

Airport Pavement Operational Requirements

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Operational requirements of pavement areas

- Runways and Taxiways
 - Provide relatively smooth ride quality, particularly in high-speed areas
 - Provide good friction characteristics, particularly in high-speed areas
 - Provide effective drainage of run-off water
 - Provide a surface free of loose or potentially loose particles

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Operational requirements of pavement areas

- **Parking and Servicing Aprons**
 - No ponding water
 - No faulted slabs, stepped edges or potholes that could cause a trip hazard to personnel servicing aircraft
 - No loose particles
 - Bituminous surfacing must be Fuel resistant
 - Spilt fuel and oil must not be permitted to accumulate and should be cleaned off immediately
 - Resistant to intended operations such as tight turns and extended period of static loading
 - Depression in the aircraft wheel standing positions on flexible pavements should not be permitted to develop due to significant increase break-away thrust required to initiate movement

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Aircraft characteristics relevant to pavements

- **Military fighter jet aircraft**
 - Fighter jet impose most demands on pavements from operational perspective
 - High take-off and landing speed
 - Small single wheels, high tyre pressures and high engine efflux temperature may affect the pavement surface at rotation

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Aircraft characteristics relevant to pavements

- Transport and passenger aircraft
 - Impose the heaviest loads on pavement, balanced by multiple wheel main gear assemblies and lower tyre pressures
- Propeller –driven aircraft
 - Aircraft mass – low
 - Operating speed and tire pressure – low
 - Less demanding of pavement surface
 - FOD is equally hazard to this aircraft, must maintain pavement to minimize loose particles

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Aircraft characteristics relevant to pavements

- Helicopters
 - Rotor wash may propel loose particles on pavement surface against nearby aircraft, ground equipment, pedestrians or infrastructure
 - Pavement surfaces must be clean
 - Often serviced and refueled on parking area, surface become contaminated with hydraulic oil and fuel spillages
 - Concrete pads are common, joint sealant should be rubberized/PMB bitumen
 - Asphalt surface must be fuel resistant

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Airport Pavement Maintenance Management

- Life of pavement depends
 - Design
 - Quality of construction
 - Pavement maintenance
- Pavement deteriorate due to
 - Harsh element of weather and climate
 - Repetitive aircraft wheel loads and tire pressures

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Airport Pavement Maintenance Management

- Under service conditions
 - Minor settlements occur
 - Cracks develop on the surface
 - Surface abrasion and/or erosion occurs under traffic and thru environmental aging
 - Line markings faded
 - Water ponds along pavement edges and also in areas that lose shape due to load deformation or settlement
 - Weed growth to neglected areas

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Pavement defects

- **Pavement suffers defects due to**
 - Poor pavement construction or maintenance
 - Subgrade weakness
 - Higher than designed for wheel loads and tire pressure
 - Increase in load repetitions compared to design predictions
 - Disintegration of pavement materials
 - Climatic conditions
 - Environmental conditions
 - Age

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Airport Pavement Maintenance Categories

- **Routine maintenance**
 - Maintenance activities carried out on regular basis
 - Grass cutting, sweeping, cleaning drains etc
- **Preventative maintenance**
 - Carried out on minor defects to prevent defects becoming safety issue, affecting functional performance of pavement or requiring major disruptive maintenance following their occurrence
 - Patching, crack sealing, rectifying ponding, resealing, improve poor drainage, overlay etc.
- **Reactive (urgent) maintenance**

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Airport Pavement Maintenance Categories

- Reactive (urgent) maintenance
 - Action taken after structural failure and pavement unacceptable for aircraft operations
 - Unplanned maintenance and involves immediate closure of affected section
 - Cost more and requires more time to organize the repairs on account of its unplanned nature
 - Can be avoided by carrying out frequent pavement maintenance inspection, routine and preventative maintenance activities, exception natural disasters

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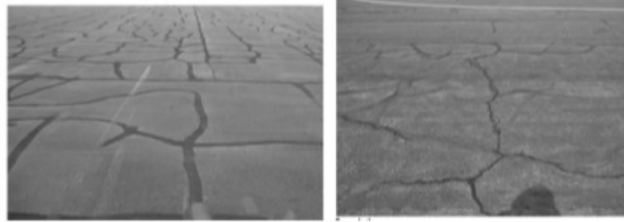
Flexible Pavement Defects

- Pavement defect categories
 - Cracks
 - Surface defects
 - Deformation
 - Edge defects
 - Groove damage

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Flexible Pavement Defects

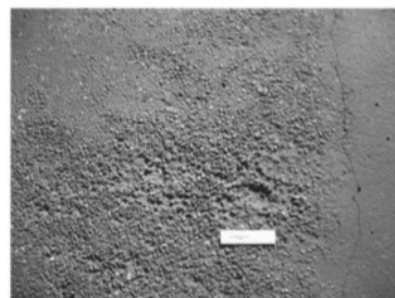
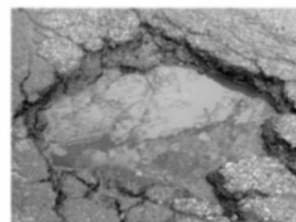
- Cracks



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Flexible Pavement Defects

- Potholes
- Raveling



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Flexible Pavement Defects

- Rubber Deposit
- Depression



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Flexible Pavement Defects

- Rutting



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PCC Pavement Defects

- PCC pavement defects categories
 - Cracks
 - Joint and edge defects
 - Joint seal defects
 - Surface defects
 - Poor compaction/honeycombing