

ICAO/FAA Comprehensive Aerodrome Certification Inspector Workshop

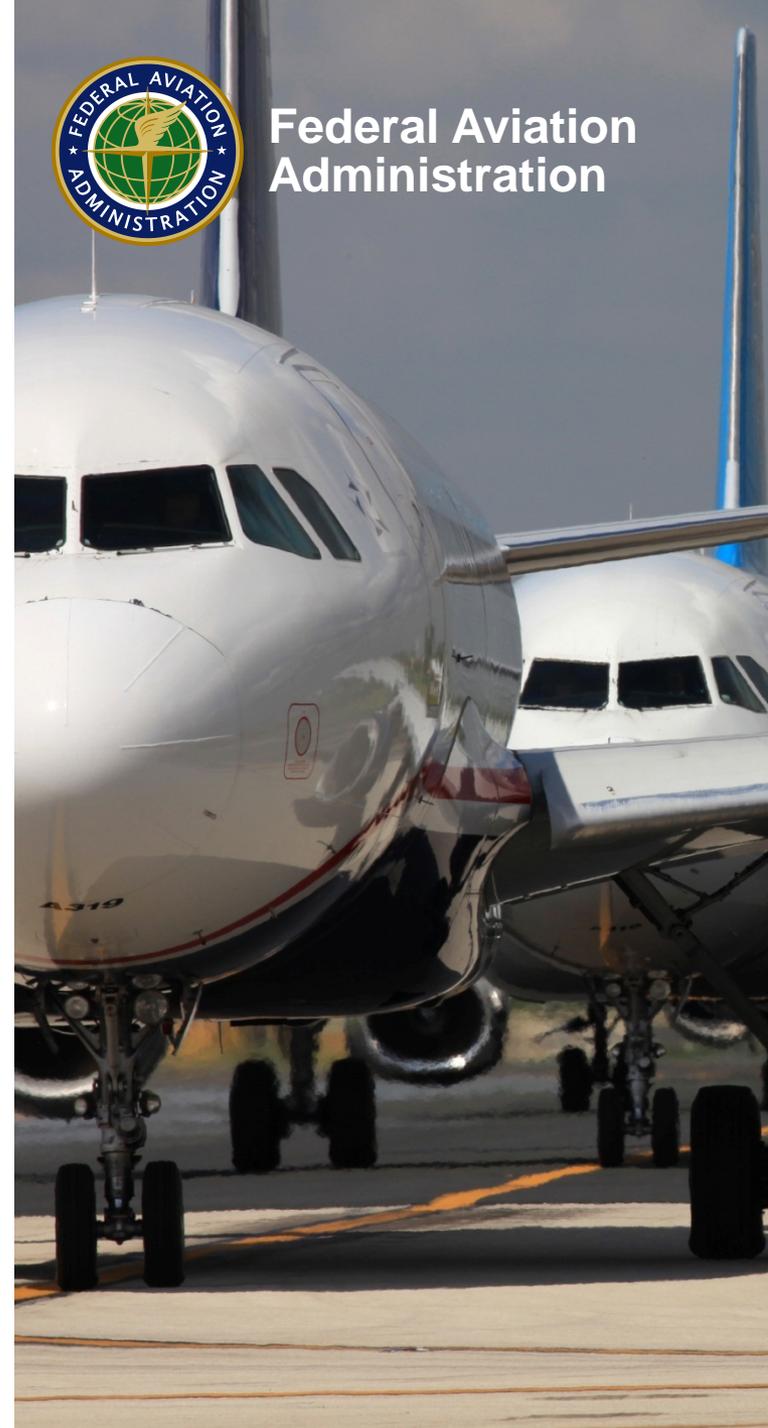
Runway Strip & Runway End Safety Area (RESA)

Presented To: Caribbean States

By: FAA Office of Airports



Federal Aviation
Administration



Presentation outline

- **Aerodrome design**
- **Design aircraft/operating aircraft**
- **Regulatory requirement/technical guideline**



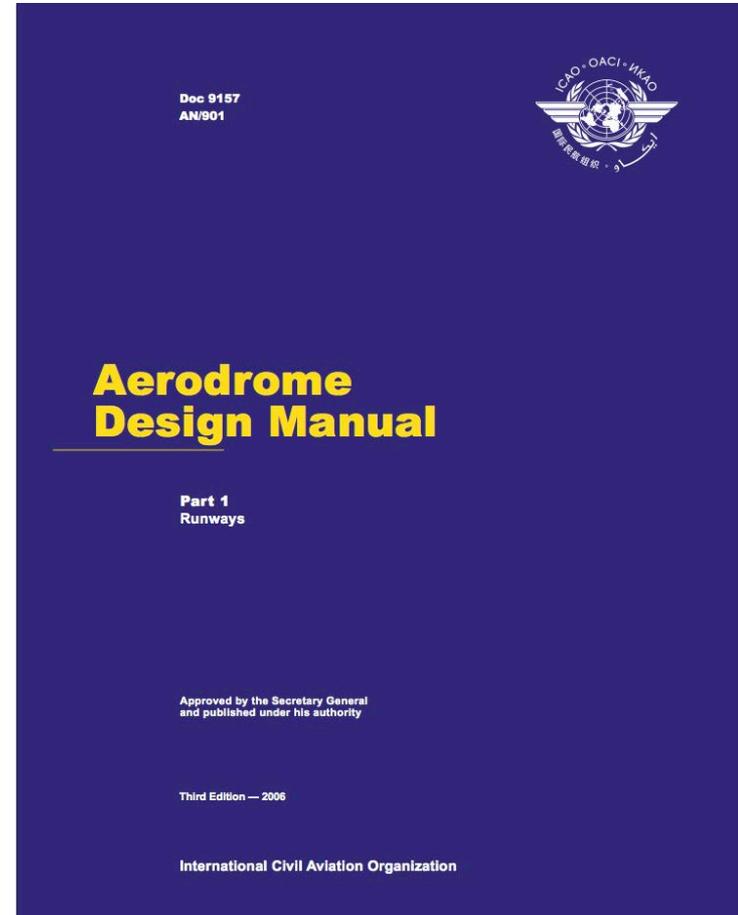
Factors for airport design

- **Runways: high speed: length, width and surface gradients**
- **Taxiway/Taxi lane: width, lateral separation and surface gradient.**
- **Aprons and Hangars: lateral separation and surface gradients**



Factors for airport design (Cont)

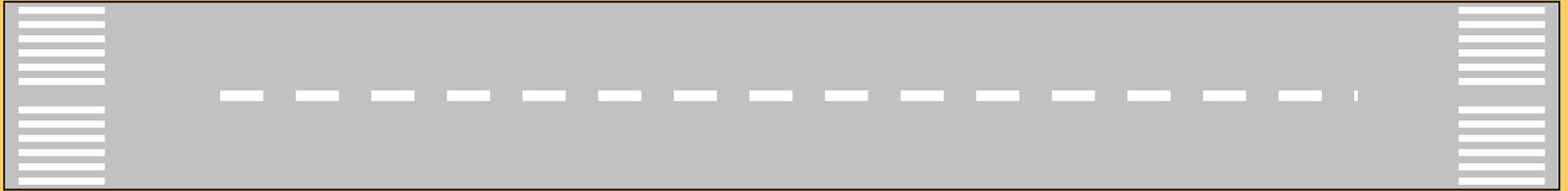
Doc 9157 – Aerodrome Design Manual, Part 1



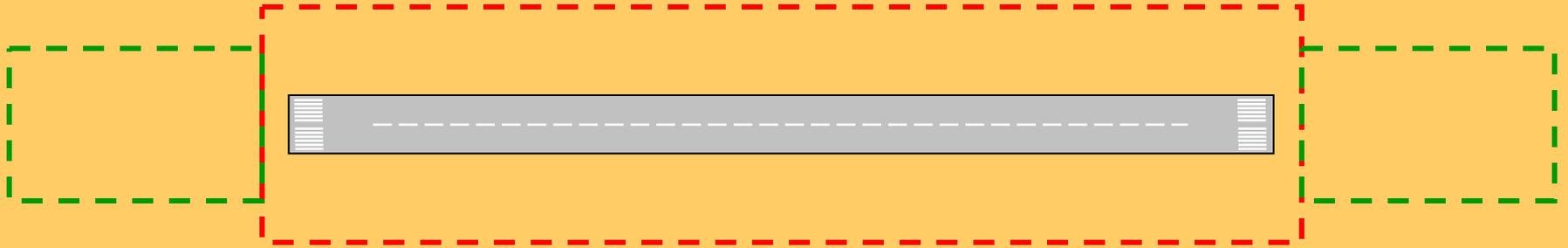
Runway strip and RESA



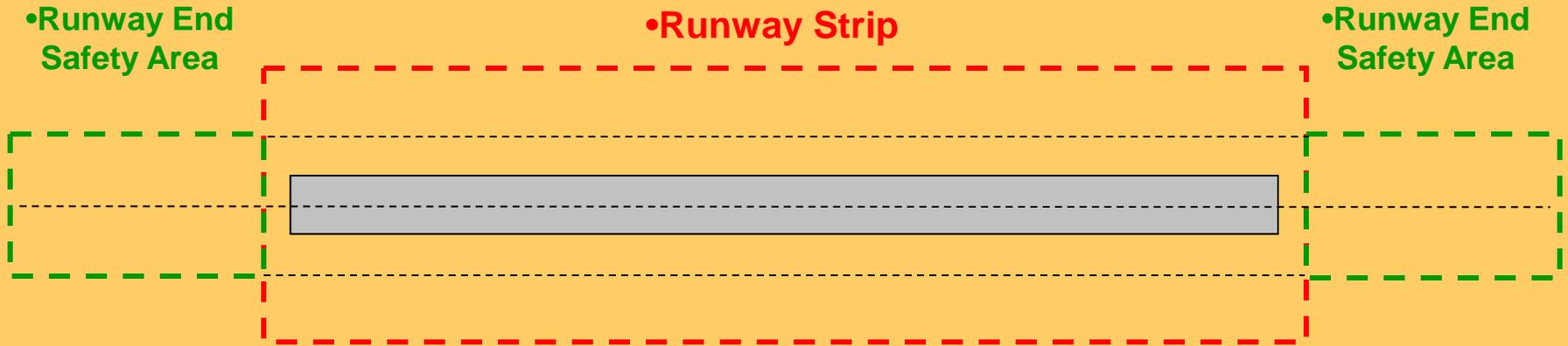
•Runway Pavement



•NAVAIDs and Marking



•Runway Strip/Runway End Safety Area–Code No. 3/4 Runway



•Runway Strip/Runway End Safety Area Code No. 3 & 4 PIR Runway – ICAO Annex 14, 3.4

•3.4.3 Runway strip for PIR shall extend, wherever practical, laterally 150 m (500') of CL.

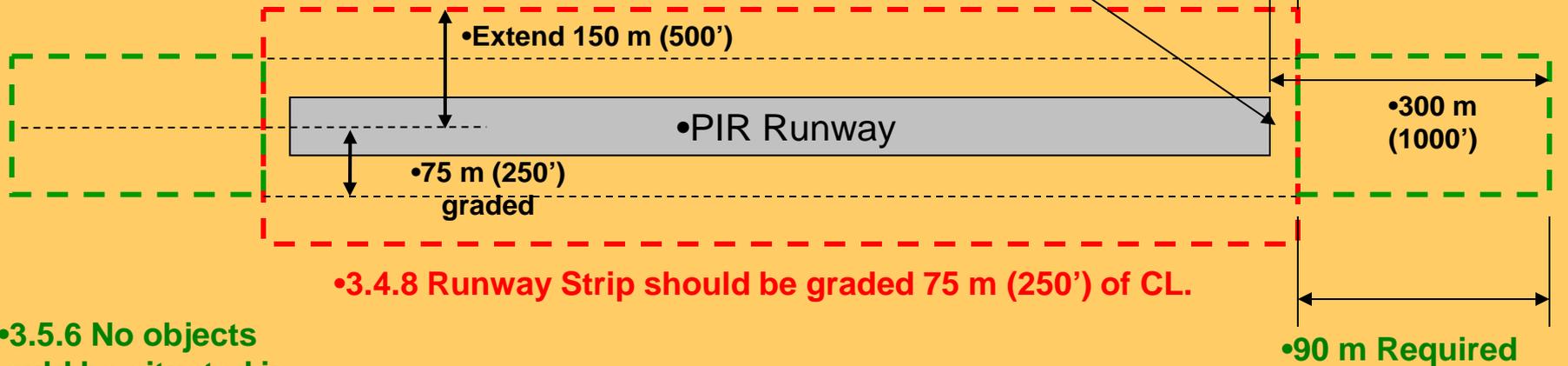
•3.4.11 Runway Strip should have blast erosion protection 30 m (100') prior to threshold

•Runway Strip extends 60m (200') past thresholds

•Runway End Safety Area

•Runway Strip

•Runway End Safety Area



•3.4.8 Runway Strip should be graded 75 m (250') of CL.

•3.5.6 No objects should be situated in RESA that may endanger planes.

•3.4.7 No Fixed Objects other than frangible visual aids permitted in Runway Strip within 60 m (200') of CL or 77.5 m (250') of CL for Code 4F runway.

•240 m Recommended

•3.5.7 RESA should be graded and cleared to reduce risk of damage to planes undershooting or overrunning the runway.

•3.4.6 An object situated on a runway strip which may endanger aeroplanes should be regarded as an obstacle and should, as far as practical, be removed.

•Width shall be at least twice runway width. Recommended width same as graded width of Runway Strip (75 m).

•3.11.5 Taxiway strip should be graded 22 m (72') from centre line for Code Letter E.

Runway strip and RESA

- **Runway strip: FAA divide this surface into Runway Safety Area and Runway Object Free Area. Only the RSA has regulatory requirement.**
- **Taxiway and Apron strip**
- **Runway End Safety Area (RESA)**



Regulatory requirement

- **Dimensions:**
- **Grading**
- **Bearing capacity**
- **Objects**
- **Frangibility**
- **Surface smoothness**



FAA – Runway Safety Area

- **Previous standards 60 m by 150 m**
 - **Current standards 300 m by 150 m**
 - **Analysis done by FAA collecting all accidents/incidents after 2/1987**
 - **Runway Project required RSA improvement**
 - **EMAS**
- ✓ **Airport Example**



Aerodrome Manual

- **Identify existing dimension of graded RSA**
- **Inspector verify required dimension using design aircraft and IFR minimums**
- **Verify that all objects in the RSA are fixed-by-function and mounted with frangible support**
- **Verify operator's procedure to maintain RSA**



Taxiway strip

- **Width from Annex 14 Table 3-1 column 11**
- **Leveled width: 11m, 12.5 m, 19 m, 22 m, 30 m (A-F)**
- **Gradient: 2.5% (C-F); 3% (A-B)**
- **Gradient beyond leveled area: 5%**
- **Object Fixed-by function? (frangible?)**



Part 139 – Field Inspection



PART 139.309(a)

- **Dimensions: authorized by the administrator at the time the construction, reconstruction or significant expansion was began after 01/01/1988**



PART 139.309(b)

- **1) Cleared and graded with no potentially hazardous humps, depressions or other surface variations**
- **(2) Drained by grading or storm sewers to prevent water accumulation**



PART 139.309(b)(3)

Capable, under dry conditions,
of supporting equipment



PART 139.309(b)(3)

(cont'd)

Capable, under dry conditions, of supporting aircraft without causing major damage to the aircraft



PART 139.309(b)(4)

- **Safety Area:**

- Only those that are “fixed by function”
 - E.G. PAPIs; ALS; Runway Lights; Glide Slope Antenna; etc.
- Must be frangible at ≤ 3 ”



Inspection of RSA

- **Observe RSA dimensions/ grading at EoR**
- **Drive runway edge: observe standards compliance**
- **Use holding position signs as guide for dimensions.**
- **Observe slopes on RSA: Survey**
- **Check object in the RSA for frangible support.**
- **May drive over RSA in dry condition to assess support**

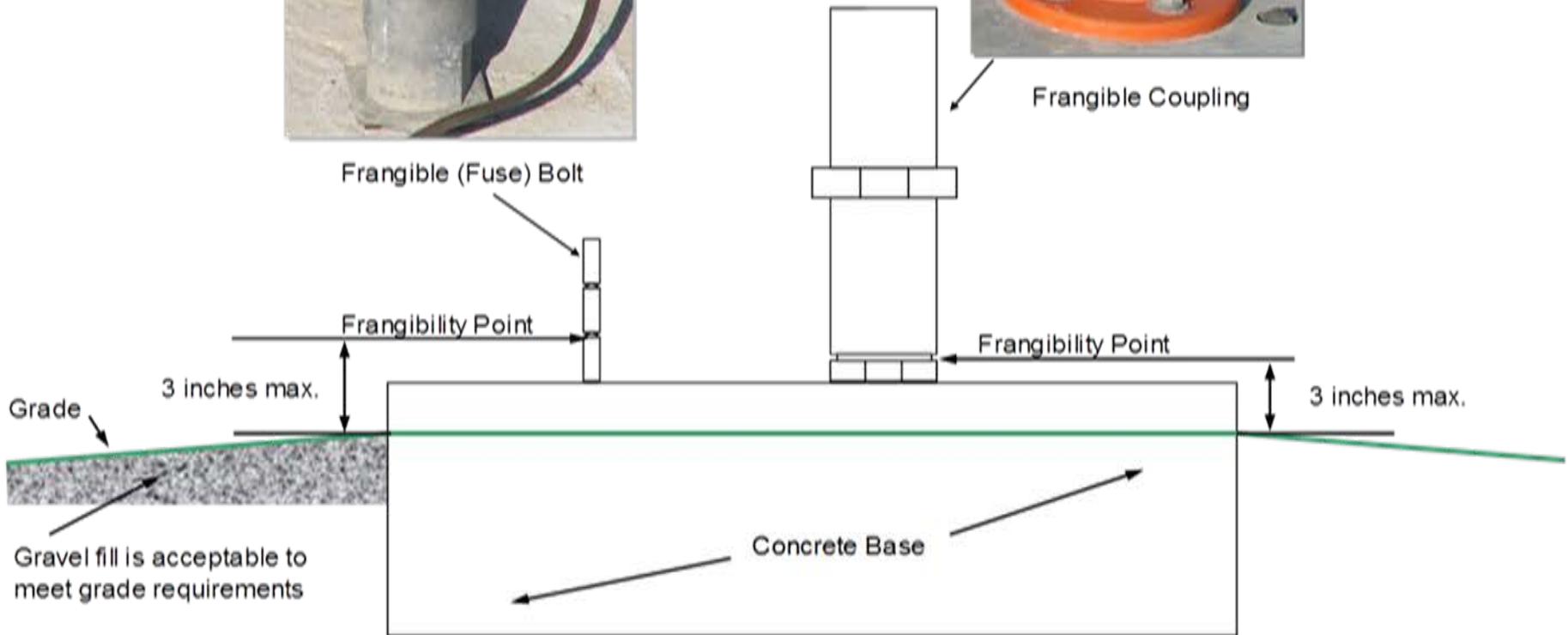




Frangible (Fuse) Bolt



Frangible Coupling

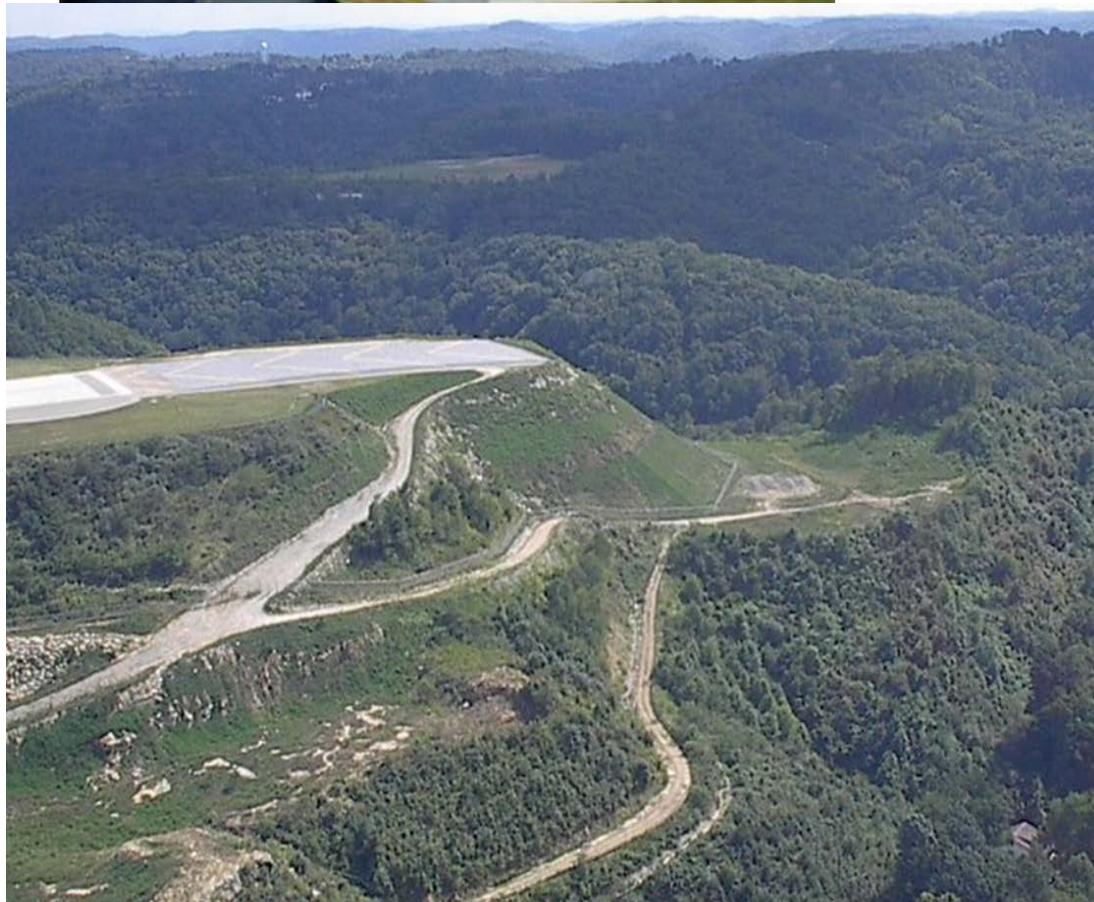


Declared distances

- **It is payload limitation method**
- **Accelerated stop and landing distance available are reduced to build in RSA**
- **Published in Airport Facility Directory**
- **Mostly used by dispatchers**







INSPECTOR TECHNIQUES - SAFETY AREAS

Drive safety area **ONLY**
when conditions allow



LOOK FOR:

- ✓ Improper objects in SA
- ✓ Frangible point less than 3" above grade. Exposed concrete base
- ✓ Potentially hazardous ruts, bumps



Pavement



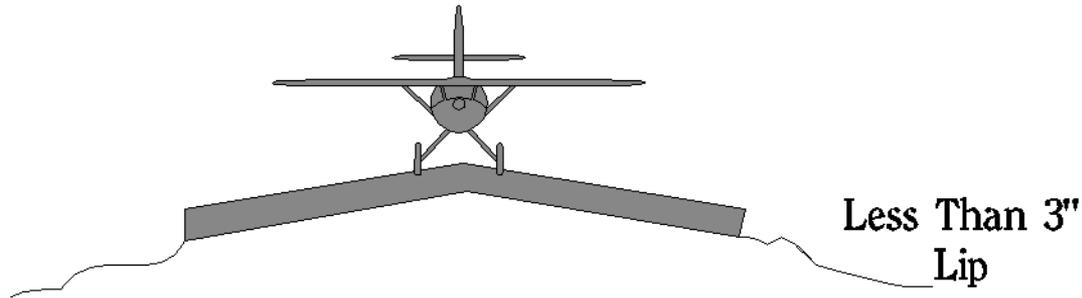
Presentation outline

- **What Part 139 requires for paved areas**
- **Three types of pavement information**
- **Pavement Classification Number (PCN)**
- **Pavement Surface Evaluation (PASER)**
- **Pavement Condition Index (PCI)**

- **Reporting condition to users**



Regulation requirements - 309.305(a)(1)



Pavement edges must not exceed 3” between

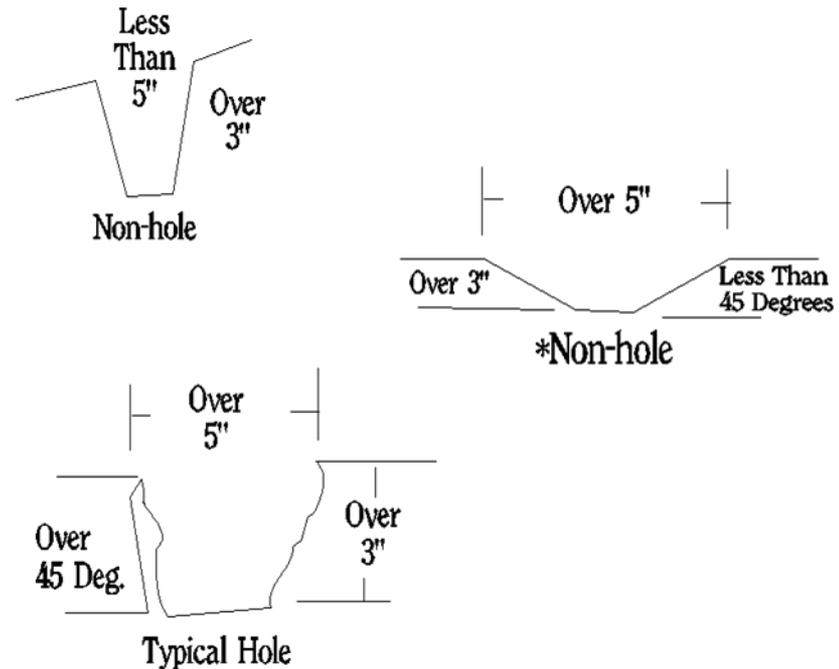
- Pavement and abutting areas
- Abutting pavement sections



SECTION 139.305(a)(2)

Holes over 5"
across may not

- Exceed 3" depth
- Slope 45° or more



Regulation requirements – 309.305(a)(3)

- **Pavement must be free of cracks and surface variations that could impair air carrier aircraft directional control**
- **Any crack or surface deterioration that produces loose aggregate or other contaminants must be repaired immediately**



Regulation requirements –309.305

- **Airport Certification Manual**
- **Maintenance and prompt repair**
- **(a)(1): Maximum 3 inches lips (edges)**
- **(a)(2): No holes**
- **(a)(3): Cracks and surface variation**
- **(a)(4): Foreign Object Debris (FOD)**
- **(a)(5): Chemicals**
- **(a)(6): Drained, water accumulation**



Pavement crack



Regulation requirements – 309.305(a)(4)

- Remove promptly and as completely as possible all
 - ✓ Mud
 - ✓ Dirt
 - ✓ Sand
 - ✓ Debris
 - ✓ Loose aggregate
 - ✓ Foreign objects
 - ✓ Rubber deposits
 - ✓ Other contaminants
- Does not apply to snow, ice, deicing materials (139.305(b))





**RUBBER
BUILDUP**



**Foreign
Object Debris
FOD**



Regulation requirements – 309.305(a)(6)

- ◆ Pavement shall be sufficiently drained and free of depressions to prevent ponding that
 - ✓ Obscures marking
 - ✓ Impairs safe aircraft operations





Regulation requirements – 309.305(a)(5)

- ✘ Remove as soon as possible chemical solvents used to clean any movement area
- ✘ Does not apply to snow, ice, deicing materials (139.305(b))



Types of pavement

- **Flexible pavement: transmit the load from granular contact. It is made of asphalt concrete surface.**
- **Rigid pavement: transmit the load like a beam, It is made of Portland Cement Concrete**

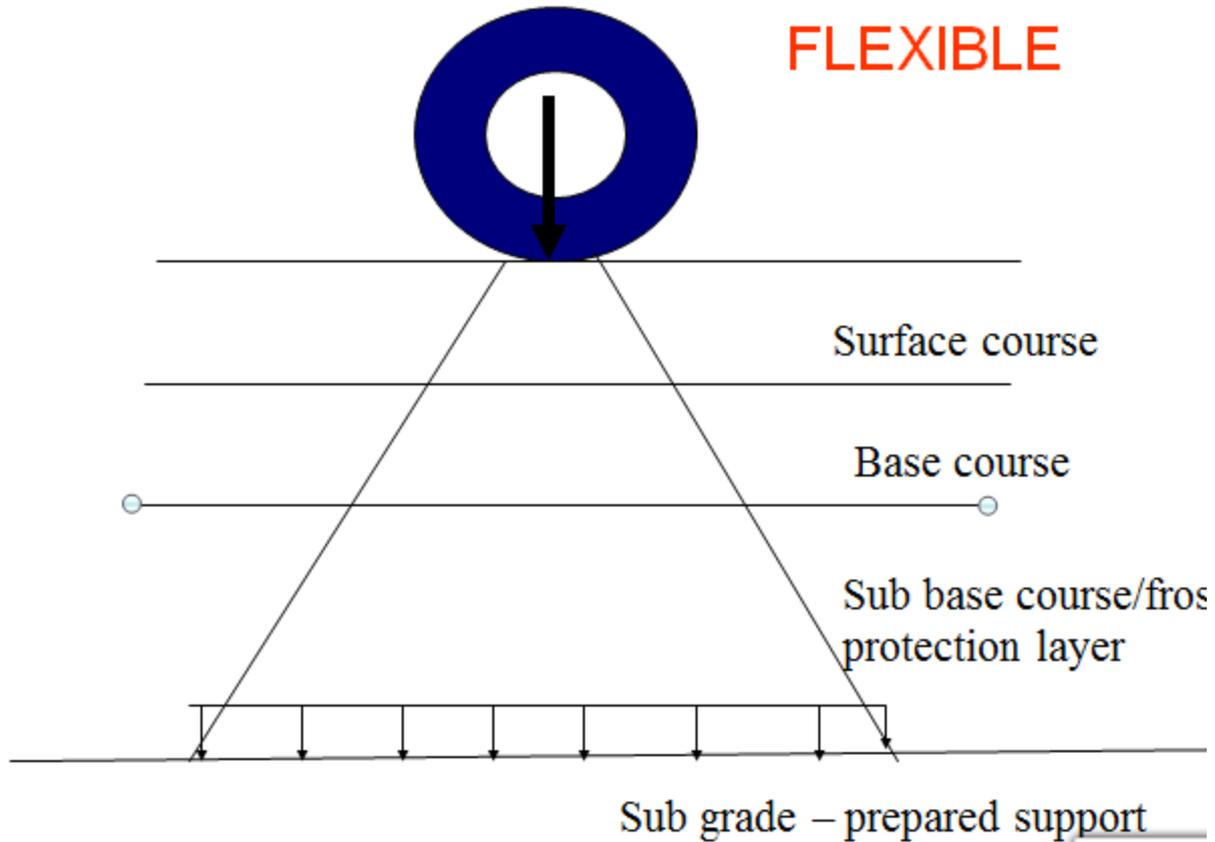


Types of Pavement

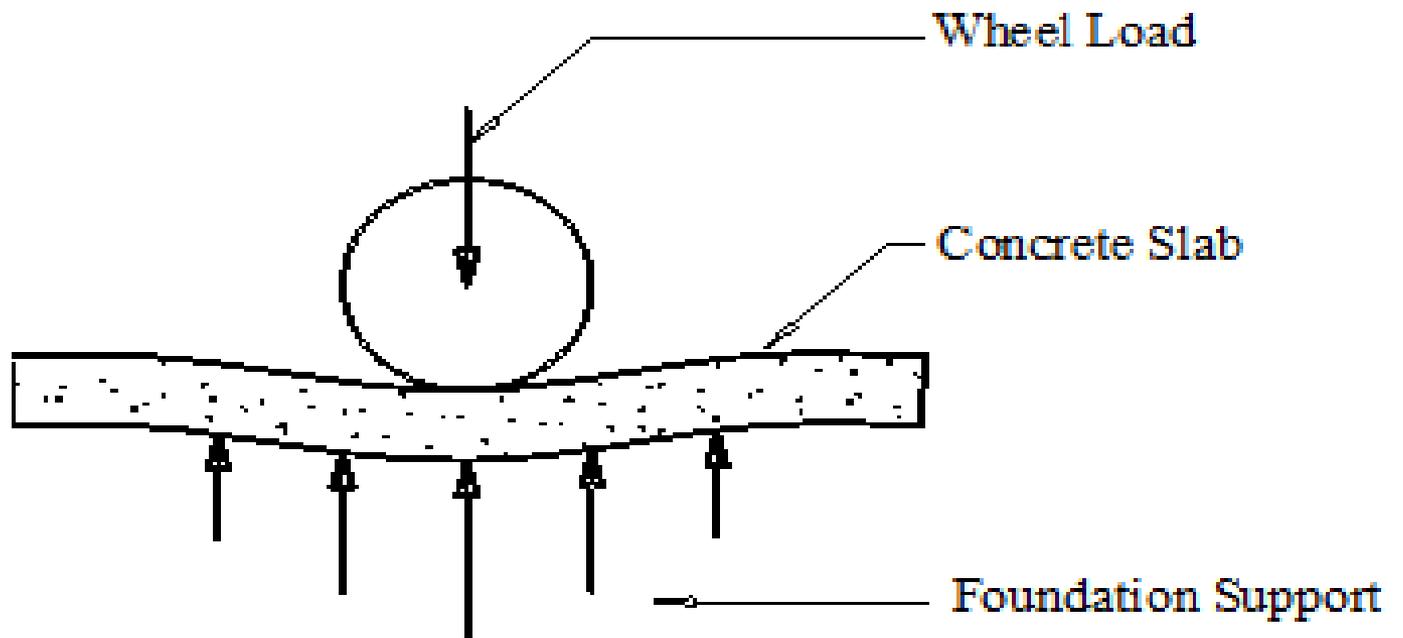
- **Pavement is the structure we build over a supporting surface (soil) to transmit the traffic load (aircraft). The load at the soil must be less than what the soil is capable to support.**
- **Pavement structure consist on a series of layer being the surface layer the highest quality and the bottom one the lowest quality**



FLEXIBLE



RIGID PAVEMENT



Types of pavement

- **Flexible = Asphalt**
- **Rigid = Portland cement**
- **Asphalt over concrete**
- **Concrete over asphalt (asphalt is basically a base course)**
- **Resurfacing (asphalt over asphalt)**
- **Thin layer (concrete)**



Causes of pavement deterioration

- **Loading: passages of loads (aircraft)**
- **Climate: pavement expansion and contraction due to temperature**
- **Environment: snow, rain etc..**
- **Natural deterioration**



Pavement distresses

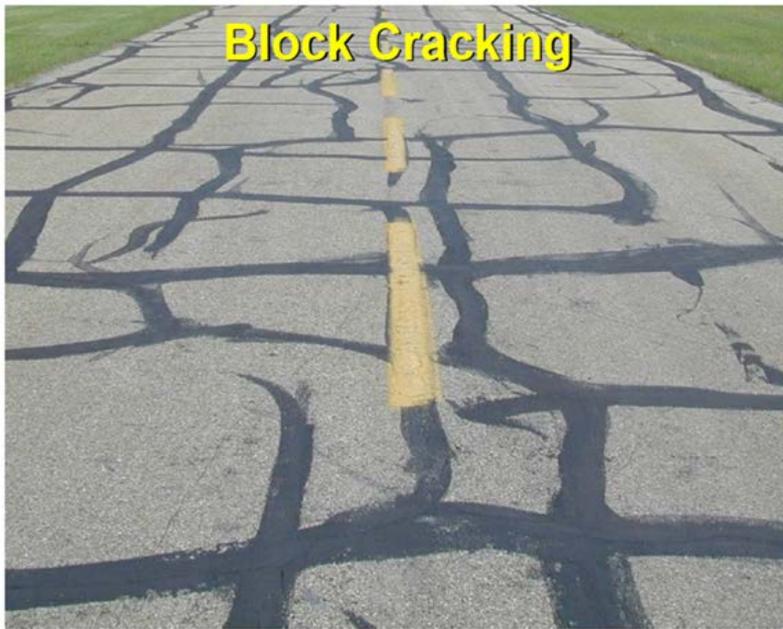
- **Cracking**
- **Joint seal damage (rigid pavement)**
- **Distortion**
- **Disintegration**
- **Loss of skid resistance**





Fatigue [Alligator] Cracking

- Possible Causes
 - Weak base/subgrade
 - Thin pavement
 - Poor Drainage
 - Overloading
- Bottom-up cracking
- Typically with Rutting



Rutting

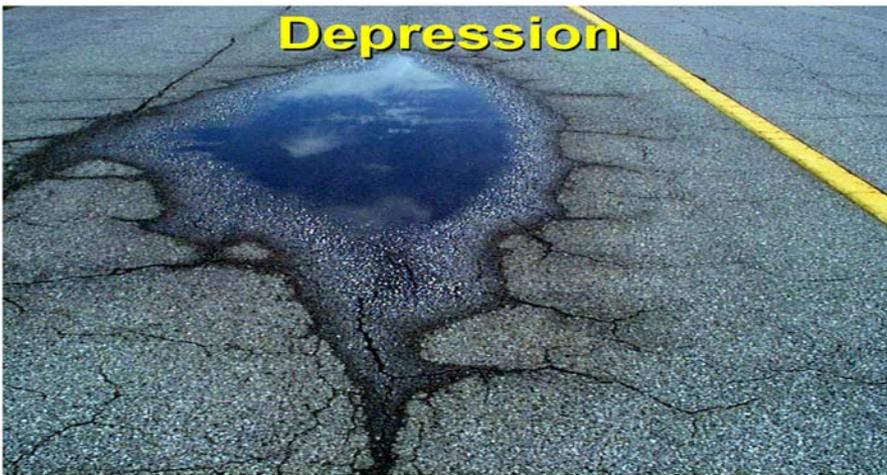
- In Subgrade/Base
 - Design Problem
 - Later Stages Will Develop Fatigue Cracking
- In the AC Layer
 - Plastic Flow--Material/ Mix Design
 - Consolidation--Compaction



Shoving



Depression



Raveling/Weathering





QUESTIONS?

