

IMPLEMENTATION OF OCCUPATIONAL SAFETY AND HEALTH MANAGEMENT SYSTEM IN CIBEBER IRRIGATION PROJECT WITH HIRARC METHOD

Canda Halim Azhari ^{1st*}
Universitas Nusa Putra
Sukabumi Indonesia
canda.halim_ts20@nusaputra.ac.id

Maharani Tira Yusina ^{2nd}
Universitas Nusa Putra
Sukabumi Indonesia
tira.yusina_ts20@nusaputra.ac.id

Revi Yusup Tri MN
Universitas Nusa Putra
Sukabumi Indonesia
revi.yusup_ts20@nusaputra.ac.id

Abstract

The rapid development of infrastructure in Indonesia raises the risk of hazards in construction projects. Occupational safety planning using the HIRARC (Hazard Identification, Risk Assessment And Risk Control) method is important in identifying and evaluating hazard risks. This research aims to apply the Occupational Safety and Health Management System (OSH) with the Hazard Identification, Risk Assessment, and Risk Control (HIRARC) method to the Cibeber irrigation project. Through the HIRARC approach, this research identifies physical, chemical, biological, ergonomic, and environmental hazards. Risk assessments were conducted to determine risk control strategies involving changes in work procedures, use of protective equipment, and training for workers. This research is expected to provide an effective framework for sustainable OHS practices in construction projects, particularly in similar irrigation projects in the future.

Keywords: *Hirarc Method, Infrastructure Development, Occupational Safety Planning*

I. INTRODUCTION

Construction projects are closely related to changing human needs. To achieve this, construction projects must be handled professionally with good management and quality.[1] The success or failure of a very large project is determined by the policies implemented, namely by initiation and implementation. Projects must be planned, organized, directed, coordinated and controlled as well as possible. So that good planning is needed in the development process, taking into account, among others, time efficiency, efficient cost and high quality. Occupational safety and health (OHS) is very important in construction projects because the impact of accidents and occupational diseases not only harms workers, directly and indirectly[2].

The goals of occupational safety and health (OHS) are aimed at protecting the workforce and other people around the workplace, occupational diseases, environmental damage and risks[3].

The HIRARC (Hazard Identification Risk Assessment and Risk Control) method is a series of hazard identification processes that occur in routine and non-routine activities in companies that are expected to make efforts to prevent and reduce the occurrence of work accidents that occur in the company, and avoid and minimize risks in the right way by avoiding and reducing the risk of work accidents and controlling them in carrying out the process of repair and maintenance activities so that the process becomes safe.

Hazard identification and risk assessment and control are part of the risk management system which is the basis of the SMK3 occupational safety and health management system which consists of hazard identification, risk assessment and risk control[4].

The analysis of the occupational safety and health management system is limited to the cibeber irrigation network improvement project in tanjungsari village, curug twin sub-district. By using the HIRA method (Hazard Identification and Risk Assessment) di setiap proses pekerjaan peningkatan jaringan irigasi cibeber.

This study aims to analyze the Occupational Safety and Health Management System (SMK3) along with potential hazards and risk assessments that exist in the cibeber irrigation network improvement project. With the benefit of knowing SMK3, it can also identify hazards and risk assessments in the work environment, and provide information about the controls that must be carried out.

II. LITERATURE REVIEW

A. Definition Of Occupational Safety and Health

Occupational safety and health is a thought and effort to ensure the integrity and perfection of both physical and spiritual labor in particular, and humans in general, work and culture towards a just and prosperous society. One of the objectives of OHS is to achieve Zero Accident[5]. Risk management is a process consisting of steps that have been well formulated, have a sequence (steps) and help in making better decisions by looking at the risks and impacts."[6]

Risk Management Based on ISO 31000:2009
The scope of the risk management process consists of:

- a. Determination of the context of the activity to be risk managed
- b. Risk identification
- c. Risk analysis
- d. Risk evaluation
- e. Risk control
- f. Monitoring and review
- g. Coordination and communication

Risk management is a method that is logically and systematically organized from a series of activities to establish context, identify, analyze, evaluate, control and communicate risks.

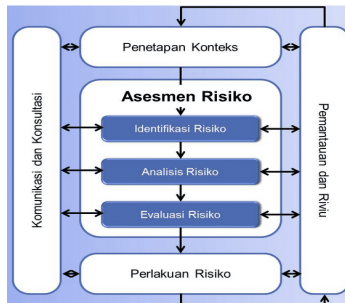


Figure 1. Proses manajemen resiko ISO 31000:2009

B. HIRARC (Hazard Identification, Risk Assessment and Risk Control)

HIRARC is a series of processes to identify hazards that can occur in routine or non-routine activities in the company then conduct a risk assessment of the hazard and then create a hazard control program so that the risk level can be minimized to a lower level with the aim of preventing accidents.

Hazard Identification

Hazard identification is a systematic effort to identify hazards in organizational activities." Every workplace that carries out risk identification of each event and then considers the conditions in determining the risk is as follows:

- Normal operating conditions (N): Daily work and according to procedures
- Abnormal operating conditions (A): Work outside the procedure
- Emergency condition (E): Circumstances that are difficult to control

Risk Assessment

Risk assessment is an attempt to calculate the magnitude of a risk and determine whether the risk is acceptable or not. Risk assessment is used to determine the level of risk in terms of likelihood and severity. The qualitative method according to the AS/NZS 4360 standard, the possibility or likelihood is given a range between a risk that rarely occurs to a risk that can occur at any time. For severity or severity is categorized between events that do not cause injury or only minor losses that are most severe if they can cause fatal events (death) or major damage to company assets[7].

Table 1. Qualitative Measures of Likelihood in AS/NZS 4360-2004 Standard

Table 2. Qualitative Measures of Severity in the AS/NZS 4360-2004 Standard

Table 3. Likelihood Measurement Scale

Table 4. Severity Measurement Scale

Rule	Level	Explanation
5	Almost certain	An incident that will inevitably occur under all conditions (There are ≥ 1 occurrences in a day)
4	<i>Likely</i>	Suatu insiden yang sangat mungkin akan terjadi (berkala) di hampir semua kondisi (Terdapat ≥ 1 kejadian dalam seminggu)
3	Possible	An incident that will occur under certain conditions (There is ≥ 1 incident in a month)
2	Unlikely	An incident that may occur under certain conditions, but the likelihood of occurrence is small (rare) (There is ≥ 1 occurrence in a year)
1	Rare	An incident that is likely to occur only under special/extraordinary conditions/after many years (There is < 1 occurrence in a year)

Rule	Level	Explanation
1	Insignificant	No injury - low financial loss
2	Minor	Slight Injury - medium financial loss requires immediate first aid treatment on site
3	Moderate	Moderate Injury - high financial loss requires on-site medical treatment due to temporary loss of limb function
4	Major	Serious Injury - high financial loss medical treatment is required due to total loss of body function, thus disrupting the production process.
5	Catastrophic	Fatal Occurrence - very high financial loss There are cases of death, poisoning with major disruptive effects with a large disruption effect and impact on the cessation of all activities

Level	Level of likelihood	Definition
1	Rarely	Accidents occur once every 5 years
2	Occasionally	Accidents occur once every 2 - 5 years
3	May occur	Accidents occur every 1 - 2 years
4	Happens often	Accidents occur once every 2 - 10 months
5	Almost certain to occur	Accidents occur once a month

Level	Severity	Definition
1	Not significant	If there is no very minor impact on people, production processes, property or causes physical treatment in at least 15 minutes.
2	Small	In case of minor injury but sufficient to be treated by the first aid team and / or cause one working day lost or less
3	Medium	In case of moderate injury, requiring medical treatment, causing at least two working days lost or less
4	Severe	If the injury is severe and requires hospitalization and/or results in more than two days of lost work.
5	Disaster	If the impact results in permanent or partial disability or even death

Risk Rating A risk matrix where the likelihood and severity ratings are assigned a value of 1-4. Thus, the risk value can be obtained by switching between the likelihood and severity, which is between 1-16. (Ramli, 2010)

Tabel 5. Skala Risk Rating pada Standar AS/NZS 4360-2004

Possibility, Likelihood	severity			
	1	2	3	4
1	1	2	3	4
2	2	4	6	8
3	3	6	9	12
4	4	8	12	16

Risk Control Risk control is carried out on all hazards found in the hazard identification process and considers the risk rating to find priorities and control methods. Furthermore, in determining control, the hierarchy of control must be considered starting from elimination, substitution, technical, administrative and PPE control.

III. METHODOLOGY

A. Type Of Research

The method used in this research is a qualitative descriptive method that aims to understand what hazard control looks like in the Cibeber Irrigation Network Project. Descriptive means shading a problem, and qualitative is the way used to present the problem. Therefore, the qualitative descriptive method used for this research intends to provide a comprehensive and simple description of the activities and

hazard control in the related project. In this study, researchers focused on the potential hazards contained in each construction work activity starting from the beginning of procurement until the project is completed and ready for use, then determined the right suggestions for minimizing potential construction hazards using the Hazard Identification Risk Assessment and Risk Control (HIRARC) method.

B. Research Location

The research location is a place or object for conducting a study. The location of this research is in Tanjungsari Village, Curug Kembar District. Researchers took this research location because the project area has potential hazards and the lack of awareness of workers in occupational health and safety.

C. Data Collection

Data collection in this study was carried out by:

1. Primary Data

Primary data is data obtained directly from the source. This data can be obtained through observations and interviews with sources or experts who are used as a means of obtaining the necessary information, including information related to the reconstruction process.

2. Secondary Data

Secondary data is a data source that is not obtained directly. Data can be obtained through intermediary media or other sources such as the Central Bureau of Statistics, books, journals and other references which are used as supporting data in the formulation and resolution of problems supporting data in the formulation and resolution of problems in research. in research. Secondary data in this study to support literature review. Literature review on theories related or related to the HIRARC method.

D. Data Collection Method

The data collection methods used in this research include:

1. Observation

Observation is one of the data collection techniques where researchers conduct a direct review of the work process of the cibeber irrigation network project. This is done in order to get a clear picture about the problem to be studied.

2. Interview

Interview is one of the data collection techniques carried out by conducting questions and answers, either directly or indirectly with data sources. data source. In this study, researchers interviewed experts or parties folded in the construction section. who are folded in the construction section.

3. Literature Study

Literature study was conducted by collecting literature relevant to this research. In addition, this literature study is also used as a theoretical basis and assumptions used in research. This literature study can be in the form of a collection of information via the internet, books and journals that are used as guidelines in data

collection, ways of solving problems, the basis for conducting analysis and providing input in research results.

E. Data Analysis

The data analysis method used is the HIRARC method (Hazard Identification Risk Assessment and Risk Control). Method

- At this stage, data that has been obtained from observations to the local area of the project where there are various potential hazards such as being injured by work equipment and potentially hazardous work areas. After the data from observations and observations at the project site, the data will be described in tabular form as follows:

Number	Activity or work	Potential hazards	Possible risk

- Risk Assessment

The risks that have been described are assessed by considering two dimensions; likelihood of occurrence and consequences. The following is an initial risk assessment table before the Risk Analysis and Risk Evaluation process.

- Determinan control

After the assessment stage is completed, proceed to the risk control stage. Where this stage is needed to avoid and reduce risk. This method is done to reduce the likelihood and reduce the severity of the consequences. This method is done to eliminate the source of danger, and avoid the possibility of danger that can occur.

The hierarchy for risk control plays an important role in order to make decisions regarding further risk control. Below is a table of the control stages of the risk control hierarchy.

Controlling	Definition	Target
Elimination	Eliminate the source of danger	Workplace, safe work reduces hazards
Substitution	In the form of tools or materials	
Design	Modification of tools or workplace	
Administration	Procedures, training rules, tables, and hazard signs	Workers at the project site

PPE	Personal protective equipment	
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With the stages of the risk control hierarchy, it can make it easier for researchers to describe the risks of occupational accidents and health that have high potential. The following is an implementation table in determining what options I have to do the elimination process and so on.

Activities	Danger	risk control measures	Hierarchy

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