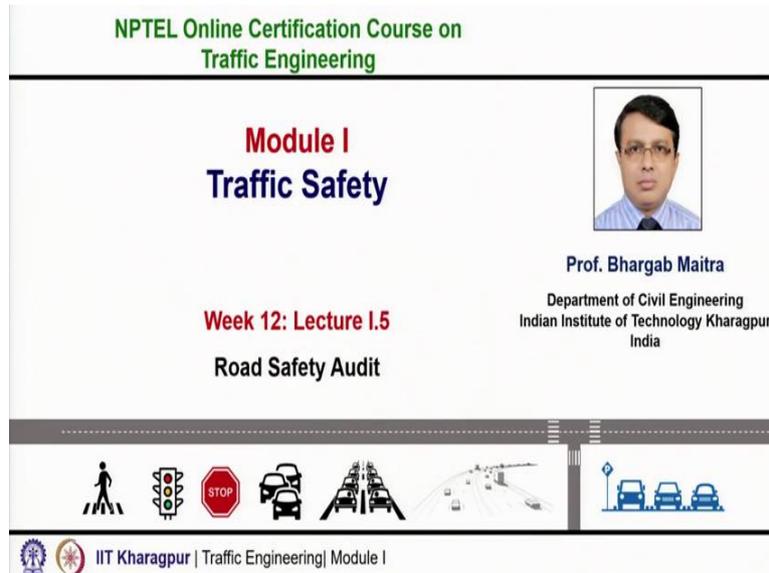


**Traffic Engineering**  
**Professor Bhargab Maitra**  
**Department of Civil Engineering**  
**Indian Institute of Technology Kharagpur**  
**Lecture 63**  
**Road Safety Audit**

(Refer Slide Time: 00:16)



The slide features a white background with a green header. The main content is centered, with a portrait of Prof. Bhargab Maitra on the right. Below the portrait is his name and affiliation. The text 'Module I Traffic Safety' is in red and blue, and 'Week 12: Lecture I.5 Road Safety Audit' is in red and black. A horizontal bar with various traffic-related icons (pedestrian, traffic light, stop sign, car, truck, bridge, road, and cars) is positioned below the text. The footer includes the IIT Kharagpur logo and the text 'IIT Kharagpur | Traffic Engineering | Module I'.

NPTEL Online Certification Course on  
Traffic Engineering

**Module I**  
**Traffic Safety**

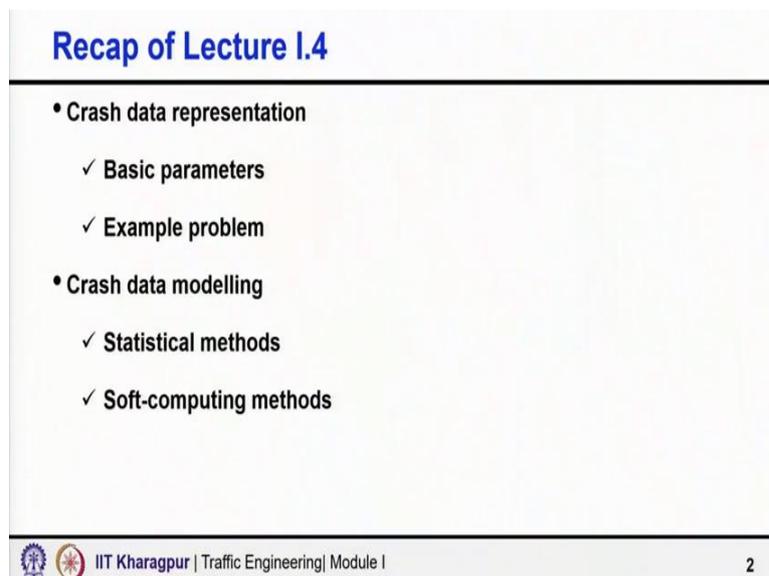
**Week 12: Lecture I.5**  
**Road Safety Audit**

**Prof. Bhargab Maitra**  
Department of Civil Engineering  
Indian Institute of Technology Kharagpur  
India

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Welcome to Module I Lecture 5. In this lecture, we shall discuss about Road Safety Audit.

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**Recap of Lecture I.4**

- Crash data representation
  - ✓ Basic parameters
  - ✓ Example problem
- Crash data modelling
  - ✓ Statistical methods
  - ✓ Soft-computing methods

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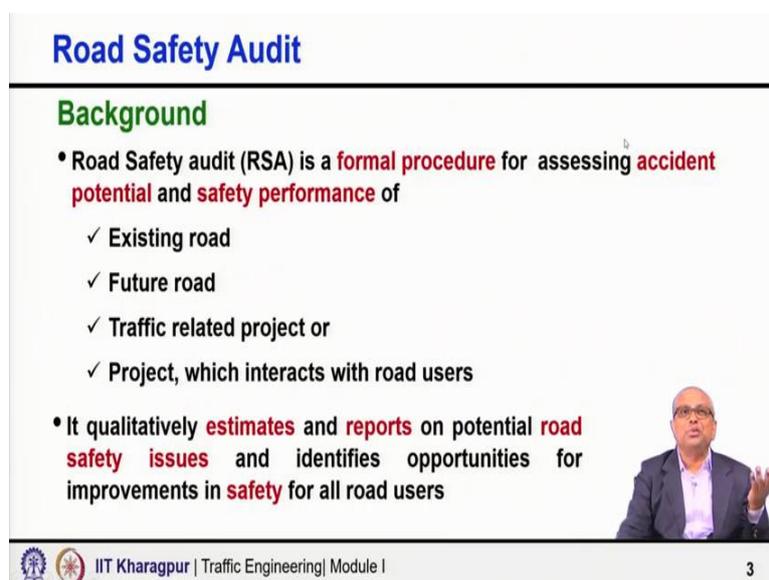
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In lecture 4, I mentioned to you about the crash data representations using several basic parameters we can represent the crash data, meaningful basic parameters, and also I took some one example problem to tell you that different situation different segment length number of

years is different volume is different, still how different segments can be compared meaningfully. And we can try to model then also the crash data to predict the number of crashes or the crash counts or the severity.

And in all, both cases, number of statistical methods are available. I mentioned some of the models also which could be utilized. And then also discussed about the application of soft computing methods, the machine learning techniques which is becoming increasingly popular, so many different algorithms are available and in transportation field the transportation researchers are also applying those ml models to predict the crashed frequency or the crash severity.

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**Road Safety Audit**

**Background**

- Road Safety audit (RSA) is a **formal procedure** for **assessing accident potential** and **safety performance** of
  - ✓ Existing road
  - ✓ Future road
  - ✓ Traffic related project or
  - ✓ Project, which interacts with road users
- It qualitatively **estimates** and **reports** on **potential road safety issues** and identifies opportunities for improvements in **safety** for all road users

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Now, with this background today, in this lecture, we shall discuss about Road Safety Audit. What is Road Safety Audit? It is a formal procedure, please carefully note, we are talking about a formal procedure for assessing accident potential. Again observe it, carefully note it, we are talking about not accidents, but accident potential that is very, very important and safety performance of any facility maybe an existing road, future road, any traffic related project or project which interacts with road users.

It qualitatively estimates and reports on potential road safety issues and identifies opportunities for improvement in safety of all road users, that is again important, all road users not only the motor vehicle users or car users, but all road users. So, we are talking about the formal procedure for assessing accident potential and safety performance of any facility which were the road user interaction exist.

And eventually, we want to with an intention of improving the overall safety performance for all road users, by cyclist, pedestrians, public transport users, motorcycle users, car users everybody.

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## Road Safety Audit

**Characteristics**

- A **formal process** and not an informal check
- Carried out by persons who are **independent of the design and construction**
- Carried out by persons with appropriate **expertise, experience and training**
- Restricted to **road safety issues**
- Applying **Road Safety Engineering** experience to designs before they are built



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Now, there are certain characteristics which are very important. As I said, it is a formal process not an informal check. Carried out by persons who are independent of the design and construction, this is again very important, many times, at times I have seen people do not understand it. A designer is also competent, a designer or somebody who is working in the field practitioners, they are equally competent.

But as you know, look at the accounts department of any organization. Accounts department do the accounting they are competent, but they cannot audit their own account. So, it has to be audited by someone who was not involved in preparing this account. That is very important. Why? It is only that a fresh look at the whole thing. Just to see whether there is apparently any safety concerns, and if so, bring it out or bring it to the notice of the designer.

See, I have these consents, let the designers either accept or reject it. Designer may also say no what you are saying your observation is there, but see, this is the way I have predicted that will not happen, that also can be possible. So, it is all like a team game, client, designer, and auditor, all together we should try to make our infrastructure and facilities safer.

In one project, I may act as a designer and you may act as an auditor, in another project, you may act as a designer, I may act as an auditor. But a person who has been involved in designing the facility should not audit the same project. So, that is really important. Always think that

your accounts department, they are competent, they are all educated, they are highly experienced people, but can they audit their own account, the answer is no.

So, till next time, somebody tells you that why I need an auditor I have a safety consultant, so safety consultant is to prepare the thing for you. You should have somebody independent, who will audit and then tact the true audit of the facility, otherwise there is no audit. Carried out by persons with appropriate expertise, experience and training. Restricted to safety issues, and basically its application of road safety engineering experience to design before they are built.

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**Road Safety Audit**

**Aims and Objectives**

- Ensure a **high level of safety** in all new/existing road projects
- **Minimize risk and severity** of crashes
- **Minimize/ avoid** crashes in the adjacent road network
- Reduce the life cost or long term cost of a project
- Promote the safety of **ALL road users** on new and existing roads
- **Improve awareness** of safe design practices

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Aims and objectives also, obviously, to ensure a high level of safety in all new or existing road project, minimize the risk and severity, minimize or avoid crashes in the adjacent route network, reduce the lifecycle cost or long term cost of the project because early you take action, you eliminate the road crash.

Because you are assessing the potential and if any deficiency you found in the concept, design, implementation, immediately you are correcting it. So, you are not waiting for the accidents or the crash to occur and people to die, you are getting injured. So, obviously, the early you take action you are actually gaining in terms of your long term cost or the lifecycle cost.

Promote the safety of all road users on new and existing all is very important here, not only carry users but all road users, and overall, it helps you to improve awareness of the safe design practices, because in India I have told in the beginning, we are building roads, but building roads and building safe road and transportation facilities, there are two different thing we need

to build safe road infrastructure not only we need to build roads, not building roads, but building safer road infrastructure and safe road infrastructure.

So, that is what should be the target. Not the building of roads alone, but building safe road infrastructure, considering the requirements of not only the motor vehicle users or car users, but all different road users including pedestrians, including bicycles, including all other public transport user, including the facilities, bus stops you are giving that means people will cross, am I providing facility for them to cross. All such kind of things, all road users, all requirements you have to look into, all age group.

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**Road Safety Audit**

**Type of Projects**

- New Expressways
- Major divided carriageway roads
- Reconstruction and realignment projects
- Pedestrian and bicycle routes
- Deviated local roads near major projects
- Local area traffic management schemes
- Signal upgrading
- Maintenance works

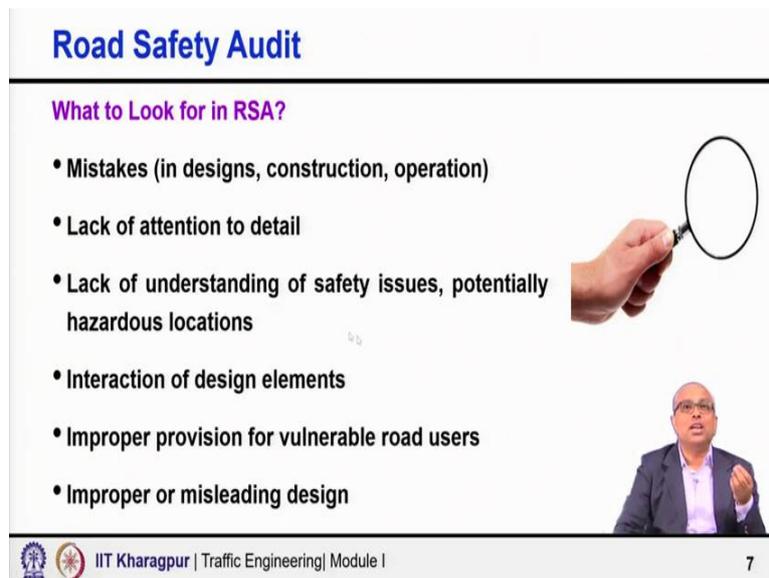
MANUAL ON ROAD SAFETY AUDIT  
(IRC: SP – 88: 2010)  
INDIAN ROADS CONGRESS 2010

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Type of projects I said any project it may be new expressway, it will be major divided category road to signal upgradation to maintenance work anywhere wherever anything, any road any project wherever human being are involved or road users are involved their behavior is involved please include such projects in the Road Safety Audit. We have in India IRC: SP – 88, special publication in India Road Congress guideline that is a manual on road safety audit, quite useful. And please if you are interested to know more you can refer to this manual as well.

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**Road Safety Audit**

**What to Look for in RSA?**

- Mistakes (in designs, construction, operation)
- Lack of attention to detail
- Lack of understanding of safety issues, potentially hazardous locations
- Interaction of design elements
- Improper provision for vulnerable road users
- Improper or misleading design

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What to look for in RSA? Yes, certainly some mistakes in terms of design, construction operation, lack of attention in details, you might have designed the intersection, but have you really considered all the requirements of different user groups while designing the intersection maybe nearby there is a school and lots of schoolchildren are crossing the road at their junction.

Have you specially given a consideration to this requirement of schoolchildren or you have just simply used a prototype design which often the designers will do that a typical design put it there. It might be okay but it needs a little bit of modification to take care of the requirements which are very specific to that location.

Lack of understanding of safety issue and potentially hazardous location, interaction of design elements, improper provision for vulnerable producer and improper or misleading design all these we try to look in, look in daytime, nighttime all reducers point of view all types of reducer schoolchildren to senior citizen, elderly people, even the specially abled person all requirements you have to think.

You see number of highways I have I know number of highway stretches where there are so many schools which are located adjacent to highways and obviously the school is located on one side of the road does not mean that students only from that side of the road they will come to the school, people are students are also coming from the other site nearby villages everywhere and the no crossing provision is made.

So, children are really forced to cross four lanes six lane highways to go to the other side to schools, sometimes the school may not be right next to the carriage way or next to the road, it

may be a little bit inside maybe half a kilometer one kilometer inside does not matter, still the people or children's are crossing the road we have to take care, so such kind of things.

So, whether any age group, any road user group, any requirement has not been taken care of and which may lead to potential safety hazards that we want to identify. And we want to take corrective actions, designer only will take it we can only as auditor can only suggest it that this is what we feel we have these are our concerns and then it is up to the designer.

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Road Safety Audit		Crash Investigation vs. RSA
Crash Investigation	RSA	
Reactive measure	Proactive measure	
Crashes have already occurred, with resulting injuries and fatalities	Prevents future crashes and resulting injuries and fatalities	
Investigates accidents and treats problems on existing roads	Recommends modifications to minimize these problems	
Monitors and evaluates accident sites	Gives an unbiased view of safety issues with support from safety experts	
Focuses on blackspots, which may or may not be the sites that could benefit most from a safety improvement	Involves thorough inspection of all the stretches of a road. May be conducted in different stages, e.g., new roads, existing roads, during constructions, etc.	
Limited by the quality and timeliness of the data	Lack of crash data is not a major concern	



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This is very important the next part, crash investigation and RSA. I have told about in my previous lecture only, I have said how the crash data can be analyzed, the crashed data and RSA how we compare them. Crash investigation is reactive measure, crashes happen, you have the data you have built the database.

And I am now trying to analyze to find out how the number is related to what factor or how the type of crash is related to what factors other variables or causal factors. Or sometimes I have identified the black spots and I know here, these are the location where statistically significant the higher number of road crashes or fatalities are happening. And therefore I want to go there and inspect and then investigate and see what is happening. Reactive, everything I am doing is reactive in nature.

Crashes have happened and then I am doing it something. RSA Road Safety Audit, it is a proactive measures. I am not waiting for crash to happen. I am not waiting for the fatality to occur. But using the basic safety knowledge, understanding principles, fundamentals, also the expertise, experience everything.

I am looking at the existing the way you are planning to develop it and trying to identify whether there is any potential safety issue that in future may lead to root crashes so it is proactive, not reactive but proactive. So, crash investigation is reactive versus proactive. The other points I have says crash, here crash investigation we do when crashes have already occurred. With resulting injuries and fatalities, and RSA we are doing to prevent future crashes and resulting injuries and fatalities, very different.

Here we investigate accidents and treat problem on existing road here we recommend modification to minimize these problems even before they occurs. Crash investigations, we monitors and evaluates accident site and giving an unbiased view of safety issues, gives an unbiased view of safety issues with support from safety expert. So, essentially I have written many points you can see those but remember one thing one is proactive, another is reactive, crash investigation reactive, RSA proactive.

And crash investigation is something like you have a pain in your stomach or somewhere you go to doctor and say that I am getting the pain then doctor does all certain investigation, they will do the blood test, ECG and all sorts of investigation to find out why you are getting the pain in stomach or chest pain as the case may be or whatever investigation required they will do to find out why you are getting that pain what is wrong.

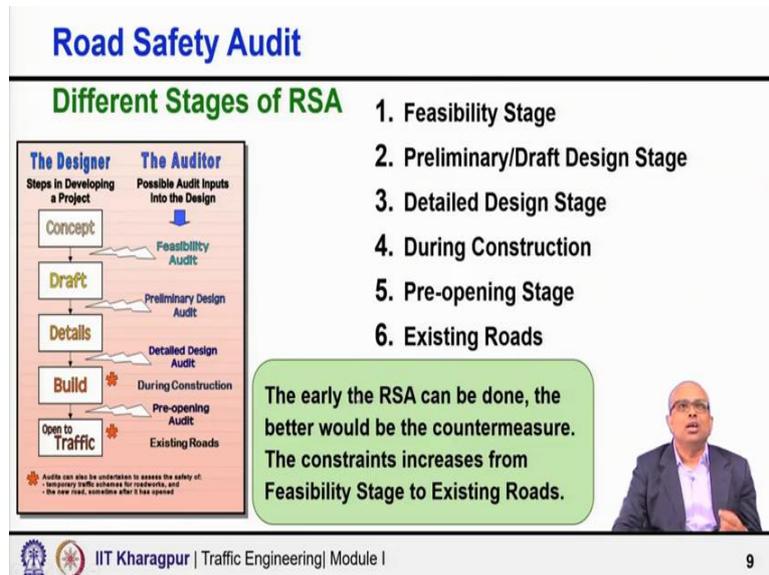
But you made a complain that I am getting the pain chest pain or stomach pain or some difficulties you are reporting. So, the investigation is being carried out to identify what is the real problem and then the doctor will prescribe you medicine or maybe if it is acute, even may ask you to go for a surgery or other kinds of treatments. RSA not like that, RSA is almost like a health checkup.

You go for the checkup, you do not have a problem apparently, but still you go to checkup. So, some basic parameters, all they will check and they will tell you everything is all right. Or even if you identify a problem, it will be identified right it a very early stage. Maybe a simple one or two tablets can solve that problem. But once you wait, and after one year, if you detect that, then maybe no more medicine, but you probably needed surgery or medicine also, number of medicines probably will required for a longer time to treat.

So, think of that kind of difference between RSA and crash investigation. RSA is like health checkup. I am not waiting for the problem to occur. But before that itself, I am checking whether something is wrong. I am not waiting for the crash to occur. I am not waiting for the

people to get killed, but I am doing the audit to see whether there is any safety potentials or unsafe things.

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There are different stages of RSA, different stages you can apply RSA in true sense not different stages of RSA means, but you can use Road Safety Audit in all different stages of road development. After feasibility stage you can do, after preliminary design or the draft design stage you can do, after DPR detailed design you can do, during construction you should do, pre opening stage you should do, on existing rate you should do.

The purposes are very different. Here some of the issues which can be rectified at feasibility stage cannot be rectified in the detailed design stage. Or some of the things which can be rectified at the detailed design stage cannot be rectified when your construction is done. So, early detection some of the things can be detected early.

And where it can be detected early it should be detected early, it should be audited early, but some of the things everything at feasibility stage you do not know exactly how the intersection design is going to happen, where exactly you put what signboard or what is the exact shape of island what dimension and everything not known.

So, you also have to do it at the detailed design stage because that feasibility stage many things are not known, but feasibility stage whatever things are known, they need to be if there is any safety issues, you have to correct them at this stage only, you cannot correct many of those things at a later stage or at DPS stage. So, end of the day will only put some speed limit, some signs.

You say cannot do anything now, it has been designed it has been constructed, everything has been done and now we are auditing. So, even if a problem is identified, you will say okay, do some speed, speed limit, put some speed limit board or put some physical methods of for reducing the speed and you cannot solve the problem, we are only trying to minimize the impact of that reduced speed. But if you would have identified it in the beginning feasibility stage or the PPF stage maybe things could have been done in a different way. So, at all stages we need audit.

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The slide is titled "Road Safety Audit" in blue. Below the title, it says "Feasibility Stage Audit" in purple. A bulleted list follows, with each item preceded by a checkmark. The items are: "Assessment and checks are done for:", "The concept is appropriate or not", "Route choices/ options", "Alignment and ease of achieving design standards", "Intersection locations are appropriate or not", "Standards and cross-sections", "Impact on adjacent/ nearby facilities/ network", and "Possible hazards from roadside development". A small video inset of a man in a suit is visible in the bottom right corner of the slide content. At the bottom left, there are logos for IIT Kharagpur and a traffic engineering logo, with the text "IIT Kharagpur | Traffic Engineering| Module I". At the bottom right, the number "10" is displayed.

**Road Safety Audit**

**Feasibility Stage Audit**

- Assessment and checks are done for:
  - ✓ The **concept** is appropriate or not
  - ✓ **Route choices/ options**
  - ✓ Alignment and ease of achieving design standards
  - ✓ **Intersection locations** are appropriate or not
  - ✓ Standards and cross-sections
  - ✓ **Impact** on adjacent/ nearby facilities/ network
  - ✓ Possible hazards from roadside development

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Here I have mentioned you see in details, feasibility stage what to check for example, whether the concept is appropriate, whether the route choice options are proper, whether the alignment or ease of achieving vehicle standards that you check. Intersection location set appropriate or not. Are you just it is the geometry of the intersection how it will happen or you may probably know I do not want slightly I will realign.

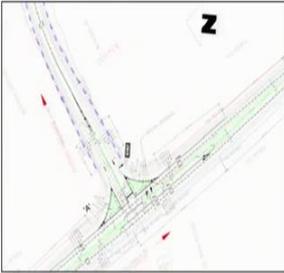
So, by intersection becomes the proper intersection. It should not be geometrically deficient intersections right from the beginning. Standards and cross sections, impact on adjacent nearby facilities network, these are the things you can check.

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## Road Safety Audit

### Preliminary Stage Audit

- Assessment and checks are done:
  - ✓ Changes occurred in project since stage-F audit
  - ✓ Geometry: Horizontal/ Vertical alignment
  - ✓ Cross-section
  - ✓ Land Implications
  - ✓ Concept of Signs and Markings
  - ✓ Arrangement of intersections, Layout Sight Lines



Example: Layout of a major T-junction



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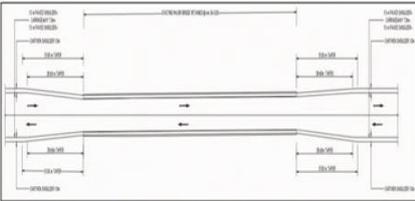
Similarly, the preliminary stage something more is available. Little bit about the geometry, horizontal vertical alignment, the cross section is available, the concept of sign and marking started building up, the concept is there, so at least check that. So, whatever information will check that at that stage whatever if you identify some lacunas some genuine issues, they can be corrected easily.

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## Road Safety Audit

### Design Stage Audit

- Assessment and checks are done:
  - ✓ Changes occurred in project since stage-1 audit
  - ✓ Detailed design of junctions
  - ✓ Design of geometrics
  - ✓ Marking and Signs, Side drains, embankment slopes
  - ✓ Traffic signals, lighting (urban sections)
  - ✓ Interim measures
  - ✓ Roadside impact protection



Example: Layout at a major Bridge location



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Then the detailed design stage DPR. Now, you have every information nearly as it will appear in the field after implementation, the same thing is now available that level of detail is available now in front of you on a piece of paper or in the form of a drawing everything is available, so

you just check it, more detailed information which were not there earlier, now you check it. So, detailed or design stage audit.

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**Road Safety Audit**

**During Construction Stage**

- Assessment and checks are done:
  - ✓ Examination of **work zone**, different **transition zones** and **warning zone** w.r.t safety point of view
  - ✓ Examination of safety measures adopted for **workmen and road users**
  - ✓ Examination of **traffic control devices** adopted at construction zone

The slide includes two photographs of construction sites: one showing heavy machinery on a dirt road and another showing a truck stopped at a construction site with traffic control devices. A presenter is visible in the bottom right corner of the slide.

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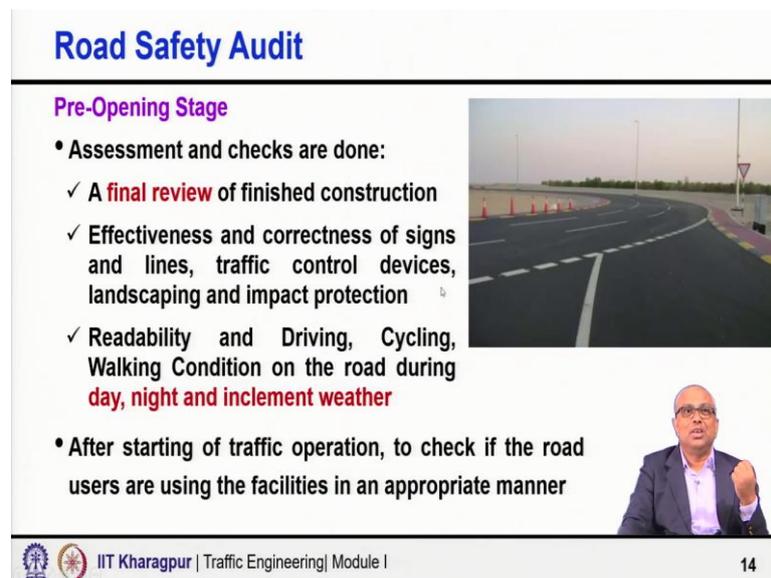
Then during construction. In countries like India we have a major issue that always the concessionaires or the contractors who execute the road project often tend to think that my during construction, whatever I am doing I am doing it only temporarily. It is only for a few days. So, then everything will be back to regular finished thing. So, just for a few days, why to spend money, why to be so careful.

But you have to understand if somebody a fatal accident happens and in the fatality happens, it happens permanently, not temporarily. Any kind of disability happens due to a severe crash it happens permanently. So, you have to audit, you have to audit in country like India, the construction stage audit is really very important. Good number of accidents or crashes do occur at or around the construction site, because many times the proper diversion of traffic and the protocols all are not followed properly, who has to check, it is only the auditor who can check. And the cost involvement is negligible, negligible as compared to the project cost.

So, we need to assess and checks everything starting from examination of work zone, different transition zones, warning zone, then examination of safety measures adopted for work man and road users, examination of traffic control devices and you know the delineation is important, the proper direction and de routing of the traffic, the speed management, number of things barricading of the construction site, safety of the workers.

So, the construction zone, safety within construction zone that is one aspect and the outside because most cases you will find existing roads are being widened or upgraded. So, the traffic is on when the traffic is on, you have to be very careful, very careful if you are stopping the traffic movement, then did something else. But if you are not stopping the traffic movement, then these are all very, very important. So, construction stage audit is very important for countries like India.

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**Road Safety Audit**

**Pre-Opening Stage**

- **Assessment and checks are done:**
  - ✓ **A final review** of finished construction
  - ✓ **Effectiveness and correctness of signs and lines, traffic control devices, landscaping and impact protection**
  - ✓ **Readability and Driving, Cycling, Walking Condition on the road during day, night and inclement weather**
- **After starting of traffic operation, to check if the road users are using the facilities in an appropriate manner**





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Then till now, everything was on paper up to the DPR stage. Now, the facilities are variable. So, although you did the audit at every stage, but again, once everything is done before opening the road to traffic, do a pre opening audit see whether drive through and just check whether everything looks perfect.

Maybe some fine tuning needs to be done at this stage which you could not anticipate that you could not think actually looking at the things on paper or maybe you will say that okay, the sign is there a little bit changed angle then the line of sight will be the better visibility will be better the functions will be better or he may say okay, install one more sign here repeat this thing there also, or you said no three are not sufficient, maybe put one more, it will be better for the road user. So, you have the facility in place. So, now you can see whether everything is fine. And if there is anything you can make the necessary corrections.

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## Road Safety Audit

**Operation & Maintenance Stage (Existing Roads)**

- **Assessment and checks are done:**
  - ✓ Roadside hazard identification
  - ✓ Level of safety considering the function of the road
  - ✓ Readability of road
  - ✓ Road Signage and Delineation
  - ✓ Check for any (overlooked) design deficiency



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Operation and maintenance stage, again very important, you develop a facility develop it considering the current requirement. And once you open maybe you develop it considering future requirement also in the context of demand forecast, but you develop and audit it when you are opening you said yesterday safe now for the road users, but then things are changing very fast.

For a country like India or Asian countries, things are changing very fast population is growing the land use is changing you build a road and which was nothing was there practically, open area no interference down the line five years you will find number of markets self come up near the road or some of the places which was only in a few houses were there in the area, surrounding area.

Now, it has become like a semi urban development and multiple households are there and some local shop is -- Some few shops have been developed land use is changing. And now probably earlier there were not so many pedestrian crossings, but now because we have a new industry or new offices government office or something and a lot of people are now crossing so now the requirement is come.

Now, there is a safety issue. So, it road might be safe today. But because of the change in the land use activities and all others down the line 2 years or 5 years or 10 years the road may not be safe anymore, not the whole stretch of the road, but some segments may require further interventions, you need probably somewhere some protection, somewhere underpass or

pedestrian underpass, somewhere maybe a side road was coming and meeting with hardly any traffic was there.

Now, you find suddenly because of some other connectivity or so, a lot of vehicles are using and now you need a vehicular underpass, because at grade things are not really safe anymore. So, you need to upgrade. So, the operation and maintenance stage audit should be carried out on a regular basis at regular interval just to ensure that always we are keeping our facilities and operating team in with due regard to safety.

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**Road Safety Audit**

**RSA Process**

**Site Inspections**

- Both day & night time inspections are required
- During inclement weather conditions
- Attention is required to be paid first in overall, then in detailed
- Includes adjacent/ intersecting roads
- Consideration of perspective of all road users
- Consideration of different movements & manoeuvres

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RSA process involves site inspection day or night because the road during daytime during night time look different. So, day and night audit both time you have to audit. Also during inclement weather further, you know the weather condition is bad, if possible, not always you may get an opportunity but if you get a possibility, if there is a possibility, you should try to do that while it is raining, how it works, how the roads look like because the facility during daytime during nighttime during rainy days may look entirely different.

So, you want the facility to be safe during all the periods. Also, attention is required to be paid faster in overall then in details includes adjacent or intersecting roads, consideration of perspective of all road users consideration of different movements and maneuvers everything.

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## Road Safety Audit

**RSA Checklist (IRC: SP – 88: 2010)**

- Useful to assist the auditors, available for different stages
- Describe the performance and situations that can affect the road safety
- **Purpose:** Used as a prompt (to ensure no items are missed). Helps to re-check relevant issues while writing report
- ✓ Auditing is **not** a “ticking off” exercise
- ✓ **Not** to overlook something important, **Not** a substitute for knowledge of local conditions



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Then there is a RSA checklist. IRC: SP - 88 provides that in Indian condition, you can check that it is very good. But remember that audit is not a ticking of exercise. It is not the filling of it form. It is the core expertise. You must have a clear understanding, expedience, expertise and then it is the application of that.

Yes, it provides some checklist just for you to say that at least you should do minimum this, you should not forget these aspects it just to remind you, but so it is not really a ticking of activities. So, it is not that anybody and everybody you just sent to a project site and ask you fill out this questionnaire, tick off, it displaces and audit is done. It is not nothing like that. So, not to you it is there only just to ensure that you do not overlook something important, but list is never a substitute of knowledge of local conditions.

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## Road Safety Audit

### Examples: Commonly Identified Problems

#### Pedestrians

- Not continuous walkways, improper location of crossings
- Inadequate guard rails, etc.



#### Cyclists

- Absence/ Discontinuity of cycle lanes
- Obstruction from street furniture, etc.



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These are commonly identified problem I have given picked up a few here and there for pedestrians maybe not continuous walkway improper location of crossing in that one area, walkway is there but it is not continuous. So, you have some portion where people are using footpath then they come on the road carriage right next to busy traffic, no crossing facility, guard rail is not there.

So, anywhere and everywhere they can close in the market within the market area. Cyclist, absence or discontinuity of cycle and either it is not there or even is there it is there only for half a kilometer but then what we do, before beyond and before what will I do, it has to be continuous it has to be a network of bicycles, facilities and networking concept is important. So, obstruction from street furniture they cannot go.

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### Road Safety Audit

**Motor Cyclists**

- Slippery road surface
- Protruding manholes, etc.

**User of Public Transport**

- Inadequate facilities
- Unsafe locations, etc.



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Motorcycle, slippery road surface, manhole sometimes it is not in proper shape. Public transport user in adequate facilities, unsafe locations maybe you have the bus stop is located in an unsafe location. I have seen a number of times bus stops are not located in a safe location, maybe some 20, 30 meter up either upstream or downstream could have made a big difference. And you are alighting, people are doing the alighting, but then there is no crossing facility. So, give me a crossing facility, for giving a bus stop give me a crossing facility. So, that is the kind of thing.

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### Road Safety Audit

**Vehicle Users**

- High speed
- Inadequate, incorrect & obscured signs
- Uncontrolled accesses
- Signs/ Lamp posts in front of safety fences
- Conflict points at intersections not eliminated
- Poorly sited street furniture
- Poor visibility
- Poor skid resistance



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Then vehicle users, often you might be some places long segments, or there are also engineering issues, I have mentioned a number of things, but the photographs are also

interesting, you see this is the kind of design the press median is very good, but not this one. Because, look at this edge line, if there is a slight error, the driver will have no opportunity to get back the control of vehicle, it is going to be a crash, surely.

So, it is not a good design good to road you know, you cannot erode directly suddenly, you block it during construction, do you expect vehicles suddenly to stop suddenly to change the lane, it should be informed well in advance and the barricading should happen in a completely different manner. So, there are many, many issues.

And as you have seen, sometimes the signs are lamppost or light post, maybe in front of the safety fence, it has come, maybe the real relocation has not happened. But then you should not open the road to traffic. You do that, and then you open it. So, number of issues out there. And India, country like India, where we have issues with the good crash data, we are developing now we are improving, and we have a bright future, I am sure, but for the moment also still not uniformly all across a good database is not available.

So, rather than depending on the data and data based analysis analytics, the audit should be a very good way. And sometimes you can mix both take advantage of the data, wherever it is available, and also take the strength of it. And then take the strength of both and then try to move forward. So, safety is a really big issue. And road safety audit has got a lot of promise, every project every stage should be audited.

And remember that the country the kind of money we are spending for developing infrastructure, there is hardly any money as compared to whatever the investment is going for infrastructure, the audit cost and the necessary changes in the design or construction or implementation is hardly anything, hardly anything. It is not a big cost. It is only the right approach. And understanding and getting convinced that yes, it is a necessity for saving people avoiding crashes and saving people and avoiding fatalities.

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**Summary**

- Road safety audit
  - ✓ Background
  - ✓ Crash investigation vs. RSA
  - ✓ Different stages of RSA
  - ✓ RSA process
  - ✓ Examples: Commonly identified problems

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So, I would say what we discussed here, why we need Road Safety Audit, what is Road Safety Audit, the difference between crash investigation and road safety audit, then different stages of development where the RSA may be required, the process of RSA day, night, good weather, bad weather and all sorts of things. And then also a few example problems, I gave a few examples of audit.

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**THANK YOU**

*Prevention is better than Cure: Let's not wait until injuries/ fatalities happen*

*Let's Drive, Ride and Walk Safely*

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And I would like to close saying that prevention is better than cure. So, let us not wait until injuries or fatalities happen. Let us do the road safety audit and overall improve the environment. Make it safer. Thank you so much.