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# A STUDY ON THE ANALYSIS OF CAUSES OF WORK ACCIDENTS IN GRINDING WORKERS USING THE SYSTEMATIC CAUSE ANALYSIS TECHNIQUE (SCAT) METHOD IN SUBCONTRACT X, PT X, NORTH JAKARTA

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**Abstract**

Based on data from the HSE department at PT X, North Jakarta, from 2021 to 2024, the highest number of occupational accidents (KAK) occurred among grinding workers, totaling 12 cases. The types of accidents experienced by workers included metal sparks in the eyes, cuts, lacerations, scratches, and first-aid injuries. The purpose of this study is to analyze the causes of occupational accidents among grinding workers at PT X using the Systematic Cause Analysis Technique (SCAT) method. This research is a descriptive-analytic study using observation, interviews, and documentation studies. The research was conducted between July and August 2025. The research population consisted of 32 people, including 30 grinding workers who had experienced accidents, 1 HSE manager, and 1 field coordinator. The sample for this study is the same as the population. Data analysis used univariate analysis and the SCAT method analysis. Based on the results, the most frequent accident experienced by grinding workers was metal sparks in the eyes, involving 30 respondents (100%). The direct causes of these accidents were the use of inadequate PPE by 15 respondents (50%) and the improper use of grinding tools by 11 respondents (36.7%). It is recommended that management commit to maximizing the implementation of established K3 (Occupational Health and Safety) programs and standards so that work-related accidents can be prevented and zero accidents can be achieved.

**Keywords:** Accident cause analysis, SCAT method, grinding.

**Abstrak**

Berdasarkan data dari departemen HSE di PT X, Jakarta Utara, tahun 2021 - 2024 kecelakaan akibat kerja (KAK) terbanyak dialami oleh pekerja gerinda, yaitu sebanyak 12 kasus, dan jenis KAK yang dialami pekerja adalah mata terkena percikan gram gerinda, luka sayat, luka sobek, luka gores, dan *first aid*. Tujuan penelitian ini adalah untuk melakukan analisis penyebab kecelakaan akibat kerja pada pekerja gerinda, PT X dengan menggunakan metode *Systematic Cause Analysis Technique* (SCAT). Jenis penelitiannya adalah deskriptif analitik dengan metode observasi, wawancara, dan studi dokumentasi. Penelitian dilakukan pada

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bulan Juli – Agustus 2025. Populasi penelitian sebanyak 32 orang, yaitu 30 orang pekerja gerinda yang pernah mengalami KAK, 1 orang *manager HSE*, dan 1 orang koordinator lapangan. Sampel penelitian ini sama dengan populasi. Analisis data yang digunakan, yaitu analisis univariat dan analisis metode SCAT. Berdasarkan hasil penelitian didapat kecelakaan terbanyak dialami pekerja gerinda adalah mata terkena percikan gram sebanyak 30 responden (100%), dan penyebab langsung kecelakaan tersebut karena pekerja menggunakan APD yang tidak memadai 15 responden (50%) dan 11 responde (36,7%) penggunaan alat gerinda yang tidak sesuai. Disarankan kepada pihak manajemen untuk komitmen melaksanakan secara maksimal program dan standar K3 yang telah dibuat, agar kecelakaan akibat kerja dapat dicegah dan nihil kecelakaan dapat tercapai.

**Kata kunci :** Analisis penyebab kecelakaan, metode SCAT, gerinda.

## 1. INTRODUCTION

Occupational accidents are a common problem faced by workers in the workplace. An accident is any unplanned event that causes or has the potential to cause injury, illness, damage, or other losses (AS/NZS Standard 4801:2001). Meanwhile, according to OHSAS 18001:2007, an occupational accident is defined as a work-related event that can cause injury or illness (depending on severity), fatalities, and events that can cause environmental damage.

According to data from the International Labor Organization (ILO), there is an average of 99,000 cases of work-related accidents per year in Indonesia. From that total, approximately 70% result in fatal consequences, namely death and lifelong disability. Based on accident data in the DKI Jakarta region, the BPJS Ketenagakerjaan regional office for DKI Jakarta showed that from January to December 2015, there were 105,182 occupational accident cases, with 2,375 fatalities, resulting in work safety guarantee (JKK) losses/claims of Rp 150 billion and death guarantee (JKM) claims of Rp 68 billion (Pos Kota, 2016). Amri (2016) revealed that four things cause this high rate of work accidents. First, the implementation of Occupational Health and Safety (K3) in companies and society is still low; second, the implementation of K3 inspection testing is low; third, the quality and quantity of supervisory officers, both labor inspectors and K3 inspectors, are low; and fourth, the duties and functions of supervisory officers since regional autonomy have not been maximized, especially in supervising K3.

Occupational accidents can be caused by two factors: unsafe human acts and unsafe conditions. Several research results show that human factors have an important influence on the occurrence of occupational accidents. Heinrich (1980) conducted an analysis of 75,000 accident reports in companies and developed the domino theory. The results of his analysis showed that 88% of accidents were caused by unsafe human acts.

Work-related accidents are the worst thing to handle because no one wants them to occur. If a work accident has occurred, we must conduct an investigation to identify the root cause of the accident. Work accident investigation is an effort to control and prevent production activity losses arising from work accidents. A work accident investigation is an activity of examination and inquiry into accident cases conducted to learn more about the events that occurred. Implementing an accident investigation is a necessity and an effective technique for preventing the same accidents in the future. Accident investigations are carried out to determine the causes of accidents and then determine how the occurring accidents can be reduced or eliminated (National Safety Council, 1985). An accident investigation is an

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effort or action to enrich information about an accident event, look for causes, identify the most important aspects of an event, and find the errors that occurred so they caused the accident (Bird, 1990). Accident investigation is a series of activities carried out to find the main cause of an accident and accurately determine the corrective actions to be taken after finding the actual facts and the cause. Based on existing definitions of accidents, accident investigators must carefully look at the sequence of events and the factors involved during the accident (Covan in Permatasari, 2009). SCAT is a tool used to evaluate and investigate incidents using a SCAT chart. SCAT was developed from the ILCI (International Loss Control Institute) Loss Causation Model.

The causes of occupational accident cases can be identified by conducting investigation efforts, one of which is using the Systematic Cause Analysis Technique (SCAT) method, which is to find and determine the root causes of accidents and provide recommendations for corrective actions for a job.

The purpose of an accident investigation is to collect data/information as material for analysis to determine the actual cause of the accident so that appropriate corrective actions can be created to prevent similar accidents. Additionally, it aims to find out what actually happened and find the best solutions to overcome accident-related problems. The general purpose of conducting an accident investigation is to prevent the same occurrence in the future. Furthermore, it is to identify the cause of the accident, as the information obtained will be needed to avoid the same accident. Accident investigations are also carried out to collect clear evidence and facts to formulate solutions for the accident that occurred. They can then help assess the losses incurred.

PT X is a company engaged in the shipbuilding industry and was established in 1972 in North Jakarta. The company has built and repaired various types of ships made of steel, iron, aluminum alloy, fiberglass-reinforced plastic, and others. In the process of building these ships, many machines and heavy equipment are used. Activities carried out by PT X include dismantling, checking, welding, painting, repairing, cleaning, installation, and grinding. In each of these jobs, there are hazards that, if contact occurs, can cause work accidents. One of the jobs at PT X that has a high level of hazard is grinding. Grinding is the work most frequently performed to complete the construction of the ship's hull.

Based on data obtained from the HSE department, from 2021-2024, there were 47 recorded occupational accident cases at PT X, with the highest cases occurring among grinding workers. Occupational accidents in grinding in 2021 saw 9 cases, 1 case in 2022, and 2 cases in 2024. The most frequent case experienced by grinding workers is metal sparks from grinding (iron, steel, aluminum, and stainless steel) entering the eyes, and such cases occur almost every week. Other occupational accidents experienced by grinding workers include deep (serious) lacerations and cuts affecting the fingers, palms, back of the hand, arms, and face. Additionally, there are cases of electric shock and many other first-aid cases.

Investigation results conducted by HSE officers show that these accident cases were caused by unsafe acts from workers, namely not using PPE or using inappropriate PPE, as well as installing grinding tools not in accordance with procedures. These accident cases resulted in lost work days, ranging from 1 to 30 days, depending on the severity. According to HSE officers, the medical costs spent on these accidents range around ± Rp. 60,000,000. Based on the researcher's observations in the field, some workers were seen not using PPE, such as not using combination gloves, clear-type safety spectacles, and earplugs during grinding work, as well as using inappropriate PPE, such as using cotton gloves or using

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clothes/cloth as masks which can be dangerous if caught while grinding. Many worker postures during grinding are still non-ergonomic (awkward), such as tilting the head up ± 20° or bending ± 60°; furthermore, work is sometimes done while squatting, and the housekeeping of the work area is messy, which can endanger the workers themselves. According to information from workers, they have worked in the grinding section for 2 to 10 years; besides experiencing accidents, they also experience other complaints, such as muscle pain, fatigue, mild hearing loss, and skin dermatitis (red and itchy skin).

According to HSE officers, to implement K3 in the company, K3 programs have been created, but some of these programs have not been implemented maximally, such as the standard for written inspection report analysis, given the limited HSE staff, the mismatch between education and HSE duties, and the fact that some HSE officers are not committed or firm regarding the K3 programs and standards that have been established.

Based on this background, the author is interested in conducting research on the analysis of the causes of occupational accidents among grinding workers at Subcon X, PT X, North Jakarta.

## 2. RESEARCH METHODOLOGY

### 1.1. Type of Research

The type of this research is descriptive-analytic using observation, interviews, and documentation study approaches to identify the causes of occupational accidents using the SCAT method.

### 1.2. Research Location and Time

This research was conducted at Subcon X, PT X, located in North Jakarta. The research period was from July 26 to August 24, 2025.

### 1.3. Population and Sample

The research population consists of grinding workers, the HSE manager, and the field coordinator, with a total population of 32 people, detailed as: 30 grinding workers, 1 HSE manager, and 1 field coordinator at Subcon X. In this study, the sample is equal to the population, which is 32 people.

### 1.4. Data Collection

The data collected consists of:

a. Primary Data Primary data were obtained from direct observation at the work site and interviews with grinding workers, the HSE manager, and the field coordinator at Subcon X, PT X, North Jakarta.
b. Secondary Data Secondary data were obtained by reviewing accident data that occurred at Subcon X among grinding workers through the HSE department archives/documentation and by conducting a literature study.

### 1.5. Data Analysis

The research data obtained were analyzed using univariate analysis to describe the characteristics of each variable studied. Furthermore, occupational accidents occurring among grinding workers were analyzed using the SCAT method to identify the most frequent causes of occupational accidents, thereby obtaining direct causes, basic causes, and root problems of events that are expected not to recur in the grinding process.

## 3. RESULTS AND DISCUSSION

### 1.1. Results

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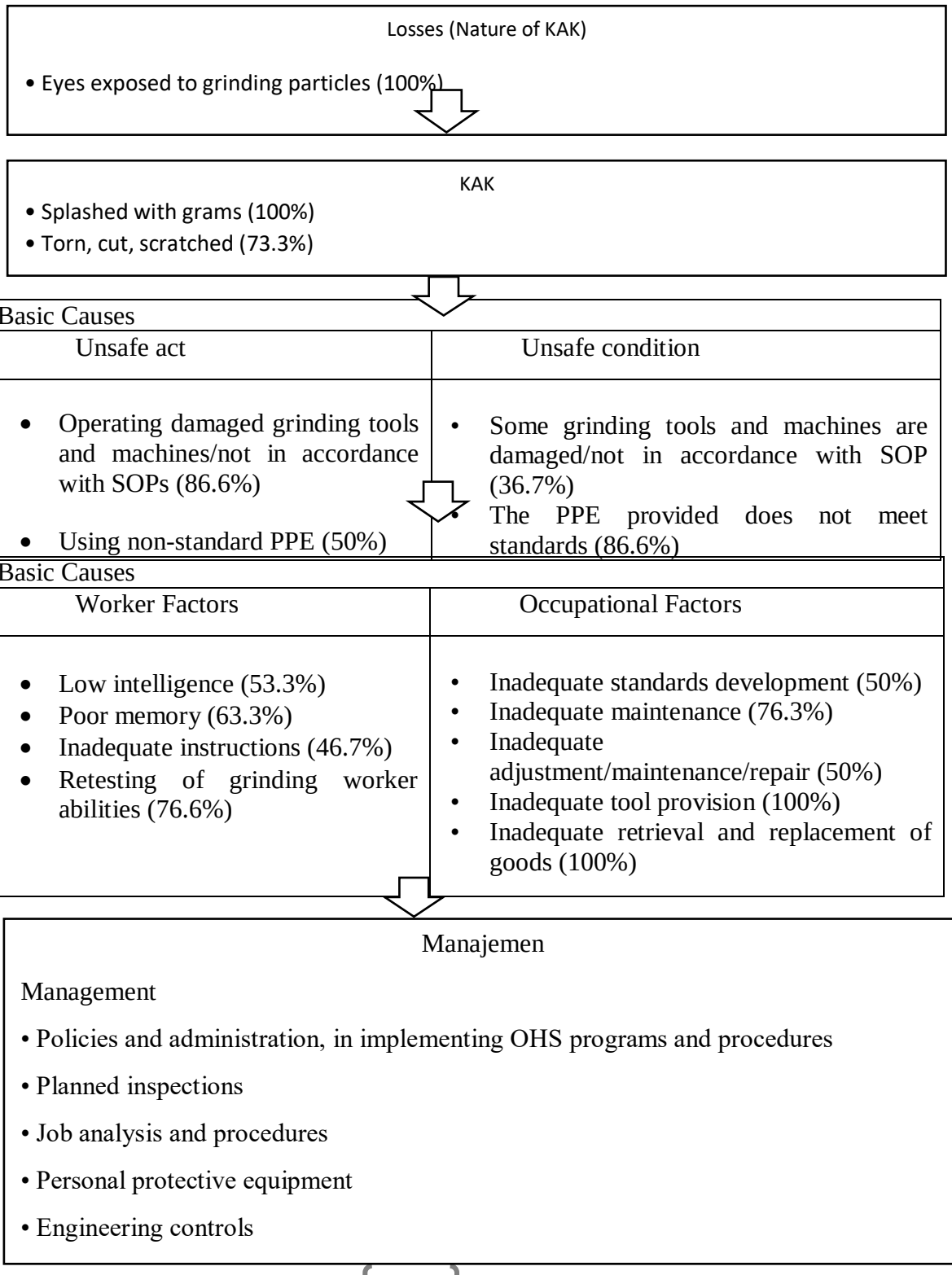
Based on field observations, interviews with grinding workers, the HSE manager, and the field coordinator, as well as documentation studies of past accidents, the occupational accidents occurring at Subcon X, PT X, can be mapped using the SCAT method in the following chart:

**Chart 1 Causes of Occupational Accidents (KAK) at Subcon X, PT X, North Jakarta.**



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## Discussion

### a. Management

The suboptimal implementation of existing K3 (Occupational Health and Safety) programs and standards is related to management functions ranging from planning, organizing, leadership, and controlling (Bird, 1980). In the planning function, the focus must be on operational tasks and K3 efforts prepared to prevent accidents. In the implementation function, what has been planned should be executed well. Because accidents are mostly caused by human factors, management is required to provide clear instructions and guidelines in carrying out duties and responsibilities. Supervision in K3 management determines the success rate of accident prevention efforts; additionally, there needs to be an understanding of accident prevention programs, an understanding of existing standards, and the coaching, measurement, and evaluation of HSE member performance. Without proper control from management, losses in the form of accidents will occur (Bird, 1980).

Other programs that have not run optimally include planned inspections, job and procedure analysis, accident analysis, and engineering controls. Inspection is a tool for supervising and monitoring management programs to see if they operate according to established standards and regulations. Interviews with the HSE manager and field coordinator revealed that scheduled and well-executed inspection programs are currently limited to fire extinguishers, while others are not yet implemented. Procedures for follow-up on inspection results exist as a program but are not yet in writing, and implementation has not been maximized; no written reporting system has been created, and the maintenance of reports and monitoring of inspection programs have not been established.

Job and procedure analysis, such as JSA (Job Safety Analysis) for grinding work, has not been conducted. Furthermore, job and procedure analyses for critical tasks have not been created for supervisors and foremen. The existing accident analysis program is also not performed optimally, especially regarding the required follow-up; consequently, improvements for problems or field findings are hindered, leading to recurring accidents.

Interviews with grinding workers revealed that the accidents they experience occur almost every week, such as metal sparks in the eyes, cuts, lacerations, and scratches due to grinding. Based on field observations regarding these accidents, many grinding workers still do not use PPE that meets standards. Non-standard PPE used includes cotton gloves; not wearing special grinding work clothes such as aprons or heat-resistant and spark-resistant clothing (e.g., leather or thick denim); and not wearing protective goggles or eye protection, instead using cloth or t-shirts to cover their faces.

Every work accident is essentially a sign of imbalance or discrepancy in the application of management programs and standards, and a sign of a problem that must be immediately corrected. If work accidents are not promptly followed up, the potential losses could increase. Regarding engineering controls, the assessed points are design considerations, work processes, and periodic monitoring. Engineering control also includes the care and maintenance of machinery and tools used, but this program has not been run optimally at PT X. This is evident from field conditions where some grinding machines used are damaged or worn out; this must be repaired immediately because failing to consider the work process or

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tool design can create new hazards or cause accidents. According to Oxenburg (2000), engineering controls are estimated to reduce accident risks by 70% - 90%.

Personal communication is an essential element in preventing accidents. Bird (1980) states that in fulfilling programs and standards, good communication is necessary in work to avoid errors, misunderstandings, and failure to achieve goals. If every K3 program and standard in management is implemented fully and maximally, it will certainly yield the results and objectives expected by the policymakers. Reason (1997) argues that if every element within an organization operates harmoniously, it will produce an efficient and safe operational system.

**b. Basic Causes**

**1. Personal Factors**

- Insufficient intelligence level (53.3%)
- Poor memory (63.3%)
- Inadequate instructions (46.7%)
- Re-testing of grinding workers' skills (76.6%)

The research found that 30 (100%) respondents experienced fatigue due to lack of rest, 30 (100%) were exposed to occupational health hazards, 30 (100%) were exposed to heat, and 30 (100%) experienced oxygen deficiency. Observations showed that during breaks (coffee time and lunch), workers rested in work areas directly exposed to heat (sunlight). This causes rest periods—which should provide comfort—to be uncomfortable. Generally, a person works effectively for 6-8 hours a day. The remaining time (16-18 hours) is used for family/social life, rest, and sleep. Extending work hours beyond this capacity usually results in low efficiency, decreased productivity, and a tendency toward fatigue, illness, and accidents. Typically, a person works well for 40-50 hours a week; exceeding this increases negative tendencies. The longer the work hours, the greater the possibility of undesired events (Suma'mur, 2009).

Additionally, 30 (100%) workers experienced oxygen deficiency. Air pollution by particles can be caused by natural events or human activity through industry and technology. Using masks with material that is too dense can also interfere with lung ventilation and oxygenation. Dense materials obstruct airflow into the nasal cavity, hindering oxygen circulation. Other factors like high temperatures make the workload feel heavier as heat reduces comfort. Similarly, oxygen deficiency increases the risk of respiratory disorders; low oxygen in the bloodstream leads to easy fatigue and poor concentration. High-temperature influences can pose work accident risks (ILO, 2004).

**2. Job Factors** Analysis found that 25 (83.3%) respondents stated that standard communication was inadequate. According to worker information, they often experience unclear, confusing communication between superiors and workers. This can be linked to the loud noise at the workplace generated by the grinding process. OSHA (Occupational Safety and Health Administration) states that noise affects memory and concentration, resulting in psychological fatigue and an inability to understand instructions related to the worker's intelligence level. From an ergonomic perspective, every workload received must be balanced against human physical and cognitive abilities/limitations. Any job, whether requiring muscle strength or thought, is a burden. Excessive workload or weak physical capacity can lead to occupational disorders, diseases, or accidents. Inadequate initial operation monitoring (6.7%) and mismatch between ability and task (16.7%) affect the grinding process. If pre-work monitoring is not consistent, hazards will not be identified or

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corrected, becoming sources of accidents. Low knowledge regarding the job makes proper tool usage, installation, and accident prevention difficult. According to The Ministry of Labour, applying appropriate knowledge and methods is vital to preventing accidents.

**c. Direct Causes**

Unsafe Conditions: Results show 30 (100%) respondents reported complaints due to noise, and 30 (100%) stated that workplace lighting was inadequate. According to Bridger (1995), factors causing accidents—both from occupational diseases and accidents—can disrupt a laborer's work capacity. For instance, insufficient lighting intensity usually tires the eyes. Loud noise affects memory and concentration, leading to psychological fatigue.

Unsafe Acts: Direct causes of accidents among grinding workers include: use of inadequate PPE (50%) and operating grinding machines with inappropriate or inadequate grinding stones (33.3%). this is related to inadequate knowledge of grinding work and insufficient training. Suma'mur (1996) emphasizes that safety education or training is vital, especially for new workers lacking experience. Having job knowledge and correct tool usage significantly influences behavior, turning unsafe acts into safe ones.

Furthermore, PPE that does not meet standards (50%) in terms of feasibility and provided quality is a cause of accident rates. Research by Pertiwi et al. (2013) states that grinding has many potential hazards, necessitating the provision and use of safety equipment such as safety goggles, face shields, masks, earplugs, safety gloves, wearpacks, safety shoes, and safety helmets. Bird (1980) formulated that safe performance is influenced by knowledge, skills, motivation, and work procedures.

**d. Accidents and Losses**

All 30 (100%) grinding workers experienced accidents where metal sparks entered the eyes. Questionnaire results indicate these occurred because PPE was not used correctly or did not meet standards. Respondents noted that non-standard PPE conditions were due to damage, limited stock, work interference, discomfort, or being accustomed to not using it. Inspection, analysis, and follow-up programs for accidents were also inadequate. Heinrich (1980) stated that 80-90% of accidents are caused by human error. According to Bird (1980), the basic cause of accidents arises from weak management supervision, as unsafe acts and conditions stem from this. Every accident is a loss for both the worker and the company. The company is obligated to provide costs for medical treatment, care, transportation, disability compensation, and damage costs. Inadequate worker knowledge regarding safe machine use and procedures is linked to insufficient initial training and orientation during recruitment. Besides eye injuries, 22 (73.3%) respondents experienced cuts, lacerations, and scratches ranging from minor to deep/serious. Every accident is a loss; besides harming the worker, the company suffers losses such as first aid costs, medical treatment, hospital fees, and transportation. This aligns with Bird's (1980) Iceberg Theory, where accident losses are measured by both direct and indirect costs. Thus, calculating the magnitude of loss is important, but total costs must be based on actual costs to serve as a guide for positive actions like K3 promotion and accident prevention (ILO, 1989).

## 4. CONCLUSION

### 1.1. Conclusion

Based on the results of the univariate analysis and analysis using the SCAT method, with discussions referring to the objectives regarding the analysis of the causes of

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occupational accidents among grinding workers using the SCAT method at Subcon X, PT X, North Jakarta, it can be concluded as follows:

a. The most frequent loss in the form of occupational accidents (KAK) experienced by workers was metal sparks in the eyes, involving 30 respondents (100%), and the most severe type of KAK was injury events (lacerations, cuts, and scratches) due to grinding, involving 22 respondents (73.3%).
b. The most common accidents experienced by grinding workers involved 30 respondents (100%) being hit by sparks, lacerations, and cuts.
c. The direct causes of KAK from unsafe conditions were highest for noise and inadequate lighting, involving 30 respondents (100%), while unsafe human acts included the use of inadequate PPE by 15 respondents (50%) and the non-standard operation of grinding tools by 10 respondents (33.3%).
d. The basic causes of KAK were fatigue involving 30 respondents (100%) in personal factors and inadequate communication standards involving 25 respondents (83.3%) in job factors.
e. Regarding management, from several existing programs, overall standards have been created and implemented; however, several items have not been executed maximally, namely policies and administration, planned inspections, task analysis & procedure, accident investigation monitoring, accident analysis, personal protective equipment, engineering control, and personal communication.

### 1.2. Recommendations

Recommendations are addressed to the management and workers, including:

**a. Management**

1. It is expected that management maintains the performance and implementation of K3 programs and standards that are already running well and maximally.
2. It is expected that they create standards and maximize implementation, especially regarding planned inspections, task analysis & procedure, accident investigation monitoring, accident analysis, personal protective equipment, engineering control, and personal communication.
3. It is expected that in the recruitment of workers to be placed in the company, testing of skills and knowledge is conducted so that they align with the workers' own abilities.
4. It is expected that management holds adequate and periodic training or coaching for grinding workers, along with evaluations of their skills, both pre- and post-training, so that workers can improve and update their knowledge and abilities.
5. It is expected that management provides a proper and designated rest area for workers that is not directly exposed to high temperatures (sunlight) and increases tree planting within the company area to reduce heat and pollution generated from the shipyard work processes.

**b. Workers**

1. Workers must comply with the regulations created and enforced by the company and must always use PPE while working, such as earplugs, face shields, safety goggles, wearpacks, safety shoes, helmets, combination gloves, and masks.

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2. Workers must have high motivation to improve their skills and knowledge related to the work performed.
3. Workers must make the best use of available rest time to restore their energy.

## 5. REFERENCES

Ahli K3 Umum, https://sistem manajemen keselamatan kerja. blogspot. co.id /2013/09/kerugian-kecelakaan-kerja-teori-gunung.html ( 16 Agustus 2016)

AS/NZS 4801:2001, *Australian/New Zealand Standard Occupational Health and Safety Management System scope only*. dari : http://shop.standards.co.nz/scope/ASNZS4801-2001.scope.scope.pdf

*Australian Standard/New Zealand Standard* 4360. 1999. *Risk Management Guidelines*. Sydney. ICAM. Investigation Guidelines

Bird, *Loss Control Management*, Georgia, The Institute Press, 1980.

Departemen Tenaga Kerja dan Transmigrasi Republik Indonesia. 1998. *Peraturan Menteri Tenaga Nomor: PER.03/MEN/1998 Tentang Tata Cara Pelaporan dan Pemeriksaan Kecelakaan.* Jakarta: Depnakertrans

Depnaker R.I. 1997. *Keputusan Menteri Tenaga Kerja Republik Indonesia Nomor : KEP-81/MEN 2000 Tentang Kelengkapan Organisasi dan Tata Departemen Tenaga Kerja.* Jakarta : Depnaker.

Departemen tenaga kerja dan transmigrasi. 2005. *tentang keselamatan dan kesehatan kerja (K3).*

Frank E. Bird, Jr. and George L, Germany. 1985. *Practical Loss Control Leadership*. Georgia : Loganville

_____ ,1996. *Practical Loss Control Leadership*. Georgia : Loganville

Hermiyanti, Dyah. 2012. *Analisis Penyebab Kecelakaan Fatal Jatuh Dari Kapal Pada Transportasi Air Survei Seismik 2d Pt. X*. Tidak Dipublikasikan. Tesis. Simenggaris Kalimantan Timur : FKM UI

Hinze, Jimmie, W. 1997. *Construction Safety*. Prentice Hall Inc.. New Jersey.

Husni, Lalu. 2003. *Hukum Ketenagakerjaan Indonesia*. Jakarta: PT Raja Grafindo Persada.

H.W Heinrich. Dan Petersen. Nestor Roos. (1980) Industrial Accident Prevention, dikutip dari *International Labour Organization* (ILO),

Multidisciplinary Indonesian Center Journal (MICJO)
Journal page is available to
https://e-jurnal.jurnalcenter.com/index.php/micjo
Email: admin@jurnalcenter.com

www.ilo.org/jakarta/info/public/pr/WCMS_155174/.../index.htm (04 agustus 2016, 13:18 WIB)

*International Labour Organization* (ILO), 2004. Keselamatan dan Kesehatan Kerja di Indonesia.

ILO, *Encyclopedia Of Occupational Health and Safety*, Gewana, 1989

*International Labor Office.* 1989. *Buku Pedoman Pencatatan Kecelakaan, Seri Manajemen No. 132*. Jakarta : PT. Pustaka Binaman Pressindo.

Kristiyanto, Samuel. 2013. *Analisis Kecelakaan Kerja di Ketinggian Dengan Menggunakan Metode Systematic Cause Analysis Technique Pada Pekerjaan Pemasangan dan Pembongkaran Kayu Proyek Hotel Margo PT BAM Decorien, Depok.* Tidak Dipublikasikan. Skripsi. Jakarta : Universitas Respati Indonesia.

Mangkunegara. 2002. *Manajemen Sumber Daya Manusia Perusahaan*. Bandung: PT Remaja Rosda Karya.

Mayendra, Oni. 2009. *Analisis Penyebab Kecelakaan Kerja Berulang di PT. X*. Tidak Dipublikasikan. Skripsi. Jakarta: FKM UI.

Oberlender, Garold D. *Project Management for Engineering and Construction.* McGraw-Hill.2000

OHSAS 18001: 2007. *Occupational Health and Safety Management System -Requirements.*

Peraturan Menteri Tenaga Kerja Republk Indonesia Nomor : PER.03/MEN/1998 *Tentang Tata Cara Pelaporan dan Pemeriksaan Kecelakaan.*

Pertiwi, Andhini Dwi., Sugioni., dan Efranto, Remba Yanuar. 2013. *Implementation Of Job Safety Anakysis (JSA) In Prevention Of Work Accident.* Jurnal. Malang : Universitas Brawijaya.

Poskota News, http://poskotanews.com/2016/01/19/sektor-konstruksi-rajai-kecelakaan-kerja-di-dki/ (02 Agustus 2016)

Prastiyo, Ardi. 2015. *Usulan Perbaikan Sistem Keselamatan Dan Kesehatan Kerja (K3) Pemanenan Kelapa Sawit Menggunakan Metode Systematic Cause Analysis Technique (SCAT)*. Tidak Dipublikasikan. Skripsi. Pekan Baru Riau: Universitas Islam Negeri Sultan Syarif Kasim.

Reason, J T 1997. *Managing the risk of organizational accidents*. England: Ashgate Publising Ltd.

Multidisciplinary Indonesian Center Journal (MICJO)
Journal page is available to
https://e-jurnal.jurnalcenter.com/index.php/micjo
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Republik Indonesia. 1996. *Peraturan Menteri Tenaga Kerja Nomor 5 Tahun 1996 tentang Manajemen Sistem Keselamatan dan Kesehatan Kerja*. Jakarta : Sekretariat Negara.

Susetyo, http://susetyo.staff.gunadarma.ac.id /Downloads /files/ 45233/ Materi +mesin+ gerinda. doc. ( 16 Agustus 2016)

Silalahi and Bennet N.B. 1995. *Manajemen Keselamatan dan Kesehatan Kerja*, Jakarta : PT Pustaka Binawan Pressindao.

Soekidjo, Notoatmodjo. 2010. *Metodologi Penelitian Kesehatan*. Rineka Cipta, Jakarta

Sulaksmono, M. 1997. *Manajemen Keselamatan Kerja*. Surabaya: Penerbit Pustaka.

Suraji, Akhmad, 1996. *Keselamatan kerja dan pencegahan kecelakaan.* Jakarta: Toko Gunung Agung

Suma'mur, PK, 2006. Higene Perusahaan dan Kesehatan Kerja. Gunung Agung, Jakarta.

_____ ,1981. *Keselamatan Kerja dan Pencegahan Kecelakaan.* Jakarta: Gunung Agung

Sumarjono, R. 1996. *Accident Investigation.* PT Patri Utama Humanindo,

*Undang-Undang Nomor 1 tahun 1970 tentang Keselamatan dan Kesehatan Kerja*. Jakarta: Kementerian Tenaga Kerja dan Transmigrasi Republik Indonesia.