

## Evaluation of Standard Operating Procedure Implementation for Scissor Lift Operations to Support Occupational Safety at PT Puri Anjasmoro Indonesia

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**Abstract:** The increasing use of scissor lifts in construction projects has contributed to improved efficiency and accessibility for work at height. However, improper operation, inadequate inspections, and insufficient operator competency may increase the risk of workplace accidents. Therefore, the implementation of Standard Operating Procedures (SOPs) is essential to ensure safe and effective scissor lift operations. This study aimed to evaluate the implementation of SOPs for scissor lift operations at PT Puri Anjasmoro Indonesia, focusing on pre-operational inspections, operational and emergency procedures, and operator competency in supporting occupational safety. A qualitative descriptive approach with an evaluative design was employed. Data were collected through direct observations, document reviews, and semi-structured interviews with operators and safety personnel. The collected data were analyzed using qualitative descriptive analysis involving data reduction, categorization, interpretation, and conclusion drawing. The findings revealed that pre-operational inspections were consistently conducted before equipment use, operational and emergency procedures were implemented in accordance with established safety requirements, and all observed operators possessed valid certifications and had participated in occupational safety training programs. These findings indicate that the integration of preventive inspections, standardized operational procedures, and competent operators contributes significantly to reducing operational risks and enhancing workplace safety performance. The study implies that construction companies should strengthen routine inspections, continuous safety training, and regulatory compliance to maintain safe scissor lift operations. The originality of this study lies in its integrated evaluation of technical, procedural, and human factors affecting scissor lift safety within an actual construction environment, providing practical evidence for improving occupational safety management in construction projects.

**Keywords:** scissor lift; standard operating procedure; occupational safety; operator competency; construction industry.

## INTRODUCTION

The rapid growth of infrastructure development, industrial areas, high-rise buildings, and manufacturing facilities in Indonesia has significantly increased the demand for elevated work equipment, particularly scissor lifts. As a type of Mobile Elevating Work Platform (MEWP), a scissor lift is designed to vertically raise workers, equipment, and materials while providing greater stability and safety compared to conventional ladders or

scaffolding (Dong et al., 2012). In modern construction projects, scissor lifts have become essential tools because they improve work efficiency and reduce the risks associated with working at height. However, occupational accidents involving lifting and elevating equipment remain a major concern within the construction industry. Hazards such as hydraulic system failures, overloading, unstable ground conditions, operator errors, and non-compliance with safety procedures can result in severe injuries or fatalities. Consequently, the implementation of Standard Operating Procedures (SOPs) for scissor lift operations has become a critical component of occupational health and safety (OHS) management and is strongly emphasized in Indonesian labor regulations, particularly the Regulation of the Minister of Manpower No. 8 of 2020 concerning Lifting and Transporting Equipment.

Previous studies on scissor lifts can be classified into three major categories. The first category focuses on engineering design, mechanical performance, and structural stability. Dong et al. (2012) investigated the dynamic stability of scissor lifts and demonstrated that variations in scissor mechanism configurations significantly affect platform stability during lifting operations. Fitriani et al. (2021) developed a scissor lift with a lifting capacity of 1,000 kg and reported that the hydraulic system was capable of generating sufficient lifting force for industrial applications. Similarly, Rizat Adrian et al. (2022) examined the working principles and major components of hydraulic scissor lifts, highlighting the importance of structural and hydraulic systems in operational performance. Although these studies provide valuable technical insights, they primarily focus on engineering aspects and offer limited discussion regarding operational procedures and user compliance in real workplace settings.

The second category includes studies addressing occupational safety and the application of Mobile Elevating Work Platforms (MEWPs). Pan et al. (2017) reported that elevating work platforms provide safer access to elevated workplaces than conventional methods, thereby reducing fall-related risks. Seri et al. (2016) emphasized the importance of safety devices such as interlock systems, emergency stop mechanisms, and mechanical locking systems in preventing accidents during operation. In addition, the Industry Health & Safety Authority (IHSA) has established comprehensive guidelines for the safe operation of MEWPs, including pre-operation inspections, operational controls, and post-operation procedures. While these studies contribute significantly to understanding technical safety

requirements, they do not comprehensively evaluate how such procedures are implemented and adhered to by operators within actual construction environments.

The third category concerns operator competency, safety training, and regulatory compliance. Irawansyah et al. (2024) found that structured occupational safety training significantly improves workers' understanding and compliance with safety procedures. Kadarisman et al. reported that operator competency plays a crucial role in hazard identification, risk management, and emergency response. Furthermore, Rizki Juniarto (2025) emphasized the importance of operator certification and licensing in ensuring the safe operation of lifting equipment. These findings are supported by the Regulation of the Minister of Manpower No. 8 of 2020, which requires operator certification, periodic equipment inspections, and the implementation of occupational safety management systems for lifting and transporting equipment. Nevertheless, studies that simultaneously examine SOP implementation, operator competency, and safety compliance in scissor lift operations remain limited, particularly within the context of Indonesian construction projects.

Based on the literature review, a significant research gap exists regarding the evaluation of SOP implementation for scissor lift operations in construction environments. Previous studies have predominantly focused on engineering design, equipment performance, safety systems, and operator competency separately, while comprehensive evaluations integrating pre-operational inspections, operational procedures, emergency response measures, operator qualifications, and regulatory compliance remain scarce. Therefore, this study aims to evaluate the implementation of Standard Operating Procedures (SOPs) for scissor lift operations at PT Puri Anjasmoro Indonesia, focusing on pre-operational inspections, operational practices, emergency procedures, and operator competency as key elements supporting occupational safety.

This study argues that consistent implementation of SOPs, supported by competent and certified operators, contributes significantly to improving workplace safety and minimizing accident risks associated with scissor lift operations. Conversely, inadequate compliance with operational procedures and insufficient operator competency may increase the likelihood of operational failures, workplace accidents, and project-related losses. Therefore, evaluating the implementation of SOPs is essential to ensure the effectiveness of occupational safety management systems and to support safer construction operations involving scissor lift equipment.

## RESEARCH METHOD

This study focused on evaluating the implementation of Standard Operating Procedures (SOPs) for scissor lift operations in a construction environment. The unit of analysis consisted of scissor lift operational activities conducted at PT Puri Anjasmoro Indonesia, including pre-operational inspections, operational procedures, emergency response practices, and operator competency. In addition, operators, supervisors, safety personnel, and related operational documents were included as important sources of information to assess compliance with occupational health and safety requirements. The study emphasized how SOPs were implemented in daily construction activities and how these procedures contributed to workplace safety performance.

A qualitative descriptive research design with an evaluative approach was employed in this study. This design was selected because the objective of the research was not to measure causal relationships statistically but to understand and evaluate the extent to which existing SOPs were implemented in actual construction operations. The qualitative approach enabled the researchers to obtain an in-depth understanding of operational practices, worker behavior, safety culture, and compliance with occupational safety regulations related to scissor lift operations. Furthermore, the evaluative approach was considered appropriate for comparing field implementation with established safety standards and regulatory requirements.

The study utilized both primary and secondary data sources. Primary data were obtained directly from observations of scissor lift operations, interactions with operators, supervisors, and occupational safety personnel, as well as information gathered during daily work activities at the construction site. Secondary data were collected from company documents, operational records, safety checklists, training records, operator certification documents, Standard Operating Procedures (SOPs), and relevant regulations, including the Regulation of the Minister of Manpower No. 8 of 2020 concerning Occupational Safety and Health for Lifting and Transporting Equipment. Supporting information was also obtained from scientific literature related to scissor lift operation, occupational safety, and operator competency.

Data collection was conducted through direct field observations, document reviews, and informal interviews with relevant personnel involved in scissor lift operations. Observation activities focused on monitoring pre-operational inspections, equipment utilization, compliance with safety procedures, use of personal protective equipment (PPE),

and emergency preparedness practices. Document reviews were carried out to examine operator licenses, equipment inspection records, maintenance logs, and safety management documents. Interview activities were conducted using semi-structured guidelines to obtain information regarding operator experience, safety awareness, implementation challenges, and perceptions of SOP effectiveness.

The collected data were analyzed using qualitative descriptive analysis. The analysis process consisted of data reduction, data organization, data interpretation, and conclusion drawing. Information obtained from observations, interviews, and document reviews was categorized according to the main aspects of SOP implementation, namely pre-operational inspection, operational procedures, emergency response measures, and operator competency. The findings were subsequently compared with applicable occupational safety regulations and established operational standards to evaluate the effectiveness of SOP implementation. Finally, conclusions were drawn regarding the level of compliance, strengths, potential deficiencies, and opportunities for improving occupational safety performance in scissor lift operations at PT Puri Anjasmoro Indonesia.

## RESULT

### Pre-Operational Inspection of Scissor Lift

The first result concerns the implementation of pre-operational inspection procedures before the scissor lift was used in construction activities. Based on field observations at PT Puri Anjasmoro Indonesia, operators performed several inspection activities before operating the equipment. These inspections were intended to ensure that the scissor lift was in safe working condition and that the surrounding work area was suitable for operation. The observed inspection components are presented in Table 1.

**Table 1.** Pre-Operational Inspection Components

No.	Inspection Component	Observation Result
1	Platform condition	No visible damage was found
2	Scissor mechanism	Functioned properly
3	Hydraulic system	No leakage was detected
4	Control panel	Operated normally
5	Emergency stop button	Functioned properly
6	Battery condition	Sufficient for operation
7	Work area condition	Stable, flat, and free from obstacles

As shown in Table 1, the pre-operational inspection covered both equipment condition and workplace readiness. The platform, scissor mechanism, hydraulic system, control panel, and emergency stop button were found to be in proper working condition. In addition, the work area was checked to ensure that the surface was stable and free from obstacles before the equipment was operated.

These findings indicate that pre-operational inspection had been implemented as an important preventive measure. The inspection process helped operators identify potential technical problems before operation, especially those related to hydraulic leakage, control system failure, and platform instability. This result also shows that the company had integrated daily equipment checks into its safety procedure to reduce the possibility of accidents during work at height.

### Operational and Emergency Procedures

The second result relates to the implementation of operational and emergency procedures during scissor lift use. Observations showed that operators followed the established SOP when operating the equipment. The operational procedures included maintaining load capacity, ensuring proper load distribution, using personal protective equipment, communicating with field personnel, and operating the platform gradually. The evaluation of operational and emergency procedures is presented in Table 2.

**Table 2.** Implementation of Operational and Emergency Procedures

No.	SOP Aspect	Observation Result
1	Load capacity compliance	Implemented
2	Load distribution on platform	Implemented
3	Controlled lifting and lowering	Implemented
4	Personal protective equipment use	Implemented
5	Communication during operation	Implemented
6	Emergency stop system	Available and functional
7	Emergency response procedure	Understood by operators

Table 2 shows that the main operational and emergency procedures were implemented during scissor lift activities. Operators did not exceed the equipment load capacity, distributed loads properly on the platform, and carried out lifting and lowering movements in a controlled manner. The emergency stop system was also available and functional, while operators understood the basic emergency response procedure.

The results suggest that scissor lift operation at PT Puri Anjasmoro Indonesia was carried out under controlled safety conditions. The most visible pattern was the emphasis on preventing instability during lifting activities. In addition, the use of personal protective equipment and communication between operators and supporting personnel helped maintain safety during operation. These findings indicate that operational SOPs were not only documented but also practiced in daily construction activities.

### Operator Competency and Safety Compliance

The third result focuses on operator competency and compliance with occupational safety requirements. Based on document review and field observation, operators involved in scissor lift activities had received safety training and possessed the required operator certification. The company also conducted safety briefings and toolbox meetings to strengthen workers’ understanding of safe work procedures. The evaluation of operator competency and safety compliance is presented in Table 3.

**Table 3.** Operator Competency and Safety Compliance

No.	Competency Indicator	Observation Result
1	Operator certification	Available
2	Safety training participation	Completed
3	Understanding of SOP	Good
4	Emergency response knowledge	Good
5	PPE compliance	High
6	Participation in safety briefing	Regular

As presented in Table 3, operator competency was supported by certification, safety training, and regular participation in safety briefings. Operators demonstrated a good understanding of SOP requirements, including safe equipment operation, emergency response, and the use of personal protective equipment.

These findings show that operator competency played an important role in supporting SOP implementation. Certified and trained operators were more likely to understand equipment limitations, identify potential hazards, and follow safety procedures consistently. The regular implementation of safety briefings also strengthened safety awareness and encouraged workers to prioritize safety during construction activities.

## DISCUSSION

### **The Importance of Pre-Operational Inspection in Supporting Scissor Lift Safety**

This study found that pre-operational inspection procedures were consistently implemented before scissor lift operations at PT Puri Anjasmoro Indonesia. Operators routinely inspected the platform condition, hydraulic system, control panel, emergency stop button, battery status, and work area conditions before equipment use. These findings indicate that preventive safety measures have become an integral part of daily operational activities.

The implementation of systematic inspections can be explained by the company's commitment to minimizing operational risks associated with working at height. Pre-operational inspections enable operators to identify equipment defects, hydraulic leakage, control system malfunctions, or unsafe environmental conditions before accidents occur. The existence of standardized inspection checklists also contributes to consistency in safety practices among operators.

The findings are consistent with the recommendations of JLG (2006), which emphasize that daily inspections are essential for maintaining equipment reliability and preventing mechanical failures. Similarly, the Industry Health & Safety Authority (IHSA) highlights the importance of inspecting hydraulic systems, structural components, and safety devices before operating Mobile Elevating Work Platforms (MEWPs). The present study extends these findings by demonstrating that such inspection procedures are not only prescribed by regulations but are actively implemented in a real construction environment.

From a practical perspective, effective pre-operational inspections contribute to reducing accident risks, minimizing equipment downtime, and improving operational reliability. However, the effectiveness of inspections depends heavily on operator discipline and management supervision. Therefore, continuous monitoring and documentation of inspection activities remain necessary to maintain compliance and ensure long-term safety performance.

### **Operational and Emergency Procedures as Components of Safety Culture**

The findings indicate that operational and emergency procedures were implemented consistently during scissor lift operations. Operators complied with load limitations, maintained balanced load distribution, used personal protective equipment, and followed safe lifting and lowering procedures. Emergency response mechanisms, including

emergency stop systems and evacuation procedures, were also available and understood by operators.

These findings suggest that safety procedures have evolved beyond formal documentation and have become embedded within daily work practices. This condition may be attributed to regular supervision, routine safety briefings, and the enforcement of occupational safety requirements throughout construction activities. The integration of operational safety measures into routine work processes helps reduce human error, which is widely recognized as a major contributor to workplace accidents.

The findings support previous studies by Pan et al. (2017), who reported that Mobile Elevating Work Platforms provide safer working conditions than conventional access equipment when operated according to established procedures. Likewise, Seri et al. (2016) emphasized the importance of emergency stop systems, interlocks, and safety mechanisms in preventing operational accidents. The present study confirms these conclusions by demonstrating that proper implementation of operational and emergency procedures contributes significantly to maintaining safe working conditions in construction projects.

The broader implication of these findings is the development of a positive safety culture within the organization. When workers consistently follow operational procedures and emergency protocols, safety becomes a shared responsibility rather than an individual obligation. Nevertheless, maintaining this culture requires continuous reinforcement through supervision, refresher training, and periodic evaluations of safety performance.

### **Operator Competency and Regulatory Compliance in Occupational Safety Management**

Another important finding of this study is that all observed scissor lift operators possessed valid certifications and had participated in occupational safety training programs. Operators demonstrated a good understanding of equipment operation, emergency response procedures, and personal protective equipment requirements. Regular toolbox meetings and safety briefings further supported safety awareness among workers.

The relationship between operator competency and safe equipment operation can be explained through the role of knowledge and experience in hazard recognition and decision-making. Competent operators are more capable of identifying unsafe conditions, understanding equipment limitations, and responding appropriately to emergency

situations. Consequently, operator competency serves as a critical factor influencing the effectiveness of SOP implementation.

These findings are consistent with the work of Irawansyah et al. (2024), who reported that structured safety training improves worker compliance with occupational safety procedures. Similarly, Rizki Juniarto (2025) emphasized that certification and competency verification are fundamental requirements for reducing operational risks associated with lifting equipment. Furthermore, the findings align with the Regulation of the Minister of Manpower No. 8 of 2020, which requires certified operators and periodic competency verification for lifting and transporting equipment.

From a broader perspective, operator competency contributes not only to accident prevention but also to organizational productivity and operational efficiency. Competent operators are less likely to commit operational errors that could lead to equipment damage, work delays, or project interruptions. Therefore, continuous investment in training, certification, and competency development should be considered a strategic component of occupational safety management within the construction sector.

Overall, this study demonstrates that the successful implementation of scissor lift SOPs depends on the interaction between preventive inspections, operational safety procedures, emergency preparedness, and operator competency. The novelty of this study lies in its integrated evaluation of these factors within an actual construction environment, providing practical evidence that occupational safety performance can be strengthened through the simultaneous implementation of technical controls, administrative controls, and competency-based workforce development.

## CONCLUSION

This study evaluated the implementation of Standard Operating Procedures (SOPs) for scissor lift operations at PT Puri Anjasmoro Indonesia, focusing on pre-operational inspections, operational and emergency procedures, and operator competency. The findings indicate that SOP implementation has been carried out effectively and consistently across all observed operational stages. Pre-operational inspections were routinely conducted to ensure equipment readiness and workplace safety, while operational and emergency procedures were implemented in accordance with established safety requirements. In addition, all observed operators possessed the necessary certifications and demonstrated adequate knowledge of equipment operation, emergency response, and

occupational safety practices. These findings suggest that the integration of preventive inspections, safe operational practices, and competent personnel contributes significantly to reducing operational risks associated with work at height.

The scientific contribution of this study lies in its comprehensive evaluation of scissor lift SOP implementation within an actual construction environment. Unlike previous studies that primarily focused on equipment design, technical performance, or safety systems separately, this study integrates technical, procedural, and human factors into a single framework of occupational safety evaluation. The findings provide empirical evidence that effective occupational safety management depends not only on equipment reliability but also on the consistent implementation of SOPs and the competency of certified operators. Therefore, this study contributes to the growing body of knowledge on construction safety management and the practical implementation of occupational health and safety regulations for lifting equipment.

Despite these contributions, several limitations should be acknowledged. The study was conducted within a single construction project and focused primarily on qualitative observations of SOP implementation. Consequently, the findings may not fully represent practices across different construction sectors or organizations. Future studies are recommended to include multiple project sites, larger samples of operators, and quantitative safety performance indicators such as accident frequency, near-miss incidents, and operational efficiency metrics. Such approaches would provide a more comprehensive understanding of the effectiveness of scissor lift safety management systems and support the development of evidence-based occupational safety policies in the construction industry.

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