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Risk Analysis of Work Accidents in the Construction Project of Class D Pratama Hospital Building Construction of Nias Regency

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ABSTRACT

In the construction project of RSU D Pratama in Nias Regency, this study aims to identify variables that increase the risk of work accidents. The author of this study used quantitative methods. The aspects used by researchers to identify the risk of work accidents include Factors of Work Accidents, Factors Causing Disease, Factors Causing Work Accident Hazards in Development Construction Projects, and Protection Factors for the Application of Occupational Safety and Health. Based on the results of the study, almost all aspects of the Class D Primary Hospital building in Nias Regency have occupational accident risks that have an impact on Occupational Safety and Health (K3).

Keywords: *Risk; Work Accident; OHS; Construction Project.*

INTRODUCTION

Construction projects have a relatively high risk of workplace accidents due to their unique characteristics, including varied work sites, exposure to the elements, short execution times, high physical endurance requirements, and extensive use of untrained labor.

In fact, two-thirds of all occupational deaths worldwide occur in Asia, according to the International Labour Organization (ILO) in Alfiyah et al [1], which reported that in 2018 there were more than 1.8 million occupational deaths per year in the Asia and Pacific region. More than 2.78 million people worldwide die each year from illness or accidents at work.

The implementation of construction projects is often hampered by unwanted events such as work accidents. An accident is a sudden, unprepared incident. According to Tarwaka [2] work accidents are unwanted and often unexpected events, which can result in losses in terms of time, assets, or property, as well as casualties, in a production process or industrial work process or related to it. While workplace accidents are accidents that occur while you are at work and are related to your work in the company [3].

To create a decent, comfortable, and safe working environment and conditions and be able to avoid adverse events and health problems caused by work, the implementation of occupational safety and health management (K3) is very important. However, without a reaction from companies and employees to address problems or violations of occupational safety and health (K3), the government's efforts will not succeed. The purpose of occupational safety is to ensure that employees are safe while performing their work at work as well as the safety of the tools

of the trade so that they can be used safely at all times [4].

Similarly, there is a construction project for Class D Pratama Hospital Building in Nias Regency. The hospital building construction project is located in Gido District, Nias Regency. This project belongs to the Nias Regency Population Control and Family Planning Health Office (Dinkes, P2KB) carried out by PT. Viola Cipta Mahakarya.

So to prevent or minimize work accidents on a job, especially construction construction, a work accident risk analysis is needed. This study aims to analyze the risk of work accidents in the construction project of the construction of the Class D Pratama Hospital Building in Nias Regency.

LITERATURE REVIEW

Risk

Risk is an element that is often part of any work activity. Risks that have the potential to result in significant losses in the K3 industry must be calculated to be controlled because they can endanger employee safety. By taking possible precautions, risks can be avoided and their impact can be reduced [5].

Work Accidents

Events that occur in the work environment without warning, cannot be anticipated, and are difficult to control, either directly or indirectly, caused by risky behavior or an unsafe environment that forces work operations to stop are called work accidents [6]. Meanwhile, according to Minhayani, work accidents are unwanted and unplanned incidents that can cause various losses related to work processes, both inside and outside the work site [7].

Putra stated that, in general, there are two types of causes of accidents in the work environment, namely risky behavior and unsafe working conditions. Risk behavior refers to human actions that violate safety principles, such as working at height without using a seat belt. Meanwhile, unsafe working conditions involve unhealthy and irregular working conditions [8].

Construction Projects

According to Dipohusod in Diharjo and Sumarman a project is a planned effort to achieve important goals, objectives, and expectations using the budget and available resources, and must be completed within a certain time frame [9]. Meanwhile, construction is a series of related tasks that are done together to achieve a goal [10]. A construction project can be defined as a temporary activity that takes place for a limited period of time, requires certain resources, and aims to complete a task whose objectives have been clearly outlined [11].

Hospital

According to the WHO (World Health Organization), hospitals have a primary responsibility to serve society by providing holistic, healing, and preventive care. In addition, the hospital acts as a medical research center and training institute for health workers. By law, a hospital is defined as a healthcare facility that offers comprehensive care services, including inpatient, outpatient, and emergency department [12]. Hospital responsibilities include planning medical services and recovery efforts in accordance with hospital service guidelines, improving patient welfare through advanced health services and specialists in accordance with medical needs, and designing education and training programs to improve the competence of human resources in the field of health services [13].

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Occupational Health and Safety

Occupational Health and Safety (K3) is an effort to make the workplace safe, comfortable, and achieve the goal, which is to increase productivity [14]. According to Mankunegara and Tannady in Hidayati stated that occupational safety and health (K3) aims to ensure that employee performance improves by increasing morale, compatibility, and work involvement [15].

METHOD

This research is a quantitative research with an analytical approach that aims to analyze the risk of work accidents in the construction project of the construction of Class D Pratama General Hospital Nias Regency. The data collection method used a questionnaire that was distributed to 30 respondents who were workers of the construction project. Prior to the survey, initial identification of risks was compiled based on a literature review in five categories. The collected data is then analyzed by grouping variables based on their average value range to determine factors that affect the risk of work accidents.

The research location is a construction project for the Class D Pratama RSU building in Nias Regency. The study time starts from February to August 2023. The data collected consists of primary data through surveys and secondary data from literature reviews. The research stages consist of: (1) Survey and Data Processing; (2) Data Processing, Data Analysis and Discussion; (3) Preparation of Conclusions and Recommendations; and (4) Improvement of Results and Improvement of Reports.

The four factors with the highest influence were selected based on the ranking score of the analysis results. Conclusions and recommendations are compiled as findings from the study. There are also improvements to the results if needed, as well as improvements to the report so that it can be a better reference for similar research in the future.

RESULTS AND DISCUSSION

Analysis of Work Accident Risk in Construction Project Implementation

The following is an explanation of the risk analysis of work accidents in the construction project of the construction of Class D Pratama General Hospital Nias Regency.

Table 1. Analysis of Causal Factors of Accidents

Num.	Factors Causing Accidents	Average	Rangking
	Manajemen Factors		
A1	Poor work standards	4,00	1
A2	Inappropriate planning standards	4,00	2
A3	Improper maintenance standards	4,00	3
A4	Wrong working method	4,00	4
A5	Tool wear due to frequent use, and abnormal usage	3,67	5
A6	Inappropriate equipment purchase standards	3,60	6
A7	Lack of machine safety devices and installation	3,53	7
A8	Lack of machine or equipment maintenance	3,07	8
A9	Layout in placing machine positions	2,93	9

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	Worker Factors		
A10	Kurang ketrampilannya pekerja	4,00	1
A11	Lack of concentration	4,00	2
A12	Such as lack of worker knowledge	3,90	3
A13	Unfavorable physical condition	3,83	4
A14	Working without safety equipment	3,47	5
A15	Mental problems and physical stress	3,30	6
A16	Lack of motivation	3,03	7
A17	Imbalance of psychological abilities	3,00	8
A18	Taking inappropriate risks	2,67	9
A19	Not taking work seriously	2,57	10

The following is an analysis of the risk of work accidents (management factors) that affect the location of the risk of implementing the construction project for the construction of the Class D Pratama RSU building in Nias Regency, namely:

1. The factors that cause work accidents are poor work standards, and from the results of distributing questionnaires to 30 respondents stated that poor work standards are very influential, with the average result (4.00) being the first rank of 9 levels of management factors that cause work accidents in the construction project of the construction of the Class D Pratama Hospital building in Nias Regency.
2. For inappropriate planning standards from the results of distributing questionnaires to 30 respondents stated that inappropriate planning standards were very influential, with the average results being the same as point 1, namely (4.00).
3. Meanwhile, for inappropriate treatment standards from the results of questionnaire distribution to 30 respondents, inappropriate treatment standards were very influential, with average results equal to points 1 and 2, namely (4.00).
4. And for the wrong working method from the results of distributing questionnaires to 30 respondents stated that inappropriate treatment standards were very influential, with the average results being the same as points 1, 2 and 3, namely (4.00).
5. The majority of the 30 questionnaires that have been filled out by respondents stated that equipment wear due to frequent use, and abnormal use are very influential in the construction project of the construction of the Nias Regency Primary Class D RSU building, with an average result (3.67).
6. In the factors causing work accidents, namely inappropriate equipment purchase standards and from the results of distributing questionnaires to 30 respondents stated that inappropriate equipment purchase standards were very influential, with the average result (3.60) being ranked sixth out of 9 levels of management factors that caused work accidents that were influential in the construction project of the construction of the Nias Regency Class D Pratama RSU building.
7. For the lack of machine safety equipment and fence installation from the results of the questionnaire distribution to 30 respondents stated that the lack of machine safety equipment and fence installation was very influential, with an average result (3.53).
8. The results of the questionnaire distribution to 30 respondents stated that the lack of maintenance of machinery or equipment had an effect in the construction project of the

construction of the Nias Regency Class D Pratama RSU building, with an average result (3.07).

9. The results of the questionnaire distribution to 30 respondents stated that the layout in placing the position of the machine was influential in the construction project of the construction of the Class D Pratama RSU building in Nias Regency, with an average result (2.93).

Meanwhile, the analysis of the risk of work accidents (worker factors) that affect K3 in the construction project of the construction of the Class D Pratama Hospital building in Nias Regency, namely:

1. The majority of respondents are very concerned about workers' knowledge, so respondents stated that the lack of workers' skills is very influential in the construction project of the construction of the Nias Regency Primary Class D RSU building, with an average result (4.00).
2. There are still many respondents who still pay attention if the lack of concentration is very influential on the construction project of the Class D Pratama RSU building in Nias Regency, with an average result equal to point 1 (4.00).
3. The results of the distribution of questionnaires to 30 respondents stated that the lack of knowledge of workers was also very influential with the average results (3.90).
4. Physical support is one of the factors causing work accidents that can occur at the project site with the results of data analysis worth (3.83) or included in the category of very influential.
5. The results of the distribution of questionnaires as many as 30 respondents stated that it was very influential on working without safety equipment, with the same results as points 1, 2, and 3 (3.47).
6. Similar to mental problems and physical stress, this is also a factor causing work accidents that can occur at the project site with the results of data analysis worth (3.30) or included in the category of very influential.
7. The results of the questionnaire distribution to 30 respondents stated that the motivation that influenced K3 in the implementation of the construction project for the construction of the Class D Pratama Hospital building in Nias Regency, with an average result (3.03).
8. From the results of 30 respondents who had filled out the questionnaire, imbalance of psychological abilities affected the cause of work accidents with average results (3.00).
9. Not much different from point 8, taking inappropriate risks is included in the influential category with the same result as point 7, namely (2.67).
10. Not being serious at work is one of the factors causing work accidents that can occur at the project site with the results of data analysis worth (2.57) or included in the influential category.

Based on the results of the questionnaire distribution to 30 respondents, it can be concluded that almost all points regarding the risk of work accidents in the construction project of the construction of the Nias Regency Class D Pratama RSU building affect Occupational Safety and Health (K3). The following is an analysis of the factors causing work accidents in the construction project of the construction of the Class D Pratama RSU building in Nias Regency.

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Table 2. Analysis of Disease Causal Factors

Num.	Disease Causal Factors	Average	Rangking
C1	Chemical Type Hazards Hazards due to inhalation or contact between humans and hazardous chemicals. Examples of chemical types include: chemical combustion ash, chemical vapors and chemical gases.	1,07	8
C2	Hazard Type Physics a) Danger due to an air temperature that is too hot or too cold and abnormal air conditions that cause changes or experience abnormal body temperature. b) Hazards due to extremely noisy conditions that cause hearing damage.	1,87 3,27	5 1
C3	Hazards due to poor lighting or illumination cause visual impairment.	2,77	3
C4	Biological type hazards Hazards due to bacteria, viruses, fungi, etc.	1,83	6

Table 3. Ranking of Disease-Causing Factors

Num.	Disease Causal Factors	Average	Rangking
1	Chemical-type hazards Hazards due to extremely noisy conditions that cause hearing damage.	3,27	1
2	Hazards due to Ergonomics/Physiology, Hazards resulting from incorrect work methods, work positions, work tools, work environment, and faulty construction that cause physical fatigue, muscle pain, bone deformities and accidents.	2,90	2
3	Hazards due to poor lighting or illumination cause visual impairment.	2,77	3
4	Psychological type hazards Hazards due to work organization, excessive work type causes psychological stress and work demands.	2,53	4
5	Physical Hazards Hazards due to an air temperature that is too hot or too cold and abnormal air conditions that cause changes or experience abnormal body temperature.	1,87	5
6	Biological type hazards Hazards due to bacteria, viruses, fungi, etc.	1,83	6
7	Hazards due to environmental conditions (dust) that cause respiratory problems.	1,77	7
8	Chemical Hazards Hazards due to inhalation or contact between humans and hazardous chemicals. Examples of chemical types include: chemical combustion ash, chemical vapor and chemical gas.	1,07	8

The following is an analysis of the risk of disease affecting K3 in the construction project of the construction of the Class D Pratama Hospital building in Nias Regency, namely:

1. In the causative factors of disease, namely the danger due to very noisy conditions that cause hearing damage, and from the results of the distribution of questionnaires to 30 respondents stated that the danger due to very noisy conditions that cause hearing

damage is very influential, with the average result (3.27) being the first rank of 8 levels of factors for the occurrence of diseases that are very influential in the construction project of the construction of the Class D Pratama RSU building Nias Regency.

2. For hazards resulting from the way of working, work position, work tools, wrong work environment, and wrong construction that causes physical fatigue, muscle pain, bone deformirity and accidents from the results of distributing questionnaires to 30 respondents stated that it had an effect, with an average result of (2.90).
3. Meanwhile, for hazards due to lighting or lighting that does not cause visual damage from the results of distributing questionnaires to 30 respondents stated that these hazards have an effect, with an average result of (2.77)
4. The majority of 30 questionnaires that have been filled out by respondents stated that hazards due to work organization, excessive work types cause psychological stress and work demands affect the construction project of Nias Regency Class D Pratama RSU building, with an average result (2.53).
5. In the causative factors of disease caused by danger due to an air temperature that is too hot or too cold and abnormal air conditions that cause changes or experience abnormal body temperature, and from the results of distributing questionnaires to 30 respondents stated that the danger of this type of physics is less influential, with an average result (1.87).
6. For hazards caused by bacteria, viruses, fungi, and others from the results of distributing questionnaires to 30 respondents stated that biological type hazards were less influential, with an average result (1.83).
7. Meanwhile, for hazards due to environmental conditions (dust) that cause respiratory tract disorders from the results of distributing questionnaires to 30 respondents stated that these hazards had less effect, with an average result (1.77).
8. The results of distributing questionnaires to 30 respondents stated that the danger was due to inhalation or contact between humans and hazardous chemicals.
9. Examples of chemical types include: ash from chemical combustion, chemical vapors and chemical gases have no effect in the construction project of the construction of the Nias Regency Primary Class D RSU building, with an average yield (1.07).

Based on the results of the distribution of questionnaires to 30 respondents, it can be concluded that the risk of disease in the construction project of the construction of the Nias Regency Class D Pratama RSU building that affects Occupational Safety and Health (K3) is chemical hazards, ergonomic/physiological hazards, lighting hazards, and, psychological hazards. Meanwhile, physical hazards, biological hazards, and hazards due to environmental conditions have little influence in Occupational Safety and Health (K3) in the construction project of the construction of the Class D Pratama Hospital building in Nias Regency. And the danger due to inhalation or contact between humans and hazardous chemicals (examples of chemical types include: ash from chemical combustion, chemical vapors and chemical gases) has no effect on the construction project of the construction of the Nias Regency Class D Pratama RSU building because the project location does not burn chemicals or even use chemicals.

The following is an analysis of the Risk Factors for Work Accidents in the implementation of the construction project for the construction of the Class D Pratama Hospital building in Nias Regency.

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Table 4. Risk Factor Analysis of Work Accidents

No.	Risk Factor Analysis of Work Accidents	Average	Ranking
	Management Factors		
B1	Work at height, such as roof installation or working on high floors, increases the risk of falls and serious accidents.	3,0	4
B2	The use of heavy equipment and complex construction machinery can result in the risk of accidents if not used or operated properly.	3,27	5
B3	The use of hazardous chemicals in construction, such as solvents, paints, or certain building materials, can lead to dangerous exposure risks.	3,40	1
B4	The use of hazardous chemicals in construction, such as solvents, paints, or certain building materials, can lead to dangerous exposure risks.	3,37	2
B5	Lack of oversight from project management or supervisors can result in violations of work safety procedures and dangerous acts.	3,33	3
B6	Work with hazardous chemicals or materials may result in potentially dangerous exposure risks.	3,20	6
	Worker Factors		
B7	Unavailability or non-use of personal protective equipment (PPE), such as helmets, eye protection or gloves, can increase the risk of injury.	3,47	1
B8	The lack of an emergency evacuation plan or rescue procedures can increase the risk of a severe accident.	3,27	2
B9	Inability of the project team to communicate	3,20	4

The following is an analysis of work accident risk factors (management factors) that affect the location of the risk of construction of the construction of the Class D Pratama Hospital building in Nias Regency, namely:

1. Lack of use of hazardous chemicals in construction, such as solvents, paints, or certain building materials, can lead to a risk of hazardous exposure. The results of distributing questionnaires to 30 respondents obtained an average result of (3.40) and ranked first.
2. The use of hazardous chemicals in construction, such as solvents, paints, or certain building materials, can lead to the risk of hazardous exposure. Because, with the presence of Work Safety staff in the construction project of the construction of the Class D Pratama Hospital building in Nias Regency. From the results of the distribution of questionnaires to 30 respondents, the average result was (3.37).
3. The majority of the 30 questionnaires that have been filled out by respondents stated that lack of supervision from project management or supervisors can result in violations of work safety procedures and dangerous actions affecting the construction project of the construction of the Nias Regency Primary Class D RSU building, with an average result (3.33).

4. High-altitude work, such as roof installation or working on high floors, increases the risk of falls and serious accidents very influential in the construction project of the construction of the Nias Regency Primary Class D RSU building. Because by implementing work safety protocols can reduce the risk of work accidents, with an average result (3.30).
5. For the results of the distribution of questionnaires to 30 respondents stated that the use of heavy equipment and complex construction machinery can result in the risk of accidents if not used or operated properly. With an average yield of (3.27).
6. Furthermore, from the results of distributing questionnaires to 30 respondents stated that work with hazardous chemicals or materials can result in the risk of potentially hazardous exposure. Obviously this is very important for staff workers, because with the awareness to maintain their own safety can protect people around them to avoid the risk of work accidents, with an average result (3.20).

Meanwhile, the analysis of work accident risk factors (worker factors) that affect K3 in construction projects during the construction project for the construction of the Class D Pratama Hospital building in Nias Regency, namely:

1. The majority of respondents are very concerned about the unavailability or non-use of personal protective equipment (PPE), such as helmets, eye protection, or gloves, can increase the risk of injury.so respondents stated that this is very influential in the construction project of the construction of the Nias Regency Primary Class D RSU building. Lack of Unavailability or non-use of personal protective equipment (PPE), such as helmets, eye protection, or gloves, can increase the risk of injury. with an average result equal to point 1, which is (3.47).
2. There are still many respondents who still lack of emergency evacuation plans or rescue procedures can increase the risk of severe accidents in the construction project of the construction of the Nias Regency Primary Class D RSU building, with an average result (3.27).
3. Pressure to complete a project in a short time can lead to cutting the viewpoint on work safety and result in careless actions. at the project site with data analysis results worth (3.23) or included in the influential category. Obviously this is very important for staff workers, because pressure to complete projects in a short time can lead to cutting the perspective on work safety and result in careless actions.
4. The results of distributing questionnaires to 30 respondents stated less influential motivation in The inability of the project team to communicate and coordinate properly can lead to confusion and risk of accidents. The average result obtained is (3.20).

Based on the results of the questionnaire distribution to 30 respondents, it can be concluded that almost all points regarding work accident risk factors in the construction project of the construction of the Nias Regency Class D Pratama RSU building affect Occupational Safety and Health (K3) which also has an impact on the implementation of construction in Nias Regency.

Impact and Risk of Work Accident Risk in Construction Project Construction of Class D Pratama Hospital Building Nias Regency

The following is an analysis of the factors that cause the risk of work accidents in the construction project of the construction of the Class D Pratama RSU building in Nias Regency.

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Table 5. Factors Causing the Risk of Work Accidents

Num.	Factors Causing the Risk of Work Accidents	Average	Ranking
D1	Working conditions that do not meet safety standards can be a contributing factor to accident risk. This can include inadequate physical condition of the building or work area, use of obsolete or poorly maintained equipment and machinery, and lack of protective measures such as fences or warning signs.	3,67	1
D2	One of the main factors that can lead to the risk of workplace accidents is the lack of safety training and education for workers. When workers are not properly trained on how to identify hazards, use equipment properly, or follow safety procedures, they are more vulnerable to potential accidents.	3,47	2
D3	If workers or project managers do not comply with or ignore established safety procedures, this can increase the risk of accidents. For example, not using appropriate personal protective equipment (PPE), ignoring warning signs, or disregarding task-specific procedures can lead to dangerous situations.	2,97	3

The following is an analysis of the risk of work accidents arising in construction projects that affect K3 in construction projects in the construction of Class D Pratama Hospital building in Nias Regency, namely:

1. If the project is carried out in an area that has difficult topography or unstable environmental conditions, such as landslides or floods, the risk of accidents may increase. Working conditions that do not meet safety standards can be a contributing factor to the risk of accidents. This can include the inadequate physical state of the building or work area, the use of outdated or poorly maintained equipment and machinery, as well as the lack of protective measures such as fencing or warning signs. Effect on K3: Working conditions that do not meet safety standards can be a contributing factor to the risk of accidents. This can include inadequate physical condition of the building or work area, use of outdated or poorly maintained equipment and machinery, and lack of protective measures such as fences or warning signs, with the average result (3.67) being the first rank of 3 levels of disease occurrence factors in the construction project of the construction of the Nias Regency Class D Pratama RSU building.
2. One of the main factors that can lead to the risk of workplace accidents is the lack of training and safety education for workers. When workers are not properly trained on how to identify hazards, use equipment properly, or follow safety procedures, they are more susceptible to potential accidents The use of Heavy Tools and Equipment is also very influential. The use of heavy equipment and equipment in the construction of RSU buildings can cause accident risks if not used or operated properly. Errors in the use of cranes, excavators, or other heavy equipment can result in serious accidents. Effect on K3: Proper training for machine operators and regular checks of equipment are required to ensure that everything is functioning properly and safe to use. From the results of the distribution of questionnaires to 30 respondents. One of the main factors that can lead to the risk of workplace accidents is the lack of training and safety education for the

workers. When workers are not properly trained on how to identify hazards, use equipment properly, or follow safety procedures, they are more vulnerable to potential accidents Respondents stated that the ha was very influential, with an average yield of (3.47).

3. Furthermore, If workers or project managers do not comply with or ignore established safety procedures, this can increase the risk of accidents. For example, not wearing appropriate personal protective equipment (PPE), ignoring warning signs, or ignoring task-specific procedures can lead to dangerous situations. Influence on K3: It is important to ensure that project management has a strong commitment to K3 and conducts strict supervision of compliance with occupational safety guidelines, with an average result of (2.97).

Based on the results of the questionnaire distribution to 30 respondents, it can be concluded that the conclusion of the work accident risk analysis in the RSU building construction project confirms that environmental factors, the use of heavy equipment, project management, safety training, and the use of personal protective equipment (PPE) play a crucial role in influencing Occupational Safety and Health (K3). By considering the surrounding environmental conditions, ensuring the safe use of heavy equipment, closely monitoring and supervising projects, providing comprehensive K3 training, and ensuring the correct use of PPE, the risk of work accidents can be minimized.

It is important to remember that investing in K3 is not only to meet legal requirements, but also to protect the well-being and physical integrity of all individuals involved in the project. By taking appropriate precautions, creating a culture of safety awareness, and ensuring that safety standards are strictly followed, RSU construction projects can be carried out efficiently and without unnecessary risk of accidents. Safety must always be a top priority in every stage of this construction project, and all parties involved have a responsibility to ensure that K3 standards are rigorously met.

Analysis of Efforts through the Occupational Safety and Health Protection Program in the Construction Project of Class D Pratama Rsu Building Construction of Nias Regency

The following is an analysis of the Occupational Safety and Health protection program along with the construction project for the construction of the Class D Pratama Hospital building in Nias Regency and does not interfere with the construction project.

Table 6. Analysis of Occupational Safety and Health Protection Program

Num.	Protection Program	Average	Ranking
E1	Management commitment and support	3,73	2
E2	Competence of workers' skills and expertise	3,67	5
E3	Emergency response preparation and response	3,67	6
E4	Safety morning / talk (TBM)	3,00	19
E5	Work monitoring and measurement	3,00	20
E6	Incident investigation	2,57	24
E7	Internal audit	2,63	23
E8	Provision of safety protocol facilities	3,80	1
E9	Implementation of shift system for project worker schedule	3,37	15
E10	Control of Occupational Safety and Health (OHS) Documents	2,50	25
E11	Costs for the provision of Personal Protective Equipment (PPE)	2,90	22
E12	The importance of wearing Personal Protective Equipment (PPE)	3,07	18

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E13	Regulations and procedures for Occupational Safety and Health (K3)	3,43	13
E14	Workers' awareness of the importance of Occupational Safety and Health (OHS)	3,70	4

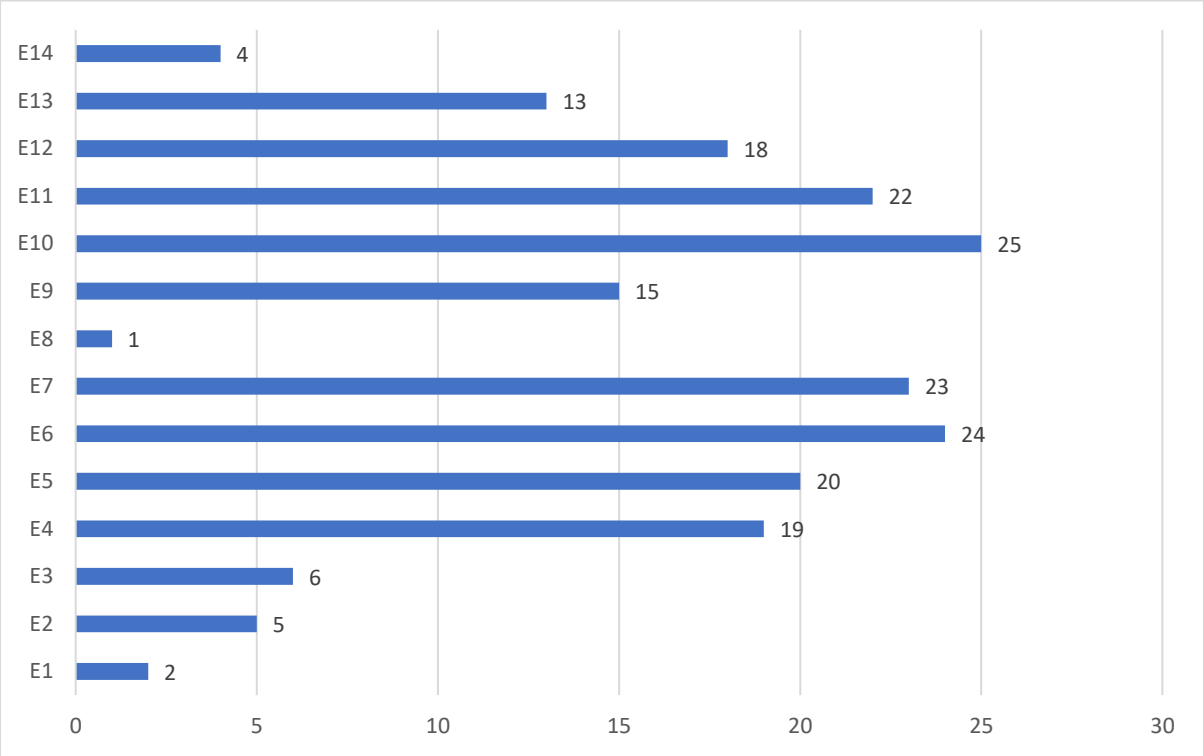

Figure 1. Protection Program Rangking

Based on the results of distributing questionnaires to 30 respondents, it can be concluded that the implementation of this program has a significant positive impact on the welfare and safety of workers in the work environment. An effective K3 program not only minimizes the risk of accidents, but also creates a more productive and quality work environment.

Through a thorough evaluation of key aspects such as the physical condition of the workplace, the use of tools and equipment, as well as the level of compliance with safety guidelines, the K3 program can be tailored to the specific needs of each project or industry. In addition, the analysis of the K3 protection program also emphasizes the importance of continuous monitoring and evaluation of program implementation. By continuously monitoring compliance levels and identifying areas of improvement that may be needed, K3 programs can be proactively scaled up to address potential emerging risks or changing working conditions.

In conclusion, occupational safety and health protection programs are valuable investments in the well-being and safety of workers, which in turn can bring long-term benefits to productivity, reputation, and the overall success of a project or organization.

CONCLUSION

On the risk of work accidents (management factors and worker factors), it can be concluded that almost all points regarding the risk of work accidents in the Nias Regency Class D Pratama RSU building affect Occupational Safety and Health (K3). The risk of diseases affecting

Occupational Safety and Health (K3) in construction projects in the Nias Regency Primary Class D RSU building that affect Occupational Safety and Health (K3) are chemical hazards, ergonomics/physiology hazards, lighting hazards, and, psychological hazards.

In the last segment, the discussion on the analysis of efforts through the Occupational Safety and Health (K3) protection program in the analysis of work accident risks in the construction project of the Nias Regency Class D Pratama RSU building which has been fully implemented, there are only a few points, namely, workers' awareness of the importance of Occupational Safety and Health (K3), competence of workers' expertise and skills, emergency preparation and response, Worker behavior that lacks interest, lack of scrutiny, laziness, arrogance, and does not care about a result, communication between workers and field staff is very active so that workers can remind each other when workers do work that has a risk level of danger, the importance of carrying out safety protocols.

REFERENCE

[1] Mawardi, Erman. (2010). *Desain Hidraulik Bangunan Irigasi* (2 ed.). Alfabeta. Jakarta.

[2] Ismaya, T., Sulakasana, J., & Hadiana, D. (2016). Pengembangan dan pengelolaan jaringan irigasi untuk meningkatkan hasil produksi dan pendapatan usahatani padi sawah. *Agrivet: Jurnal Ilmu-Ilmu Pertanian dan Peternakan (Journal of Agricultural Sciences and Veteriner)*, *4*(2).

[3] Juhana, E. A., Permana, S., & Farida, I. (2015). Analisis Kebutuhan Air Irigasi Pada Daerah Irigasi Bangbayang Uptd Sdap Leles Dinas Sumber Daya Air Dan Pertambangan Kabupaten Garut. http://jurnal.sttgarut.ac.id

[4] Krispedana, I. W., Setiyo, Y., & Madrini, I. A. G. B. (2022). Analisis Persentase Kekurangan Air Irigasi pada Subak di Das Ho Saat Musim Kemarau. JURNAL BETA (BIOSISTEM DAN TEKNIK PERTANIAN). 10(1), 1–11.

[5] Sosrodarsono, S., & Takeda, K. (2003). *Hidrologi untuk pengairan*, PT. Pradnya Paramita, Jakarta.

[6] Sari, K., & Sulaeman, B. (2020). Analisis Kebutuhan Air Irigasi Pada Jaringan Sekunder Di Kota Palopo. PENA TEKNIK: Jurnal Ilmiah Ilmu-Ilmu Teknik, 5(2), 82-90.

[7] Marica, A. (2000). Short Description of CROPWAT Model. 17 February 2022.

[8] Shalsabillah, H., Amri, K., & Gunawan, G. (2018). Analisis Kebutuhan Air Irigasi Menggunakan Metode Cropwat Version 8.0 (Studi Kasus Pada Daerah Irigasi Air Nipis Kabupaten Bengkulu Selatan). Jurnal Inersia Oktober, 10(2)..

[9] Direktorat Jenderal Sumber Daya Air. (2013). Standar Perencanaan Irigasi Kriteria Perencanaan Bagian Jaringan Irigasi Kp-01.

[10] Sugiyono. 2014, *Metode Penelitian Kuantitatif, Kualitatif, dan Kombinasi (Mixed Methods)*. Bandung: Alfabeta.

[11] Direktorat Jenderal Sumber Daya Air. (2013). *Standar Perencanaan Irigasi Kriteria Perencanaan Bagian Jaringan Irigasi Kp-01*.

[11] Priyonugroho, A. (2014). Analisis kebutuhan air irigasi (studi kasus pada daerah irigasi sungai air keban daerah kabupaten empat lawang) (Doctoral dissertation, Sriwijaya University).

[12] Dasril, D., Istijono, B., & Nurhamidah, N. (2021). Evaluasi kebutuhan air irigasi dengan aplikasi cropwat 8.0 daerah irigasi Amping Parak. Rang Teknik Journal, 4(2), 374-382.

[13] Rizqi, M., Yasar, M. Y., & Jayanti, D. S. (2019). Analisis Kebutuhan Air Irigasi Menggunakan CROPWAT 8.0 pada Daerah Irigasi Krueng Jreu Kabupaten Aceh Besar. Jurnal Ilmiah Mahasiswa Pertanian, 4(4), 412-421.

[14] Fatahillah, A., Meliyana, M., Syahputra, I., Amin, A., & Rahmawati, C. (2023). Analisis Ketersediaan Air Irigasi dan Kebutuhan Air Irigasi Menggunakan Software Cropwat Version 8.0. Jurnal Teknik Sipil Unaya, 9(1), 30-37.

[15] Prastowo, D. R. (2016). Penggunaan model cropwat untuk menduga evapotranspirasi standar dan penyusunan neraca air tanaman kedelai (Glycine max (L) Merrill) di dua lokasi berbeda. *Jurnal Teknik Pertanian Lampung (Journal of Agricultural Engineering)*, *5*(1).