



PROCEEDINGS OF 1ST NATIONAL CONFERENCE ON TRAFFIC TECHNOLOGIES

The first, **02-day National Conference on Traffic Technologies** was organised on **21st and 22nd February, 2019** at Central Academy for Police Training (CAPT), Bhopal under the guidance of DG and ADG, BPR&D. The objective of this Conference was to enhance coordination among various organizations and agencies which are directly or indirectly responsible for Road Safety and Traffic related issues. About, 150 delegates including Senior and Middle rank Police Officers from States/UTs, NGOs, Academicians from Universities, IITs and OEMs participated in the Conference. The Conference was inaugurated by **Shri Sudhi Ranjan Mohanti**, IAS, Chief Secretary, Govt. of Madhya Pradesh in the presence of Shri Purushottam Sharma, IPS, SDG (Traffic) MP Police, Shri Karuna Sagar, IPS, IG BPR&D, New Delhi and Shri Pawan Srivastava, IPS, Director, CAPT Bhopal & delegates. Shri Surendra Singh, IPS, Ex-DGP, MP Police was the Chief Guest during the Valedictory Session.

2. The following Panellists/ Guest Speakers were invited to share their expertise and experience during the Conference:

- a) Dr. M A Saleem, ADG, Crime and Technical Services, Karnataka Police
- b) Shri Taj Hassan Mohd, Spl Commissioner, Delhi Police
- c) Prof. Geetam Tewari, IIT Delhi.
- d) Shri Ramandeep Chowdhary, Deputy Secretary, MoRTH, New Delhi
- e) Dr. Nezamuddin, Asst. Professor, IIT Delhi
- f) Mr. H.M. Naqvi, CGM (Tech-RSC) NHAI
- g) Prof Ashish Verma, IISc Bengaluru
- h) Dr. T S Reddy, Senior Consultant (T&T), LEA Associates, New Delhi
- i) Prof. Sidharth Rokade, Maulana Azad National Institute of Technology - [MANIT], Bhopal, Madhya Pradesh
- j) Dr Mridul Bhasin / Sh. Shantanu Bhasin, Muskan Road Safety, Jaipur

- k) Shri Anil Amar, Sane Driving Pvt. Ltd.
- l) Miss Bivina G. R./ Dr. M. Parida Gupta A, IIT Roorkee
- m) Dr Pawan Bhardwaj, Joint Assistant Director, NCRB, New Delhi
- n) Shri C. H. Nataraj Kumar, CEO, Mother Technologies Project Ventures.
- o) Shri Shailendra Singh, M/s Ernst & Young, New Delhi
- p) Shri Shamendra Singh, M/s Vehant Technologies, Noida
- q) Shri Keshav Murti, Volvo & Eicher
- r) Shri Ajay Gupta, Volvo & Eicher
- s) Shri Jasvinder Grewal, Oracle
- t) Shri Neeraj Kushwah, Director, M/s Technosys System Pvt Ltd, Bhopal

3. The Following topics related to Traffic Technologies, solutions for implementation of effective Traffic management and road user safety were covered in different sessions during the two day Conference:

DAY 1

INAUGURATION

SESSION 1: TRAFFIC MANAGEMENT

SESSION 2: ROAD SAFETY AUDIT & ROAD USER BEHAVIOUR

DAY 2

SESSION 3: ROAD DESIGN & ENGINEERING

SESSION 4: TECHNOLOGY & ENFORCEMENT

SESSION 5: POLICY FRAME WORK AND BEST PRACTICES

VALEDICTION

PROCEEDINGS

Day-01:- 21st February, 2019 (Thursday)

4. The introductory address was delivered by **Shri C P Saxena, DIG, CAPT, Bhopal**. He gave an overview of the Conference and highlighted the importance of use of technology for Traffic Management and Road User Safety.

5. **Shri Pawan Srivastava, IG/Director, CAPT, Bhopal, BPR&D** delivered the welcome address. He welcomed the Chief Guest, Dignitaries/Guest Speakers and all the participants on

behalf of the BPR&D in the first such National Level Conference on Traffic Technologies. He informed about the establishment of CAPT, Bhopal, its mandate and functioning. He also informed that BPR&D has already planned to set up a **National Centre for Traffic Technologies in CAPT, Bhopal**. The Centre will focus on capacity building in terms of training, technology, policy imperatives and exchange of best practices at national as well as global level. He further informed that this Conference is being organized as a first step in initiating this Centre. During this conference, many of the important subjects such as Policy Framework & Institutional Framework, Technology & Enforcement, Road Design & Engineering and other subjects related to traffic management will be deliberated.

6. **Shri Purushottam Sharma, SDG (Traffic), PTRI, Madhya Pradesh** addressed the participants and stressed upon the importance of use of technology in management of Traffic, use of e-challan etc. to mitigate the problems faced by traffic police in traffic management. He also informed that various initiatives such as Speed Violation Detection System (SVD), E-Challan System, Variable Message Sign Boards etc. have been implemented by Traffic Police, Bhopal, Madhya Pradesh.

7. **Shri Sudhi Ranjan Mohanti, IAS, Chief Secretary, Madhya Pradesh** inaugurated the conference. In his keynote address he appreciated CAPT, BPR&D for organizing this Conference. He expressed that over a period of time, Road Safety and Traffic Management has become a big challenge for Traffic Police. Despite many efforts by State Police this issue still remains unaddressed. He also highlighted various issues affecting traffic management and road safety. He emphasized on use of technology in traffic management such as e-challan, ITMS, Modernization of Police i.e. Smart Policing. The State Police should make coordinated efforts towards enforcement part as well as education of road users. He said that priority should be given by providing sufficient budget for construction of road, procurement of modern equipment, technology. He also assured that MP State Govt. will provide all the required support to CAPT Bhopal.

8. **Shri Karuna Sagar, IG/Director (Modernization), BPR&D**, presented vote of thanks to the Chief Guest for sparing valuable time to address the participants. He also expressed gratitude for all the speakers and delegates for participating in the Conference. He expressed that road safety and traffic related issues are increasing as well and becoming critical problem not only in India but also globally. This statement is strengthened by the data that, every year more than 2.5 million people die in road accidents across the world and in India this figure is more than 1.5 lakh. During the last couple of decades, metropolitan cities like Delhi, Kolkata, Bengaluru, Chennai, Mumbai and Hyderabad etc. have experienced rapid urbanization, unprecedented growth in commerce & employment which leads to exponential growth of vehicles but lacks commensurate growth of road

infrastructure. It is a matter of great concern that the road accidents are one of the four leading causes of deaths in India. He further stressed that in the era of technology, we have to keep ourselves abreast with latest technologies which can help us in ensuring enforcement measures effectively for traffic management and road safety. This Conference is a step towards the establishment of National Centre for Traffic Technologies at CAPT Bhopal. Such Conferences will also be held in future to discuss and address traffic management and road safety related issues. Lastly, he expressed that the initiative of BPR&D will go a long way in providing a common platform for all the stakeholders to discuss and address the traffic related issues in an efficient and effective manner.

9. The Summary of the Conference Proceedings is as follows:

Session-I: “Traffic Management”

Topic: “Urban Traffic Management, Traffic Regulatory Measures”

CHAIR / SPEAKER: Dr. M A Saleem, IPS, ADG, CTS, Karnataka Police

During the session Dr. M A Saleem mentioned that Traffic Management has emerged as the most challenging task for Police in cities and urban areas. Though a multi-agency responsibility, very often only the Police is blamed for chaotic traffic on roads and increase in road accidents. He also explained about the reasons behind the traffic problems in India, slow growth of transport infrastructure, poor urban traffic planning, zero parking infrastructure and unregulated parking. Indiscipline among road users is leading to traffic congestion, bottlenecks, air pollution, noise pollution and road accidents leading to death & traumatic injuries. During the session he suggested the following steps for better traffic management:

- a) Integration of Land use and transport planning
- b) Priority to the use of public transport
- c) Unified Traffic Management Authority
- d) Parking Management and Traffic Regulatory Measures
- e) Use of Cleaner technologies for Pollution Control
- f) Encouragement to non-motorized transport and pedestrian facilities.
- g) Greater emphasis on educating road-users
- h) Focus on Technology Driven Traffic Enforcement
- i) Early enactment of Motor Vehicle (Amendment) Act
- j) Integrated Road Safety Mechanism
- k) Restrictions on turning movement and one-way street, Tidal flow operations

- l) Exclusive Bus-Lanes and Closing side-streets
- m) Peak hour traffic management and Traffic calming measures

Topic: “Highway Traffic, Parking Management and Traffic & Road Safety Education”

Speaker: Prof. Ashish Verma, IISC, Bengaluru

Prof. Ashish Verma, IISC, Bangalore delivered presentation on highway traffic, parking management, traffic & road safety elements. He gave a broad picture of road accidents in India and highlighted the reasons behind the accidents. He explained transportation system in India is affected by environment, vehicles and road user (pedestrian, cyclist etc.) In his recommendation he suggested that high order skills such as the safe driving attitude, responsibilities of drivers, awareness against speeding & drunken driving were found to be the critical parameters in grooming a driver as “Safe Driver”. He suggested following steps for road safety and traffic management:

- a) Creation of forgiving roadside environment.
- b) A significant proportion of intersection crashes involve right-turn manoeuvres. Older drivers in particular run the greatest risk of being involved in right turn accidents, due to their diminished ability to judge closure rates of incoming vehicles. Using alternative intersection designs for right-turn lanes can help alleviate this problem.
- c) Adding protected right-turn phases can also assist drivers in turning movements and advanced guide signs that are placed in conspicuous locations.
- d) Large pavement markings and scribing path markings for multiple turn lanes.
- e) Using larger 12 inches signals or beacons and using pedestrian refuge islands where required.
- f) Reducing size of dilemma zone with appropriate amber-phase timing or advanced detection
- g) Ensuring that the intersection is free of visual obstructions
- h) Avoiding permissive right-turn on-red when intersection skew angle is less than 75 degrees; and Ensuring crosswalks are easily visible with high visibility markings and/or beacons.
- i) He further suggested to give more stress on some road safety areas:
 - i. Reduce frequency and severity of intersection conflicts through traffic control and operational improvements-
 - Employ multi-phase signal operation and optimize clearance intervals
 - Restrict or eliminate turning manoeuvres (including right turns on red), Employ signal coordination
 - Employ emergency vehicle pre-emption

- Improve operation of pedestrian and bicycle facilities at signalized intersections and remove unwarranted signal
- ii. Reduce frequency and severity of intersection conflicts through geometric improvements
 - Provide/improve left and right -turn channelization
 - Improve geometry of pedestrian and revise geometry of complex intersections
- iii. Improve sight distance at signalized intersections
 - Clear sight triangles, Redesign intersection approaches
- iv. Improve driver awareness of intersections and signal control
 - Improve visibility of intersections on approaches, signals and signs at intersections
- v. Improve driver compliance with traffic control devices
 - Provide public information and education
 - Provide targeted conventional enforcement of traffic laws
 - Implement automated enforcement of red-light running (cameras) and approach speeds (cameras), Control speed on approaches
- vi. Improve access management near signalized intersections
 - Restrict access to properties using driveway closures or turn restrictions and cross-median access near intersections
- vii. Improve safety through other infrastructure treatments
 - Improve drainage in intersection and on approaches
 - Provide skid resistance in intersection and on approaches
 - Coordinate closely spaced signals near at-grade railroad crossings
 - Relocate signal hardware out of clear zone
 - Restrict or eliminate parking on intersection approaches

Driving License Procedure : Prof. Ashish Verma also suggested the following amendments in the present driver licensing system:

- Driver education program/ course must be introduced into the current Indian Licensing Procedure as a compulsory requirement to obtain a driving license.
- This course must be conducted in all the identified Driving Training Centres as a compulsory part of the training program.
- Certified program must be strictly conducted for a period of 30-45 days well before the learners are allowed for the next stage in the driver training program.

- Impact assessment of the driver education program to ensure effective participation of the drivers/learners.

Parking Management: Prof. Ashish Verma gave following suggestions on parking management:

General Measures

- On-street parking regulations, parking stands for rickshaws, bicycle parking, and Park & Ride Facilities
- Parking policy intervention and enforcement,
- Multi-level parking complexes integrated with shopping plazas
- Parking policies for residential areas, Differential Parking fee
- A transitional strategy - combination of short-term & long-term measures; short-term measures that cater to the prevalent demand and long-term measures that simultaneously prepares a platform to bring down the demand.
- Integration of parking management with implementation of technology (ITS) to ensure effective results.
- Traffic calming measures to ensure effective space utilization
 - One-way roads, Restriction to entry of commercial goods vehicles, Alternate day parking
- Alternatives to Parking provision within residential developments
- Shared Parking and Remote Parking and Shuttle Service

Topic : “Use of Public Transport”

Speaker:-Dr. T. S. Reddy, Senior Consultant (T&T), LEA Associates South Asia Pvt. Limited

Dr. T. S. Reddy, Senior Consultant gave presentation on long term public transport strategy for Hyderabad Metropolitan Area. In his presentation he gave transportation system prevailing in major metropolitan cities of world such as Shanghai Metro Transport system, London Underground (Tube), Tokyo Metro System and Hyderabad Metropolitan system.

He gave an overview about how to include data collection analysis, traffic demand analysis & modeling. In his long term transportation plans-2041, various components of long term transport plan have been prioritized and proposed for implementation for various phases. In his recommendation he emphasized on implementation of “Spoke and Wheel” concept of Bus Route.

Topic: “Integrated Traffic Management system & e- Challan system”

Speaker: Sh. Neeraj Kushwaha, Director M/s Technosys System Pvt Ltd, Bhopal

Shri Neeraj Kushwaha gave a presentation on Integrated Traffic Management System (ITMS), a part of Bhopal Smart City Development Corporation Limited (BSCDCL) initiative. BSCDCL has taken up a project for smart traffic management which provides greater information to the authorities to proactively manage the on-going traffic situation, enhance traffic discipline through effective enforcement and increase road safety by preventing accidents and allowing citizens to make informed travel choices. In order to implement ITMS services following technologies solution are proposed:-

i) Speed Violation Detection

- Capture license plate of vehicles violating traffic rule
- Traffic light violation, Traffic signal monitoring and raise alarm if signal do not change after assigned time
- Vehicle stopping on road,
- Vehicle moving wrong way

ii) Over Speed Monitoring

- Vehicle Over Speed Detection, violation detection with evidence
- Separate Speed Limits for 2 & 4 wheelers, Camera Based System
- Camera+Radar Based System

iii) No-Helmet Monitoring

- Detection of No-Helmet (Driver and Companion)
- Helmet Standard Training

iv) Variable Message Sign Boards , Public address system,

v) E-challan system

- Generate challan for valid violation
- Integration with RTO database
- Auto email challan, Challan online payment portal, Challan payment tracker

Question raised by the participants: How we will identify vehicles if number plate is not as per specified standards in ITMS?

Answer by the Speaker: We are working on the same issues and soon it will be integrated in next phase of system. However, presently same is addressed with the help of hurry calls. Director CAPT, Sh. Pawan Srivastava added to this that with the help of software designed to recognize faces this can also be done. He added that ITMS can further be improvised to help in crime control, if we can integrate it with AADHAR data base.

Session-2: “Road Safety Audit & Road User Behavior”

CHAIR / SPEAKER: Professor (Dr) Sidharth Rokade, , MANIT, Bhopal

Topic:- “Road Safety Audit”

Dr. Sidharth Rokade gave a presentation on road safety audit. The Road Safety Audit (RSA) is a systematic procedure that brings traffic safety knowledge into the road planning, designing, construction and operation to prevent traffic accidents. It is a formal procedure for assessing accident potential and safety performance. It ensures that if a crash occurs then the likelihood of injury is minimized through safety-conscious planning and design. There are two basic concept of RSA:-

- i) Prevention is better than cure. ii) Drive, ride, walk-in safety.

The benefits of conducting RSA are as follows :

- It reduces “whole of life cycle costs” of a road project
- Reduces risk of crash and its severity while using the road network
- Lowers cost for remedial work at (future) black spots
- Reduces overall costs of road trauma to the community
- Safer road networks are developed
- Contributes in meeting crash reduction targets.

He mentioned that the road safety audit is carried by specialists (Transportation Engineering/ Planning Professionals), who are independent of the design process or a person who has an understanding of road user behaviour and human perception is also likely to be able to develop road safety audit skills. He further emphasized road safety audits can be conducted on road projects as diverse as:

- Expressways, Major four-laning and multi-laning projects,
- Intersection projects both signalized and non-signalized,
- Pedestrian and bicycle routes, Rural roads providing access to villages/habitations, Access roads near project roads,
- Local area traffic management schemes in urban areas,
- Accident reduction schemes, Traffic calming measures through built-up areas,
- Approaches to bridges, rail over/under bridges, Grade separators and interchanges,

He stressed upon the road safety audit of new Road Construction projects during the following stages:

- ✓ During Planning/Feasibility Study - Stage 1 Audit
- ✓ During Preliminary Design - Stage 2 Audit
- ✓ Completion of Detailed Design - Stage 3 Audit

- ✓ During Construction Stage - Stage 4 Audit
- ✓ Pre-opening Stage - Stage 5 Audit

Besides he also stressed upon the road safety audit of roads during operational and maintenance stage due to the following reasons:

- To understand and ascertain whether previous observations and improvements are taken up or not.
- To visit the road stretch for its implementation.
- Identify the new Black Spots as per police records.
- Study the Black spots for the possible causes and taking remedial steps.
- Improving sight distance, corrections to steep curves if land is available, pedestrian consideration and safety, lighting at all rural and village limits.
- Possible creation of separate internal road parallel to highway.
- Road markings, sign and signage's (school zones etc.).
- U-turns and precautions required at the median opening, hazard boards, tapering wide medians.
- Speed arresters and caution for the road users.
- Junction improvement plans.
- Minor road connectivity and safety at joining location.

Topic : “Civic, Safe and Responsible Road Behaviour”

Speaker: Shri Anil Amar, Sane Driving Private Limited, Delhi

Shri Anil Amar gave a presentation on civic, safe and responsible road behaviour. He explained that India with 1% of vehicular population accounts for 10% of road fatalities. In India, road safety is the biggest emerging challenge due to fast pace of urbanization & motorization. He presented the necessity and importance of incorporating drivers including self-directed learning regulation in shaping civic, safe and responsible road behaviours. He emphasized on rational thinking to reduce road accidents, social ill causes prevailing in India and current ways to manage wrong behaviours. Wrong behaviours not only cause accident but also cause mistrust within population and misery of living in a bad city. He expressed that emotion plays an important part in decisions. His company is targeting on emotional aspect including faith, culture, values, beliefs, norms and expectations to make behavioural changes in the drivers to reduce road accidents. He expressed that only 25% policy/regulation determines traffic managements and culture of the country with 75% key factor.

Topic : “Traffic and Road Safety Management & Audit”

Speaker: Dr. T. S. Reddy, Senior Consultant (T&T), LEA Associates

Dr. T S Reddy, Senior Consultant gave a presentation on traffic & road safety management & Audit. He mentioned that approximately five lakh accidents occur every year in India since 2005 resulting 5 lakh injuries and 1.5 lakh fatalities. He further mentioned that more than 50% of accidents occurred in open areas were fatal. In the year 2017, more than 90,000 persons died and 3,02,952 persons got injured in road accidents. More than 30,000 accidents took place in each of these states i.e. Uttar Pradesh, Madhya Pradesh, Maharashtra, Karnataka, Kerala and Tamil Nadu in the year 2017. Tamil Nadu alone has the highest number of cases i.e. 65,562 in 2017. He explained factors responsible for road traffic accidents and requirement of road safety audits. Road safety audit stages includes:-

- Pre-feasibility stage.
- Detailed project preparation stage
- Pre-opening stage
- After opening stage
- Construction sites.

Road safety audits reduce likelihood and severity of crashes on road network. It increases awareness of safe design practices and uniform road environment for better understanding and documentation of road safety engineering.

Topic: “Education Awareness and community participation for Road Safety-case study”

Speaker: Dr. Mridul Bhasin, Muskan Road Safety, Jaipur

Dr. Mridul Bhasin, Trustee of Muskan for road safety, Jaipur mentioned that their NGO has been working in the field of road safety for the last eighteen years (since 2001). It is member of alliance of NGO’s for road safety, Rajasthan State Road Safety Council, Transport Management Committee and many other institutions working on road safety. Muskaan organizes road safety orientation programs for schools, public administration departments, corporate executive, colleges and universities and creates awareness among commercial vehicle drivers, school teachers, police officers through their various road campaign and seminars.

Observation & Suggestion:- Shri Pawan Srivastava, IPS, Director CAPT Bhopal raised observation about inconvenience faced by travellers due to obstruction by animals, pedestrians while driving on Toll Road. He suggested that toll road/express highways should be properly safe guarded from undue movements causing surprise and accidental situations. He also suggested that express highway should be developed/constructed separately avoiding populated areas. It should not be mixed with local/non-toll roads. At last he emphasized on strict implementation of Hon’ble Supreme Court’s guidelines on construction of roads/highway.

Shri Anshuman Singh, IPS, AD, CAPT Bhopal suggested that Road Highway Enforcement Agency should be created for check and balance over construction/maintenance of Road/Highways. He also suggested that Driving Schools should be created by Government for citizens to teach them driving skills and license should only be issued on the basis of certificate/performance of individuals in the driving school.

Day-02:- 22nd February, 2019 (Friday)

Session-3: “Road Design & Engineering”

CHAIR / SPEAKER: Professor Geetam Tewari, IIT, Delhi

Topic:- “Road Safety Audit ”

The Chair person in her opening remarks explained about road design and engineering for safe highway and urban roads. She emphasized on road safety policy with intuitive model (Penalties, Education, Driver Training and Licensing), Vehicle Centric Model (vehicle standards for occupants, road standards for vehicles) and Human Centric Model (Road Design, City planning for limitations of road users). Presently in our system the focus is on the injury causing properties of systems rather on the errors of owners, designers, and operators. Highway safety principals can be achieved with the adaptation of road design and features to vehicle dynamic and to pedestrian movements. She emphasized on the following points to enhance road safety:

- Speed control, containment, protection road side hazards
- Information through markings, signages and traffic management

She recommended following measures:

- Pedestrian safety to be used by system design.
- Active speed control measures (Rumble strips, speed humps).
- Modern roundabouts for effective speed management and desired flow.

Topic : “Engineering Measures on National Highways (NHs) to Improve Safety”

Speaker: Shri H M Naqvi, CGM (Tech-RSC), NHAI, New Delhi

Shri H. M. Naqvi gave a presentation on road engineering measures on National Highways to improve safety. He described various road engineering measures in road safety i.e. alignment, geometry, vertical profile, diversion and merging of roads, access road connecting to NHs and deficiency in road signs. Road transport system includes infrastructures, vehicle and driver/users. He emphasized on road alignment selection and land use in which principle of major arterials and express ways should bypass major towns and it should be connected by spurs. There should be clear zones identified for linear land use control in this regard guidelines under IRC 62: 1976, IRC Sp-15: 1996 and IRC 102-1988 should be strictly adhered.

He highlighted some of the possible factors of road crashes:

- Over speeding of vehicles
- Overloaded vehicles
- Drunken driving
- Mechanical failure of vehicles
- Pedestrian jaywalking
- Stray animals
- Poor weather conditions
- Poor vision/negligence of drivers
- Non adherence to lane driving
- Road engineering deficiencies

He also highlighted the Enforcement Related Issues on Highways

- High speed of vehicles, Non-usage of seat-belt by four-wheeler users
- Non-usage of helmets by two-wheeler riders
- Unauthorized median openings by locals, Encroachment along highways
- Halt of vehicles on carriageway along Dhabas, Abrupt lane changing by drivers without indicator
- Contra flow movement of vehicles

He also discussed about various initiatives taken by NHAI's in Road Safety

Initiatives of Road Safety cell

- Black spot Mitigation and provision of facilities for safe crossing of Vulnerable Road Users
- Road Safety Audit, Capacity Building for NHAI Field Officers in safety
- Road Accident Data Compilation for NHs
- Road Safety Awareness Campaign
- Coordinates with Supreme Court Committee on Road Safety on safety issues
- Development of GIS Database related to safety

Black spot mitigation measures - *Short-term remedial measures*

- Providing warning sign boards, solar blinkers, bar marking on carriageway, delineators, cat-eye etc.
- Traffic calming measures on access/approach roads (rumble strips, traffic islands, speed breaker on minor road)
- Metal crash barriers along curves, Minor junction improvement

Long-term remedial measures

- Bypass/realignment of road
- service road to segregate local traffic with NHs traffic
- Vehicular Under Pass (VUP)
- Other measures ; Advanced traffic management techniques (camera, variable message signs-VMS, control room)
- Pedestrian under pass (PUP)
- Foot over bridge (FoB)
- Major junction improvement

Road Safety Audit

- Independent road safety audits of project highways have been made mandatory at all the following stages i.e. design, construction and operation stage are being carried out accordingly.
- The findings of the safety auditor are being complied through the concessionaire/contractor of the project highway and the project officials.

Topic : “Best Practices: Traffic Management of Hyderabad”

Speaker : Shri Anil Kumar, IPS, Telangana

Shri Anil Kumar, IPS, Telangana gave a presentation on Road Safety and Traffic Management by using advanced technology. The initiatives in traffic management are, Hyderabad Traffic Integrated Management System (HTRIMS), Advanced Integrated Cashless e-Challan System, Automatic Red Light Violation Detection System (ARLVD), Laser Gun Camera for detection of over speed violations, Camera on towing cranes, Body worn cameras to improve the behavioural etiquettes and ITMS (integrated Traffic Management System). In order to attract Global investment, Hyderabad shall be the best traffic managed city among all metropolitan cities in India in terms of:

- Best average travel time.
- Best Road safety Standard.
- Citizen compliance of following Traffic rules for hassle free Traffic.
- Focused on engineering, enforcement, achieving the target.

He introduced and presented a Hyderabad traffic live app with features:

- Public interface.
- Auto fare estimation.
- Live traffic.
- Nearest parking, bus stops, auto stands etc.
- E-challan status.
- Find your towed vehicle.
- Find vehicle RTA details.
- Public service compliant.
- Public information.

Topic : “City Pedestrian Movement and Safety”

Speaker : Miss G. R. Bivina, IIT Roorkee

Miss G. R. Bivina, IIT Roorkee gave a presentation on behalf of Prof. M. Parida, IIT Roorkee on Improving Pedestrians’ access around metro stations in Delhi through better management of safety & security. In her deliberation, she talked about road accident statistics in India. In 2017, out of 4,64,910 road accidents, (29%) were fatal accidents. Among injury causing accidents, 26% were grievous and 37.5% were minor injuries. Delhi reported highest number of road accidents deaths

followed by Chennai. In India 22% pedestrians are killed in road accidents. Pedestrians are increasingly susceptible to road traffic injury. People may choose to avoid walking altogether if they perceive too great a risk of traffic injury or other threats to personal security. Pedestrians' perceptions of risk influence their road use behaviour, including whether or not they choose to use certain roads and pedestrian facilities. In her deliberation she discussed following points:

- Walk accessibility to the metro station highly influenced by safety & security construct.
- Since Delhi tops list for crimes (as per NCRB, 2016) it's highly mandatory to dispense safe & secure pedestrian environment.
- Mobility & infrastructure is the second construct influencing perceived walk.
- The model identified comfort & convenience construct modestly influencing the walk accessibility.
- Traffic latent variable was the least influencing factor.

Implementing pedestrian safety/security interventions:

- Reducing pedestrian exposure to vehicular traffic
- Reducing vehicle speeds
- Improving the visibility of pedestrians
- Improving pedestrian and motorist safety-security awareness and behavior.

Topic : VAHAN SAMANVAY (VAHAN and SAARTHI)

Speaker: Dr. Pawan Bhardwaj, Joint Assistant Director, NCRB

Dr. Pawan Bhardwaj, JAD, NCRB delivered a presentation on VAHAN SAMANVAY-VAHAN and SAARTHI. In his deliberation, he described about Vahan Samanvay website and highlights. He mentioned that Vahan and Sarthi are Software Application owned and implemented by Ministry of Road Transport and Highways.

- Vahan: This application is for Vehicle's Registration related services
- Sarthi: This application is for Driving License related services

It can be accessed 24x7 at NCRB's websites. Vahan Samanvay system provide Facility of enquiry for police, regional transport officers, insurance companies, general public etc. Police can update online data of lost/recovered motor vehicles besides enquiry there on. He shared VahanSamanvay- website link. Ministry of Road Transport and Highways has embedded "VahanSamanvay" database for vehicle status (Stolen or not) search in its "Vahan Software. With the integration, the RTOs get vehicle's stolen status during the application processing without moving to NCRB's VahanSamanvay Website.

Topic: “Modernization of Traffic Police”

Speaker: Shri Shailendra Singh, Ernst & Young

Shri Shailendra Singh, delivered a presentation on modernization of Traffic Police. In his deliberation, he described about era of Modernized Traffic Management for our cities-vision 2020. He talked about Integrated Traffic Management System, Safe and Smart city system, integrated transportation system, Highway surveillance, Objectives & Key Performance Indicators. He mentioned the importance of emerging technologies which include connected vehicle concept, Artificial Intelligence & Machine Learning based Predictive policing, Smart Urbanized Junction Models, Next-Gen Smart Cities, Driverless Cars, Google Glass, holographic Barriers, Analytics such as GPS/Satellite based congestion monitoring, seat belt/Helmet Violations.

Topic : “Technology & Enforcement”

Speaker and Moderator: Dr. Nezamuddin, Asst. Professor, IIT Delhi.

The session was chaired by Dr. Nezamuddin, Asst. Professor, IIT Delhi. He mentioned that Intelligent Transportation Systems (ITS) is an application of electronics and communication technologies to manage and operate surface transportation systems i.e. camera and radar-based vehicle detection and counting, adaptive traffic signal, electronic toll collection, smart fare cards, Dynamic message signs, etc. He also highlighted the advantages of Adaptive Signal Control such as, the system responds to prevailing traffic conditions by changing signal timing, it uses real-time information, improve traffic flow, reduce congestion and delay, reduce emission, respond to incidents, transit vehicles.

The benefits of ITS:

- It helps to make the transportation system safe, efficient and sustainable.
- It can help us get more out of the existing system.
- It can enhance law enforcement’s capabilities to enforce rules to ensure safe and efficient traffic flow.
- **CCTV cameras/Speed cameras** are used in Traffic Management Centres (TMC) to keep an eye on the transportation system, verify reports of incidents, detect traffic violations. **Zoom/tilt/pan cameras** are used remotely from the TMC, detect over speeding and **Red light cameras** are used to detect red light running violations at signalized intersections, collect photographic evidence of violation along with time stamp.
- In ITS, the use of Automatic Number Plate Recognition (ANPR) helps to detect vehicle red light violations, speed violations, violation at toll plazas, facilitate payment at toll plazas and open road toiling.

- **Weigh-in-motion (WIM) Station helps to weigh** commercial vehicles without stopping them, detect overloaded vehicles which cause pavement damages and loss of revenue

The challenges being faced in India:

- Mixed traffic conditions: significant proportion of two-wheelers and non-motorized traffic, Lack of lane discipline, Non-standard license plates
- Infrastructure: technology and communication network
- Maintenance and operation: skilled workforce

Topic : Enforcement (Challenges in E-Challan, Challan of the driver)

Speaker: Shri C. H. Natraj Kumar, CEO, Mother Technologies

Shri C.H. Natraj Kumar delivered a presentation on Enforcement challenges in e-challan, challan of the driver. He spoke about traffic cashless enforcement integrated e-challan & crime prevention system. He mentioned that e-Challan System is basically where Traffic citations are recorded electronically using various resources formally known as e-challan system. Non contact enforcement imposing the traffic violations without stopping the vehicle. This type of system is already working in Hyderabad city.

Integrated e-Challan System:- Recording an evidence based on traffic citations/violations using the both contact & non contact enforcement system with the help of an advanced technology using various methods. This system works under both traffic and crimes department as well.

Advantages of Non-contact Enforcement

- | | |
|-------------------------------|------------------------------------|
| • Reduces arguments /assaults | • No traffic obstruction |
| • Reduces corruption | • Reduces demand for more strength |
| • Instils more discipline | • Corruption free |

He further added that this system will help in establishing the Road Safety Signaling & Enforcement Infrastructure, Traffic enforcement technology that will reduce the traffic rule violations, accidents & crime prevention ratio for the State. He also explained the benefits to Govt. as well as citizens from the system.

Benefits to the Government

- Zero capital expenditure/Investment for the State/Central Government on this proposal.
- Zero recurring expenditure for the State/Central Government on this proposal.
- The Govt. revenue/collections through the citizen Police services system will be expected about Rs. 6,600+ Crore for the Police department(For 33 years).

- Enforcement officers get a new advanced Gadget Set for every 5th year with advanced technology that makes each COP as powerful Information weapon officer that empowering the Police department with 1:4 Cops ratio.
- There is no additional user charges burden over the citizens for their traffic violations based on this proposal.
- This system will help the girls/women from eve teasing, Women trafficking, drugs mafia, repeated offenders.
- Police dept. can concentrate on enforcement using advanced Technology without any budget constraints.
- Violators will receive an Instant SMS and e-mail confirmation if, they violate any traffic rules or if they pay fine.
- No action for the first 3 violations based on the Driving License No. or Vehicle Registration No.
- All violations will be recorded and linked to the Driving license (Driver basis) using contact enforcement.
- The cashless enforcement with evidence-based system will help in avoiding unnecessary arguments with the Driver/Owner.
- Charge sheets/action will be generated/ initiated for the TOP violators/Offenders based on their Driving License.
- The violator's DL information will be shared with RTA for further DL suspension/Cancellation.
- All RS Enforcements can be made including the drunk & drive cases based on the DL thus helping in reducing the DD cases
- RS IES System will ensure that the Violations & fines will be different for the Cities, towns and rural villages.
- Police department will get new gadget set for every 5th Year for smooth enforcement operations.
- Road violations will be controlled & Road safety awareness will increase.
- This System will help the State in reducing sound pollution.
- This System acts as a tool for Crime prevention. It can be integrated with Crime Records, Convict credentials, Technical clues as part of crime prevention.

Benefits to the Citizen

- The Crime ratio, Accidents ratio, Traffic violations ratio will come down.

- Citizen Police services will be improved without any physical interactions at police stations.
- The real time community Policing system will be introduced without any budget constraints.
- Using Citizen Police paid banking services the transparency will be established between the commuter & the Police
- It will also help in getting the various new police services like FIR verifications, complaints information etc. which will help the corporates/Govt. agencies/girls/women to know the status of drivers, criminals etc.
- Entire System works under cashless and friendly Policing System where the citizens will not be forced by cops to pay the fines at the same spot of violation
- Violators will receive an Instant SMS and e-mail confirmation, if they violate any traffic rule or if they pay fine.
- Evidence based System will help the citizen to avoid unnecessary arguments or other related complications.
- Provision of public view online e-challan verification System will be transparent to the Citizens thus helping them to see the violated pictures/evidences instantly.
- Citizens are facilitated to make the e-Challan payments using the Mobile App which is much easier process.
- Citizens are facilitated to give the complaints through online portal/mobile App related to the wrong Challans/ fake Regn Numbers/fake Addresses/ stolen Vehicles/Crime involved vehicles/ Change in Ownership/Transfer of Ownership/Driver's details etc
- Citizen will be aware of Traffic penalty points which will lead in reducing the rule violations and road accidents.
- Citizen need not to approach the police staff/station for any sort of verification of certificates and can avail through the Citizen Policing Services.
- All verifications/permissions related to the Police department can be done through Citizen Services.

Topic: “Use of Technology in Enforcement”

Speaker: Sh. Shamendra Singh, M/s Vehant Technologies, NOIDA

Shri Shamendra Singh from Vehant Technologies gave a presentation on use of technologies in enforcement. He explained the use of technology in helping new innovations in Traffic Enforcement with following examples –

- **Vehicle Detection Camera:**
 - Advance high resolution sensor technology

- Can give vehicle occupancy and vehicle count
- Traffic flow and density monitoring.
- **No-Helmet Detection System:**
 - Violation evidence capturing module
 - Does not use any inductive loop Sensor / Radar
 - With automated 24/7 Operation.
- **Wrong Lane Detection System:**
 - Video based enforcement and management system
 - Excellent image quality even in low lights
 - High definition video streaming of incident.
- **Triple Riding Detection System :**
 - Video based triple riding detection
 - Works with non lane discipline traffic
 - Review violation and evidence data
- **Red Light Violation Detection System :**
 - Video based Red Light Violation Detection System
 - Contains ANPR cameras and an overview camera
 - User friendly Graphical User Interface (GUI).
- **Speed Violation Detection System :**
 - Video based Speed Violation Detection System
 - Reads up to 120 Km/ hr of speed with high accuracy
 - Useful for tracking hot listed/Stolen/Wanted Vehicles.
- **Automated Number Plate Recognition :**
 - Detects and reads licence plates in real time
 - Real time 24X7 city surveillance solution
 - Integrate with other security modules
 - Vehicle Mounted ANPR System
 - No parking Violation, Mobile Surveillance
 - Hot listed Vehicle search, Mobile Facial Recognition

Topic: “Integration of Predictive policing with crime control measures with Traffic Analytics”

Speaker: Shri Jasvinder Grewal, ORACLE

He gave a presentation on Best practices on Integration of predictive policing with crime control measures with traffic Analytics on the ORACLE platform. He explained various projects implemented in world’s various cities such as Turkey, China, Mexico national command & control centre.

- Integrated Command Control Platform
- Predictive Policing – A tool to crime control.
- Digital Transformation using new Technologies.

Police department of Izmir city responds to all threats related to security, emergency services, immigration, pollution and public disorder offenses across 35 police stations from multiple cities. He claimed that it improves public safety by integrating surveillance system (cameras, VMS, phone & Radio System), Vehicle-plate identification (500 alarms/day) to enhance coordination of tactical operations and enable real-time feedback various security personnel. He also presented that China Beijing Traffic police (command & control (C2) and violation sensors)- they use 3 different number “122”, Video Surveillance overlay, traffic monitoring and guiding, speeding monitoring, accident management.

Mexico national command & control centre has maintenance of public order and public peace, critical infrastructure protection, national defence liaison and coordination and disaster management.

Topic: “Motor Vehicle Act”

Speaker & Moderator : Shri Taj Hassan, IPS, Special Commissioner, Delhi

In this session the existing discrepancies in Policy Frame work & Institutional Frame work were discussed. The session was chaired by Shri Taj Hassan, IPS, Special Commissioner, Delhi.

Shri Taj Hassan, IPS, Special Commissioner, Delhi delivered a presentation on Motor Vehicle Act. He spoke about part of criminal justice system, traffic challans sent to Court. He described about challan without interface, visible challans, camera proceedings, communication regarding violation through SMS/email, payment through e-gateway, payment matter resolved. He further mentioned that, to comply for e-challans, we require data of telephones numbers of vehicle owners, communication through SMS by the Court also, recognizing the same by the Court, payment to the Court through payment gateway. He suggested the following amendments in Act/Rules for complying e-challans:-

- CrPC for sending summon by Court through SMS

- Amendment in MV Act/Rules for mandatory uploading data of telephone number of vehicle owners
- Applicability of Section 468 CrPC with regard to offences under MV Act.
- Linking the e-challan penalty with insurance premium.
- Linking with Pollution under control certificate.
- Linking with Fitness Certificate for public transport vehicle.
- Some kind of NOC for private vehicles.

He also endorsed the idea of Dr. M A Saleem for a separate Traffic Police Station on the pattern of Karnataka Police.

Topic : “Policy Framework & Institutional Framework”

Speaker : Dr. M.A. Saleem, IPS, ADG, Karnataka Police.

Dr. M A Saleem delivered a presentation on B-TRAC Technology Driven Traffic management. In his deliberation, he discussed about Bengaluru City Traffic in which he presented that the city covered 13000 kms of road, 44000 intersections, 350 signalized intersections, 500 manned intersections, 193 one-ways roads and the need based deployment of Police personnel on more than 1000 intersections. There are about 78 lakh vehicles registered as on today, 2000-3000 new vehicles being registered every day, number of BMTC buses 6400, whereas Bangalore Traffic Police has strength of 5267 officers/other personnel services at Bangalore city.

B-TRAC concept is the first of its kind project in the country to address the issue of traffic congestion, safety etc. by utilizing the latest traffic management technologies and techniques which are appropriate to address traffic related problems in the city. This will give much needed scope for larger infrastructure projects to be planned and implemented for improving the transportation system in Bengaluru city. In his deliberation, he spoke about components of B-TRAC which includes intelligent transportation system, surveillance/enforcement cameras, junction improvement, street furniture, education/awareness and capacity building. He described about Traffic Management Centre, personal device assistant (PDA), Automation enforcement, Search & pay violation, traffic surveillance cameras, interceptor, VMS, Up-gradation/new traffic signals, pedestrians control signal lights, standardization of Sign boards, road markings, street furniture, overhead signage, cat eyes, junction improvement, Red light violation detection camera. The speaker emphasized that the project “B-Trac” has been accepted by the BPR&D and the same has already been circulated to all the State/UTs.

Topic: “Integration of Land Use & Transport Planning”

Speaker: Mr. H M Naqvi, CGM, NHAI, New Delhi

The speaker discussed the urbanization pattern in India and the present scenario of integration of land use & transport planning. He mentioned that this aspect is observed missing in many cities/towns. It leads to inefficient use of infrastructure resources including congestion on road, parking problem, road safety issues etc. He gave examples of cities where the integration of land use and transport planning is already implemented to some extent such as Chandigarh, Bhubaneswar, Navi Mumbai, New Raipur, Vaashi Railway Station in Navi Mumbai, integrated railway station & bus terminal in Bengaluru resulting reduced parking requirement and improved safety and traffic congestion.

Topic: “MV Act & 3rd Party Insurance”

Speaker: Mr. Ramandeep Chowdhary, IAS, Deputy Secretary, MoRTH, New Delhi

Mr. Ramandeep Chowdhary, MoRTH gave a presentation of MV Act & 3rd Party Insurance. The motor vehicles Act, consolidates and amends the law relating to motor vehicles. He discussed some of the important sections of MV Act:

He also highlighted the Role of a Police Officer after an accident is occurred and recommended the following actions immediately:

- Reaching the spot of accident immediately and inform to Ambulance in case of injury to any person, and take photographs etc.
- Mark the spot of accident and record FIR.
- Record spot punchnama (sketch of the accident site) and statements of witnesses u/s 161 of Cr.PC.
- Record details of the vehicles involved, persons driving, persons injured, deceased and extent of injury and/ or damages. Insurance policy details etc.
- Site plan/sketch of accident spot with measurements
- Inquest report, arrange MV inspection, Post-mortem from hospital.
- Accident report as per the Form prescribed by MoRTH.
- Investigate the accident.
- File charge sheet against the negligent party responsible, whether big or small vehicle in criminal court within time limit.
- Sections charged (under IPC as well as MC Act) is important.

Topic: “Automotive Safety & Road Safety”

Speaker: Mr. Keshav Murti & Mr. Ajay Gupta, Volvo & Eicher

Mr. Keshav Murti & Ajay Gupta gave a presentation on how road safety can be enhanced by incorporating various safety features in the modern day vehicles. He highlighted that the OEMs are also in the process of developing many inbuilt safety features in vehicles to reduce road accidents and injury to the occupants in case of accidents. The participants mentioned that such safety features are presently in high end models. They requested that the MORTH should make it mandatory for all vehicles.

VALEDICTORY SESSION

10. The valedictory session commenced with the summing up report by **Shri Pawan Srivastava, IPS, Director, CAPT**. He gave introduction of the Conference, its main objective and broad overview of the conference. He mentioned that the main objective of conference was to find out innovations, new ideas, new technologies being pursued by different states and to share them for betterment of prevailing traffic system of the country. He appreciated the meaningful and fruitful discussions held during the conference. From the deliberation of the conference it emerged that the increase in population, vehicle and unscientific manner of traffic management are the key factors for increase in road accidents and traffic congestions. In some states few innovative steps have been taken for improvement of traffic systems of major cities but a lot of improvement is required as far as technology is concerned. He also highlighted the summary of the proceedings of the conference.

11. **Shri Surendra Singh, IPS, Ex-DGP (M.P), Chief Guest** in his valedictory address felicitated BPR&D & CAPT for organizing a conference/seminar on this important issue of Traffic Technologies. He emphasized that simultaneous efforts should be made by all the stake holders for use of technologies and implementation of Integrated Traffic Management System (ITMS) including the local municipal authorities. He further, mentioned that the basic infrastructure has to be established before launch of such projects to make them successful. The ITMS will only be useful if data of the vehicles from all the State/UTs is integrated under uniform data base of vehicles. It will also help in maintaining the record of the original owners, so that if any vehicle owner transfers/ sells the vehicle to other person, the data is automatically updated.

He also stressed upon the need of education on traffic safety beginning from the tender age of schooling.

12. **Dr. Sidharth Rokade, Professor, MANIT, Bhopal**, proposed the vote of thanks.

OUTCOMES

1. The conference provided an opportunity for CAPT Bhopal and key stakeholders in traffic domain to raise and discuss a wide range of issues related to traffic management. Through group work and discussions, participants assessed the relevance of these practices for their respective states. As a result of the work conducted at the conference, participants agreed to a unanimous solution that use of technology should be rampant in traffic management and road safety.
2. It was also concluded that Enforcement should be given top priority in traffic management besides Education & Engineering.
3. There should be better coordination among various stakeholders to enhance Road Safety & improve traffic management in the country.
4. The participants were able to know about the latest technologies being used globally to control traffic & enhance road safety.
5. The Central Academy for Police Training (CAPT) will have the National Centre for Traffic Technologies and should undertake following tasks:
 - a) Conduct Certified Courses (one-two weeks) on Capacity building for various ranks of States/UTs Police personnel on Traffic Management & Traffic Technologies. (on appropriate technology, products and services (viz., Interceptor, Crash Lab, Breath Analyser, Vehicle driving simulators, ANPR, e-challan, real time monitoring (CCTV & UAVs) etc to enable Traffic Staff of the State/UT Police Force to carryout duties efficiently)
 - b) Should act as a Knowledge Centre – Library and publications (on all Traffic related & Road Safety issues)
 - c) Organise Workshops/Seminars in the field of Traffic Technology and Management at National and regional level (Mix of Private & Public Display)
 - d) Preparing the Video/Movies for Children/Public for Traffic Awareness/Road Safety to reduce road accidents and fatalities.
 - e) Collate Legal rules / Information related to traffic for public and police officers
 - f) Coordinate with Transport and Road Engineering Department
 - g) Potential Research areas in Traffic including vulnerability, scientific aids to police investigation

More information on the conference is available at academy website <http://www.captbhopal.in>
