



Hazard Identification And Risk Control In The Preparatory Department At PT. Gajah Duduk Pekalongan District

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ABSTRACT

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The development of industry in Indonesia is currently very rapid. This is also accompanied by the risk of increasing and diverse dangers due to technological experts where the use of increasingly complex machines and work equipment to support the production process causes occupational health and safety problems. The same thing happened at PT. Gajah Duduk Pekalongan. This study focused on the scope of the preparation area, because this section has a great potential for work accidents. This study aims to determine efforts to assess and control hazards and risks at PT. Gajah Duduk. The method used is qualitative research. Data were obtained from the results of in-depth interviews and observations. Research Results: show the importance of the use of personal protective equipment (PPE) and standard operating procedures (SOP) that the company has set. The company needs to emphasize job training institutions to obtain information and work systematically at the training stage for new employees. Conclusion: The production process in the preparation unit has not been running optimally. Several things can still be used as evaluation material for the company related to potential hazards that can endanger workers. Suggestion: Support is expected from various parties, PT. Gajah Duduk to protect every worker and increase company production

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INTRODUCTION

The textile industry is experiencing very rapid development along with the development of human needs towards their needs. This is also followed with the growing world population. Textile industry sector and Textile Products (TPT) are growing very rapidly in all countries so that The textile industry sector is one of the mainstay sectors that can utilized to increase economic growth. (Faradilla & Hakim, 2022)

An industrial activity is never free from the potential risk of accidents, no matter how small, an accident will have a big impact on a company and social society. Work accidents are accidents related to work,

including diseases arising from work relations. Physical and human factors cause an accident that occurs at work. Physical factors such as conditions unsafe work environment. Meanwhile, human factors, namely. For various work accidents that occur the human factor is the biggest cause. (Ridasta, 2020) in Biatmojo, 2021), Hazard Identification Risk Assessment and Risk Control (HIRARC), is a series of processes to identify hazards that can occur in routine and non-routine activities in hospitals, then assess the hazards so that the risk level can be minimized from the highest, medium, to low. The purpose of this HIRARC program is as an effort to prevent and reduce the rate of accidents (Tarwaka, 2012 in Biatmojo, 2021)

Occupational safety and health in a company is evidence of whether a company implements a reliable work management system. Occupational safety is a guarantee of employee safety while working in the company. The occupational safety and health program aims if each party is aware of their respective rights and obligations, both from the workforce or the company, the rights and obligations of the workforce are regulated in Law No. 13 of 2003 concerning labor which includes occupational safety and health and other obligations of the company to its employees. As also emphasized in Law No. 1 of 1970 "every worker has the right to receive protection for their safety in carrying out work for the welfare of their lives and to increase national production and productivity".

PT. Gajah Duduk is engaged in the textile sector and produces sarongs with the Gajah Duduk brand. The company, founded in 1972, in Pekalongan, Central Java, has adopted 1,000 employees. Among them are 300 workers in the Preparation section. The production stages start from preparation, weaving, sewing, and finishing. In the preparation stage, there are 4 processes, namely kilos, which is the process of changing the roll from a soft cone (dye spring) shape to a cone roll to facilitate the warping process, the warping process is the process of arranging the warp threads in parallel which are arranged according to the pattern or design on the beam roll, the sizing process is a process of giving a layer of starch to the thread to increase the strength of the thread, the cucuk process is the process of inserting the warp thread into the dropper, gun, and comb for the weaving process.

PT. Gajah Duduk has made maximum efforts to protect employees by providing policies on SOPs at each production stage. Then the company enacted laws to protect workers from risks while working. In this study, the researcher chose the scope of the preparation area because based on the results of preliminary studies and field observations, there is a high potential for danger that can cause work accidents. This is caused by several factors, namely human error or unsafe behavior from the employees themselves, and also from old production machines, based on the findings in the field, in the production process there are production machines that often experience trouble that can cause accidents for workers and also hinder production. To overcome the occurrence of work accidents that can disrupt the production process, causing losses and incidents or injuries to humans, equipment, materials and the environment, it is necessary to know the risks of work accidents.

METHOD

This study entitled Hazard identification and risk control in the preparatory section at PT Gajah Duduk, Pekalongan Regency, contains problem identification, namely potential



hazards in accidents, assessment of work accident risks, control of work accidents. This research is qualitative research that is descriptive in nature using observation and interview methods which aim to find out the information to be studied.

There are 3 types of informants in this study: First, Main Informant is an informant who has comprehensive information about the problems raised by the researcher. (P2K3), Triangulation Informant, is a person who knows technically and in detail about the research problem to be studied. (Worker). Supporting informant Ordinary informants are people who can provide additional information as a complement. (Head of Production). The data analysis techniques used are data reduction, data presentation, drawing conclusions and data validation.

RESULT

1. *Research Overview*

The company, founded in 1972 in Pekalongan, Central Java, adopted 1,000 employees. Among them, 300 workers are in the preparation section. The production stages start from preparation, weaving, sewing, and finishing. In the preparation stage, there are 4 processes, namely kelos, which is the process of changing the roll from a softcone (dye spring) shape to a cone roll to facilitate the warping process, The warping process is the process of arranging the warp threads in parallel, which are arranged according to the pattern or design on the beam roll. The sizing process is a process of giving a layer of starch to the thread in order to increase the strength of the thread. The cucuk process is the process of inserting the warp thread into the dropper, gun, and comb for the weaving process.

The workforce at PT. In the preparation section, Gajah Duduk works 8 hours a day with 3 shifts: morning shift 06.00-14.00, afternoon shift 14.00-22.00 and night shift 22.00-06.00 with a 45-minute break per day. One week they work for 6 days and 1 day off. While working they are in a standing position while operating the work machine.

2. *Analysis of findings*

Research on hazard identification and risk control in the preparatory section at PT. Gajah Duduk, Pekalongan Regency, was conducted in March and May 2023 through an observation process and in-depth interviews; the following research results were obtained: Based on the results of in-depth interviews with key informants, supporting informants, and triangulation informants, it was found that there were several hazards as stated in the following table:

A. Key Informant

Table 1. Identification Of Key Informant Hazards

Stage	Danger	Risk
Package Receipt	• Leg crushed by iron (roll of thread) • Leg crushed by trolley wheel	• Leg Injury
Kelos	• Caught in the spool machine • Dusty machine with minimal blower • Finger cut by thread	• Hand injuries • Respiratory disorders • Finger injuries
Warping	• Stuck in Warping Machine • Veil caught in warping machine	• Hand injury • Death
Kanji/Sizing	• Legs hit by beam • Hands hit by hot cylinder. • Dusty machine with minimal blower	• Leg injuries • Hand injuries • Respiratory disorders
Cucuk	• Unergonomic sitting position • Lots of flying dust	• Lower back pain disorders • Respiratory disorders

B. Supporting Informant (Head of Production)

Table 2. Hazard Identification Supporting informants

Stage	Danger	Risk
Package Receipt	• During the package-receiving process the operator was hit by a roll of thread • When pushing the foot trolley the operator was run over by the trolley tire	• Leg Injury
Kelos	• Fingers in the machine • Hands entangled in thread	• Severed finger • Severed hand
Warping	• Caught in the warping machine • Hands caught in the thread • Hands entered the warping rotation • Veil caught in the warping machine	• Death • Cut finger • Severed hand • Death
Cikalan	• There is dust on the thread during the weaving process • The sitting position is not ergonomic	• Respiratory disorders • Lower back pain
Kanji/Sizing	• Legs hit by beam • Hands hit by hot cylinder. • Dusty machine with minimal blower	• Leg injuries • Hand injuries • Respiratory disorders



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|-------|---|--|
| Cucuk | <ul style="list-style-type: none"> • Unergonomic sitting position • Lots of flying dust | <ul style="list-style-type: none"> • Lower back pain disorders • Respiratory disorders |
|-------|---|--|

C. Triangulation Informant

Table 3. Hazard Identification Triangulation Informant

Stage	Danger	Risk
Package Receipt	• During the package receiving process, the operator was hit by a roll of thread	• Leg Injury
Kelos	• Fingers in the machine • Hands entangled in thread	• Severed finger • Severed hand
Warping	• Caught in the warping machine • Hands caught in the thread • Hands entered the warping rotation • Veil caught in the warping machine	• Death • Cut finger • Severed hand • Death
Kanji/Sizing	• Legs hit by beam • Hands hit by hot cylinder. • Dusty machine with minimal blower	• Leg injuries • Hand injuries • Respiratory disorders
Cucuk	• Unergonomic sitting position • Lots of flying dust	• Lower back pain disorders • Respiratory disorders

Based on observations and interviews with key informants, supporting informants, and triangulation informants, researchers can conclude that the dangers in the preparation section are as follows:

1. Package Receiving Stage:
 - a) Humans are the source of danger from the package receiving stage. When pushing a trolley containing a roll of thread, the roll of thread falls on the operator's feet, posing a risk of leg injury.
 - b) The source of danger from the package receiving stage is humans. When pushing the trolley, the operator's feet are crushed by the trolley tires which has a potential risk of leg injury.
 - c) When pushing the trolley, the operator's body is hit by the trolley because the floor in the preparation area is wavy which has a risk of injury to the body area

2. Spooling Stage:
 - a) The source of danger from the Spooling stage is human. When changing the thread roll, the operator is not focused and then his hand is caught in the machine. The potential risk is injury to the finger.
 - b) The source of danger from the Package Receiving stage is human. When attaching the thread to the spooling machine, the operator's finger is cut by the thread which has the potential danger of a broken finger
3. Warping Stage
 - a) The source of danger from the Warping stage is humans. When operating the machine, the operator is not focused, and the operator's veil gets caught in the rotation of the warping machine which causes the risk of danger in the form of death
 - b) The source of danger from the Kelos stage is the Work environment. The workplace in the warping area has minimal blowers so that air circulation is smooth which has the potential risk of respiratory tract disorders.
 - c) The source of danger from the Warping stage is humans. When operating the machine, the operator is not focused so the operator's body gets caught in the thread. The potential danger caused is death.
4. Kanji/sizing
 - a) The source of danger from the starch stage is the machine. When mixing the yarn medicine into the mixer machine, the hot steam from the machine hits the operator's face. The potential danger of burns in the facial area
 - b) The source of danger from the starch stage is humans. When carrying the yarn medicine the stairs to the mixing machine are quite steep. The potential danger that arises is falling from the stairs which causes injury to the operator's limbs.
 - c) The source of danger from the starch stage is the work environment. In the starch area, a lot of flying dust remains from the starch stage process. The potential danger that arises is respiratory disorders
 - d) The source of danger from the starch stage is humans when installing the beam/roll of yarn the operator's feet are hit by the beam roll. The potential danger that arises is injury to the feet.
5. Cucuk
 - a) The source of danger from the cucuk stage is the machine. During the cucuk, there is flying dust from the remains of the cucuk process. The potential dangers that arise are in the form of respiratory disorders.
 - b) The source of danger from the cucuk stage is the non-ergonomic working position. The potential dangers that arise are in the form of low back pain
 - c) The source of danger from the cucuk stage is humans. During the beam-changing process, the operator is hit by the beam roll. The potential dangers that arise are in the form of injuries to the leg area.

According to (Ramli, 2010) risk assessment is an analysis to determine the magnitude of a risk by considering the possibility of its occurrence and the magnitude of the consequences it causes. Risk assessment is identifying hazards so that action can be taken to eliminate, reduce or control them before an accident occurs that can cause injury or damage (Redjeki, 2016). This risk assessment is used by industry or companies to provide an assessment of the potential hazards that can occur. Risk assessment is carried out by determining the likelihood and severity figures from the specified scale and multiplying the two to determine the risk value.

- a) Severity is the level of severity that is expected to occur. The scale at this severity level is categorized based on the AS/NZS 4360 standard.
- b) Likelihood is the possibility of a hazard occurring within a certain period of time. The scale at this likelihood level is based on the AZ/NZS 4360 standard
- c) Risk Matrix, assessed using the Risk Matrix Scale based on the AZ/NZS 4360 standard.



Risk assessment in this study uses a matrix and can be concluded in the following explanation:

1. At the Package Receipt stage.
 - a) When pushing the trolley, the operator's foot was hit by a roll of thread. With a risk score of 6. And has a Medium risk level with a ranking score of 10.
 - b) When pushing the trolley, the operator's foot was hit by a roll of thread. With a risk score of 6. And has a Medium risk level with a ranking score of 11
 - c) When pushing the trolley, the floor in the preparation area was wavy, the operator was hit by the trolley. With a risk score of 4. And has a Low risk level with a ranking score of 15.
2. Kelos stage
 - a) When changing the thread roll, the operator is not focused, and then his hand is caught in the machine. . With a risk score of 12. And has a high-risk level with a ranking score of 2.
 - b) During the process of attaching the thread to the machine, the operator's finger is cut by the thread. With a risk score of 9. And has a high risk level with a ranking score of 3
 - c) When operating the machine, the operator is not focused; the veil is caught in the warping machine. With a risk score of 8. And has a high-risk level with a ranking score of 8.
 - d) The operator's workplace has minimal blowers with a risk score of 20. And has an extreme risk level with a ranking score of 1.
 - e) When operating the machine, the operator is not focused; his hand or body part is cut by the thread with a risk score of 9. And has a high risk level with a ranking score of 4.
 - f) The operator's body is exposed to the rotation of the warping machine. With a risk score of 8. And has a Medium risk level with a ranking score of 9
3. At the Kanji / Sizing Stage
 - a) The face is exposed to hot steam when mixing the yarn medicine into the starch mixer machine. With a risk score of 2. And has a Low-risk level with a ranking score of 16.
 - b) The operator fell while carrying the yarn medicine while climbing the stairs. With a risk score of 6. And has a Low-risk level with a ranking score of 12.
 - c) In the starch area there is a lot of dust from the starch process flying. With a risk score of 9. And has a High-risk level with a ranking score of 5
 - d) When changing the beam, the operator was hit by a beam roll. With a risk score of 9. And has a High-risk level with a ranking score of 6.
4. At the Cucuk Stage
 - a) During the cucuk process, there is flying dust. With a risk score of 6. And has a Medium risk level with a ranking score of 13.
 - b) Unergonomic sitting position. With a risk score of 9. And has a High risk level with a ranking score of 7.
 - c) Hit by a thread beam during the cucuk changing process. With a risk score of 6. And has a Medium risk level with a ranking score of 14.

In addition to identifying risks that arise at the research location. Researchers also formulate hazard risk controls in section Preparatory is as follows:

- 1) Package Reception
 - a) When pushing the trolley, the operator's foot is hit by a roll of thread with a risk score of 6 and has a Medium risk level with a ranking score of 10. Danger risk control to minimize the risk of work accidents is:
 - Elimination: Cannot be done
 - Substitution: Cannot be done
 - Engineering control: By installing tools
 - lock on the thread spool trolley
 - Administration: Checking the suitability of the equipment by installing work implementation procedures
 - Personal Protective Equipment: Safety Shoes
 - b) While pushing the trolley, the operator's feet were crushed by the trolley tires, which resulted in a risk score of 6 and has a Medium risk level with a ranking score of 11. Danger risk control to minimize the risk of accidents work is:
 - Elimination: Cannot be done
 - Substitution: Cannot be done
 - Engineering control: By carrying out installation wheel guard on the trolley
 - c) When pushing the trolley the floor in the preparation area was bumpy. The operator is hit by a trolley with a risk score of 4 and has a risk level. Low with a ranking score of 15. As for controlling the risk of danger for minimizing the risk of work accidents is
 - Elimination: Cannot be done
 - Engineering control: By carrying out installation
 - floor repair maintenance wheel safety.
 - Administration: Safety Sign
 - Personal Protective Equipment: Safety Shoes
- 2) Spools
 - a) When changing a spool of thread the operator is not focused on pinching his hand machine with a risk score of 12 and has a risk level of High with ranking score 2. Control of hazard risks to minimize their occurrence The risks of work accidents are:
 - Elimination: Cannot be done
 - Substitution: Cannot be done
 - Engineering control: Cannot be carried out
 - Administration: Safety briefing
 - Personal Protective Equipment: Use of safety gloves
 - b) During the process of attaching the thread to the machine, the operator's finger was cut thread with a risk score of 9 and has a High risk level with ranking score 3. Control of dangerous risks to minimize their occurrence. Work accident risks are:
 - Elimination: Cannot be done
 - Substitution: Cannot be done
 - Engineering control: Cannot be carried out
 - Administration: Safety Signs, Safety Briefing, SOP
 - Personal Protective Equipment: Use of safety gloves.
 - When operating the operator's machine t



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- c) While operating the machine the operator was not focused, the hood got stuck warping machine with a risk score of 8 and has a High risk level with a ranking score of 8. Control the risk of danger to minimize it. The risk of work accidents occurring is:
- Elimination: Cannot be done
 - Substitution: Cannot be done
 - Engineering control: Maintenance
 - Administration: Safety Signs, Safety Briefing, SOP
 - Personal Protective Equipment: Neatness when working
- d) The place where the operator works has minimal blowers with a risk score of 20 and has an Extreme risk level with a ranking score of 1. Risk control dangers to minimize the risk of work accidents is :
- Elimination: Cannot be done
 - Substitution: Cannot be done
 - Engineering control: Cannot be carried out
 - Administration: Adding blowers, checking dust,
 - Change of Work Shift
 - Personal Protective Equipment: Not applicable
- e) When operating the machine, the operator does not focus on his hands or body parts. exposed to a thread incision with a risk score of 9 and has a level High risk with a ranking score of 4. Danger risk control for Minimizing the risk of accidents at work is
- Elimination: Cannot be done
 - Substitution: Cannot be done
 - Engineering control: Cannot be carried out
 - Administration: Safety Signs, Safety Briefing, SOP
 - Personal Protective Equipment: Not applicable
- f) The operator's body is exposed to warping machine rotation with a risk score of 9 and has a Medium risk level with a ranking score of 9. Risk control dangers to minimize the risk of work accidents is :
- Elimination: Cannot be done
 - Substitution: Cannot be done
 - Engineering control: Cannot be carried out
 - Administration: Safety Sign, Safety Briefing
 - Personal Protective Equipment: Not applicable
- 3) At the Kanji / Sizing Stage
- a) The face is exposed to hot steam when mixing the thread medicine into the starch mixer machine with a risk score of 2 and has a Low risk level with a score ranking 16. Control of hazard risks to minimize their occurrence The risks of work accidents are:
- Elimination: Cannot be done
 - Substitution: Cannot be done
 - Engineering control: Cannot be carried out
 - Administration: Safety Signs, Safety Briefing, SOP
 - Personal Protective Equipment: Use of a face mask

- b) The operator fell while carrying thread medicine while climbing the stairs with a risk score of 6 and has a Low risk level with a score ranking 12. Control of hazard risks to minimize their occurrence. Work accident risks are:
 - Elimination: Cannot be done
 - Substitution: Cannot be done
 - Engineering control: The design of the stairs is not steep installation of stair railings
 - Administration: Safety Signs, Safety Briefing, SOP
 - Personal Protective Equipment: Safety Shoes
 - c) In the starch area, there is a lot of dust left over from the production process flying around. The risk score is 9 and has a High risk level with a ranking score of 5. Danger risk control to minimize risk accidents work accidents are:
 - Elimination: Cannot be done
 - Substitution: Cannot be done
 - Engineering control: Cannot be carried out
 - Administration: Cleaning the starch machine
 - Personal Protective Equipment: Use of masks
 - d) When changing the beam the operator is hit by the roll of the beam with a risk score of 9 and has a High risk level with a ranking score of 6. Danger risk control to minimize risk accidents work accidents are:
 - Elimination: Cannot be done
 - Substitution: Cannot be done
 - Engineering control: Cannot be carried out
 - Administration: SOP, Safety Sign
 - Personal Protective Equipment: Not applicable
- 4) Cucuk stage
- a) During the cutting process there is dust flying with a risk score of 6 and has a Medium risk level with a ranking score of 13. Controlling the risk of danger to minimize the occurrence of accidents The risks of work accidents are:
 - Elimination: Cannot be done
 - Substitution: Cannot be done
 - Engineering control: Cannot be carried out
 - Administration: Regular dust cleaning, maintenance
 - Machine regularly
 - Personal Protective Equipment: Mask
 - b) Unergonomic sitting position with a risk score of 9 and has a High risk level with a ranking score of 7. Risk control dangers to minimize the risk of work accidents is :
 - Elimination: Replacing a seat with another more ergonomic
 - Substitution: Cannot be done
 - Engineering control: More ergonomic seating design
 - Administration: Change of seats
 - Personal Protective Equipment: Not applicable
 - c) Being hit by a thread beam during the process of changing the bow with a score risk of 6 and has a Medium risk level with a ranking score 14. Control the risk of danger to minimize its occurrence. Work accident risks are:
 - Elimination: Cannot be done
 - Substitution: Cannot be done



- Engineering control: Cannot be carried out
- Administration: Safety Signs, SOP
- Personal Protective Equipment: Not applicable

CONCLUSION

Based on the research results, it was concluded that:

1. Identifying the problems found for the risks of danger has a large level of risk, namely at the warping stage which includes On. When operating the machine the operator is not focused, the hood gets caught in the machine warping, Where the operator works with minimal blowers, When operating The machine operator does not focus on the hand or body part affected by the cut thread, the operator's body is exposed to the next rotation of the warping machine the spooling stage includes When changing the thread spool the operator does not focus then the hand is clamped by the machine, during the hooking process thread into the machine the operator's finger is exposed to a thread cut.
2. Assessment of the risk of work accidents in the preparation section of PT. GAJAH DUDUK with Low, High, Extreme risk levels is found in stages Warping, Spools,
3. Control efforts that have a large level of risk at PT.GAJAH DUDUK is at the Warping and Spools stage. with effort control at the warping stage is technical control in the form of installation of warping machine covers, administration in the form of safety signs,

safety briefing, SOP, addition of blowers, stage of personal protective equipment in the form of use of safety gloves, use of a facemask. At the spool stage administration in the form of safety briefings, safety signs, safety briefings, tools personal protection in the form of using safety gloves

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