

Revolutionizing Road Infra with Modern Equipment, Technologies, Sustainable Materials and Policy Guidelines

February 29th - March 1st, 2024, Manekshaw Centre, New Delhi

NHAI Road Safety Initiatives To Enhance Safety of Road Users

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**International Road Federation
India Chapter**

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Presentation Flow

1. Highway Implementation Mode
2. Proactive Approach Towards Road Safety
3. Reactive Approach Towards Road Safety
4. Capacity Building
5. Road User Empowerment
6. Safety Awareness



Highway Projects Implementation Mode

- BOT Mode i.e. Public Private Partnership
- Hybrid Annuity
- EPC
- TOT Mode (Toll Operate Transfer)
- O & M Contract



Proactive Approach towards Road Safety



Safety Has been Made Part of the Process: DPR Design

□ DPR Design Quality Improvement

- **Schedule A:** Provide Complete Existing Features Details such as Carriageway, Intersections, Bridges, etc.
- **Schedule-B:** Detailed description of each design aspects, Construction Safety Items included in to enhance work zone safety
- **Schedule -C:** Detailed Safety Items included such as signs, markings, safety barrier, impact attenuators, lighting, Intelligent Transport System (CCTV, Speed Detection),etc.
- **Schedule D:** Referred As Specifications, Attach all Circulars in Schedule- D as referred in Schedule B & C



Safety Has been Made Part of the Process: DPR Design

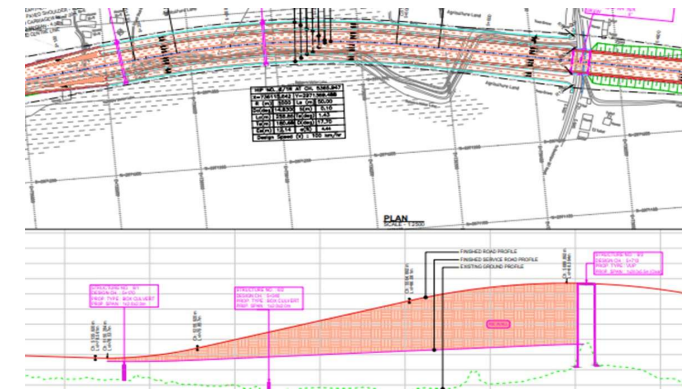
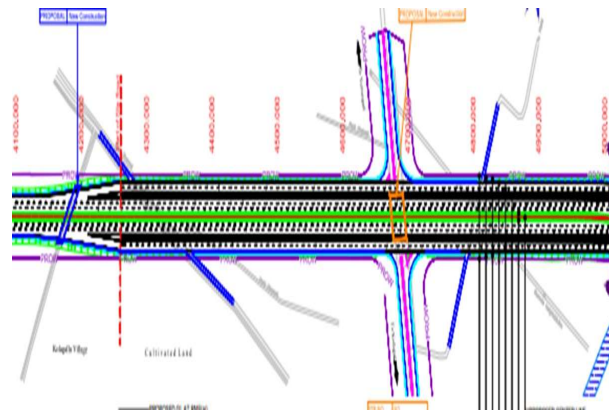
Design of Vertical Alignment with Intermediate Sight Distance (Desirable Minimum Sight Distance)

Summit & Valley Curves shall be designed for ISD

Flush and Depressed median shall be provided with 0.6m paved edge strip towards median side

Retaining Wall/ RE Wall shall be provided full height on (VUP/LVUP/SVUP)

Interchange/ Intersection Layout, Entry/Exit, Right Turning Lane, U-Turns, Geometric Design and Cross Sections of Intersections shall be included in Annexure to schedule-B.



Safety Has been Made Part of the Process: DPR Design

Sr. No.	Location at km	Skew Angle	Footpath Width (m)	LHS Footpath Chainage		RHS Footpath Chainage		Remarks
				From	To	From	To	
1	ROB@ 1+944							
2	MIB @ 2+857							
3	MJB@ 26+494							

Drainage Arrangement Details Chainage Wise

- i. Median/Separator Drains
- ii. Roadside Drains
- iii. Chutes Drains, their section and Spacing
- iv. Structures Drainage Arrangement
- v. Drainage for Underpass and Subways Structures
- vi. Drainage Arrangement of Retaining Structures

Safety Has been Made Part of the Process: DPR Design

□ Workzone Traffic Management Provision

Sr. No.	Design Chainage (Km)		Construction Activity	Diversion	Traffic Management Plan	Barricading Type - III/IV/CC Barrier with lighting along barrier	Deployment of Flagman in Habitation/ Schools/ Hospital, etc.	Remarks
	From	To						
			Widening of Pavement					
			VUP					
			Bridge Widening					

Safety Has been Made Part of the Process: DPR Design/**Signs**

S.No.	Signs	Carriageway (Left, Right, Both)
1	Overhead Gantry signs	Both
a	Start of Project	
b	End of project	
c	Toll plaza location on both side	
2	Overhead Cantilever Gantry signs	Either left or Right
a	At all major locations of crossroads i.e NH, SH, MDR (start of grade separated structure/at grade interchange)	Either left or Right
b	At major trauma center, roads leading to religious places or any other important location	Both sides
3.	Double/Butterfly Cantilever	On Gore Area of Exit Locations of Access Controlled Highway/Expressway

Safety Has been Made Part of the Process: DPR Design/ **Safety Barrier**

S.No	Item	LHS		RHS		Total Length (m)	Remarks
		From	To	From	To		
1	W-beam Single faced metal crash barrier						
2	Thrie-beam Single faced metal crash barrier						
3	Wire rope safety barrier						
4	W-beam Double faced metal crash barrier						
5	Thrie-beam Double faced metal crash barrier						
6	Concrete Single faced barriers						
7	Concrete Double faced barriers						
8	Pedestrian guardrails						
9	End Treatment for Steel Barriers						



Barrier Installed Confirming to Performance Tests



Safety Has been Made Part of the Process: DPR Design

Traffic Impact Attenuators

S. No.	Item	Chainage / Number	Remarks
1	On flyover/grade separated structure at exit from main carriageway		
2	On Island of Toll Plaza		
3	Any other location which Safety Hazard		

End Terminals

S.No.	Item	Chainage / Number	Remarks
1	Culvert Ends		
2	Structures Ends		
3	Any other location which Safety Hazard		

Safety Has been Made Part of the Process: DPR Design/ Pedestrian Facilities

S.No	Pedestrian facilities	Chainage		Side	Remarks
		From	To		
1	Pedestrian guardrails shall be 150 mm from Carriageway/Paved Shoulder i. Hazardous Locations on Straight Stretches ii. At Junctions/Intersections iii. Schools iv. Bus Stop/Railway Stations v. Overpass, Subway vi. Central Reserve				
2	Footpath paving including fixing of Tactile pavers				
3	Pedestrian Crossing i. With Zebra Marking ii. With Tabletop Crossing iii. At Intersections iv. At Schools				

Safety Has been Made Part of the Process: DPR Design/Lighting

S.No	Lighting facilities	Chainage		Side	Lighting Source: Electricity Board/ Generator/ Solar
		From	To		
1	Toll Plaza area				
2	Rest Area				
3	Truck lay-bye: The entire area of truck lay-byes and 50m length of the project				
4	Bus Bay & bus shelter locations				
	Grade separated structures, interchanges, flyovers, underpasses (vehicular/ pedestrian) and Vehicle overpasses. The top and underside of the grade separated structures including service road/ slip road, interchange area at the ground level up to 50m beyond the point from where flaring of the main carriageway takes place				
6	Built-up sections on the project highway both in the median of main carriageway and on the service roads on both sides				
7	On Median Openings provide 1 nos. high mast lighting of 25m height				
8	On Major Bridges and its approaches higher than 3m				

Safety Has been Made Part of the Process: DPR Design/ **ATMS**

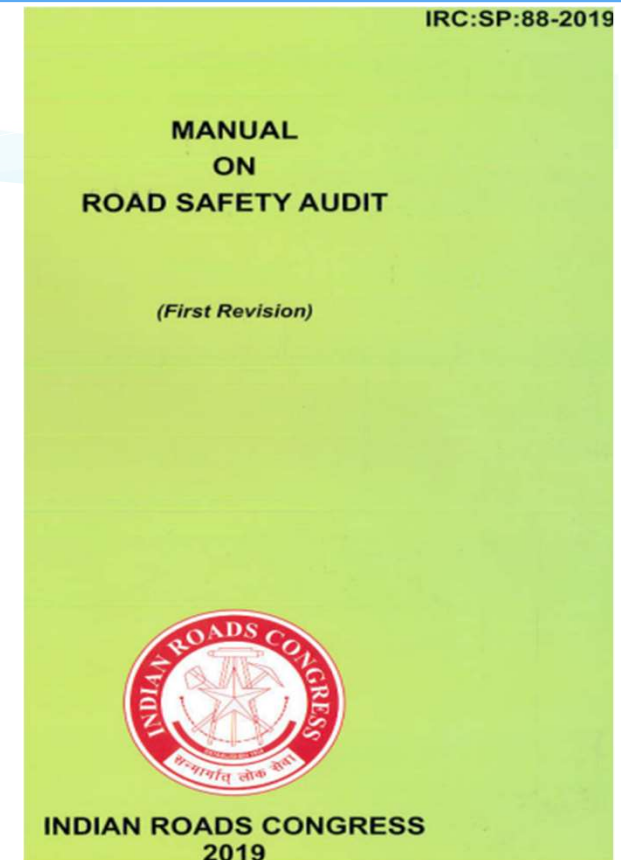
- ❑ NHA Policy Circular No 11.53/2023 dated 10th October, 2023 for ATMS
- ❑ Functional and Technical Specifications of ATMS Solutions & its Sub-systems has been given as follows:
 - (i) Video Surveillance System / Traffic Monitoring Camera System (TMCS)
 - (ii) Video Incident Detection and Enforcement System (VIDES)
 - (iii) Vehicle Actuated Speed Display System (VASD)
 - (iv) Fixed and Portable Variable Message Sign (VMS) System
 - (v) Communication Network with OFC Backbone
 - (vi) Emergency Call Box*
 - (vii) Mobile Radio Communication System*
 - (viii) ATMS Command & Control Center with ATMS Software
 - (ix) Power Supply for Field Equipment as well as for ATMS Command & Control Center

** The requirement may be assessed by RO/PD as per site conditions and scope may be included/deleted*



Safety Has been Made Part of the Process: **Road Safety Audit Policy**

- NHA has notified a **Road Safety Audit Policy** vide Circular No 12.26/2022 dated 27th May, 2022 for undertaking safety audit of highways implemented under any mode at the planning, construction and O&M stages.
- Through this policy, the procedure for carrying out **Road Safety Audit** has been laid down in consonance with **IRC SP-88** and responsibility has been earmarked for all stake holders for facilitating the audit and also for implementing the recommendation of Safety Audit.



Empanelment of Independent Road Safety Auditors

- **94 Teams of Road Safety Consultants empaneled**
- Empanelment of Safety Auditors is a continuous Process
- Each team has one Road Safety Auditor cum Team Leader and one Traffic Planner
- RSA to be done during DPR/design, Construction and O&M stages
- Road Safety Audit is conducted of Projects Implemented on various mode

Deployment of Road Safety Auditors

- NHAI has centralized system (Road Safety Division) to engage road safety auditors by adopting roster mechanism at fixed cost per km
- Three verticals viz DPR, Construction and O&M will be created for awarding projects on Roster Basis
- New empanelment document based on new criteria will be floated shortly to have new empanelment and till that time current empanelment will remain in vogue.



Road Safety Audit Mobile App

- ❑ Safety Audit Mobile App developed by NHAI In-house
- ❑ Safety Auditor conducts on site safety audit and observations gets uploaded in data lake real time
- ❑ Audit Observations Compliance Process
 - PD/RO,
 - Implementation confirmed by AE/IE
 - Finally Implementation Approved by PD/RO
- ❑ No Audit Observation can be deleted and compulsorily have to be complied
- ❑ Regular review by Road Safety Division at Hq



Audit Details
NHAI_ATTENDANCE

Chainage From* Chainage To
Chainage From Chainage To

Safety Issue* --Select--

Sub Category* --Select--

Road Side* --Select--

Roadway* --Select--

Observation

Risk* --Select--

Recommendation

Priority* --Select--

Safety Audit During DPR Design Stage

- ❑ Appointment of Independent Safety Auditor along with DPR Design Consultant of each Project
 - **Safety Audit of reports submitted by DPR Consultants in 5 stages**
 - Inception Report(Planning Proposals by DPR Consultants)
 - **Accident (e-DAR/iRAD) Data on exiting road in last 3 years and give recommendations for DPR design**
 - Safety Audit of feasibility report
 - Safety Audit of DPR Report
 - Safety Audit of Technical Schedules
 - **DPR Consultant to give certificate of compliance of safety observations**

Safety Audit During Construction and O & M Stage

❑ Construction Stage

❑ Appointment of Independent Safety Auditor along with Appointment of Contractor/ Concessionaire

- **Development Stage Safety Audit of Designs submitted by Contractor/ Concessionaire**
- Check compliance of Audit Observations by Contractor/ Concessionaire in designs and at site
- Construction stage audit @4 months to check work zone safety by Contractor/ Concessionaire

❑ Pre-Opening/Completion Stage Safety Audit

- Independent Safety Auditor to conduct Safety Audit before issue of provisional completion certificate
Safety Inspection by AE/IE along with PD to ensure Compliance of Audit Observations

❑ Operation and Maintenance Stage Safety Audit

- Independent Safety Auditor to conduct Safety Audit
- Accident Analysis and suggesting mitigation measures
- Check Compliance of safety audit observations




Monitoring of Safety Audit Implementation

- To ensure implementation of recommendation of Safety Audit, a web based application (Data Lake) has been developed at NHA
- The safety reports are being uploaded by the safety consultants on Data Lake
- Safety Audit reports are being monitored for implementation at NHA field office, NHA Regional office through this application, which generates exception reports in case of non-compliance

Further, following actions are also being taken by Road Safety Division (Hq):

- (i) Data of the physical progress (65-75%) of under construction projects is being extracted on monthly basis from data lake and letter is being issued to all ROs, sensitizing timely conduction of pre-opening audit and compliance of the observations in time bound manner
- (ii) RO wise data of observations pending for compliance of the road safety audit at every stage is being extracted from the Data Lake on quarterly basis and directions issued wherever compliance pending





Reactive Approach towards Road Safety



Mitigation Measures on Blackspots & Financial Delegation to RO/PD

Short Term Measures

➤ Such as cautionary sign boards, bar markings, rumble strips, speed calming measures etc.

Comprehensive Guidelines

➤ NHAH has framed comprehensive guidelines for rectifications of Accident Prone Locations and Black spots Power has already been delegated to RO and PD

- **vide circular # 12.25/2022 dated** April 12, 2022 for taking both short term and long term measures for MoRTH identified blackspot upto Rs 500 million per blackspot to RO and Rs 2.5 million to PD
- **vide circular # 12.33/2023 dated** June 6, 2023 for taking short term measures for other vulnerable/accident spots upto 1 million to PD and upto Rs 2.5 million to RO

Long Term Measures

- Construction of flyovers, under passes, Junctions improvements, road widening, etc.
- There is also provision of appointing safety consultants for investigation and devising rectifications measures.

Power To RO's

- NHAH has also delegated powers to ROs for providing safe crossing facilities for Pedestrians
 - Foot over Bridge (up to 2.25 Cr. for 4-Lane & Rs. 2.75 Cr. for 6-Lane & above)
 - Pedestrian Underpasses/Subway (up to 25 Cr.).



Monitoring of Rectification of Black Spots

01

Web Based Portal

Developed a web-based blackspot monitoring portal integrated with Project Management Software (PMS/ Datalake)

02

Updates of black spots

Exploring this portal enables on-line update of blackspot rectification status

03

GIS enabled

This portal also has GIS features where blackspots are displayed on the map with rectification status.

04

Video conference

Video conference meeting held on regular basis with ROs and PDs to discuss progress and related issues.

Black Spot Rectification Before/After Monitoring

Post Rectification



Capacity Building



Capacity Building

- ❑ **230 no. NHA officers** at the level of CGM, GM, DyGM, Manager & Dy Manager have attended 15 days Road Safety Certification course at IAHE, IIT Delhi, CRRI, VNIT Nagpur and NATPAC, Kerala
- ❑ **Road Safety Officer** (Must have completed 15 days Road Safety Certification course) has been appointed in each RO Office to review and make **Independent site inspections for Safety Audit Compliances**
- ❑ Road Safety Officers have been further imparted **Special Safety Training at Centre of Excellence at IIT Madras**
- ❑ **Regular Safety Presentation to NHA officers** such as recently on NH 67 2022
- ❑ **Safety Auditors training for use of NHA One APP** for conduction on site safety audit
- ❑ **DPR Consultants Workshop for Quality Improvement of DPR to incorporate Safety Items**
- ❑ **IE/AE, Project Managers Workzone Safety Workshops to Improve Construction Stage Safety**



Road Safety Mobile App Hands on Training to Safety Auditors



Workshop With DPR Consultants for Quality DPR Preparation

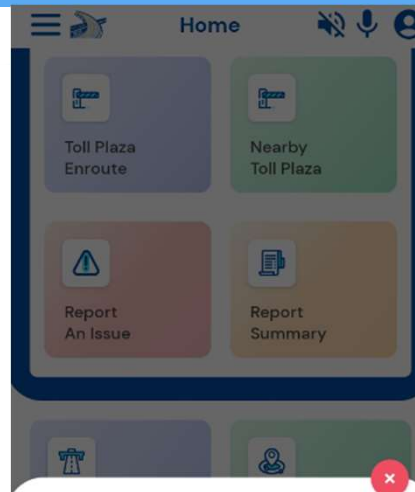
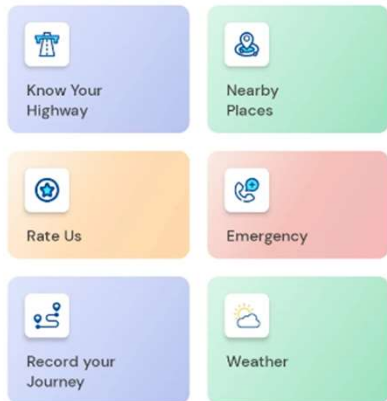
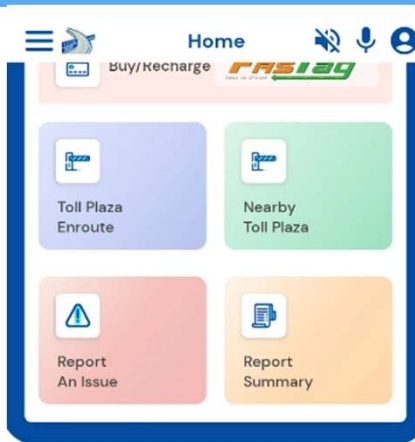




Road User Empowerment

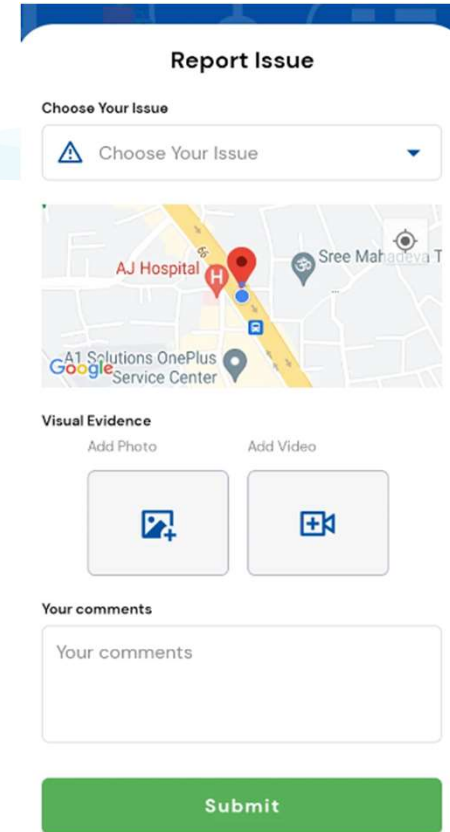
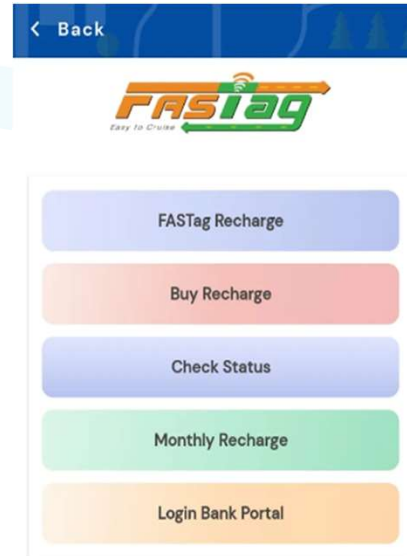


Raj Marg Mobile App



Emergency Contacts

- Highway Assistance 1033
- Emergency Contact 7403732452
- Police Assistance 112
- 112 India App





Safety Awareness Among Road Users



Major activities undertaken in Road Safety Week by NHA

• Events conducted in Delhi such as Essay Writing, Poster Making Competition, Exhibition, Walkathon & Fire Side Chit Chat at Indian Agricultural Research Institute, Pusa along-with Nukkad Natak & Mass Awareness event at various places were organized by FICCI.

Activities undertaken at Field units (RO/PIU, Toll Plaza, Habituated Areas, Education institutes etc.

- Display of Banners/Distribution of Pamphlets
- Health cum eye check-up camps for heavy vehicle drivers.
- Educational drive - Stop wrong side driving, Follow lane discipline and traffic rules etc.
- Road signage/lane marking, delineators, crash barriers and guard rail etc. to be checked.
- Checking Drives - Overloading, Over-speeding, unauthorized parking, drunken driving, etc.
- Checking/Installation of Retro reflective sheet/tapes on truck, tractor-trolley, animal cart, etc.



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Safety audit of 19,300 km of national highways completed till Dec

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1 दरभंगा



सड़क सुरक्षा सप्ताह के तहत चलाया जागरूकता अभियान

मौढिया दर्शन/ मनीगलो संवाददाता दरभंगा सड़क सुरक्षा सप्ताह के अवसर पर मंगलवार को एनएस-57 राजे स्थित टोल प्लाजा पर यातायात नियमों के पालन करने के लिए वाहन चालकों के बीच ए.ए.सी एस कंपनी की ओर से जागरूकता अभियान चलाकर यातायात नियमों के पालन की खाता दी गई। कंपनी के कर्मियों ने यातायात नियमों के पालन से होने वाली सुरक्षा में बाधा बनाने में निषिद्ध बस से हेल्मेट पहनने तथा राइब पीकर गाड़ी नहीं चलाने की सलाह दी गई। इस दौरान



यातायात नियमों का पालन करने वाले वाहन चालकों को गुलाब का फूल और गुलदस्तों में डेट कर उपज्जल भविष्य की कामना की गई। तथा

कता अभियान के दौरान राष्ट्रीय राजमार्गों के किनारे स्थित ग्राम पंचायतों में यातायात नियमों की जागरूकता के लिए नुककड़ नाटक के माध्यम से लोगों को जागरूक करने की सलाह दी गई। साथ ही राष्ट्रीय राजमार्ग से होकर गुजरने वाले घाटी बसों में यातायात नियमों को संबंधित केन्द्र पोस्टर एवं फ्लेक्स लगाकर लोगों को यातायात नियमों के पालन के प्रति जागरूक करने अभियान चलाया गया। इस अवसर पर टोल प्लाजा मैनेजर पुष्कर तिवारी ने बताया कि सड़क परिवहन एवं

राजमार्ग मंत्रालय भारत सरकार के निर्देशानुसार 11 जनवरी से 17 जनवरी 2023 तक सड़क सुरक्षा सप्ताह 2023 का आयोजन किया जा रहा है। तब आय मार्गों पर वाहन चालकों में यातायात नियमों के पालन के प्रति जागरूक किया जा रहा। उन्होंने कहा कि सड़क दुर्घटनाओं में अधिकांश मौतें दो पहिया वाहन चालकों की हेल्मेट नहीं लगाने के कारण हर में संधीर चोट अनेक बार पहिच वाहन चालकों में खीट बेल्ट नहीं लगाने के कारण होती है इस अभियान में दो पहिया

वाहन चालकों को हेल्मेट धारण करने और चार पहिया वाहन चालकों को खीट बेल्ट लगाने के लिए प्रेरित करने के लिए किया जा रहा है। इसके साथ ही सुधारियों को भी यातायात नियमों से संबंधित पंचनेट वितरण कर नियमों का पालन कर वाहन चलाने के लिए निर्दिष्ट किया गया। इस मौके पर एजीएम महेग मिश्रा, टोल मैनेजर पुष्कर तिवारी, सहायक मैनेजर हरे राम यादव, सुरक्षा मैनेजर राजेश कुमार अर्जुन सम्पद शील कई अन्य लोग मौजूद थे।

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Driver's Safety Awareness and Annual Health Checkup





Thank You!

