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*Runway Incursion Avoidance & Airport Markings

Objectives

The Learned develops and understands techniques for effective incursion avoidance

Elements

1. Read back ALL clearances fully
2. Head down activities limited to when stopped
3. Have current Airport Diagram
4. Runway Incursion
5. Taxiing - Plan, Brief, Review
6. Appropriate flight deck activities
7. Airport markings, signs & lights
8. Airport Operations & Runway Incursions

Schedule

1. Discuss objectives :5
2. Review Material from previous lesson :5
3. Discuss Runway Incursion and Airport Markings 1:00 Maybe take a break
4. Conclusion :5
5. Total Time

Equipment

1. Whiteboard and markers
2. References (AIM, PHAK, RMH, AFH)

Instructor Actions

1. Discuss Lesson
2. Present Lecture
3. Ask and Answer Questions
4. Reference runway incursion videos - Briefly show runway EXCURSION

Student Actions

1. Participate in active listening and discussion
2. Take Notes
3. Ask and respond to questions

Completion Standards

The learner can safely and completely describe how to navigate (if haven't flown) toward and non-towered airports while effectively avoiding runway incursions

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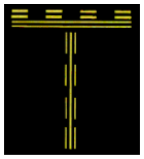
Introduction:
Runway incursions have led to serious accidents with significant loss of life (Show some runway incursions, incorrect taxi instructions, etc. on youtube)

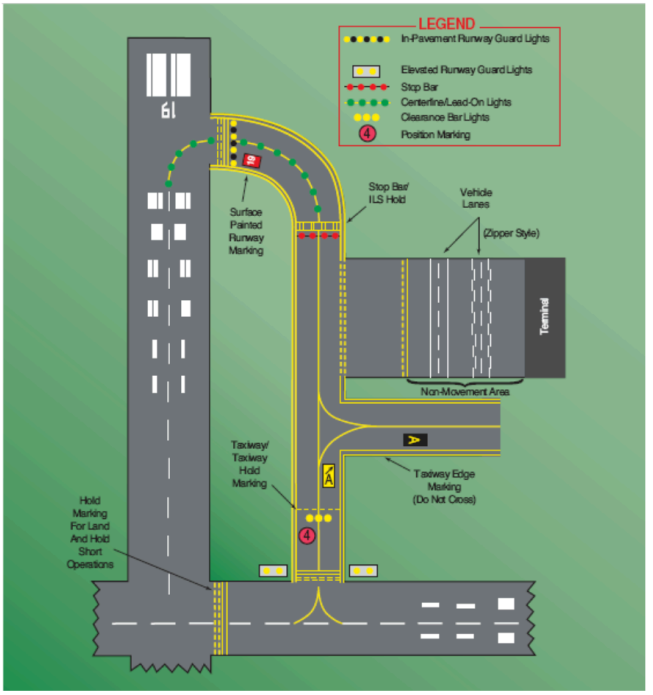
Runway Incursion:

1. What is a runway incursion?
    a. Any occurrence when an aircraft, vehicle, person, or object on the ground without permission enters the runway area. Can result in loss of separation with an aircraft taking off, landing or intending to land
    b. Approx. 3 runway incursions every day at towered airports in the US
    c. Maintain situational awareness - increased traffic and airport construction can create complex runway and taxiway layouts
        i. Be aware of distractions - Checklists, radio calls, cell phone…
        ii. This is the biggest safety concern in aviation.
    d. Casual factors - Failure to comply with ATC instructions, Lack of airport familiarity, Nonconformance with standard operating procedures (SOPs)
    e. Preventative practices - Maintain awareness of the airplanes position - and be aware of aircraft and vehicles on the airport
        i. Build a 3d visual in your mind by listening to other radio calls and build a picture
        ii. Readback all runway crossing and/or hold short instructions
        iii. Review airport layouts
        iv. Know airport signage
        v. Review NOTAMs
        vi. Request progressive taxi when needed
        vii. Visually check for traffic before crossing any runway and hold short line, or entering a taxiway
        viii. Write down complex taxi instructions
2. Taxi Instructions
    a. Approval must be obtained prior to moving into or on the movement area.
    b. Clearance required before crossing ANY runway at towered airport
        i. ATC will specify - The runway, or the point to taxi to
        ii. Taxi instructions, and hold short instructions
    c. Always fully readback:
        i. The runway assignment, Any clearance to enter a specific runway (Entering or crossing), any instruction to hold short of a specific runway
    d. Uncontrolled Field - Announce your full intentions on CTAF - Using the AD, Review and plan your route
        i. Monitor the CTAF, be aware of other aircraft in the area
3. Review Taxi Route:
    a. Ask for taxi “Tower, Warrior 5567D, at East Coast with info X, request taxi”
    b. Receive taxi “Warrior 5567D, Nashua Tower, taxi runway 32 via A”
    c. Respond “Taxi runway 32 via A, N5567D”
    d. Refer to airport diagram, and identify taxi start and end points, illustrate cleared taxi routing, identify hazards and hot spots along route

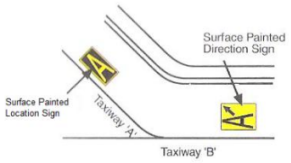
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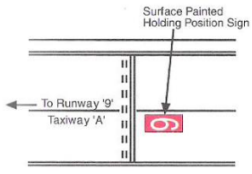
4. Appropriate Flightdeck Activities
    a. Keep workload to a minimum while on the ground
    b. Maintain a sterile flightdeck when desired - No excess chatter about items not relating to the operation of the flight
    c. If a person is distracting, explain the situation and ask them to stop
    d. Be vigilant, listen to the radio, paint a picture, and scan.
5. **Airport Markings, Signs & Lights,**
    a. A lot of different markings that mean different things, they're all there for your safety and situational awareness. It's just like driving a car on the street.
    b. **Taxiway Centerlines** - Solid yellow centerline permits taxing along a designated path - Enhanced centerlines (same purpose) but may contain lights to designate that a runway hold position is being approached. Can contain extra dashed lines on the either side of the centerline





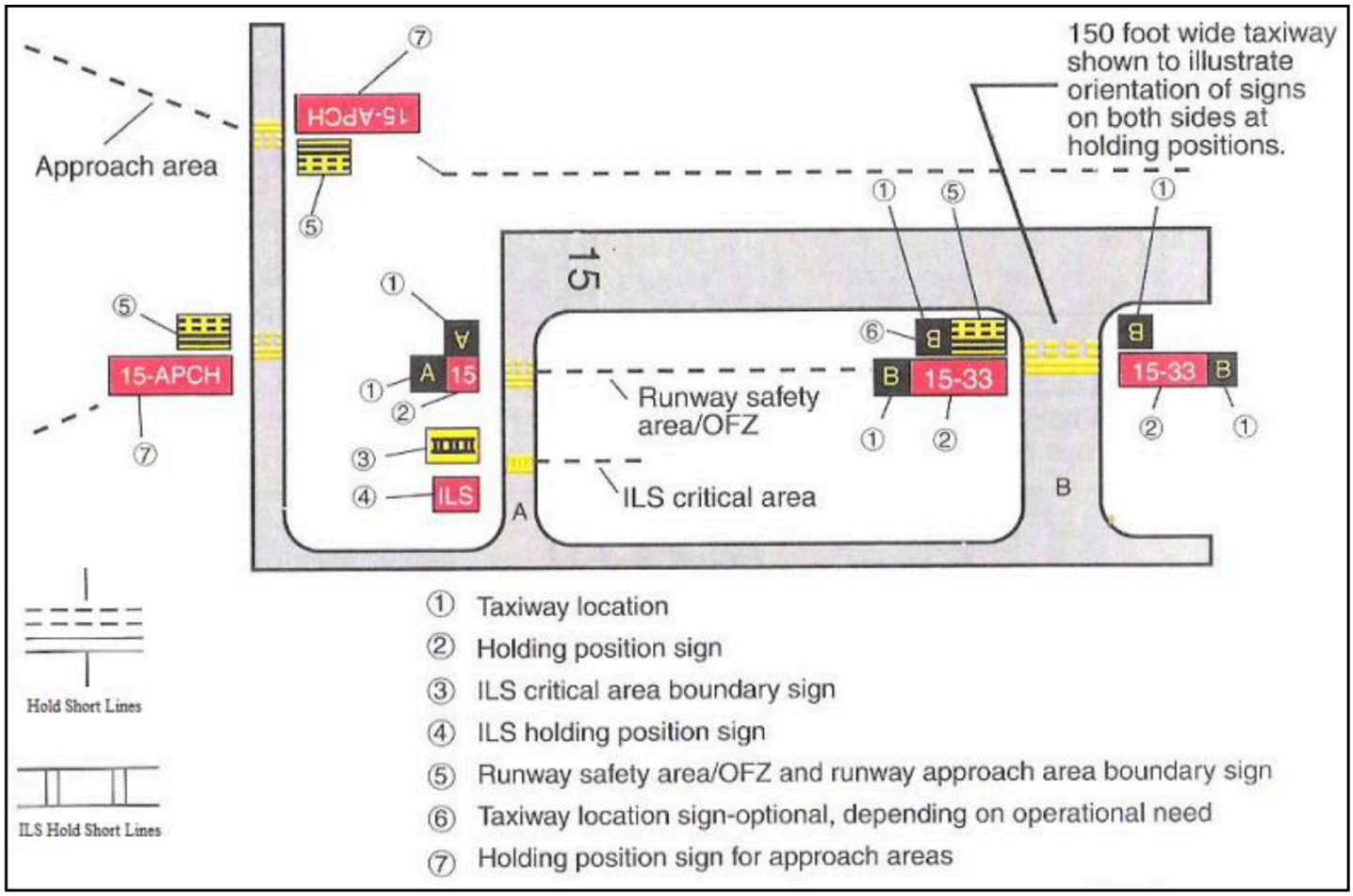
        i. Generally taxiways have a centerline and runway hold position markings whenever intersecting a runway
        ii. Edge markers define areas not for aircraft to use or taxiway edges
        iii. May have extra markings for ILS critical areas and taxiway/taxiway intersections
    c. **Taxiway Edge Markings** - Defines edge of the taxiway or area which aircraft are not to taxi into
        i. Two types of markings:
            1. Continuous - Define the taxiway edge from the shoulder/paved surface not for use by aircraft - Continuous double yellow line
            2. Dashed Markings - Define the taxi edge when adjoining pavement that is intended for aircraft (Apron)
    d. **Surface Painted Taxiway Direction Signs**
        i. Used when it isn't possible to offer direction signs at intersections, or to supplement such signs
        ii. Surface painted location signs with a yellow background and black inscription
        iii. Placed Adjacent to the centerline with signs indicating left turns on the left side of the centerline and vice versa





    e. **Holding Position Markings**
        i. Show where an aircraft is supposed to stop when approaching a runway (hold on the solid side), taxiway or approach area.
        ii. 4 yellow lines (2 solid/2 dashed)
            1. Three locations: Taxiways, Runways, Approach Areas

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f. Other Markings

i. <u>Vehicle Roadways Markings</u>

ii. VOR Receiver Checkpoint Markings

iii. <u>Nonmovement Area Boundary Markings</u> - Dashed line on Movement side, Solid line on Nonmovement line - Contact ATC at towered airport before crossing into movement side

iv. Marking and Lighting of Permanently Closed Runways

1. Lights will not be illuminated, Yellow crosses placed on the runway at each end. Visual indication may not be present depending on reason for closure

g. Runway Markings

i. Runway Designators - Labeled according to mag heading, L, C, R if parallels, Large white numbers

ii. Runway Centerline Markings - Large white dashes down the center of runway

iii. Runway Aiming Point Markings - Serves as visual aiming point, Broad white strips on each side of center line typically mark the 1000’ point

iv. Runway Touchdown Zone Markers - Identifies the touchdown zone, placed in 500’ increments

v. Runway Side Stripe Markings - Delineates the edge of the runway, provides contrast between runway and shoulder

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vi. Runway Shoulder Markings - Identify pavement areas not for intended aircraft use (Yellow stripes)

vii. Runway Threshold Markings - Stripes can vary with width (reference chart)

1. Identifies beginning of usable runway for landing,
2. Stripes about the Centerline
3. **Displaced Threshhold**
    a. When the Landing Threshold starts at a point other than the beginning of the runway - Used for taxiing, takeoff and landing rollout (not to be landed on, reduces landing distance
    b. Marked by a wide white, threshold bar across the runway
    c. White across heads are located across the runway just prior to the threshold bar or can be White across down the centerline between the start of the runway and displaced threshold
4. Relocated Threshold - Construction or other activities require the threshold to be relocated (NOTAM)

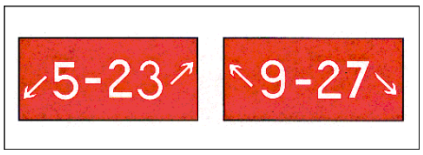
Runway Surface Marking Scheme	Threshold Approach Category		
	Visual Approach	Non-precision Approach (Approaches with vertical guidance not lower than 0.75 statute mile visibility)	Precision Approach (Approaches with vertical guidance lower than 0.75 statute mile visibility)
Runway diagram			
Landing Designator	Required	Required	Required
Centerline	Required	Required	Required
Threshold	Note 1	Required	Required
Aiming Point	Note 2	Note 3	Required
Touchdown Zone	(not applicable)	(not applicable)	Required
Edge Markings	Note 4	Note 4	Required

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h. Airport Signs

i. Six types of signs installed on airfields:
   1. Mandatory Instruction, Location, Direction, Destination, Information, Runway Distance Remaining

ii. Mandatory Instruction Signs - Denote entrance to runway or critical area/area where aircraft are prohibited
   1. Red background with white inscription
   2. Located at hold position for taxiways intersecting runways,
   3. Runway Approach Area Holding Position Sign - Used when necessary to hold aircraft on taxiways short of an approach/departure area
   4. ILS Critical Area Holding Position Sign
   5. NO ENTRY SIGN







iii. Location Signs - Identify either a taxiway or runway on which the aircraft is located
   1. Black background, with yellow inscription and border
   2. Taxiway location
   3. Runway location
   4. Runway boundary
   5. ILS Critical Area Boundary

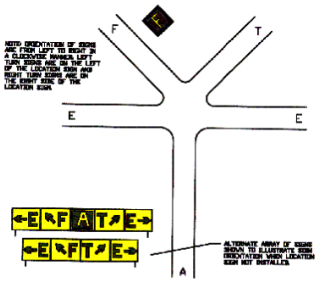








iv. Direction Signs - Identify intersecting taxiways leading out of an intersection
   1. Designations and their arrows are arranged clockwise from the 1st taxiway on the pilot's left
   2. Yellow background/black inscription - Think of these when you're going to another taxiway, you're looking for this one as you go



v. Destination Signs - Indicates a destination on the airport
   1. Destinations commonly shown:
      a. Runways, Aprons, Terminals, Military Areas, Civil Aviation Areas, Cargo Areas, International Areas, FBOs
   2. Yellow background/black inscription indicating a destination



vi. Information Signs - Used to provide information on things such as:
   1. Areas the tower can't see, radio frequencies, and noise abatement procedures
   2. Yellow background/black inscription



vii. Runway Distance Remaining Signs
   1. Inform pilot on the distance remaining on the runway
   2. Will use single or two digits to indicate feet in thousands



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AIRPORT SIGN SYSTEMS

TYPE OF SIGN AND ACTION OR PURPOSE	TYPE OF SIGN AND ACTION OR PURPOSE
 **Taxiway/Runway Hold Position:** Hold short of runway on taxiway	 **Runway Safety Area/Obstacle Free Zone Boundary:** Exit boundary of runway protected areas
 **Runway/Runway Hold Position:** Hold short of intersecting runway	 **ILS Critical Area Boundary:** Exit boundary of ILS critical area
 **Runway Approach Hold Position:** Hold short of aircraft on approach	 **Taxiway Direction:** Defines direction & designation of intersecting taxiway(s)
 **ILS Critical Area Hold Position:** Hold short of ILS approach critical area	 **Runway Exit:.** Defines direction & designation of exit taxiway from runway
 **No Entry:** Identifies paved areas where aircraft entry is prohibited	 **Outbound Destination:** Defines directions to takeoff runways
 **Taxiway Location:** Identifies taxiway on which aircraft is located	 **Inbound Destination:** Defines directions for arriving aircraft
 **Runway Location:** Identifies runway on which aircraft is located	 **Taxiway Ending Marker** Indicates taxiway does not continue
 **Runway Distance Remaining** Provides remaining runway length in 1,000 feet increments	 **Direction Sign Array:** Identifies location in conjunction with multiple intersecting taxiways

i. United 1448 (PVD Airport)
j. REFER TO BACKSEAT LESSON PLAN II.C “Runway Incursion Avoidance”

Conclusion:
One of the biggest safety concerns in aviation is the surface movement accident. By Focusing resources to attack this problem head-on, the FAA hopes to reduce and eventually eliminate surface movement accidents