Competency Railway Safety Officers (RSO) at KTMB

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ABSTRACT

This study investigates the competency of Railway Safety Officers (RSOs) in ensuring railway track safety in Malaysia, with a focus on Keretapi Tanah Melayu Berhad (KTMB). The increasing demand for railway services, driven by population growth and infrastructure expansion, has intensified the need for effective safety management in complex and high-risk environments. Railway construction and operations involve various hazards, including heavy machinery, electrical risks, working at heights, and exposure to hazardous materials, making competent safety personnel essential.

This research adopts a competency-based approach by integrating key elements such as knowledge, skills, attitudes, and behavioral attributes required for effective job performance. The study highlights the critical role of RSOs in minimizing accident risks, ensuring compliance with safety regulations, and promoting a strong safety culture within the organization. A competency framework is proposed, incorporating dimensions such as professional knowledge, teamwork, leadership, psychological attributes, and management capabilities. The study is further supported by the Theory of Planned Behavior, which emphasizes that an individual's intention significantly influences their actions and safety performance. The findings suggest that enhancing RSO competencies can improve safety outcomes, reduce incidents, and ensure efficient railway operations. Ultimately, this study provides a structured framework for improving the training, assessment, and development of RSOs, contributing to a safer and more sustainable railway system in Malaysia.

Keywords: Railway Safety Officer (RSO); Competency; Railway Safety Management; KTMB; Malaysia

INTRODUCTION

In Malaysia, the diversity of building and infrastructure activities involves numerous potential hazards. The management of worker safety and health has become a major concern at civil engineering construction sites, particularly in railway projects in Malaysia. Protecting workers and the public requires a comprehensive strategy that includes risk assessment, safety training, regulatory compliance, and the application of the latest technology (Kaewunruen & Tang, 2019).

At railway construction sites, common risks include handling hazardous materials, working at heights, operating heavy machinery, and electrical hazards (Arifin et al., 2023). It is mandatory for contractors to develop a comprehensive safety and health plan that addresses these hazards and includes emergency response protocols. Regular audits and site inspections are conducted to ensure safety regulations are followed and to identify any new hazards that need to be properly managed.

The implementation of safety management in the railway industry is crucial. Railway Safety Officers (RSOs) are individuals responsible for the operation of trains to ensure that both passengers and railway workers are safe

when present in railway areas (Bahr, 2014). Examples of safety measures in the railway industry related to safety at railway tracks and stations include ensuring that users and railway workers comply with regulations and promoting a safety culture throughout the organization (Kim, Park & Park, 2016).

In addition, other critical components are important when aiming for effective safety management for both railway tracks and railway areas. For example, as identified by Railway Safety Officers (RSOs), in addition to knowledge and understanding of safety regulations, risk assessment and management, hazard identification, incident investigation, emergency preparedness, communication, teamwork, and leadership are also essential considerations in developing a comprehensive system to manage safety at railway tracks and stations (Bolden et al., 2003; Hu, Chen & Yu, 2020; Jamieson et al., 2021).

The global increase in population has contributed to a growing demand for railway services. According to a report from the Department of Statistics Malaysia (DOSM) released on July 15, 2019, Malaysia's population from 32.4 million in 2018 to an estimated 32.6 million in 2019 (DOSM, 2019). As the population continues to grow, the demand for rail transport has also steadily increased, placing additional pressure on railway infrastructure and limiting the time available for maintenance. Factors such as the quality of railway facilities, station amenities, operations, maintenance, and policies can impact the overall performance and service quality of the railway system (Yusoff, Ezwan, Safian, Bilal, & Yassin, 2019).

At the same time, it is essential to maintain or improve the performance and capacity of railway infrastructure. In fact, during the launch of the National Transport Policy (NTP) 2019-2030, Tun Dr. Mahathir Mohamad emphasized that the government would prioritize enhancing the railway network, with the goal of developing a modern rail system comparable to those in Japan, South Korea, and China (Lai & Bedi, 2019).

This study selects the railway track management of Keretapi Tanah Melayu Berhad (KTMB) because railway operations are a complex system that requires coordination and cooperation among various parties to ensure safe, efficient, and reliable services for both railway users and employees working at KTMB in Malaysia. The study also focuses on individuals responsible for the competency of Railway Safety Officers (RSOs), who are KTMB staff tasked with ensuring safety along the tracks and at the railway stations.

LITERATURE REVIEW

Definition of Competence

In general, personal competence refers to the qualities or personality traits possessed by an individual that can influence or enhance their job performance. In the context of competency assessment, personal competence is often identified and evaluated to understand how an individual can effectively contribute to the workplace. It also helps organizations in decision-making related to employee placement and development. Table 1 shows previous studies on the definition of competence.

TABLE 1: Definition of competences

Author	Definition of Competence
McClelland (1973)	Competence is a term derived from Latin, referring to the ability to differentiate between various levels of work performance based on personal traits and the organizational environment.
Zemke (1982)	Highlights the diversity of views and definitions of competence in training studies. There is no universal agreement on the key elements of competence.
Spencer Couple (1993)	The definition of competence is related to effective or excellent job performance, measurable personal traits and potential, which includes five levels: knowledge, cognitive skills or behaviors, self-concept, character, and motivation. It has a correlation with position, performance, and dynamic traits.
Herling (2000)	The definition of competence can vary depending on the role being used and the level within the structure of an organization. The need to measure and

	define expertise is seen as critical for organizations to effectively manage and develop their human resources, with basic characteristics of expertise being examined and definitions of human expertise being developed.
Stoof et al. (2002)	Uses a competency boundary approach that assesses competence based on progress in three dimensions: individual, goals, and context. It shows the complexity and variation in the concept of competence.
Gherardi (2013)	Competence is defined as the ability to apply knowledge embedded in specific contextual practices, or as knowledge in practice.
Mulder (2014)	Competence can be viewed as a coherent set of knowledge, skills, and attitudes that can be used in the context of actual performance and are required to perform a role or task satisfactorily.
Antonio et al. (2013)	Their understanding of competence can be found in studies by both researchers as they seek skills and formal knowledge defined by law.
Lindberg and Rantatalo (2015)	The entity-based paradigm conceptualizes competence as a combination of attributes, skills, or knowledge that are applied in the workplace, derived from a positivist or rationalist perspective of knowledge.
Olesen (2017)	Competence is conceptualized as capability.
Health and Safety Executive (HSE) (2020)	Competence can be defined as the blend of training, skills, experience, and knowledge that an individual possesses, along with their capacity to apply these attributes to perform tasks safely. Additionally, factors such as attitude and physical capability can also influence a person's level of competence.

Table 1 explains the definitions of competence according to structured understandings from various scholars and organizations, highlighting the complexity and variation within the concept, as well as the importance of measuring and developing competence within the organizational context.

Keretapi Tanah Melayu Berhad (KTMB)

Keretapi Tanah Melayu Berhad (KTMB), commonly known as Malayan Railways, is the primary railway operator in Peninsular Malaysia. Other railway companies in the country include Express Rail Link Sdn. Bhd., Prasarana Malaysia Bhd., and Sabah State Railway. KTMB is wholly owned by the Minister of Finance Incorporated, a government entity under the Ministry of Finance. Malaysia's rail transportation system includes services such as Light Rapid Transit (LRT), Mass Rapid Transit (MRT), monorails, Express Rail Link (ERL), Electric Train Services (ETS), and commuter trains. KTMB has undergone significant modernization, transitioning from traditional diesel engines to more sophisticated train technologies. With a high number of passengers annually, KTMB remains the leading railway operator in the region.

TABLE 2: The count of passengers traveling on intercity rail services.

	KTM Komuter	KTM ETS (Intercity)
2023	18,130,700	4,155,242
2022	14,516,366	3,337,781
2021	5,899	633
2020	11,796	1,647

The data in Table 2 presents the number of passengers for two key services offered by Keretapi Tanah Melayu Berhad (KTMB): KTM Komuter and KTM ETS (Intercity). These figures illustrate the volume of passengers over four consecutive years, from 2020 to 2023. The initial decline in 2020 and 2021 for both services reflects the severe impact of the COVID-19 pandemic, which led to widespread travel restrictions, lockdowns, and health concerns. 2022 and 2023 show significant recovery in passenger numbers, especially for KTM Komuter, as restrictions were lifted, and Malaysians returned to commuting for work and other activities. The KTM ETS service also witnessed growth, suggesting a rebound in intercity travel as the demand for domestic travel increased. The numbers suggest a positive trajectory for rail transport in Malaysia post-pandemic, with increasing passenger confidence in train travel, boosted by safety measures and convenience.

The role of the Railway Safety Officer (RSO)

The role of the Railway Safety Officer (RSO) at Keretapi Tanah Melayu Berhad (KTMB) in Malaysia is critical as it plays an essential part in ensuring the smooth and safe operation of the railway system. Below are some key aspects of the importance of railway track safety management at KTMB:

Passenger and Staff Safety

Safety is the top priority for KTMB. Effective safety management ensures that both passengers and staff are protected from accidents or incidents that could result in injury or death.

Reducing Accident Risks

With effective safety management, the risk of accidents on the railway tracks can be minimized. This includes accidents involving trains and vehicles at level crossings, as well as incidents involving members of the public on the tracks.

Ensuring Smooth Operations

Good safety management ensures that trains run smoothly without disruption. This is crucial for maintaining train schedules and providing efficient services to passengers.

Infrastructure Protection

Safety management helps protect railway infrastructure, such as tracks, bridges, and tunnels, from damage. This is essential to avoid service interruptions and high repair costs.

Compliance with Regulations and Laws

A good safety manager ensures that KTMB complies with all regulations and laws related to railway safety. Compliance is vital to avoid legal actions and penalties.

Increasing Public Trust

When safety is prioritized, public trust in KTMB's services increases. Passengers feel safer and more confident using the railway services.

Cost Reduction

Effective safety management helps reduce costs associated with accidents, such as medical expenses, compensation, and infrastructure repairs. It also minimizes service disruptions that could lead to revenue losses.

Enhancing Image and Reputation

A good safety record improves KTMB's image and reputation as a safe and reliable railway service provider. This is important for attracting more passengers and investors.

Service Continuity

By ensuring the safety of railway tracks, KTMB can ensure the continuity of services without major disruptions. This is essential for daily operations and meeting the country's logistical needs.

Environmental Protection

Safety management also involves measures to prevent the spillage of chemicals or hazardous materials that could harm the environment. This is important to ensure that railway operations are environmentally friendly.

Overall, KTMB's railway track safety management is crucial for ensuring the safety and well-being of passengers, staff, and the public, as well as for ensuring efficient and sustainable railway services in Malaysia.

Knowledge Gap (Previous Study)

Based on previous study, explore different aspects of competency management in railway safety, focusing on various international contexts and addressing critical issues for ensuring safety in railway.

i) **Mehdi Vakil Zadeh et al. (2023)** focus on Iran's railway projects, particularly the challenge of a skilled labor shortage. This study suggests the implementation of a competency-based selection process for project managers, using advanced genetic programming models to identify and assign personnel with the required expertise. This approach emphasizes the need for robust selection criteria to address the specialized nature of railway infrastructure projects in Iran, ensuring economic and operational success.

ii) **Robert Henry Edward Baughan (2022)** explores the management of competence in the UK's heritage railway industry. Given that many workers in this industry are volunteers, the study discusses how competencies are managed in a volunteer-based environment, where factors such as motivation, skill diversity, and the ability to learn are key. The findings stress the importance of understanding and addressing the unique challenges faced by volunteer organizations in maintaining safety standards and operational efficiency.

iii) **Yakimova et al. (2020)** discuss the application of a competency-based approach for the implementation of corporate social responsibility (CSR) at Russian Railways. The study provides insights into how a structured competency framework can enhance the implementation of CSR initiatives, ensuring that key competencies align with job roles at various organizational levels. This model is critical for improving organizational performance and sustainability while fostering a culture of social responsibility within railway operations.

iv) **Nikhil Bugalia, Yu Maemura, and Kazumasa Ozawa (2019)** delve into the role of top management decisions in influencing safety culture in high-speed railways, particularly in India and Japan. The study highlights how senior leadership can shape organizational behavior and safety outcomes by fostering a strong safety culture, promoting proactive safety measures, and ensuring continuous improvement across all levels of the organization.

v) **Charles Johnson and Aidan Nelson (2004)** investigate strategic safety management within the UK rail industry, focusing on the self-assessment of organizational competence in managing safety. The study emphasizes the need for continuous evaluation and self-assessment by senior management teams to ensure they are equipped to handle evolving safety challenges in the railway industry. The study's findings have been instrumental in supporting the development of best practice guidelines and safety standards within the UK's rail industry.

These studies collectively highlight the diverse approaches to competency management across different countries and railway systems, stressing the importance of ensuring that railway safety officers and project managers are adequately trained and equipped to handle the complex and high-risk environment of railway operations. Whether through improving volunteer competence in the UK, selecting skilled personnel for Iranian railway projects, or enhancing corporate responsibility in Russia, the competency frameworks discussed are vital for ensuring safe, efficient, and sustainable railway systems globally.

In the context of Malaysia's railway system, these findings could offer valuable insights into the development of a more structured competency-based approach for Railway Safety Officers (RSOs) and other personnel, helping to improve safety standards and operational excellence at Keretapi Tanah Melayu Berhad (KTMB).

Statement of Issues

Transport projects often require significant investments, with some large-scale ventures costing RM 1 billion or more. These projects are typically complex, spanning several years for development and construction, involving

a wide range of public and private stakeholders, and having far-reaching effects on millions of people (Flyvbjerg, 2017). Despite the substantial financial resources allocated annually to the planning, construction, operation, and advancement of these projects, transport accidents continue to claim thousands of lives during various stages of development or operation. As noted by Hall (1997) and Andersen (1999), human errors account for approximately 70–90% of transport accidents overall, with more than 70% of railway-related incidents specifically linked to human mistakes..

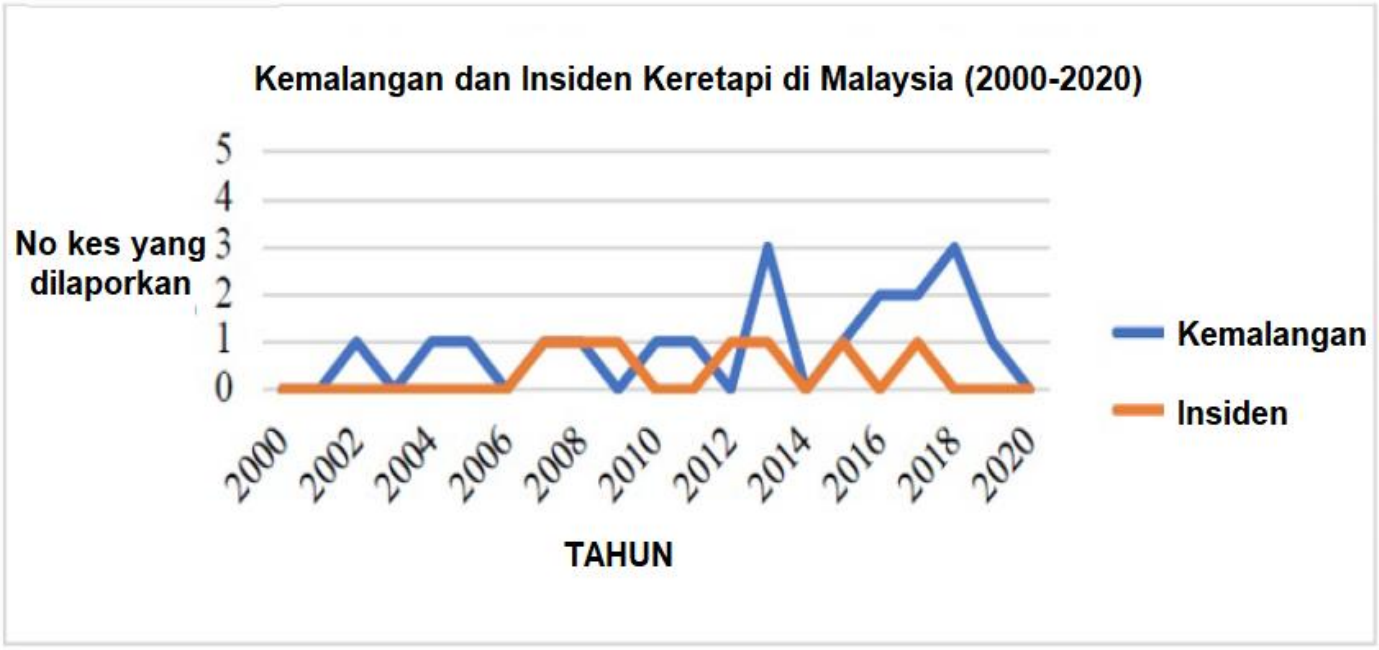

Figure 1 Analysis of Railway Accidents and Incidents in Malaysia

Based on Figure 1, it can be concluded that the number of accidents reported over the 20-year period fluctuated. In 2014, there was a sharp increase in the number of accidents reported, reaching the highest peak that year. After 2014, the number of accidents decreased but still showed some increases in the following years before dropping significantly in 2020. In terms of incidents, the number of incidents reported was more consistent compared to accidents. Although there were some minor fluctuations, the number of reported incidents did not show significant changes over this period. The number of incidents also decreased in 2020. Overall, Figure 1.1 indicates that the number of accidents was more variable, experiencing several peaks between 2000 and 2020, while the number of incidents was more stable and less influenced by annual changes.

This study discusses that the competency of Railway Safety Officers (RSOs) is an important issue and a current challenge. Therefore, there are several questions to address this challenge. The research question is: How competent are the Railway Safety Officers (RSOs) in ensuring the safety of railway tracks in Malaysia where this study aims to serve as a guiding framework to systematically answer the research question. The objective of the study is to identify the competency of Railway Safety Officers (RSOs) in ensuring the safety of railway tracks in Malaysia.

FINDINGS AND ANALYSIS

Competency Framework for Railway Safety Officers (RSO) at KTMB

The theoretical concept shown in Figure 2 was developed in 1991 by Icek Ajzen as an extension of the Theory of Reasoned Action proposed by Ajzen and Fishbein (1980). The key factor in this theory is an individual's intention to perform a specific behavior. According to Ahmmadi et al. (2021), this theory has been used to examine and predict user behavior, as Senger et al. (2017) and Zaremohzzabieh et al. (2022) agree that the intention to act is the immediate determinant of that behavior. This theory assumes that the stronger the intention to engage in a behavior, the more likely the performance of that behavior will occur (Ajzen, 1991).

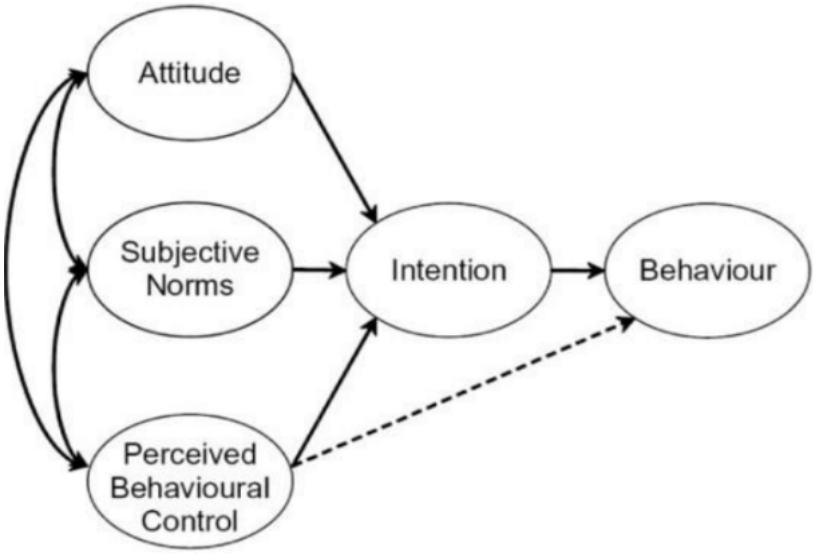

Figure 2 The theory of planned behavior (Ajzen, 1991)

The competency framework for Railway Safety Officers (RSO) at KTMB as illustrated in Figure 3, represents a comprehensive framework to evaluate and enhance the core competencies required for effective leadership in railway transport enterprises. The model identifies key dimensions and competencies that contribute to the success of team leaders in railway stations. These competencies are crucial for managing teams, ensuring safety, optimizing operations, and fostering a culture of continuous improvement. The competency model of team leaders in railway stations is divided into five main competency.

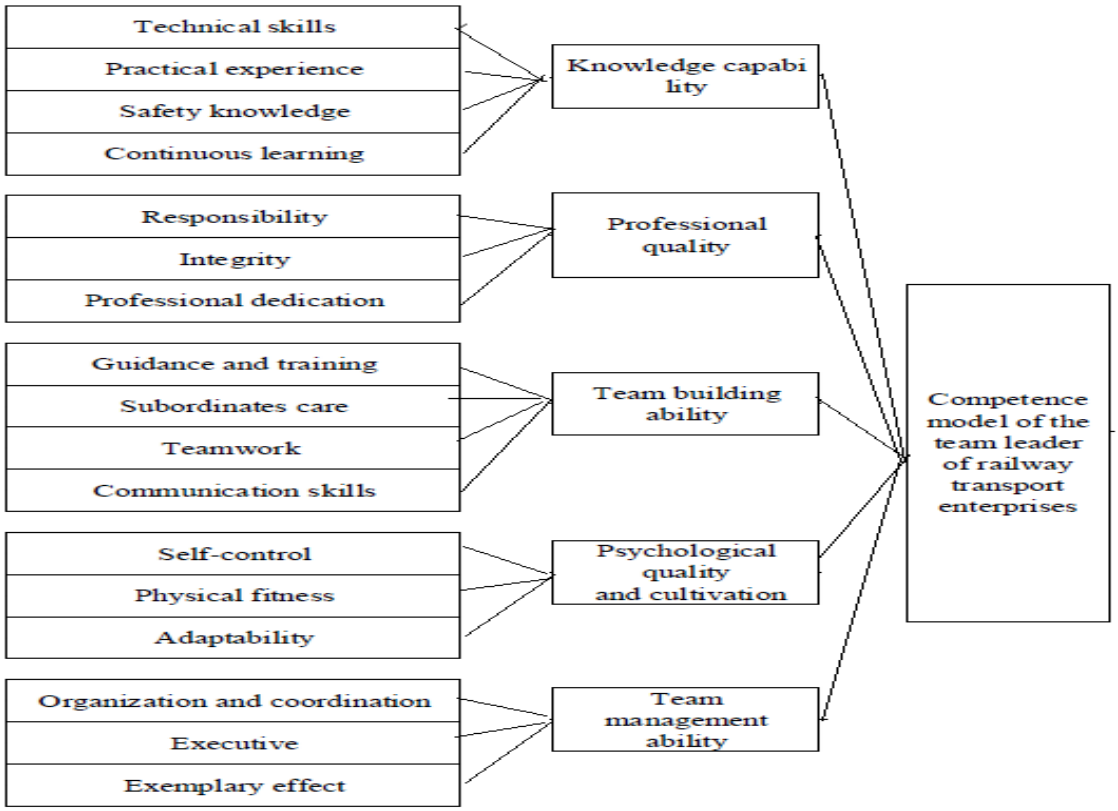

Figure 3 Competency framework for Railway Safety Officers (RSO) at KTMB

CONCLUSION

The findings of this study reveal that the competency of Railway Safety Officers (RSOs) plays a pivotal role in ensuring the safety and efficiency of railway operations, particularly in Malaysia, where the rail network is an

essential component of the national transport system. The study highlights the importance of the competencies required by RSOs in effectively managing railway track safety and ensuring the well-being of both passengers and employees. The competency framework for Railway Safety Officers (RSOs) at Keretapi Tanah Melayu Berhad (KTMB) provides a structured approach to evaluating the core competencies necessary for effective leadership in railway safety management.

The integration of knowledge, professional literacy, team-building ability, psychological quality and cultivation, and team management ability as key dimensions in the competency framework enables RSOs to address the complexities of the railway environment. The framework emphasizes the need for comprehensive safety management that includes not only regulatory compliance but also proactive risk management, hazard identification, incident investigation, and emergency preparedness. These competencies are crucial for enhancing safety culture, minimizing accidents, and ensuring smooth operations in Malaysia's railway industry.

Furthermore, the Theory of Planned Behavior (Ajzen, 1991) serves as a guiding principle for understanding how the intention to act influences the behavior of individuals, particularly Railway Safety Officers. By strengthening the intentions and competencies of RSOs, it is possible to enhance their performance, which directly contributes to a safer and more efficient railway system. The framework and theoretical models discussed in this study provide a roadmap for improving the training, development, and performance evaluation of RSOs, ensuring that they are equipped with the necessary skills to manage the growing challenges in the railway sector.

In conclusion, the competency of RSOs is critical in ensuring the safety of railway tracks and stations, reducing accidents, and maintaining public trust in the railway system. As the railway industry in Malaysia continues to grow, enhancing the competencies of RSOs will be crucial for meeting the increasing demand for safe, efficient, and reliable rail transport.

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