



15 Days Certification for Road Safety Auditors

Sponsored by
Ministry of Road Transport and Highways
Govt. of India

Organized by
Indian Academy of Highway Engineers



Background: Road safety was never recognized as a major problem till the vehicle ownership boom in last 2-3 decades and wide-spread road network expansion for better mobility in India. With highest road fatalities in the world, India has recognized the social and health burden caused by this human tragedy, which costs the nation 2-3% of its GDP every year. It is also realised that the roads built with full compliance to standards also need careful road safety interventions, and therefore, the importance of road safety engineering and associated audits is understood. The curriculum in engineering colleges so far has not built in road safety engineering in any significant manner. Acute shortage of trained and qualified road safety engineers and auditors is felt since a long time to bring in the desired improvement in road safety scenario. Ministry of Road Transport and Highways (MORTH), Government of India (GOI) has taken several steps for improvement of road safety in the recent past. To bridge this gap and to develop well-versed road safety engineers and auditors, MORTH has supported the initiative by bearing more than 50% of the cost and starting a 'Certified Road Safety Engineers and Auditors' six week programs organised by Indian Academy of Highway Engineers (IAHE) since 2015. The IAHE has so far conducted 6 such courses and trained 116 numbers of engineers since May 2016 to till date. However, the Ministry of Road Transport and Highways have finalized the content for the 15 days certification mandatory course for becoming Road Safety Auditors. A tripartite agreement has been signed between the Ministry, Indian Roads Congress and various training imparting institutes including IAHE.

Objectives: The main objective of this certificate programme is to develop highway professionals as 'Road Safety Auditors' who should be able to bring-in safety engineering elements in planning, design, construction, operation and maintenance stages systematically ensuring safety for the road users. They will also be used for the network in operation for identifying safety deficiencies and to suggest improvements based on thorough analysis & audit.

Delivery: The fully residential course has been planned to be delivered in 15 days as per the standard curriculum through class room lectures, field works and practical/demonstration aspects of learning combined with academic assignments. The course would be conducted without break over two consecutive weeks comprised of theory, practical and assignments. The participants will undergo a systematic, rigorous learning and evaluation process covering the adequate details from fundamentals to the advanced traffic engineering and road safety audit, making them a group of trained and skilled professionals, to be certified as 'Road Safety Auditors' duly accredited by the Indian Roads Congress under the aegis of Ministry of Road Transport and Highways (MORTH), Government of India (GOI).

Strategy: This specially designed course shall be delivered with the help of Indian experts to bring-in the best safety practices around the world and sharing Indian experience. The specially designed and developed course materials with help of Australian experts and team of Indian experts would also be provided to the participants. During the delivery, Indian safety engineering and audit experts/faculty including experts from IITs/NITs and other institutions would be invited to participate in the programme for lectures, field audits and interaction and by sharing the best safety audit principles and practices.

Targeted Participants and Group Size: The highway engineers working in public & private sectors with following qualification & experience will be enrolled to undergo this certificate programme and may be considered as targeted participants. A maximum of 30 participants per programme would be considered for enrolment and the slots would be confirmed in order of receipt of nominations along with prescribed fee for confirmation. Being a residential programme, all the participants will have to stay in trainees' hostel in IAHE campus. This is subject to the following of Covid-19 guidelines as applicable and in force by the Government of the State of Uttar Pradesh during the schedule. This will facilitate interaction and discussions amongst the participants themselves to accomplish daily assignments. All necessary facilities for lodging, boarding, recreational, DTH TV and dedicated wi-fi net access facilities, etc. are available in the hostel.

Educational Qualification: Essential: Should be holders of minimum of a Civil Engineering Bachelor's Degree. **Desirable:** Post-Graduate Degree like M.Tech./M.E./PG Diploma etc. in Highway Engineering/ Transportation Engineering/ Traffic Engineering/Transport Planning/ Transportation Systems Engineering, Structural Engineering etc. **Experience:** Although not necessary preference shall be given to those having working experience either from highway agencies associated with road development or from academic institutions dealing traffic and highway engineering discipline or from highway engineering/design consultancy or contracting firms.

Course Fee: The total cost of the 15 days course is Rs.88,500/- per participants including 18 % GST. The fee is inclusive of lodging and boarding of the participants in IAHE hostel. The fee should be paid in favour of 'Indian Academy of Highway Engineers' through local cheque/ PO/DD/transferred through ECS/RTGS in IAHE's SB A/c No. 712212100000311, Bank of India, Sector-62 Noida Branch, IFSC Code: BKID0007122. The minimum qualifying marks are compulsory for getting training certificate. In case of leaving the programme at any stage, the fee deposited shall not be refunded back.

Schedule of the Course:

The Course shall be conducted at IAHE NOIDA campus from 2nd-16th August, 2021

Faculty: Faculty will be eminent practicing professionals in the field of road safety and audit from public and private sectors including experts of IITs/NITs.

Training Materials: International experts of repute from ARRB, IRF and other renowned Indian practicing Road Safety experts have developed a specially designed supporting course material to fulfill the requirements of certified safety engineers and auditors for India. The soft copy of the same will be shared along with PPTS of the faculties.

Evaluation for Certification:

- There will be continuous evaluation or marking of the reports/assignments submitted by the participants as well as based on written and oral examinations at the end of course.
- For successful completion of the course, the participant has to score minimum 75% marks for certification.

Certification/Accreditation: MORTH has declared IAHE as its authorised institution for issuance of certificate for 15 days course. A Certificate will be given to each successful participant, duly evaluated as prescribed, by the IAHE as an authorised institution of MORTH. This certification would necessarily be required to be produced by the individual professionals so as to get the accreditation by the Indian Roads Congress. The procedure for the accreditation shall be informed during the course.

IAHE shall maintain a register/record and database of all the participants including evaluation records for one year and certification who have successfully completed the Certification Course. IAHE shall maintain and will also keep updating the audit experiences/records of the certified professionals. All key personnel involved/to be involved in road safety audit on Road Projects should undergo this certification programme; and subsequently to allow only Certified 'Road Safety Auditors' to undertake safety audit works for projects.

Day-wise Course contents

Day-1: Monday 2.8.2021

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, Netherland, 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 Latest Global Status Report on Road Safety by WHO, Latest Report on road crash data published by National Crime Records Bureau (NCRB). Any other relevant literature / report pertaining to the road traffic crash data.

Session 2: Traffic Signs, Pavement Markings, Delineators, Crash Barriers, Traffic Impact Attenuators • 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 standard and practices prescribed by IRC Codes and applicable/ useful for Road Safety

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

Day -2 Tuesday 3.8.2021

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 and 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 • Intersection design on Urban Roads with safety considerations • IRC: SP 41, IRC:65 and IRC 92 • Type Design of intersections on National Highways by MoRT&H, 1995 • Design of safe facilities for Public transport users and pedestrians on at-grade and 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 4.8.2021

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 on 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 persons with disabilities (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 MoRT&H 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 MoRT&H and NCRB, Government of India; Latest Accident data recording and reporting prescribed by MoRT&H; Black Spot Manual of SWEDEN Roads – EU funded for TRACECA (Transport Corridor Europe-CaucasusAsia)

Day 4: Thursday 5.8.2021

Session 7: 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 crash investigation for road safety.

Suggested References: PIARC Guidelines on Crash Investigation and other relevant literature

Session 8: Road Side Hazard Management • Use of Spot Speed measurement • Road Side Hazard Management • Crash Barrier requirements & placement • Fixed Hazards/Object Hazard Markers • Recovery Zone • 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 6.8.2021

Session 9: 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: To understand the practice of traffic studies, analysis and usage in 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 10: 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

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

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

Day 6: Saturday 7.8.2021

Session 11A: Non- Engineering Measures, Enforcement and Trauma Care • Amendments to Motor Vehicle Act relating to road safety • Emergency Care System with stationing of ambulances, communication, response time, linkage with primary, secondary and tertiary hospitals, good Samaritan role and protection.

Session 11B: Presentation on allied areas relating to road safety issues • Basics of Asset Management and the benefits. • Good pavement surface for Road Safety enhancement • Bridge Engineering issues related to road safety

Objectives: To understand provisions of Amendments in Motor Vehicle Act - 2019 related to road safety, Trauma Care practices and Protection of Good Samaritan.

Suggested References: Motor Vehicle Act amendments and other relevant literature, practices and policy documents related to Trauma Care

Session 12-A: Introduction to Intelligent Transportation Systems (ITS) 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 Intelligent Transport System (ITS) in road safety

Suggested References: Publications of FHWA/ US DoT and ITS World Congress proceedings

Session 12-B: Interactive Session on subjects covered in the week, discussions on real life situations/ problem and safety measures

Day 7: Sunday 8.8.2021: Self-study and revision of learnings during the week.

Day 8: Monday 9.8.2021

Session 13A: 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 – e.g. 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: To understand and appreciate 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 PIARC, UK, Australia, FHWA and ADB

Session 13B: 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 PIARC, UK, Australia, FHWA and ADB

Session 14A: 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 PIARC, UK, Australia, FHWA and ADB

Session 14B: 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” (First Revision) and other International Road Safety Audit Manuals such as from UK, Australia, FHWA and ADB

Session 14-C: Road Safety Audit/ Review on Existing Road / Road Safety Inspection (RSI): Case Study Presentation • Road Safety Audit/ Inspection 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” (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), Course Participants would be briefed by the Faculty on the road sections to be visited for Road Safety Inspection of a section of Existing Road and RSA of Construction Stage.

Day 9: Tuesday 10.8.2021

1. Full day is suggested for the Site / Field RSA. The Institute may combine the site exercise visit for Work Zone RSA and RSI so that field study gets completed in one day. The practice stretch may cover possibly Expressways/NH/SH/MDR/ODR including intersections and interchanges located in the immediate vicinity, so that travel time from Institute to the site is minimal. The Faculty would be the Mentor. Participants may be suitably distributed in groups whereby each group may comprise 5 to 6 participants.

2. Each participant should prepare a presentation on findings and recommendations for RSI and on Construction Stage RSA.

Participant may also start writing the Audit Report (for both exercises) which would be required to be submitted on or before Day-14.

Session 15A: Practical on Road Safety Audit/ Review / Road Safety Inspection (RSI) of Existing Road • Pre requisites for Road Safety inspection and Construction Stage RSA would be the selection of suitable sites and arrangement of Logistics

Session 15B: Practical on Construction Stage RSA • Conducting Construction Stage RSA with the help / guidance of the mentors; Site Visit shall be guided by the Faculty as Mentor. The Training Institute would have to identify and select a suitable construction site in the vicinity and arrange the logistics for transport, paper and pencil. Each group would comprise 5 to 6 participants.

Objectives: Practical on Road Safety Inspection and 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 PIARC, UK, Australia, FHWA and ADB

Day 10: Wednesday 11.8.2021

Session 16A: 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 one copy of DPR for each group. Each Group would comprise of 5- 6 participants mentored by a Faculty. Study/ examination of the Detailed Project Report Drawings by the participants in each group.

Session 16-B: Presentations on Design Stage RSA. Each participant shall make a presentation highlighting salient findings. They may also start writing the Report, to be submitted on Day 14. Any spill over work on report preparation may be completed after training hours.

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 PIARC, UK, Australia, FHWA and ADB.

Day 11: Thursday 12.8.2021

Session 17A: Practical on Construction Stage RSA • Presentation on Work Zone RSA. Each participant shall make a presentation highlighting salient findings and recommendations... Participants would have started writing the Report. Any spill over work on report preparation may be completed after training hours.

Objectives: Practical for making presentation 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 PIARC, UK, Australia, FHWA and ADB.

Session 17B: 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 PIARC, UK, Australia, FHWA and ADB

Day 12: Friday 13.8.2021

Session 18: Practical on Road Safety Audit on Existing Road /Road Safety Inspection • Presentation on RSA/RSI of Existing Road. Each participant shall make a presentation highlighting salient findings and recommendations on safety measures, based on the Inspection (under guidance of Faculty), undertaken of the identified existing road. Each group shall comprise of 5 to 6 participants mentored by a Faculty. Any spill over work on report preparation may be completed after training hours.

Objectives: Practical on making presentation for 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 PIARC, UK, Australia, FHWA, and ADB

Day 13: Saturday 14.8.2021

Session 18: 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 19: Time available to participants, for completion of RSA reports for submission which carry 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 Road 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 15.8.2021: • 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

Day 15: Monday 16.8.2021

Session 19: 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 qualifying overall percentage of 80 %.

Assessment Criteria: Total marks of 100 shall comprise: i) 10 % weightage for the attendance ii) 30 % weightage for Audit Reports submitted by each participant iii) 15 % weightage for presentation given by each participant iv) 45 % weightage for the Examination v) A minimum of 75 % overall marks would need to be secured by each participant for being qualified to get the Certificate for Road Safety Auditor Course. vi) The suggested timings for the above training program are from 9.30 am to 5.30 pm on all the days. vii) If any candidate fails, to secure overall 75 % marks, then he / she shall have to repeat the examination component only (of 45% weightage/ marks) for securing the requisite 75 % overall marks for getting the certificate. The candidate is not required to pay any additional Course Fee to the institute again.

Note: The above suggested course curriculum topics for imparting the Training Course on Road Safety Auditor, are recommendary, to cover the core areas of, allied subjects on road safety engineering and road safety audit. IAHE may make slight modifications to cover new technologies/ concepts relating to road safety within the above given time frame.

About IAHE: IAHE (formerly NITHE), an apex institute of excellence, was established by the Ministry of Road Transport & Highways, Govt. of India in Jan, 1983, as a registered Society, to fulfill the needs for training of highway professionals. It organises various types of training programmes at entry level and during the service at different levels for Central & State Governments., Public and Private sectors working in the road sector. IAHE promotes co-operation and foster exchange of knowledge, ideas and experience in the sphere of highway engineering among highway professionals in India and Abroad. So far, it has organised about 1536 programmes for about 38,839 professionals from 50 Countries. Visit www.iahe.org.in for details.

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