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ANALYSIS OF POTENTIAL HAZARDS AND RISKS OF CONTAINER LOADING AND UNLOADING ACTIVITIES ON WORK AT PT. PELINDO MULTI TERMINAL

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Abstract

HIRARC is a hazard identification, risk assessment, and risk control process, which identifies potential hazards in ordinary and unusual business activities, including an assessment of potential hazards and strategies to mitigate risks. Work accidents can occur due to actions, human conditions, and mechanical factors. The research method is data analysis in the work process and container filling, then risk control of each process. The data in the hazard and risk assessment is a qualitative analysis in AS/NZS 4360:2004. 53 sources of danger were identified from 12 stages of work. The results of the risk evaluation showed a low-risk level of 32% with 18 sources of danger, a moderate risk level of 28% with 16 sources of danger, a high-risk level of 16% with 9 sources of danger, and an extreme risk level of 24% with 14 sources of danger. This study concludes that in the dismantling process there are four stages of work, namely starting from the opening of the hatch (3 sources of danger), stevedoring (20 sources of danger), cargodoring (4 sources of danger), and delivery (2 sources of danger). In the loading process, there are four stages of work, starting from receiving (6 sources of danger), cargodoring (4 sources of danger).

Kata Kunci: *HIRARC, Risiko bongkar muat, Risk Asesment, Bahaya*

Abstract

HIRARC adalah proses hazard identification, risk assessment, and risk control, yang mengidentifikasi bahaya potensial dalam kegiatan bisnis biasa dan tidak biasa, mencakup penilaian potensi bahaya dan strategi untuk mengurangi risiko. Kecelakaan kerja dapat terjadi karena tindakan, kondisi manusia, dan faktor mekanis. Metode penelitian ini adalah analisis data dalam proses kerja dan pengisian kontainer, kemudian kontrol risiko masing-masing proses. Data dalam penilaian bahaya dan risiko adalah analisis kualitatif pada AS/NZS 4360:2004. Diidentifikasi 53 sumber bahaya dari 12 tahapan pekerjaan. Hasil evaluasi risiko menunjukkan tingkat risiko rendah 32% dengan 18 sumber bahaya, tingkat risiko moderat 28% dengan 16 sumber bahaya, tingkat risiko tinggi 16% dengan 9 sumber bahaya, dan tingkat risiko ekstrim 24% dengan 14 sumber bahaya. Kesimpulan dari penelitian ini yaitu Pada proses bongkar terdapat empat tahapan kerja, yaitu mulai dari pembukaan palka palka (3 sumber bahaya), stevedoring (20 sumber bahaya), cargodoring (4

sumber bahaya), dan pengiriman (2 sumber bahaya). Pada proses muat terdapat empat tahapan kerja, yaitu mulai dari receiving (6 sumber bahaya), cargodoring (4 sumber bahaya).

INTRODUCTION

Hazard Identification, Risk Assessment, And Risk Control commonly called HIRARC is the process of identifying potential hazards in routine and non-routine activities that can occur in a process of activity in the company, then a risk assessment can be carried out from potential hazards that arise in the process of these activities [1]. Continuous work activities that involve physical stress on the muscles can cause injuries or low back pain, disorders, and disorders of the skeletal muscles. Other risk factors include awkward and irregular posture [2]. The causes of work accidents that do not meet safety requirements are unsafe human acts and unsafe conditions [3] In work accidents, mechanical factors and also chemical factors that are not handled safely are usually more visible as causes [4]. Work accidents can hit and/or injure and/or cause defects in limbs, namely body parts/organs such as hands, feet, nose, ears, eyes, neck, chest, abdomen, genitals, lungs, heart, intestines, brain, and so on [5][6]. As with work accident defects, defects occur if there is a disease caused by work or the work environment [7].

This loading and unloading job includes jobs that are very vulnerable to work accidents to diseases caused by work [8] Unergonomic work environment conditions can provide an additional burden for the workforce because this job is heavy physical work [9]. Container loading and unloading activities have many potential dangers that cause work accidents, such as when unloading containers from ships to trucks using cranes, some TKBM workers do not wear head protection helmets so work accidents can occur caused by human error, namely due to drowsy operators [10]. Damage to loading and unloading equipment also often occurs, for example, the crane is damaged or the sling is peeled off, in this case, it can also cause work accidents if the tool is not checked before use [11]. For this reason, it is necessary to conduct further research on hazard identification analysis and assessment of the risk of work accidents as well as to take control over container loading and unloading work activities at the Port of PT. Pelindo Multi Terminal by directly observing workers [12].

RESEARCH METHODS

Data processing in this study uses descriptive statistics, namely analyzing data by describing or describing the data that has been collected [13] [14] The data that has been obtained will be identified and given a risk assessment, data analysis begins by calculating the risk value obtained from the results of the multiplication of likelihood and consequences so that a risk rating consisting of 4 categories is obtained, namely [15] :

The Extreme Risk, High Risk, Moderate Risk, and Low-Risk categories are descriptive in each work process in container loading and unloading activities, then risk control from the results of the risk assessment of each process. Then the data is presented in the form of tables. The data used in determining hazard and risk assessment is a qualitative analysis referring to the AS/NZS 4360:2004 standard.

Rumus Risk Rating = Likelihood x Consequences

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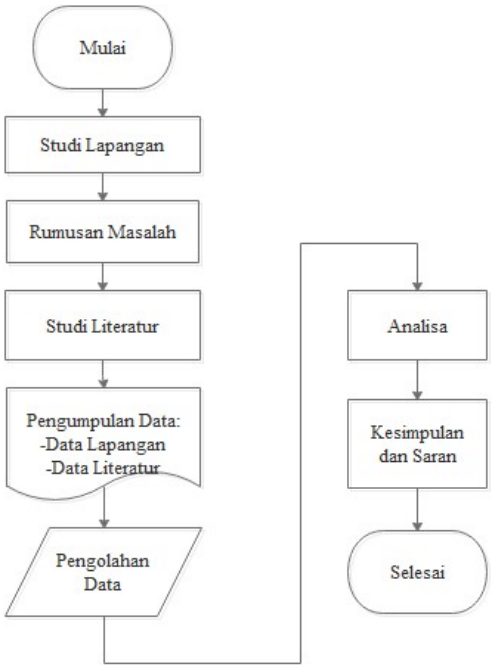

Figure 1. Research flow chart

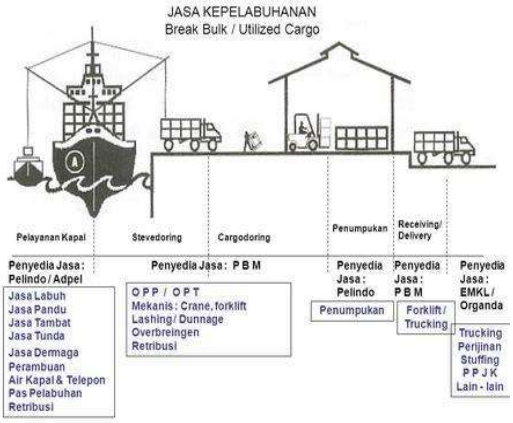

Figure 2. Process of Unloading and Loading Activities

Figure 3. Process Flow

RESULTS AND DISCUSSION

Table 1. Potential hazard identification, assessment, and control of the container loading process

No	Work Activities	Hazard Identification			Risk Assessment		Control
		Source of Danger	Potential Hazards	Potential Risks	Level	Risk Rating	
	Receiving Driver drives a container	Driver negligence	Tabrakan	Accident/Death			Workers are required to be more careful when working and have enough rest time so that

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1	truck to the container yard				> 16	Extreme Risk	they are not easily sleepy while driving
2	Tally container yard records incoming containers	Exposure to sunlight	Direct sunlight exposure	Work fatigue, dehydration	5-11	Moderate Risk	Workers are required to stretch their muscles
3	The foreman who regulates the course of activities in the field	Vertical position for too long	Pain in the muscles	Work Fatigue	1-5	Low Risk	Workers are advised to stretch the leg muscles
4	Equipment operators who move containers	Operator negligence	There was an accident in the wrong position of the container and hit another container	Container damage	5-11	Moderate Risk	Workers are required to be more careful when working so that accidents do not occur
5	Cargodoring Foreman who regulates the course of activities in the field	standing position upright for too long	Muscle/joint pain	Work fatigue	1-5	Low Risk	Workers are advised to stretch the leg muscles
6	The operator moves the container from the field onto the truck	Operator negligence	An accident occurred/misplaced container	Container damage	1-5	Low Risk	Workers must be more careful when working and have enough rest time so that they do not get sleepy while driving
7	Stevedoring Foreman who regulates	standing position upright for too long	Muscle/joint pain	Work fatigue	1-5	Low Risk	Workers are advised to stretch the leg muscles

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	the course of activities at the pier						
8	Tally Pier does recording/reporting	standing position upright for too long	Muscle/joint pain	Work fatigue	1-5	Low Risk	Workers are advised to stretch the leg muscles
9	Container operators move from trucks onto ships	Operator negligence	Hit by heavy equipment/containers	Head leaked, body seriously injured, died	>16	Extreme Risk	Workers are required to be more careful when working and have enough rest time so that they do not easily get sleepy while driving heavy equipment
10	Labor workers are on top of the container truck hooking slings on all four sides of the container	Hit by machine slings	Hit by a sling	Head leaked, body squeezed, died	>16	Extreme Risk	Workers are required to do a briefing before work and use complete PPE such as gloves, safety vests, safety shoes, and safety helmets
11	In Dry Bulk Loading activities such as fertilizers	Exposed to Fertilizer powder When Loading from the ship to the stack/ Truck using crepe	Distracted view, Vision and breathing	Cause Eye pain, red eyes I'm going to give you a nap	5-11	Moderat Risk	Workers should pay attention to their work and use PPE such as Sefty Helmet Glasses. Sefty phase,
12	Activities on Liquid Bulk Loading jobs such as COP	CPO spill from ships loaded into tanker trucks through Boiler/spiral pipes,	Herding fall stuck	Causing bodily injury/bruises	12-16	High Risk	Workers should pay more attention to their work and use PPE tools such as Safety Shoes, Safety Helmets, Safety Gloves

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13	Activities in the B3 Demolition work	Exposure to hazardous and toxic substances	Shortness of breath Burns	Causes Death Die	12-16	High Risk	Workers should pay attention to their work and use PPE tools such as Vests, Safety Shoes, Safety Gloves, Safety Face, Safety Helmet

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Based on the results of the identification of potential hazards, risk assessment, and control carried out in the process of unloading containers, liquid bulk, dry bulk, and toxic (B3) at PT Pelindo Multi Terminal, there is a process of work activities, namely, unloading containers, liquid bulk, dry bulk, toxic (B3) where each process has four (4) stages of work.

From a total of 12 stages of work, 53 sources of danger can be identified and the results of the risk assessment obtained a low-risk level of 32% with a total of 18 sources of danger, a moderate risk level of 28% with a total of 16 sources of danger, a high-risk level of 16% with a total of 9 sources of danger, and an extreme risk level of 24% with a total of 14 sources of danger. The first risk assessment is carried out in the opening of the hatch, there are several sources of danger, namely steep stairs with the risk of bruises on the legs and drowning are given a high-risk value, loss of balance with the risk of drowning is given a high-risk value and exposure to direct sunlight with the risk of dehydration and work fatigue is given a moderate risk value

CONCLUSION

Based on the results of research at PT. Pelindo Multi Terminal Belawan Branch came to the following conclusions:

Container loading and unloading activities, dry bulk, and liquid bulk, there are two (2) activity processes, namely the process of unloading activities and loading activities, in the process of unloading activities there are four (4) stages of work, namely starting from the opening of the hatch (3 sources of danger), stevedoring (20 sources of danger), cargodoring (4 sources of danger), delivery (2 sources of danger)

In the loading process, there are (4) stages of work, namely starting from receiving (6 sources of danger), cargodoring (2 sources of danger), stevedoring (18 sources of danger), and closing the hatch of the ship (2 sources of danger).

In the process of unloading activities:

1. The first stage is the opening of the ship hatch
   a. Risk assessment with a moderate risk level is exposure to sunlight.
   b. A risk assessment with a high-risk level is a steep staircase when boarding the ship and a loss of balance when installing a sling on the hatch.
2. The second stage of stevedoring:
   a. Risk assessment with a low-risk level is an operator who drives heavy equipment in a sitting position for too long, a foreman who regulates the course of standing activities for too long, a labor worker installs a sling on a heavy machine to a container on a ship with a repetitive work position, namely bending, a labor worker opens a sling on a container on a truck on a dock with a repetitive work position, namely bending and standing upright for too long.
   b. Risk assessment with a moderate risk level is tallying the pier with a standing position for too long on the dock and exposed to the sun, the foreman exposed to the sun, the labor worker installing the sling on the heavy equipment to the container on the ship is exposed to sunlight and is exposed to the container body, the labor worker

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opens the sling on the container on the truck on the dock by swinging on the container loses balance and is hit by the container body and is exposed Sunlight.

c. The risk assessment with a high-risk level is that the operator who drives the tool is negligent in working, the labor worker installs the sling on the heavy equipment to the container on the ship loses balance and the labor worker opens the sling on the container on the truck on the dock and jumps across the truck next to him.

d. Risk assessment with an extreme risk level is that labor workers who install slings on heavy equipment to containers on ships are exposed to heavy equipment slings, labor workers who open slings on containers on trucks on the dock are hit by slings and hit by containers while on trucks and when workers push containers so that their position is appropriate.

3. The third stage is cargodoring
   a. Risk assessment with a low-risk level is a foreman with a standing position for too long in the accumulation field.
   b. Risk assessments with a moderate risk level are tally container yards that are exposed to sunlight, foremen who are exposed to sunlight, and equipment operators who are negligent when moving containers that have an accident/misposition of the container/collision with other containers.
4. The fourth stage is the delivery
   a. A risk assessment with a low-risk level is a driver who drives a truck filled with containers to the delivery/ordering destination in a sitting position for too long
   b. Risk assessment with an extreme risk level is a driver who is negligent in driving a truck filled with containers to the delivery/order destination.

In the Process of Loading Activities

1. The first stage is receiving
   a. The risk assessment with a low-risk level is the driver driving a truck filled with containers to the stacking field in a sitting position for too long and a foreman with an upright standing position for too long.
   b. Risk assessments with a moderate risk level are tally container yards and foremen exposed to sunlight as well as negligent tool operators when moving containers.
   c. The risk assessment with the extreme risk level is that the driver is negligent in driving a truck filled with containers to the drowsy stacking field.
2. The second stage is cargodoring

Risk assessment with a low-risk level is a foreman with an upright position for too long and a negligent tool operator when moving containers.

3. The third stage is stevedoring

a. Risk assessment with a low-risk level is foreman and tallyman with an upright standing position for too long on the dock, equipment operator moving containers from the truck to the ship with a sitting position for too long, labor workers on top of the container who are on the truck to hook the sling on the four sides of the container with a repetitive working position, namely bending and standing upright for too long on the truck, Labor workers open the sling attached to the container on the ship with a repetitive working position, namely bending over and standing upright for too long on the truck.

b. Risk assessment with a moderate risk level is that labor workers on top of the container who are on top of the truck hook the sling on the four sides of the container and lose balance on the truck.

c. The risk assessment with a high-risk level is that the labor worker is on the truck to hook the sling on the four sides of the container, jumps from one container to another on the same truck, and jumps across the truck next to it, the

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labor worker opens the sling attached to the container on the ship loses balance.

d. Risk assessment with an extreme risk level is that the operator of the equipment is negligent when moving the container from the truck to the ship with a blurred view at night, the labor worker on the truck installs the sling on the four sides of the container and is hit by the tool sling and hit the container body and the worker who opens the sling attached to the container on the ship is hit by the sling and hit the container body and is hit by the container while on the ship.

4. Fourth Stage of Closing the Ship Hatch
   a. A risk assessment with a high risk level is when a worker releases a sling on a hatch on a ship that loses its balance.
   b. Risk assessment with an extreme risk level is a worker who releases a sling on a hatch exposed to a tool sling.

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