earf ulness, anger, increased wakefulness, and sadness. A s well as, stress can be depression and several sym ptoms such as headache, backache and digestive pro

blems. Stress and pressure is one of the psychologic al hazards can be damaging fisherman’s health. Thu s, psycho-social risk management is fundamentally i mportant for individual workers, and for the product ivity of work teams, organizations and our nation as a whole. As fisherman to treating stress is increase their restful periods and stress can be minimize wit h taking some time then learning to relax. It is imp ortant to get enough sleep and try to sharing the pr oblem with others. Additionally, it becomes clear th at various pressures appear from the workplace, as well as additional psycho-social pressures, impact th e workers’ health and well-being.

3. Research Method

3.1 Research Design

HIRARC OBSERVATION	❖ Observation towards fishermen in Seberang Takir
SAMPLING TECHNIQUE	❖ Random
STATISCAL SOFTWARE	❖ Excel

Figure 3.1: Research Design

Figure 3.1 was shown the research design that ha ve been used in this study. The research design is v ery important in order to determine a method which creates accurate and unbiased data from which vali d conclusion may be drawn. In this chapter, HIRARC observation become the primary focus. The applic ation of HIRARC observation towards fishermen is use to assess hazard identification towards the occup ational safety and health issues among fishermen at Seberang Takir. Therefore, action, recommendation a nd prevention measures are prepared to tackle that i ssues.

3.2 Evaluation of Occupational Safety and



Health Issues Among Fishermen Using HIRAR CH Form

In this study, the evaluation of Occupational Safety and Health issues among fishermen using Hazard Identification, Risk Assessment and Risk Control (HIRARC) it is become basic to the practice of planning, management and the operation of a business as a fundamental of risk management. Furthermore, this guideline is to provide a systematic and objective approach to evaluate hazards and fishermen risks during work or at sea that will provide an objective measure of an identified hazard as well as provide a routine to control the risk. The method of hazard identification HIRARC process shown in the figure 3.2 below.

Figure 3.2: Method of hazard identification. Source: Department of Occupational Safety and Health Ministry of Human Resources Malaysia (2008)

4. Research Outcome

Table 4.1: Risk assessment on fishermen during working (Routine Activity) at Seberang Takir.

Likelihood	1-Inconceivable	2-Remote	3-Conceivable	4-Possible	5-Most likely
Severity	1-Negligible	2-Minor	3-Serious	4-Fatal	5-Catastrophic
Level of Risk	1-4 - Low	5-12 - Medium	15-25 - High		

INDICATOR:

4.1 Risk Assessment Result On fishermen during working (Routine Activity) at Seberang Takir

Overall, for the risk result on fishermen during working (Routine Activity) is achieved with a total of seven (7) hazards. Moreover, all of the hazards were identified through analysis based on the hazard identification checklist, workplace interview & observation, review existing safety and health procedure, job hazard analysis and current control measures. The process to classify the hazards into three classifications such as low, medium, high were used as a risk assessment methodology. There are 2 low level, 4 medium level and 1 high level. The risk assessment result are shown below in percentage of number items.

Job Task	Type of hazard	Hazard Classification	Hazard Cause	Consequence	Likelihood	Severity	Risk	Current Control Measures	Suggestion Prevention Measures
Fishermen required to exert force with their hands	Health	Ergonomic	Unnatural Movement	Could result in musculoskeletal disorders	5	3	15 High	None	Engineering Control: Automation PPE: Glove Control
Fishermen cleaning fish from their catch daily and maintenance	Health	Biological	-Fish slime and guts	-Bacteria -Virus	2	1	2 Low	None	Engineering Control: Automation PPE: Glove Natural Rubber
Use of tools and machinery without proper training	Safety	Physical	Impact by machinery or tools	Bodily injury	3	2	6 Medium	Repair based on fishermen knowledge	Administrative Control: Supervision and training
Lifting equipment or heavy items such as fish catches	Health	Ergonomic	Unnatural movement	Could return in musculoskeletal disorders	5	3	15 High	None	Engineering Control: Automation
	Safety	Physical	Slippery conditions	Slip and fall	4	1	4 Low	- Safety boots	PPE: Safety Boots
Fishermen working long hours	Health	Physical	Fatigue	High blood pressure	5	2	10 Medium	- Rest enough - Drink a lot of mineral water	Administrative Control: Job Rotations
First aid kit are not being along on board	Safety	Physical	Injured	Bodily injury	4	3	12 Medium	None	Provide First Aid Kit on board

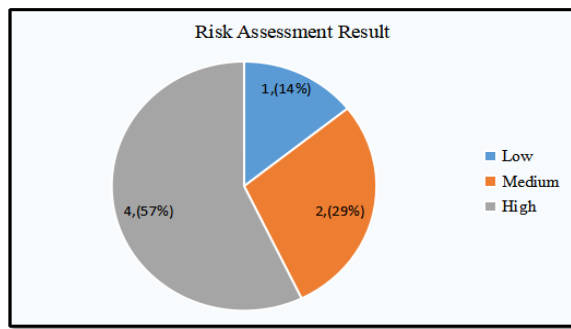


Figure 4.1: Risk assessment results for during working (Routine Activity)

From the analysis done in table 4.1, based on the task number 1 is fishermen required to exert force with their hands. It means after all the stock are arrived at collecting point fishermen need to bring the fish basket from the boat to the collecting place. This is to ensure all fish stocks will be counted and distribute to the supplier or their customers. The hazard classification found is ergonomic for the range of likelihood is 5 and the severity is 3 for the total risk level is 15 (high). Furthermore, unnatural movement is hazard cause that can affect fishermen musculoskeletal disorder.

Based on the task number 2, the issues of fishermen cleaning fish from their catch daily and maintenance are not crucial problem. However, the level of risk is 2 (low) which the range of likelihood is 2 and the severity is 1. The hazard classification was found is biological, it can affect fisherman's health when the bacteria and virus spread such as infection from a fish bone when handling the bait, but the response from respondent are under control.

Through the task number 3 is the use of tools and machinery without proper training, the effect to the fishermen is bodily injury that impact by machinery or tools. The range of likelihood is 3 and the severity is 2 for the total risk level is 6 (medium).

The controls on machinery such as fishing rod are correctly to ensure the movement is smooth and also fishermen exposed to unguarded machinery. Otherwise, referring to the job task number 4 the total highest level of risk is 15%, which is the range of likelihood is 5 and the severity is 3. The highest hazard classes on this part are ergonomic that can harm fisherman's health which the condition is lifting equipment or heavy items such as fish catches. However, on this task, it also have hazard cause such as slippery condition which the range of likelihood is 4 and the severity is 1 for the total level risk is 4 (low).

Based on the task for 5 and 6 the level range are the same which is medium. Through the job task number 5 is fishermen working long hours that give effect high blood pressure to the fisherman's health. As usual, occupation as fishermen more of challenging and the working hour depending on the satisfaction of fishing catch results. However, the job task number 6 is a first aid kit are not brought along on board and fisherman safety is unsecured during working or fishing. Every fisherman at Seberang Takir, must be aware about this issue because they have to consider what might happen on board such as crew member falling overboard, entanglement with a net, falling into a winch or net drum. However, on the task number 5 and 6 are under control, but should take an action to avoid from any risk of injury.

Last but not least, all the job task has current control measure, but it is not suitable for fishermen for their safety and health. However, to overcome for each risk level has several suggestion prevention measures of risk assessment on fishermen during working (routine activity) as guidance to the fishermen at Seberang Takir, Terengganu. The main control m

measure such as Engineering, Control, Administrative Control, and usage of Personal Protective Equipment (PPE).

The risk assessment result are shown below in percentage of number items.

Figure 4.2: Risk assessment results for during fishing at sea

Through the analysis done in table 4.2, 6 hazards identified during fishing at sea, 2 were potential hazards another 4 were existing hazards. Otherwise, all of that was grouped as safety hazards and health hazards and then classified as physical, natural, psycho-social and ergonomic. There are 5 health related hazards and 1 safety related hazards identified. From the 6 hazards identified, there are 1 physical hazards, 3 ergonomic hazards, 1 natural hazards and 1 psycho-social hazard. Based on the job task number 1 is fishing under hot weather or heavy rainfall without any protection, the hazards caused from this activity are impact of hot temperature and acid rain and the hazard classification was physical.

The range of likelihood is 4 and the severity was found is 1 for the total level of risk is 4 which is low. However, suggestion measure, control for guidance fishermen during hot weather or heavy rainfall is to drink a lot of mineral water and personal protective equipment which is using hat cover. Harm caused by sun exposure is greater at sea compared on land because of the unhindered reflection of the sunlight. This can result in skin damage, blistering, skin aging and in the long term, skin cancer. Next, the task number 2 is fishermen smoking during fishing, the range of likelihood is 5 and the severity is 2 for the total level of risk is 10 which is medium. It is a negative habit that gives effect fishermen's health and people surrounding them with cigarette smoke impacts. This issue is very common to the fishermen because to them it can overcome their stress and it is becoming a habit in life. Administrative control is a suggestion measure control for this part which is fishermen should quit smoking, so that they will live 1

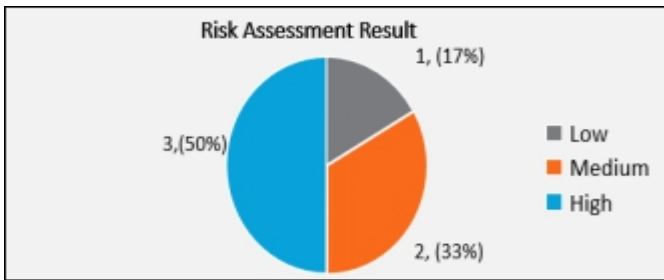


Table 4.2: Risk assessment on fishermen during fishing at sea

Job Task	Type of hazard	Hazard Classification	Hazard Cause	Consequence	Likelihood	Severity	Risk	Current Control Measures	Suggestion Prevention Measures
Fishing under hot weather or heavy rainfall without any protection	Health	Physical	Impact of hot temperature and acid rain	-Diarrhea -Fever -Heat stroke -Dehydrated -Skin damage -Skin aging	4	1	4 (Low)	None	-Drink a lot of mineral water -PPE: Wearing sun hat
Fishermen Smoking during fishing	Health	Psychosocial	Cigarette smoke	-Stress -Asthma -Lung Cancer	5	2	10 (Medium)	None	Administrative control- Prohibiting smoke at contaminated area
Fishermen is fishing and bad weather happened (Monsoon season)	Safety	Natural	Environment condition on-board hazardous	-Bodily injury -Slip and fall	4	2	8 (Medium)	None	Administrative control- Weather reports PPE: Safety boots, Personal flotation device
Fishermen lack skills in handling tools such as trawlers	Health	Ergonomic	Muscle stress	-Wrist pain -Spinal problems	5	3	15 (High)	None	Administrative control- Training
Fishermen stand continuously for long period of time	Health	Ergonomic	Unnatural movement	Could result in musculoskeletal disorders	5	3	15 (High)	None	Administrative control- Training
Fishermen activity requires the neck and shoulders to bending to view the task	Health	Ergonomic	Unnatural movement	Could result in musculoskeletal disorders	3	3	9 (High)	None	Administrative control- Training

INDICATOR:

Likelihood	1-Inconceivable	2-Remote	3-Conceivable	4-Possible	5-Most likely
Severity	1-Negligible	2-Minor	3-Serious	4-Fatal	5-Catastrophic
Level of Risk	1-4 - Low	5-12 - Medium	15-25 - High		

A total of 6 hazardous job task were detected on fishermen during fishing at Seberang Takir. Furthermore, all of the hazards were identified using the same analysis, which based on the hazard identification checklist, workplace interview and observation, review existing safety and health procedure. On this risk assessment result, have 1 low level, 2 medium level and 3 high level.

onger, feel healthy and will save money. Moreover, the task number 3 is fishermen are fishing and bad weather happened (Monsoon season) it is related to the natural hazard which is environment condition on-board hazardous, especially on small fishing boats. Suggestion administrative controls weather reports and PPE using Safety boots also Personal flotation device. The range level of likelihood is 4 and the severity is 2 for the total level of risk is 8 in medium group. It is important for the fishermen to understand what weather is expected for the duration of the fishing trip.

Furthermore, the task number 4 and 5 the level of risk is the same which is high for both result get 15. Through, the task number 4 is fishermen lack skills in handling tools such as trawlers that will give an impact to the fisherman health and the hazard classification was found is ergonomic. Occupational as fishermen is very tough compared than other occupation scope and ergonomic hazard is a high level risk of this observation.

Lastly, task number 6 is fishermen activity requires the neck and shoulders to bending to view the task, this is crucial part that fishermen facing during fishing which is unnatural movement are involve. Could result in musculoskeletal disorders is a potential hazards that fishermen must aware so that the risk can reduce. The range level likelihood is 4 and the severity is 3 for the total level of risk is 12. To conclude the task number 4, 5, is a same suggestion measure control which is administrative control by training.

Conclusion

In a nutshell, the objective of this study was achieved. This study aims to evaluate the current state of the safety and health status of fishermen based on risk assessment methodology such as risk matrix ranking in Seberang Takir, Terengganu. The highest current state was found for both job tasks is ergonomic hazards which is the total risk level 15 (high). The result of risk matrix ranking based on the HIRARC survey of occupational safety and health for fishermen Seberang Takir was conducted to determine the hazards and to improve the safety and health at the workplace. There are have several prevention measures are applied such as engineering control, administrative control and usage of personal protective equipment to reduce or prevent the hazards.

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