Delay / Congestion Studies

Types of delay

Recurrent delay – occurs periodically at particular place and time

Non-recurrent delay – unpredictable and causes for random events

Causes of delay

Fixed / geometric delay

- Road intersection / signal
- Inconsistent roadway width
- Sharp hor / verticle curves
- Sharp bend, bridges

Operation delay – caused by road side and inter-veh frictions

Other causes-

Negative impacts of Delay / Congestion Studies

- Wasting time of motorists and passengers.
- Inability to forecast travel time accurately, leading to drivers allocating more time to travel and less time on productive activities.
- Wasted fuel increases air pollution owing to increased idling, acceleration and braking.
- Wear and tear on vehicles leading to more frequent repairs and replacements.
- Stressed and frustrated motorists, encouraging road rage and reduced health of motorists leading to accident.
- Emergency vehicles may be interfered traveling to their destinations where they are urgently needed.
- Economic aspec.
- Others

Causes of Accident

1. Distracted Driving.
2. Speeding.
3. Drunk Driving. ...
4. Reckless Driving
5. Weather: Rain, snow, fog, darkness, ice etc.
6. Running Red Lights
7. Running Stop Signs
8. Teenage Drivers.
9. Design Defects:automobile and highway
10. Unsafe Lane Changes
11. Improper Turns
12. Tailgating

Discuss under three groups
Roadway user, Highway environment and Mechanical Failure.

Causes of Accident

1. Distracted Driving
Distracted drivers are the top cause of car accidents in the U.S. today. A distracted driver is a motorist that diverts his or her attention from the road, usually to talk on a cell phone, send a text message or eat food.

2. Speeding
Many drivers ignore the speed limit and drive over the limit. Traveling above the speed limit is an easy way to cause a car accident. The faster you drive, the slower your reaction time will be if you need to prevent an auto accident.

3. Drunk Driving
Driving under the influence of alcohol causes car accidents every day. A drunk driver lose the ability to focus and function properly and its very dangerous when operating a vehicle.

4. Reckless Driving
If you don’t drive carefully, and you may end up in a needless car accident. That’s what often happens to reckless drivers who speed, change lanes too quickly or tailgate before causing a car accident. Reckless drivers are often impatient in traffic so be sure to take extra care around aggressive drivers.

Causes of Accident

5. Rain
Car accidents happen very often in the rain because water creates slick and dangerous surfaces for cars, trucks, and motorcycles and often causes automobiles to spin out of control or skid while braking. To avoid a car accident, drive extra careful when it rains.

6. Running Red Lights
Drivers that run red lights, run the risk of causing wrongful death because they often cause side-impact collisions at high speeds. To avoid a car accident, look both ways for oncoming cars as you approach a green light.

7. Running Stop Signs
Stop signs should never be ignored, but when they are, serious car accidents are often the result. Many rollover accidents and side-impact car accidents result from drivers that run stop signs. You should always look both ways when proceeding through a stop sign.

8. Teenage Drivers
Unfortunately, teenagers aren’t often known for their carefulness. When teen drivers hit the roads they don’t always know what to do and that lack of experience ends up causing car accidents.

Causes of Accident

9. Night Driving
Driving in the daylight can be hazardous, but driving at night nearly doubles the risk of a car accident occurring. When you can't see what's up ahead you don't know what to anticipate as you drive towards it.

10. Design Defects
No product is ever made perfectly, and cars are no different. Automobiles have hundreds of parts, and any of those defective parts can cause a serious car accident.

11. Unsafe Lane Changes
There will always come a time where you need to get over to another lane (i.e. exit from a freeway, get in the correct lane to make a turn, etc.). When drivers don't make safe lane changes properly, it often leads to a car accident.

12. Wrong-Way Driving
You can turn down a street thinking it is a normal right turn, when in actuality, it is a one-way street in the opposite direction. When you go the wrong way, everyone is in danger because as you head towards a car accident.

Causes of Accident

13. Improper Turns
The reason that we have stop lights, turn signals, and lanes designated for moving either right or left as opposed to straight is because when drivers ignore the rules of the road, car accidents are often the result.

14. Tailgating
Many drivers are impatient and reckless, driving so close to another car that they cannot react in time if the car in front of them brakes suddenly.

15. Driving Under the Influence of Drugs
It’s not only alcohol that is dangerous when mixed with drivers on the road. Drugs, both legal and illegal, can impair your ability to fully function as a driver. If your mind isn’t clear and you don’t have complete control over your body, getting behind the wheel can lead to serious car accidents.

17. Snow
Snow’s dangerous mixture of ice and water is a dangerous recipe for car accidents each winter storm.

Causes of Accident

18. Road Rage
By tailgating another driver in anger or speeding past another driver only to pull in front of them and brake, these road “ragers” cause many needless car accidents each year.

19. Potholes
Drivers run the risk of losing control of their car or blowing out a tire when they drive over these potholes. If you see a pothole in your car’s path, you can avoid a car accident by making sure that your tires do not drive over it.

20. Drowsy Driving
Most of the car accidents caused by drowsy driving occur at night. If you find yourself wanting to fall asleep at the wheel, pull over when it’s safe and try to take a quick 30 minute power nap.

21. Tire Blowouts
Most highways are littered with the scattered remains of a tire blowout. Tire blowouts can cause you to lose control of your vehicle, and they are especially dangerous for bigger automobiles like semi-trucks. When encountering a tire blowout, try to maintain control of your vehicle and pull over safely and you will likely avoid a serious car accident.

Causes of Accident

22. Fog
Fog isn't the most common weather occurrence, and that's good news for car accidents statistics. Driving is a skill that requires the ability to see, but fog makes it extremely difficult to see sometimes more than a car length in front of you.

23. Deadly Curves
Many motorists have lost control of their cars along a dangerous curve and lost their lives in a car accident. So when you approach these signs, take head of the posted speed limit and drive cautiously to avoid a car accident.

24. Animal Crossings
While drivers are required to know the rules of the roadway, wild animals do not take driver's education. Wild animals will wade out into the street, and it's up to you to make sure that you don't get into a car accident with them.

25. Street Racing

Accident Studies

Accident Responsible for:

- Road users – drivers and pedestrians (60%)
- Road environment – 30%
- Mech Failure – 10%

Explain different aspect in light of Bangladesh

Use of Accdt Data

- Engineering use
- Enforcement use
- Administrative use
- Educational use

Engineering use

- ✓To justify safety measures and traffic rergulating measures
- ✓Determine adequacy, shape, size and legibility of traffic signs
- ✓To design and plan ped safety facilities
- ✓To implement speed zoning and speed control
- ✓To improve geometric element

Traffic Collision

A **traffic collision**, also known as a motor vehicle **collision** occurs when a vehicle collides with another vehicle, pedestrian, animal, **road** debris, or other stationary obstruction, such as a tree or utility pole.

Traffic collisions may result in injury, death and property damage

Types of Collisions

- **Backup collisions** when a driver reverses the car into an object, person, or other car.
- **Frontal impacts /head on collision**
- **Side impacts / Brush or side swipe** - here the side of one or more vehicles is impacted. These crashes often occur at intersec and parking lots and when two vehicles pass on a multi-lane roadway.
- **Rear end collision-** wherein a vehicle crashes into the vehicle in front of it.
- **Right Angled collision**
- **Right turn collision**
- **Rollovers**

Various Types of Collision



Rear end collision















Head on Collision







Side impacts / Brush or side swipe







Right Angled collision







Parking Studies

Types of Parking Facilities

On-street / curb parking

- along curb
- Seriously impede tfc flow and contribute to conflicts/ crashes
- short stay
- convenient
- preferable parallel
- charged or free

Off-street parking

- away from curb
- long stay
- may be inconvenient as walking is reqd
- preferably angle
- Types: back street, surface car parks/parking lots, multi storied (self or auto), basement parks

Method of Parking

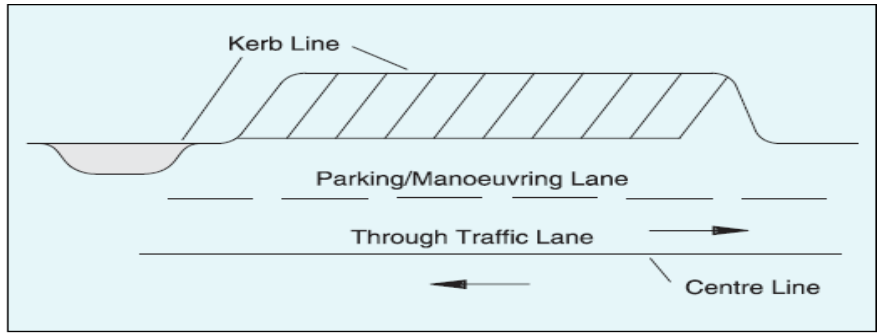
Parallel parking

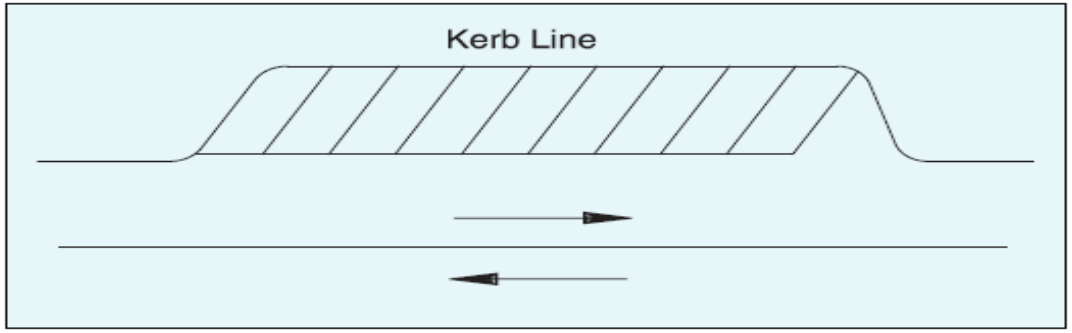
- Space reqr for parking and unparking maneuvers is least
- Reqr least rdway width but max curb length
- Maneuver is very difficult
- Off side door opening difficult
- Gen recommended for road with narrow width or with high vol of through tfc

Angle Parking

- Space reqr for parking and unparking man increases with angle
- Reqr more rdway width but less curb length
- Maneuver is more convenient or easier
- Usually recommended for off street parking or for exceptionally wider rd or rd with low vol of through tfc

Angle parking









Problem with Uncontrolled On Street Parking:

- Reduce roadway capacity and causes congestion and serious economic loss.
- Encourage rd side non-motor activities / rd side friction
- Less efficient use of rd side space
- Loss of revenue
- Make rdway op unsafe and haphazard

Traffic Surveillance

What is it?

Real time tfc con and mgt / enforcement measures

Useful for peak hr and wide area tfc prob

Need remote sensing, replace police petrol

Objective

To provide optimum utilization of all available facilities by monitoring, collecting, integrating etc.

To enforce / detect tfc law breakers

To improve security of public crowded areas or shops

Surveillance Techniques

Manual: Citizen calls, Police petrol

Remote sensing: Detectors / sensors, Using CCTV

Traffic Surveillance

Flow break down?

Is a sudden change of flow condition

It generate shock wave in the saturated tfc stream

The wave propagate and amplified through downstream tfc very quickly

Causes due to non-recurrent events like accdt, mech failure, signal malfunctioning, excess of tfc or congestion etc.

Consequences of Flow break down

Causes temp blockage of road and contribute to non-recurrent congestion

Long queue of veh is built very quickly

Large amount of delay incurred by the travelers at peak period

Since it is an unpredictable real time events, for taking prompt action, continuous surveillance system to detect roadway incidents.

Street Lighting

Key Loc where Adequate Street Lighting is Necessary

- Where there are high proportion of ped, cyclist or other poorly lit rd users incl animals
- Intersection where both veh and ped flow is high
- Sharp bend, summit curves, tunnels, ped x-ing areas, br sites, level x-ing, other bottlenecks
- Hazardous obj like road humps, channelizing islands etc.

Street Lighting

Arrangement/Layout

- Single side
- Both sides: staggered or opposite
- Central : one arm or two arms

Recommended arrangement

- ✓ One side when pavement width <= 30 ft
- ✓ Both sides staggered for pavement 30 ft > width <= 60 ft
- ✓ Both sides opposite for pavement width > 60 ft