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Journal of Engineering Design and Technology 159 LOGIC Journal of Engineering Design and Technology Vol. 22 No. 2 July 2022; p. 159 - 165 ANALYSIS OF SMK3 IMPLEMENTATION LEVEL AND ACCIDENT RISK IN THE ADMINISTRATION OFFICE BUILDING DEVELOPMENT PROJECT AT GUSTI NGURAH RAI AIRPORT BALI 1,2,3,)

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1): ketutsutapa@pnb.ac.id | Ketut Sutapa1), I Nyoman Ardika2), I Nyoman Sutapa3), I Nengah Darma Susila4), I Putu Agus Krisnadinata5) Abstract. Every construction project, whether high-tech or simple, certainly has risks in its implementation process, therefore it is necessary to establish an Occupational Safety and Health Management System to minimize Occupational Safety and Health (K3) risks, but there are still many construction companies that are lacking in identifying K3 risks. and implementing an Occupational Health and Safety Management System (SMK3) in the process of implementing a construction project. The purpose of this study was to determine the level of OSH risk based on work items, as well as to measure the level of implementation of SMK3 in a construction project. In this research, the object of the case study is the construction project of the Administration Office Building at I Gusti Ngurah Rai Airport, Bali, during the lower structure work. After carrying out risk identification, 35 risk questions and 5 jobs are obtained, namely Borepile, Pilecap, Pendestal Column, Sloff, Roof Frame, then the results of the identification are processed and the risk level is obtained from the implementation of the Administration Office Building Construction Project at I Gusti Ngurah Rai Airport, Bali. Enter the Medium Category with a risk value of 8.69, while for the implementation of the Occupational Safety and Health Management System (SMK) the Administration Office Building Construction Project at I Gusti Ngurah Rai Airport, Bali is included in the good category with a total application value of 83%. Hopefully this research can become a reference in identifying K3 risks and a reference in implementing the Occupational Health

and Safety Management System (SMK). Keywords: risk level, implementation of SMK3 1.

INTRODUCTION Construction service activities are one of the most influential factors in economic development and growth throughout the world. The development of construction services in addition to providing benefits, also poses a considerable risk where in the construction industry work accidents are still very common. Work accidents that occur on a project will be one of the causes of delays and even cessation of work activities in the project. According to data from the International Labor Organization (ILO) in 2013, work accidents result in 1 worker in the world dying every 15 seconds and 160 workers experiencing work-related illness. Putra and Syahrial noted that there were 65,000 cases of work accidents that occurred in Indonesia in 2010 [1]. Work accidents often occur due to the lack of fulfillment of requirements in the implementation of K3. In this case, the government as a state administrator has an obligation to provide protection to workers. Project implementers often ignore the requirements and regulations in K3. This is because they are not aware of the magnitude of the risk that must be borne by the workforce and the company [2]. Therefore, implementing occupational safety and health (K3) management is very important because it aims to provide a good, comfortable p-ISSN : 1412-114X e-ISSN : 2580-5649 <http://ojs2.pnb.ac.id/index.php/LOGIC>

LOGIC Jurnal Rancang Bangun dan Teknologi Vol. 22 No. 2 July 2022 Journal of Engineering Design and Technology 160 and safe environment and working conditions and can avoid accidents and occupational diseases. But all government efforts will not succeed without a response from companies and workers to address problems or violations of occupational safety and health (K3). Safety Planning is to analyze the risk of danger in the work which is the scope of the contract on the project in question, so that effective prevention and mitigation methods can be formulated. Meanwhile, from the website of the Employment Social Security Administering Agency (BPJS) it was noted that in July 2015 there were 50,089 accident cases where it was claimed to be down from the previous year [4]. However, data on the number of work accidents during 2015 amounted to 105,182 cases of which 2,375 cases of serious accidents were recorded [5]. Work

accident data shows that the number of work accidents in Indonesia has reached 100,000 work accidents per year. The ILO estimates that around 2.3 million workers worldwide die from accidents and occupational illnesses in the construction sector each year, this corresponds to more than 6000 deaths every day. ⁵ Data from the Central Bureau of Statistics (BPS) shows that the number of workers in construction has significantly increased, from 4,844,689 people in 2010 to almost double in 2015, as many as 8,208,086 people or about 7% of the 114 million workers [8]. Safety Planning is to analyze the risk of danger in the work which is the scope of the contract on the project in question, so that effective prevention and mitigation methods can be formulated[7] From the statement above, it can be seen that work accidents in the construction world are still very common. Therefore, this researcher aims to measure the level of implementation of SMK3 and the level of accident risk in the Administration Office Building Project at I Gusti Ngurah Rai Airport.

2. METHODS

According to the problems and objectives of the existing research, this research belongs to the type of descriptive correlative research. Descriptive research is one type of research whose purpose is to present a complete picture of the social setting or is intended to explore and clarify a phenomenon or social reality, by describing a number of variables relating to the problem and the unit under study between the phenomena being tested. While correlative research is a study to determine the level of relationship between two or more variables without any effort to influence these variables so that there is no variable manipulation. This research was carried out directly by distributing questionnaires about the level of implementation of SMK3 and the risk of accidents in the construction project of the I Gusti Ngurah Rai Airport Administration Office Building, Bali. For research on the level of implementation of SMK3 and the risk of accidents will be carried out on the Construction Project of the I Gusti Ngurah Rai Airport Administration Office Building in Bali. Can be seen in Figure 1 Research Locations.

Determination of data sources is raw data that needs to be processed so as to produce information or information, both qualitative and quantitative that show facts. The data obtained must be relevant, meaning data that has a direct relationship with the

research. In addition, the data obtained is reliable data that is still hotly discussed and obtained from the first person (primary data). After the data is obtained, the data are grouped first before being used in the analysis process, namely as follows: Figure 1.

Research Locations

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of Engineering Design and Technology 161 a. Primary data Is data obtained from the first source. Primary data was obtained by conducting field studies. Field studies are conducted by surveying with related parties, so the approach to primary data is to conduct surveys or conduct questionnaires. b. Secondary Data Is data obtained from literature studies, such as books, papers, journals, previous research and can be in the form of data that can be processed and can also be data from the project. The data used by the author in this study are primary data (direct) and secondary data in the form of literature studies and project data. According to Sugiyono [10], population is a generalization area ² consisting of objects or subjects that have certain qualities and quantities and characteristics determined by researchers to be studied and then drawn conclusions. The population referred to in this research is the contractors and structural workers in the I Gusti Ngurah Rai airport administration office building project in Bali. The sample is a number of members of the population that represent the population as the object of research. Research that uses the entire population as the object of research is called a census or total sample. Research like this is done when the population is not too large. If the research is conducted on a large population such as this research population, it is necessary to do sampling. Validity test is a measure that shows the levels of validity or validity of an instrument [9]. An instrument is said to be valid if it is able to measure what is desired and can reveal data from the variables studied appropriately. There are two ways to assess the validity of the questionnaire instrument, the first is whether or not an instrument is valid if the significance value (sig) is less than 0.05 then the data will be valid. While the second way is to compare the value of r-count with the value of r-table. If r-count is greater than r-table and positively correlated, then the item or question is valid. Or in other words, the question item is said to

be valid if the question item score has a positive and significant correlation. In assessing the validity of each question item, it can be seen from the Corrected Item-Total Correlation value of each question item. A question is said to be valid if the value of r-count which is the value of Corrected Item-Total Correlation is greater than r-table.

3. RESULTS AND DISCUSSION
 Characteristics of Respondents The respondents from the research on risk level analysis and the application of the Occupational Safety and Health System (SMK3) were taken from the project organization, the foreman and the chief handyman on the construction project of the Administration Office Building at I Gusti Ngurah Rai Airport, Bali.

Table 1. Characteristics of Respondents Based on Position

Classification	Number of Respondents (person)	Percentage of Respondents (%)	Position
Site Engineer	1	5	Site Engineer
Site Engineer MEP	1	5	Site Engineer MEP
Drafter	1	5	Drafter
QC	2	10	QC
QS	1	5	QS
Technical staff	3	15	Technical staff
K3 Staff	3	15	K3 Staff
MEP Staff	2	10	MEP Staff
Executor	3	15	Executor
Foreman	3	15	Foreman
Total	20	100	

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of Engineering Design and Technology 162 From the Table 1 above shows that the positions of respondents who filled out the questionnaire consisted of Technical Staff, K3 Staff, Implementers, Foreman with a percentage of respondents that was 15% then followed by QC, MEP Staff with a percentage of respondents that was 10% then followed by Site Engineer, Site Engineer MEP, Drafter, QS percentage of respondents is 5%.

Characteristics of Respondents Based on Education The results of the characteristic analysis based on the education of the respondents are presented in the following table 2 below.

Table 2. Characteristics of Respondents Based on Education

Classification	Amount Respondent	Percentage Respondent (%)	Education
JUNIOR HIGH SCHOOL	3	15	JUNIOR HIGH SCHOOL
SENIOR HIGH SCHOOL	2	10	SENIOR HIGH SCHOOL
3-year diploma	3	15	3-year diploma
4-year diploma	1	5	4-year diploma
Bachelor	11	55	Bachelor
Total	20	100	

From the table 2 above, it can be seen that respondents with undergraduate education have the most number, namely 11 people with a percentage of 55%. Respondents with junior high school education and diploma 3 have the least number of respondents, namely 3 people with a percentage of 15 % each. Respondents with high school education have the same number of respondents, namely 2 people with a

percentage of 10%. Respondents with diploma 4 education have the highest number of people with a percentage of 5%. So the most dominating education in this research is Bachelor. Risk Matrix The definition of K3 is an activity that ensures the creation of safe working conditions, protected from physical and mental disorders through coaching and training, direction and control over the implementation of the duties of employees and providing assistance in accordance with applicable regulations, both from government agencies and the company where they work. [3]. Based on these data, a mapping of the existing risks based on the existing risk matrix is carried out in the Urgent, High, Medium, Low, None categories. Classified (risk level) can be seen in the following explanation: URGENT (U): Filled with the letter U if the risk score is between 15-20 HIGH (H): Filled with the letter H if the risk score is between 10-<15 MEDIUM (M): Filled with the letter M if the risk score is between 5-<10 LOW (L): Filled with the letter L if the risk score is between 2-<5 NONE (N): Filled with the letter N if the risk score <2 To classify the level of risk, it is obtained by multiplying the average result of the frequency with the average result of the severity of each existing work risk, which can be seen in the Table 3 below.

LOGIC Jurnal Rancang Bangun dan Teknologi Vol. 22 No. 2 July 2022 Journal of Engineering Design and Technology 163 Table 3. Risk Level Classification Results

Risk Variable	frequency	severity	risk score	classified
Borepile Jobs	3 4 12	H	3 3 9	M
Struck by work tools/materials	3 4 12	H	3 3 9	M
Injured due to work tools	3 4 12	H	3 3 9	M
stabbed by a sharp object	3 4 12	H	3 3 9	M
Struck by iron material	3 4 12	H	3 3 9	M
Exposed to maneuvering heavy equipment	2 4 8	M	2 4 8	M
Exposed to Casting Tool	2 3 6	M	2 3 6	M
Get hit by readymix truck	2 4 8	M	2 4 8	M
Trapped by a tremi pipe	2 3 6	M	2 3 6	M
Pilecap Jobs	2 4 8	M	2 4 8	M
Struck by work tools/materials	2 4 8	M	2 4 8	M
stabbed by a sharp object	3 4 12	H	3 4 12	H
Injured due to work tools	3 4 12	H	3 4 12	H
Pierced by iron material	3 4 12	H	3 4 12	H
Struck by iron material	3 4 12	H	3 4 12	H
Exposed to maneuvering heavy equipment	2 4 8	M	2 4 8	M
Exposed to Casting Tool	2 3 6	M	2 3 6	M
Get hit by readymix truck	2 4 8	M	2 4 8	M
Pedestal Column Work	2 4 8	M	2 4 8	M
stabbed by a sharp object	2 4 8	M	2 4 8	M
Exposed to bar cutter and bar bending	3 3 9	M	3 3 9	M
Legs/hands hit by a saw	2 2 4	L	2 2 4	L
Exposed to Casting Tool	2 3 6	M	2 3 6	M
Get hit by readymix truck	2 4 8	M	2 4 8	M
Sloof Job	2 4 8	M	2 4 8	M
Hands/feet pinched by reinforcing iron	2 4 8	M	2 4 8	M
stabbed by a				

sharp object 2 4 8 M Struck by material maneuver 2 4 8 M Exposed to barcutter and
barbending 3 3 9 M

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classified Legs/hands hit by a saw 3 3 9 M Exposed to Casting Tool 2 3 6 M Get hit by

readymix truck 2 4 8 M Steel Roof Frame Work Falling from a height 2 5 10

H stabbed by a sharp object 2 5 10 H Hit by tower crane 1 4 4 L The worker below is hit

by the material 2 4 8 M Workers below are exposed to welding sparks when welding steel

frames 2 3 6 M Being hit / hit by material when loading / unloading material 3 4 12

H Material hit the building 3 4 12 H Rata-Rata Risk Score 8.69 M From the table 3

above, the results of the classification of the risk level above when viewed as a whole

against the 35 existing work risks, the work risk in the construction project of the

Administration Office Building at I Gusti Ngurah Rai Airport, Bali is included in the Medium

(M) category because it obtains average risk score of 8.69 . The Occupational Health and

Safety Management System is part of the overall management system which includes the

organizational structure, planning, responsibilities, implementation, procedures, p rocesses

and resources needed for the development of implementation, achievement, review and

maintenance of occupational safety and health policies in order to create a workplace safe,

safe, efficient and productive work (Regulation of the Minister of Public Works, 2008)

[6][11-15]. To Descriptive Table of SMK3 Implementation Level, which can be seen in the

table 4 below. Table 4. Descriptive Table of SMK3 Implementation Level Question N

MEAN TCR (%) CATEGORY Management Planning 20 4.19 84 Good Implemetation 20

4.19 83 Good Evaluation 20 4.07 81 Good MEAN 4.14 83 Good From the Table 4 above,

based on the results of the descriptive analysis above, it shows that the level of application

of the occupational safety and health system (SMK3) in the Administration Office Building

Construction project at I Gusti Ngurah Rai Airport, Bali is in the "Good" category with the

average TCR (Respondent's Level of Achievement) value of the 3 sub-variables of the

implementation of SMK3 is 83 %. K3 will improve worker safety and increase work

productivity [16][17].

of Engineering Design and Technology 165 4. CONCLUSION The results of the analysis on Questionnaire 1, namely the risk variable based on the answers from 20 respondents, showed that the level of risk in the construction project of the Administrative Office Building at I Gusti Ngurah Rai Airport, Bali. included in the S (Medium) category by getting an average risk score of the Medium (M) category because it obtained an average risk score of 8.69. it can be concluded that the frequency of risk that has the highest value is Injury due to work tools on borepile, pilecap, sloof work, pendestal columns with a scale of 3 and on the roof truss the highest value is Affected / crushed by material when loading / unloading material with a scale of 3 while for the smallest value on borepile work, pilecap, sloff, pendestal column is exposed to retail tools with a scale of 2. for severity (severity) the risk in borepile work which has the highest value is being stabbed by sharp objects with a scale of 4, on pilecap work is being hit work tools/materials with a scale of 4, in the pendestal column work, it was hit by a readymix truck 4, in the sloff work it was hit by a material maneuver and on the roof truss work it was punctured by a sharp object with a scale of 5, while the smallest value in the borepile work was struck by a tremi pipe with a scale of 3, on pilecap work is exposed to casting tools with a scale of 3, on the pendestal column work, the feet/hands are exposed to a saw with a scale of 2, on the sloff work is exposed to barcutter and barbending with a scale of 3, on the roof truss work Workers below are exposed to welding sparks when welding a steel frame with a scale of 3. The results of the analysis of the application of SMK3 show that the level of application of the occupational safety and health system (SMK3) in the Administration Office Building Construction project at I Gusti Ngurah Rai Airport, Bali is in the "Good" category with the average TCR value of the 3 sub variables of the implementation of SMK3 is 83%. 5.

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