

Lecture: 01

2CLOE28-Traffic Characteristics



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1.

Introduction

What is Traffic Engineering?

Traffic Engineering is that branch of engineering which deals with the **improvement of traffic performance** on road network and terminals.

The basic objective of traffic engineering is to achieve **efficient, free and rapid** flow of traffic with least number of accidents.



Objectives

- ▶ To achieve smooth and easy flow of traffic at intersections.
- ▶ To have safe, convenient, comfort, rapid and economic transport of goods and persons.
- ▶ To improve the speed of vehicles.
- ▶ To increase traffic capacity of roads.
- ▶ To make the street safe for movement of both pedestrians and vehicles.
- ▶ To reduce delays in road journeys.
- ▶ To reduce chance of road accidents.
- ▶ To reduce traffic congestion.



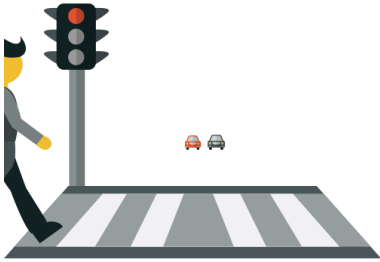
Scope of Traffic Engineering

- ▷ Traffic characteristics
- ▷ Traffic studies and analysis
- ▷ Planning area analysis
- ▷ Geometric design
- ▷ Traffic operation, regulation and control
- ▷ Road safety aspects
- ▷ Administration and management



Source: <https://unsplash.com/photos/yBhOcUr4TVY>

Who is a road user?



Pedestrians



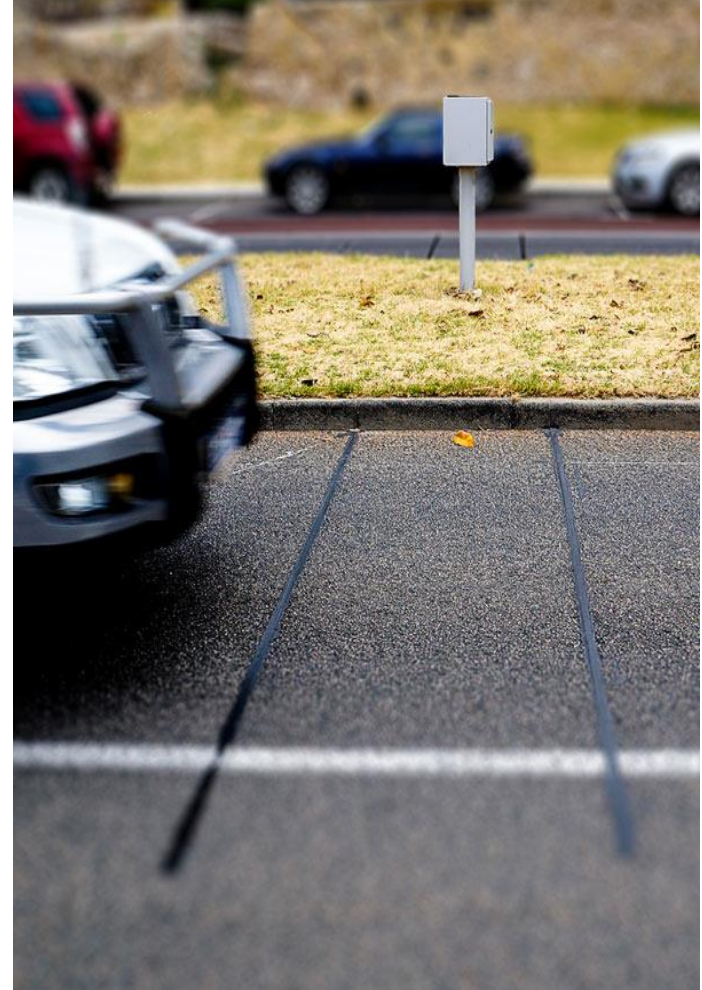
Cyclists



Motorists

Importance of Human Behaviour

- ▷ Certain human factors govern the behaviour of the road user
- ▷ Design of traffic facilities is influenced by this behaviour
- ▷ External conditions could also alter this behaviour



Source: <https://www.strongtowns.org/journal/2016/5/9/ask-ramoses-how-do-traffic-counts-work>

2.

Road User Characteristics

Road User Characteristics

Physiological

Psychological

Mental

Temporary

Physiological characteristics

▷ Vision

Vision is a human factor that affects almost all aspects of highway design and safety



Acute Vision

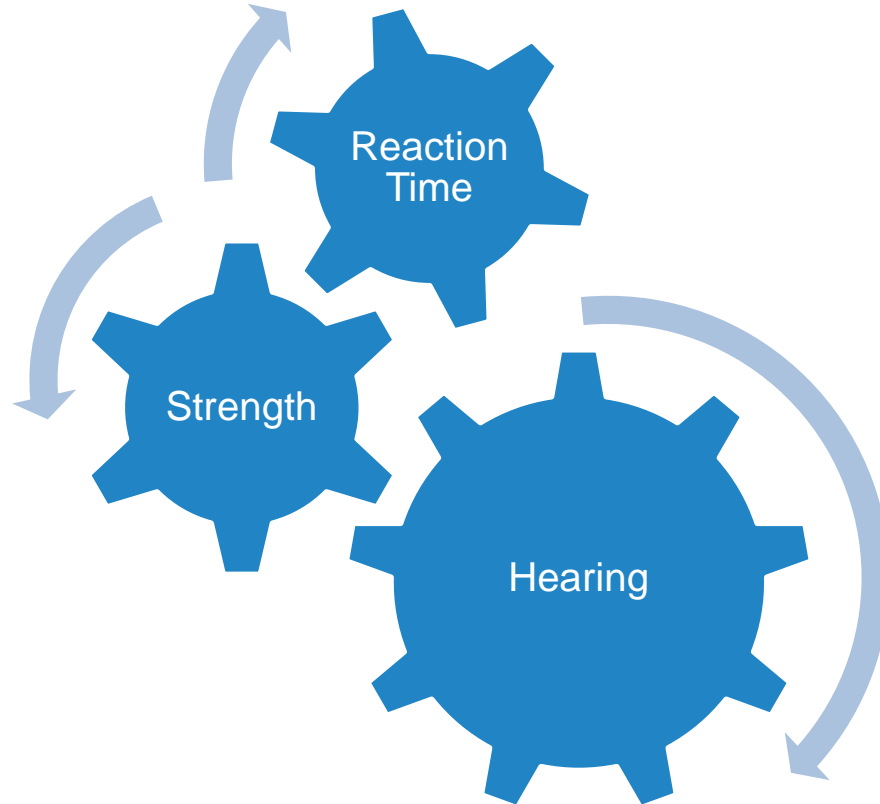
Peripheral Vision

Colour Vision

Ability to judge depth and distance of objects

Glare recovery

Other physiological characteristics



Psychological characteristics

Fear

Anger

Impatience

Maturity

Motivation

Attentiveness

Psychological characteristics



Temporary characteristics

- Illness
- Alcohol influence
- Influence of drugs
- Workload
- Fatigue

In April, TOI highlighted that most accidents on the Yamuna expressway occurred due to drivers dozing off, surpassing the percentage attributed to overspeeding.

Nitin Gadkari pitches for fixed driving hours for commercial truck drivers

To reduce road accidents, Union minister Nitin Gadkari on Tuesday pitched for fixed driving hours for commercial truck drivers similar to that of pilots, as well as on-board sleep detection sensors in commercial vehicles.

Driving via Ariyalur in early morning? Cops may stop you... to give tea

KSRTC mulls tech to check drowsy drivers, collisions

TNN / Feb 28, 2018, 00:30 (IST)

Mental characteristics

- Knowledge
- Skill
- Intelligence
- Experience
- Literacy

Mental characteristics

Palakkad: Driver's skill averts major accident as bus collides with car at signal

14 June 2023, 10:31 AM IST

The driver of the car, Danst, a resident of Vadakkanchery and a businessman, was en route to Coimbatore when he approached the junction and stopped at the signal. The bus behind him was traveling at a high speed and failed to brake in time, resulting in a collision with the rear of the car.

The impact of the collision sent the car spiraling out of control, causing it to veer into the opposite lane. However, displaying the exceptional presence of mind and remarkable driving skills, Danst maneuvered the car through the oncoming traffic on the opposite lane, ultimately reaching the other side unharmed.



Road user characteristics



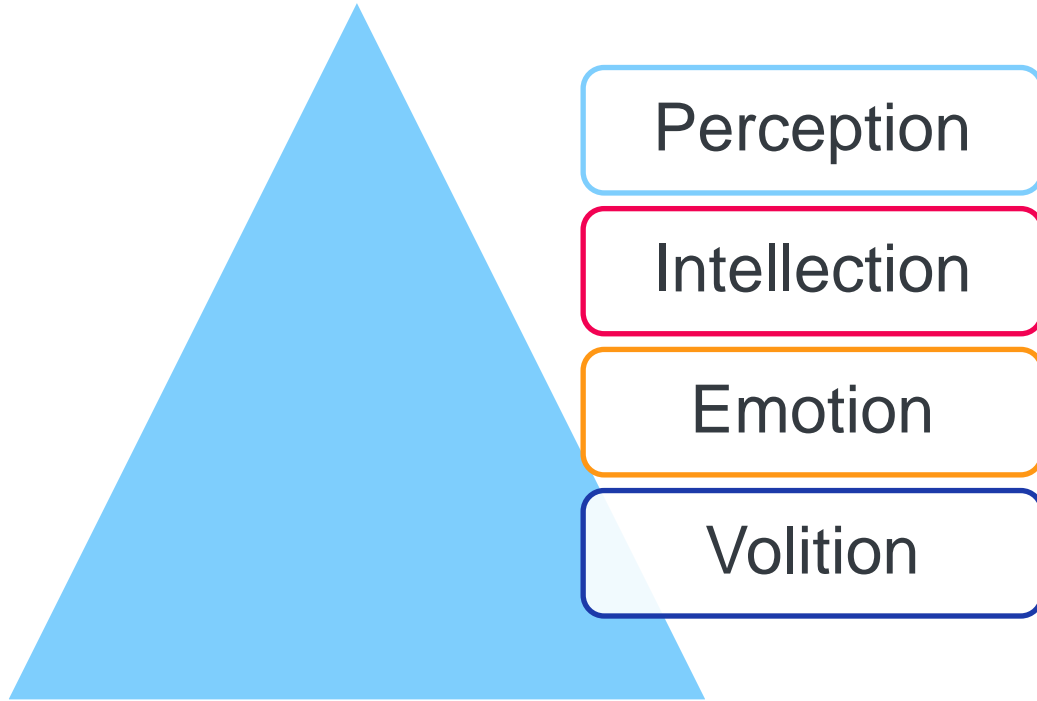
Road user characteristics- continued

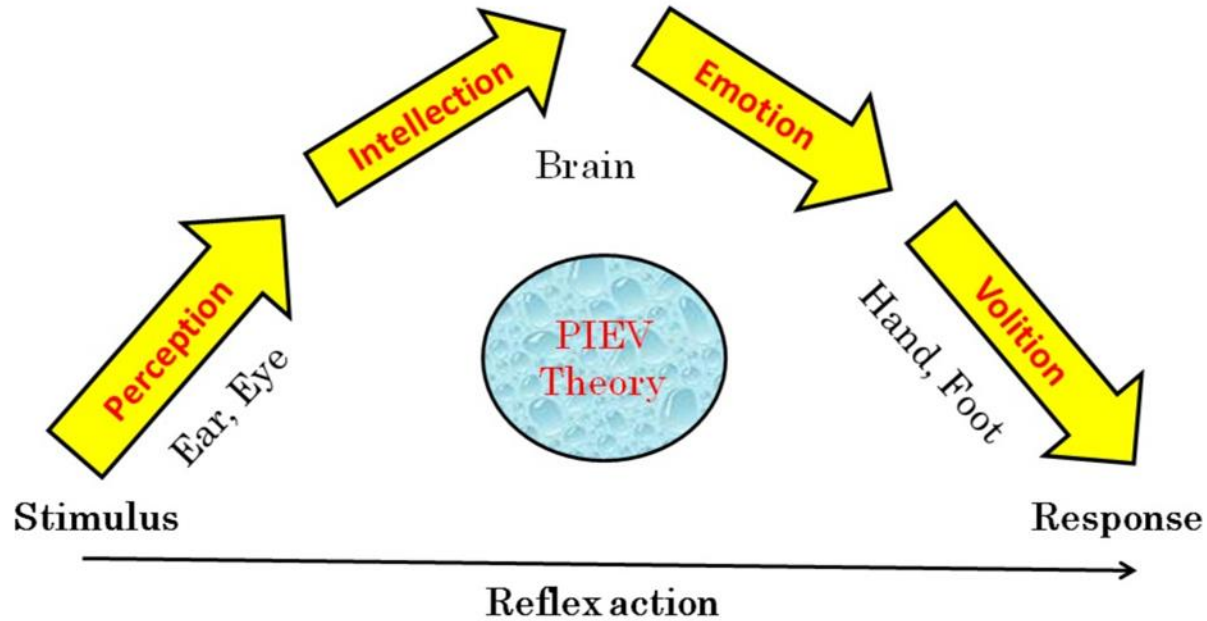


3. PIEV Theory

PIEV Theory

Reaction time of a driver is sum of-





3.

Vehicular Characteristics

vehicular characteristics

- It is possible to design a road for any vehicle but not for an indefinite vehicle
- Vehicle characteristics could be of two types – **static** and **dynamic**



Static vehicular characteristics

- **Dimension-**

- I. Height- affects clearance of overhead structures, height of driver seat affects the sight distances
- II. Field of vision depends on design of windshield
- III. Length- affects the capacity, overtaking distance

- **Weight**

- Gross weight, axle, wheel load- affect the structural design of pavements.

- **Maximum Turning angle**

- Length of wheel base – affects the turning radius

Dynamic vehicular characteristics

- **Speed-** affects sight distance, superelevation, length of transition curve, width of pavement, length of vertical curves, capacity of traffic lane etc
- **Acceleration and Braking Characteristics** - guide safe vehicle operation , spacing between two vehicles, stopping distance

Dynamic vehicular characteristics

26 dead as bus catches fire on Mumbai-Nagpur Expressway, probe ordered

Buldhana bus accident: Tyre burst caused mishap

Did Highway Hypnosis Kill 26 in Buldhana?

"This happens on smooth, empty highways. Despite the eyes being open, the driver may feel as if he/she is sleeping. It is a brief disconnect with the outer world. On Samruddhi Mahamarg, there are no hoardings or billboards on the roadsides or hotels/*dhabas*," an official explained, adding that even in case of **Buldhana bus accident** it is suspected that the driver experienced sleep hypnosis.

News18 accessed the state highway data that showed 358 accidents took place on Samruddhi Mahamarg between December 2022 and April 2023, of which 39 people were killed, 143 were critically injured and 236 people received minor injuries



SUMMARY

- Understanding of road user behaviour is essential in order to design and operate traffic facilities.
- PIEV time is the reaction time of a driver from the instance he/she perceives that brake needs to be applied to the time the brake is actually applied.
- Indian Roads Congress adopts a value of 2.5 seconds as avg PIEV time
- Vehicular characteristics affect the overall traffic planning. They are of two types static and dynamic.



Thanks!

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