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# Construction Safety Planning Method Based on Project Loan ( Lot 8 Jarit-Puger Road Project Case Study)

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## Abstract

The development of infrastructure in Indonesia has increased with the implementation of national strategic projects. With the increasing growth of infrastructure development in Indonesia and the increasing number of work-related accidents on the site. Accidents at work occur because of the lack of attention to implementation and monitoring. The success of the project is not measured merely in terms of performance, but in the application of occupational safety and health to a project and becomes one of the benchmarks for success. To control the implementation of Occupational Safety and Health in the project, a Construction Safety Plan is required, while compiled in the Construction Safety Plan document included in the Construction Safety Management System document. The research methodology used data collected in the field. Collect data from implementation case studies and comparisons related to construction safety planning documents against applicable regulations through field observations using documentation, questionnaires, observations and documentation methodology. Based on the analytical results conducted in this study, there are five elements to prepare the construction safety plan documents. Reduce the number of work-related accidents by planning, monitoring, and evaluating work-related accidents. There is an expectation that further analysis of the factors that cause work accidents by adding research objects to reduce work accidents in construction projects. For the analysis, the authors hope that the causes of industrial accidents will be more detailed by adding research topics to reduce accidents in construction projects.

**Keywords**
Occupational Safety and Health, Safety Management System document

## 1. Introduction

### 1.1. Background

Infrastructure development in Indonesia in the space of five years has increased, various development achievements in national strategic projects in connectivity infrastructure and outside connectivity infrastructure. According to Minister of Public Works and Public Housing (PUPR) Basuki Hadimuljono said, the condition of Indonesia's infrastructure is still far behind other countries in Southeast Asia (Alexander, 2020).

From the increase in the budget of infrastructure development in Indonesia from year to year is increasing, but there are still work accidents, currently the success rate of a project is not only seen from its performance, butthe application of K3 Construction on a project becomes one of the benchmarks.

With the acceleration carried out by the Indonesian government in infrastructure development to control the implementation of construction came iso 45001:2018 *Occupational Health and Safety Management System*regulation, then came Ministry of Public Works and Public Housing regulation No. 21/PRT/M/2019 on Construction Safety Management System Guidelines (SMKK) in force since December 30, 2019, Replacing the Regulation of the Minister of PUPR No. 02/ PRT / M / 2018 on Changes to the Regulation of the Minister of Public Works No. 05 / PRT / M / 2014 on Guidelines for Occupational Safety and Health Management System (SMK3) Construction in the Field of Public Works has undergone changes in inactive status. [1]

With the emergence of various regulations for occupational health and safety management is expected to be able to parse the factors that can be caused during the implementation of construction work well and can reduce work *accidents*in the safety plan/ construction safety planning on construction work. Development with *a loan* financing scheme will be of more concern, so that a good safety *plan*/ construction safety planning canbe adjusted to the construction work on the Development of Trans *South-South Java Road Project (TRSS) Lot 8 Jarit-Puger* or Lot 8 Road Development: Jarit-Puger.

### 1.2 Problem Formulation

a. With the emergence of various regulations ISO 45001:2018, regulation PUPR No. 21 / PRT / M / 2019 what are the differences between construction safety plan documents and the influence on the Lot 8 Jarit-Puger Road Construction project?
b. What are the advantages and disadvantages of the document of the construction safety plan of lot 8 Jarit-Puger road construction project in ISO 45001:2018 regulation, regulation PUPR No. 21/PRT/M/2019?
c. How is the evaluation carried out if there is a change in the regulation of the construction safety plan document during the construction work on the Lot 8 Jarit-Puger Road Construction project?

### 1.3 Problem Limitations

The research compared the appropriate construction safety planning methods to be applied to the project with the *IsDB loan* funding scheme on lot 8 Jarit-Puger Road development.

### 1.4 Research objectives

a. Find out the proper construction safety plan documents for loan projects *by* comparing ISO 45001:2018 regulations, regulation PUPR No. 21/PRT/M/2019 on the Lot 8 Jarit-Puger Road construction project.
b. Knowing the advantages and disadvantages of the construction safety plan document in ISO 45001:2018 regulation, regulation PUPR No. 21/PRT/M/2019
c. Knowing the evaluation carried out in case of changes in the regulation of construction safety plan documents during construction work on the Lot 8 Jarit-Puger Road Construction project

## 2. Library Review

A construction project is a series of activities carried out only once and generally in the short term. In the series of activities, there is a process that processes project resources into a result of activities in the form of buildings (Ervianto, 2002). A project is a temporary activity that takes place over a limited period of time, with a certain allocation of resources and intended to carry out tasks whose objectives have been clearly outlined (Suharto, 1995). Work accident prevention efforts need to be done as early as possible before it is too late (Ervianto, 2005). As for the things / actions that may be done, among others:

Identify each type of work at risk and group them according to their risks

1. Here is training for construction workers according to their skills
2. Conduct more intensive supervision of the implementation of work
3. Provide work support tools for the duration of the project
4. Implementing arrangements at the construction project site

According to the Regulation of the Minister of PUPR No. 21/PRT/M/2019 on Guidelines for Construction Safety Management System, Construction Occupational Safety and Health hereinafter referred to as K3 Construction is all activities to ensure and protect the safety and health of workers through efforts to prevent occupational accidents and occupational diseases in Construction Work.

Construction safety is all technical activities to support construction work in realizing the fulfillment of safety, safety, health and sustainability standards that ensure the safety of construction engineering, occupational safety and health, public safety and the environment. Construction Safety Plan (RKK) is a complete document of SMKK implementation plan and is a unity with contract documents. RKK is one of the conditions in the election document.

There are several SMK3 standards that apply internationally and nationally. International and national SMK3 standards, including ISO 45001:2018 Occupational Health and Safety replace OHSAS 18001: 2007 on Occupational Health and Safety Assessment Series, Government Regulation No. 50 of 2012 on Implementation of Occupational Safety Management System, Regulation of the Minister of Public Works and Public Housing Number 21/PRT/M/2019 on Construction Safety Management System Guidelines.

## 3. Research Methods

### 3.1 Research Methods

Research methods are scientific procedures, steps, or procedures in obtaining data for research purposes that have a specific purpose and usefulness. According to (Sugiyono, 2018) research methods are a scientific way of obtaining data for specific purposes and uses.

### 3.2 Research Procedure

Research methods used in research are literature studies, comparative analysis and discussion. The research stage in the literature study of this study refers to (Nazir, 1988), as follows:

a. Formulate and define issues related to construction safety plan documents;
b. Search and research literature that has to do with construction safety plan documents;

c. Formulate theoretical frameworks and hypotheses and assumptions used in the research of construction safety plan documents;
d. Create a research design, conduct data analysis from various literature;
e. Make generalizations of conclusions;
f. Prepare a report by way of scientific writing.

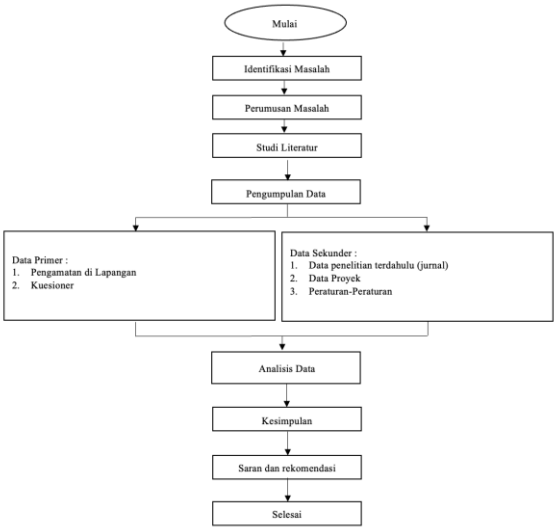


Figure 1. Research Flow Chart

### 3.3 Materials or Materials

According to (Sugiyono, 2016) Primary data is a data source that directly provides data to data collectors. Primary data sources are obtained through interview activities with research subjects and by observation or direct observation in the field.

Primary data obtained from project data and observations in the lot 8 Jarit-Puger Road Development field is RK3K (Contract Work Safety and Health Plan) or now becomes RKK (Construction Safety Plan). Secondary data is obtained by a researcher indirectly from the object, but through other sources, both oral and written. The data is the Regulation of the Minister of PUPR Number 21/PRT/M/2019 on Construction Safety Management System Guidelines, ISO 45001:2018 *Occupational health and safety management systems* and research journals.

### 3.4 Tools or Instruments

Instruments are tools or facilities used by research in collecting data so that the work is easier and the results are better, so it is easy to process (Suharsimi. Arikunto, 2006). In this study researchers used observation methods, documentation and interviews.

### 3.5 Variable Research

A research variable is a unit of attributes or properties or values of people objects or activities that have certain variations set by researchers to be studied and drawn conclusions (Sugiyono, 2007). Variables used by researchers based on The Minister of Public Works and Public Housing Regulation No. 21 of 2019 on Construction Work Safety Management System Guidelines, consisting of Leadership and Work Participation in Construction Safety, Construction Safety Planning, Construction Safety Support, Construction Safety Operations and Construction Safety Performance Evaluation become variables or indicators in comparison and interviews in conducting engineering data collection of researchers.

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Table 1. Table Comparison of Construction Safety Plan Documents

| No. | Indicators | Rule 1 | Rule 2 | Rule 3 |
|---|---|---|---|---|
| 1. | Leadership and Work Participation in The Construction Ministry | | | |
| 2. | Construction Safety Plan | | | |
| 3. | Construction Safety Support | | | |
| 4. | Construction Safety Operations | | | |
| 5. | Evaluation of Construction Safety Performance | | | |

### 3.6 Data Analysis

Qualitative data analysisby describing the data that the author finds during observations and documents of construction safety plans. Methods used in data analysis include:

5. Data Analyst

This analysis is used to find out the profile of respondents, the method used is to assess the respondent's answer to the question to be asked to theresearcher, namely regarding the respondent's personal data. The percentage size of respondents' answers will show the characteristics of respondents using the likert scale with 5 (five) scales, *semantic differences* or rating *scale* calculations using formulas.

$$\sum Skor_{observasi} = (jumlah \times skor\ TP) + (jumlah \times skor\ KP) + (jumlah \times skor\ CP) + (jumlah \times P) + (jumlah \times SP)$$

$$Skor\ yang\ diharapkan = \frac{\sum skor\ observasi}{\sum skor_{\ yang\ diharapkan}} \times 100\%$$

Information:
TP: It doesn't matter.
KP: Less Important
CP: It's pretty important.
Q: Important
SP: Very important

6. Comparative

Comparative methods are the relevances between several data from various sentences, opinions obtained, after which compared between the data to be drawn conclusions. (Surachmad, 1970).

7. Observation

Observation method is a method of collecting data based on the results of observations from researchers on the focus of research conducted either directly or indirectly.

## 4. Discussion

Based on a questionnaire distributed to 15 respondents in the project environment, obtaining a score of 86.39% was categorized as important, the review of the list of questions based on pupr minister regulation No. 21 of 2019 concerning the Guidelines for Construction Safety Management System.

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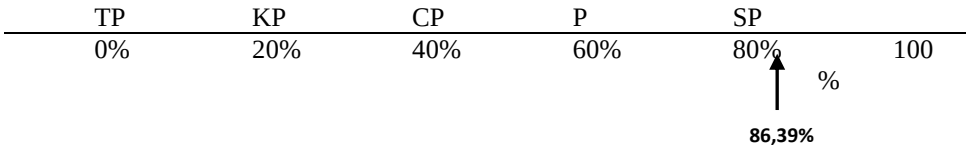
Table 2. Pcalculates eligibility percentage

| Respondents | TP | KP | CP | P | SP | Total | maximum value | Percentage of eligibility (%) |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | | | |
| 1 | 0 | 0 | 84 | 192 | 70 | 346 | 450 | 76,89 |
| 2 | 0 | 0 | 0 | 8 | 440 | 448 | 450 | 99,56 |
| 3 | 0 | 0 | 9 | 252 | 120 | 381 | 450 | 84,67 |
| 4 | 0 | 0 | 9 | 300 | 60 | 369 | 450 | 82,00 |
| 5 | 0 | 0 | 27 | 212 | 140 | 379 | 450 | 84,22 |
| 6 | 0 | 0 | 6 | 184 | 210 | 400 | 450 | 88,89 |
| 7 | 0 | 0 | 12 | 36 | 385 | 433 | 450 | 96,22 |
| 8 | 0 | 0 | 3 | 344 | 15 | 362 | 450 | 80,44 |
| 9 | 1 | 2 | 138 | 160 | 10 | 311 | 450 | 69,11 |
| 10 | 0 | 0 | 0 | 88 | 340 | 428 | 450 | 95,11 |
| 11 | 0 | 0 | 3 | 96 | 325 | 424 | 450 | 94,22 |
| 12 | 0 | 0 | 0 | 292 | 85 | 377 | 450 | 83,78 |
| 13 | 0 | 0 | 0 | 348 | 15 | 363 | 450 | 80,67 |
| 14 | 0 | 0 | 0 | 4 | 445 | 449 | 450 | 99,78 |
| 15 | 1 | 2 | 30 | 248 | 80 | 361 | 450 | 80,22 |
| | | | | Average | | | | 86,39 |

Source: Author's Processed Results, 2021

The total observation score of 15 respondents obtained a score of 86.39% expected which is 450 (100%) with a very important category. Based on the criteria in the eligibility table according to (S. Arikunto, 2009), the percentage of the total score is included in the Category of Worthy. The presentation of the scale according to the percentage of the total score according to (S. Arikunto, 2009) in detail can be described as follows:




Information:
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Construction safety plan documents are one of the requirements in technical offer documents when service providers follow the procurement of construction work. This document covers in terms of cost, socialization, risk identification, hazards, implementation and evaluation of project activities. From the RKK document at the time of the offer by the service provider then resensified, discussed and approved by the relevant PPK in the discussion of the preparation meeting for the implementation of construction work*(preconstruction meeting)*and became part of the contract document. The approved RKK document then becomes an RKK implementation document and the relevant parties are obliged to implement and control the implementation of RKK consistently.

Service providers are obliged to upgrade RKK in accordance with working conditions because RKK documents are integrated with RMPK (Construction Work Quality Plan) documents because construction safety activities follow from observation or identification of the implementation of work.

From the results of research and observations researchers can be interesting that the RKK document can change when it occurs.

1. Changes in new jobs or jobs as well as changes in the scope of work on contracts, including additional/less work;
2. Work accidents that result in loss of work time, death and/or permanent disability.
3. Change of officials in the project environment.

RKK documents can be updated by the service provider at the time of the construction work addendum and poured in the contract addendum. If the construction work contract runs with a single year contract (SYC) it is permissible to keep using the previous regulation until the work expires at the end of the year or the service provider can apply for changes at the time of the work addendum, while for the plural year contract or Multi Years Contract (MYC) if the regulation changes related to construction work then the service provider can make changes during the work addendum or at the turn of the new year.

Service users conduct supervision of RKK implementation and evaluate the performance of SMKK implementation implemented by service providers, in conducting supervision and evaluation of service users can be assisted by K3 Construction experts and/ or construction safety officers.

Lot 8 Jarit-Puger Road Development Project still uses the guidelines of The Minister of Pu Regulation No. 5 of 2014 because procurement and work contracts took place before the emergence of new regulations in 2019,so that in implementation stilluse theold regulations but for construction safety planning documents need to attach K3 officer certificates with conditions namely architectural, civil, mechanical, electrical and/or environmental governance (ASMET) and quality assurance and quality control letters, so that there are adjustments to regulations from service users.

As for the results of research from construction safety planning documents from service providers, there is no format or template for the control of infectious diseases, to take steps to protect workers from the current coronavirus or the spread of infectious diseases, it is necessary to make a risk assessment of Covid-19 and this is expected to help in managing and protecting workers. All you have to do is identify the activities or work situations that could lead to transmission of the virus, who could be at risk, how likely a person or worker could be exposed. Here is an example table to control coronavirustransmission.

Table 3. Identify the dangers of spreading infectious diseases/covid on the project

| Any danger | Who might be harmed? | Control/control | Further actions to control risk | Who needs to take action? | When action is needed |
|---|---|---|---|---|---|
| *example Coronavirus spreads when it doesn't wash your hands | Worker<br>Contractor<br>Consultant<br>Partners in and out of the project scope<br>Visitors | Provide water, soap, drying in hand washing facilities<br>Provide information on how to wash your hands properly and display posters<br>Find handwashing places<br>Placing a barcode scan for visitors as a preliminary check when there is a visit | Conduct monitoring,and supervision to ensure workers<br>Put up a sign to encourage workers to wash their hands<br>Identify hand washing facilities | Field K3 expert | |

## 5. Conclusion

Based on research on Construction Work Safety Planning Methods in accordance with Project Loan (Case Study of Lot 8 Jarit-Puger Road Construction Project) concluded, among others:

Comparison between ISO 45001:2018 regulation and PUPR Ministerial Regulation No. 21/PRT/M/2019 with construction safety plan document on Lot 8 Jarit-Puger project there is a difference in the numbering clause contained in each of the five elements of SMKK in PUPR Ministerial Regulation No. 21/PRT/M/2019 with ISO 45001:2018 regulations including leadership and workforce participation in Construction Safety; Construction Safety planning; Construction Safety support; Construction Safety operations and evaluation of the performance of the implementation of the Construction Safety Management System as well as in the preparation of no differences in the two regulations.

Pupr Ministerial Regulation No. 21/PRT/M/2019 has advantages in the preparation of construction safety plans using 86 indicators and has a template or example format and has shortcomings in format examples. Deficiencies between pupr ministerial regulation no. 21/PRT/M/2019 and ISO 45001:2018 there is no detailed discussion for infectious diseases (epidemiology) in the construction environment.

Evaluations conducted in the event of a regulatory change to the construction safety plan document during construction work on the Lot 8 Jarit-Puger road construction project can be done with changes to the construction safety plan document at the time of the work addendum or the turn of the budget year to follow the latest regulations.

## 6. Suggestion

The advice obtained as a development material for future research can be continued by using the latest regulations, namely the Minister of Public Works and Public Housing Regulation No. 21 / PRT / M / 2019 on SMKK and can compare with other regulations. Can be added format / identification list on the dangers of infectious diseases in the construction work environment during the current pandemic.

From the results of this research is expected to provide insights both academics, practitioners and the government in the field of construction safety regarding construction safety planning both from planning there are five elements that need to be considered in the preparation that are in accordance with the construction association can be implemented and controlled through evaluation to prevent the occurrence of construction work accidents.

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