The readiness of JKR Sarawak to adopt ISO 39001 road traffic safety (RTS) management systems

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Abstract. The recently launched ISO 39001 is a management system for the safety of road traffic. It specifies requirements to enable an organization that interacts with the road traffic system, to reduce death and serious injuries related to road traffic crashes which it can influence. This paper looked at the readiness of JKR Sarawak to adopt ISO 39001 Road Traffic Safety (RTS) Management Systems. This paper highlights the current (RTS) practices and identified those which fulfilled the ISO 39001 requirements. This paper also investigated the challenges in achieving certification based on the six steps of a basic plan-do-check-act model for continuous improvement. The finding shows that the organization do fulfill parts of the requirement, however, it is not ready to adopt the best practice in road traffic safety management due to challenges in certification. Measurable RTS objectives are proposed to overcome the identified challenges.

1. Introduction
Malaysia’s economic growth accelerated to 5.8% in 2017, the country’s highest annual growth rate since 2014 [1]. Rapid economic growth is usually connected to a rapid expansion of road transportation [2]. Sarawak in particular, is currently expanding its existing road network to connect the urban and rural areas. While the people enjoy the connectivity, it also leads to road crashes, injuries, and fatalities. According to the statistics published by Kementerian Pengangkutan Malaysia, in 2007, Malaysia recorded 6282 deaths compared with 3913 deaths in 2017. For Sarawak, there are 316 deaths in 2007, the highest deaths recorded 443 in 2012, and 236 in 2017 [3]. Although the figures show a decrease in the number of deaths, it is relatively high and calls for an effective measure.

The United Nations (2011) concur that having an effective and efficient road safety management system is crucial to support the implementation of measures that improve legislation, roads, vehicles, road-user behavior, and post-crash response [4]. The US Transport Research Board (2011) agrees that management is the direction of resources to attain defined objectives [5]. This means that having an effective management system would ensure that all department or personnel will collaborate to achieve a common set of goals.

2. Background
Malaysia adopted the Road Traffic Safety (RTS) management system ISO 39001[6] and later named it as MS ISO 39001:2013, to address the nation’s road-safety related issues. It is fully aligned with the
Safe System approach to road safety, which is embedded in the UN Global Plan for Road Safety, and the UN sustainable Development Goals. ISO 39001 is the template for best practice road traffic safety management in an organizational context [7] and has been adopted by countries like Sweden and Japan. The implementation in both countries are reported to be effective and successful in increasing the awareness and interest on the part of top management in addressing road safety.

Jabatan Kerja Raya (JKR) Sarawak is currently adopting MS ISO 9001 which is a quality management system. Unlike ISO 39001[8], it is a more general quality system that can be applied to every level of an organization. ISO 39001 is fully aligned with ISO 9001 Quality Management System, the difference is the former provides direction on key road traffic safety issues and a strong focus on achieving better results for the interim and long-term. With success stories from countries like Sweden and Japan, JKR Sarawak should adopt ISO 39001 as a Road Traffic Safety Management System to address traffic safety issues during the planning, construction and operation of the road.

This paper will determine the readiness of JKR Sarawak to adopt the ISO 39001 to address the state’s road-safety related issues. MIROS [9] claims that organization that have implemented the ISO 9001 can easily integrate ISO 39001 into their system. In the context of this study, the focus is on the Intervention stage: Road Network, planning, design, construction and maintenance of road.

3. Related Literature
In 2008, the Organization for Economic Cooperation and Development (OECD), and the International Traffic Forum published “Towards Zero: Ambitious Road Safety Targets and the Safe System Approach” [10]. This report noted the importance of RTS management systems and referenced a codified management system that was developed, and subsequently published in 2009, by the World Bank Global Road Safety Facility (WBGRSF). The WBGRSF publication drew on a comprehensive review of successful jurisdictional RTS management practice to develop an RTS management system framework as in figure 1. It is neutral to organizational structures and cultures, and presents three inter-related elements, namely institutional management functions, interventions and results.

![Figure 1. World Bank Global Road Safety Facility Road Safety Management System Framework](image)
This paper aims to answer the following research questions:
1. What are the current JKR Sarawak Road Traffic Safety Management practices?
2. What are the challenges faced by JKR Sarawak in adopting ISO 39001?
3. How ready is JKR Sarawak in adopting ISO 39001 as its Road Traffic Safety Management practices?

4. Methodology
This is a qualitative case study and data is gathered through document analysis. The rationale for document analysis lies in its role in methodological and data triangulation, the immense value of documents in case study research, and its usefulness as a stand-alone method for specialized terms of qualitative research [11]. Quality manuals for ISO 39001, and manuals prepared by JKR Sarawak based on MS ISO 9001 are potential source for empirical data for this study.

5. Findings
5.1 Current RTS Practices
This section will identify the current RTS practices in compliance with MS ISO 9001. The next section will analyse the differences and similarities with ISO 39001 practices.

JKR Sarawak organization is structured based on the conventional lines with a headquarters set-up divided into specialist technical and non-technical branches, three (3) regional offices and twelve (12) divisional organizations.

JKR Sarawak Headquarters is responsible for the overall administration and policy making. Road Branch is an engineering authority for Sarawak on matter relating to road. It undertakes the task of ensuring sustainable development, planning, design and setting standards for better and safer road network in Sarawak. Road Safety and Traffic Engineering Section is specifically designated to oversee road safety matters.

JKR Regional Offices undertakes the task for all projects implementation. Road and Civil Engineer Asset Branch maintain and rehabilitate the roads to the required level of service. This office represents JKR Sarawak to participate in the Majlis Keselamatan Jalan Raya (MKJR). MKJR is a council that brought together relevant parties concerning road safety, namely, the Police, Road Transport Department, Health Department, etc to discuss road safety issues and come up with short term and long term solutions.

The current RTS practices are categorized into four stages: planning stage; design stage; construction stage and maintenance stage. The practices will be acknowledged accordingly.

5.1.1 Planning Stage. In the planning stage, project proposal is received from the client (state or federal agency) and the JKR divisional offices. These proposals can be a new project or an upgrading project. New project is concerned with mobility and safe movement of goods and people. Upgrading project usually addresses the increasing number of traffics and improving the safety features of existing roads.

Planning officer will assess and identify safety problems that might arise with the concept of the proposed project, such as, road network implications, alignment and other traffic engineering features and make necessary improvement to the proposal. The proposal would be submitted to relevant ministry for approval.

5.1.2 Design Stage. The design team is to discuss with design committee on the scope of work, design requirements, road standards and geometric criteria to be adopted and construction cost estimate. The design team can be in-house design team or appointed design consultant.

All detailed design works are to be carried out in accordance with the standard JKR Terms of Reference for Detailed Ground Survey, Engineering Design and Documentation for Sarawak Roads (CETRDES, Rev.11/96), relevant Arahan Teknik Jalan (ATJ), other technical standards and best
engineering practices (collectively referred as guidelines). Drawings and report are submitted in stages: conceptual, preliminary and final.

The detail of traffic engineering features such as the cross section elements, carriageway layout, intersection layout, horizontal and vertical alignment and traffic control options are established based on the ATJ published by JKR Malaysia.

A Road Safety Audit (RSA) is also to be carried out on the design. The RSA Auditor can be an independent certified RSA Auditor, Road Designer from within the department or by a member of the project’s design team. Arising from the findings and recommendations of the Road Safety Audit Report, amendments shall be made to the design where necessary, if any.

5.1.3 Construction Stage. The JKR Regional Office will be responsible for all projects implementation and field operations that include site supervision and coordination. During the construction, traffic management is the biggest concern so as not to cause much inconveniences to road users, thus, a contractor is required to submit the traffic management plan to be checked by certified road safety auditor. The plan is prepared by certified traffic management officer. JKR Regional Office will endorsed the plan prior to the implementation on-site.

5.1.4 Road Maintenance. JKR divisional office is responsible to monitor and ensure the implementation of maintenance work being carried out accordingly as required in the agreed performance standards.

Inspection is carried out on the existing roads to identify safety problems which develop due to normal ‘wear and tear’ from traffic operation. Routine and periodic maintenance will be carried out by the road maintenance concessionaire. This is to improve safety, and, conversely, to remove all known safety defects.

5.2 Practices that Conform with ISO 39001

Document analysis is applied to identify the current RTS practices that conform with ISO 39001. The analysis is based on the six steps plan-do-check-act (PDCA) in figure 2.

![Figure 2. Six Steps Plan-Do-Check-Act. (Adapted from [6])](image-url)
### Table 1. Comparison of ISO 39001 RTS Management System and Current RTS Practices

| Step | ISO 39001 RTS Management Systems                                                                 | Current RTS Practices                                                                 |
|------|-------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Step 1: Scope and Context | Identify the impact the organization can have on road traffic safety (RTS), map that impact across interested parties, and determine the organizational scope of an RTS management system (refer clause 4 of ISO 39001). | JKR Sarawak’s Road Branch is the engineering authority ensuring sustainable development, planning, design and setting standards for better and safer road networks in Sarawak. |
| Step 2: Leadership | Establish leadership commitment by adopting a long-term vision to eliminate death and serious injury and providing resources to establish, implement, maintain and continually improve the RTS management system towards these ends. Establish, document and communicate RTS policy, and assign organizational responsibilities (refer clause 5 of ISO 39001). | Road Safety and Traffic Engineering Section is specifically designated to oversee road safety matters. The RSA Auditor can be an independent certified RSA Auditor, Road Designer from within the department or by a member of the project’s design team. |
| Step 3: Planning | Determine risks and opportunities through assessment of current performance and identify the RTS performance factors that are relevant to the agency. Set objectives and targets for each performance factor and develop action plans (refer clause 6 of ISO 39001). | Planning officer will assess and identify safety problems that might arise with the concept of the proposed project, such as, road network implications, alignment and other traffic engineering features and make necessary improvement to the proposal. The detail of traffic engineering features such as the cross section elements, carriageway layout, intersection layout, horizontal and vertical alignment and traffic control options are established based on the guidelines. |
| Step 4: Implementation | Implement and operate the RTS management system, and ensure that sufficient capacity is provided for the objectives and targets to be met (refer clauses 7 and 8 of ISO 39001). | Road Branch is an engineering authority for Sarawak on matter relating to road. JKR Regional Office will be responsible for all projects implementation and field operations that include site supervision and coordination. JKR divisional office is responsible to monitor and ensure the implementation of maintenance work being carried out accordingly as required in the agreed performance standards. Each office is responsible in maintenance of records and reports within their scope of work. |
| Step 5: Monitoring and Evaluation | Monitor and evaluate RTS performance, conduct internal audits and periodic reviews of the RTS management system to identify opportunities for continual improvement (refer clause 9 of ISO 39001). | Not practiced. |
| Step 6: Continual Improvement to Elimination of Death and Injury | Improve the RTS management system on a continual basis following review of RTS performance, and of the RTS management system itself (refer clause 10 of ISO 39001). | Not practiced. |
5.3 Challenges to Certification Based on 6 Steps PDCA

The six steps PDCA are: (1) Scope and context; (2) Leadership; (3) Planning; (4) Implementation; (5) Monitoring and Evaluation; (6) Continual Improvement to Elimination of Death and Injury. It is a structured guideline for ISO 39001 certification.

Based on the analysis tabulated in Table 1, it is deduced that some JKR Sarawak RTS practices do conform with ISO 39001 RTS Management Systems. Step 1 is practiced as the scope and context is specified. Steps 2 to 4 show that the current practices produced the desired outcome of the relevant departments. However, there are some discrepancies found. In Step 2, a ‘long term vision to eliminate death and serious injury’ is absent. The absence of this vision resulted in the inability to ‘establish, document and communicate Road Traffic Safety policy’. These two criteria are important step for documentation and their absence affect the next step (Stage 3 - Planning). JKR Sarawak is unable to effectively ‘determine risks and opportunities through assessment’ as there are no official documentation available for reference. This leads to the challenges in setting objectives and target for RTS practices. The implementation stage (stage 4), shows that the relevant offices are able to implement and operate the current management system, with documentation.

However, there are no practices recorded in Steps 5 and 6. Step 5 is monitoring and evaluation, a very crucial step in identifying opportunities for continual development. There is no evidence that suggest JKR Sarawak identifies a measurable outcome for monitoring purposes, thus, evaluation cannot be executed. The absence of practices in Step 5 leads to the non-existence of practices in Step 6. Any form of improvements is not interpreted because there is no benchmark available for review purposes. This further explained the challenges faced by JKR Sarawak in obtaining the certification for ISO 39001.

6.0 Conclusion

In conclusion, although ISO 39001 is fully aligned with ISO 9001 Quality Management System, JKR Sarawak is not ready to adopt it in the near future. JKR Sarawak must acknowledge the crucial role of setting a long term vision with measurable objectives. These objectives may differ from one department to another, but the outcome is similar, which is to eliminate death and injury. Having measurable RTS objectives will help to evaluate the RTS performance and effectiveness of the system. The suggested measurable RTS objectives are as follow: 1) reduction in the number of complaint in regards to safety issues, 2) high compliance to the safety requirements in road project, 3) an increase of road users’ satisfaction, and 4) a decline in the number of accidents caused by road conditions for a defined time frame. Subsequently, RTS management system itself can be improved.

7. References

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