Control of Risk in the Process *Loading / Unloading* In. Pelindo Iii Surabaya

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Abstract

PT. Pelindo III Surabaya is a company engaged in service providers. One of them is loading/unloading services. The results of preliminary observations made at PT. Pelindo III Surabaya shows that container loading/unloading workers do not follow standard operating procedures in the workplace such as not using *safety helmets*, *safety vest,* and *safety shoes*. Neat and dirty workplace conditions can increase potential hazards such as falls and tripping material and damage to the goods. This can threaten the safety and disturb the health of workers loading/unloading containers at PT. Pelindo III Surabaya. This study aims to analyze the *risk assessment* on loading/unloading work at PT. Pelindo III Surabaya. This research is an observational study with design *crossectional*. The study population was the workers in the loading/unloading section at PT. PELINDO III Surabaya as many as 20 people. Data that has been obtained from observations and interviews are processed and analyzed descriptively, namely by describing in real terms the object of research and the conditions at the research site. The results of the study show the process of loading/loading PT. PELINDO III Surabaya has 5 types of hazard risks in high-risk categories, 12 types of hazard risk, medium risk categories and 3 types of hazards in low-risk categories. The company is expected to provide and require workers to use *body harnesses* as additional PPE for workers who are above the *container* during the process *cargo during.*

Keywords: *risk assessment, loading/unloading*

Introduction

Companies that provide loading/unloading services are one of the most important companies in the transportation of goods and services.Unloading/ loading services are useful for transporting goods in various places including ports. Transportation services increasingly offer or provide facilities such as container terminals, loading/unloading equipment, and containers themselves.

Data on occupational accidents (including death) that occurred in loading and unloading workers (TKBM) from 2004 to 2007 were 110 people. Details of the incidence of workplace accidents loading and unloading workers (TKBM) are: in 2004 as many as 29 people (4.11%), in 2005 as many as 44 people (5.6%), in 2006 as many as 17 people (2.21%) and in 2007 as many as 20 people (2.65%)[1].

Things that affect the risk include the type of work, job location, potential harm due to hazards in the workplace, potential harm due to contractor activities, simultaneous work by several contractors, duration of work, experience and expertise of contractors[2].

One of the loading/unloading service providers, including PT. Pelindo III Surabaya which plays a role in carrying out loading/unloading and is one of the largest container companies in Indonesia. Activities loading/ unloading occurs increases significant every year where there was an increase of 0.64% in 2013.

The number of workers loading/unloading port of

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Tanjung Perak in 2004 as many as 705 people, in 2005 as many as 756 people, in 2006 as many as 796 people and in 2007 as many as 756 people.

One effort that can be done to prevent work accidents is by implementing a *Risk Assessment* which is a process to evaluate the risks arising from a hazard by considering the adequacy of the controls owned and determining whether the risks are acceptable or not[3].

The danger of risk assessment needs to be done so that the amount of risk that can occur is known, so that after the hazard is identified a risk assessment is carried out to find out how big the risk is *(how big the risk)*[2].

Risk assessment is the process of risk analysis and evaluation to determine the level of risk and level of risk and determine whether the risk is acceptable or not. Risk Assessment is an attempt to calculate the amount of risk and determine whether the risk is acceptable or not[2].

All risks that have been identified and assessed must be controlled, especially if the risks are considered to have a significant impact or cannot be properly controlled in terms of various aspects such as financial, practical, human and other operations[2].

Based on this, research was conducted with the aim of analyzing *risk assessment* which included activities to identify hazards at loading/unloading work at PT. Pelindo III Surabaya, analyze risk assessment and analyze risk control at loading/unloading work at PT. Pelindo III Surabaya.

Methods

This study was an observational study that was descriptive in nature with design *cross-sectional* to analyze the *risk assessment* on loading/unloading work at PT. Pelindo III Surabaya. This research was conducted in December 2014.

The population of this study was unloading/loading workers PT. PELINDO III Surabaya with a total of 20 workers. The sample size taken in the study used a total population of 17 workers, 2 officers of Occupational Safety and Health (K3), and 1 *operational supervisor*.

The variables examined in this study were hazard identification, risk assessment, and risk control. There are no dependent variables and independent variables because this research is a descriptive study.

Primary data is collected by conducting field observations and interviewing respondents. Observation is carried out by making observations directly by seeing, and recording all the conditions in the workplace both regarding process activities in the loading/unloading section, materials, tools, number of workers, working environment conditions, work methods, control technology, personal protective equipment.

The instruments used for data collection in this study include Form *Job Safety Analysis* (JSA); Risk assessment matrix sheet; sheet *Risk Assessment Table* to carry out a *risk assessment*; Interview guide; Observation sheet.

Data analysis carried out include:

Identifying the existing material at the loading/unloading sub-unit of PT. PELINDO III Surabaya using the technique *Job Safety Analysis* (JSA)that is entered into the risk assessment matrix and observes the hazard for calculation using a risk assessment matrix table.

After identification, the risk assessment calculation is complete, where the hazards that have been classified are assessed based on exposure values, opportunities, and consequences. At the risk assessment stage, there is a perception of equality between researchers and PT. PELINDO III Surabaya in determining exposure events, opportunities, and consequences based on the theory put forward by Suardi (2007), in order to get the results correctly and precisely which has been operationalized by the company[4]. The calculations from each aspect can be seen as follows:

Table 1. Determining the Opportunity (L) in the Risk Assessment at PT. PELINDO III Surabaya

Choice of Opportunities	Operational Definition		Value
Very often	Can occur at any	time can occur	1
Often	Can occur periodically	Every hour can occur	0.6

***Cont.*. Table 1. Determining the Opportunity (L) in the Risk Assessment at PT. PELINDO III Surabaya**

Moderate	can occur in certain conditions	When there is work every day	0.3
Rarely	Can occur under certain conditions	At when there is work within a few days of the week	0.1
Very Rarely	Allows never to occur	very rarely the existence of work (can be counted in a few weeks)	0.05

Source: Suardi (2007)

Table 2. Determining the consequences (K) of the Risk Assessment at PT. PELINDO III Surabaya

Kinds of Consequences of	**Operational Definition of**	**Value**
Fatal	Can directly lead to workplace accidents and result in death	20
Major	Can cause direct workplace accidents but not death (Severe injury)	10
Medium	Can cause workplace accidents but can still be handled by company clinics	5
Minor	Can cause work accidents but is still said to be a minor injury (can be handled using a first aid kit)	2
Not Significant	Still said to be safe	1

Source: Suardi (2007)

Table 3. Determining Exposure (E) to Risk Assessment at PT. PELINDO III Surabaya

Types of Exposure to	**Operational Definitions**	**Value**
Continuous	for 12 hours or more a day	10
Periods More or	less for 4-8 hours a day	6
Specific For	more or less 2-3 hours a day	3
Not regular for	more than 1 hour a day	2
Rarely	As long as there are only jobs	1

Source: Suardi (2007)

The results of these calculations are combined through a risk level matrix with semi-quantitative risk analysis techniques which will then be obtained the level of risk ranging from low risk to high risk, then evaluated to determine whether the risk is acceptable, accepted by conditions, or not accepted. This study uses a 3D model risk assessment so that the risk value category loading/ unloading activities can be seen in Table 4.

Table 4. Definition of 3D Risk Assessment Model

Definition of							
Exposure		**Opportunities**		**Consequences**		**Risk Value**	
Continuous	10	Very often	1	Fatal	20	E	> 20
Periodic	6	Often	0.6	Major	10	H	11-20
Specific	3	Moderate	0.3	Medium	5	M	3-10
Irregular	2	Rarely	0.1	Minor	2	L	<3
Rarely	1	Very rare	0.05	Not Significant	1		

* Source: Book of occupational health and safety management systems, Rudi Suardi (2007)

After carrying out the analysis and risk level the next stage is to do risk control and classifying risk control whether it feels sufficient or not fulfilling. Risk control is said to be sufficient if it meets ≥ 2-4 controls, both substitution, technical, administrative and PPE control. Risk control is said to be lacking if it only meets the criteria of one type of control that exists.

Results

General Description of Unloading / Loading at PT. PELINDO III Surabaya The

Port of Tanjung Perak is one of the port gates of eastern Indonesia, becoming the center of collectors and distributors of goods to Eastern Indonesia. Its strategic location makes Tanjung Perak Port the center of interinsulair shipping in Eastern Indonesia and becomes the second largest port after the Tanjung Priok Port in Jakarta.

Geographically, the location of Tanjung Perak Port in Surabaya is at position 112º44'100 "-112º32'40" East Longitude and 7º11'40 "-7º13'20" South Latitude precisely located at the North of Surabaya City and with a wide overall, 2,218 ha. Tanjung Perak Port Surabaya has 8 terminals, including Emerald Terminal, Berlin Terminal, Patchouli Terminal, Mirah Terminal, Passenger Terminal, Surabaya Container Terminal, Roro Terminal, Kalimas Terminal.

In total, Surabaya Container Terminal has unloaded/ loaded 192,047 *Twenty feet Equivalent Units* (TEU's) in early 2014, while in the same period in 2013 there were 153,249 *Twenty feet Equivalent Units* (TEU's). For the past four months, domestic loading/unloading services have reached 9,000 *Twenty feet Equivalent Units* (TEU's), so that on average 2,000obtained on average *Twenty feet Equivalent Units* (TEU's) are.

Hazard Identification in the Container Loading / Unloading Process at PT. PELINDO III

The process of identifying hazards on loading/ unloading work container PT. PELINDO III Surabaya is carried out by taking into account the work steps, hazards arising from activities in the loading/unloading process, and the impact resulting from the danger that arises.

Hazard identification results on container loading/ unloading work at PT. PELINDO III Surabaya that has been done is shown in Table 5.

Table 5. Hazard Identification in the Unloading / Loading Section of PT. Pelindo III Surabaya 2015

Process	Work	Hazards	Impacts
Cargodoring	lifts on	Terpleset	wounds, fractures, died
		Fell into the sea	Drowned
		Tripping	injuries, fractures, died
		Affected container	Death
		Caught container	wounds, broken bones, death
		Sling broke	wounds, broken bones, died
		Sandwiched hook	wounds, fractures
	Shift ground	Crushed container	died world
		Sandwiched container	fractures, died
	Trucking	Container fall	died world
		Collision	Injuries, fractures, died
Stevedoring	lifts off	Terpleset	wounds, fractures, died
		Tripped	Wounds, fractures
		Stricken by container	Passed by
		pinned container	A broken bone, died
	Stacking	Container fell	A broken bone, died
		Stuck by container	Death of

Activities to identify hazards include diagnosing and finding hazards in parts of the system and subsystems, the sequence of activities and also calculating the possibility of arising and the consequences that these hazards will produce. Doing hazard identification well will result in good risk management2.

Hazard Risk Analysis at Container Loading / Unloading Work at PT. PELINDO III Surabaya

The results of the study regarding the risk assessment of hazards at loading/unloading work at PT. PELINDO III Surabaya is shown in Table 6. The results of exposure multiplication, opportunities and consequences are then evaluated using a *risk matrix* so that it can be concluded that the danger is included in the category of danger with low, medium or high risk.

Risk assessment is the process of risk analysis and evaluation to determine the level of risk and level of risk and determine whether the risk is acceptable or not. (Ramli, 2010). Risk assessment in the loading/unloading section at PT. PELINDO III Surabaya is based on data in the field conducted by observing and distributing questionnaires to all permanent workers.

Stevedoring

1.5 risk value is owned by a dripped hazard and stumbles on activities *elevator off*. The danger of falling *container,* sandwiched container, *container* falling and falling *container* on *lift off* and *stacking* value risk 6.

Receiving / Delivery The

the danger of falling *container* and *container* has a value of risk 6. The danger of collisions between *containers* is in the low category with a risk value of 1.5.

Activities *receiving / delivery* of services that activity in the form of work takes a pile of goods / Line I place the accumulation of goods or yard goods and deliver the goods to be composed on the vehicle/conveyance tightly in the dooryard goods ashore or otherwise.

In the process *receiving/delivery* there is only one job, namely, *lift on* with a low-risk category with a value of 1.5 and a moderate risk category with a value of 6.

Low risk in the process *receiving* is due to the low exposure value and the possibility of an accident high. Risk is generally acceptable but still needs to be reviewed.

Table 6. Hazard Risk Assessment in the Loading / Unloading Process at PT. PELINDO III Surabaya Year 2015

Process	Work	Danger	Impact of	Risk Assessment Risk			Value Risk	Level
				E	L	K	E x L x K	
Cargodoring	Lift on	Plastered	Wounds, fractures, dies	6	0.1	5	3	Risks Being
		Falling into the sea	Sinking	6	0.05	10	3	Medium Risk
		Tripped	ulcers, fractures, died	6	0.1	5	3	Medium Risk
		Affected container	death	6	0.1	20	12	High Risk
		Wedged container	ulcers, fractures, mortality	6	0.3	10	18	High Risk
		Sling broke	Luka , fracture, death	6	0.05	10	3	Risk Being
		sandwiched hook	, wound	6	0.3	5	9	Risk Medium
	Shift ground	overwritten container	Died	6	0.1	20	12	High Risk of
		Sandwiched container,	Fracture died	6	0.1	20	12	High Risk
	Trucking	Container fall	died	6	0.1	20	12	High Risk of
		Collision	Injuries, fractures, died	6	0.1	5	3	Medium Risk
Stevedoring	lifts off	Terpleset	Wounds, fractures, died	3	0.1	5	1.5	Low Risk
		Tripped	Luka, fracture	3	0.1	5	1.5	Low Risk
		Affected container	Died	3	0,1	20	6	Risk Being
		Sandwiched Container	Broken bones, died	3	0,1	20	6	Risk Moderate
	Stacking	Container fell	Broken bones, died	3	0,1	20	6	Risks Being
		Affected by Container	Died	3	0.1	20	6	Risk Medium
Receiving / Delivery	lifts on	Crushed container	Died	3	0,1	20	6	Risk Medium
		Container fell	Broken bones, died	3	0,1	20	6	Risk Medium
		Collision between containers	Broken bones, died	3	0.1	5	1.5	Low Risk

Hazard of Risk Control in the Unloading / Loading Process at PT. PELINDO III SURABAYA

Potential hazards that will be received by loading and unloading workers (TKBM) have a high-risk level are crushed and pinched *containers* inactivities *elevator on*, crushed *containers* inactivities *shift ground* and pinned *containers* and *containers* fall activities *trucking*.

Control with PPE that has been carried out by PT. PELINDO III includes procurement of gloves, helmets and *safety shoes* for workers, especially those who carry out loading/unloading activities above the *container* or c*rane*.

Risk control implemented by PT. PELINDO III Surabaya is categorized enough because it has made a combination of two hierarchies, namely administrative control, and the use of personal protective equipment (PPE)[6].

The risks that are known to be large and the potential consequences must be managed appropriately, effectively and in accordance with the capabilities and conditions of the company[3].

Risk control using the approach *Long Term Gain* in Tarwaka's book (2008) regarding the hierarchical approach to control, namely long-term and permanent oriented control starting from engineering control, isolation or restriction, administration and the most recent is the use of personal protective equipment (PPE)[7].

Control by procuring PPE has been applied at PT. PELINDO III Surabaya to minimize work accident rates.

Conclusion

The conclusions that can be taken based on the results of this study are:

Potential hazards identified in the loading/unloading section at PT. PELINDO III Surabaya there are 20 types of potential hazards from 6 jobs in 3 loadings/ unloading processes.

Potential hazards identified *in* loading/loading PT. PELINDO III Surabaya found 5 dangers of high-risk categories, 12 hazards of moderate risk categories and 3 hazards of low-risk categories.

Conflicts of Interest: All authors have no conflicts of interest to declare.

Source of Funding: The source of this research costs from self.

Ethical Clearance: The study was approved by the Institutional Ethical Board of Faculty of Public Health, Hasanuddin University.

All subjects were fully informed about the procedures and objectives of this study each subject prior to the study signed an informed consent form.

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