



# Impact of the Crane Collapse on the South Sumatra LRT Construction Project on the Environment and the Company

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**Abstract:** *This report examines the crane collapse incident during the Light Rail Transit (LRT) construction project in Palembang, South Sumatra. This case study analyzes the impact of the event on the environment and the company, and evaluates the incident handling from the perspective of engineering ethics and code of conduct. The methodology used includes field observations, interviews, and data analysis from investigation reports. The discussion covers aspects of occupational safety, health, and environment (SHE), as well as professionalism in engineering. The report also highlights the importance of risk management, geotechnical analysis, and innovation in construction techniques. The conclusions drawn emphasize the priority of workplace safety, the importance of comprehensive risk analysis, and adherence to engineering professional ethics. Recommendations include improving safety standards, stricter supervision, and thorough risk evaluation in similar infrastructure projects in the future. A key lesson from this incident is the importance of balancing technological advancement with safety in infrastructure development.*

**Keywords:** *Occupational Safety, Risk Management, Engineering Ethics, Transportation Infrastructure, Geotechnical Analysis*

## Introduction

The construction of the Light Rail Transit (LRT) in Palembang, South Sumatra, is an infrastructure transportation project initiated as part of the preparations for the 2018 Asian Games. This project aims to provide an efficient and modern mass transportation system, support economic growth, and reduce traffic congestion in the city of Palembang (Aminah et al., 2021; Azka, 2022; Hafizah & Sari, 2019; Sumbawa et al., 2022)

President Joko Widodo signed Presidential Regulation Number 116 of 2015 on October 20, 2015, assigning PT Waskita Karya Tbk to build the LRT infrastructure. The project was initially financed by PT Waskita Karya in 2016 and subsequently supported by the government through the Ministry of Transportation with budget allocations from the 2017 and 2018 State Budget. However, during its implementation, the project faced serious challenges when a crane collapsed on August 1, 2017 (Putra, 2023). This incident caused damage to the surrounding environment, including the collapse of two houses, and significantly impacted the project implementing company. This case study will analyze the

incident, evaluate its impact on the environment and the company, and examine the handling of the incident from the perspective of ethics and engineering codes of conduct. The main focus will be on aspects of Security, Safety, Occupational Health, and Environment (K4L), as well as professionalism in engineering practice. Through this analysis, it is hoped that valuable lessons can be learned to improve safety standards, risk management, and best practices in the implementation of similar infrastructure projects in the future (Valentine & Sugandi, 2019).

## **Basic Theory**

### **Risk Management in Construction Projects**

This theory encompasses the processes of identifying, analyzing, and mitigating risks in large-scale construction projects. It involves understanding various types of risks, including technical, environmental, and operational risks, as well as strategies to manage them effectively.

### **Ethics and Code of Conduct in Engineering**

This theory focuses on the ethical principles that professional engineers must uphold. It includes the concepts of Catur Karsa and Sapta Dharma established by the Indonesian Engineers Association, emphasizing integrity, social responsibility, and professional competence (Fabrianti, 2022).

### **Occupational Health and Safety (OHS) in Construction**

This theory discusses the importance of occupational health and safety in construction projects. It covers safety standards, safe working procedures, and effective OHS management systems to prevent accidents and protect workers.

### **Geotechnical Analysis in Infrastructure Construction**

This theory relates to the understanding and analysis of soil and rock conditions in the context of construction. It includes methods to evaluate soil stability, bearing capacity, and risks associated with specific geological conditions.

### **Infrastructure Project Management**

This theory includes the principles of planning, implementing, and controlling large-scale infrastructure projects. It involves aspects such as resource management, scheduling, budgeting, and stakeholder coordination (Sumbawa et al., 2022).

### **Environmental and Social Impact of Infrastructure Projects**

This theory discusses how large infrastructure projects can affect the environment and surrounding communities. It includes methods to assess and manage impacts, as well as strategies to engage communities in the development process.

## Innovation and Technology in Construction

This theory focuses on the role of innovation and new technologies in enhancing the efficiency, safety, and sustainability of construction projects. It covers the use of digital technology, modern construction methods, and innovative approaches to addressing challenges in the construction industry (Aminah et al., 2021).

### Methodology

Research Approach: Descriptive-analytical case study, focusing on the crane collapse incident in the Palembang LRT construction project.

Data Collection:

a. Field Observation:

1. Visual inspection of the incident area
2. Documentation of site conditions and damage impact

b. Interviews:

1. Semi-structured interviews with workers and on-site staff
2. Discussions with the project management team and safety experts

c. Document Analysis:

- b. In-depth review of the Investigation Report
- c. Examination of related project documents, including safety plans and standard operating procedures

1. Data Analysis:

a. Content Analysis:

- 1) Systematic evaluation of the Investigation Report
- 2) Identification of key themes and patterns in the collected data

b. Risk Analysis:

- 1) Retrospective risk assessment based on information available before the incident
- 2) Evaluation of the effectiveness of existing risk mitigation strategies

c. Comparative Analysis:

- 1) Comparison of implemented safety procedures with industry standards and best practices

2. Evaluation of Ethics and Professionalism:

- a. Reviewing actions and decisions in the context of Catur Karsa and Sapta Dharma
- b. Assessing compliance with the engineering code of ethics

3. Synthesis and Formulation of Recommendations:

- a. Integrating findings from various data sources
- b. Developing recommendations for improving safety practices and risk management

4. Validation:

- a. Triangulating data from multiple sources to ensure the accuracy of findings
- b. Consulting with independent experts to validate interpretations and recommendations

5. Report Preparation:

- a. Compiling a comprehensive report that includes analysis, findings, and recommendations
- b. Preparing a presentation for project stakeholders

This methodology is designed to provide a systematic and comprehensive approach to analyzing the incident, evaluating its impact, and developing meaningful lessons and recommendations for improving safety practices and risk management in future infrastructure projects(Maudyta et al., 2023).

### **Subtopics of Discussion**

This paper discusses the crane collapse incident in the Light Rail Transit (LRT) construction project in Palembang, South Sumatra. The discussion begins with the project background, including its objectives and significance in the context of national infrastructure development(Khairunnisa, 2022). The chronology of the incident is detailed, followed by an in-depth analysis of the technical causes, including an evaluation of geotechnical conditions and crane capacity analysis. The impact of the incident on the environment and its consequences for the company are also a main focus, covering property damage, ecosystem disruption, financial implications, and the effects on the project schedule and the company's reputation. A comprehensive evaluation of risk management and Occupational Health and Safety (OHS) aspects is discussed, highlighting the importance of risk identification and effective safety protocols(Juditha, 2020).

### **Subtopics of Discussion**

This paper also examines the application of engineering ethics and professionalism in the context of the incident, including how the principles of Catur Karsa and Sapta Dharma were applied in crisis management(Anggraini & Utara, 2021). Post-incident handling, including emergency response and crisis communication, is evaluated to identify areas for improvement. The discussion continues by exploring the potential of innovations and technologies in the construction industry that could prevent similar incidents in the future. Finally, the paper presents key lessons learned and concrete recommendations for improving safety standards, risk management systems, and personnel competency development. The broader implications for the construction industry, including the need for stricter best practice standards and enhanced regulation and oversight, are also discussed in conclusion(VELINSIA, 2023).



**Figure 1.** Condition of the Collapsed Crane

## Result and Discussion

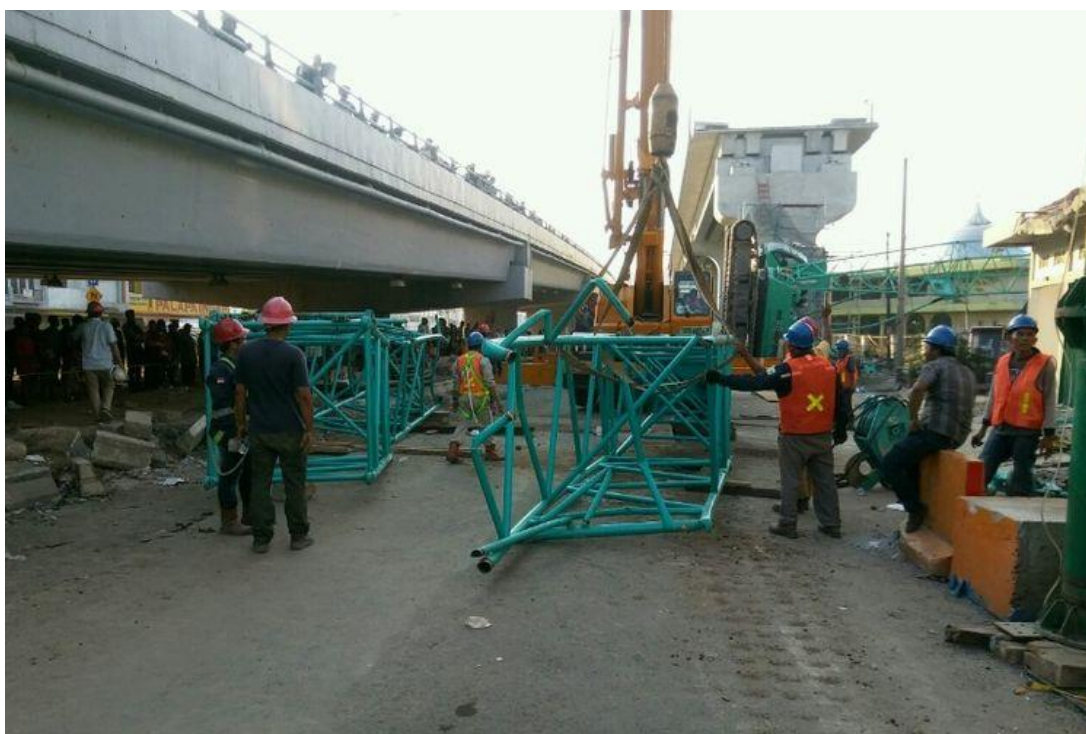
The crane collapse incident in the Palembang LRT construction project revealed several critical factors in managing large-scale infrastructure projects. The analysis indicates that the primary cause of the incident was the sudden soil subsidence under the crane's foundation (Utomo et al., 2023), exacerbated by inadequate geotechnical analysis before the equipment placement. Overloading the crane during the installation of the steel box likely also contributed to the event. The environmental impact of the incident was significant, with damage to two houses and potential disruption to the local ecosystem, necessitating extensive rehabilitation efforts (Riauana & Salsabila, 2022).

For the company, this incident resulted in serious legal and financial consequences, including repair costs, compensation, and potential project delays that affected operational expenses. Furthermore, the company's reputation and public trust were also negatively impacted. The risk management evaluation revealed weaknesses in the pre-incident risk assessment process, emphasizing the importance of continuous updates to the project risk register and improvements in monitoring and risk mitigation procedures (Rohimah, 2020). Occupational Health and Safety (OHS) aspects are a major focus, highlighting the urgent need to enhance safety protocols, especially in the operation of heavy equipment. More comprehensive OHS training for workers and evaluation of the company's OHS management system are also priorities. In the context of engineering ethics and professionalism, the incident tested the application of the principles of Catur Karsa and Sapta Dharma, as well as adherence to the engineering code of ethics in crisis management (Nurhabyana et al., 2024).

The response and post-incident handling are also evaluated, including the effectiveness of emergency response plans, evacuation processes, victim management, and crisis communication with stakeholders and the public. Lessons from this incident encourage the identification of areas for improvement in construction practices and project management, including the potential application of new technologies for monitoring soil conditions and equipment stability (Susilawati & Zikri, 2022).



Based on this comprehensive analysis, several recommendations are proposed. These include enhancing safety standards and procedures for operating heavy equipment (Subakti et al., 2022), implementing real-time monitoring systems for soil conditions and equipment stability, improving training and certification for crane operators and safety personnel, developing more effective crisis communication protocols, and strengthening due diligence processes in contractor selection and oversight. Overall, this discussion underscores the importance of a holistic approach to risk management, occupational safety, and professional ethics in the execution of large-scale infrastructure projects (Retnowati, 2021).



**Figure 2.** Evacuation of the Collapsed Crane

## Conclusion

The conclusion of the case study on the crane collapse incident in the Palembang LRT construction project highlights the complexity and challenges of managing large-scale infrastructure projects. The comprehensive analysis reveals that the incident was caused by a combination of factors, including inadequate geotechnical analysis, potential overloading of the crane, and possible weaknesses in operational procedures. The impact of the incident was extensive, causing not only physical damage and environmental disruption but also significant effects on the company's financial, operational, and reputational aspects. The evaluation of risk management and Occupational Health and Safety (OHS) protocols

underscores the importance of a proactive and systematic approach to identifying and managing project risks.

Furthermore, the incident emphasizes the crucial role of ethics and professionalism in engineering practice, as reflected in the principles of Catur Karsa and Sapta Dharma. The key lessons from this case include the need for improved safety standards, the implementation of more advanced monitoring technologies, and the importance of continuous training for project personnel. The proposed recommendations include improvements in risk analysis, strengthening safety protocols, and developing more effective crisis response systems. Ultimately, this case highlights the importance of stricter regulation and more intensive oversight in the construction industry, as well as the need for technological innovation to enhance safety and efficiency in large infrastructure projects. This conclusion affirms that the success and sustainability of infrastructure projects depend not only on technical aspects but also on effective integration of risk management, occupational safety, professional ethics, and technological innovation.

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