

## Outline: Chapter 1

### 1.1 What is Traffic Engineering?



### 1.2 Elements of Traffic Engineering



### 1.3 Objectives of traffic engineering



### 1.4 The Traffic Engineering Profession



### 1.5 Introduction to Transportation Planning

1

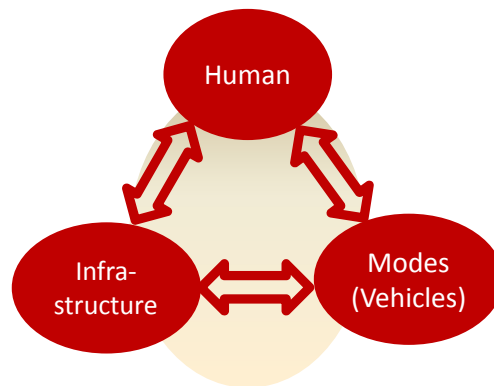
## What is Traffic Engineering?

- **Transportation Engineering** \*:
  - “The application of technology and science principles to the planning, functional design, operation and management of facilities for any mode of transportation”
  - In order to provide safe, rapid, comfortable, convenient, economical, and environmentally compatible movement of people and goods.
- **Traffic Engineering** \*:
  - “The phase of transportation engineering that deals with the planning, geometric design and **traffic operations of roads, streets, and highways, their networks, terminals, and relationship with other modes of transportation**”

*\* Definition from the Institute of Transportation Engineering (ITE)*

## Transportation System

- Consist of Human, Modes of transportation and Infrastructure (links and terminals), as well as Management and Operations.

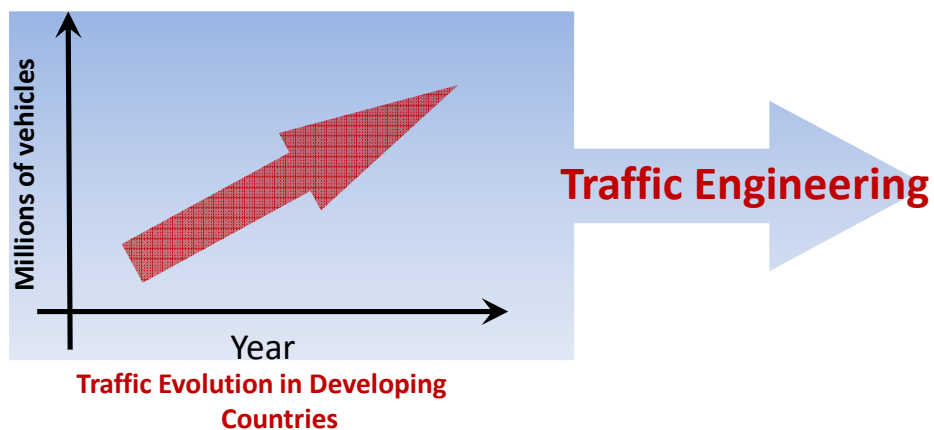


TRANSPORTATION SYSTEM ENGINEERING 2 , 61463

3

## Transportation and Traffic

- **Transportation:** change of geographical positions of people or goods
- **Traffic:** transportation related exclusively to vehicle movement



TRANSPORTATION SYSTEM ENGINEERING 2 , 61463

4

## Elements of Traffic Engineering

1. Traffic Studies and Characteristics
2. Facility Design
3. Traffic Control
4. Traffic Operations
5. Performance Evaluation
6. Transportation System Management
7. Intelligent Transportation Systems

TRANSPORTATION SYSTEM ENGINEERING 2 , 61463

5

## 1) Traffic studies and Characteristics

- Involve measuring and quantifying various aspect of road traffic
- Studies focus on data collection and analysis, such as:
  - a) traffic volumes
  - b) speed
  - c) delay and travel time
  - d) parking
  - e) inventory
  - f) accident
  - g) origins and destinations
  - h) modal use

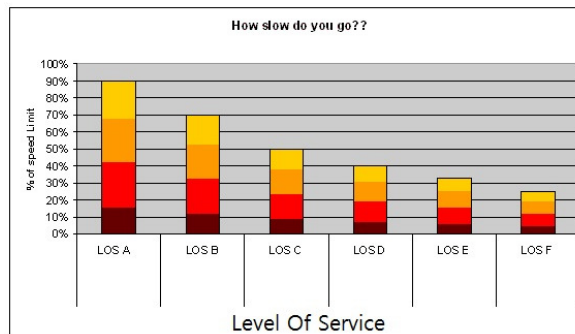


TRANSPORTATION SYSTEM ENGINEERING 2 , 61463

6

## 2) Performance Evaluation

- Is a means by which traffic engineers can rate the operating characteristics of the transportation facilities.
- Such evaluation relies on measures performance quality and is often stated in terms of “**level of service**”.



TRANSPORTATION SYSTEM ENGINEERING 2 , 61463

7

## 3) Facility Design

- Functional and geometric design of highways and streets, and other traffic facilities, including intersections
- Traffic Engineers are not involved in the structural design of highway facilities but should have some appreciation for structural characteristics



TRANSPORTATION SYSTEM ENGINEERING 2 , 61463

8

## 4) Traffic Control

- It's a central element of traffic engineering
- It involves the establishment of traffic regulations and communication them to the drivers through the use of traffic control devices, such as:

a) signs



b) markings



c) signals



TRANSPORTATION SYSTEM ENGINEERING 2 , 61463

9

## 5) Traffic Operations

- Involves measures that influence overall operation of traffic facilities, such as:

a) one-way street systems

b) transit operations

c) parking and curb management

d) surveillance and network control systems



TRANSPORTATION SYSTEM ENGINEERING 2 , 61463

10

## 6) Transportation Systems Management TSM

- TSM covers a range of potential improvement supply-related strategies and optimization of system capacity and operations, focusing on short-range, low-cost and quick to implement measures, such as adopting one-way streets, intersection operations coordination, high-occupancy vehicle/bus priority systems
- In addition to supply management, there is full range of potential Transportation Demand Management (TDM) strategies, including car-pooling programs, pricing strategies, telecommuting, flexible working hours



TRANSPORTATION SYSTEM ENGINEERING 2 , 61463

11

## 7) Intelligent transportation systems ITS

- Refers to the application of modern telecommunications technology to the operation and control of transportation systems.
- Such systems include traveler information, advanced vehicle control and safety, automated highways, automated toll collection systems, vehicle tracking systems, Global Positioning Systems (GPS) and smart control devices.



TRANSPORTATION SYSTEM ENGINEERING 2 , 61463

12

## Objectives of Traffic Engineering

- **Safety (Primary)**
  - The principal goal of the traffic engineer remains the provision of a safe system for highway traffic
- **Mobility (Speed and Capacity)**
- **Comfort**
- **Convenience**
- **Economy**
- **Environmental compatibility**

TRANSPORTATION SYSTEM ENGINEERING 2 , 61463

13

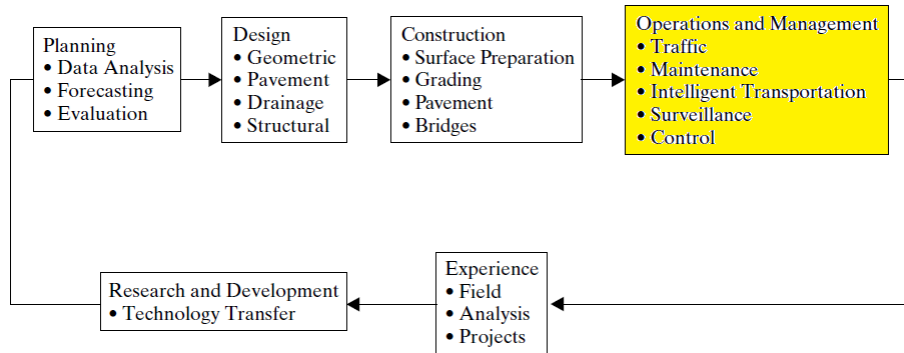
## Types of Traffic Flow

- **Uninterrupted (continuous) traffic:**
  - No external fixed elements interrupt traffic flow, like traffic lights, that oblige vehicles to stop.
  - The possible stoppage is caused by internal reasons of traffic flow ( accident, collision, break down, etc.)
- **Interrupted (discontinuous) traffic:**
  - Fixed elements interrupt periodically traffic ( such as traffic lights and stops.
  - These elements significantly diminish vehicle speed in certain instants

TRANSPORTATION SYSTEM ENGINEERING 2 , 61463

14

## Traffic/Transportation Engineering Profession



TRANSPORTATION SYSTEM ENGINEERING 2 , 61463

15

## Traffic Engineering Profession

- **Relationship with General Public**
  - More than any other engineer
- **Relationship with Elected Official**
  - A wide range of officials
- **Professional Ethics**
  - There is great responsibility, according to the outcomes

TRANSPORTATION SYSTEM ENGINEERING 2 , 61463

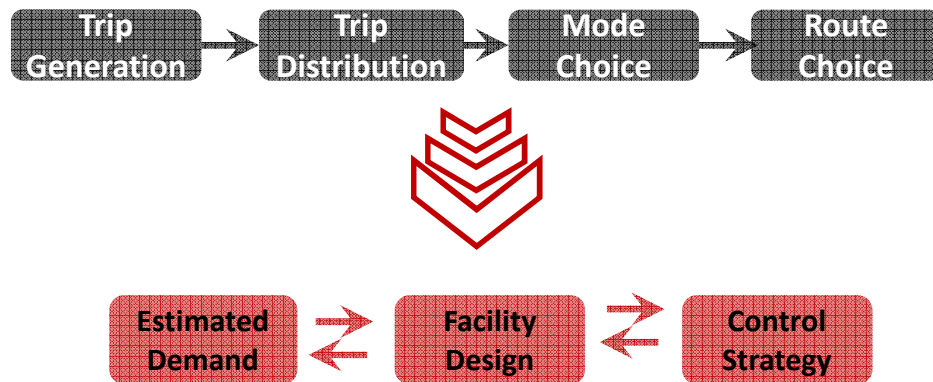
16



## Introduction to Transportation Planning

### • Travel Demand Forecasting

#### 4-Step Model



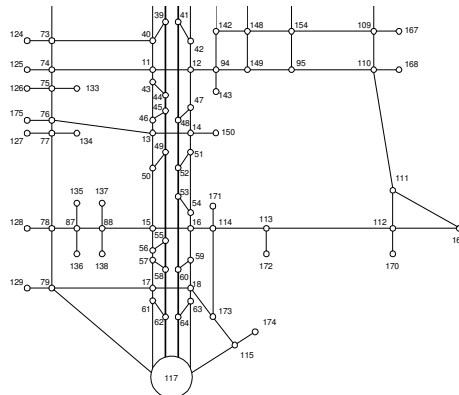
TRANSPORTATION SYSTEM ENGINEERING 2 , 61463

17

## Introduction to Transportation Planning

### • Network analysis

- The principal goal of the traffic engineer remains the provision of a safe system for highway traffic



TRANSPORTATION SYSTEM ENGINEERING 2 , 61463

18