

Conference Paper

Occupational Accident Prevention and Efforts of Safety Behavior Implementation in Ship Inspector Officers of KKP Class I, Surabaya

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Abstract

Occupational accident is an unplanned and uncontrolled event resulting from an act or reaction of an object, material, person, or radiation resulting in injury or other possibilities. The purpose of this study was to conduct occupational accident risk surveillance and effort of applying safety behavior to ship inspector officers of KKP Class I Surabaya. This was an observational study with cross-sectional design where both studied variables were observed at the same time. Sampling used was incidental sampling to ship inspectors by measuring safety behavior. The results of this study indicated that ship inspection workers in KKP Class I Surabaya had eight steps of work activities, ranging from preparation of departure to the dock, the implementation of the inspection until the step of going back to the KKP. There were 20 potential hazards with 82 possible risks, with 13 work steps having risks that included in priority 3; and 9 work steps that had acceptable level of risk. Control measures applied were engineering, administrative and supervisory controls, more specifically for the use of personal protective equipment. As a conclusion, out of a total of eight occupational activities that have a variety of hazards, the application of control had a value of 40 percent, indicating that various controls have been well implemented. Occupational accident control should focus on hazard communication treatment in work environment.

Keywords: occupational accidents, risk assessment, safety behavior

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1. Introduction

Occupational accident is an unplanned and uncontrolled event resulting from an action or reaction of an object, material, person, or radiation resulting in injury or other possibilities. Occupational accidents may harm human, company, and environment [1].

The International Labor Organization or ILO notes the occurrence of occupational accidents globally reaches 337 million cases of accidents per year and 2.3 million of them died. The average number of occupational accidents in Indonesia reaches 99,000 per year, 70 percent result in death and lifelong disability, the loss reaches 4 percent of total Gross Domestic Product/GDP nation [2].

Efforts to prevent and reduce occupational accidents under Law No. 1 of 1970 on Occupational Safety is that every workplace shall meet applicable safety requirements, so that safety for everyone, including the workforce, who enter and work in the site, even for a short period, is guaranteed. According to the Government Regulation of the Republic of Indonesia Number 50 Year 2012 on the Implementation of Occupational Safety Management System, one of the efforts to control the risk or danger of occupational accident is to conduct risk assessment. The purpose of risk assessment is to establish the magnitude of an identified risk so that it is used to determine control priorities for the occupational hazards risk level in the workplace. The purpose of this study was to conduct occupational accident risk surveillance and the effort to apply safety behavior to ship inspector officers in KKP Class I Surabaya.

2. Methods

The type of study was an observational study in which the variables studied were observed at the same time. This study was conducted using cross-sectional approach, in which this study investigated safety behavior which includes the use of PPE in accordance with risk, SOP compliance, work instruction, work time discipline, and checking of work instruments before use, ability to use available work facilities and assessment of occupational safety risk to ship inspector officers in KKP Class I Surabaya, by approaching and observing or collecting data at once at one time.

The population in this study was the ship inspectors at the Port of Tanjung Perak KKP Class I Surabaya, amounting to 36 people. Sampling used incidental sampling technique, that is, sampling was based on the fact that they incidentally appeared to the site to measure safety behavior in the use of PPE within a period of one month. Occupational safety risk assessment used purposive sampling, that is, samples were taken based on research objectives. Samples referred were the Section Head and Division Head responsible for the implementation of OSH program.

3. Results

The risk assessment process was conducted by determining the magnitude of likelihood, exposure and consequences of each identified hazard and the magnitude of the impact of the hazard. The process of risk assessment activities was conducted by FGD (Focus Group Discussion) method, a way in which some people considered as experts provide information.

Such information is collected together for consultation on the value of likelihood, exposure and consequence of a risk from experts deemed to have control over the circumstances and environment of the workplace. Then, the results of the assessment are evaluated so that potential hazards, including those with low, moderate risk or high risks, can be inferred.

Based on observations, interviews and FGDs conducted at KKP Class I Surabaya, we obtained the results of risk identification and assessment on the ship inspector officers of the KKP Class I Surabaya:

TABLE 1: Risk identification and risk assessment of KKP officers.

Activities	Hazard Potential	Risks	Risk Level			Risk Value	Level
			C	E	L		
SPT preparation	-	-	-	-	-	-	-
Trip to the dock	Crash	Scratches, Bruises, Serious Injuries, Fractures, Defects, Deaths	100	0.5	0.5	25	Priority 3
	Nudging	Injuries, bruises, disabilities, death	1	0.5	1	0.5	Acceptable
Entering the dock	Crash	Scratches, Bruises, Serious Injuries, Fractures, Defects, Deaths	100	0.5	0.5	25	Priority 3
	Nudging	Injuries, bruises, disabilities, death	1	0.5	1	0.5	Acceptable
	Struck down by falling container	Serious injuries, broken bones, defects, death	100	0.5	0.5	25	Priority 3
Going up to the ship	Falling into the sea	Drowning, death	100	0.5	1	50	Priority 3
	Stumbled to the step of the stairs	Bruises, scratches (on legs)	5	0.5	1	50	Acceptable
	Railing of the stairs	Mild wound, Scratched	1	0.5	0.1	0.05	Acceptable

	Slippery stairs	Slipping, Falling into the sea, Drowning	100	0.5	0.5	25	Priority 3
	Sandwiched Ship	Scratches, Bruises, Fractures, Falling into the Sea, Drowning, Death	50	1	0.5	25	Priority 3
Ship examination	Document examination	-	-	-	-	-	-
	Ship sanitation examination	Food Storage Building (hit by food shelves, injuries, minor injuries, scratches, broken bones, death)	50	0.5	1	25	Priority 3
		Kitchen (table surfaces or sharp table ends, minor injuries, bruises, abrasions, scratches)	1	0.5	0.5	0,25	Acceptable
		Kitchen Floor (slippery) Slipped	15	0.5	0.5	0.25	Acceptable
		Clean and Drinking Water Quality (PH and Color: Irritation)	-	-	-	-	-
		Vector Controlling (flies, cockroaches, rats, fogging, fumigation, spraying, larvicide and trapping) -Dizzy -Eye irritation -Poisoning -Out of breath	50	0.5	1	25	Priority 3
	Health examination	Infected with a disease or virus brought from an infected country	100	1	0.5	50	Priority 3
Going down from the ship	Falling into the sea	Drowning, death	100	0.5	1	50	Priority 3
	Stumbled	Bruising, scratching, galling	5	0.5	0.5	25	Acceptable
	Stair railing	Bruising, scratching, falling into the sea	1	0.5	0.1	0.05	Acceptable
	Slippery stair	Slipping, Falling into the sea, Drowning, Death	100	0.5	0.5	25	Priority 3
	Crash	Scratches, Bruises, Mild Wounds, Serious Wounds, Fractures, Deformities, Deaths	100	0.5	0.5	25	Priority 3

Trip to the KKP	Crash	Scratched, Mild Sores, Serious Injuries, Defects, Deaths	100	0.5	0.5	25	Priority 3
	Nudging	Bruises, Mild Wounds, Scrapes	1	0.5	1	0.5	Acceptable
Permission Letter Issuing Process	-	-	-	-	-	-	-

The result of hazard identification based on observation, interview and forum discussion group showed there were eight work/activity steps with 18 potential hazards to ship inspection officers in KKP Class I Surabaya. The eight steps of work/activities consisted of the first steps and implementation steps of the work. Eight steps of work/activity ranging from the preparation of equipment in the form of tools, documents, up to the PPE used by ship inspector officers in KKP Class I Surabaya.

The results showed that there were 64 risks that may occur from the eight steps of work/activities undertaken by ship inspector officers in KKP Class I Surabaya. After the level of risk at each risk/hazard has been identified, then we conducted a risk evaluation to determine whether the risk was acceptable or not.

There are three categories in risk evaluation, the acceptable risk, the tolerable risk, and the unacceptable risk. Acceptable risks are low risk, while tolerable risks are medium risk, and unacceptable risks are high and extreme risk. Based on the result of risk evaluation, there were 62 hazard risks from 8 job steps that were divided into two types of risk levels, the priority 3 level and acceptable level [3]. Results obtained from hazard risk assessment data showed 13 at priority 3 risk level and 12 acceptable risk levels for ship inspection officers in KKP Class I Surabaya.

4. Discussion

Respondents were mostly male. Sex is the biological difference between males and females since a person was born. Males and females are different, both physically and psychologically. According to Popenoe in Abdipatra [4] physically, males have on average 50 percent more physical power than females. This physical difference causes males to be more suited to field work that requires a lot of energy. Psychologically, males are more action-oriented and less talkative, and pay less attention to details, whereas females are otherwise.

The respondents mostly aged 21-40 years. According to the developmental psychology theory of workers, ages 21-40 years are included in young adult age group [5].

Young workers have strong physical characteristics, dynamic, and creative. However, young workers also usually have psychological characteristics that bored quickly, more labile emotion, careless, less experienced, and less responsible. Conversely, elderly workers have declining physical condition, resilient, higher sense of responsibility, more credible, and more cautious [6].

The period of work is a person's length of time in work that is closely related to work experience. Most respondents worked in the category of < 6 years. The working period of < 6 years is a new working period. The longer the working life of a worker, the higher the workers experience and maturity. Length of work will affect performance, both positive and negative [7].

Relatively longer working period will increase experience and skills. Long-term workers have more experience than new ones, so long-term workers may understand the workplace environment better [8]. Workers who better understand the working environment will better understand the risks or potential hazards that exist in the workplace so that workers will be more careful in work. Most of the respondents never received K3 training.

Training is one of the work accident prevention efforts. Training for the workforce is one of the efforts to improve knowledge about work safety [9]. Improving workers' knowledge will improve understanding of the conditions and risks that exist in the workplace. The risks falling into unacceptable category necessitates immediate attention and treatment so that they do not cause negative impacts that could hurt workers or firms because the percentage is more than 20 percent. The risks falling into the unacceptable category may have a fatal impact and the likelihood of occurrence is high (the value of severity and large likelihood). Risk included in the category not acceptable is high risk category [3]. The acceptable risk and priority 3 for ship inspector officers of KKP Class I Surabaya were among others:

4.1. Officers, trip to the dock

According to the results of interviews to ship inspector officers in KKP Class I Surabaya, there were two potential dangers of collision and scratching, but the priority 3 (the need for continuous attention and supervision) was a crash that occurs during the trip to the dock. Possible risks were scratches, bruises, serious injuries, fractures, deformities, and death. The risk value of this priority 3 was 25, which means controlling the recommendation of the need for continuous monitoring and attention from the start of PPE and reducing the speed of the vehicle on the way to the dock. Acceptable risk

levels, which allow for the occurrence of vehicle nudges, obtained 0.5 risk score that required control measures and should be done by observing the flow of traffic passing along the dock.

4.2. Entering the dock area

There are many potential hazards after arriving at the dock area. Possible events are collision, scratching and falling containers at the dock area. Potential acceptable hazards are scratches between vehicles or goods passing through the dock area, then for priority 3 risk levels of collisions and falling containers within the dock area. The recommendation is almost the same as the previous interview, that is, full use of PPE completely and accordingly. When using the car in the dock area, the rotary of the car should be correct, and always be alert and careful in doing work in the dock area.

4.3. Going up to the ship

From the results of interviews that have been done, there were five possible potential hazards that occur are falling into the sea, tripping stairs, porous or slippery stairs that pose the risk of falling, and sandwiched between two ships. There were two acceptable risk levels and three were included in priority 3.

4.4. Ship inspection

The results of the risk assessment indicate the details of inspection to be performed on board:

1. Examination of food storage buildings (potential hazards that occur are struck down by falling food shelves, injuries, bruises, minor injuries, fractures, physical disability, death),
2. Kitchen inspection (from kitchen floor, special kitchen storage shelf, potential danger of slip, slip, struck down by falling kitchen shelves, physical defects, minor injuries, moderate injuries to death)
3. Checking the quality of clean water and drinking water
4. Vector control from inside the ship (from potential vector or biological dangers in the ship by fogging, fumigation, spraying, larvacidation and trapping, which may cause dizziness, eye irritation, toxicity and shortness of breath).

5. Health and First Aid examination in the ship to reduce the occurrence of occupational diseases in the environment of KKP Class I Surabaya. Possible risk is the outbreak of the disease or virus brought from the area of origin.

The recommendation is to use PPPE completely, from masks, reflector-stripped field uniform, proper wearing of safety shoes, and complying with applicable SOP.

4.5. Trip to KKP Surabaya

According to the results of interviews conducted on ship inspector officers in KKP Class I Surabaya, there were two potential dangers of collision and nudge. However, the ones included in priority 3, which needs continuous monitoring and attention, was collision that allows scratches, bruises, serious injuries, broken bones, defects, up to death. The risk value of priority 3 was 25, which means that it needs recommendation control, need for continuous supervision and attention to start using PPE and reduce the speed of the vehicle on the way to the dock.

There was also an acceptable risk level. The possibility of vehicle crashing has a risk value of 0.5 that requires control measures with regard to the flow of traffic along the road to the KKP Class I Surabaya. Based on the results of the study, there was a level of risk with priority 3, which means that special surveillance is required and always alert if an accident occurs. Therefore, according to the results of risk identification and assessment, if the availability of tools and materials has been completed, then the safety behavior approach should be run accordingly.

5. Conclusion

There are a total of eight job activities that have a source of hazards. Implementation of control has a value of 40 percent, indicating that various controls are well implemented. Workplace accident control should focus on hazard communication treatment in the work environment.

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