

2.4 DIFFERENCE BETWEEN HIGHWAY AND AIRPORT PAVEMENTS

In essence, a highway pavement and an airport pavement are similar to each other. Both receive loads from rubber tyred vehicles travelling at high speeds. Both are built up of material such as cement concrete, stone aggregates and bitumen bound layers. Both rests on natural soil subgrade.

There are, however, some differences between highway and airport pavement. Firstly, Airport loadings are very high when compared to highway loading. Tyre pressure of aircraft are also higher than highway tyre pressures. The impact of aircraft on landing is very high.

For ensuring smooth flow at very high speed, runway surfaces need to be build to a very high degree of finish, free from bumps. Skidding becomes a serious problem at very high speeds of the aircraft and extra care has to be exercised to prevent accidents.

Airport pavements are generally thicker than highway pavements & require better surfacing materials because the loading & tire pressure of aircraft are much greater than those of highway vehicles. However, the main differences are –

1. The number of load repetitions on airport pavements is lower than that on highway pavements. On airport pavements, due to the wander effect of aircraft landing & taking off, several passages of a set of gears are counted as one repetition, whereas on highway pavements, the passage of one axle is considered as one repetition.
2. The total weight of an aircraft is higher than that of typical road vehicle (e.g. – commercial vehicles like trucks). Hence the design load for is higher in case of airport pavements (50 tons approx.), as compared to highway pavements (10 tons approx.).
3. Tire pressures (which influences contact area & contact pressure) on aircraft (up to 1580 kPa) are much higher than that of conventional truck tires (up to 800 kPa).
4. The lateral placement of traffic on highways is such that the trucks travel within 0.9 to 1.2 meter from the pavement edge, whereas the lateral placement of traffic

on an airport pavement is primarily concentrated in the center of the runway, distributed mostly over central 20 meters of the runway width.

5. The traffic on highway pavements is highly channelized. Whereas wheel loading on airport pavements less channelized than on highway pavements due to the large variation in the wheel assembly configurations & layout of different aircraft.
6. The design of highway pavements is based on moving loads with the loading duration as an input, for viscoelastic behaviors & the resilient modulus under repeated loads, for elastic behaviors. The design of airport pavements is based on moving loads in the interior of runways but stationary loads at the end of runways. As a result, thicker pavements are used at the runway end than in the interior.
7. The most severe distresses to an airport pavement occur where the traffic follows a designated line along the aprons, taxiways & at runway ends. Flexible highway pavements exhibit serious distress at pavement edges whereas airport pavements do not.