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IN-BUILT ROAD SAFETY THROUGH PLANNING AND DESIGN

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India, *facts*….

125th in terms of motor vehicles ownership, *15 veh. per 1000 people*

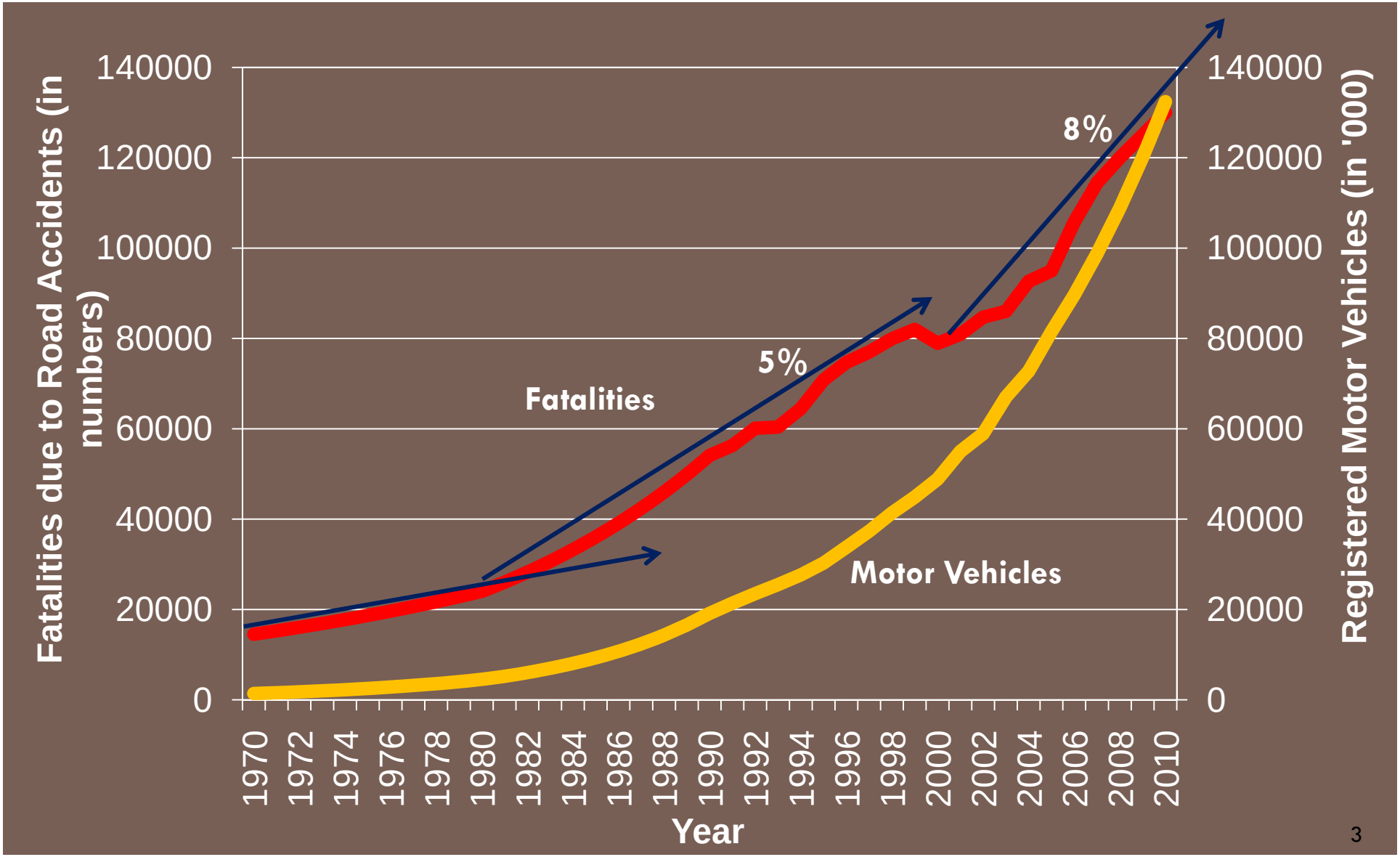
2nd largest road network in the world, *4.2mn km*

1% of world's motor vehicle population, *125mn*

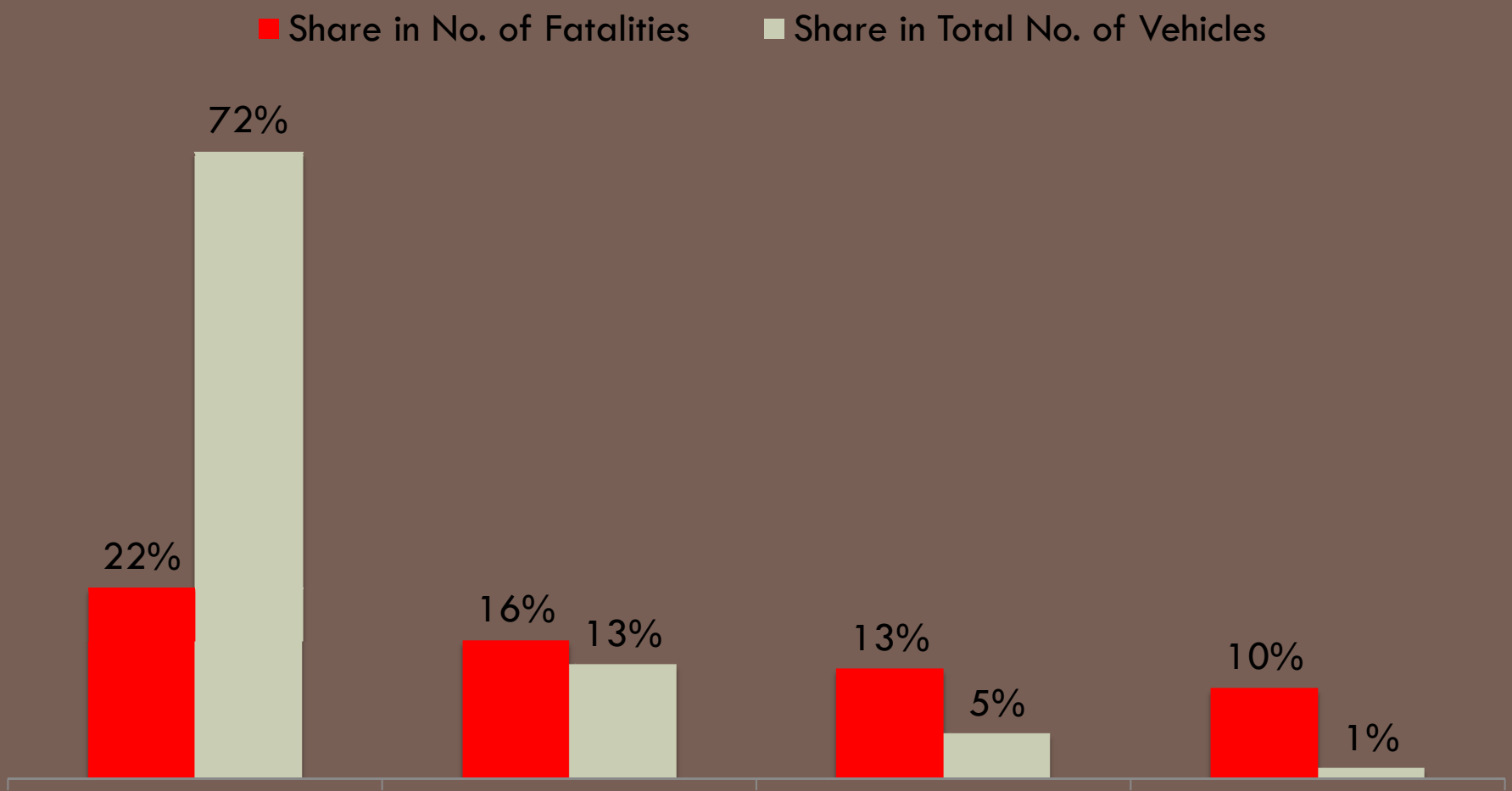
10% of world's road fatalities

1st in number of road fatalities, *127,000 per year*

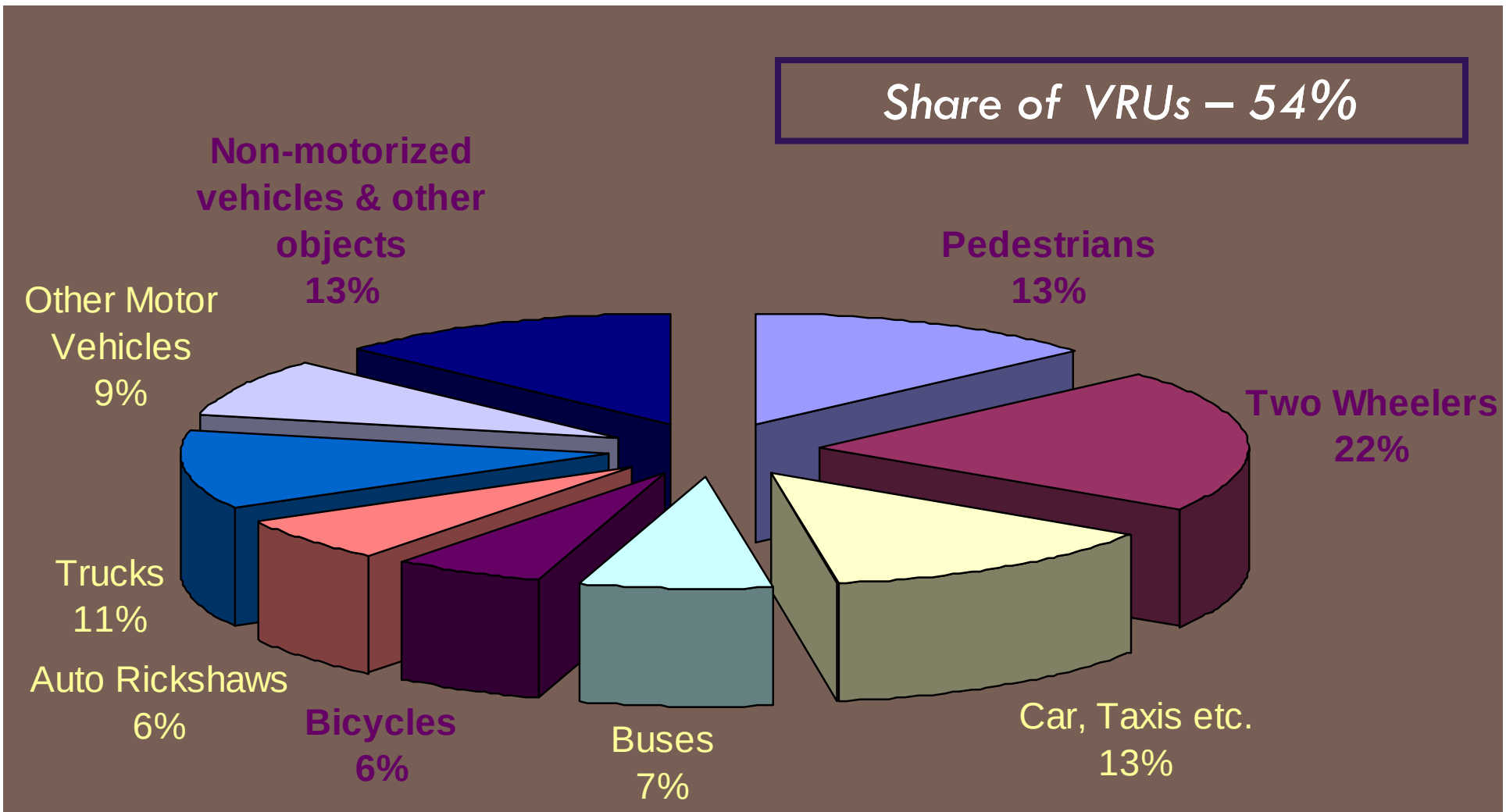
Trend in Motor Vehicle Population and Road Fatalities



Share of Vehicles in Vehicle Population and Fatalities



Fatalities by road user type

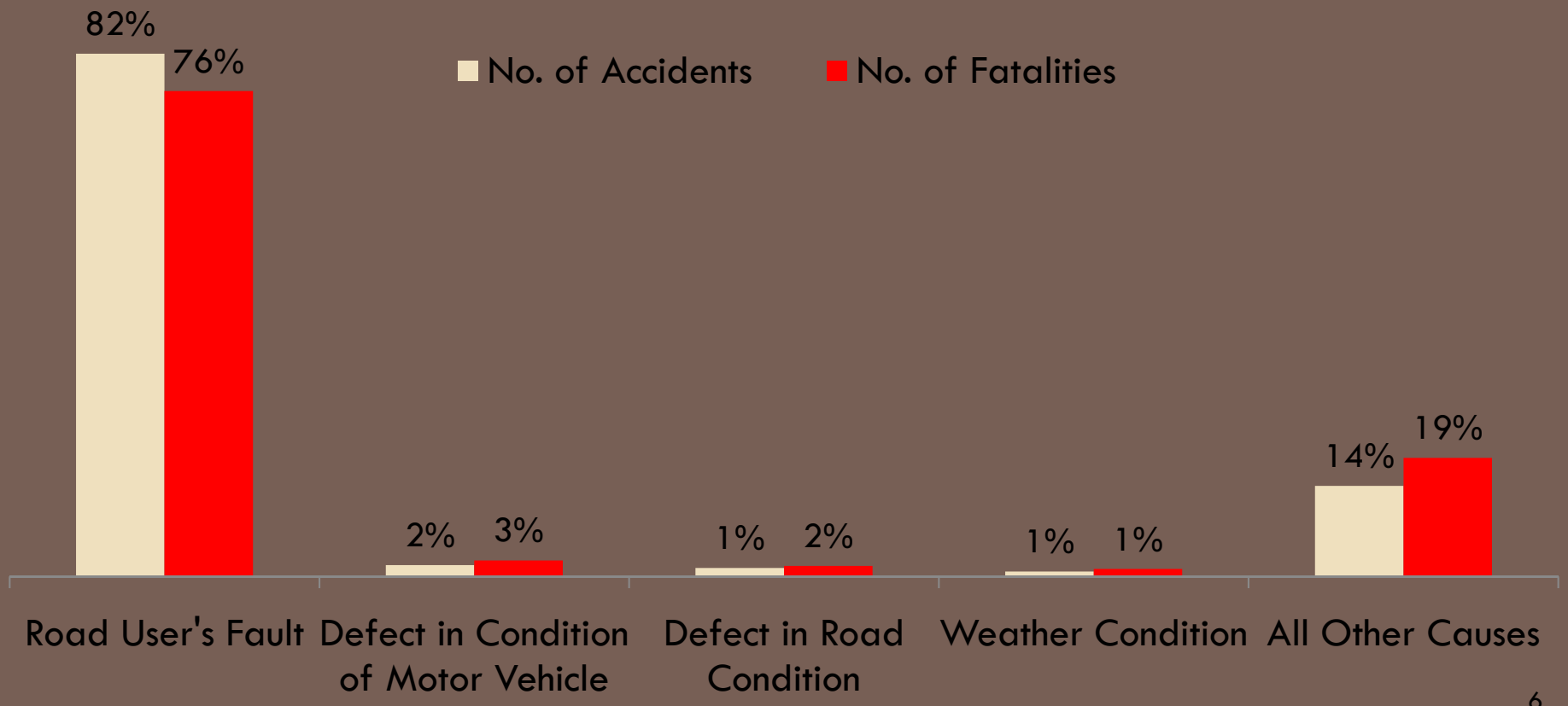


Causes of Road Accidents

Often it is stated that,

"Over 80% of road accidents are due to Road Users' Fault"

It is probably not correct !!!!



Deficient Road Accident Data Collection System

- Presently the road accident data is collected by Police officers and recorded in the form of FIR (First Information Report), which is a crime record and NOT accident data
- No investigation possible using this data to ascertain the cause of accident
- An IRF initiative using CSR funding from corporate world has developed **RADaR**, which will address this issue

What is the reason for huge number of road fatalities?

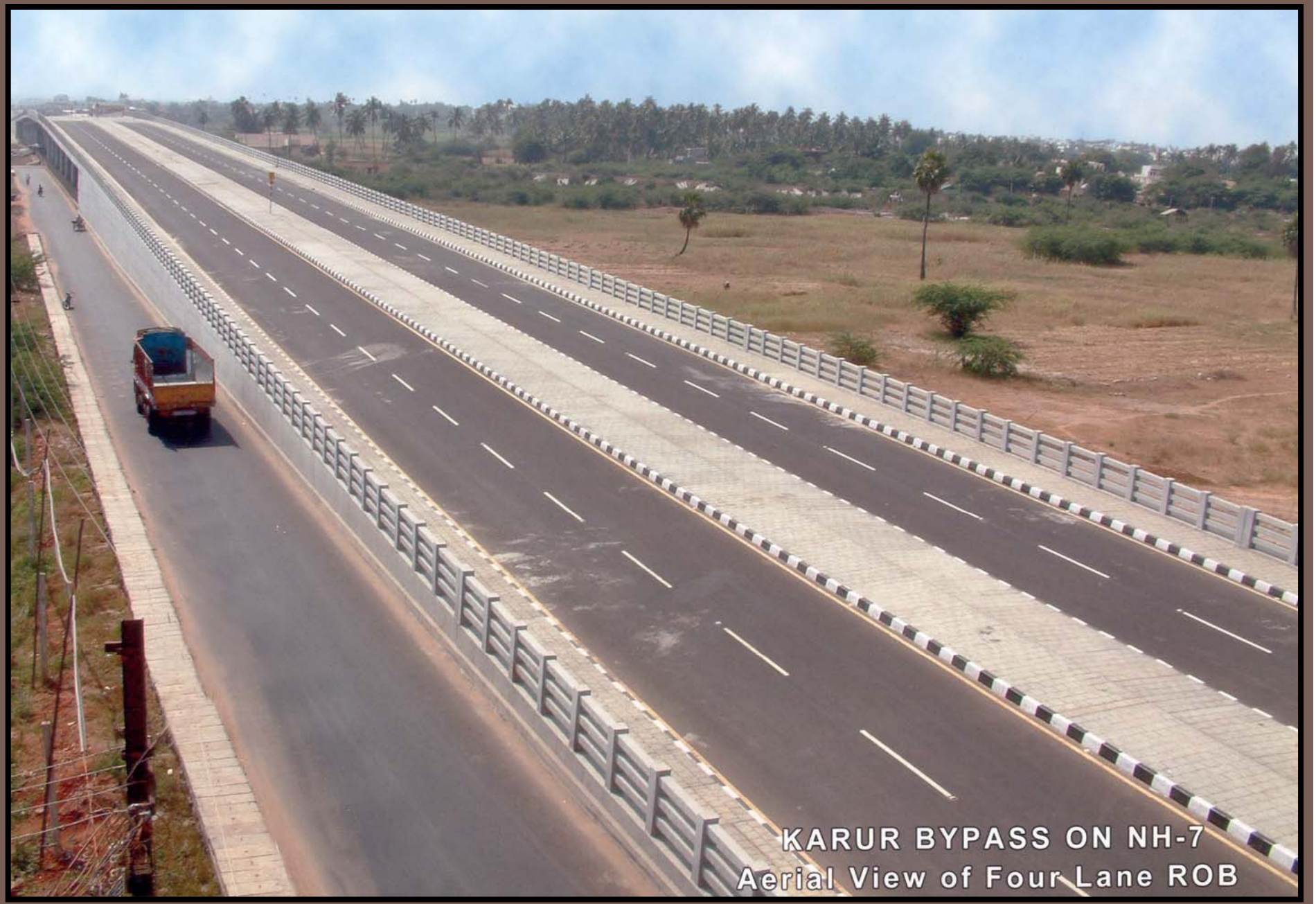
- High growth in number of vehicles over past few decades? Yes, but up to certain extent
- No commensurate improvement in the road network efficiency or its management
- Rampant violation of traffic rules, as enforcement is primitive and without motivation
- Extremely poor road use behaviour in all types of road users
- Of course, the roads are not forgiving, and errant drivers are punished with death

Giant Road Development Programs in India

Giant Road Development Programs in India

- NHDP – National Highway Development Project
- PMGSY – Prime Minister's Rural Road Development Project
- SRDPs – State Road Development Programs
- Urban Transport Projects
- NHDP being implemented by NHAI with long term objective of connecting the country together through arterial network of high class four/six-lane highways
- NHDP started with two main phases, which is now been extended to an ambitious plan of seven phases


NATIONAL
PERMIT
GOODS
CARRIER


KARUR BYPASS ON NH-7
Aerial View of Four Lane ROB


DM LOGISTICS LTD.

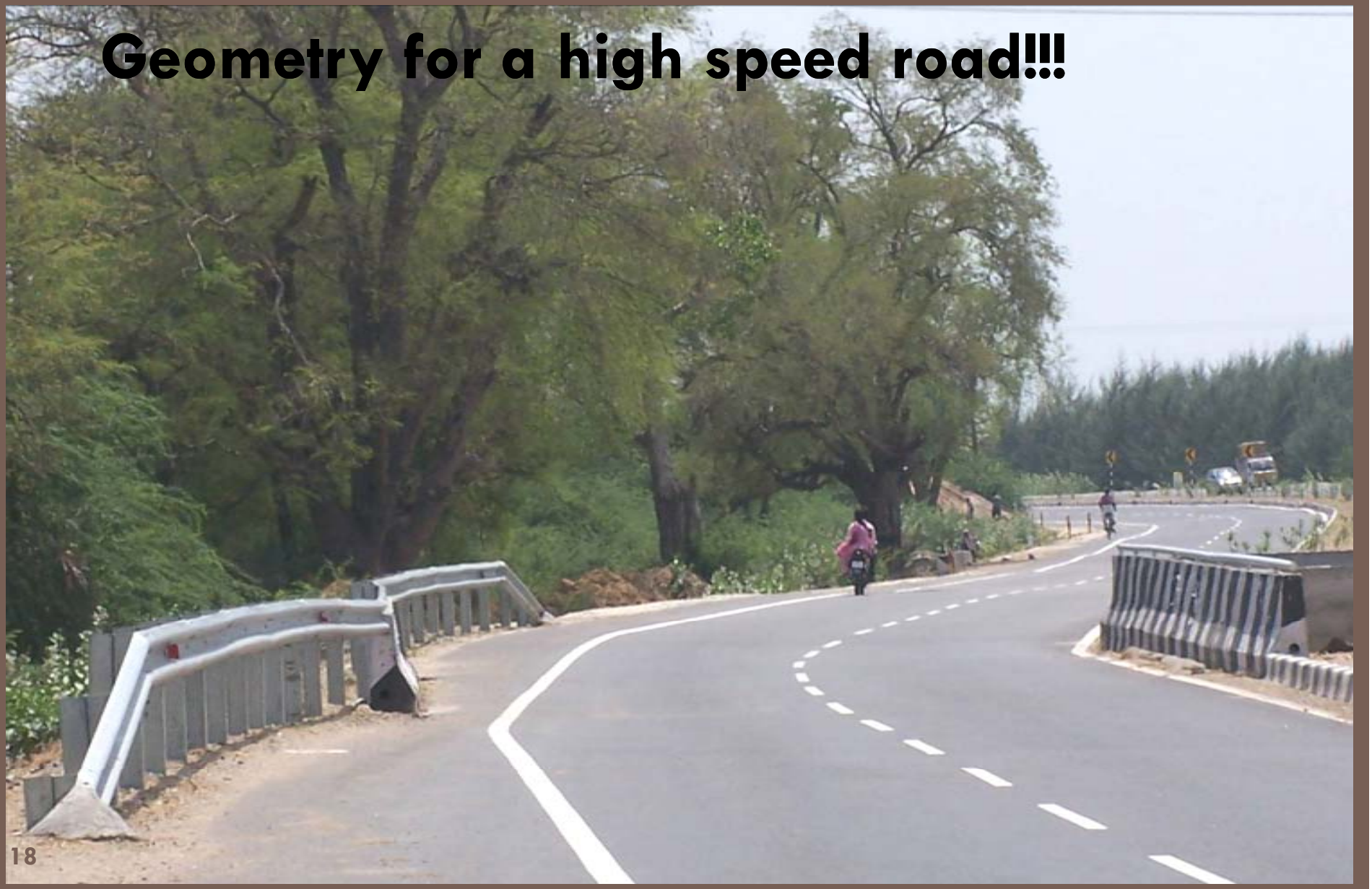

KEEP LEFT FOR BHALEJ
भालेज के लिये बांये रहे

Some of them have glaring problems

Improperly designed entry ramp


Intersection of village road not
designed for geometry
(… this could be pointed out by audit)

Geometry for a high speed road!!!



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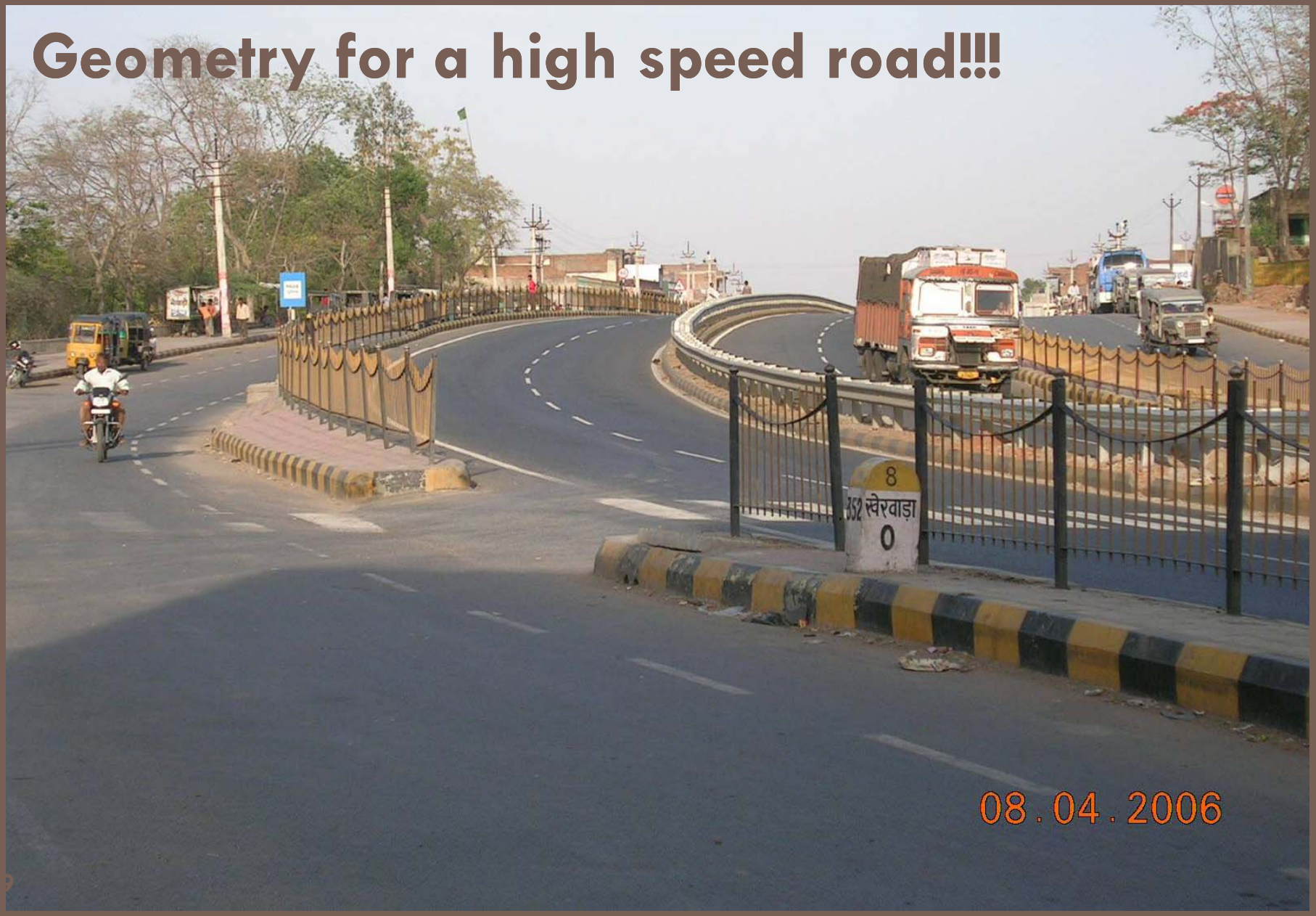
Geometry for a high speed road!!!



Level difference between the two carriageways

Deficient design and Implementation

Land use close to road: No recovery zone

Road Development should be parallel to Safety Initiatives

- India has experienced tremendous rise (8-10% growth) in road fatalities
- Attention was mainly on the road development, and no attention has been paid till recently for anything related to road safety
- Government plans to invest US$ 200 billion in the 12th Five Year Plan
- Higher speeds on NHDP roads have changed the mobility scenario across the whole country, with consequent disastrous impact on safety outcomes of the National Highways
- Systematic plan and programme required to address the problem from all angles

A Decade of Action for Road Safety… *2011-2020*

- For reducing the road fatalities for 2020 by 50%, the UN has launched the Decade of Action
- Five Pillars,
  - Road safety management
  - ***Safer road design***
  - Safer vehicle design
  - Safer road users
  - Post crash care

Deficiencies in the current system of Planning & Designing

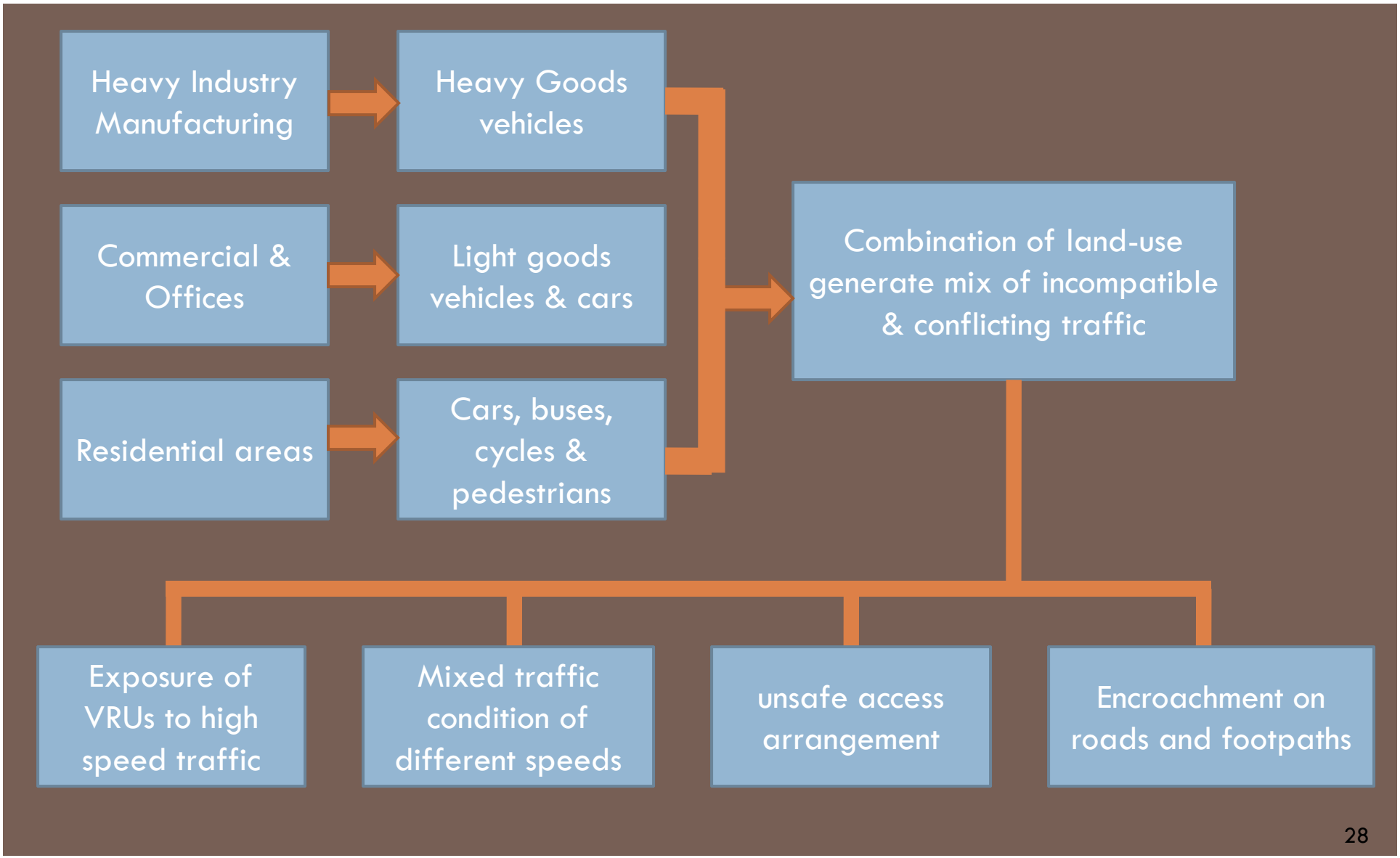
Planning: Practical Problems

- Absence of planning exercise, in true sense
- Even if some planning is done, the time allotted is not sufficient, and that various alternatives are never evaluated
- There are no proper guidelines and standards for planning as such
- Lack of forward thinking; as a result, safety is never thought about at the time of planning
- No considerations for communities; adequate public consultations are not done; and no *optioneering* is attempted

Planning doesn't account for,

- Land-use planning
- Development control and encroachment
- Ribbon development
- Network hierarchy
- Route planning
- Access control

Road Safety ⟺ Land-use



Land-use Planning *Safer Practice*

- **Zoning**: e.g. Residential areas shall be separated from industries and major commercial areas
- Strong **planning regulations** and their strict adherence to influence location of new developments and to control access and parking
- Design **residential schemes for low speeds** and light vehicles with occasional access to other commercial vehicles
- Incorporate **Road Safety in assessing traffic impact** studies of new development

Design doesn't strictly aim for,

- Traffic segregation
- Traffic calming
- Road Safety Audits
- Accident investigation & prevention

Even if it is considered, it is removed later just to meet the objective of financial viability

Did we consider social viability ever ?

Did we ever ensure safety ?

Initiatives being taken by Govt. of India

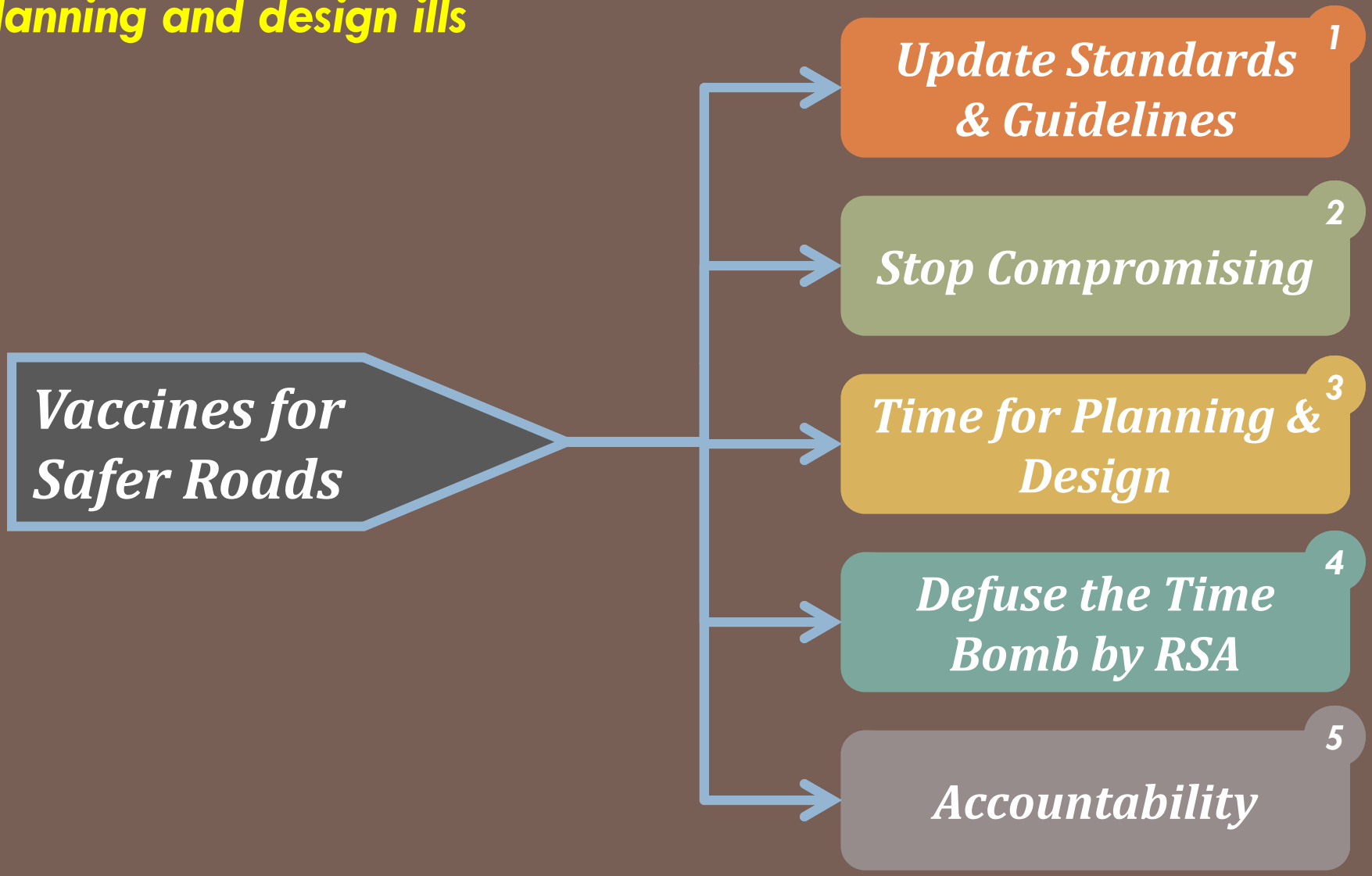
Initiatives of Govt. to Ensure Safety in Planning & Designing

- Issued a circular to all concerned Depts. to implement the desired **additional** engineering measures both on existing roads as well as in on-going road projects
- Issued instructions that **certificate of compliance to RSA** recommendations will be required for project approvals
- Allocated **designated fund** for road safety improvements in existing roads as well as in proposed projects
- **These are excellent initiatives….**

A FIVE-SHOT VACCINATION PLAN

Diagnosis:

Planning and design ills



1 UPDATE STANDARDS & GUIDELINES

- The standards & guidelines are to be updated so that safety is duly incorporated into the road design
- Standards & guidelines to be updated regularly for improving them based on experience about their performance
- This experience may be collected from around the world
- DO SOME RESEARCH !!! Standards are to be updated based on research findings
- Review and upgrade planning/design codes and guidelines for roads, with focus on road safety

2 STOP COMPROMISING

- Generally to implement the ambitious road development plans in a tight time-frame, safety features are compromised
- Road design shall incorporate all required safety features such as,
  - Low-cost measures, e.g. signing, marking, delineation, etc.
  - Medium-cost measures, e.g. bus stop bays, separate pedestrian sidewalks, truck laybys, rumble strips on shoulders and centerlines, etc.
  - High-cost measures, e.g. service roads, dedicated lanes for VRUs, grade separation, pedestrian overpasses, etc.

2 STOP COMPROMISING

- An uncompromised VRU-centric design and its implementation will itself save lives of many VRUs being killed every year on road
- Roads designed with provision of all required safety features shall only be implemented

3 GIVE SUFFICIENT TIME FOR PLANNING & DESIGNING

- Roads are generally built without a proper planning exercise
- Planning exercise, if undertaken, is not provided with sufficient time to evaluate different planning alternatives
- Planning exercise considering all the VRUs in urban areas is never given due importance resulting into safety hazard for VRUs

3 GIVE SUFFICIENT TIME FOR PLANNING & DESIGNING

- Time given for design is not sufficient – especially optimization is not possible, interaction/interplay of design elements never examined
- Critical decisions affecting 90% of the project cost are taken in very little time and with limited or no choice examined

3 GIVE SUFFICIENT TIME FOR PLANNING & DESIGNING

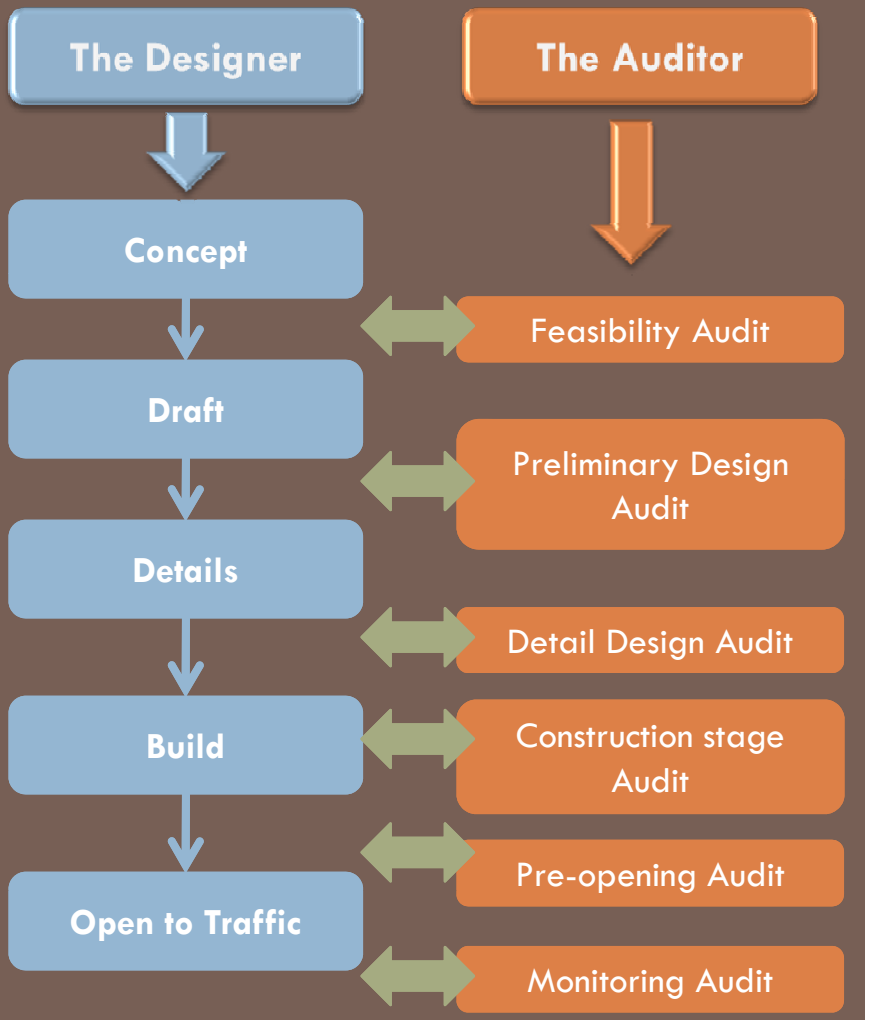
- Mandatory input of Road Safety Engineer at the stage of planning, i.e. feasibility study, and at all the stages during design is necessary
- Implement FIVE YEAR ROAD PLANS – identify the road development needs in 5 year blocks in advance, give 6 months for planning, 1.5 yr for feasibility and detailed design, and 3 yrs for construction
- Due and adequate time for planning and design shall remove many of the design shortcomings

4 DEFUSE THE TIME BOMB

- *ROAD SAFETY AUDIT (RSA):* Applying road safety engineering experience to designs before the roads are built
- RSA is the safety insurance of the roads, an important input at planning and designing stage
- It is like defusing a 'time bomb'
- a principle of 'prevention is better than cure' applied in advance of building roads
- Funds to be earmarked for implementing audit recommendations
- The RSA process to be utilized uniformly for all road projects across the country

4 DEFUSE THE TIME BOMB

- *RSA* right from planning exercise is a must for road projects. The audit must be done at different stages,
- Feasibility stage
- Preliminary design
- Detailed design
- During construction
- Constructed (Pre-opening)
- Existing roads (monitoring)



5 ACCOUNTABILITY

- The design of roads done by technical consultants never gets checked by Client Agency due to lack of competence
- In case of PPP projects, the entire responsibility of design is given to the private party, which has far reaching consequences
- Accountability is to be built-in in all planning and design outputs

ACTION PLAN

- Organize capacity building programs for the implementing agencies and road authorities (at the level of decision makers & policy planners)
- Give clear mandate with definite accountability to show results based on pre-defined targets
- Divide responsibilities across the organizations responsible for roads and utilities
- Develop and implement Road Safety Action Plan for each state and district

ACTION PLAN

- A culture of safety mindedness is required to be adopted uniformly all organizations
- Planners and designers shall be self conscious about road safety, for which training is required
- A process of accounting each and every detail about safety in planning and designing is required to be in-built in codes and standards

  e.g. at the time of design, the designer shall provide details of design features, with their safety consequences (level of potential risk) and measures to avert the risks

IN CONCLUSION

- In our current system, the road user is blamed for his failure to cope with the road environment (he/she is made responsible for all safety ills)
- Responsibility for the road safety lies with designer and the road authority. Let them be responsible

IN CONCLUSION

- The *Vision Zero* (in Sweden) explicitly shares the responsibility between designers and road user according to the following principles:
  - The designers are always ultimately responsible for the design, operation, use of the system, and for the level of safety within the entire system
  - Road users are responsible for following the rules for using the system set by the designers
  - **If road users fail to obey these rules due to lack of knowledge, acceptance or ability, or if injuries occur, the system designers are required to take necessary further steps to counteract people being killed or seriously injured**

IN CONCLUSION

Let us aim for safer roads through better planning and design

"Knowing is not enough;
we must apply.
Willing is not enough;
we must do."

- Goethe

THANK YOU

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