



COMPREHENSIVE REPORT ON THE ONLINE TRAINING COURSE:

**ENGINEERING SAFER ROADS – PRINCIPLES,
STANDARDS & AUDIT PRACTICES**

Held from 15th – 19th September 2025



EXECUTIVE SUMMARY

Tanzania Road Safety Initiative (TARSI), in collaboration with seasoned road safety professionals, successfully conducted a five-day Online Training Course on “Engineering Safer Roads – Principles, Standards & Audit Practices” from 15th to 19th September 2025. The training aimed to build national capacity in road safety engineering, audits, and assessment practices aligned with international standards such as the International Road Assessment Programme (iRAP).

The course brought together 50 participants from key institutions including TANROADS, TARURA, ERB, NIT, Municipal and District Councils Engineers, private engineering firms, and consultants, with one participant joining from Rwanda. This diverse participation fostered cross-learning and encouraged collaboration among professionals involved in the design, construction, and management of road infrastructure across Tanzania.

Facilitated by CEng. Ronald M. Lwakatare, CEng. Elhanan A. Lema, and Eng. Laurent Maganga, the training combined theoretical insights and practical applications. Key topics included iRAP methodologies, road safety audits, safe system approaches, design principles, speed management, data coding, star rating processes, and the development of Safe Road Investment Plans (SRIPs). The sessions also explored innovative tools under iRAP’s evolving framework, such as AI-RAP, Star Ratings for Schools, and Risk Mapping.

Participants gained a deeper understanding of how safety considerations can be integrated at all stages of road project development. The training highlighted that adherence to design standards alone does not guarantee safety unless verified through systematic audits. It emphasized the use of scientific tools such as iRAP star ratings to identify high risk road sections and prioritize interventions based on cost effectiveness and impact.

Several key recommendations emerged from the course, including: making road safety audits mandatory at the design stage; updating the Road Safety Policy (2009); modernizing the Road Accident Information System (RAIS); adopting SATCC guidelines for road signage, and strengthening institutional frameworks to mainstream road safety practices. The need for continued capacity building, development of pedestrian and cyclist infrastructure, and enhancement of urban road safety management was also strongly emphasized.

Overall, the training represented an important milestone in Tanzania’s journey toward achieving the UN Global Road Safety Targets 2030, particularly the goal of reducing road traffic deaths and injuries by 50%. TARSI reaffirmed its commitment to advancing road safety education, professional development, and inter agency collaboration. The insights and knowledge gained from this program are expected to translate into safer road designs, improved infrastructure standards, and enhanced institutional capacity for road safety management in Tanzania.



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List of Abbreviations

TARSI –	Tanzania Road Safety Initiative
iRAP –	International Road Assessment Programme
IRF –	International Road Federation
TanRAP –	Tanzania Road Assessment Programme
RSA –	Road Safety Audit
SRIP –	Safe Roads Investment Plan
BCR –	Benefit-Cost Ratio
RAIS –	Road Accident Information System
UN –	United Nations
TANROADS –	Tanzania National Roads Agency
TARURA –	Tanzania Rural and Urban Roads Agency
ERB –	Engineers Registration Board

1. INTRODUCTION

Tanzania Road Safety Initiative (TARSI), in collaboration with distinguished road safety professionals, organised an intensive five-day online training course on Engineering Safer Roads: Principles, Standards & Audit Practices. The training took place from 15th to 19th September 2025. It aimed to strengthen professional capacities in road safety engineering, audits, and the application of international best practices such as the International Road Assessment Programme (iRAP) methodologies. The training was designed to address the increasing need to engineer safer roads that align with Tanzania's road safety objectives and global standards.

The program was facilitated by three highly experienced resource persons who brought a blend of expertise from both local and international experiences:

- ▶ CEng. Ronald M. Lwakatare – Independent Consultant
- ▶ CEng. Elhanan A. Lema – Managing Director, GrandConsult Engineers and Planners Ltd.
- ▶ Eng. Laurent Maganga – Road Safety Manager, NORPLAN Tanzania Ltd.

The course was attended by a diverse group of participants, including engineers from TANROADS, TARURA, NIT, ERB, various Municipal and District Councils, and several private construction and engineering firms. There was one participant from Rwanda. This mixture of participants fostered knowledge sharing and collaboration among practitioners involved in the planning, design, and management of road infrastructure in Tanzania.

2. Objective of the Training

Based on information and knowledge from the International Road Assessment Programme (iRAP), Tanzania Road Assessment Programme (TanRAP), and the International Road Federation (IRF), participants will be provided with an overview of how Road Safety Audits, Road Safety Designs, and Road Safety Assessments are conducted. Specifically, the training sought to:

- Introduce participants to the International Road Assessment Programme (iRAP) tools and methodologies such as road surveys, attribute coding of roads, star rating of roads, safe road investment plans and innovations in road safety.
- Develop a strong understanding of road safety audits and their importance in reducing crashes.
- Equip participants with knowledge of road-safety design principles aligned with global best practices.
- Present the current status of iRAP star ratings in Tanzania, and share progress toward achieving UN road safety targets by 2030.
- Discuss policy, institutional, and technical challenges in road safety management, and recommend practical reforms.
- By spreading knowledge on road safety audits, designs and assessments, it is anticipated that there will be an increase in enrollment of professionals undertaking courses on road safety audits and assessments.
- With increased awareness of the importance of road safety audits, designs and assessments, road agencies will allocate more resources to improve road safety in Tanzania.

3. Training Proceedings and Daily Sessions

Day 1 Monday, 15th September 2025

The training commenced with opening remarks by the lead resource person, CEng Ronald M. Lwakatare, who officially introduced the purpose, objectives, and structure of the course. He emphasised the importance of aligning Tanzania's road safety programs with global commitments, particularly the UN Global Road Safety Targets for 2030.

The first session focused on a presentation on the Status of iRAP Star Ratings in Tanzania, Gap Analysis, and Recommendations to achieve United Nations (UN) targets by 2030. The presenter, CEng Ronald Lwakatare, talked on the Global Plan, Decade of Action Plan for Road Safety 2021-2030, and the target to reduce road traffic casualties and injuries by at least 50% by 2030. CEng Lwakatare mentioned the UN Road Safety Targets to support Sustainable Development Goals (SDGs) notably Target 3 which is "By 2030 all new roads achieve technical standards for all road users that takes into account road safety, or meet a three star rating or better" and Target 4 "By 2030, more than 75% of travel on existing roads is on roads that meet technical standards for all road users that take into account road safety.

CEng. Lwakatare further presented on the Status of Star Ratings in Tanzania, including the history of iRAP Star Ratings in Tanzania between 2010 and 2022; a Summary of recommended countermeasures from the assessments; Gap analysis in road infrastructure safety management in Tanzania; TanRAP Action Plan; and Status in implementation of recommendations for safe road infrastructure in the Decade of Action for Road Safety 2021-2030.

Day 2 Tuesday, 16th September 2025

The second day started with CEng Lwakatare winding up his presentation from the previous day and providing a recap of Day 1.

Eng Laurent Maganda made a presentation on an Overview of Road Safety Audits. Eng Maganga talked on the Safe System model; The RISE Tanzania conventional and project preparation (people-centred design); Road Safety Audit practices and standards; Six international stages of Road Safety Audits; the Road Safety Audit process; Good Road Safety Management; Road Safety Inspections; Road Safety Impact Assessments (RSIA). Eng Maganga also talked on Network Safety Rating; "What projects do we audit and what we audit?"; Economics for Road Safety, including Economic appraisal in Road Safety Engineering and Global economic cost of road casualties; iRAP 'Rule of Thumb' method; Types of Auditors and the Audit team.

Day 3 **Wednesday, 17th September 2025**

The third day started with Eng Maganga winding up his presentation from the previous day and providing a recap of Day 2.

CEng Elhanan Lema gave a presentation on Engineering Safer Roads: Principles, Standards, and Audit Practices. CEng. Lema discussed Safe Roads, including planning, road infrastructure (geometry and roadside facilities), road signs/markings, and road restraint systems. He then spoke on Safe Vehicles, including Vehicle condition and Vehicle safety features.

Day 4 **Thursday, 18th September 2025**

On the fourth day, CEng Lema continued with his presentation. CEng Lema spoke on Safe Speeds, including standards, guidelines, and speed restrictions. He then talked about Safe Road Users, including Vehicle drivers, Bodaboda and Bajaj drivers, and changes in road-user behaviour.

Day 5 **Friday, 19th September 2025**

On the final day, CEng Ronald Lwakatare made a presentation on the Introduction of iRAP. He talked about iRAP and its work worldwide; the Basic iRAP Philosophy; Policy and Business case for safer roads; and the iRAP Training and Accreditation.

CEng. Ronald Lwakatare then made a presentation on iRAP Surveys, including the Purpose of a survey, the Survey process, and Standard deliverables. He made a presentation on iRAP Coding that included Coding systems, Key principles of Coding, the Coding process, Coding teams, Quality of Coding, and Standard deliverables. He made a presentation on iRAP Star Ratings and the VIDA online software, and Safe Road Investment Plans (SRIPs).

He gave a last presentation on Introduction to RAP Innovation in which he talked briefly about the Innovation Framework - Governing Model Evolution; Innovation Products, Star Rating for Schools, Star Rating for Designs, User Defined Investment Plans, Road Safety Big Data, Ai - RAP, Star Rating Demonstrator, Light Star Rating Model, iRAP Urban, iRAP Risk Mapping, Modelling Shunt crashes, ITS Enhanced Model, Speed Management, Infrastructure for Autonomous vehicles, Decimal Star Ratings, and Safe System Star Rating Module ('zero harm').

The course ended with a closing speech from CEng Lwakatare, thanking all facilitators, participants, and TARSI for organising such a timely and impactful program.

4. Training Proceedings and Daily Sessions

The training attracted 50 participants representing a wide range of key institutions responsible for road infrastructure and safety in Tanzania. These included:

1. Engineers and planners from TANROADS and TARURA
2. Municipal and District Council engineers
3. Representatives from private engineering and construction firms
4. Consultants, academics, and independent practitioners in transport and infrastructure safety
5. Engineers Registration Board

The diversity of participants enriched the training discussions and encouraged cross-learning among professionals from different institutional backgrounds.

5. Key Lessons and Technical Insights

The training enhanced participants' technical knowledge in multiple areas, including audit procedures, data collection for iRAP, coding practices, and development of investment plans. Participants gained a deeper understanding of how safety considerations should be integrated into each phase of road project development.

Some of the key takeaways included:

1. Design standards do not automatically guarantee road safety; it must be verified through audits.
2. iRAP coding and star ratings provide a scientific basis for identifying high-risk road sections.
3. Safer Roads Investment Plans are essential in prioritising cost-effective interventions.
4. There is a pressing need to enhance institutionalised road safety audits and update outdated design manuals.

6. Recommendations

Based on the training outcomes, participants and facilitators agreed on several recommendations to advance road safety in Tanzania:

1. Road safety audits be mandatory from the design stage.
2. The TanRAP Action Plan (Implementation Road Map) for 2023 – 2030 be executed, which includes carrying out road assessments.
3. The Road Safety Policy of 2009 be updated to be relevant in current circumstances.
4. The Road Accident Management System (RAIS) be revived and modernised.
5. SATCC guidelines for road signs be adopted for Tanzania as they are more comprehensive than the Tanzania guidelines.
6. The Star Rating of road networks be used to measure the performance of road agencies.
7. Workzone Management guide for road works be enhanced/developed for Tanzania.
8. Roadside barrier design be included in the design manuals.
9. Capacity building that was carried out during the Ten Step Plan Project be continued to get more accredited professionals on road safety. Support be sought from various institutions, such as ERB.
10. Investments be made in cities to provide pedestrian crossings on heavily trafficked roads, such as underpasses and pedestrian bridges, to reduce road accidents, fatalities and serious injuries.
11. Land use adjacent to roads be addressed to avoid potential road safety hazards. Land officials be engaged in planning.
12. In areas with many people, bus bays be physically separated from the traffic lanes to reduce pedestrians being hit by vehicles.
13. The safety of pregnant women in vehicles be addressed as seat belts are not suitable for them.
14. Climbing lanes on steep gradients be placed where appropriate for use by heavy trucks.
15. Visible road markings be applied for rigid pavements.
16. Vandalism of roadside safety barriers be addressed.
17. Education on road safety be taught at schools.
18. Stakeholders be consulted when considering appropriate pedestrian crossings.
19. Provide pedestrian and cyclist infrastructure in all urban areas.

7. Conclusion

The TARSI Online Training Course on Engineering Safer Roads was a significant milestone in strengthening Tanzania's capacity to implement engineering-based road safety practices. The combination of international methodologies, such as iRAP, with local case studies provided participants with practical and applicable skills. The contributions from CEng. Lwakatare, CEng. Lema, and Eng. Laurent ensured that participants benefited from both theoretical knowledge and practical experience.

TARSI remains committed to expanding such programs, fostering partnerships, and supporting Tanzania's efforts to achieve the UN Global Road Safety Targets 2030. The knowledge gained from this training is expected to directly contribute to safer road designs, safer constructed road infrastructure, reduced fatalities, and improved institutional capabilities and collaboration in road safety management.

