CAR PARKING

Safe and secure parking facility for the vehicles is a fundamental right of all visitors. Most of the hotels are unable to provide sufficient parking space for their guests.

Planning of parking totally depends on the availability of the space, size, configuration and contours of a site.

There are various types of parking, like

a) **On grade parking (includes on street and off street parking)**
b) **Above grade parking**
c) **Below grade parking**
d) **Composite parking**
e) **Parallel parking**
f) **Angled parking**

a) **On grade parking**:- This is the most common and least expensive car parking, totally dependent on the availability of space and its configuration. Low costs of land always support the on grade parking. This requires a lot of maintenance in respect of property management.

Parking lots deteriorate with the passage of time. Cracks and break of surface are common problem, if unnoticeable may become serious defects. Preventive maintenance programme to be ensured. General precautions to be taken are:-

- Use of salt to melt snow or ice on concrete surface
- Avoid spillage of oil / kerosene or other liquids on surfaces.

Inspection of the area to be done twice a year. Maintenance record to be maintained.

Off-street

Off-street parking is the most common and accepted method of satisfying facility parking needs. In many cases, these areas are developed as one large mass parking area. The result is often an installation dotted with huge expanses of asphalt with little consideration of the negative visual impacts. When siting off street parking areas, the designer should consider:

- Creating multiple smaller parking areas rather than one large mass
- Integrating planted islands to increase aesthetics
- Minimize extensive grading operations by designing to the topography
- Ensuring a distance of at least 15 meters is provided from proposed parking area entrances and exits to intersections
- Minimizing the number of entrances and exits

On-street

- Permit only parallel parking
- Maintain a minimum distance of 15 meters from on-street parking spaces to intersections and off-street parking area entrances
- Break up long lines of vehicles with occasional planting island projections if appropriate
- Ensure streets maintain required traffic-carrying capacities and provide safe vehicular and pedestrian passage

b) **Above grade parking**:- This is a free standing parking deck of two or more levels. This type provides maximum efficiency in terms of area, structure and circulation. This is least expensive after on grade parking.

c) **Below grade parking**:- This is commonly known as underground parking. This is more expensive because of structure and mechanical systems required to construct it. Best method of protecting a dry flood

proofed garage from flood waters is to design garage entry to the above BFE (Base Flood Elevation).

d) **Composite parking**:- This is basically integrates above and below grade parking types with the building above the structure. It requires special ventilation and sprinkler systems and more elaborate facade.

e) **Parallel parking**: The vehicles are parked along the length of the road. Here there is no backward movement involved while parking or un parking the vehicle. Hence, it is the most safest parking from the accident perspective. However, it consumes the maximum curb length and therefore only a minimum number of vehicles can be parked for a given kerbed length. This method of parking produces least obstruction to the on-going track on the road since least road width is used.

For the designer, the parallel parking configuration can be used where suitable off-street parking cannot be accommodated or is not practical. For the driver, parallel parking requires experience, confidence, and patience. Parking spaces should be a minimum of 7.5 meters long and at least 2.75 meters wide. On-street parallel parking spaces should be 3.35 meters wide.

f) **Angled parking**:

- *30 parking:* In thirty degree parking, the vehicles are parked at 30 with respect to the roinad alignment. In this case, more vehicles can be parked compared to parallel parking. Also there is better maneuver-ability. Delay caused to the track is also minimum in this type of parking.
- *45 parking:* As the angle of parking increases, more number of vehicles can be parked. Hence compared to parallel parking and thirty degree

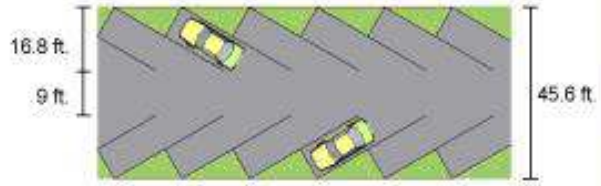
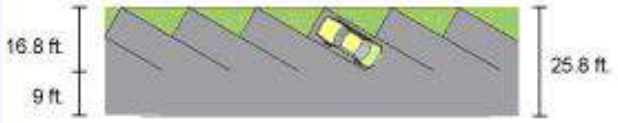
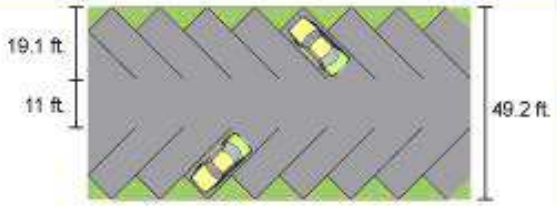
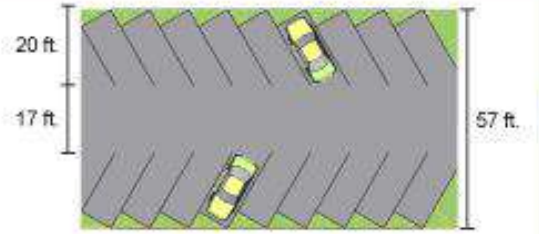
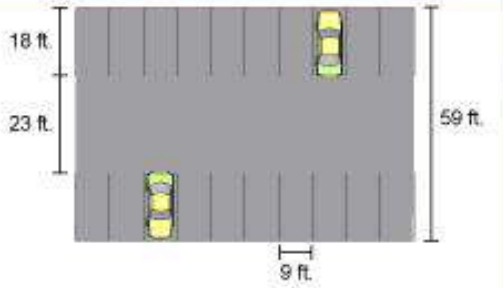
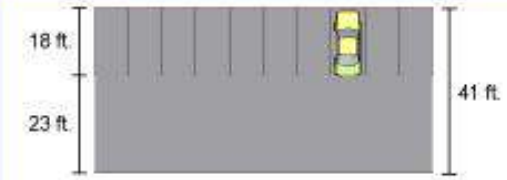
parking, more number of vehicles can be accommodated in this type of parking.

- *60 parking:* The vehicles are parked at 60 to the direction of road. More number of vehicles can be accommodated in this parking type.
- *Right angle parking:* In right angle parking or 90parking, the vehicles are parked perpendicular to the direction of the road. Although it consumes maximum width kerbed length required is very little. In this type of parking, the vehicles need complex maneuvering and this may cause severe accidents. This arrangement causes obstruction to the road track particularly if the road width is less. However, it can accommodate maximum number of vehicles for a given kerbed length.

g) **Multiple Level Car Parking**

It is a building (or part there hereof) which is designed specifically to be for Automobile Parking and where there are a number of floors or levels on which parking takes place.

Layout diagram of angled parking:

Double row	∠	Single row
	30°	
	45°	
	60°	
	90°	

Zoning Laws :- The car parking area must be covered with certain zoning laws as per statutory requirement. **Requirement of the parking space is as per thumb rule is 1000 sq. ft. to park 03 cars in suburban area and 10% lesser space in urban area (i.e. 900 sq. ft.)**

Parking space standards :-

i) Standard off-street (for standard vehicles) :- Minimum width- 9 ft., Minimum length- 18 ft, except for parallel stalls.

ii) Compact off- street (for compact vehicles) :- Minimum width- 8.5 ft., Minimum length- 16 ft.. Maximum of 10% of total parking area for this type of parking can be kept.

iii) Long term off-street:- Minimum width- 8.5 ft., Minimum length- 18 feet. This is meant for long time parking for employees for minimum of 04 hours or more.

Ramps:-

- Protected ramps shall not be constructed with slopes exceeding 12.5% gradient.
- Unprotected ramps shall not be constructed with slopes exceeding 10% gradient.
- Ramp slopes exceeding 10% shall have transition area of not less than 15 ft. in length at the top and bottom of the ramp and the slope of the transition ramp shall be approximately 1.5 times of the main portions of the ramp.
- Single lane entrance shall not be less than 15 ft. wide at the street.

Design:- Openings etc. to be designed in accordance with National Building Code.

Lighting:-

- Interior light levels shall be at an average equal to or greater than 5 ft. candles to enhance security and safety.
- Lighting for rooftop parking to be placed in the parapet or interior of the parking area. Lighting shall not to reflect or shine on adjacent properties.

Parking studies

Before taking any measures for the betterment of conditions, data regarding availability of parking space, extent of its usage and parking demand is essential. It is also required to estimate the parking fares also. Parking surveys are intended to provide all these information. Since the duration of parking varies with different vehicles, several statistics are used to access the parking need.

Parking statistic:

1. **Parking accumulation** It is defined as the number of vehicles parked at a given instant of time. Normally this is expressed by accumulation curve. Accumulation curve is the graph obtained by plotting the number of bays occupied with respect to time.

2. **Parking volume** Parking volume is the total number of vehicles parked at a given duration of time. This does not account for repetition of vehicles.

3. **Parking load** Parking load gives the area under the accumulation curve. It can also be obtained by simply multiplying the number of vehicles occupying the parking area at each time interval with the time interval. It is expressed as vehicle hours.

4. **Average parking duration** It is the ratio of total vehicle hours to the number of vehicles parked.

5. **Parking turnover** It is the ratio of number of vehicles parked in duration to the number of parking bays. This can be expressed as number of vehicles per bay per time duration.

6. **Parking index** Parking index is also called occupancy or efficiency. It is defined as the ratio of number of bays occupied in time duration to the total space available. It gives an aggregate measure of how effectively the parking space is utilized. Parking index can be found out as follows: *Parking index = parking load/parking capacity × 100*

Effects of parking

Parking has some effects like congestion, accidents, pollution, obstruction to fire-fighting operations etc.

1. **Congestion** Parking takes considerable street space leading to the lowering of the road capacity. Hence, speed will be reduced, journey time and delay will also subsequently increase. The operational cost of the vehicle increases leading to great economical loss to the community.

2. **Accidents** Careless maneuvering of parking and unparking leads to accidents which are referred to as parking accidents. Common type of parking accidents occur while driving out a car from the parking area, careless opening of the doors of parked cars, and while bringing in the vehicle to the parking lot for parking.

3. **Environmental pollution** They also cause pollution to the environment because stopping and starting of vehicles while parking and unparking results in noise and fumes. They also aced the aesthetic beauty of the buildings because a car parked at every available space creates a feeling that building rises from a plinth of cars.

4. **Obstruction to firefighting operations** Parked vehicles may obstruct the movement of firefighting vehicles. Sometimes they block access to hydrants and access to buildings.

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