



'Urban Streetscape and Traffic Management'

Traffic Engineering : The Missing Component of Traffic Management in Indian Cities

By: Dr. Rohit Baluja

President: IRTE

Director: College of Traffic Management

www.irte.com



College of Traffic Management

Faridabad, Haryana



DEPARTMENTS OF COLLEGE OF TRAFFIC MANAGEMENT



Department of Traffic Engineering



Department of Traffic Enforcement



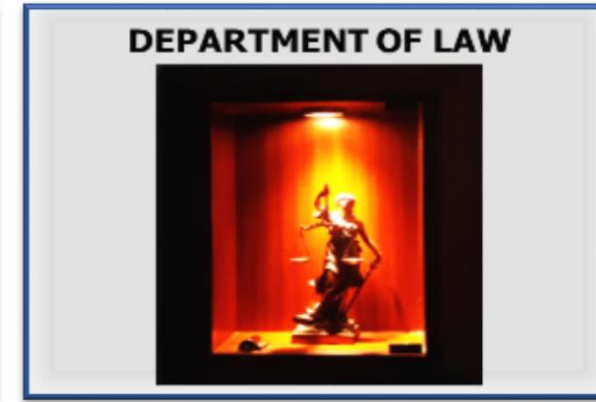
Department of Forensic Science



Department of Driver Training



Department of Public Health for
Road Safety



Department of Law

DEPARTMENT OF TRAFFIC ENGINEERING



Journey Risk Management™ (JRM)

Road Safety Audit

Highway Assessment Programme (HAP)®

Department of
Traffic
Engineering

Completed 58,000 KMS of Risk Audit on
NH/SH/MDR

Traffic Management Plans, Junction Designs and
Traffic Studies & Research

Conducted Capacity Building Course for Road Engineers
RTO's, Planners Concessionaires, Contractors PAN India



IRTE was given the Roster Consultative Status by United Nations



**United Nations & IRTE
Sign an MOU
To improve Road Safety In
South East Asia**

**South East Asia & United Nations
Recognise
the College of Traffic Management
as the
Centre of Excellence
in Road Safety
for
South East Asia**



M.Sc. Traffic Management

With **26 years of our experience**, we firmly believe that Road Safety forms the basis of a scientifically managed traffic management system, and therefore the science of traffic management needs to be promoted, not only in India but also in other emerging economies of our region. Based upon our legacy of research and data collected therefrom, time is opportune to transform this rich literature into formal academic methodology by creating the first ever Masters programme in Traffic Management. Such a program would support human resource development for many organisations such as concessionaires who are building and maintaining our highways, transport department, police personnel, insurance agencies, fleet management organisations, real estate management organisations and those in the field of transport planning, urban development amongst others.

Academic Objectives

To create capabilities of individuals to understand the basis and complexities of the following domains of Traffic Management through the process of research, globally applied best practices, recognizing national and local needs:

- Traffic Engineering
- Forensic Science in Crash Investigation
- Human Factors in Road Crashes
- Driver Training and Management
- Post-crash Management
- Traffic Legislation and Codes of Practice
- Traffic Enforcement
- Road Safety Awareness and Education



Program Structure



MSc: Traffic Management



M.Sc. Forensic Science

Forensic Science, an amalgamation of almost all faculties of knowledge, is an essential and efficient enabler in the dispensation of justice in criminal, civil, regulatory and social contexts.

As of today few Government and Private Universities have initiated this program under its aegis. The need however remains for quality education, training and research in Forensic Science. With this view, the College of Traffic Management has initiated this Master's Program to impart quality Forensic Education that will cater not only to crash investigation but also to crime at large and over a period evolve as an integrated entity encompassing scientific, technological and legal services. Our curriculum lay emphasis on a practical approach in all the domains of Forensic Science and is affiliated to Maharshi Dayanand University (MDU), Rohtak, Haryana.

Academic Objectives

- 1 To work towards development of forensic science by providing quality education and research in the area
- 2 To provide facilities for training and research to students, trainers and working professionals associated with the field Forensic Science.
- 3 To act as a reference body in the area of Forensic Science and impart its services to all associated stakeholders.



Program Structure



MSc: Forensic Science

SUSTAINABLE URBAN MOBILITY PLAN FOR INDIAN CITIES



New
Infrastructure



Infrastructure to
be Retrofitted



Traffic Engineering : The Missing Component of Traffic Management in Indian Cities

SUSTAINABLE URBAN MOBILITY PLAN FOR INDIAN CITIES



Safe

Inclusive & Efficient

Environment Friendly

Economically Viable

Core Infrastructure Elements

- Adequate water supply
- Assured electricity supply
- Sanitation & solid waste management
- Efficient urban mobility and public transport
- Affordable housing, especially for the poor
- Robust IT connectivity and digitalization
- Good governance
- Sustainable environment
- Safety and security of citizens
- Health and education



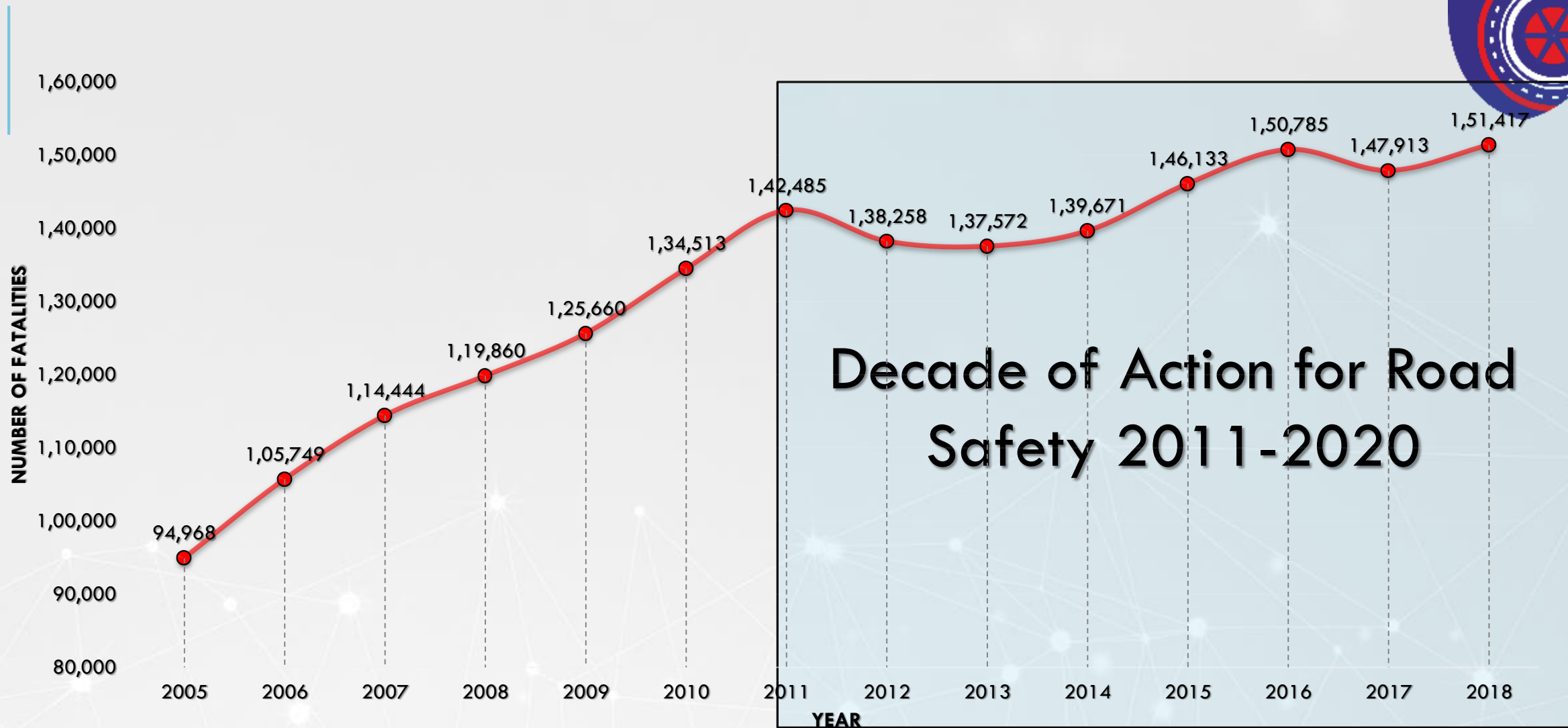
Proposed 100 Smart Cities under Smart Cities Mission



Smart Cities Mission

“The main objective is to promote cities that provide core infrastructure and give a decent quality of life to its citizens, a clean and sustainable environment and application of ‘Smart’ Solutions”.

ROAD FATALITIES IN INDIA



● Road Deaths



INSTITUTE OF ROAD TRAFFIC EDUCATION

Source: Road Accidents in India 2017, Ministry of Road Transport and Highways, Government of India, Ministry of Road Transport & Highways

www.irte.com

GLOBAL STATUS REPORT ON ROAD SAFETY **2018**



Source: Global Status Report on Road Safety 2018, WHO

2,99,000 people are killed on Indian in road crashes each year

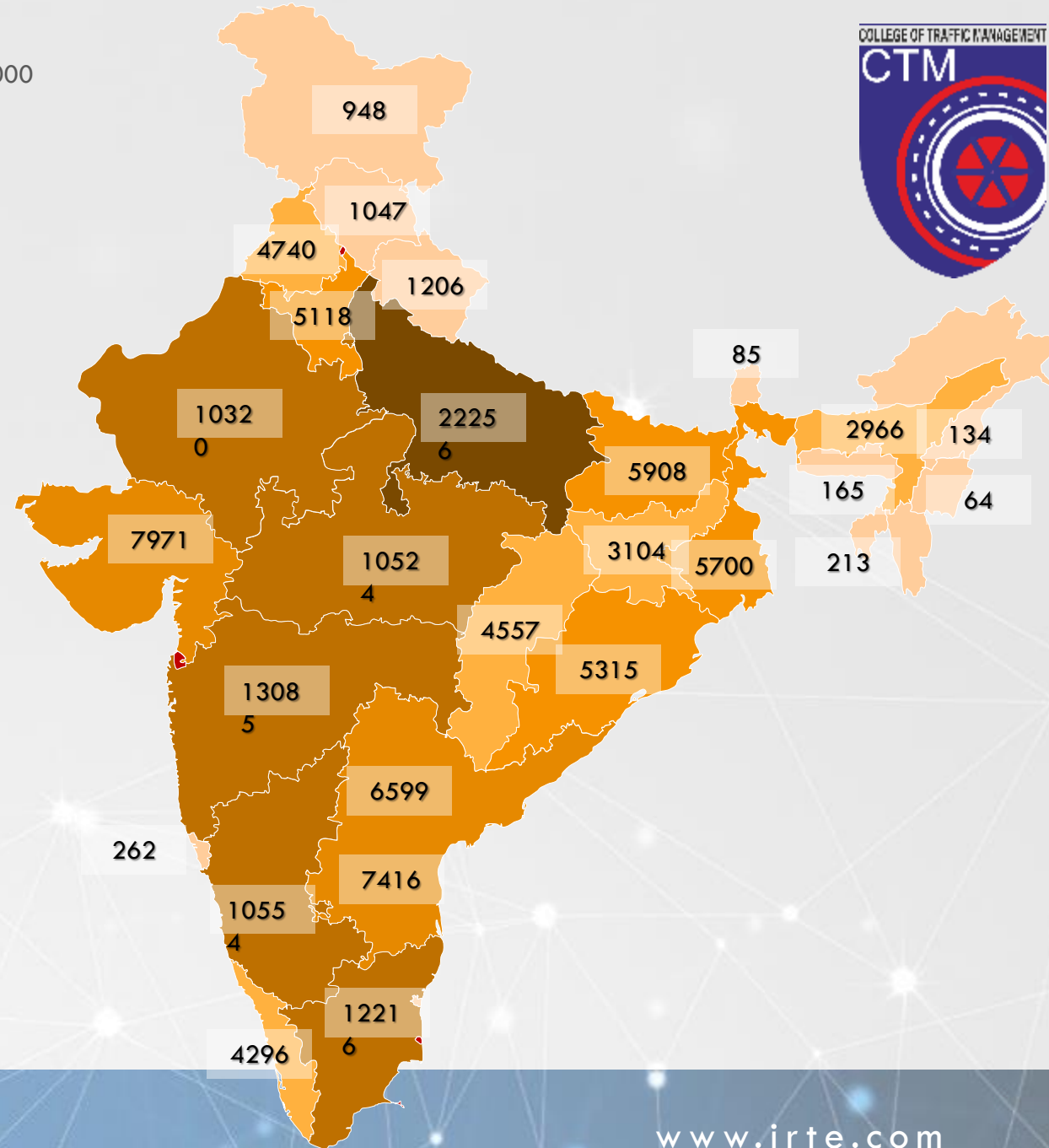
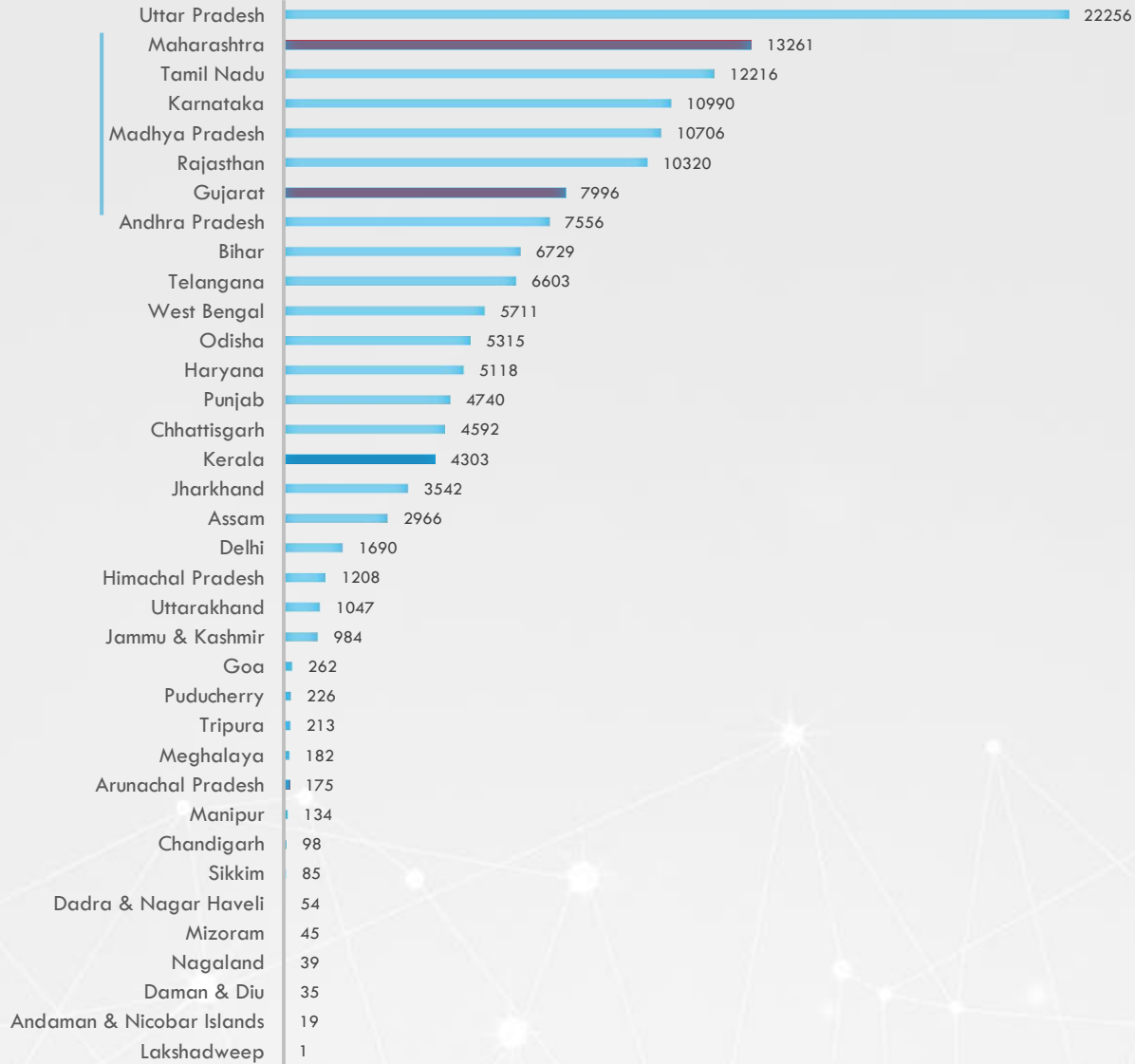
According to WHO Report

820 innocent lives are lost every single day in India

ROAD TRAFFIC FATALITIES INDIA 2018



0 5000 10000 15000 20000 25000

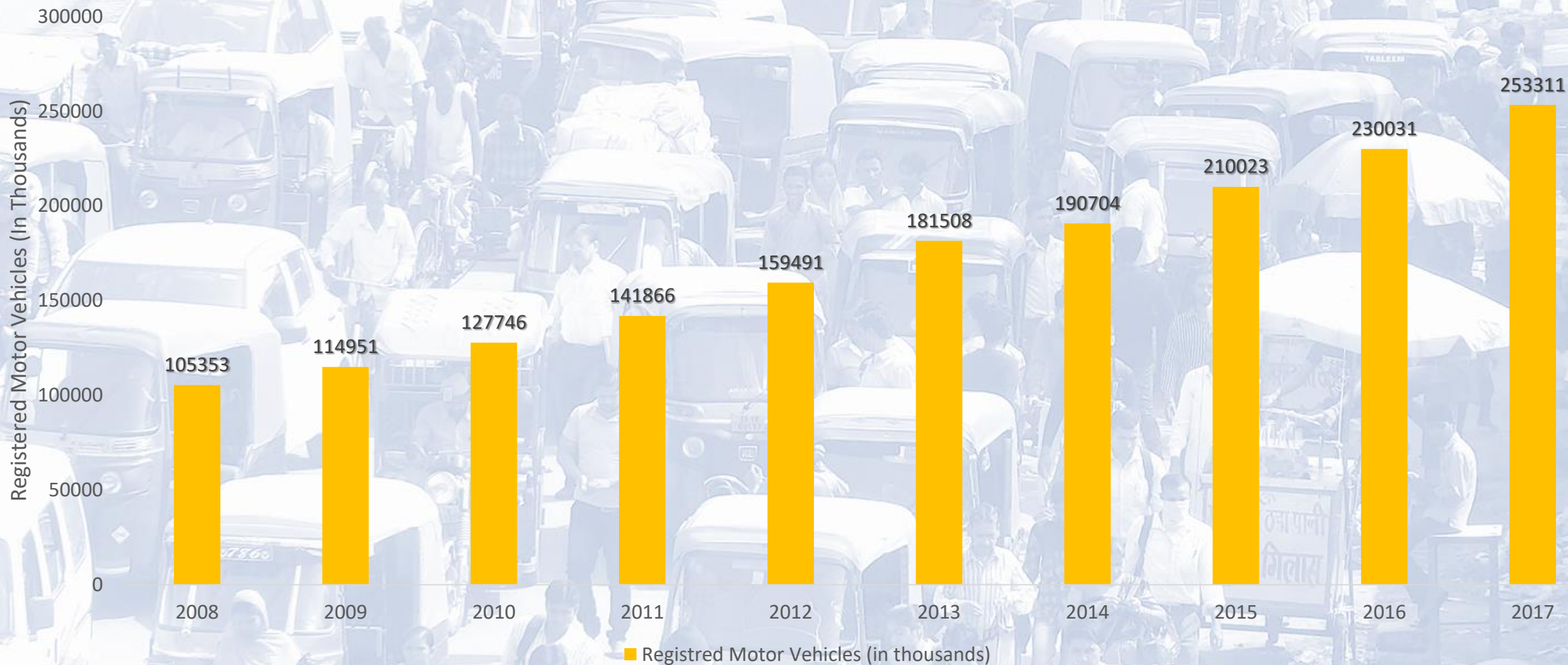


जय प्रकाश नारायण एपेक्स ट्रॉमा सेन्टर - अ.भा.आ.सं.
JAI PRAKASH NARAYAN APEX TRAUMA CENTRE - A.I.I.M.S.

Approximately 26,00,000 people get seriously injured every year in road crashes

Growth of Registered Motor Vehicles in India

Registered Motor Vehicles (in thousands)

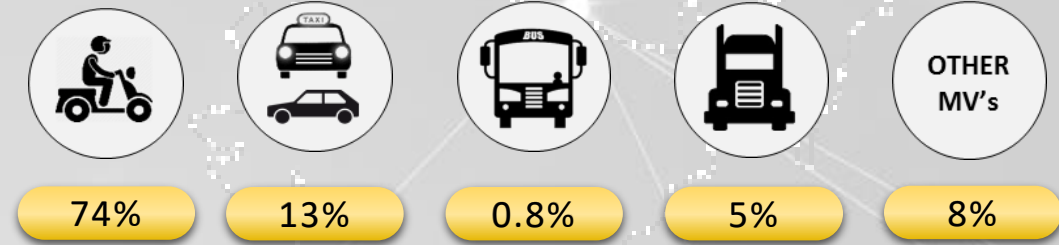


Registered Vehicles in India



250 Million
Registered Vehicles in India

Categories of Registered Vehicles



Public Transport = **0.8%** Buses



19A
PRTC
കാലത്തുനിന്നും
കാലത്തുനിന്നും
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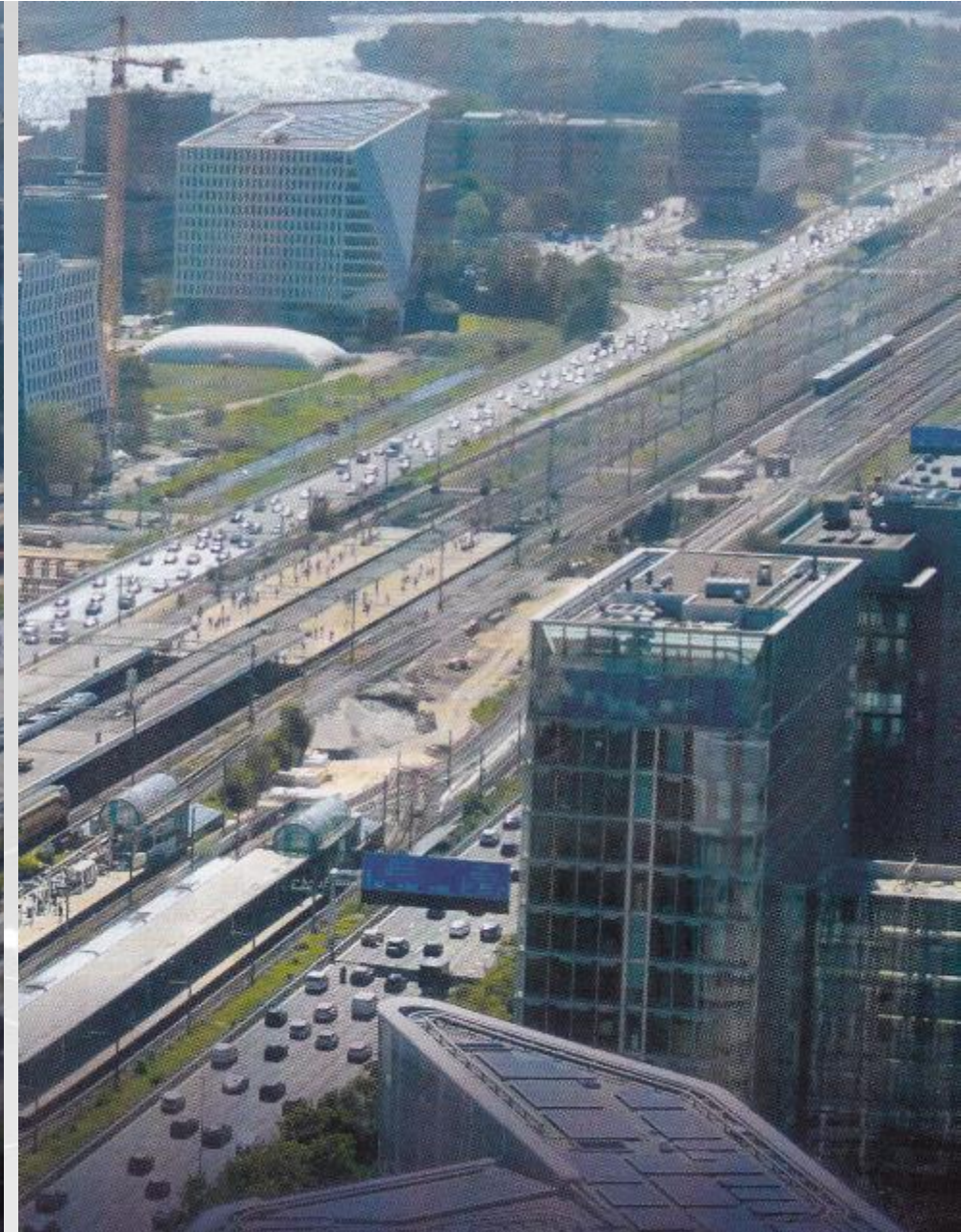
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The road to Amsterdam



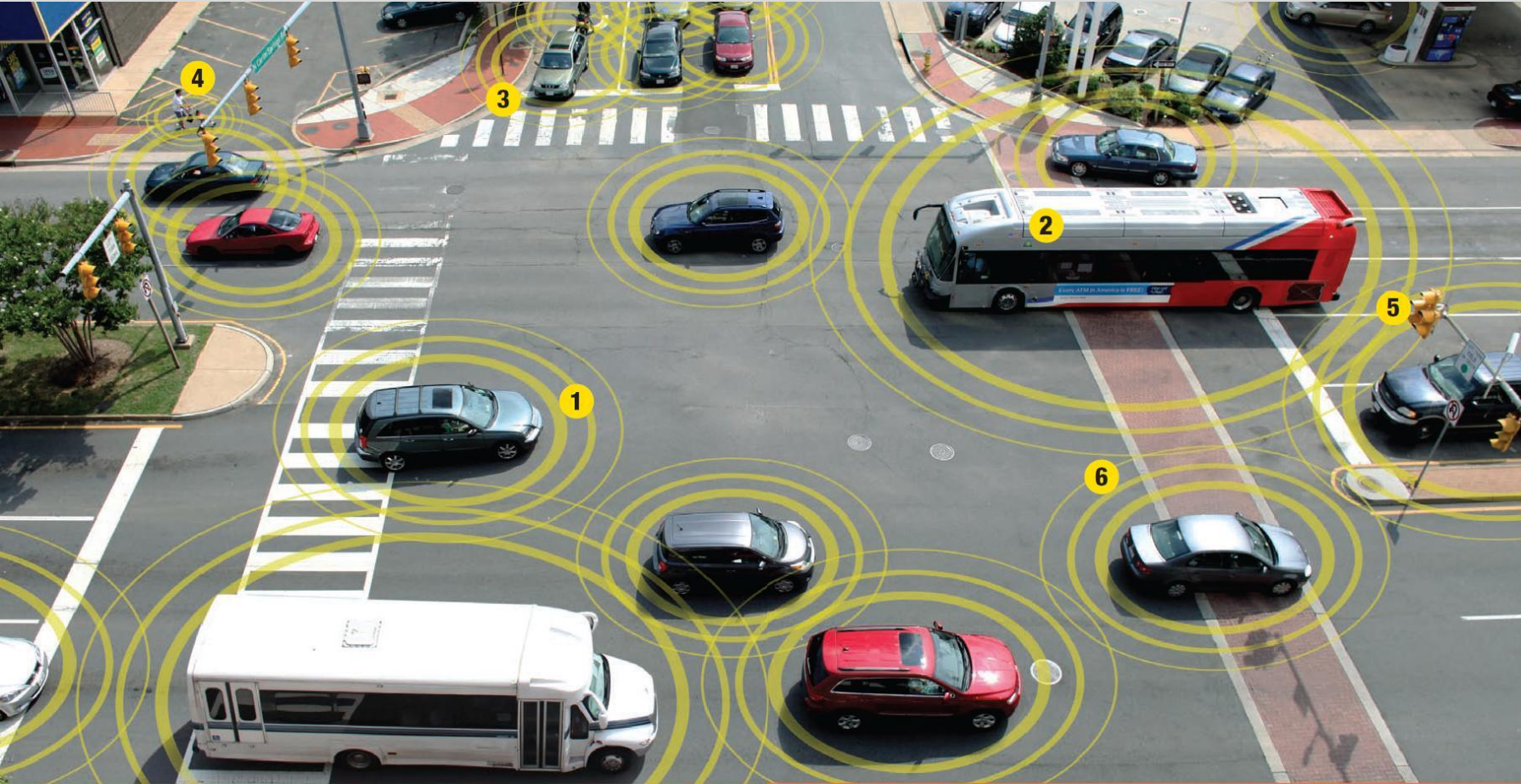
Singapore





Smart Mobility Vision





For successful implementation of technology: Necessary network infrastructure is in place.

CROSSING THROUGH

- 1 Cars equipped with vehicle-to-vehicle (V2V) communication share data with each other about their speed, heading and direction. With V2V all cars know where they are in relation to other cars on the road.
- 2 Buses with connected vehicle technology will know whether there are riders waiting at bus stops and whether those riders need extra time to load bikes or wheelchairs. This data will help optimize routes in real time.
- 3 V2V technology alerts drivers of potentially unsafe situations, such as making a right turn when another vehicle may pose a collision risk. Drivers will receive audio, visual or haptic alerts to help prevent accidents.
- 4 Pedestrians and cyclists with smartphones or wearable devices will make their presence known to drivers and vice versa. Cars and citizens utilizing this vehicle-to-pedestrian technology will make streets safer for everyone.
- 5 Vehicle-to-infrastructure (V2I) technology facilitates communication among vehicles and roadside infrastructure, such as traffic signals, helping drivers hit more green lights to avoid stop and go driving.
- 6 Instead of laying a cable across the road once per year to measure traffic, V2I will feed real-time traffic and road condition data to traffic operations centers, greatly improving understanding of citywide traffic.



Meghalaya



Uttar Pradesh



Andhra Pradesh



Chhattisgarh





BR
DESIGN
JEWELLERY MARTS
9281 2831324-26

KABIR RESTAURANT & C. MALL
HOTEL
KABIR

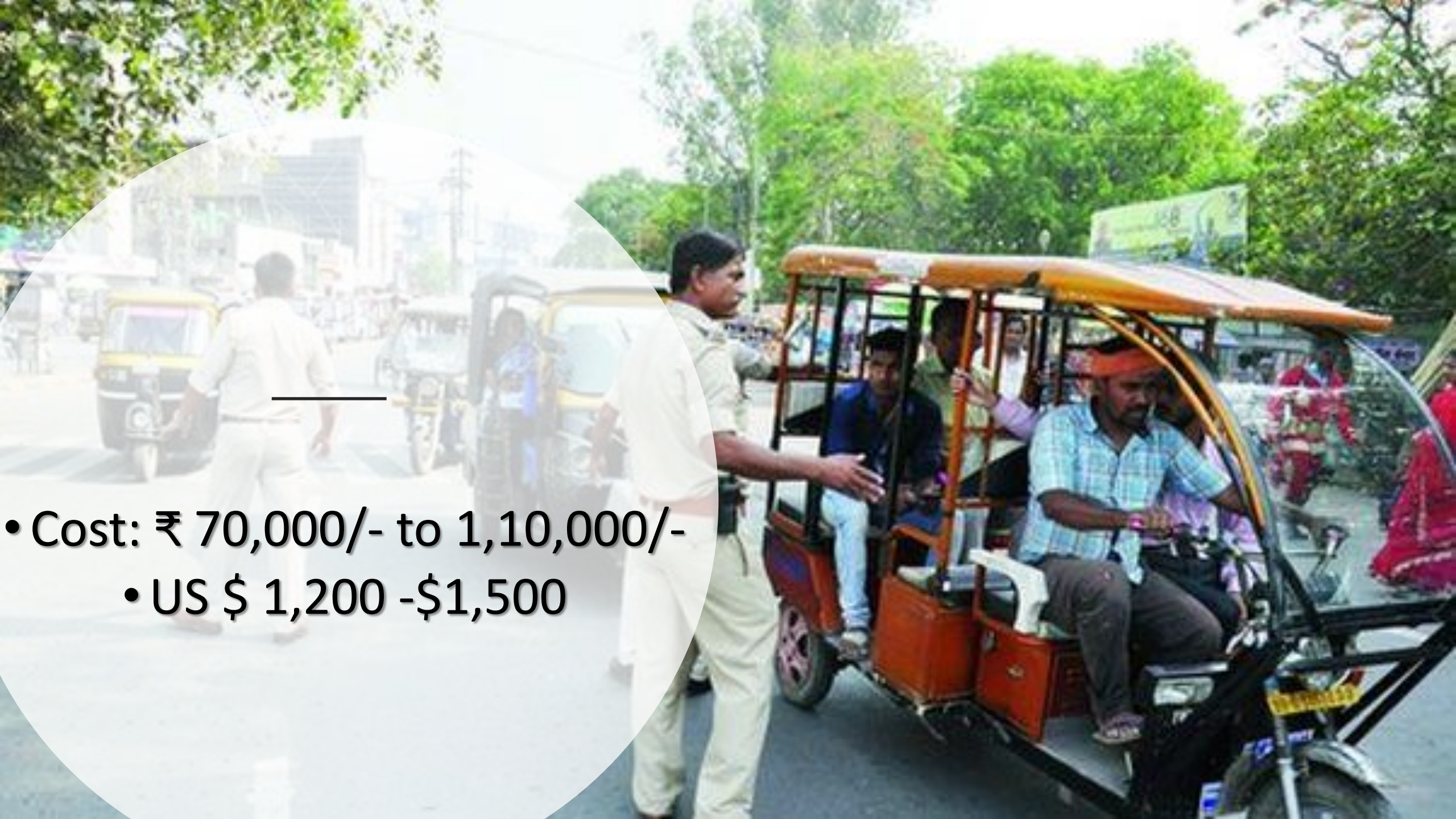
EDITED WITH

EDIUS

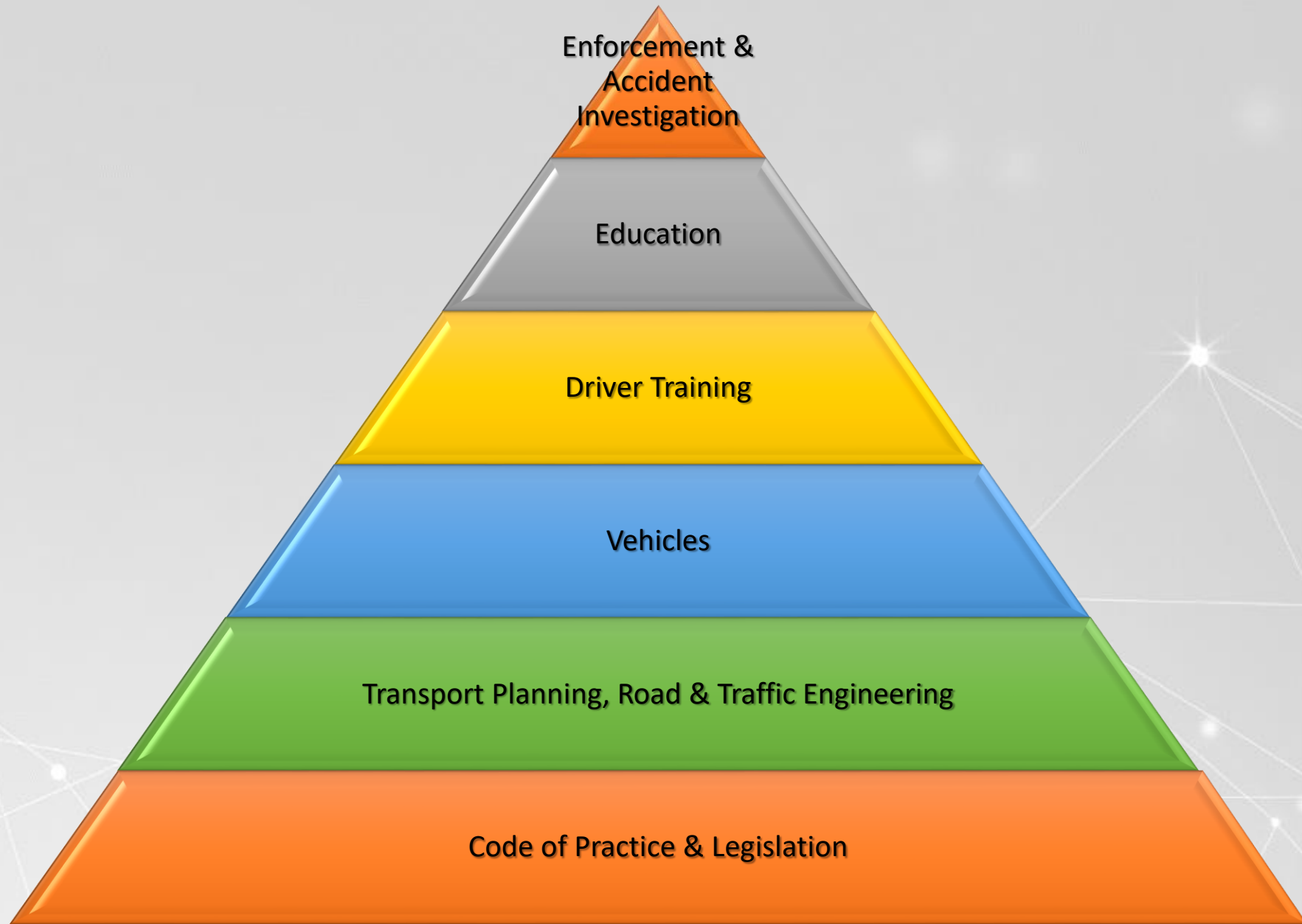
A Busy Intersection : Kanpur, India

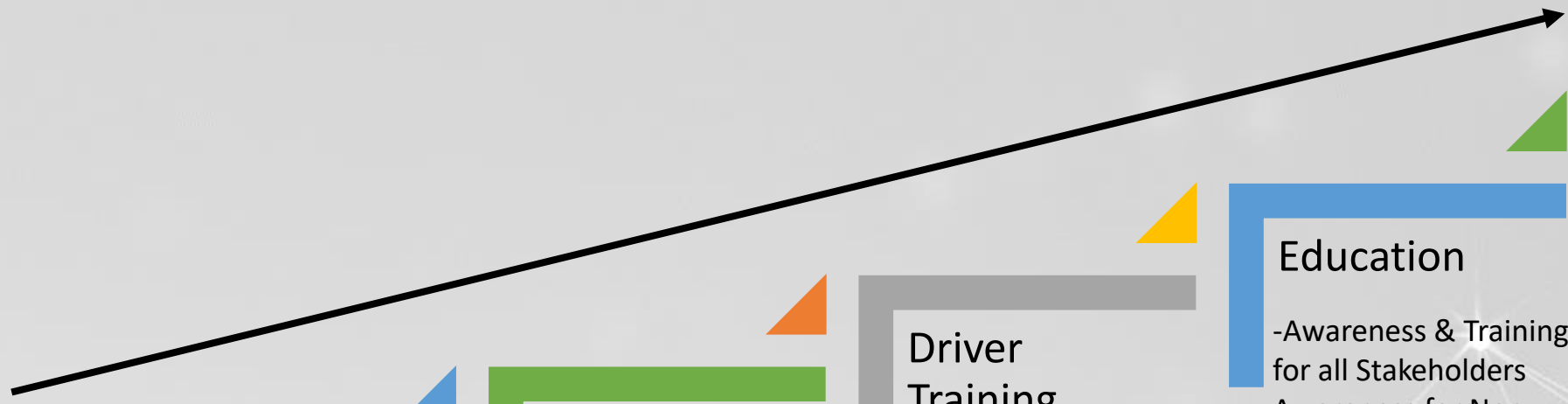




- 
- Cost: ₹ 70,000/- to 1,10,000/-
 - US \$ 1,200 -\$1,500







Code of Practice & Legislation

- IRC Codes
- MVDR
- MVA
- Road Construction standards

Transport Planning, Road & Traffic Engineering

- Traffic Control Devices
- Parking, Speeds, One Way System
- VUR's Safety
- Transport Mobility Plan
- ITS

Vehicles

- Vehicle Standards & Safety

Driver Training

- Training & Licensing

Education

- Awareness & Training for all Stakeholders
- Awareness for Non Motorised Traffic
- Road Safety Education for School Children

Enforcement & Accident Investigation

- Enforcement by Police & Transport department
- Road Crash Investigation

ITS



Can we leapfrog technology such as ITS from Developed to the Emerging Economies

- Developed Countries

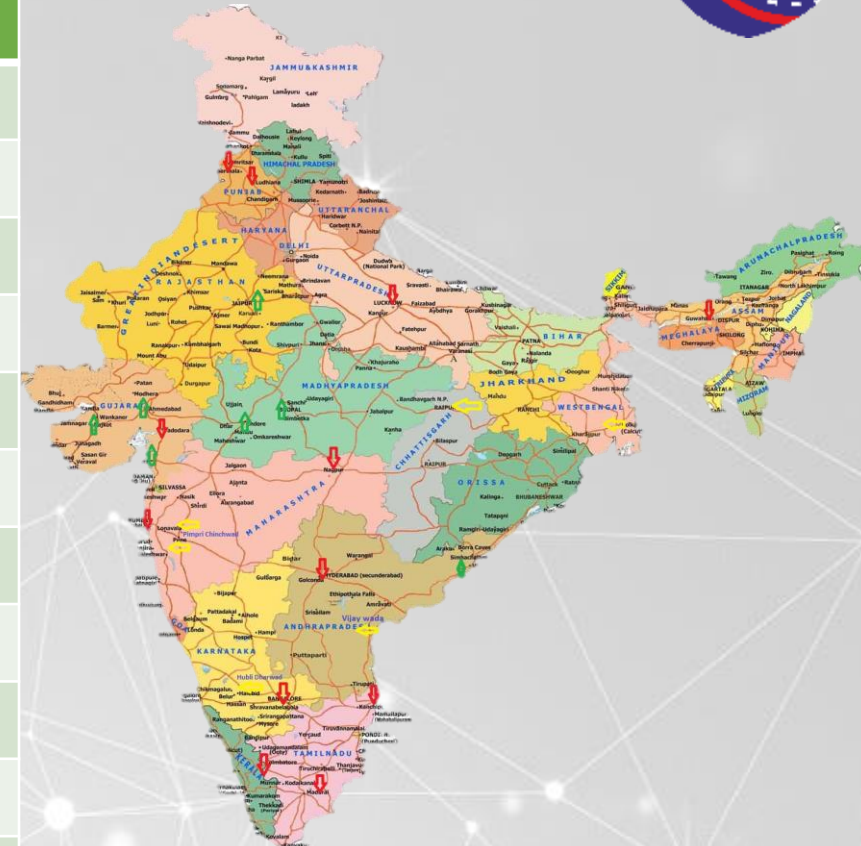


- Emerging market Countries

Status of BRTS projects in India



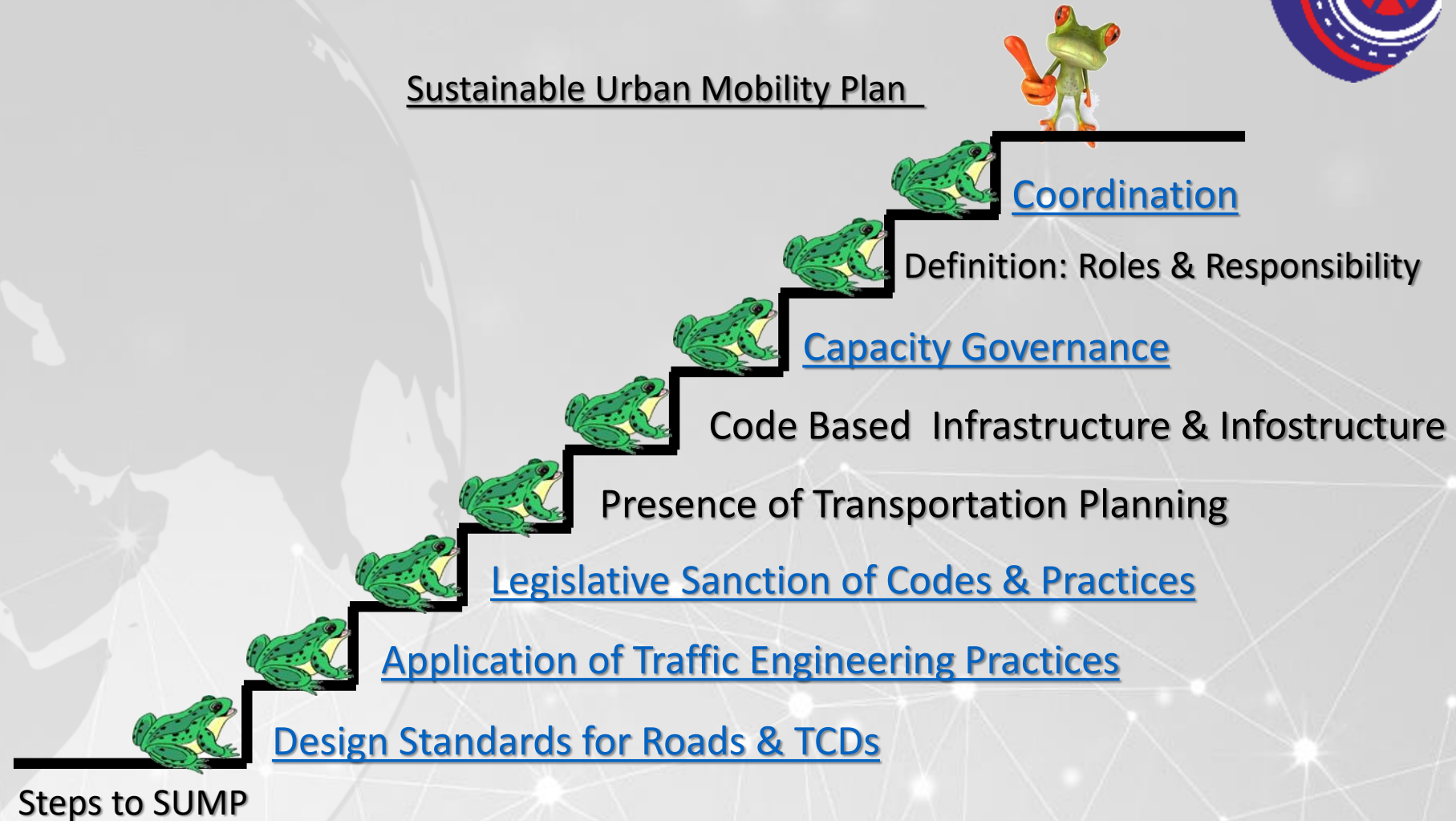
S. No.	CITY	STATUS	S. No.	CITY	STATUS
1	Pune & Pimpri- Chinchwad	Operational	12	Amritsar	Operational
2	Ahmedabad	Operational	13	Bhopal	Operational
3	Delhi	Scrapped	14	Hubli-Dharwad	Operational
4	Jaipur	Operational	15	Kolkata	Under Construction
5	Vijaywada	Operational	16	Mumbai	Under Construction
6	Rajkot	Operational	17	Jodhpur	Under Construction
7	Surat	Operational	18	Chennai	Planning Phase
8	Indore	Operational	19	Coimbatore	Planning Phase
9	Bhubaneshwar	Operational	20	Hyderabad	Planning Phase
10	Raipur & Naya Raipur	Operational	21	Madurai	Planning Phase
11	Vishakhapatnam	Operational	22	Tiruchirapalli	Planning Phase

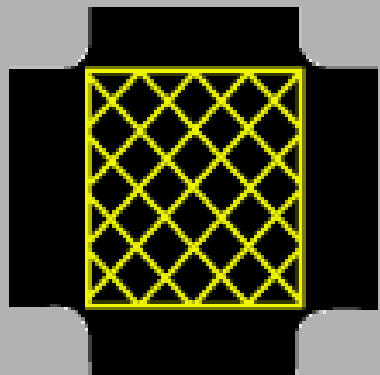


Process Recommendation for Emerging Economies



Sustainable Urban Mobility Plan





Absence of Traffic Engineering

Case Study Traffic Control Devices NCT Delhi

Dr. Rohit Baluja

President - Institute of Road Traffic Education

Director - College of Traffic Management



A Report was presented to Honorable Lt. Governor Mr. Tejendra Khanna

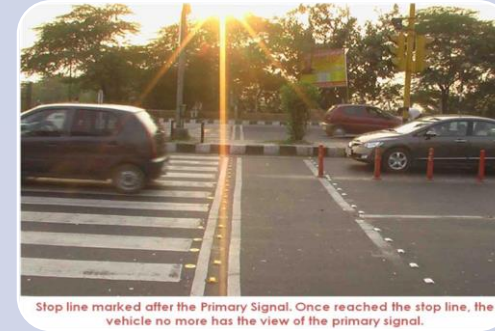
on

May 15, 2007

On the number of daily road traffic violations by
motorized traffic in Delhi



Road Traffic Violations by Motorized Traffic On One Single Day in NCT Delhi :2007



146
million
total daily

138
million
moving
violations

34
million
due to faulty
road & traffic
engg

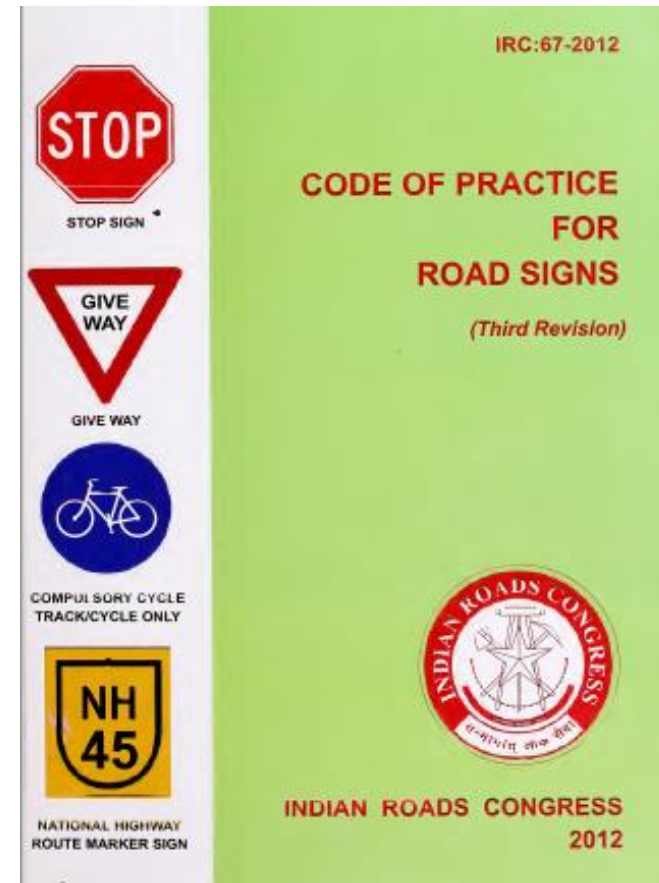
Purpose of Creation of UTTIPEC

- Capacity Building of traffic management organizations: DDA, MCD, PWD, NDMC, Delhi Traffic Police.
- Developing a coordination mechanism with all agencies dealing with traffic management which include DDA, MCD, PWD, NDMC, Delhi Traffic Police, NHAI, Cantonment Board, DMRC, DIMTS amongst others.

Study was conducted between
April 2016 and May 2017

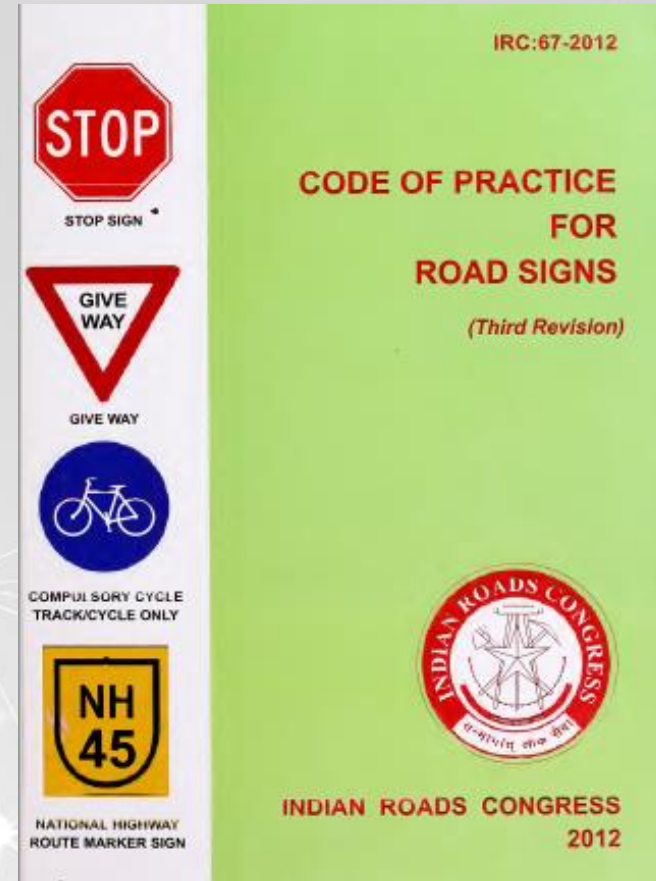
IRC: 67-2012 Guides on Three Categories of Signs in India

- ✓ Regulatory Signs
- ✓ Warning Signs
- ✓ Information Signs

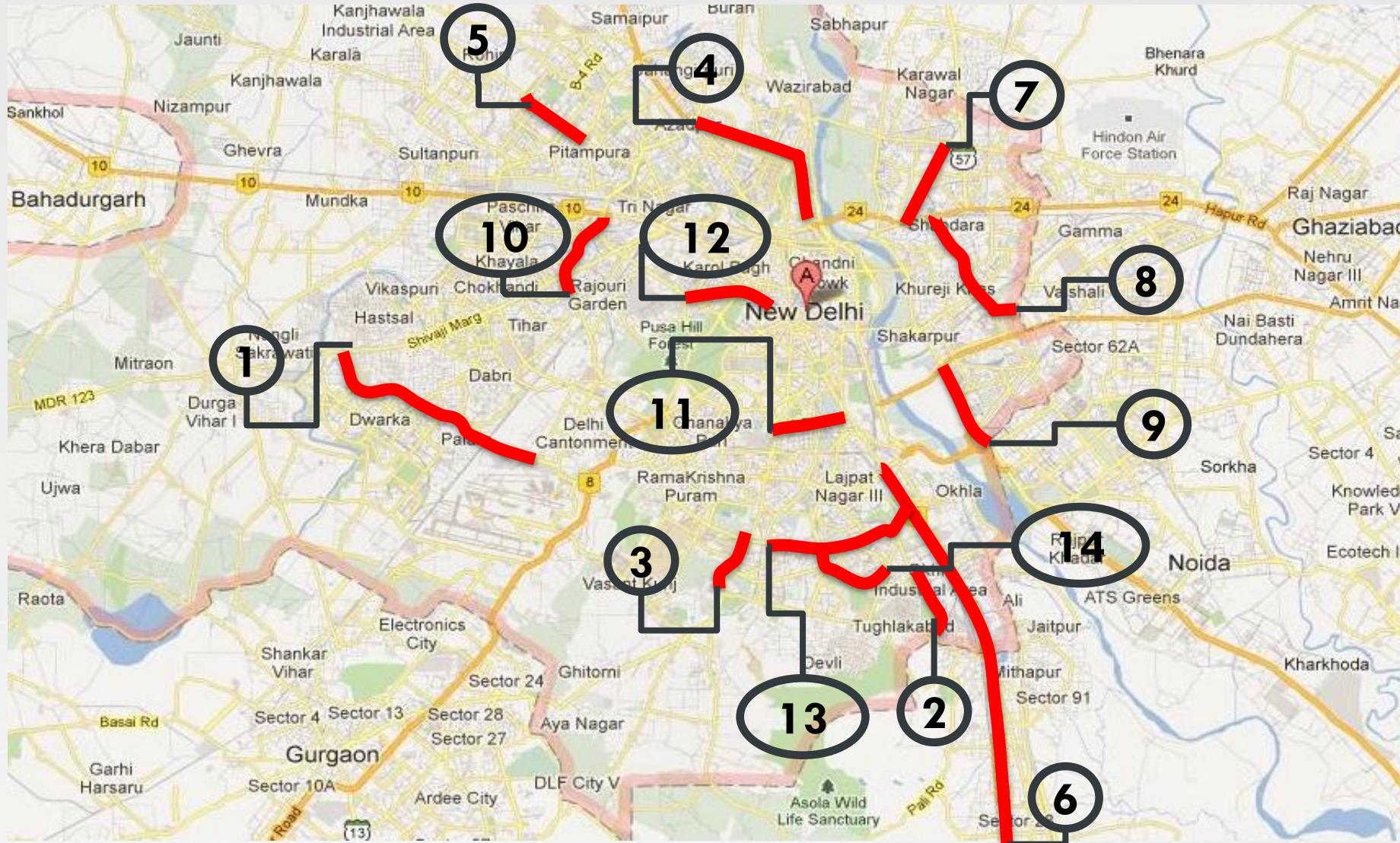


IRC: 67-2012 Guides on Three Categories of Signs in India

- ✓ Regulatory Signs
- ✓ Warning Signs
- ✓ Information Signs



Delhi (NCT) Stretches Covered





70% of Traffic Control Devices
Are not as per Standard

Traffic Situation in Delhi



Traffic Situation in Delhi

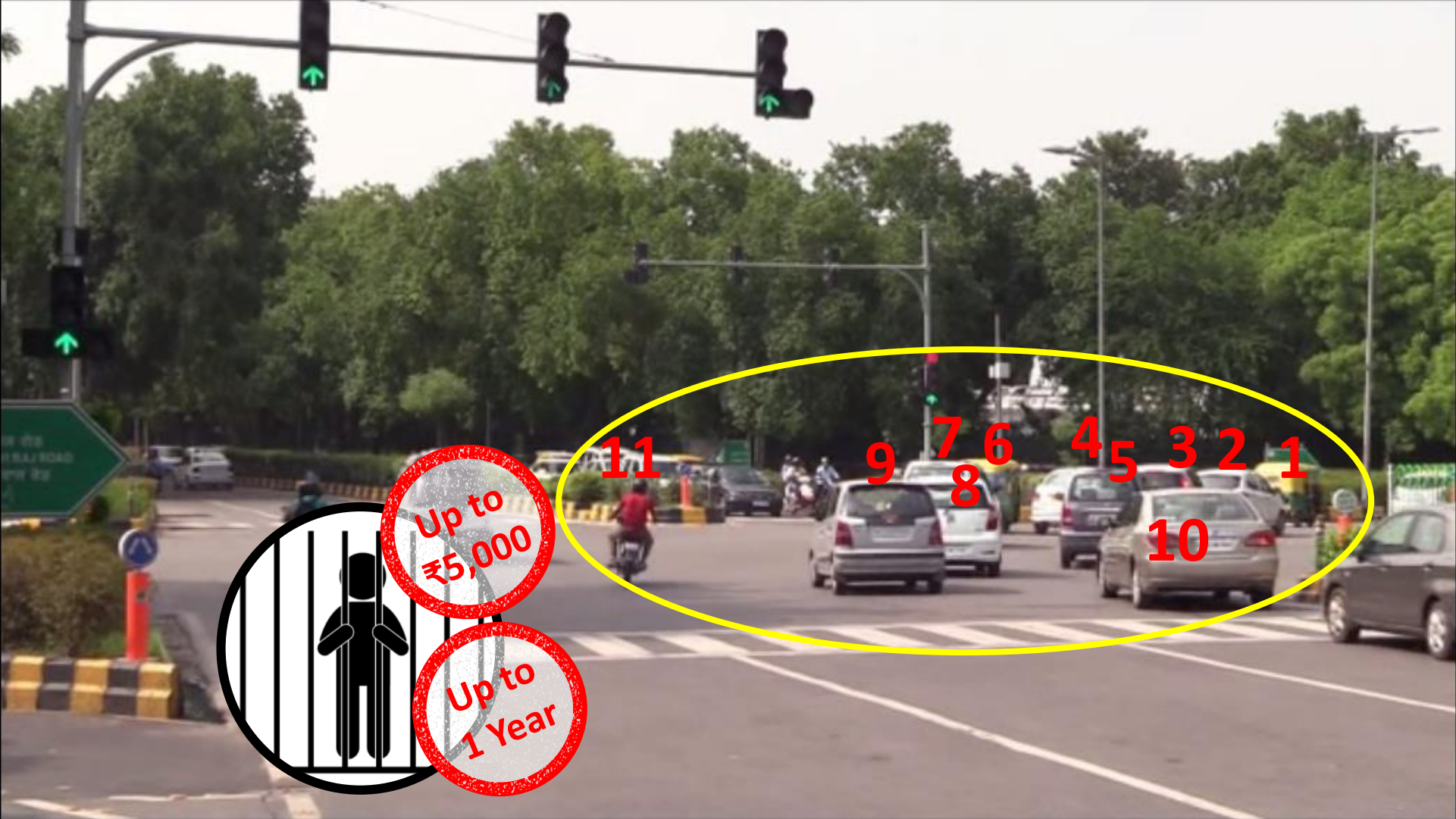


On a 4 Lane Carriageway



**Aurobindo- Tughlaq Road Crossing
Unfortunate Road Accident of Late Mr Gopinath Munde happened at this Junction**





Up to ₹5,000

Up to 1 Year





Sangam Vihar T Junction



Sangam Vihar T Junction



Sangam Vihar T Junction



5

6

4

3

2

1



Up to
₹5,000

Up to
1 Year

Sangam Vihar T Junction





Green Park Nagar
सिंफोर्ट परिसर
Simfort Auditorium
←
ग्रीन पार्क
Green Park

Left Turn Prohibited

STOP

ROADSIDE STOP R2

Provision Crossing







Right Turn Signal



हंसराज गुप्ता मार्ग
Hansraj Gupta Marg
ਹੰਸਰਾਜ ਗੁਪਤਾ ਮਾਰਗ
ہنسراج گپتا روڈ
दिल्ली सरकार



Double Solid line



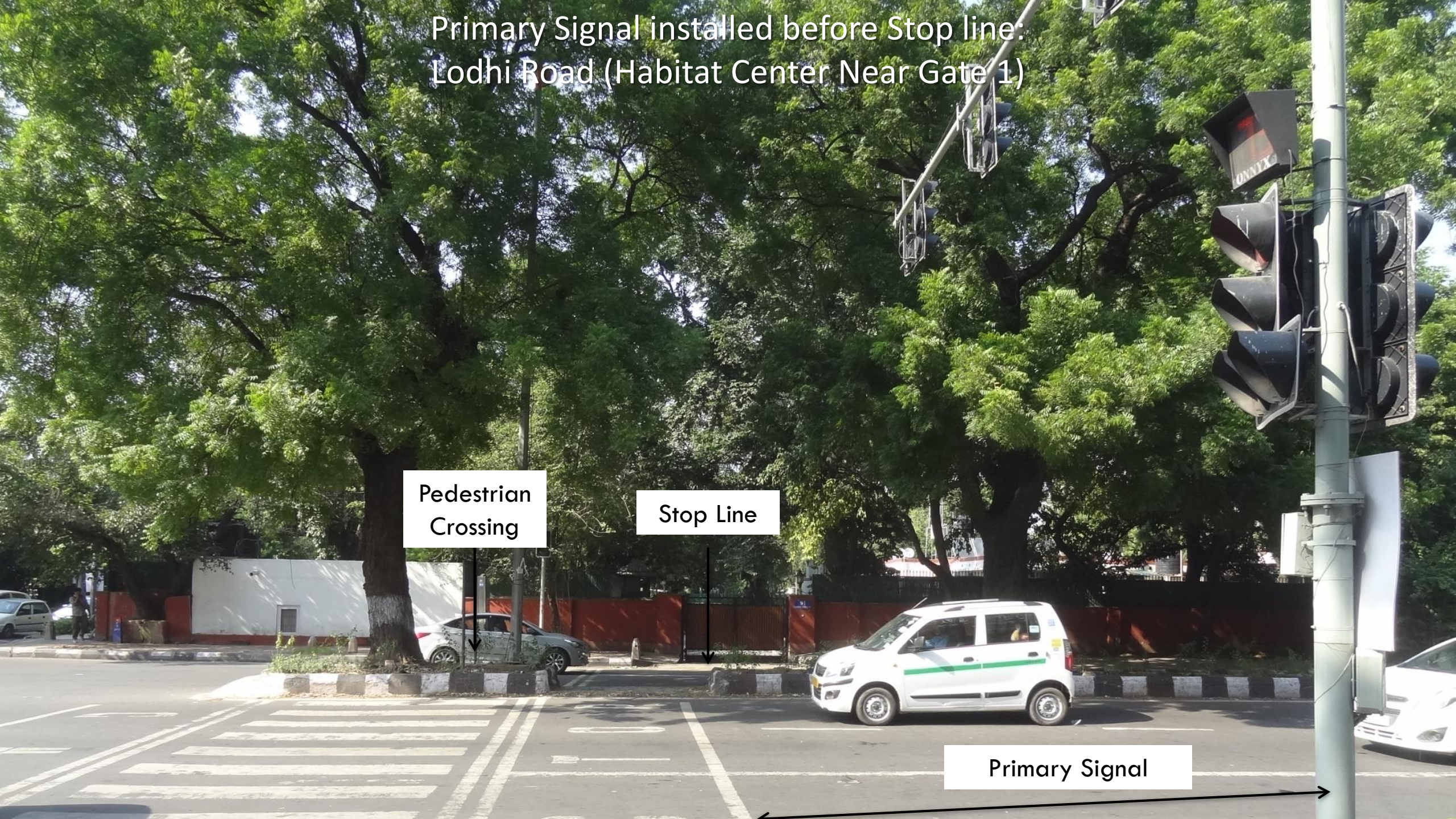
Fine of Crossing Double Continuous Lines: **Section 177A, ₹500**

Primary Signal installed before Stop line:
Lodhi Road (Habitat Center Near Gate 1)

Pedestrian
Crossing

Stop Line

Primary Signal



MOTOR VEHICLES AMENDMENT ACT 2019



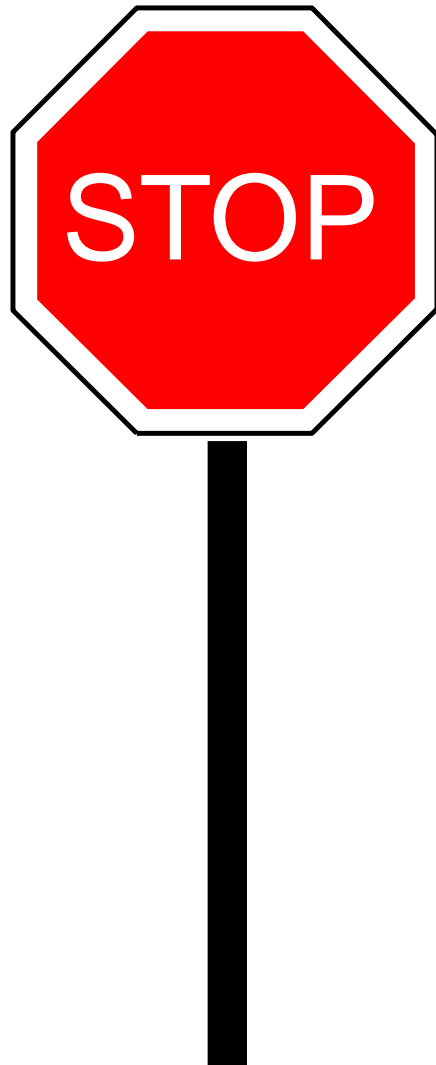
Section 184 : Driving **Dangerously**

The minimum the penalty of this offence of dangerous driving: with imprisonment which may extend to one year but not less than 6 months, or with fine which will extend to ₹ 5,000 but not less than ₹ 1,000/-

the following will constitute dangerous driving:

- a) Jumping a red light
- b) Violating a stop sign
- c) Use of hand held communication devices while driving
- d) Passing or overtaking other vehicles in a manner contrary to law.
- e) Driving against the authorized flow of traffic or
- f) Driving in any manner that falls far below what is expected of a competent and careful driver and where it would be obvious to a competent and careful driver that driving in that manner would be dangerous.

Where to Place Stop Sign

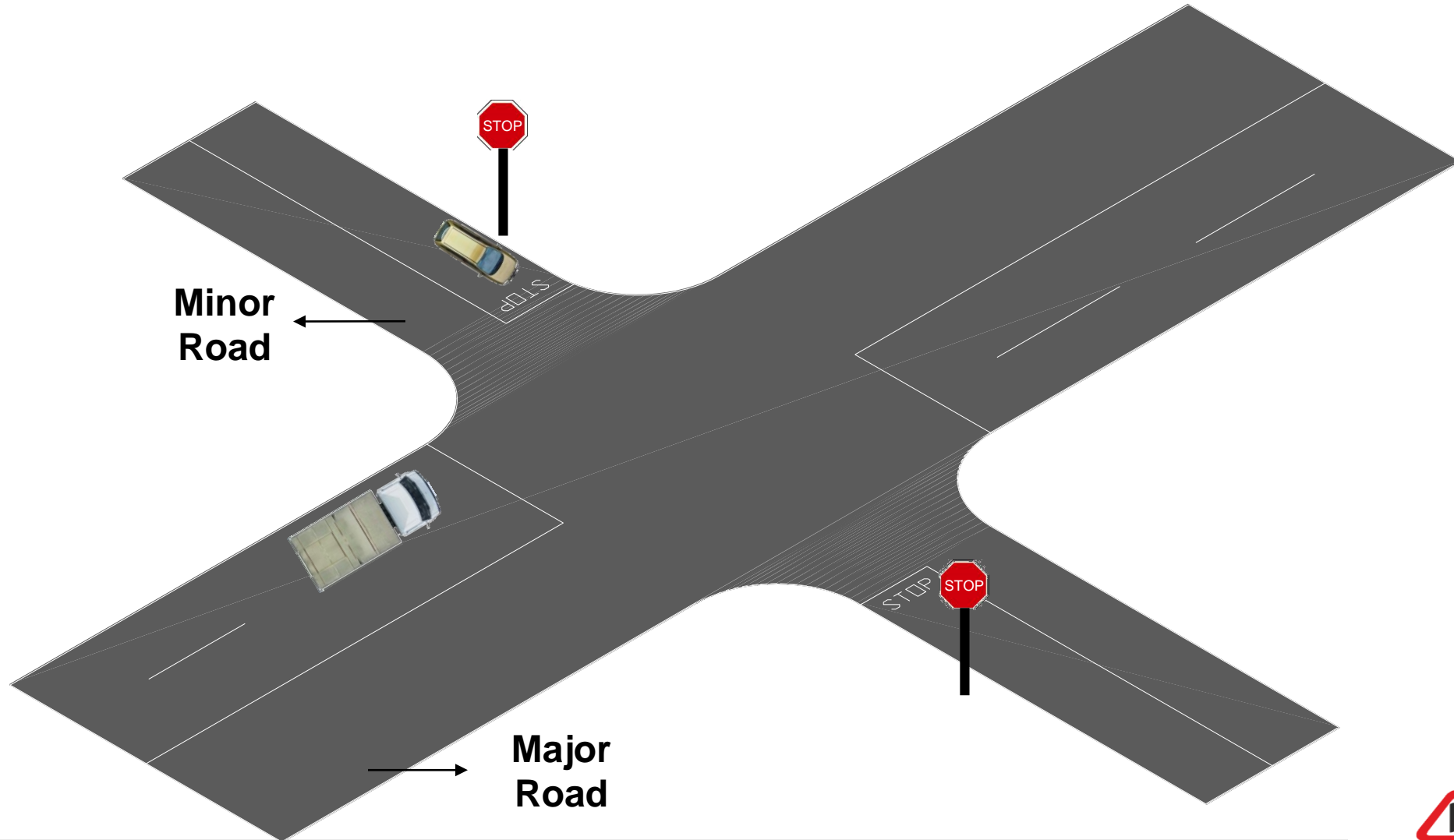


IRC Code Guides

This is for indicating priority for the right of way. The sign is intended for use on roadways where **traffic is required to stop before entering a major road**, and where it is intended that the vehicle shall proceed past the stop line only after ascertaining that this will not cause danger to traffic on the main road.

Installed on a Minor Road which is connecting to a Major Road. **It should not be used at intersection where traffic signals are installed.**

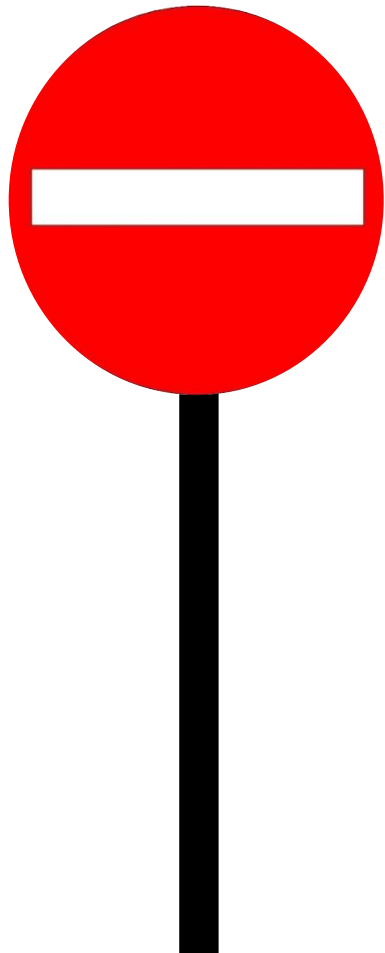
Where to Place Stop Sign





Examples of STOP Sign Not Meeting IRC Code





IRC Code Guides

The signs shall be located at the place where the vehicles not allowed to enter. It is generally erected at the end of one-way road to prohibit traffic entering the roadway in the wrong direction and also at each intersection along the one-way road.

Not Meeting IRC Code- No Entry Sign

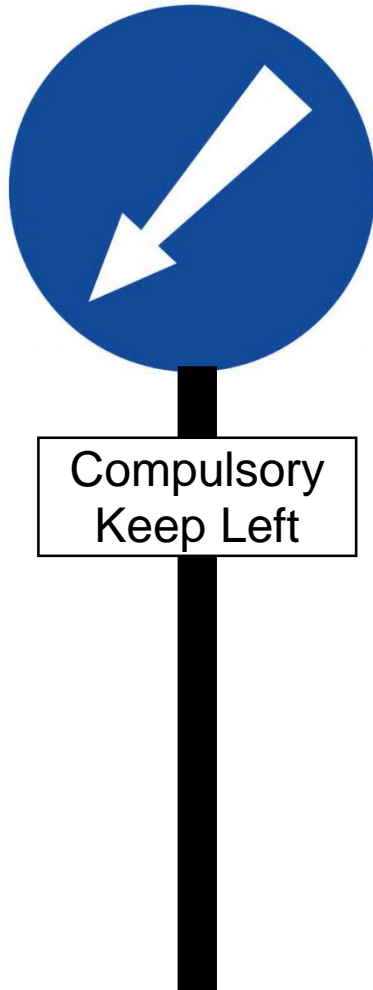




NO ENTRY

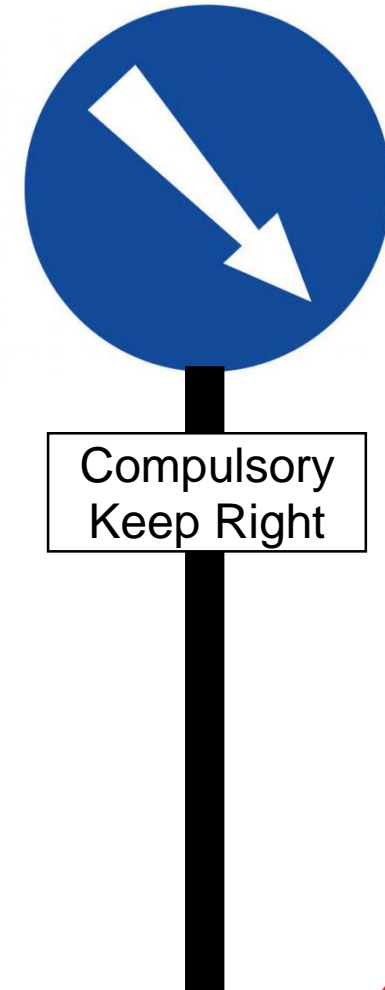


Where to Place Compulsory Keep Left/ Right Sign



IRC Code Guides

- Keep left/Right sign should be used at Traffic Islands, Refuges and at the beginning of Central median of a divided carriageway.







Keep Right

UP-13 L 2040

Analysing Keep Left/ Right Sign



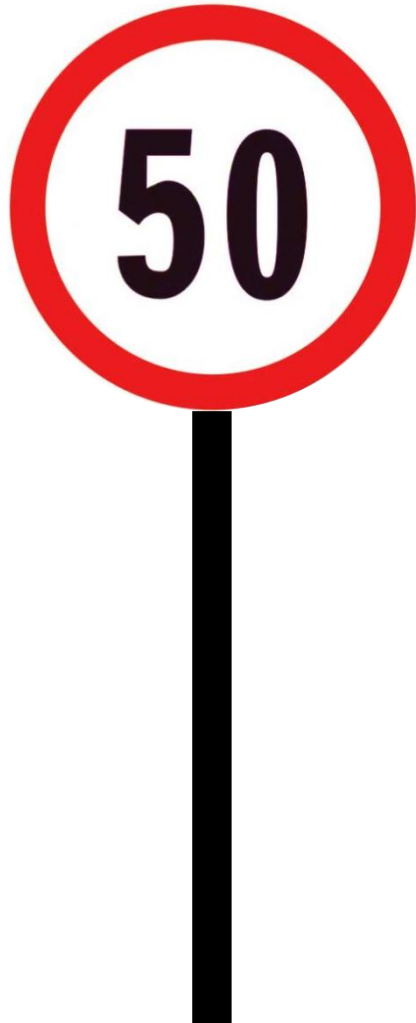
Compulsory Keep Left/ Right Sign	
As per Standard	1 (2%)
Not as per Standard	58 (98%)
Total	59

Not Meeting IRC Code: Compulsory Keep Left/ Right





Where to Place Maximum Speed Limit Sign



IRC Code Guides

The sign shall be located at the beginning of the section of the road or area covered by a speed restriction, with numerals indicating the speed limit in km per hour. The speed limit should be marked in multiples of 5 km per hour.



Where to Place Maximum Speed Limit Sign



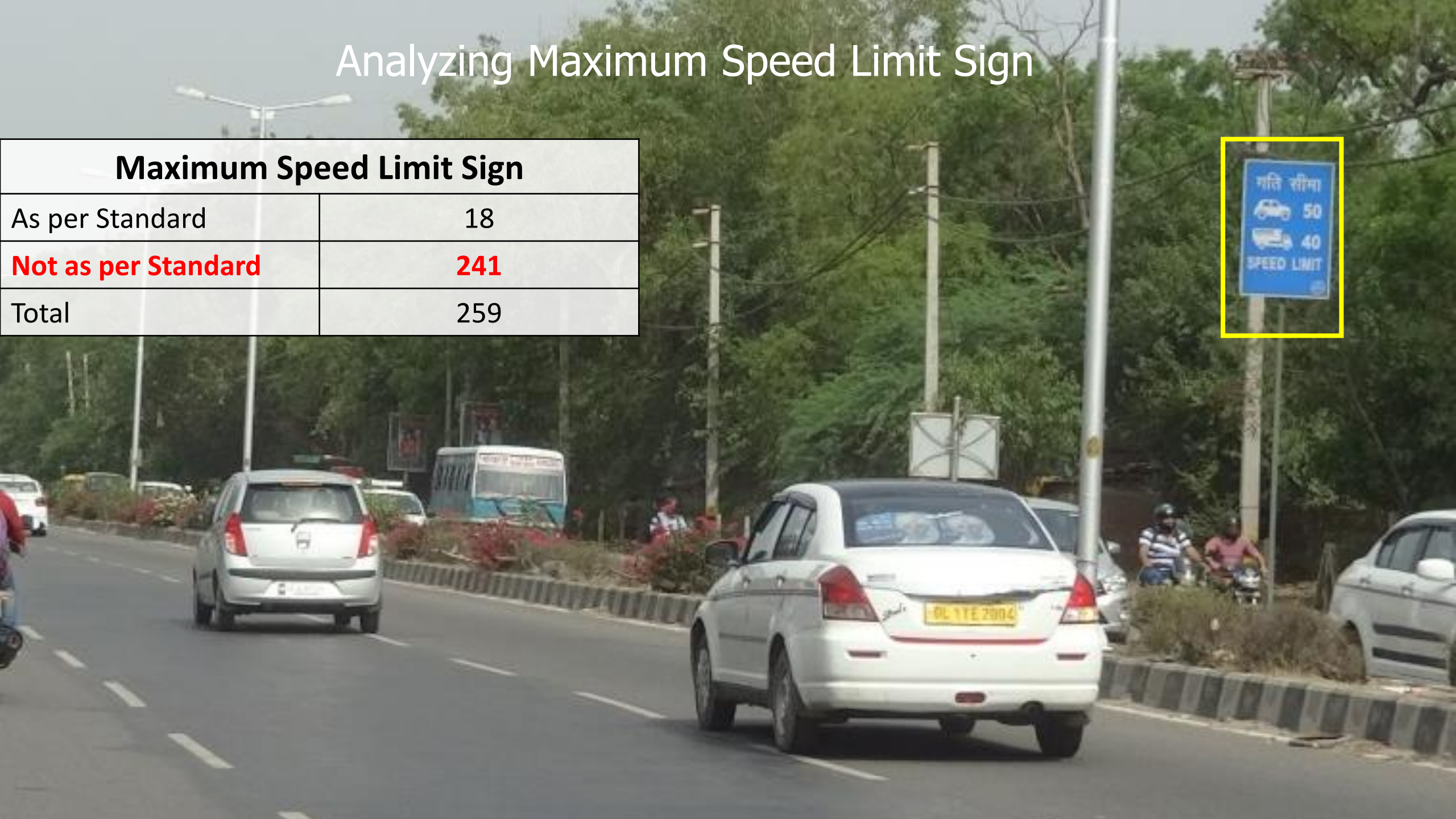
गति सीमा
50
40
SPEED LIMIT

OL 1YE 2902

Analyzing Maximum Speed Limit Sign

Maximum Speed Limit Sign

As per Standard	18
Not as per Standard	241
Total	259



64.35% Registered Two Wheelers in Delhi of the total 88,27,000





DMRC

25^{KM}

SPEED LIMIT

L&T SUGG JV

50
40
Speed Limit

DL3CCE6827

DLN301173

DL8C N 605

Not Meeting IRC Code-Maximum Speed Limit Sign



Obstructed Pedestrian Crossing



the Pedestrians shall have sufficient space on the footpath to wait. The **obstructions** such as trees, sign post, lamp post etc. **shall be cleared in the path of pedestrians** at either end of the pedestrian crossing.

Obstructed Pedestrian Crossing





सत्यमेव जयते

SUPREME COURT COMMITTEE ON ROAD SAFETY

Chairman : Justice K.S. RADHARISHNAN

Members : S. Sundar

Dr. Nishi Mittal

Secretary : S.D. Banga

Tel. No. : +91-11-23060597

Email : roadsafetysc@gmail.com

No. 10/2019 /CoRS

Date: 24th June, 2019

To
The Principal Secretary (Transport),
Govt. of NCT of Delhi
Delhi
Email: commtpt@nic.in

Sub: **Enforcement of traffic laws in the NCT of Delhi**

Sir,

The Committee has been informed by the Institute of Road Traffic Education (IRTE) that they have conducted a study in the year 2017 on the uniformity and standard application of Traffic Control Devices (TCDs).

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4. The Committee has taken an adverse note of the above findings and desires the concerned authorities to take appropriate action to ensure that;
- (i) All the Road Signage, Road Markings and Traffic Signals should conform to the IRC specifications
 - (ii) Traffic Police, transport officers and road engineers should be imparted need based capacity building training in Motor Vehicle Act, 1988, Central Motor Vehicle Rules, 1989 the Motor Vehicles (Driving) Regulations 2017. These agencies should also be apprised of the importance of the IRC Codes of Practice related to these TCDs.
 - (iii) Enforcement of traffic laws by the State Agencies should be strategically planned and should be as per the extant laws and evidence based.
5. The IRTE would be happy to provide any specific information which the NCT of Delhi may require in this area.

Yours faithfully,

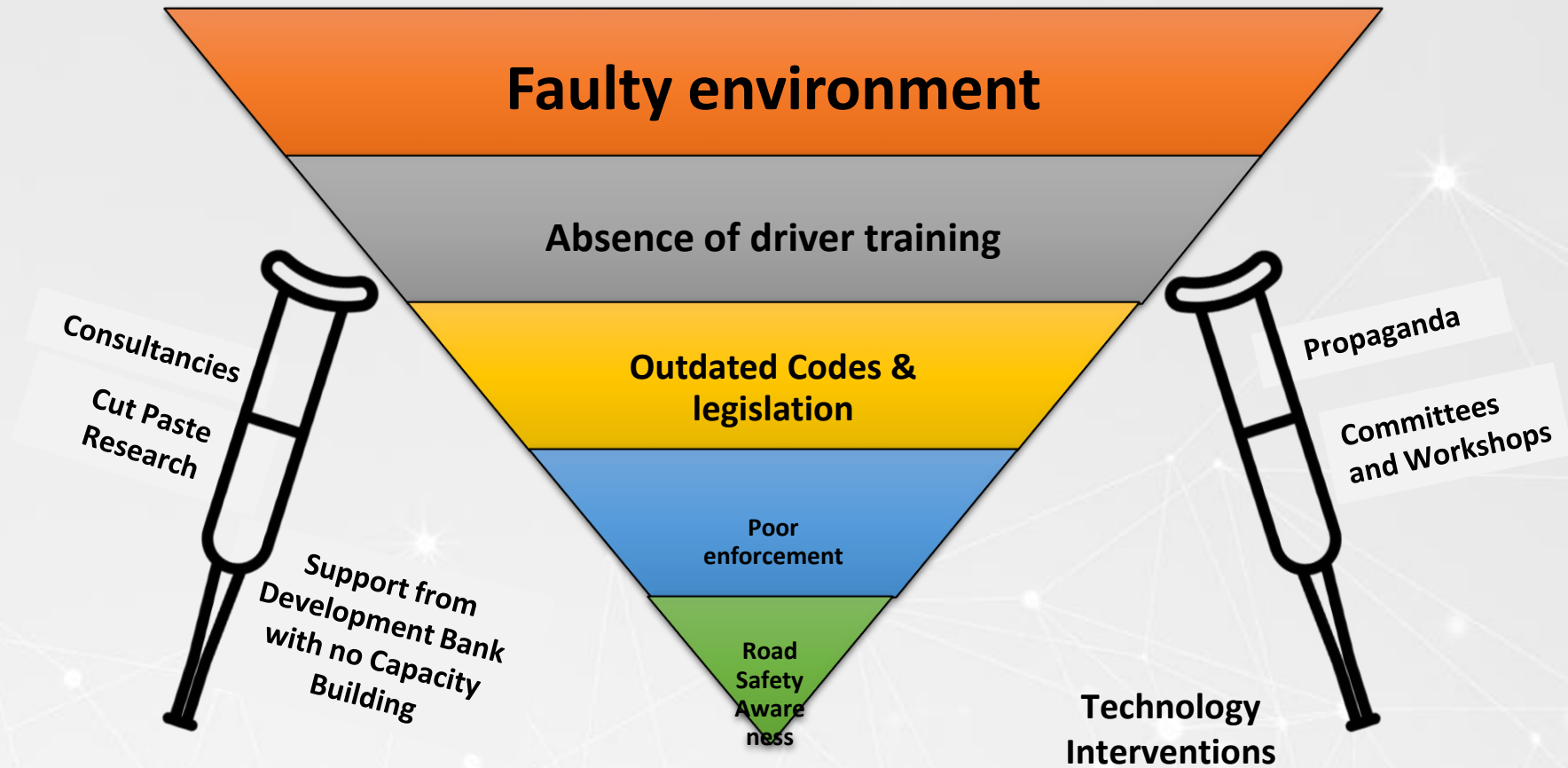
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Confused pyramid of road safety



Traffic Engineering as a subset of Traffic Management is a Science

which deals with the application of techniques, standards and legislation in order to strategize the movement of traffic within the required capacity and layout of roads and highways, safely, conveniently, economically & efficiently without degenerating the environment.

Smart Mobility Vision



Smart Mobility Vision

Sustainability

SUMP

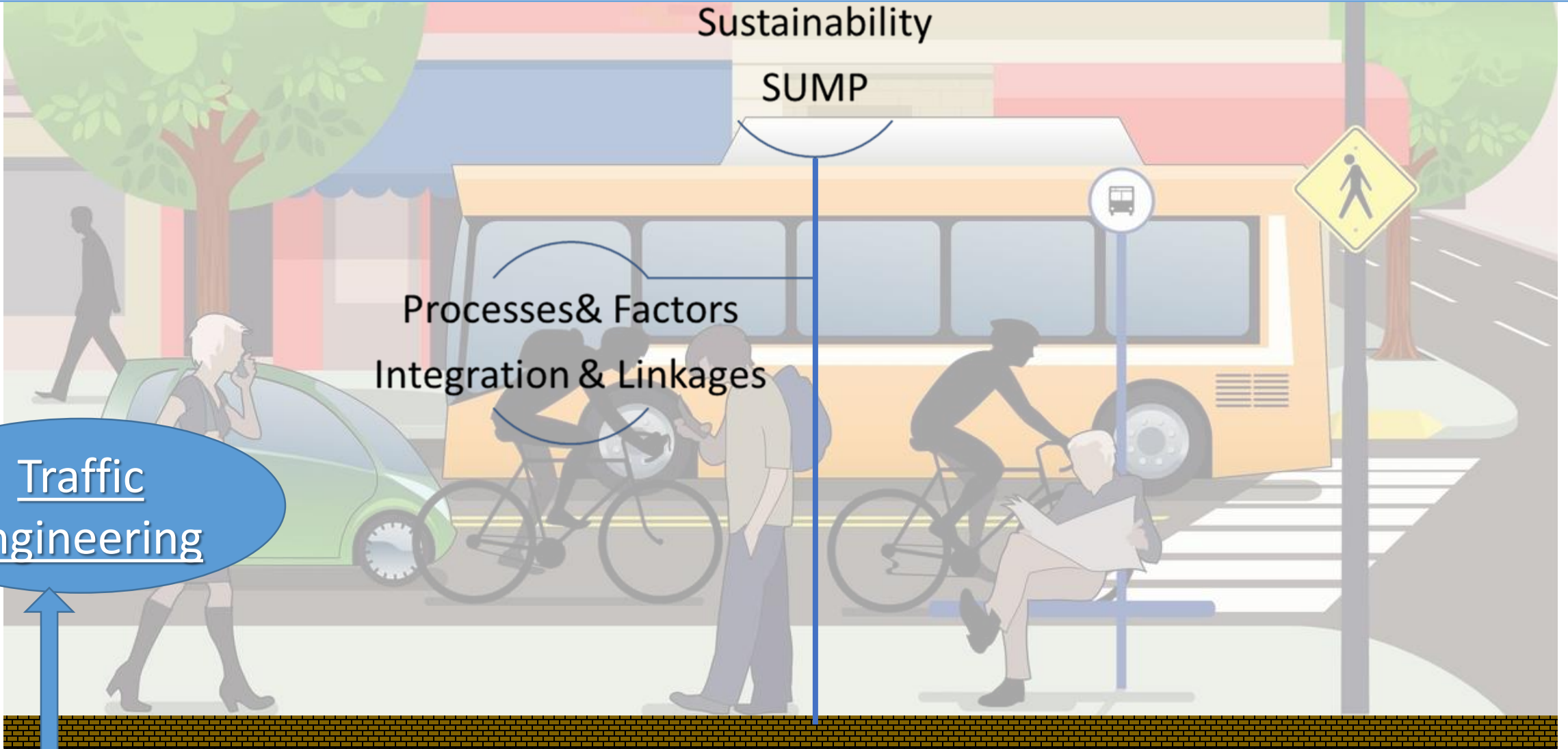
Processes & Factors
Integration & Linkages

Traffic Engineering

Infrastructure

Definition MRV

Constitution
Laws & Codes





THANK YOU



Lets make Global Roads Accident-free,
Pollution-free and Stress-free, through
Education, Discipline, Research
and Planning.

That's the Philosophy of IRTE,

a non-profit institution
for making people aware -
of the value of life,
so that happiness prevails!

INSTITUTE OF ROAD TRAFFIC EDUCATION | COLLEGE OF TRAFFIC MANAGEMENT

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For further details, please contact: +91-129-2477011, 7291987507 – 8 | Email us at: ctm@irte.com