Airport, Runway, and Taxiway Signs, Markings, and Lighting

Objective	
To ensure the applicant learns the meaning of the various types of airport markings, signs, and lighting, as well as their purpose.	
Purpose	
A large number of safety incidents occur every day at airports, involving aircraft taxiing or crossing runways without clearance, or misreading or failing to follow signs, lights, and markings. This lesson introduces pilots to the types of signs, markings, and lighting that they will encounter when operating at an airport, and stresses their meaning and importance for avoiding runway incursions.	

Schedule	**Equipment**
● **Ground Lesson**: 20 minutes ● **Student Q&A**: 10 minutes	● Airport Diagrams ● Runway/Taxiway Sign Chart ● Whiteboard / Markers (optional) ● Model Airplane (optional)

Student Actions	**Instructor Actions**
● Ask any questions, receive study material for the next lesson. ● Watch linked video. ● Review listed references.	● Deliver the ground lesson (below). ● Answer student questions.

Completion Standards

● Student can explain the following signs, markings, and lighting, along with their purpose:
    ● Runway threshold, displaced threshold, runway designation, and aiming point markings
    ● Runway lighting, approach lighting, and the use of pilot controlled lighting
    ● The types of Visual Glide Path Indicator lighting
    ● Hold Lines, and signs, markings, and lights that are found near them
    ● Taxiway signs and markings
    ● Airport beacons

References

- FlyBoyWA - "Airport Signs, Markings and Taxi Instructions"
    - YouTube - https://www.youtube.com/watch?v=YF2kuzzHWyY
- FAA-H-8083-3B (Airplane Flying Handbook) - Chapter 2, Page 14-17 [Taxiing]
- FAA-H-8083-25B (Pilot's Handbook of Aeronautical Knowledge) - Chapter 14, Page 5-16 [Airport Markings and Signs], Chapter 14, Page 16-20 [Airport Lighting]
- AIM (Aeronautical Information Manual) - Chapter 2, Section 1-11 [Taxiway Lights], Chapter 2, Section 3 [Airport Marking Aids and Signs]
- FAA AC 150/5340-30J (Design and Installation Details for Airport Visual Aids)
- FAA AC 150/5340-18G (Standards for Airport Sign Systems)
- FAA-S-ACS-6B (Private Pilot ACS) - Area III Task A
- FAA-S-ACS-7A (Commercial Pilot ACS) - Area III Task A
- FAA-S-8081-6D (CFI PTS) - Area VI Task C

Ground Lesson Outline

- Airport Markings
    - Threshold Markings, Displaced Thresholds, Runway Designation
    - Centerline, Aiming Points (1000 foot markers)
    - Hold Lines, ILS Critical Areas
    - Taxiway Centerlines, Enhanced Taxiway Centerline Markings (near hold lines)
- Airport Signs
    - Mandatory Instruction Signs - Red and White. Hold Lines, Runway Entrances, Restricted Areas, etc.
        - Be aware for runway incursions when these are nearby!
    - Direction/Information Signs, Runway Safety Area Exit Signs - Black on Yellow
    - Taxiway Location Signs - Yellow on Black
    - Runway Distance Remaining - White on Black, In Thousands of Feet
- Airport Lighting
    - Runway Lighting
        - REIL - Runway End Identifier Lights, Centerline Lighting, Edge Lighting, Threshold Lighting
        - Runway Status Lights
            - REL - Runway Entrance Lights, THL - Takeoff Hold Lights
        - Closed Runway Lighting
    - Taxiway Lighting
        - Taxiway Edge Lighting (blue), Taxiway Centerline Lighting (green)
        - Clearance Bars - 3 in-pavement yellow lights, at hold positions
        - Runway Guard Lights - Taxiway/Runway intersections, pair of elevated flashing yellow lights or in-pavement yellow lights across the length of the hold bars
        - Stop Bar Lights - Confirm ATC clearance to enter a runway, red in-pavement lights
    - Visual Glideslope Indicators
        - VASI - Visual Approach Slope Indicator. Multiple bars, red and white
        - PAPI - Precision Approach Path Indicator. Single bar, individual lights, red and white
    - Approach Lighting
    - Airport Beacons - White/Green for Civilian Airports, White/White/Green for Military
   - Pilot Controlled Lighting - 3/5/7 clicks for Low/Medium/High Intensity

Common Errors

- Failure to comply with airport/seaplane base, runway and taxiway signs and markings.
- Failure to comply with airport/seaplane base, runway and taxiway lighting.
- **Failure to use proper runway incursion avoidance procedures.**

Ground Lesson Content

- **Airport Markings**
  - **Threshold Markings** - Identify the beginning of the runway available for taking off and landing.
    - **Displaced Thresholds** - Indicate an area of runway that is available for taxi or takeoff but *not* landing.
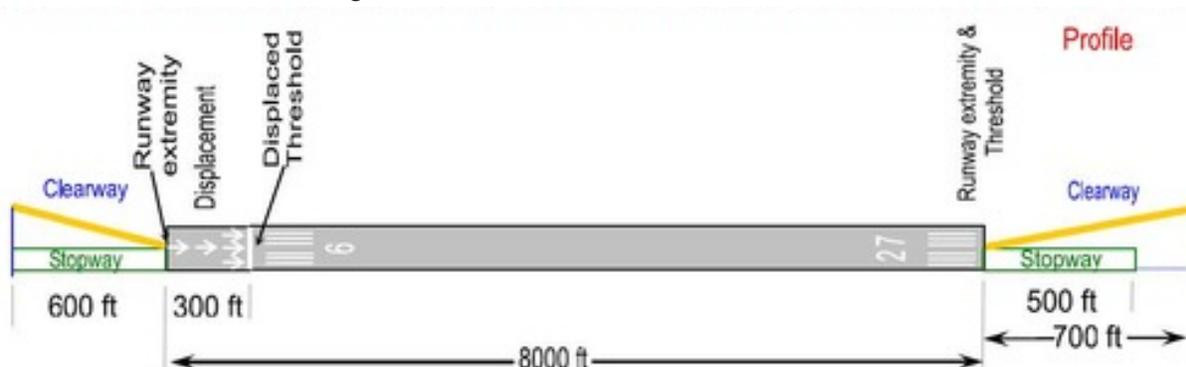
  - **Runway Designation** - The numerical identifier of the runway, determined by its magnetic direction. For example: a runway aligned 93 degrees magnetic would be designated Runway 9.
  - **Centerline** - Dashed markers indicating the centerline of the runway. Not present on all runways.
  - **Aiming Points** - Also called *1000 foot markers*, large blocks painted on runways to give pilots an aiming point when performing an approach.

NONPRECISION INSTRUMENT RUNWAY MARKINGS

VISUAL RUNWAY MARKINGS
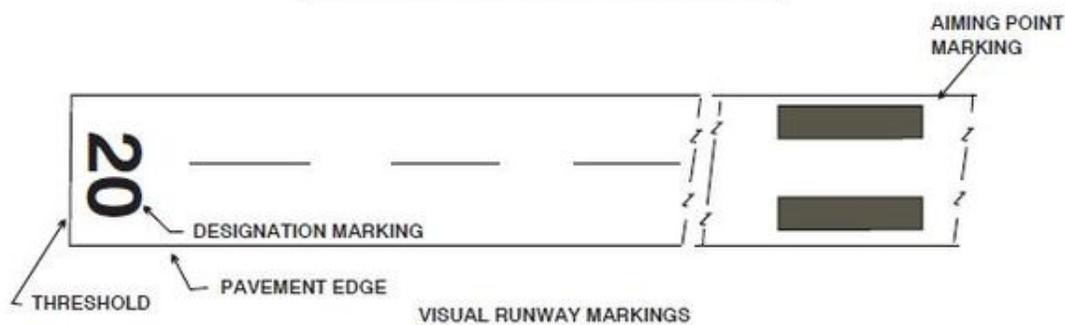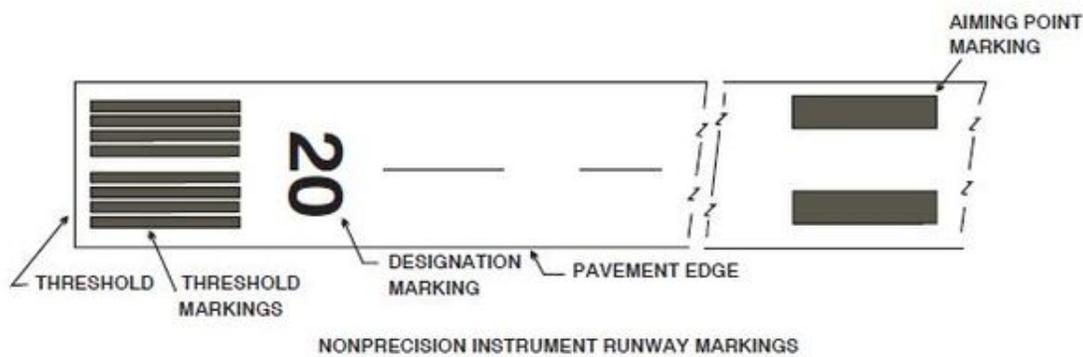
- ○ **Hold Lines** - *Hold lines* are the primary marking that indicates the boundaries of runways or other protected areas. Often called *hold short lines*, they are depicted on the pavement as two solid and two dashed lines. Crossing from the dashed lines to the solid lines requires no clearance (as in, exiting a runway area), however, **crossing from the solid lines to the dashed lines always requires explicit ATC clearance!** (At towered airports)

- ○ **ILS Critical Areas** - Identify areas where pilots must hold short (when instructed by ATC) when ILS approaches are in use. Only used in low visibility conditions, below VFR weather minimums.
- ○ **Taxiway Centerlines** - Solid yellow lines identify the centerline of a taxiway.
 - ■ **Enhanced Taxiway Centerline Markings** - Near hold lines

- ● **Airport Signs**
  - ○ **Mandatory Instruction Signs** - **Red** and White. Hold Lines, Runway Safety Areas, Runway Entrances, Restricted Areas, etc.
    - ■ **Runway Hold Position** - One of the most important airport signs that pilots should keep watch for is the *runway hold position* sign. The **red** color of the sign is used only for important hold signs on airports, and should always be a clue that there is a hold line nearby.

- **■** **Be aware for runway incursions when these are nearby!**
  - ○ **Direction/Information Signs** - Black on Yellow, indicate info or the direction of taxiways or runways.
  - ○ **Taxiway Location Signs** - Yellow on Black, indicate the name of the current taxiway.
  - ○ **Runway Distance Remaining** - White on Black, In Thousands of Feet
  - ○ **Runway Safety Area Exit** - Black on Yellow. Indicate the location of the runway safety area hold lines when exiting a runway.
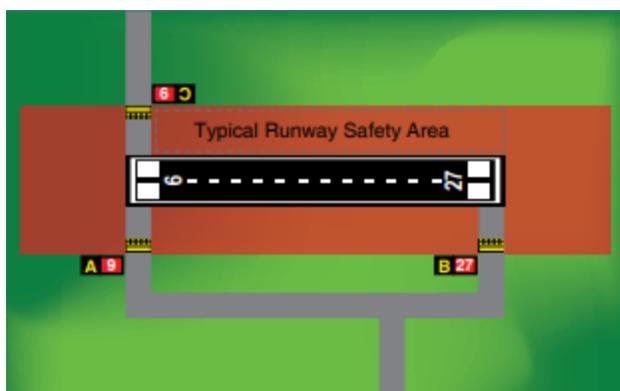
AIRPORT SIGN SYSTEMS

TYPE OF SIGN AND ACTION OR PURPOSE		TYPE OF SIGN AND ACTION OR PURPOSE	
4-22	**Taxiway/Runway Hold Position:** Hold short of runway on taxiway	(yellow band sign)	**Runway Safety Area/Obstacle Free Zone Boundary:** Exit boundary of runway protected areas
26-8	**Runway/Runway Hold Position:** Hold short of intersecting runway	(yellow band sign)	**ILS Critical Area Boundary:** Exit boundary of ILS critical area
8-APCH	**Runway Approach Hold Position:** Hold short of aircraft on approach	**J→**	**Taxiway Direction:** Defines direction & designation of intersecting taxiway(s)
ILS	**ILS Critical Area Hold Position:** Hold short of ILS approach critical area	**↙L**	**Runway Exit:.** Defines direction & designation of exit taxiway from runway
⊖	**No Entry:** Identifies paved areas where aircraft entry is prohibited	**22↑**	**Outbound Destination:** Defines directions to takeoff runways
B	**Taxiway Location:** Identifies taxiway on which aircraft is located	**↖MIL**	**Inbound Destination:** Defines directions for arriving aircraft
22	**Runway Location:** Identifies runway on which aircraft is located	(hatched marker)	**Taxiway Ending Marker** Indicates taxiway does not continue
4	**Runway Distance Remaining** Provides remaining runway length in 1,000 feet increments	**↙A G L→**	**Direction Sign Array:** Identifies location in conjunction with multiple intersecting taxiways

- **Airport Lighting**
  - **Runway Lighting**
    - **REIL** - Runway End Identifier Lights, flashing lights on either side of the threshold.
    - **Centerline Lighting** - Found only at larger airports, embedded in the pavement.
    - **Edge Lighting** - The most common type of runway lighting, just mark the runway edges.

    - **Threshold Lighting** - Green lights indicate the start of the runway, and red lights indicate the end of the runway.


    - **Runway Status Lights** - Found only at large airports, used to indicate when the runway is safe to enter or start takeoff.
      - **REL** - Runway Entrance Lights
      - **THL** - Takeoff Hold Lights
    - **Closed Runway Markings/Lighting** - Used when runways are temporarily or permanently closed.

- ○ **Taxiway Lighting**
  - ■ **Taxiway Edge Lighting** - Omnidirectional, blue lights.
  - ■ **Taxiway Centerline Lighting** - Omnidirectional, green lights. In-pavement.
  - ■ **Clearance Bars** - 3 in-pavement yellow lights, at hold positions
  - ■ **Runway Guard Lights** - Taxiway/Runway intersections, pair of elevated flashing yellow lights or in-pavement yellow lights across the length of the hold bars
  - ■ **Stop Bar Lights** - Confirm ATC clearance to enter a runway, red in-pavement lights
- ○ **Visual Glideslope Indicators**
  - ■ **VASI** - Visual Approach Slope Indicator. Multiple bars, red and white
  - ■ **PAPI** - Precision Approach Path Indicator. Single bar, individual lights, red and white

- ○ **Approach Lighting** - Used to help pilots transition from instrument approaches to visual landings.
- ○ **Airport Beacons** - White/Green for Civilian Airports, White/White/Green for Military, White/Yellow for seaplane bases.
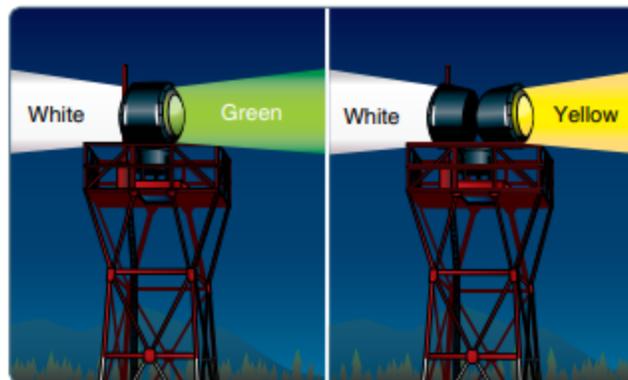
- ○ **Pilot Controlled Lighting** - Many uncontrolled fields (or towered fields after the tower closes) have runway lights that are not illuminated unless requested by pilots. Pilots use 3, 5, or 7 clicks of the push-to-talk button on the CTAF frequency within 5 seconds for Low, Medium, or High Intensity runway lighting. Lights usually remain on for 15 minutes.