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Analysis of Factors Causing the Risk of Work Accidents in the Construction Work of the CWI-02 ITS Surabaya Building Package

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ABSTRACT

Construction projects are inherently associated with high-risk environments that can lead to work accidents if not managed properly. This study focuses on analyzing the factors that contribute to occupational accidents in the construction of the CWI-02 Package Building at ITS Surabaya. The primary objective is to identify key risk factors that compromise occupational safety and health (OSH) and propose strategies for risk mitigation. Utilizing both qualitative and quantitative approaches, data were collected through questionnaires, interviews, and field observations involving 30 respondents, including contractor staff, field workers, and supervisory consultants. The study employed the Risk Breakdown Structure (RBS) method to categorize risks into environmental, human, and system factors. Findings reveal that labor indiscipline (93.33%), rejection of personal protective equipment (90.00%), and the lack of standardized OSH implementation (86.67%) are the primary contributors to workplace accidents. Environmental factors, such as extreme weather and unsuitable raw materials, further exacerbate these risks. The study highlights the critical need for comprehensive OSH management, regular safety training, and strict enforcement of safety regulations to reduce work-related accidents. These findings provide valuable insights for construction project stakeholders to improve safety standards and promote a safer working environment, ultimately enhancing project efficiency and worker well-being.

INTRODUCTION

In the development of progress in the 4.0 era at this time it is very important for us as part of Indonesian citizens to take an active or passive role in helping the progress of this country, especially in the field of state development. Whether it's physical building work, road and bridge infrastructure development or development in the water resources sector. This is because the Indonesian state is one of the developing countries with a relatively large population of around ± 275 million people, so we as part of the Indonesian Construction sector workers are obliged to participate in realizing the noble ideals of the predecessors of this nation. In addition, this country also has provisions that are very supportive for the formation of the nation's progress in 2045, namely as a golden age with the number of productive population in Indonesia in that year increasing and proportional to the development of community needs, it must also be supported by progress, especially in the education sector starting from the increasingly massive physical construction of elementary school buildings, junior high school buildings to high school, and also university higher education buildings. In addition to physical building work, we can also see the increasing number of road and bridge infrastructure development works and air infrastructure that are currently underway or already functioning in the form of airport development and new airport construction. And we should not put aside the development of infrastructure in the field of Water Resources in various regions throughout Indonesia. Both the construction of DAMs, Dams and also the construction of irrigation channels and urban drainage which are being massively carried out in various places.

As we already know, any construction project development that is being carried out is quite identical to the occurrence of work accidents. This is because construction projects are one of the work sectors that have a negative risk level and work accidents also occur. This incident can occur due to the low awareness of several related parties who have an interest in the project environment to prioritize and implement a good Occupational Safety and Health (K3) system and in accordance with applicable laws and regulations. Occupational safety is a specialization of health science and its practice which aims to ensure that workers or working communities obtain the highest degree of health, both physically, mentally, and socially with preventive efforts against diseases / health problems caused by work and environmental factors and against general diseases (Urip Santoso, 2015).

Often the application of the Occupational Safety and Health (OHS) system in a construction project development is considered to only burden the costs of construction service providers, and still do not have the awareness that the Occupational Safety and Health (OHS) system to be implemented can be in addition to an investment to prevent work accidents can also provide positive benefits to reduce the increasing level of losses from the construction project activities themselves if something negative happens.

Occupational Safety and Health (K3) is one of the most important fields in a work section that is closely related to the sustainability of the health, safety, and welfare of every individual human being who works or does activities within the scope of an institution or at a project site. In K3, there are three main problems of work accidents, namely events that occur by chance, conditions and actions or actions that are harmful, and result in work accidents (Habir & Mardianti, 2022). The purpose of implementing the implementation of Occupational Safety and Health (K3) in the scope of project work is to maintain the health and safety of the worker's own environment, as well as protect fellow workers, workers' families, consumers, and other people around the project who may also be affected by the activities of the work environment conditions being carried out. Next, work safety is also about making safe working conditions equipped with work safety equipment, good lighting conditions, and keeping floors and stairs free from liquid water, liquid oil, mosquitoes and maintaining good water facilities (Paramita et al., 2012)To realize all of this, a team is needed within the Occupational Safety and Health (K3) organizational structure starting from K3 officers, K3 Supervisor Staff to K3 Experts have an obligation to ensure that every worker and other people involved or other people around their work project environment remain in a safe condition at all times. The steps that need to be implemented in order to create safe conditions, it is necessary to have practices and simulations about Occupational Safety and Health (OHS) at every moment of work time, which can be carried out in the morning or once a week and so on, the material includes preventive measures, emergency response information in the event of a work accident, sanctions for violating OHS rules, and compensation provided in the event of a work accident, it is also necessary to provide information on how to heal wounds and care for workers who are resting due to work accidents, and provide health care workers, and sick leave for those who need it.

From the existing data that the construction sector is one of the contributors to the high number of accidents. According to research data from the United Nations agency for international labor, namely *The International Labor Organization (ILO)*, whose research results aim to encourage the presence of opportunities to obtain decent, productive work, freely, fairly, safely, and with dignity. *The International Labor Organization (ILO*) states that every year more than 1.2 million people die due to work accidents or due to work-related diseases. And based on data that has been studied, there is an estimate of ± 250 million work accidents and around ± 160 million contracted diseases caused by work activities that have been carried out. One of the work sectors that has the highest number of work accidents, occurs in the construction sector with a percentage reaching 31.9%. Based on *The National Institute for Occupational Safety and Health* (NIOSH), work in the construction sector is one of the most dangerous jobs in the world, because it produces the most death rates and often occurs among other sectors. Meanwhile in Indonesia, data on work accidents according to the Ministry of Manpower Satudata, which is available on the Indonesian Manpower Data Portal. In 2023, the number of work accident cases in Indonesia was recorded at 370,747 cases. Of these, around 93.83% were cases of wage earner participants, 5.37% were cases of non-wage earner participants, and around 0.80% were cases of participants in the construction services sector. This happens because in the process of building construction projects the activities carried out contain many elements of danger. Meanwhile, from the BPJS Employment data center in 2022, there were 36 million workers recorded as active participants out of a total of 131.06 million workers throughout Indonesia.

If we trace back, according to Indonesian Law No.1 of 1970 concerning Occupational Safety, Law No.3 of 1992 concerning Labor Social Security (JAMSOSTEK), Law No.23 of 1992 concerning Occupational Health, Law No.18 of 1999 concerning Construction Services, Law .23 of 2002 concerning Building, Law No.13 of 2003 concerning Manpower and Regulation of the Minister of Manpower No. Per.05 / Men / 1996 concerning Occupational Safety and Health Management System . All the regulations listed above have regulated in detail regarding Occupational Health and Safety (K3) for all elements that are active working in the construction environment. But in reality, service providers / project implementers often ignore the requirements and regulations in Occupational Safety and Health. addition, the existence of regulations regarding occupational safety and health is not balanced by balanced legal protection and strict and severe sanctions for violators. Therefore, to realize it, the regulation of occupational safety and health is absolutely the responsibility of all parties involved in construction projects. So that the success of a project is greatly influenced by various factors, one of which is the factor of work accidents in construction projects which of course can hinder the performance and achievement of project goals that have been planned from the start. Therefore, procedures and implementation of occupational safety and health must be considered because of the impact of work accidents that can arise at any time and will be able to hamper the work being done in the construction project.

In every construction project work process, we always prioritize the application of the Occupational Health and Safety (OHS) system, whose main objective is to minimize the risk of work accidents and minimize the risk of occupational disease impacts in the construction project environment. So it is necessary to have regulatory standards in the application of the Occupational Health and Safety (OHS) system which we usually call

Construction OHS Risk Management. Even though the use of complete PPE can minimize the risk of injury (Fasahri et al., 2024). The implementation of Construction OHS Management aims to minimize the consequences of negative impacts or adverse impacts that may occur in an activity in the field of Construction Services. We can implement Construction OHS Management through a process that starts from planning, identifying, analyzing, handling, and monitoring risks. In addition, construction OHS management also aims to identify sources of risk and negative uncertainties that will occur, determine the effects that will occur, and determine the appropriate response so that the impact that occurs can be minimized. In addition, the purpose of construction OHS management is not only to reduce the risk of negative impacts that occur, but can also be used by a leader in making decisions in the construction project work environment in estimating the risks that will occur in order to avoid negative impacts that will occur during the process of carrying out work in the field. As for some of the best steps to minimize the occurrence of work accidents, namely by using personal protective equipment (PPE) which must be used by every construction worker who works in the field of construction projects. In addition to the use of personal protective equipment (PPE), the completeness of project safety facilities is also very necessary to minimize the occurrence of work accidents, such as: safety nets, signs, K3 warning banners, hydrants, warning lights, warning alarms, etc. (Fasahri et al., 2024).

On the basis of the thoughts that have been conveyed above, as well as the existence of several existing desires regarding the application of the Occupational Health and Safety (OHS) system in the form of OHS Management in all construction project work activities. So the researcher wants to raise material about K3 management in building construction work projects, especially educational buildings. The object of research on educational buildings referred to here is the construction of lecture buildings or campus learning centers. The availability of adequate and sustainable higher education facilities on campus is an urgent need to support the implementation of national development. The campus world has produced many superior generations in all aspects / lines in this beloved country. In addition, University higher education is one of the basic needs that is indispensable in improving the quality of life of human resources (HR) and is able to increase the economic growth of a region.

To support the goal of developing the quality of human resources (HR) in the University environment, as well as a close relationship in the process of building construction in accordance with the rules of applying the Occupational Health and Safety (K3) system in the form of K3 Management in all construction project work activities, the object to be taken is the campus of the Institute of Technology ten November (ITS) Surabaya. As for what makes the basis for this research, namely because of the long history of the establishment of an engineering campus in the city of Surabaya which has created many great intellectual human resources (HR) in this beloved country. According to existing historical data, as the initial initiator, the idea of establishing the Sepuluh Nopember Institute of Technology (ITS) was sparked by Ir. Soendjasmono (PII East Java representative) in 1954. The idea to establish an engineering college in East Java was presented at the PII CONFERENCE in Bogor. A little history that we can take from the page https://www.its.ac.id/id/tentang-its/sejarah/ that August 17, 1957 - The history of the establishment of the Sepuluh November Institute of Technology began with the proposal to establish the Engineering College Foundation (YPTT) in Surabaya by Dr. Angka at Lustrum I PII East Java November 10, 1957 - Inauguration of the foundation by President Soekarno by signing the Charter of the 10 November Technical College Surabaya. At that time only two departments were opened, namely the Civil Engineering Department and the Mechanical Engineering Department. Then on November 3, 1960 - Change of name to Institut Teknologi Sepuluh Nopember (ITS) with the status as a State University based on the Decree of the Minister of Education, Teaching and Culture No. 93367/UU. Until now, the management of Institut Teknologi Sepuluh Nopember (ITS) PTNBH is full with new SOTK accompanied by changes in the number of faculties from five faculties to eight faculties in January and ten faculties in September 2017. And according to the latest data based on the ITS Chancellor's regulation No, 25 of 2019 concerning the Organization and Work Procedures of Faculties in the ITS Environment, there was a change in the number of faculties from 10 to 7 faculties. As one of the best universities in Indonesia, the construction of buildings in the ITS campus environment from year to year continues to run and is increasingly developing following the needs of existing scientific developments. That way there is always a process of building new buildings and developing existing buildings. As an object that will be researched is the construction of the CWI-02 package building in the ITS Sukolilo Surabaya campus area.

The details of the building to be built in the CWI-02 package in the ITS Sukolilo Surabaya campus area include: AUTOMOTIVE CENTER GALLERY with an area of 174 m2 which has a 1-story building, CREATIVE CENTER GALLERY (GALLERY A) with an area of 4,143 m2 and CREATIVE CENTER GALLERY (GALLERY B) with an area of 2.760 m2, all of which have 3-storey buildings, 3 LANE PARKING GALLERY (1 GALLERY) with an area of 648 m2 which has 3 floors, MARITIM CENTER GALLERY (GALLERY A, B, C, D) with an area of each, namely Building A of 778 m2 with a 2-storey building, for Building B of 531 m2 with a 2-storey building, for building C of 142 m2 with a 1-storey building only, and building D of 1,224 m2 with a 2-storey building. POWER HOUSE BUILDING is 120 m2 with a 1-story building. SUPPORTING INFRASTUCTURE BUILDING (LANDSCAPE AND SIRKUIT) of 1437m2 which has a 3-storey building.

In accordance with the data above, the purpose of building the CWI-02 ITS Surabaya package building is to support the process of teaching and learning activities for active students who are carrying out a research project.

With the scope of work stated in the contract document, among others: Preparation Work, Structural Work, Steel Work, Architectural Work, MEP Work, and Infrastructure Work. The construction of the CWI-02 ITS Surabaya package building costs a total of Rp. 97,222,888,000, - which was carried out for 540 calendar days and started on October 06, 2023. In the building construction activities, several supervision support instruments are needed so that the results of the implementation of the construction of the education building are expected to meet the requirements of the technical specifications of the facilities and infrastructure in accordance with the planning from the beginning, starting from before implementation, implementation, and post-implementation of development. So that the application of the Occupational Health and Safety (K3) system in the form of risk management in all construction project work activities can run well.

Construction projects in Indonesia play a vital role in the development of national infrastructure, but the sector is also known to have a high rate of work-related accidents. Data from the Ministry of Manpower shows that in 2020, the construction sector accounted for 30% of the total number of work-related accidents in Indonesia (Rahmawati et al., 2022). This high accident rate emphasizes the importance of implementing an effective Occupational Safety and Health (OSH) system in every construction project.

The factors that cause work accidents in construction projects can be categorized into three main groups: human factors, environmental factors, and system factors. Human factors include unsafe actions such as non-compliance with work procedures and the use of inappropriate personal protective equipment (PPE). Environmental factors include extreme weather conditions and hazardous work sites, while system factors relate to a lack of standard operating procedures (SOPs) and adequate supervision (Setyawati et al., 2024).

Previous research indicates that human factors are often the dominant cause of work accidents. A study by (Huda et al., 2021) found that most workers who experience work accidents have a low level of OSH knowledge and a negative perception of OSH supervision. In addition, research by (Setyawati et al., 2024) shows that the risk of falling from a height and being hit by materials is the most common risk in construction projects.

In the context of educational building construction, ensuring the safety of both workers and the campus community is paramount. Construction activities on occupied campuses present unique challenges, necessitating meticulous planning and stringent safety protocols. Implementing comprehensive safety measures, such as proper signage, barricades, and controlled access zones, is essential to protect students, faculty, and visitors from potential hazards associated with construction sites (McKeown, 2024).

A significant concern in school construction projects is the potential exposure to hazardous materials, including asbestos and lead. Renovation activities can disturb these substances, releasing harmful particles into the air and posing serious health risks to the school community. Therefore, it is crucial to conduct thorough environmental assessments and implement appropriate abatement procedures prior to commencing construction work (Macaluso et al., 2004).

Effective communication and collaboration between construction teams and school administrations are vital to maintaining a safe environment. Establishing clear protocols for scheduling high-risk activities during off-peak hours, providing regular updates to all stakeholders, and ensuring immediate response mechanisms for any safety concerns can significantly reduce the risk of accidents and exposures (Council et al., 2010)

Moreover, the integration of safety training programs tailored to the specific challenges of educational environments is essential. Regular safety briefings, proper use of personal protective equipment (PPE), and awareness campaigns about potential hazards can empower workers and the school community to maintain vigilance and adhere to safety protocols (Park et al., 2023).

Incorporating safety considerations during the design phase of educational construction projects is essential to proactively address potential hazards. This approach, known as Prevention through Design (PtD), emphasizes the integration of safety measures early in the project lifecycle to minimize risks to workers and building occupants. By adopting PtD principles, stakeholders can effectively reduce occupational hazards and enhance overall safety outcomes in educational environments (Behm, 2005).

Previous studies on occupational safety and health (OSH) in construction projects have predominantly focused on risk identification and mitigation strategies aimed at reducing workplace accidents. Research conducted by (Wicaksono, 2011) emphasized the critical role of OHS risk management in high-rise construction projects, highlighting the importance of proactive hazard identification and the implementation of comprehensive safety protocols. Similarly, (Ayuni, 2022) analyzed the effectiveness of OHS practices in construction sites in Klungkung and Karangasem Districts, revealing that the lack of standardized safety procedures and inadequate training were significant contributors to workplace accidents. (Saragi & Sinaga, 2021) further investigated safety management in multi-story construction projects, identifying the non-use of personal protective equipment (PPE) and poor communication as major risk factors. Although these studies provide valuable insights into general safety practices, they often overlook the specific complexities associated with educational building projects and the unique challenges in managing safety in such environments.

Despite extensive research on occupational safety in the construction industry, limited studies have specifically examined the risk factors contributing to work accidents in the construction of educational facilities, particularly within university environments. Existing literature tends to generalize risk factors without considering the distinct operational, structural, and safety demands of academic infrastructure projects.

Moreover, previous research often focuses on either environmental risks or human factors independently, without exploring the interplay between multiple risk categories such as environmental, human, and system-related risks. This research addresses this gap by conducting a comprehensive analysis of the CWI-02 Package Building construction project at ITS Surabaya, integrating various risk factors and offering a holistic understanding of accident causality within the context of educational facility construction.

The novelty of this study lies in its comprehensive approach to analyzing occupational safety and health risks by incorporating the Risk Breakdown Structure (RBS) methodology tailored to educational construction projects. Unlike prior studies that focus solely on specific risk elements, this research evaluates the interaction between environmental, human, and system factors that collectively influence workplace safety. Furthermore, it offers a detailed examination of the CWI-02 Package Building at ITS Surabaya, an academic infrastructure project, thereby providing context-specific insights that have been underexplored in existing literature. By identifying labor indiscipline, non-compliance with PPE usage, and lack of standardized OHS procedures as the most critical risk factors, this study contributes new perspectives to the body of knowledge in construction safety management.

This research aims to analyze the risk factors that cause work accidents in the CWI-02 building construction project at ITS Surabaya. This research provides theoretical and practical contributions in the field of construction OHS risk management. Theoretically, this research enriches the literature on the identification and analysis of risk factors for work accidents in construction projects, especially in building construction projects. This research provides both theoretical and practical contributions to the field of occupational safety and health in construction. Theoretically, it enriches the academic discourse on comprehensive risk management by highlighting the interconnectedness of various risk categories in complex construction projects. Practically, the findings offer actionable insights for project managers, contractors, and policymakers, enabling them to implement more effective safety strategies tailored to the specific challenges of educational facility construction. By emphasizing the importance of labor discipline, proper PPE usage, and the establishment of standardized OHS procedures, this study supports the development of safer construction practices that can reduce workplace accidents, improve project efficiency, and enhance worker well-being. Additionally, the research serves as a valuable reference for future studies aiming to explore risk management in similar construction settings.

METHOD

This research was conducted at the CWI-02 Package Building construction project at ITS Surabaya, using primary and secondary data. Primary data was obtained through questionnaires, interviews, and field surveys with respondents including contractor staff, workers/mandors, and MK supervisory staff, who met certain experience and education qualifications. Secondary data included project technical documents, literature, and references related to risk management. This research used qualitative and quantitative methods for risk analysis. Risk identification was conducted through questionnaires, and interviews to categorize risks based on their sources.

RESULTS AND DISCUSSION

Information Stage

Research data on the CWI-02 Package building construction project at ITS Surabaya, including:

a. Name : Building Construction Package CWI-02 ITS
b. Project Address : ITS Campus Jl. Chemical Engineering Kel. Keputih, Sukolilo Kec., Surabaya City, Java 60111
c. Building Structure : Reinforced Concrete Construction & Steel Construction
d. Planner Consultant : PT Sigma Rekatama Consulindo
e. Supervisory Consultant / MK : PT. Ciriajasa E.C. - KSO PT Ciriajasa C.M.
f. Contractor : PT Adhi Karya (Persero), Tbk
g. Number of Buildings : 13 Buildings
h. Building Area : 11,957 m^2 (overall)

The total cost required in the implementation of the technical work of building construction of the CWI-02 Package at ITS Surabaya is Rp. 97,222,888,000, - (ninety-seven billion two hundred twenty-two million eight hundred eighty-eight thousand rupiah) including VAT which is done according to schedule, namely 540 calendar days

The respondent information data of this study involved a total of 30 people with components coming from the workforce in the building construction project environment of the CWI-02 Package at ITS Surabaya. With respondent characteristics including:

The data of the labor respondents studied are as follows:

a. Contractor employee staff = 18 people
b. Workers / foremen of the implementing contractor = 7 people
c. Staff employee of supervision consultant / MK = 5 people

Respondent Profile Data:

Based on gender: 22 men and 8 women. Those who have an education level according to the last diploma are:

a. Vocational education, minimum 5 years of experience = 6 people
b. D3 education, minimum 5 years experience = 7 people
c. S1 education, minimum 5 years experience = 17 people

With details of respondents in the age range of 25-50 years which is considered a productive age to carry out the work process in the field...

Risk Identification

The risk identification method used in this research is the *Risk Breakdown Structure* (RBS) method. In general, the goal of implementing RBS is the clarity of risk stakeholders and the improvement of organizational risk in the context of a logical and systematic framework. Risk assessments are identified and grouped based on risk sources into predetermined categories. The identification of risks that occur to workers in the construction of the CWI-02 building package at ITS Surabaya is obtained from similar research and from interviews with respondents regarding risk identification, along with an explanation of each risk factor to avoid misunderstanding assumptions between respondents, researchers, and readers. Data collection and analysis using a *Likert* scale to obtain risk levels. This discussion is intended to get an explanation of the data that has been analyzed.

Table.1 Risk Identification of Causes of Work Accidents in *Risk Breakdown Structure*

Risk Category		Risk factors	Source
Environmental Factors	1	Extreme weather*)	Safitri, 2023
	2	Selection of raw materials that are not suitable and do not meet the standards *)	Safitri, 2023
	3	Difficult location of material stacking **)	Nafdi, 2014
	4	Rainfall intensity **)	Nafdi, 2014
Human Factors	5	Refusing the recommended use of personal protective equipment *)	Safitri, 2023
	6	Irregular diet	Safitri, 2023
	7	Ignoring work rules and safety standards applied at construction project sites *)	Safitri, 2023
	8	Unskilled labor**)	Nafdi, 2014
	9	Labor shortage**)	Nafdi, 2014
	10	Labor indiscipline**)	Nafdi, 2014
System Factors	11	Lack of attention to place in the implementation of OHS *)	Safitri, 2023
	12	Does not have a good and clear standardization of OHS implementation *)	Safitri, 2023
	13	No system evaluation of work implementation in applying OHS*)	Safitri, 2023
	14	The division of tasks is not clear in the formation of the organization so that it is not clear in its implementation *)	Safitri, 2023
	15	Equipment malfunction **)	Nafdi, 2014
	16	Availability of equipment that is inadequate / as needed **)	Nafdi, 2014
	17	Equipment productivity**)	Nafdi, 2014
	18	Lack of operator proficiency in operating equipment**)	Nafdi, 2014

Risk Category		Risk factors	Source
	19	Improper equipment **)	Nafdi, 2014
	20	Lack of communication ***)	Processed by myself, 2024

Description:
*) Source: Safitri, 2023
**) Source: Nafdi, 2014
***) Self-compiled, 2023

The risks are divided into categories, and each risk factor will be treated separately so there is no need to establish validity.

Risk Level Measurement

The level of risk is measured using subjective probability which is through respondents who have professional experience and experts (competent) in the field of building construction work based on various information and experiences possessed by each respondent about the risk conditions of K3 Construction. In this study the authors used 30 respondents, which were divided into 3 elements of respondents consisting of 18 staff employees of the Contractor, 7 workers / field foremen from the Contractor, and 5 people from the supervisory consultant / MK. The method of obtaining is done through the technique of filling out questionnaires and the workplace interview process. Then separated into two variables used to measure risk, namely the frequency of possible risks and the impact of risks.

Assessment of the Level of Obstacles to Risk-Causing Factors in Project Implementation

The author takes questionnaire data through the questionnaire form process and the interview process at the work location. The following is an attachment to the questions listed on the printed questionnaire form. From the results that the author has obtained, the frequency of occurrence of risk-causing factors that have the potential to hinder the implementation of the CWI-02 building construction work at ITS Surabaya based on the results of the questionnaire that has been distributed, among others, namely:

Table 2. Assessment of the Level of Risk Factors in the Implementation of the CWI-02 Package building construction project at ITS Surabaya

No.	Risk Factors	Category	Yes	No	Obstacle Level
1	Extreme weather	Environmental Factors	25	5	83,33 %
2	Selection of raw materials that are not suitable and do not meet the standards	Environmental Factors	23	7	76,67 %
3	Difficult location of material stacking	Environmental Factors	12	18	40,00 %
4	intensity	Environmental Factors	23	7	76,67 %
5	**Refusing to use personal protective equipment**	**Human Factors**	**27**	**3**	**90,00 %**
6	Irregular diet	Human Factors	18	12	60,00 %
7	Ignoring work rules and safety standards applied at the construction project site	Human Factors	23	7	76,67 %
8	Unskilled labor	Human Factors	20	10	66,67 %
9	Labor shortage	Human Factors	19	11	63,33 %
10	**Labor indiscipline**	**Human Factors**	**28**	**2**	**93,33 %**
11	Lack of attention to place in the implementation of OHS	Management System Factors	23	7	76,67 %
12	**Does not have a good and clear standardization of OHS implementation**	**Management System Factors**	**26**	**4**	**86,67 %**
13	No system evaluation of work implementation in applying OHS	Management System Factors	25	5	83,33 %
14	The division of tasks is not clear in the formation of the organization so	Management System Factors	17	13	56,67 %

No.	Risk Factors	Category	Yes	No	Obstacle Level
	that it is not clear in its implementation.				
15	malfunction	Management System Factors	25	5	83,33 %
16	Availability of equipment that is inadequate / as needed	Management System Factors	17	13	56,67 %
17	Equipment productivity	Management System Factors	22	28	73,33 %
18	Lack of operator skills in operating equipment	Management System Factors	25	5	83,33 %
19	Improper equipment	Management System Factors	25	5	83,33 %
20	Lack of	Management System Factors	23	7	76,67 %

Source: Processed by Researchers, 2024

According to the results of distributing questionnaires to 30 respondents, out of a total of 20 risk factors that hinder project implementation, there is one risk factor that gets the largest percentage, namely **93.33%**, which can hinder project implementation, namely aspects: **Labor indiscipline**. According to the 30 respondents who have filled out the questionnaire, they fully assess that this risk factor is the highest obstacle to the implementation of construction work on the CWI-02 building package at ITS Surabaya. Conversely, the aspect of the **material stacking location** factor is considered to have the lowest implementation inhibiting factor with a processntase of **40.00%** in the implementation of the construction work of the CWI-02 Package building construction at ITS Surabaya.

CONCLUSION

Based on the results of the analysis, this study identified three main factors causing work accidents in the CWI-02 Package Building construction project at ITS Surabaya, namely labor indiscipline (93.33%), rejection of recommendations for the use of personal protective equipment (90.00%), and the absence of good and clear standardization of OHS implementation (86.67%).

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