

Policy initiatives of MORTH on Road Safety Engineering Measures

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Objectives of workshop on Road safety Engineering

- Bringing about more awareness on engineering measures for enhancing road safety.
- Clarifying issues related to policy initiatives taken in respect of engineering measures for enhancing road safety.
- Detailing on selected topics related to road safety engineering.
- Outlining broad status picture on different aspects related to road safety engineering and taking feed back on the action framework.

Road Safety Engineering measures for enhancement of road safety

- Road safety is result of effective measures and **their integration** in the areas of
 - **Engineering (Roads)**
 - Engineering (Vehicles)
 - Enforcement
 - Education
 - Emergency
- Engineering (Roads) has more scope **to go extra mile in enhancing safety.**

Road Safety Engineering measures for enhancement of road safety (Contd..)

- Immediate requirement is to deal with Road safety Engineering measures related to roads with the seriousness they deserve.

Number of people killed due to different causes in India

Cause of deaths	No of people killed	Year	Remarks /Source
Malaria	535	2014	Ministry of Health & Family Welfare
Tuberculosis	1,50,000	2014	Estimate of World Health Organization
HIV	1,30,000	2014	Estimate of World Health Organization
Road Crashes	1,39,671	2014	Ministry of Road Transport & Highways

Road Safety Engineering measures for enhancement of road safety (Contd..)

- Safety aspect of Engineering measures related to roads is more misunderstood than it is understood.
- Road safety through engineering measures is not 'Removing congestion on roads'.
- Road safety through engineering measures demands holistic approach and balancing in every step.
- Road safety through engineering measures has close linkage to road user psychology and socio economic / cultural milieu of the region.
- An inspired and motivated approach by all stake holders is required to bring about road safety through engineering measures

Road Safety Engineering measures for enhancement of road safety (Contd..)

A Logo has been designed for Road Safety Cell (Engineering) **in house** for Road Safety Cell (Engineering) for motivating and galvanizing all the stake holders



Workshop on Road safety Engineering
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Road Safety Engineering measures for enhancement of road safety (Contd..)

Different messages were intended to be given through this logo:

- Correlation of horizontal and vertical geometry in the highway planning
- Prominent and adequate road markings
- Specific measures for vulnerable road users (like footpaths and Zebra crossings for pedestrians)
- Children to be allowed to cross roads always under the guidance of elders
- Establishing and maintaining traffic signals wherever appropriate and also respecting them
- A Resolution to save lives through road safety engineering, related to roads.
- A Motto to achieve, **“Safety through Safe Roads”**

Road Safety Engineering measures for enhancement of road safety (Contd..)

Key requirements for bringing about enhancement of road safety through engineering measures

- A planned approach based on assessment of the ground conditions
- Measurement & documentation of road and traffic environment as a basis for design and implementation of rectification measures
- Holistic approach duly taking into account the conditions in sufficient length of the stretch in both directions.
- As we are working with very limited data base on road accidents, other supplementations are required till a more elaborate & reliable data base is created.
- Balancing between bringing about safety improvement in near future & minimizing wastage.
- Documenting the Feed back on the effectiveness of the measures.
- Collective actions by all the stake holders.

Road Safety Engineering measures for enhancement of road safety (Contd..)

- Any thing which **does not get measured** does not get value. Hence we need to devise appropriate parameters of measurement and **value them to make people take more interest** in enhancing safety through road engineering measures.
- Parameters which are used to measure the general road development say in terms of **expenditure incurred on road construction and maintenance or length of road built** or widened etc., **may not be the right parameters for measuring achievements in road safety.**
- Other parameters like **Number of identified road accident black spots permanently rectified** (corroborated by feed back), **length in which detailed road safety audits are carried out**, **Length in which safety concerns through audits are effectively redressed** (corroborated by feed back) can be some of the appropriate parameters for measuring the achievements in road safety.

Approach for enhancing road safety on National Highways

- Rectification of road accident black spots identified based on recorded fatalities and monitoring the feed back.
- Carrying out detailed Road Safety audits and redressing the concerns brought out through audits.
- Improving road accident data base, human resource development in the area of road safety engineering.
- All Guidelines related to Road safety Engineering are placed in Ministry's web site www.morth.nic.in under 'Roads & Highways' under sub-item 'Road Safety Cell (Engineering)'

Rectification of Identified road accident black spots

- **Guide lines** for approach to be followed **for rectification** are contained in Ministry's OM No: RW/NH-15017/109/2015- P&M (RSCE) [New No: RW/NH-29011/02/2015- P&M (RSCE) dated 08-10-2015
- Black spots on National Highways are **identified based on fatality data** furnished by traffic police/ Police authorities of states/ UTs for calendar years 2011, 2012, 2013. Spots based on 2014 data are separately circulated.
- Each black spot is **assigned a unique ID No which is a alphanumeric XX-YYY**. XX is a alphabetical state/UT code. YYY is a numerical serial number of the spot in the state/UT. This **ID is used for monitoring** (i) actions for it's rectification and (ii) feed back on accidents after rectification.
- Black spots are prioritized based on number of fatalities. But **sanction of rectification proposals shall be on first come first served basis**.

Rectification of Identified road accident black spots (Contd..)

Step by step approach:

Step 1: Furnishing Preliminary Inspection Report

- Inspection of site by state level committee and furnishing Preliminary Inspection report.
- Committee Comprises: CE (NH), RO MORT&H & Ex Engineer of the concerned NH Division.
- Why Preliminary inspection is required ?
 - Accident black spot data is very inadequate & as such limits of the black spot stretch are to be firmed up through local /police enquiry based on local knowledge.
 - Preliminary reasons for repeated fatalities are to be assessed to under stand the quantum of work involved.

Rectification of Identified road accident black spots (Contd..)

- Site conditions including availability of land are to be assessed.
- Other developmental projects in the offing on the black spot stretch and those in pipe line are to be duly considered in deciding the measures to be taken to minimize wastage.
- Most appropriate method for preparation of detailed proposal and its implementation is to be identified taking into account the near by projects in progress or in the offing.
- These are to be included in the inspection report.

Rectification of Identified road accident black spots (Contd..)

Step by step approach (contd. ...)

Step 2: **Furnishing Detailed proposal with cost estimates** to RSCE for sanction

- In case **medium term or long term measures are decided**, detailed **survey with total station** and other equipment is to be carried out to prepare **base map** and to superimpose rectification measures on the base map.
- **Traffic data including pedestrian data** is to be appropriately collected.
- **Land boundaries are to be assessed** and LA is to be included in the proposal if essential

Rectification of Identified road accident black spots (Contd..)

Step by step approach (contd.)

- Preparation of **detailed drawings showing all details including pavement markings, road signs etc.**, is essential as the proposal has to achieve the objective of eliminating/minimizing accidents at the black spot stretch.
- It is essential to show on the drawings **details of possible obstructions like advertisement boards, poles, trees, hill slopes etc.**, which may be obstructing the sight lines (which are usually major cause of accidents in several cases).
- While preparing the proposals **desired paths of movement of vehicles/pedestrians** in that area are to be duly considered.
- It is more important to **eliminate possibilities of conflicts/accidents** through adequate planning and design than to cut short the proposals. Proposals with drawings, estimates & copy of schedule of rates are to be submitted to RSCÉ for processing & sanction.

Rectification of Identified road accident black spots (Contd..)

Step by step approach (contd. ...):

Step 3: sanction of proposals and implementation

- After sanction of the proposals those are to be implemented through appropriate approach.
- Preparation of proposals / their implementation can be:
 - Through **in-house efforts of PWDs** / local arrangements.
 - Through **variations to on-going consultancies**.
 - Through a **separate consultancy by clubbing** a few spots appropriately.
 - Through **contingencies of an ongoing work** on any near by NH (**need not be on the black spot stretch**) for preparation of proposal and / or its execution.

Rectification of Identified road accident black spots (Contd..)

Step by step approach (contd. ...)

- Through variation to ongoing contract for execution of the rectification proposals.
- Execution of the rectification proposals in minimum possible time is the priority.
- Where it is unavoidable, land acquisition/ utility shifting requirements for implementing the rectification proposals can be included in the proposal itself.
- Target should be accidents at the black spot stretch should be eliminated / minimized. Bottom line is preparation of detailed proposal through adequate survey / investigations.
- Accidents and fatalities are to be monitored for 3 calendar years after implementation of the rectification measures. For this, accident / fatality data of the spot is to be sent to RSCE.

Rectification of Identified road accident black spots (Contd..)

Clarifications

- After sending inspection report, preparation & furnishing of the detailed proposals with estimates can be progressed **without waiting for completion of inspection reports of all spots in the state/ UT.**
- After inspecting all spots consolidated brief details should be sent **in the format given in Annexure II to the above cited OM.**
- In case a particular spot falls in the jurisdiction of other agency like NHAI, NHIDCL etc., it can be stated so in the format of Annexure II and remaining columns can be left blank. Preliminary inspection report for such spots need not be sent by PWD/DGBR.

Rectification of Identified road accident black spots (Contd..)

Clarifications (Contd. ...)

- In case a spot falls in an on-going BOT or EPC project stretch within the jurisdiction of state PWD or DGBR, is the spot to be inspected ?
 - Yes
 - It is to be inspected as usual. Remedial measures required for rectification of the black spot are to be assessed.
 - It is to be further assessed if those measures are covered within the scope of such BOT/EPC project. If so contractor / concessionaire is to be addressed accordingly with a copy to RSCE.
 - If not necessary action to incorporate them through variation is to be taken.

Protocol for identification & rectification of road accident Black spots

Protocol

- Black spots which are short stretches where the **accidents /fatalities take place repeatedly** get created on the road network due to various reasons like
 - **Commissions & omissions in the developmental projects**
 - Changes in the road side environment
 - Changes in **developmental scenario** in the region
 - **Unplanned developments /unauthorized constructions** on/near the roads like advertisement boards, Poles, statues, buildings, trees, bushes etc.
- Therefore rectifying the black spots is a **continuous process**.

Protocol for identification & rectification of road accident Black spots

Protocol (Contd. ...)

- Are we serious about **systematically & continuously** identifying and rectifying the road accident black spots on different categories of roads ?
- If “yes”, we need a protocol for **identification, systematic rectification and monitoring of the effectiveness of remedial measures** for the black spots.
- **If “Not”, that is not an option.**
- A protocol has been notified for **identification of road accident black spots and their rectification** including follow up monitoring vide Ministry’s OM No RW/NH-15017/109/2015- P&M (RSCE) [New No: RW/NH-29011/02/2015- P&M (RSCE) dated 28-10-2015

Protocol for identification & rectification of road accident Black spots (Contd.)

As per protocol

- Road accident black spot is literally not a spot but is a **stretch of road**
 - Of **about 500 m length**
 - **Where Five accidents involving serious injuries/fatalities or Ten fatalities took place during the past 3 calendar years.**
 - Even single accident can have multiple fatalities. Hence **number of serious accidents at the same location** indicates problematic road / road environment than the number of fatalities.
- Schedule for Actions
 - **Furnishing details of road accident black spots** as per above definition based on data pertaining to a calendar year (Say 2015) to Transport Research Wing of MORTH by 31st March of the subsequent calendar year (31st March 2016).

Protocol for identification & rectification of road accident Black spots (Contd.)

As per protocol (Contd. ...)

- Analyzing and furnishing of firmed up details of the black spots to concerned authorities [to Road Safety Cell (Engineering) of MORTH in respect of NHs] by 31st May (31st May 2016 for the above example)
- Sanction of remedial measures at the identified black spots by 31st March of next to subsequent calendar year (31st March 2017 for the example given above)

Protocol for identification & rectification of road accident Black spots (Contd.)

- **Guide lines on implementing appropriate measures** for rectification of road accident black spots are circulated vide OM No RW/NH-29011/2/2015-P&M (RSCE) dated 07-12-2015.
- Balancing between requirement of reducing fatalities / accidents in **minimum possible time and minimizing wastage in dismantling of rectification works** carried out due to other improvement projects is the Key.
- We can always go the extra mile for the sake of safety and to **save precious lives which are getting lost in road accidents**

Protocol for identification & rectification of road accident Black spots (Contd.)

➤ Short term measures:

- In case the site conditions so demand or in cases where other improvement projects on the black spot stretch are likely to commence within one year, **short term measures are appropriate**
- These should be implemented within **3 months of identifying the black spot.**
- Short term measures may be measures like provision of road signs/markings at the black spot stretch, speed control measures, delineators removal of obstructions, repair of damages causing unsafe conditions on black spot stretch etc.
- If short term measures alone are required at a black spot stretch those can be met from the routine maintenance or can be included in a **combined proposal for permanent measures** at other black spots.

Protocol for identification & rectification of road accident Black spots (Contd.)

➤ Medium term (Interim) measures

- Adopted where other improvement projects are likely to take **one year or more** to commence on ground.
- These are framed as far as possible **within the available land**
- Medium term measures are the ones like **extra widening at curves, improvement of horizontal and vertical geometry, pedestrian facilities like foot paths, zebra crossings, improvement of junctions, signalization providing lighting etc.**
- These can be implemented in different ways through **variations, individual tenders or combined proposals for a few spots put together etc.**

Protocol for identification & rectification of road accident Black spots (Contd.)

➤ Long term measures

- Provision of service roads, bypasses, grade separated interchanges, vehicular & pedestrian under-passes/ over-passes etc.
- These can be adopted where no other improvement project on the black spot stretch is contemplated or where people would continue to use the proposed improvements even after the other improvement project is executed (For example on the existing NH stretch connecting the town/city after the bypass is constructed).

Road safety audits on National Highways

Road Safety Audits

- Road Safety audit and follow up action of redressing the identified safety concerns is a **more effective way of improving road safety** than handling isolated spots.
- Road safety audits **at different stages** and addressing the identified concerns is **part and parcel of all the EPC / BOT** projects.
- **Different stretches** of National Highways are **in different stages of improvement** under different projects / schemes.
- **Availability of base maps and data** for carrying out the audits also differs from stretch to stretch of a National Highway.
- **Assessment of status of road safety audit** and / or the availability of base map & data of all National Highways stretch by stretch is **essential before a programme of road safety audit** for the network **could be planned**.
- Detailed approach for furnishing the status of road safety audit details is circulated vide OM No RW/NH-15017/120/2015/P&M [New No RW/NH-29012/1/2015-P&M (RSCE)] dated 09-011-2015.

Road safety audits on National Highways

- **Any stretch** of National Highway may fall in any of the following categories
 - The stretch may be with other agency like NHAI or NHIDCL etc.
 - The stretch may be in on-going or recently (within last one year) completed EPC/BOT project
 - The stretch may be in the recently (within last one year) completed or on-going capacity augmentation project(i.e., either two laning or two laning with paved shoulders or four laning)
 - The stretch **may not have received any substantial improvement** like widening except strengthening or IRQ.

Road safety audits on National Highways

- Depending on **change of category** each NH is to be divided in to **stretches**
 - Availability of **base map or data for each** of the above category of stretches varies from each other.
 - Wherever the category changes it should be treated as a separate stretch and the details are to be given in relevant columns of Annexure - A of the above circular.
 - The above details are to be carried to Annexure - B along with other status details like 'whether a safety audit report is submitted in cases of EPC/BOT projects' , 'whether a safety audit is carried out for other than EPC/BOT stretches', 'whether any capacity improvement is being planned in near future'.

Road safety audits on National Highways

- Each stretch of NH which is not entrusted to a separate agency like NHAI / NHIDCL is to be assigned a alpha numeric number NNN-XX for their effective follow up and monitoring.
- NNN is a three digit serial number picked up for Non-NHAI & Non-NHIDCL stretches from Annexure - A. XX is a two letter code for the state / UT.
- After these details are received **homogeneous stretches can be grouped together and Road Safety Audits or Supplementary Road Safety Audits can be planned.**
- Availability of the base map and other data is an important consideration in carrying out road safety audit.
- Wherever data is not available or inadequate the same is to be supplemented through further data collection.

Road safety audits on National Highways

Carrying out Road Safety audits

- Road Safety Audit is **an important and serious activity** essential for achieving Road Safety.
- Road Safety Audit **requires basic details like base map and other road and traffic environment related data.**
- Wherever basic details are lacking, these are to be collected as part of Road Safety Audit.
- An **active client participation in Road Safety Audit activities** goes a long way in achieving the purpose of Road Safety Audit.
- Manual of Road Safety Audit i.e., IRC-SP:88-2010 is a basic document for Road Safety Audits.
- Certain additional aspects have to be followed while conducting road safety audits especially in Indian scenario which are brought out in Ministry's O.M. No. RW/NH-29012/1/2015-P&M(RSCE) dated 14.01.2016.

Road safety audits on National Highways

Carrying out Road Safety audits - Additional guidelines

- Road Safety Audit exercise has to take the client and client constraints along while closely pursuing the objective of achieving Road Safety through Road Engineering.
- Road Safety Audit **is to be carried out Kilometer-wise without leaving** any significant safety concerns.
- Safety recommendations need to **fit into the project financial and development context.**
- Adequate time is to be devoted to audit and report preparation.
- Several **alternate methods** are always available for **addressing the safety concerns** and optimum one **fitting in the project scenario** is to be selected / recommended.
- Road Safety Audit **is not a fault finding exercise** but is an **independent third person review of safety aspects** of the detailed road stretch .

Road safety audits on National Highways

Carrying out Road Safety audits - Additional guidelines (Contd. ...)

- Road Safety Audit report should be a well reasoned and explained report to facilitate decision making.
- Two way interaction between Audit Team and the Client/Design Team while preserving independent and unbiased approach of the Audit Team is required to achieve the intended safety objective.
- Safety Audit report does not yield an executable remedial action proposal. It only gives the suggestions and approach for addressing different concerns.
- A separate design consultant team has to work on and convert the recommendations of the audit into executable proposals with cost estimates.
- Even for a capacity augmentation on existing roads (traffic plying on road during construction), formal declaration of commercial operations of improved roads is required after safety audits/rectification of the concerns is completed.

Road safety audits on National Highways

Carrying out Road Safety audits - Additional guidelines (Contd. ...)

- Safety Audits are **to be carried out even for existing roads** where capacity augmentation is neither in progress nor in contemplation.
- Safety Audits are to be carried out for **capacity augmentation projects of 5 km or more.**
- Safety Audits can be carried out at feasible stage, DPR stage, during construction and pre-opening stage.
- **DPR stage Audit is the most important one which yields maximum benefit** towards roads safety.
- Capacity improvement (widening) **projects of 50 km or more should be audited in two stages**, DPR stage and pre-opening stage.
- Audit team should have **minimum 2 Auditors** with one of the Members being Team Leader.

Road safety audits on National Highways

Carrying out Road Safety audits - Additional guidelines (Contd. ...)

- Road Safety Auditors should be well experienced in highway design / construction, traffic engineering, road safety and safety auditing.
- Systematic **documentation** is an important requirement in the entire exercise of the road safety audit and its follow up.
- Road Safety Audit Team should take **responsibility** for carrying out professional road safety audit with due diligence.
- Road Safety is an objective which **can be achieved only through collective actions** and not by one or two individual efforts.
- **Let us hope that road engineering in due course does not leave anything in the area of road safety unattended.**

Thank you