Rural Road Safety Course

OVERVIEW OF ROAD SAFETY SCENARIO

सड़क सुरक्षा का अवलोकन

FOR CIRCULATION TO PARTICIPANTS OF NRIDA TRAINING PROGRAMS

Presentation Overview

- **Why Should We Be Concerned ?**
- **World Scenario**
- **Indian Scenario**
- **Causes of Accidents**
- **Mitigation Measures**

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© WHO

GOAL 3. Target 3.6

By 2030, halve the number of global deaths and injuries from road traffic accidents

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Why Should We Be Concerned

?

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"More than **5,000 pedestrians are killed** on the world's roads **each week** because their needs have been neglected for decades, often in favor of motorized transport."

Dr. Etienne Krug
Director, WHO

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"The number of **pedestrian fatalities** due to road accidents in India is **equivalent** to losing a fully loaded **Boeing 777 aircraft every week**"

MoRTH (2018)

Is this a Big Number

?

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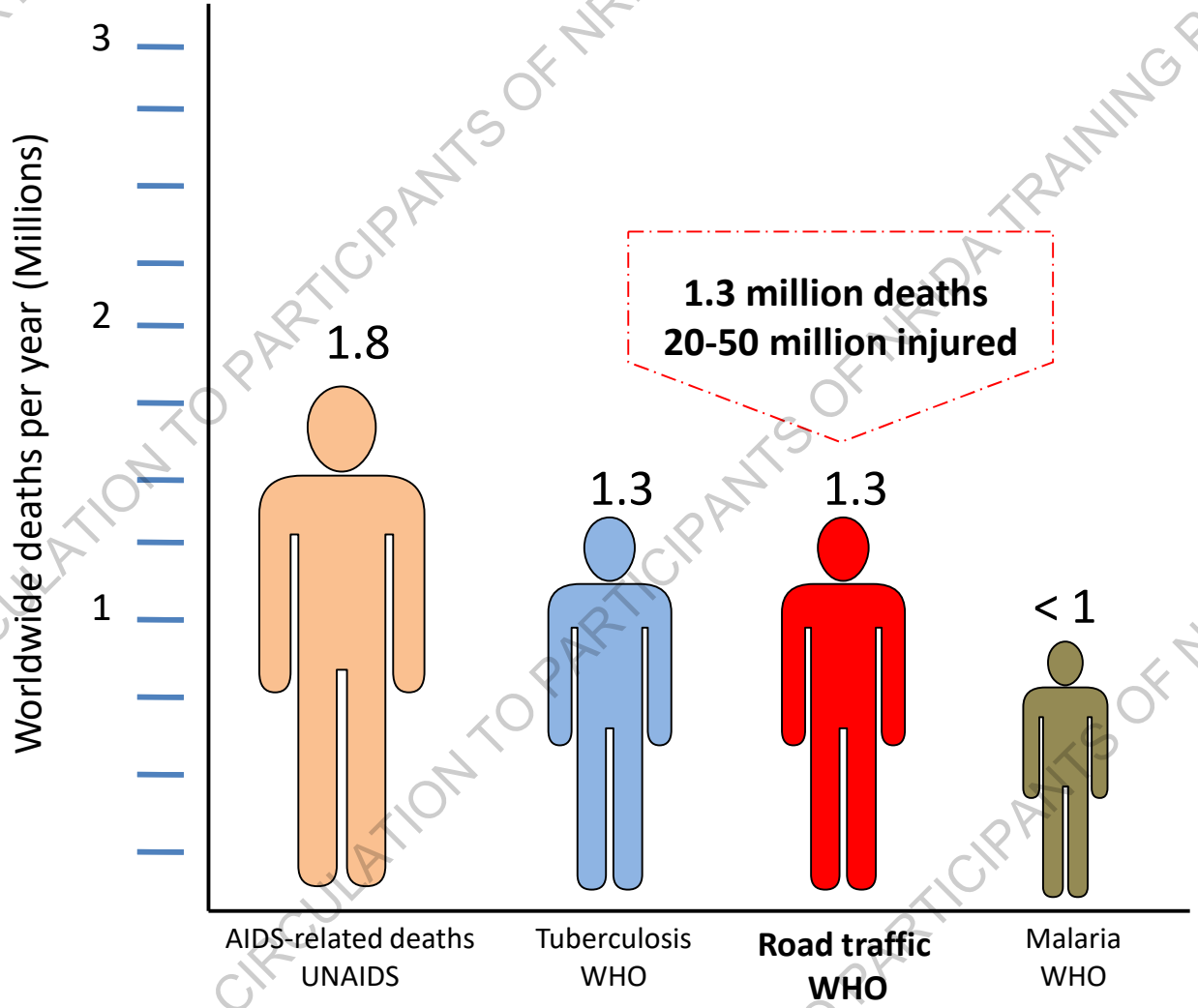
Road Traffic Deaths: The Facts



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ROAD TRAFFIC DEATHS AND INJURIES: A FAST GROWING GLOBAL EPIDEMIC

2004		2020	
1	Ischaemic heart disease	1	Ischaemic heart disease
2	Cerebrovascular disease	2	Cerebrovascular disease
3	Lower respiratory infections	3	Chronic obstructive pulmonary disease
4	Chronic obstructive pulmonary disease	4	Lower respiratory infections
5	Diarrhoeal diseases	5	Road traffic crashes
6	HIV/AIDS	6	Trachea, bronchus, lung cancers
7	Tuberculosis	7	Diabetes mellitus
8	Trachea, bronchus, lung cancers	8	Hypertensive heart disease
9	Road traffic crashes	9	Stomach cancer
10	Prematurity and low birth weight		HIV/AIDS
11	Neonatal infections and other		Nephritis and nephrosis
12	Diabetes mellitus		Suicide
13	Malaria		Liver cancer
14	Hypertensive heart disease		Colon and rectum cancer
15	Birth asphyxia and birth trauma		Oesuphagus cancer
16	Suicide		Homicide
17	Stomach cancer		Alzheimer and other dementias
18	Cirrhosis of the liver		Cirrhosis of the liver
19	Nephritis and nephrosis		Breast cancer
20	Colon and rectum cancers		Tuberculosis
22	Homicide		

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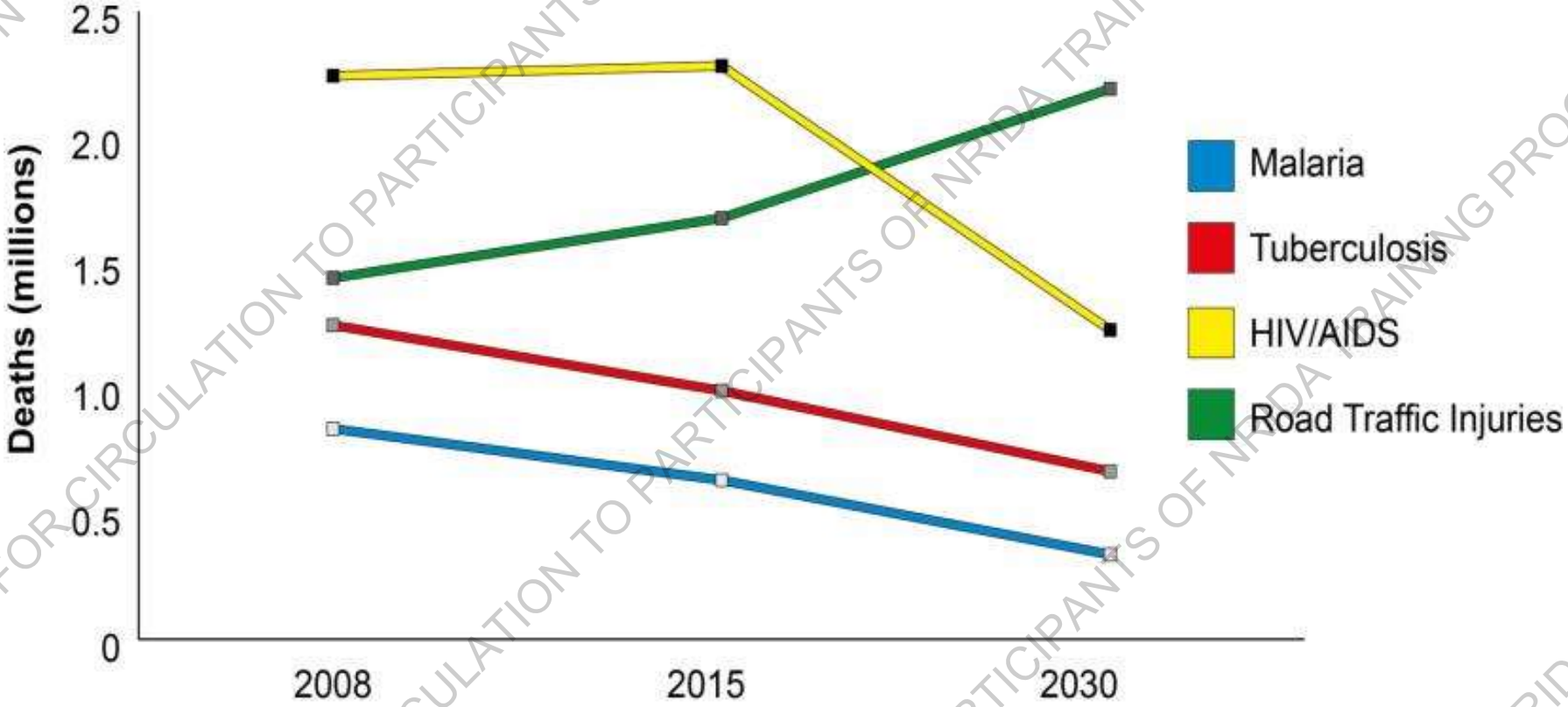
ROAD TRAFFIC DEATHS AND INJURIES: THE FORGOTTEN KILLER



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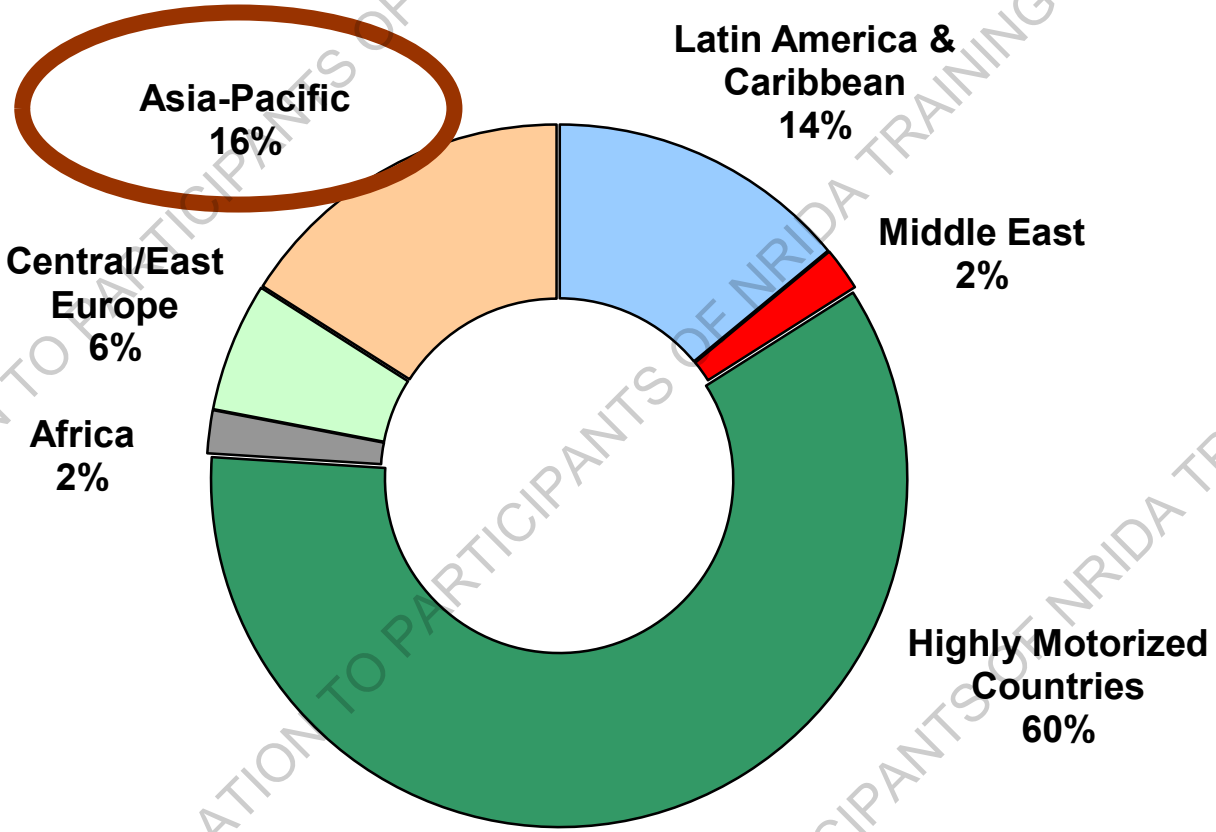
Global Population of Vehicles



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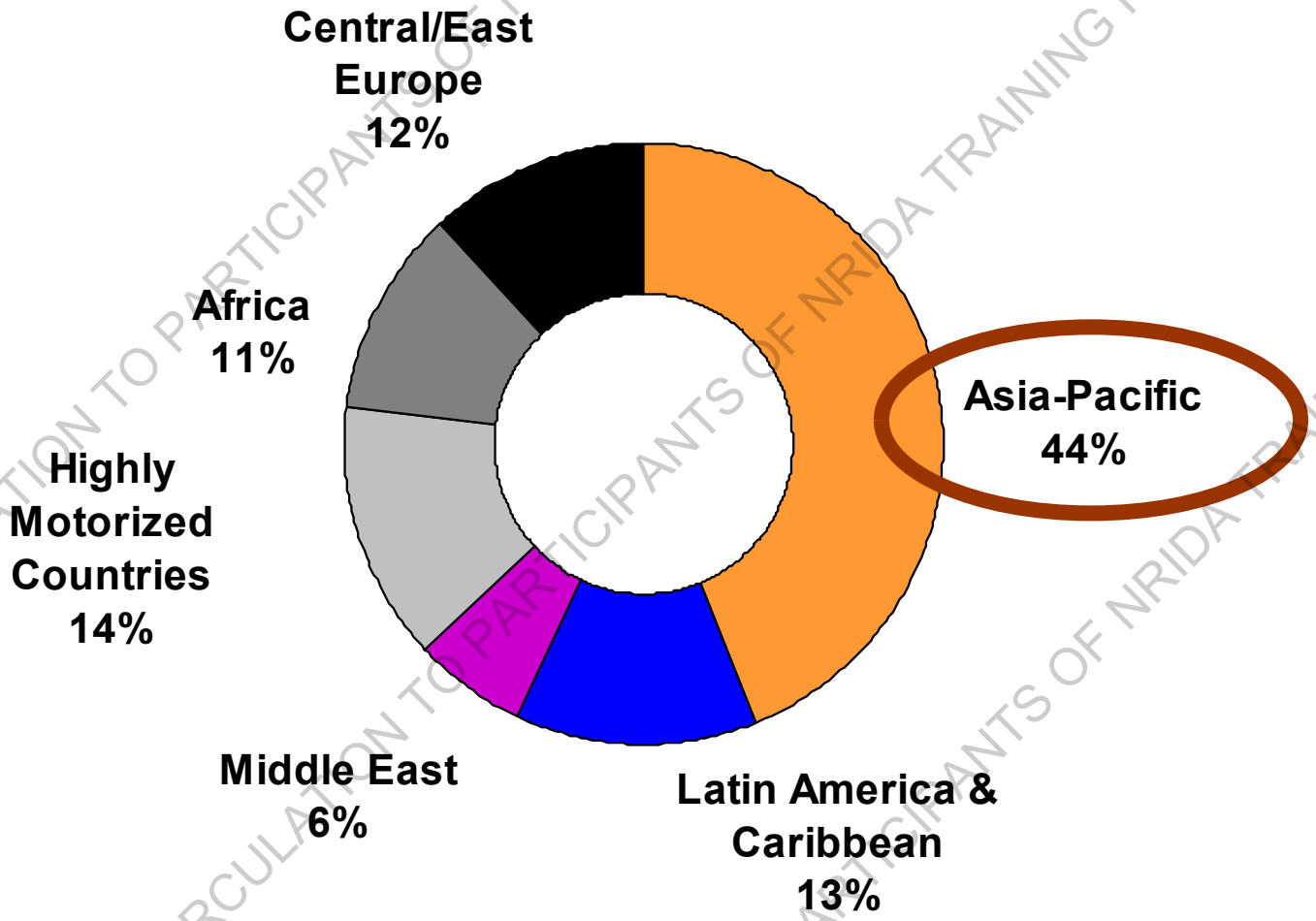
Global Fatalities Due to RTI



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Let’s look at INDIA

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ROAD ACCIDENTS IN INDIA, 2016

17 deaths on India's roads every hour, Chennai and Delhi most dangerous

Official data show more people died on Indian roads in 2016 than in 2015; UP and Tamil Nadu accounted for the largest numbers of fatalities

BIG NUMBERS

IN THE YEAR		EVERY DAY		EVERY HOUR	
ACCIDENTS	DEATHS	ACCIDENTS	DEATHS	ACCIDENTS	DEATHS
4,80,652	1,50,785	1,317	413	55	17

FEWER ACCIDENTS, MORE DEATHS

	2015	2016	% change
Accidents	5,01,423	4,80,652	–4.1
Killed	1,46,133	1,50,785	3.2
Injured	5,00,279	4,94,624	–1.1
Severity*	29.1	31.4	7.9

*Accident Severity is the number of persons killed per 100 accidents

HIGHWAYS NOT THE BIGGEST KILLERS

Road type	Share of accidents	Share of accident deaths	Share of persons injured
National Highways	29.6	34.5	29.6
State Highways	25.3	27.9	25.8
Other roads	45.1	37.6	44.6

All figures in per cent

SPEEDING BIGGEST PROBLEM, MOBILES AN ISSUE TOO

SPEEDING caused 66.5% of all road accidents and 61% of deaths

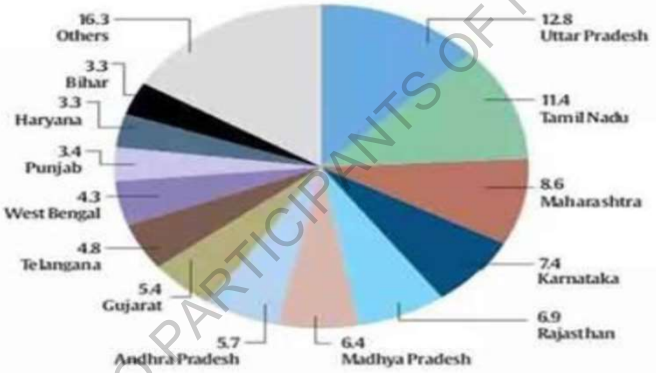
OVERTAKING caused 7.3% of all road accidents and 7.8% of deaths

INTAKE OF ALCOHOL/DRUGS caused 3.7% of all road accidents and 5.1% of deaths

TALKING OVER MOBILES caused 4,976

84%

DEATHS IN 13 STATES, UP ON TOP

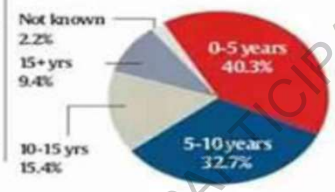


SPEEDBUMPS & POTHOLES KILLED 15 EVERY DAY

SPEEDBREAKERS CAUSED
9,583 road accidents and
3,396 people killed

POTHOLES LED TO
6,424 road accidents and
2,324 fatalities

NEWEST VEHICLES IN MOST ACCIDENTS



DELHI, CHENNAI ROADS MOST DANGEROUS

CHENNAI: LARGEST NUMBER OF ROAD ACCIDENTS,
7,486

DELHI: LARGEST NUMBER OF ROAD ACCIDENT DEATHS,
1,591

CHENNAI: LARGEST NUMBER OF INJURED PERSONS,
7,349

LUDHIANA: HIGHEST ACCIDENT SEVERITY,
69.9

50 CITIES WITH MILLION-PLUS POPULATIONS ACCOUNTED FOR
- 18.2% of all road accidents
- 11.8% of all road accident fatalities
- 16.7% of all persons injured in road accidents

CITIES WITH THE MOST DANGEROUS ROADS

Cities	No. of accidents
Chennai	7,486
Delhi	7,375
Bengaluru	5,323
Indore	5,143
Kolkata	4,104
Mumbai	3,379

Source: Road Accidents in India, 2016, published by Transport Research Wing, Ministry of Road Transport & Highways, Government of India. Compiled on the basis of information collected from the police headquarters of various states and Union Territories and Million Plus Cities through specific designated nodal officers — DGP/ADGP, Crime; ADGP, Traffic; Director, State Crime Records Bureau — in the 17-item

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UNDERSTANDING THE SCALE OF ROAD DEATHS IN INDIA

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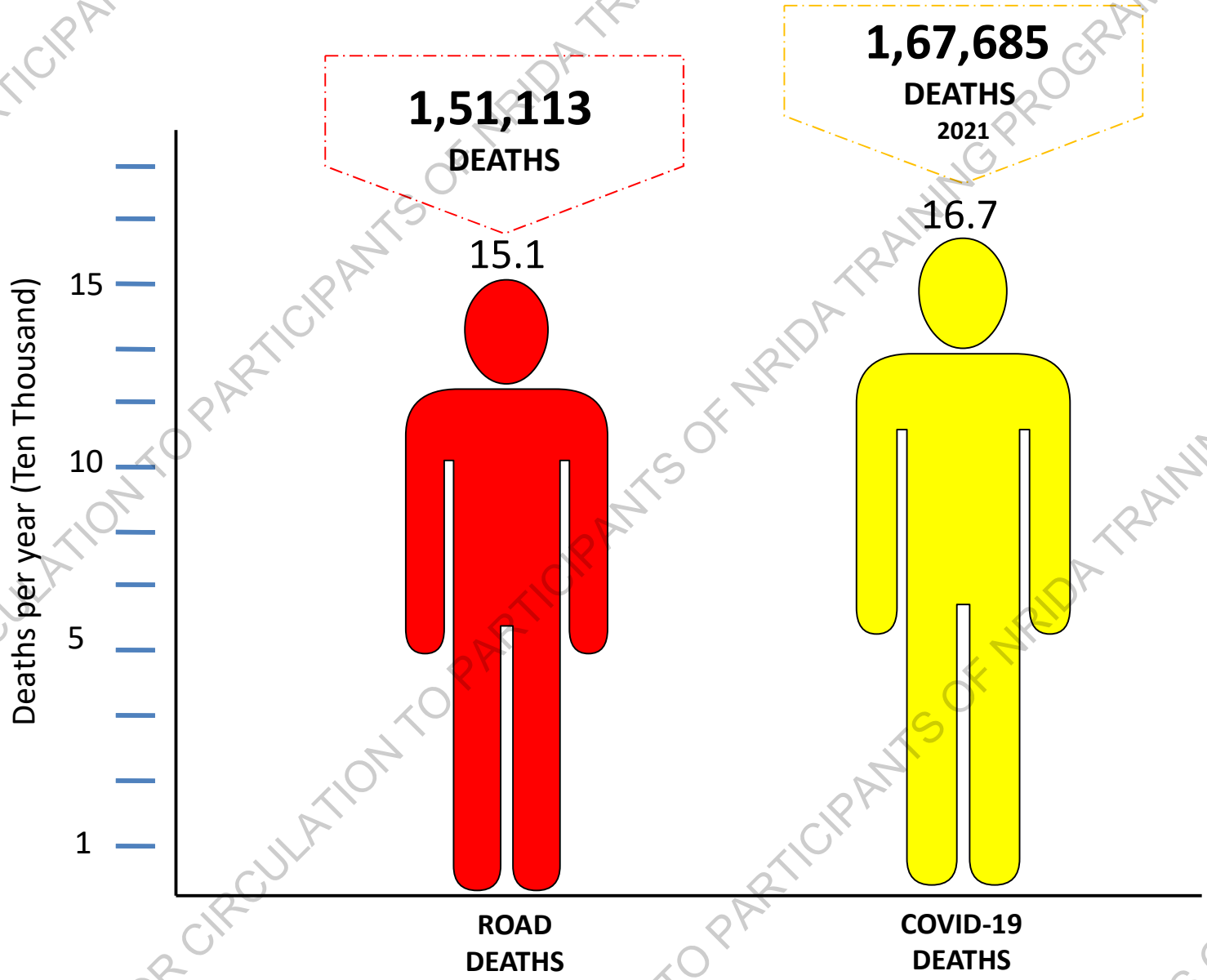
Road Traffic Deaths: INDIA



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That's Why We Should We Be Concerned

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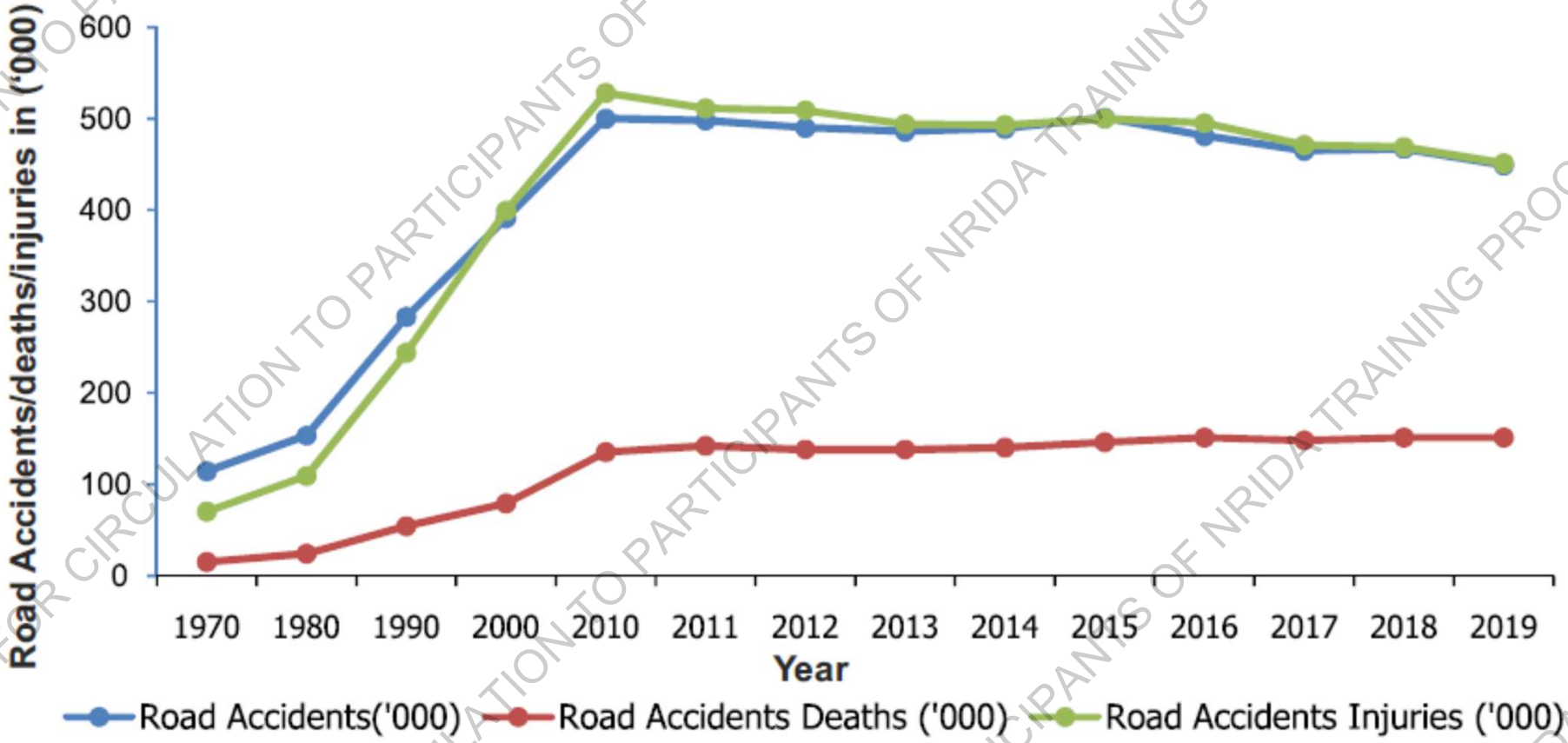
Road Traffic Deaths: INDIA



FOR CIRCULATION TO PARTICIPANTS OF NRIDA TRAINING PROGRAMS

Road Category	1970–71	1980–81	1990–91	2000–01	2010–11	2015–16	2020-21	
National Highways	23,838 (2.61%)	31,671 (2.13%)	33,650 (1.45%)	57,737 (1.71%)	70,934 (1.52%)	101,011 (1.80%)	**151,000 (2.51%)**	**Road Length (km)**
State highways	56,765 (6.20%)	94,359 (6.35%)	127,311 (5.47%)	132,100 (3.92%)	163,898 (3.50%)	176,166 (3.14%)	**186,528 (3.00%)**	
District roads	276,833 (30.26%)	421,895 (28.40%)	509,435 (21.89%)	736,001 (21.82%)	998,895 (21.36%)	561,940 (10.03%)	**632,154 (10.17%)**	
Rural roads	354,530 (38.75%)	628,865 (42.34%)	1,260,430 (54.16%)	1,972,016 (58.46%)	2,749,804 (58.80%)	3,935,337 (70.23%)	**4,535,511 (72.97%)**	
Urban roads	72,120 (7.88%)	123,120 (8.29%)	186,799 (8.03%)	252,001 (7.47%)	411,679 (8.80%)	509,730 (9.10%)	**544,683 (8.76%)**	
Project roads	130,893 (14.31%)	185,511 (12.49%)	209,737 (9.01%)	223,665 (6.63%)	281,628 (6.02%)	319,109 (5.70%)	**354,921 (5.71%)**	
Total	**9,14,979**	**14,85,421**	**23,27,362**	**33,73,520**	**46,76,838**	**56,03,293**	**62,15,797**	

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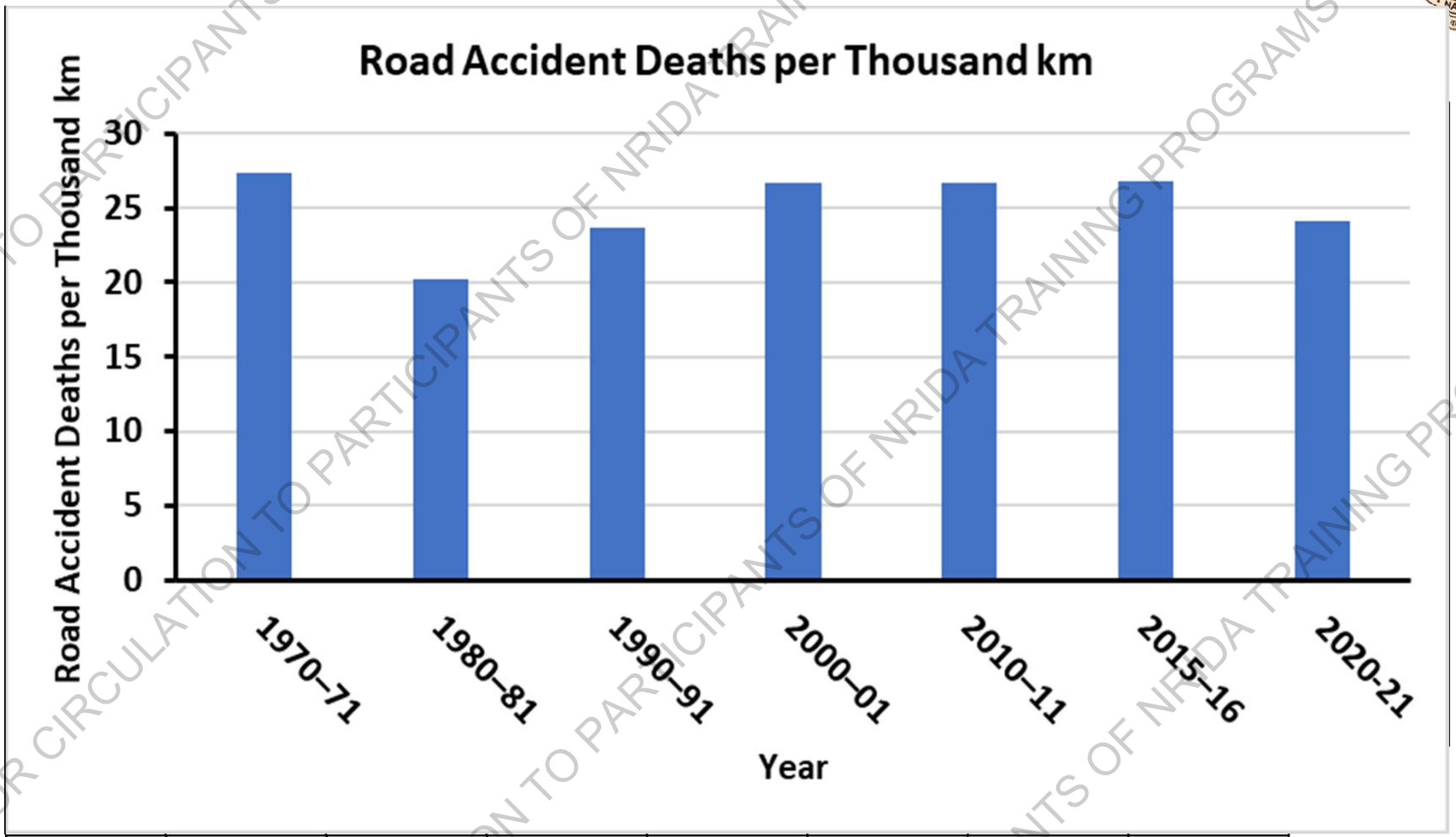
Total	**9,14,979**	**14,85,421**	**23,27,362**	**33,73,520**	**46,76,838**	**56,03,293**	**62,15,797**	
Road Accident Deaths	**25,000**	**30,000**	**55,000**	**90,000**	**1,25,000**	**1,50,000**	**1,50,000**	
Fatalities per Thousand km	**27.32**	**20.20**	**23.63**	**26.68**	**26.73**	**26.77**	**24.13**	

FOR CIRCULATION TO PARTICIPANTS OF NRIDA TRAINING PROGRAMS



Fatalities per Thousand km	27.32	20.20	23.63	26.68	26.73	26.77	24.13

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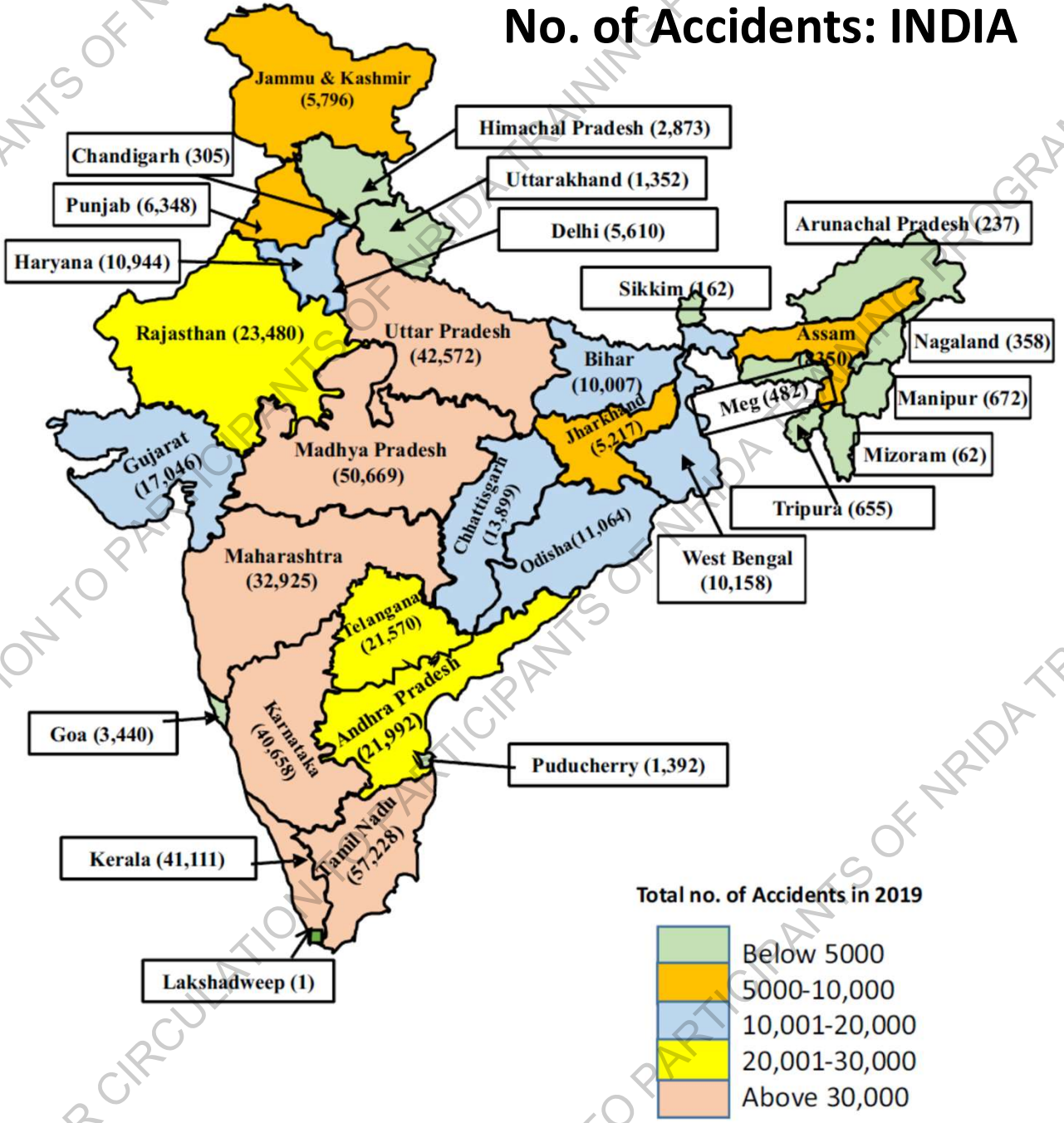
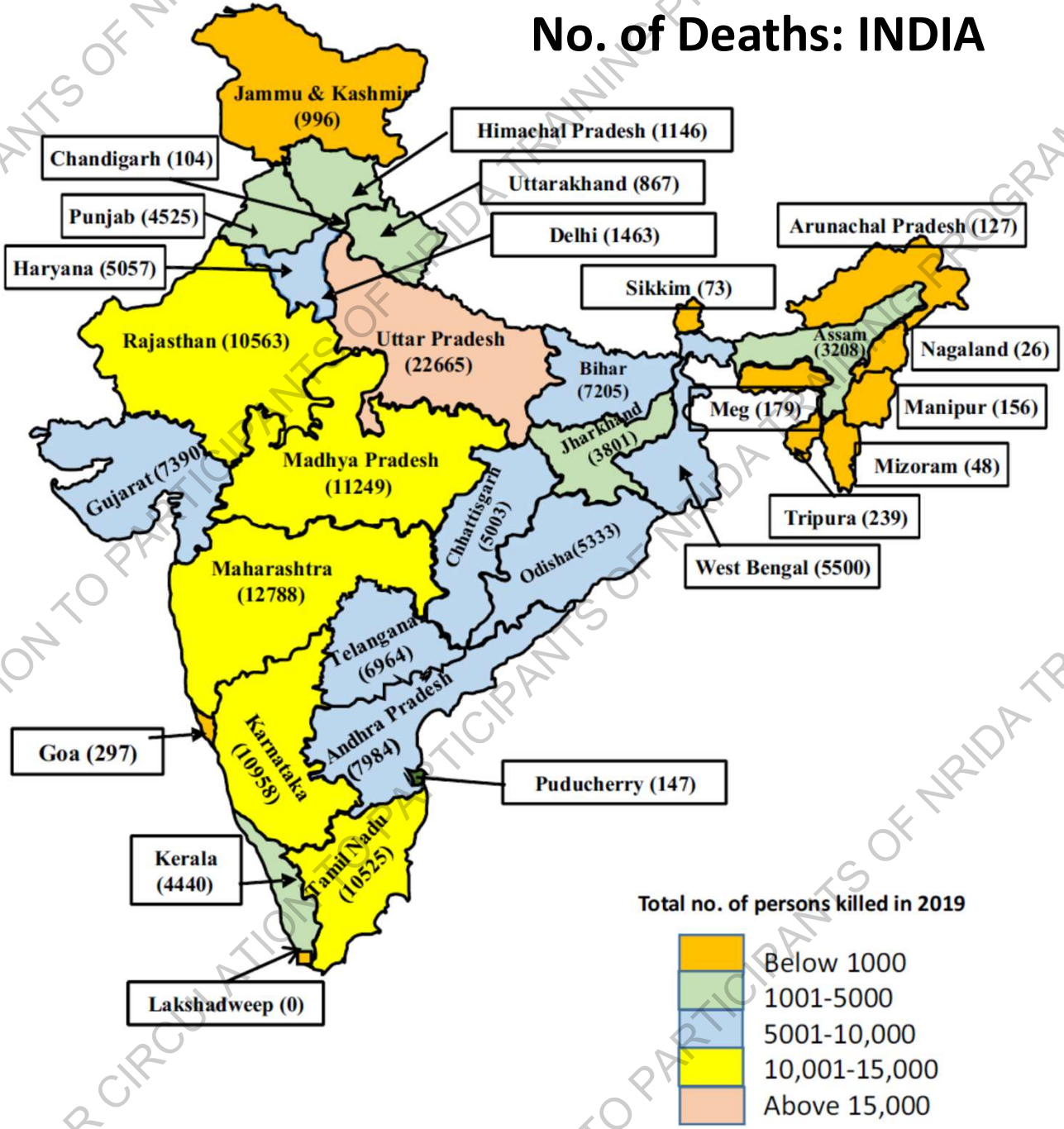
No. of Accidents: INDIA



FOR CIRCULATION TO PARTICIPANTS OF NRIDA TRAINING PROGRAMS

No. of Deaths: INDIA



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CAUSES OF ACCIDENTS

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CAUSES OF ACCIDENTS

- Importance to Road Safety (Negligence!)
  - ✓ Speeding, Helmet, Seat Belt
- Distractions while driving
  - ✓ Visual, Auditory, Physical, Cognitive

- Driving ability of motorists
  - ✓ Licensing Policy, Vehicle Health
- Road Design / Engineering Faults
  - ✓ ROAD SAFETY AUDITS

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HOW TO REDUCE ROAD DEATHS

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FIVE PILLARS OF ROAD SAFETY

ROAD SAFETY MANAGEMENT

- Management coordination and Funding
- Safety Legislation
- Road safety performance indicators
- Crash Data and analyses
- Research and teaching including crash costing

SAFER ROADS

- **Responsibilities of road authorities** (Modern procedure for safer roads)
- **Safe road design** (best Practice in design/construction/ maintenance; Traffic calming measures, School zones,...)
- **Road crash prevention** (RSIA, RSA, RAP and RSI)
- **Road crash reduction** (BSM, IDS and NSM)
- **Work Zones**

POST CRASH

- First aid on site from others/ transporting injured
- Rescue/fire services
- Emergency Ambulances/ medical service
- Police site control
- Emergency wards and rehabilitation

SAFER ROAD USERS

- Child education and training
- Driver training (driver school)
- Publicity (Campaigns and information)
- Traffic law enforcement
- Vulnerable road users

SAFER VEHICLES

- UN Conventions of vehicles
- Vehicle periodic technical inspections
- Vehicle safety standards
- Global NCAP
- Roadside inspections

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STEP 1

IDENTIFY STAKEHOLDERS OF ROAD SAFETY

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Major Stakeholders

- Government of India
- Ministry of Road Transport & Highways
- State Govt./UTs
- Public Works Department/R&B
- Police
- Health Department
- Emergency Response Teams
- Insurance
- NGOs
- Community, People and US, **THE ROAD USERS**

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STEP 2

ACTION PLAN FOR ROAD SAFETY

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5 E's of Road Safety

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The 5 ‘E’s of Safety

- Engineering
- Education
- Enforcement
- Emergency Services
- Evaluation

Non-Engineering Measures

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STEP 3
ENGINEERING ASPECT

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Engineering Aspects

- Designing Based on User Behavior
- Better Geometric Design
- Traffic Calming Devices – Speed Breakers, Rumble Strips etc.
- Traffic Control Devices – Road Signs & Road Markings

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Understanding User Behavior for Design

- Driving habits
- Decision making ability
- Driver expectancy
- Decision time & Reaction time
- Natural path of movement
- Pedestrian habits

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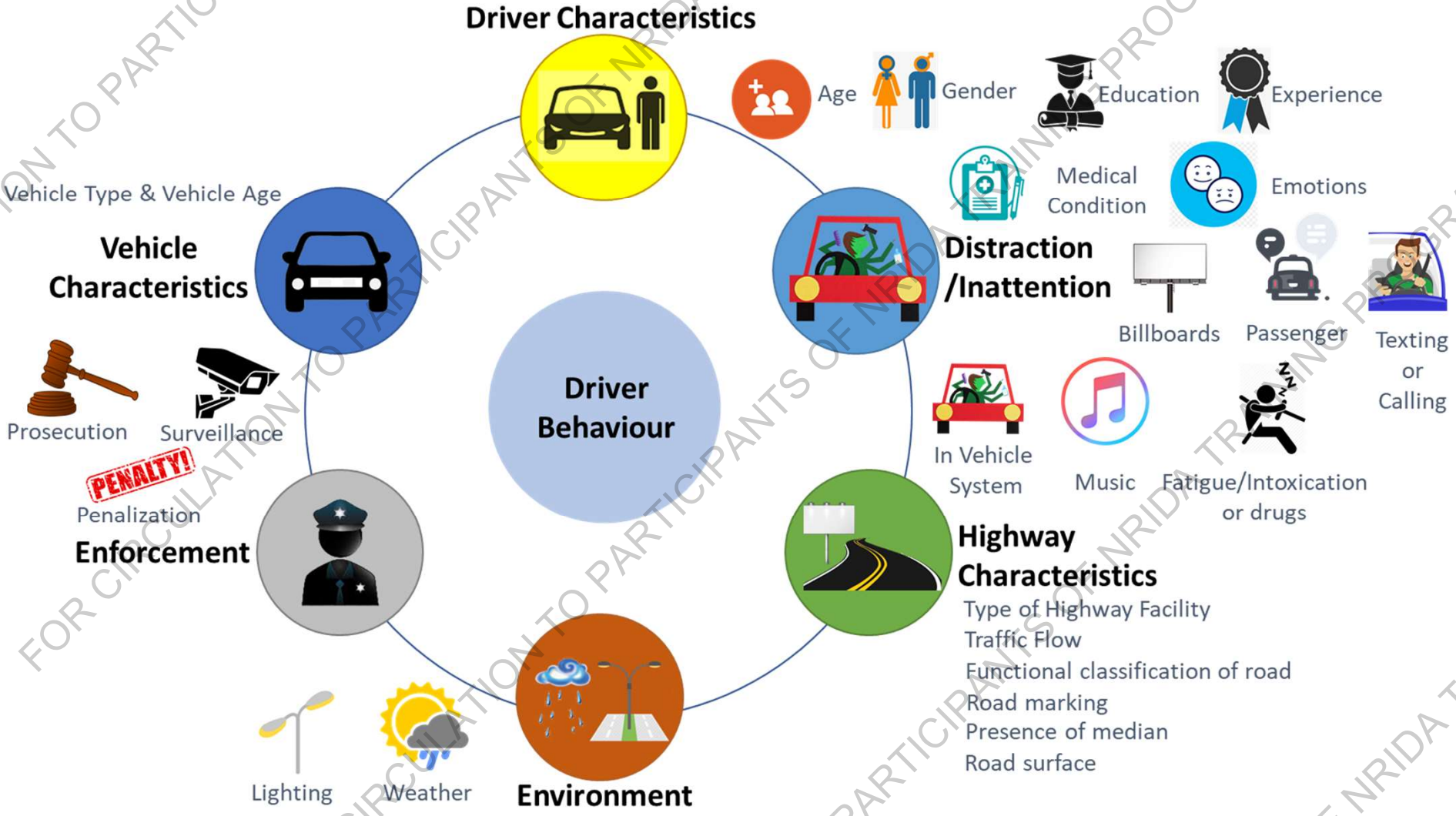
Factors affecting driving behaviour



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Better Geometric Design

- Design & actual capacity
- Turning movement
- Size & operating characteristics of vehicles
- Type of movements (merging, diverging, weaving, crossing)
- Speed
- Accident experience
- Traffic mix
- Vertical & horizontal alignment
- Sight distance
- Angle of intersection
- Conflict area
- Speed change lanes

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How Geometric Design can Ensure Safety

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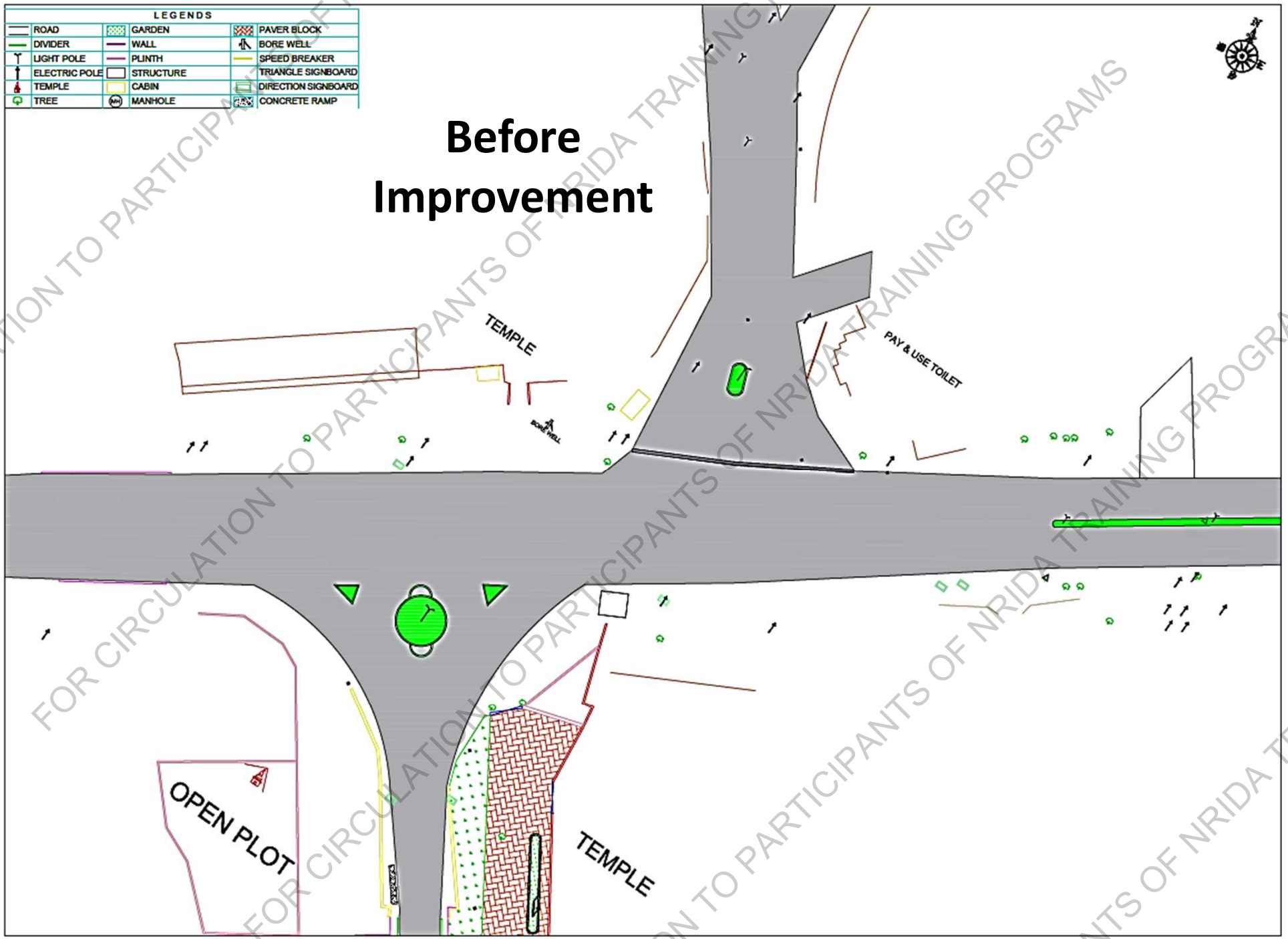

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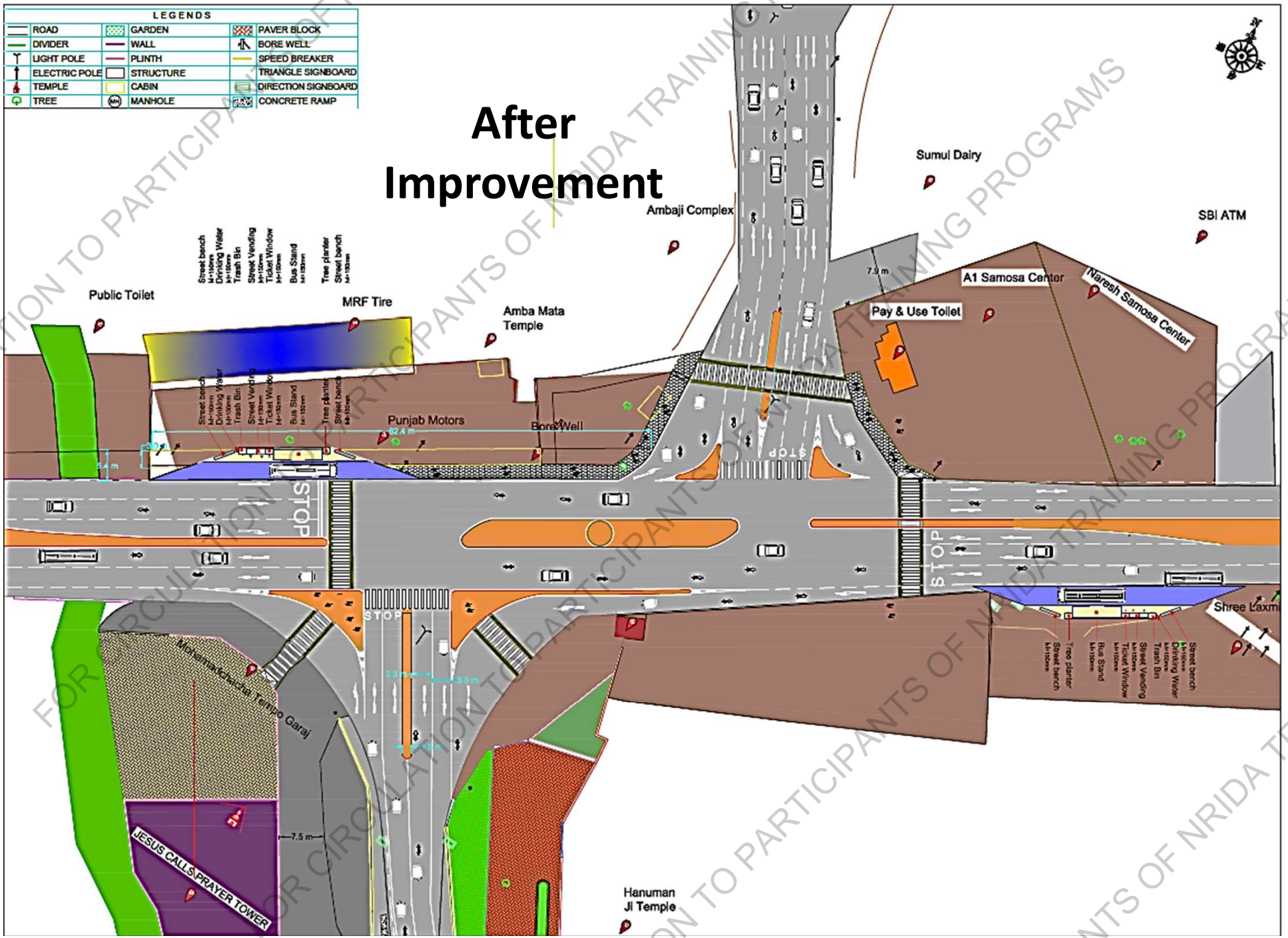
LEGENDS
ROAD
DIVIDER
LIGHT POLE
ELECTRIC POLE
TEMPLE
TREE
GARDEN
WALL
PLINTH
STRUCTURE
CABIN
MANHOLE
PAVER BLOCK
BORE WELL
SPEED BREAKER
TRIANGLE SIGNBOARD
DIRECTION SIGNBOARD
CONCRETE RAMP
After Improvement
Sumul Dairy
Ambaji Complex
SBI ATM
Public Toilet
MRF Tire
Amba Mata Temple
A1 Samosa Center
Naresh Samosa Center
Pay & Use Toilet
Punjab Motors
Bore Well
Shree Laxmi
Mohemadhusain Tempo Garaj
JESUS CALLS PRAYER TOWER
Hanuman Ji Temple
STOP
Street bench
Drinking Water
Trash Bin
Street Vending
Ticket Window
Bus Stand
Tree planter
7.5 m

Better Geometric Design

Video Credits: WRI Cities

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Engineering Aspects

- Designing Based on User Behavior
- Better Geometric Design
- **Traffic Calming Devices – Speed Breakers, Rumble Strips etc.**
- Traffic Control Devices – Road Signs & Road Markings

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Traffic Calming Devices

- Vertical deflections
- Horizontal deflections
- Road narrowing
- Central islands

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Traffic Calming: Vertical Deflections

Vertical shifts in the carriageway are the most effective and reliable of the speed reduction.

Different techniques available to achieve this:

- Speed hump (Speed Breakers)
- Plateau (Speed Table)
- Uneven road surface (Rumble strips)

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Speed hump (Speed Breakers)

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Speed hump (Speed Breakers)

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Speed hump (Speed Breakers)

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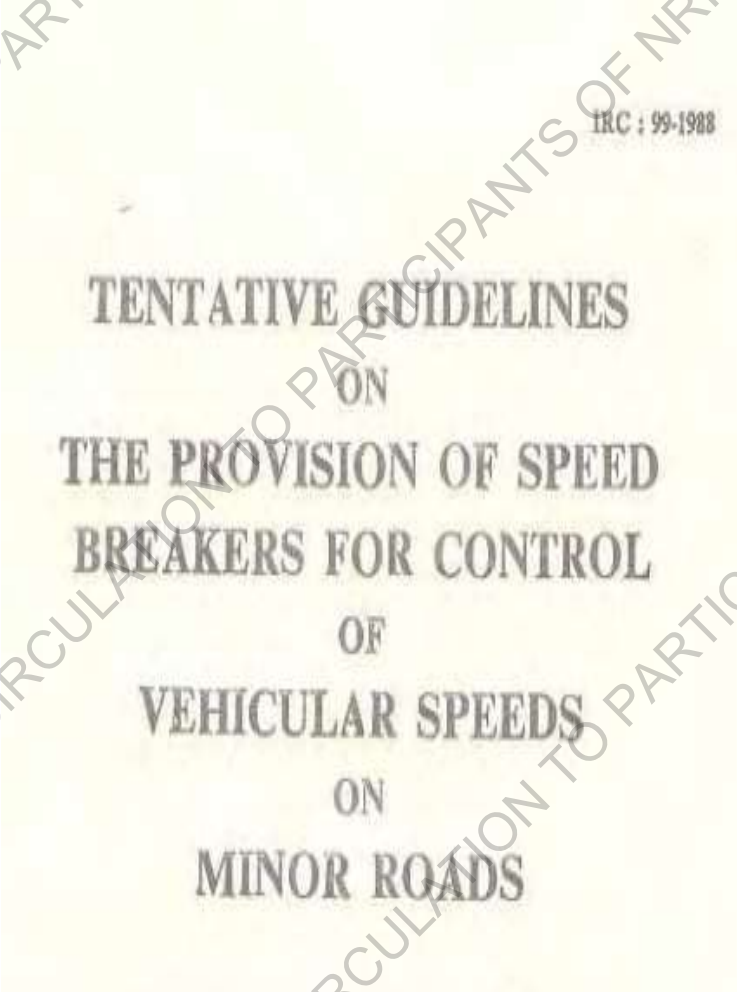
Reference Codes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TENTATIVE GUIDELINES
ON
THE PROVISION OF SPEED
BREAKERS FOR CONTROL
OF
VEHICULAR SPEEDS
ON
MINOR ROADS

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Well Designed Speed hump (Speed Breakers)

- Properly designed speed humps **are used to bring speeds to between 15-30 km/hr**

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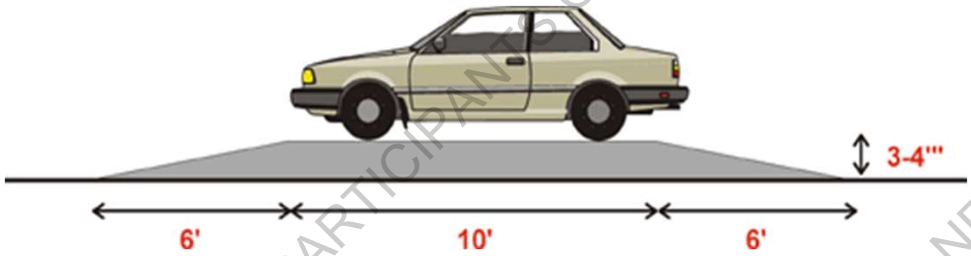
Speed Table (Plateau)

- **Speed Tables** are midblock traffic calming devices that raise the entire wheelbase of a vehicle to reduce its traffic **speed**.

- The material is kept different from the Road Surface



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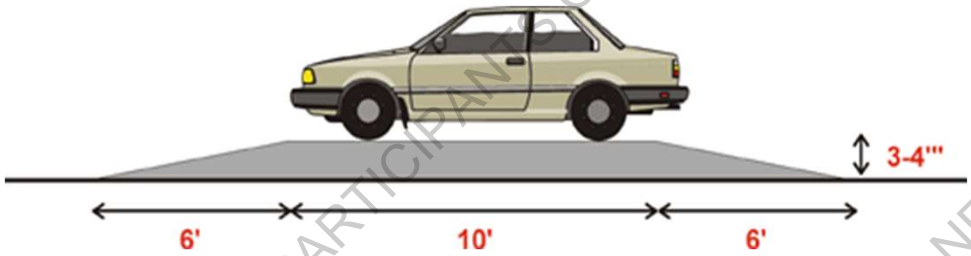

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Rumble Strips / TBMs

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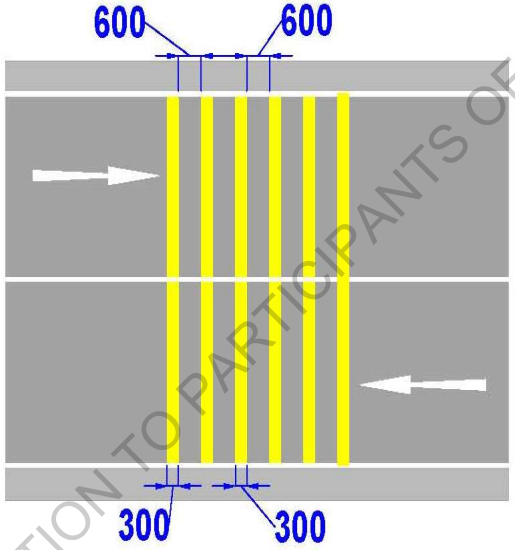
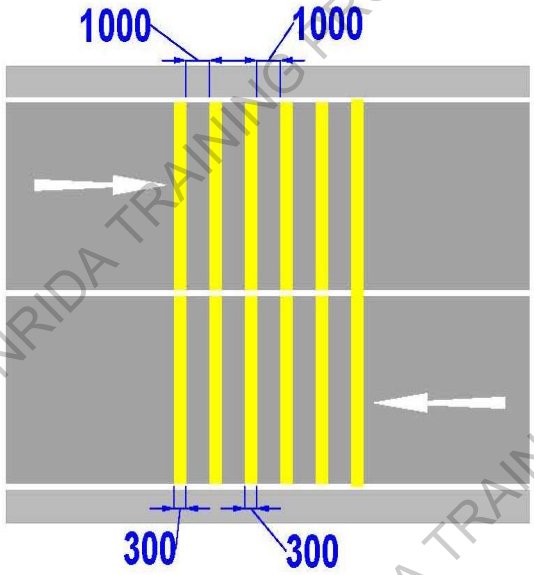
TBMs



Thermoplastic Marking of 300mm wide and 5mm height, at 600mm apart (one set is of 6 Strips)

5mm height is achieved through two applications of thermoplastic, applied at an interval not less than 1 hour for the 1st layer to be solidified



Thermoplastic Marking of 300mm wide and 15mm height, at 1000mm apart (one set is of 6 Strips)

15mm height is achieved through six applications of thermoplastic, applied at an interval not less than 1 hour for the previous layer to be solidified

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Engineering Aspects

- Designing Based on User Behavior
- Better Geometric Design
- Traffic Calming Devices – Speed Breakers, Rumble Strips etc.
- **Traffic Control Devices – Road Signs & Road Markings**

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Traffic Control Devices

- Medium of communication b/w Traffic Engineers & Road Users
- Type of TCDs
  - Traffic Signs
  - Road Markings
  - Traffic Signals
  - Parking Control

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STEP 4

NON - ENGINEERING ASPECT

Education

Enforcement

Emergency Services

Evaluation

Types of Road Safety Audits

Audit	Tollways / Expressways	National Highways	State Highways	Major District Roads	Urban Arterial, Sub Arterial and Collector Roads	Local Streets, Rural Roads
Planning	✓	Optional	Optional	Optional	Optional	N/A
(DPR) Design*	✓	✓	✓	✓	✓	✓
Construction	✓	✓	✓	Optional	Optional	Optional
Pre-opening	✓	✓	✓	Optional	✓	Optional
Existing Roads	According to local policy and resources					

Refer Handouts

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IS IN OUR HANDS

Thank You

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