

Course Contents of 15-day Road Safety Auditors Certification Course

Week-1

Day 1: Monday

Session 1: Road Safety Scenario

- UN decade for Road Safety
- Five Pillars of Road Safety Systems Approach
- Haddon Matrix
- Overview on Safety Scenario in India-
- Road Safety to be considered as public health problem
- Main reasons for unsafe roads
- International Comparison
- Lessons to be learnt from actions taken in other countries such as Sweden, UK, Holland, Japan, USA, Australia, New Zealand, etc.
- Way Forward

Objectives: *To understand and appreciate criticality of road safety and its needs*

Suggested References: *MoRT&H latest Report on Road Accidents in India*

Global Status Report on Road Safety 2018 by WHO, Latest Report on road crash data published by National Crime Records Bureau (NCRB) and Transport Wing of Ministry of Road Transport and Highways. Any other relevant literature / report pertaining to the crash data.

Session 2: Traffic Signs, Road Markings and Delineators

- Details on relevant IRC codes/ guideline on traffic signs, pavement markings, work zone safety, road delineators., safety barriers
- MoRT&H Specifications - Relevant Portions of Section 800
- Emphasis of correctness and uniformity of traffic signs and markings in their configurations and placements.
- Examples of typical applications along with bad and correct practice

Objectives: *To know the practicing IRC Codes applicable and useful for Road Safety*

Suggested References: *All the relevant IRC Codes as well as ASSTHO Guidelines*

Day -2 Tuesday

Session 3: Safety in Road Design

- Concept of hierarchical system of road network planning
- Principles of Safe Design – prevention by Safety Audit and reduction by designing ‘forgiving’ Highways
- Safe horizontal alignment and vertical profile
- Geometric design
- Geometric Design parameters
- Safety needs of all and different user groups
- Take care of Driver Behaviour and Errors
- Wayside Amenities – Rest Areas, Truck Lay-by/ terminals
- Speed Management (*road hierarchy, signing, speed zoning, markings including those to create stereoscopic illusion*)
- Main safety considerations in designing two /four/Six lane Highways/ Expressways and Urban roads
- Common mistakes to be avoided

Objectives: *To equip participants on safe design of various categories of roads/ expressway*

Suggested References: *All the relevant IRC Codes/ Manuals as well as any relevant international manuals, standards, and guidelines, AASHTO Green Book and PIARC Road Safety Manual and Other Road Safety Manuals*

Session 4: Safety in Design of Intersections and Interchanges

- Classified Turning Movements at intersections - measurement and usage in design

- Hierarchy of intersections
- Design principles and safety considerations for various types of at grade intersections
- Grade separated intersections/interchanges - types and design principles
- Urban Roads
- IRC: SP 41 and IRC:65
- Type Design of intersections on National Highways by MoRTH, 1995
- Design of safe facilities for Public transport users and pedestrians at grade separated intersections. ,
- Correct provision of signs, markings and delineators at different categories of intersections
- Common mistakes to be avoided

Objectives: Participants to get guidance on safe design of intersection and interchange

Suggested References: All the relevant IRC Codes as well as any relevant international guidelines/ standards on intersections design and AAASHTO Green Book

Day 3: Wednesday

Session 5: Safety for VRUs and special needs of Persons with Disabilities (PwDs)

- Speed and vulnerability
- Pedestrian priority for road categories
- Physical Separation – service roads – Safe systems approach
- Walking Facilities along roads – continuous and encumbrances free
- Crossing facilities – at grade and grade separated
- Special needs of Persons with Disabilities (PwDs)
- Pedestrian facilities at intersections and interchanges
- Facilities for cyclists
- Facilities for public transport and for NMTs– bus bays
- Traffic Calming in residential areas (IRC:99-2018)
- Speed Management in Highways / Roads passing through urban areas {IRC:99-2018}
- Human Factors related to Road Safety
- Safety around the School Zones

Objectives: To understand and appreciate the Needs of VRUs and differently abled Special VRUs and design the facilities suiting the above

Suggested References: All the relevant IRC Codes as well as any relevant international manuals/ standards/ guidelines

Session 6: Crash Data Analysis and Black Spot Treatment

- Crash Data Recording and Reporting Format of MoRTH prescribed in Dec. 2017
- Highlights of Ministry's Road Crash Reports with focus on causative factors
- Black Spot Treatment – protocol, procedures, collision diagram, counter measures, case studies, before and after studies
- Basic strategies for road crash reduction through Single site treatment, Route action plan, Mass action Plan and Area wide schemes

Objectives: To understand the system for crash recording and analysis, use of collision diagram to assess the types of crashes, its Characteristics and possible countermeasures

Suggested References: Crash data yearly publication of MoRTH and NCRB, Government of India, Latest road crash data recording and reporting prescribed by MoRTH, Black Spot Manual of SWEDEN Roads - EU funded for TRACECA (Transport Corridor Europe-Caucasus-Asia)

Session 7: Highway Access Permission norms, Highway Land Administrative rules, Highway Acts and MoRTH policy on Forgiving Roads

- MoRTH Circulars relating to Access Permissions
- The Control of National Highways (Land and Traffic) Act 2002
- MoRTH Policy on Forgiving Roads
- Safety Initiatives of NHAI and MoRTH for reduction of Accidents in India

Objectives: To understand the Various circulars of MoRTH/NHAI regarding the Control of Highway Acts, access Permission norms, and Safety Measures taken up by MoRTH and NHAI

Suggested References: Control of National Highways (Land & Traffic) Act 2002, MoRTH/NHAI Circulars

Day 4: Thursday

Session 8: Crash Investigation and Remedial Measures

- Difference in Crash Data Analysis and Crash Investigation
- Team Composition
- Decide the criteria for listing of crash locations
- List the crash locations to investigate
- Analysis of data : Clustering of common factors
- Collision diagram,
- Inspect the site conditions
- Finalize the assessment
- Match the solutions to the problems
- Prepare preliminary design
- Establish the benefits and costs of the counter measures
- Document the findings
 - ✓ The Preliminary Report (*Documenting the crash patterns*)
 - ✓ The Crash Summary Report (*Documenting the factors in the crashes*)
 - ✓ The Crash Location Treatment Report (*Documenting the proposed solutions*)
- Implement the treatment
- Monitor and Evaluate the treatment
- Case studies

Objectives: To understand the methodology and relevance of crash investigation for road safety.

Suggested References: PIARC Guidelines on Crash Investigation

Session 9: Road Side Hazard Management

- Use of Spot Speed measurement
- Road Side Hazard Management
- Crash Barrier requirements & placement
- Fixed Hazards/Object Hazard Markers
- Recovery Zone and Clear Zone
- Speed Management

Objectives: To understand the importance of the road side Hazard Management, clear zone width and measures

Suggested References: All the relevant IRC Codes like IRC: 119 (2015) & IRC: 79 (2019) as well as any relevant international manuals/ standards/ guidelines and AASHTO Green Book

Day 5: Friday

Session 10: Case Studies on Traffic Studies

- Case Study from actual Traffic studies and analysis from a complete DPR for road project
- Concept of capacity and level of service with relevant manuals and IRC documents
- Case study on how the traffic studies and analysis were used in design of road including intersection

Objectives: Practical studies on road link design and intersection.

Suggested References: All the relevant IRC Codes as well as ASSTHO Codes
Case of any DPR of completed road project, Planning for Bypasses

Session 11: Safety of Hill Roads

- Safety issues on Hill Roads
- Hill roads Safety Measures
- Land Slides Mitigation Measures
- Slope Protection Measures
- Drainage Issues in Hill Roads
- Tunnel Safety in Hilly Terrain

Objectives: To understand special needs on safety on hill roads design requirements and standards

Suggested References: All the relevant IRC Codes as well as any relevant international manuals/ standards/ guidelines

Session 12: Bus Rapid Transit (BRT) and its impact on pedestrian movements

Objectives: To understand the importance of BRTS, Pros and Cons related to safety of Vulnerable Road Users

- Safety Issues related to BRTS
- Need for Provision of dedicated facility for Commuters

Suggested References: IRC: 124 (2017)

Day 6: Saturday

Session 13A: Non- Engineering Measures, Enforcement and Trauma Care

- Amendments to Motor Vehicle Act relating to road safety
- Presentations on First aid care, Trauma Care Centre and Emergency related to Road Safety

Session 13B: Presentation on allied areas relating to road safety issues

- Basics of Asset Management and the benefits of good pavement surface for Road Safety
- Bridge Engineering issues related to road safety, safety Aspects in Construction, Maintenance and Operations of Bridges

Objectives: Coverage on Amendments in Motor vehicles Act -2019, Trauma Care practices, Protection of Good Samaritan;

Suggested References: Motor Vehicle Act amendments and the aspects related to Trauma Care

Session 13C: Introduction to Intelligent Transport System and Asset management

- Various components of Intelligent Transportation Systems (ITS)
- Some details on the components related to road safety e.g. ATMS, ATIS, APTS, AVCS
- Road map for ITS deployment

Objectives: To understand and appreciate the use of ITS in road safety and road asset management tools

Suggested References: Publications of FHWA and ITS World Congress

Day 7: Sunday: Self study and revision of learnings during the week.

Week-2

Day 8: Monday

Session 14A: Approach and Methodology to Road Safety Audit (RSA)

- Origin of Road Safety Audit,
- Definition of an audit and who does it
- Difference between Road Safety Audit (RSA) & Road Safety Inspection (RSI)
- Objectives of road safety audit
- Audit is not – eg. Redesign, exercise of crash analysis and investigation
- Why audits are necessary
- Independence of auditors
- Costs and benefits
- Some examples where audits have produced benefits
- Indian and International practices and documents, PIARC Guidelines

Objectives: Basics of Road Safety Audit

Suggested References: IRC: SP-88 (2019) "Manual on Road Safety Audit" (First Revision) and other International Road Safety Audit Manuals such as from UK, Australia, FHWA, and ADB

Session 14B: Audit Procedure

- A brief on type of projects be audited
- Stages of Audit
- Road Safety Audit (Feasibility stage, Design Stage, Construction Stage, Pre-Opening Stage and O& M Stage)
- Process / key steps of Audit
- Selection and Qualification of Audit Team
- Responsibilities of client and Auditor
- Sequence of steps
- Client/Auditor Relationship
- Commencement Meeting, checking of drawings and documents
- Assessment of Risk and assigning the priority
- Check List (different stages, road construction equipment, workers)
- Report writing – site specific identification and suggested counter measures
- Client response to audit report.

Objectives: Road Safety Audit and its stages, risk classifications

Suggested References: IRC: SP-88 (2019) "Manual on Road Safety Audit" (First Revision) and other International Road Safety Audit Manuals such as from UK, Australia, FHWA and ADB

Session 15A: Design Stage RSA: Case Study Presentation

- Design Stage Check List
- Design Stage Road Safety Audit
- Why audit at this stage
- What can be and cannot be achieved at this stage
- How to conduct the audit at this stage
- Case Study for RSA at design stage

Objectives: Design Stage Road Safety Audit

Suggested References: IRC: SP-88 (2019) "Manual on Road Safety Audit" (First Revision) and other International Road Safety Audit Manuals such as from UK, Australia, FHWA and ADB

Session 15B: Construction Stage RSA: Case Study Presentation

- Construction Stage Road Safety Audit - Check List
- Participants to be explained on identified stretch for WZ RSA

Objectives: Practical exercise initiation on Construction Stage Road Safety Audit

Suggested References: IRC: SP-88 (2019) "Manual on Road Safety Audit" (First Revision) and other International Road Safety Audit Manuals such as from UK, Australia, FHWA and ADB

Session 15C: Road Safety Audit on Existing roads, Road Safety Audit (RSA) /Road Safety Inspection (RSI): Case Study Presentation

- Road Safety Audit on Existing Road - Check List and Case Study Presentation
- Discussion/ introduction on the identified stretch of the road where participants would do the exercise of Road Safety Audit on Existing Road

Objectives: *Initiation of Practical on Road Safety Inspection*

Suggested References: *IRC: SP-88 (2019) "Manual on Road Safety Audit" (First Revision) and other International Road Safety Audit Manuals such as from UK, Australia, FHWA, and ADB*

In the concluding session of Day 8 (full day), a brief on the road sections to be visited on Day - 9 covering Existing Road and Construction Stage RSA would be briefed by the Faculty.

Day 9: Tuesday

Session 16A: Practical / Site Visit for conduct of Existing Stage Road Safety Audit (RSA) /Road Safety Inspection (RSI)

- *Pre requisites for Existing Stage RSA: Selection of suitable sites & arrangement of Logistics*
- Site Visit (***Institute may combine the site visit for Work Zone RSA and O & M Stage RSA so that it gets completed in one day***) with Faculty as Mentor (*Covering possibly Expressway / NH / SH /MDR /ODR located in the immediate vicinity including intersections and interchanges*). Each group shall comprise maximum of 8 to10 participants only mentored by a faculty.
- Each participant should prepare a presentation on findings and recommendations emanated out of O & M Stage RSA / RSI. Participant may also start writing the Audit Report which is to be submitted on or before Day 14.

Session 16B: Practical / Site Visit for conduct of Construction Stage RSA

- *Pre requisites for conduct of Construction Stage RSA: Selection of suitable sites & arrangement of Logistics*
- ***Conducting Construction Stage RSA with the help / guidance of the mentors;*** Site Visit shall be only Group-wise guided by the Faculty as Mentor. The onus lies on the Training Institute to select a suitable construction site in the vicinity and arrange the logistics for transport, paper and pencil. Each group shall comprise a maximum of 8 to10 participants only mentored by a faculty.
- Each participant should prepare a presentation on findings and recommendations emanated out of Construction stage. Participant may also start writing the Audit Report which is to be submitted on or before Day 14.

Objectives: *Practical on Construction Stage Road Safety Audit*

Suggested References: *IRC: SP-88 (2019) "Manual on Road Safety Audits" (First Revision), IRC: SP-55 (2014) and other International Road Safety Audit Manuals such as from UK, Australia, FHWA, ADB*

Day 10: Wednesday

Session 17: Practical on Design Stage Road Safety Audit

- Discussions/ introduction on the identified project for design stage RSA exercise. Training Institute shall identify/ select the Project and make available a minimum of two copies of DPR for each group. Each Group comprises of 8-10 participants mentored by a faculty.
- Study/ examination of the Detailed Project Report Drawings by the participants in each group.
- ***Conducting Design Stage RSA with the help / guidance of the mentors.*** Each participant shall make a presentation (*as well as start preparing the report for submission on Day-14*) highlighting salient findings in front of Faculty. Each group shall comprise of 8 to 10 participants only mentored by a faculty. Any spill over work on report preparation may be completed after training hours.
- Each participant should prepare a presentation on findings and recommendations emanated out of Design Stage RSA. Participant may also start writing the Audit Report which is to be submitted on or before Day 14.

Objectives: *Practical on Design Stage Road Safety Audit.*

Suggested References: *IRC: SP-88 (2019) "Manual on Road Safety Audit" (First Revision) and other International Road Safety Audit Manuals such as from UK, Australia, FHWA and ADB.*

Day 11: Thursday

Session 18: Practical on preparation of Construction Stage RSA Report / Presentation

- **Preparation of presentation on Work Zone RSA with the help / guidance of the mentors.** Each participant shall make a presentation (as well as start preparing the report for submission on Day-14) highlighting salient findings in front of Faculty. Each group shall comprise of 8 to 10 participants only mentored by a faculty. Any spill over work on report preparation may be completed after training hours.

Objectives: Practical Exposure on Construction Stage Road Safety Audit

Suggested References: IRC: SP-88 (2019) "Manual on Road Safety Audit" (First Revision), IRC: SP-55 (2014) and other International Road Safety Audit Manuals such as from UK, Australia, FHWA and ADB

Session 19: Pre-Opening Stage RSA: Case Study Presentation

- Pre Opening Stage Road Safety Audit - Check List
- Pre Opening Road Safety Audit - Case Study

Objectives: Identification and exposure on safety issues at Pre Opening Stage Road Safety Audit

Suggested References: IRC: SP-88 (2019) "Manual on Road Safety Audit" (First Revision) and other International Road Safety Audit Manuals such as from UK, Australia, FHWA and ADB

Session 20: Night Time Road Safety Audit

- Focus on Night time audit issues

Objectives: To understand the need for night time RSA

Suggested References: IRC: SP-88 (2019) "Manual on Road Safety Audit" (First Revision) and other International Road Safety Audit Manuals such as from UK, Australia, FHWA and ADB.

Session 21: Organizational Commitment towards Road Safety Audit

Objectives: To know about various organisations safety related organisational structure

Suggested References: IRC: SP-88 (2019) "Manual on Road Safety Audit" (First Revision) and other International Road Safety Audit Manuals such as from UK, Australia, FHWA and ADB.

Day 12: Friday

Session 22: Practical on preparation of O & M Stage RSA Report / Presentation including night time RSA

- **Conducting Existing Stage RSA / RSI with the help / guidance of the mentors.** Each participant shall make a presentation (as well as start preparing the report for submission on Day-14) highlighting salient findings emerged out of various sites visited by them in front of Faculty. Each group shall comprise of 8 to 10 participants only mentored by a faculty. Any spill over work on report preparation may be completed after training hours.

Objectives: Practical Exposure on Road Safety Inspection

Suggested References: IRC: SP-88 (2019) "Manual on Road Safety Audit" (First Revision) and other International Road Safety Audit Manuals such as from UK, Australia, FHWA, and ADB

Day 13: Saturday

Session 23: Open Book Written Exam carrying 45 % weightage

- To assess the trainee's understanding and knowledge acquired over the aspects covered during the last two weeks

Session 24: Time allotted for completion of RSA reports for submission carrying another 45 % weightage

- Participant shall utilize the time available after the written exam on Day 13 for the completion of the following reports:
- Design Stage RSA Report: Weightage - 10 Marks for report + 5 Marks for presentation.
- Construction Stage Report: Weightage - 10 Marks for report + 5 Marks for presentation.
- Existing Stage RSA/RSI Report: Weightage - 10 Marks for report + 5 Marks for presentation. Submission of all the reports for evaluation to the faculty shall be on or before 2 pm on Day 14.

Day 14: Sunday:

- **Submission of Practical Audit reports on Design Stage RSA, Construction Stage and Existing Stage RSA / RSI by each participant to the concerned institute by 2 pm**

Week-3

Day 15: Monday

Session 25: Interaction and Closing Ceremony

- Interaction with individual delegates by the mentors on all the submitted RSA Reports and giving inputs for value addition.
- Getting Feedback from the delegates on the 15-day Certification Course.
- Closing Ceremony and Certificate distribution to those delegates who secure the **minimum overall percentage of 75 %**.

Assessment Criteria:

- 10 %** weightage for the attendance
- 30 %** weightage for Audit Reports submitted by each participant
- 15 %** weightage for presentation given by each participant
- 45 %** weightage for the Examination
- A minimum of **75 % overall marks** should be secured by each participant for getting the Certificate.
- The suggested timings for the above training program are from 10 am to 6 pm on all the days.
- If any candidate fails to secure 75 % overall marks, then he / she shall have to repeat the examination only to secure 75 % for getting the certificate. However, the candidate is not required to pay any additional Course Fee to the concerned institute again.**

Note: The above suggested course curriculum topics for imparting lectures on Road Safety and Road Safety are only indicative to cover the core areas of road safety audit, road safety engineering and allied subjects. Organising institute may make modifications in terms of topics / technologies/ concepts like "Fundamentals of Traffic Engineering or any other topics related to road safety can be added within the given timeframe.