

Office of Airport Safety and Standards Update

**IESALC Conference
October 23, 2017**

**By: Robert Bassey
Airport Engineering Division**



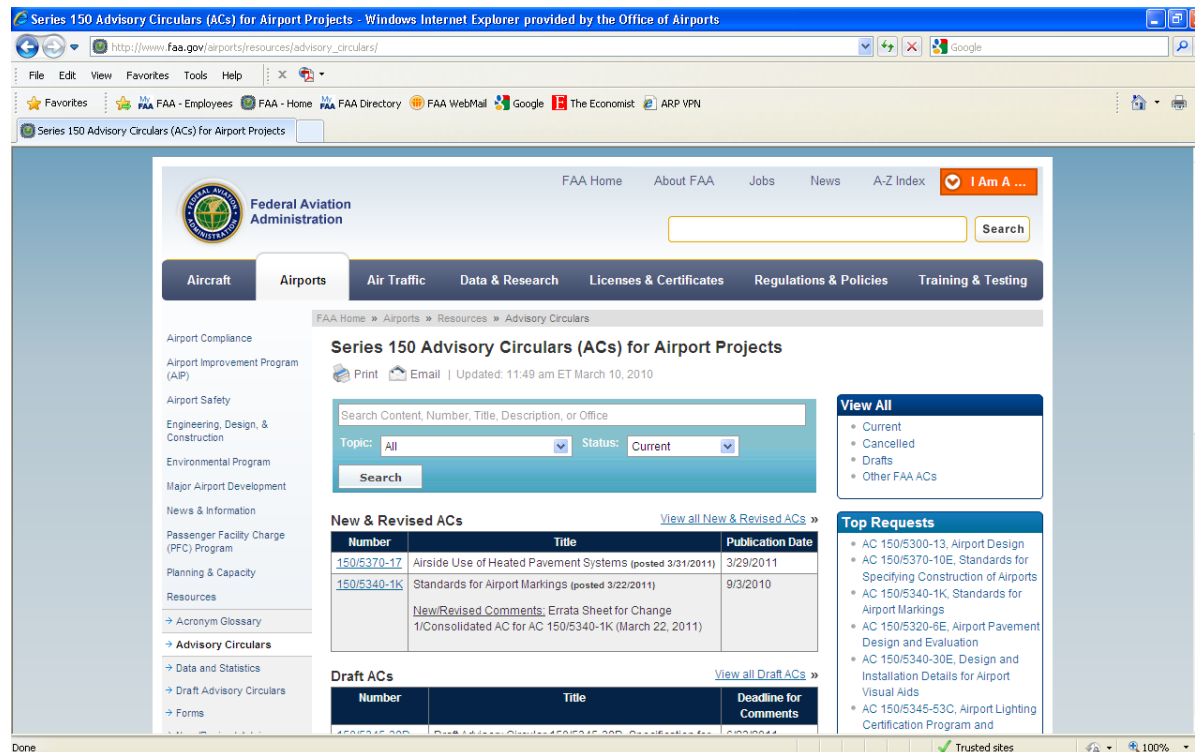
Agenda

- Overview
- FAA LED Significant Safety Issue (SSI)
- Advisory Circular Updates
- Engineering Brief Updates



Standards and Guidance

- Advisory Circulars (ACs) / Engineering Briefs (EBs)



The screenshot shows the FAA website's 'Series 150 Advisory Circulars (ACs) for Airport Projects' page. The page is viewed in a Windows Internet Explorer browser. The FAA logo is at the top left, and the page title is 'Series 150 Advisory Circulars (ACs) for Airport Projects'. The page includes a search bar, a list of new and revised ACs, and a list of draft ACs.

Series 150 Advisory Circulars (ACs) for Airport Projects

Print | Email | Updated: 11:49 am ET March 10, 2010

Search Content, Number, Title, Description, or Office

Topic: All Status: Current

New & Revised ACs

Number	Title	Publication Date
150/5370-17	Airside Use of Heated Pavement Systems (posted 3/31/2011)	3/29/2011
150/5340-1K	Standards for Airport Markings (posted 3/22/2011)	9/3/2010

[New/Revised Comments: Errata Sheet for Change 1/Consolidated AC for AC 150/5340-1K \(March 22, 2011\)](#)

Draft ACs

Number	Title	Deadline for Comments
150/5340-30D	Design and Installation Details for Airport Visual Aids	3/22/2011

http://www.faa.gov/airports/resources/advisory_circulars/



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Administrator's Strategic Initiative

- In FY15, FAA LOBs (ATO, AVS, ARP) established formal, repeatable processes to identify Significant Safety Issues (SSI) as part of Activity 2b within the Risk-Based Decision Making (RBDM) Strategic Initiative.
- An FAA SSI Team established a process to prioritize the LOB/SO lists and developed a prioritized list of 10 FAA-level, cross-organizational SSI.
- The FAA SMS Executive Council agreed to apply cross-organizational resources to conduct comprehensive safety risk assessments for:
 - Light Emitting Diodes (LED) Lighting of Airfields, Obstacles, and Aircraft



LED Significant Safety Issue (SSI)

- LED SSI Team was assembled in Nov 2015 to conduct a safety analysis on the LED SSI and identify hazards.
- Team conducted preliminary hazard analysis (PHA) on the LED SSI, including:
 - Broad look at entire LED SSI issue
 - Identification of hazards
 - Risk analysis
 - Recommended prioritization of hazards
- Team is conducting an in-depth study on those hazards and develop mitigation strategies and risk controls for the hazards identified.



Hazards being studied

- AAS-100 is the Office of Primary Responsibility (OPR) for the following hazards.
 - i. FY15_SSI_LEDPHA_01: LED-lit Obstacle Detection (with NVGs)
 - ii. FY15_SSI_LEDPHA_05: Stroboscopic Effect
 - iii. FY15_SSI_LEDPHA_06: Loss of Sight of LED Airport Lighting



Advisory Circular Updates



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AC 150/5340-30J



U.S. Department
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Advisory Circular

Subject: Design and Installation Details
for Airport Visual Aids

Date: DRAFT

Initiated by: AAS-100

AC No.: 150/5340-30J

Change:

1. **Purpose.**

This advisory circular (AC) provides guidance and recommendations on the installation of airport visual aids.



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Principal Changes

- Taxiway Edge Lights
 - Incorporated Engineering Brief (EB) #92A, Light Spacing Guidance for New Taxiway Fillet Geometry.
 - Provides new guidance for taxiway edge lighting design for new taxiway construction or rehabilitation.



Principal Changes

- PAPI Obstacle Clearance Surface (OCS)
 - Note added to explain flight inspection personnel considerations when evaluating the PAPI (OCS) and objects outside the surface.
- Flight Inspection Procedures for PAPI / Visual Glideslope Indicators (VGSI)
 - Text update to state: “All VGSI systems servicing IFR runways need to be commissioned as soon as the necessary survey data and funds are available”.
 - Updated to explain obstacles outside the PAPI OCS may be evaluated during flight inspections



Principal Changes

- Flight Inspection Procedures for PAPI / Visual Glideslope Indicators (VGSI)
 - Flight check personnel will evaluate PAPI obstacle clearance within the lateral limits of the “visible” light beam. Evaluation may exceed the standard OCS.



Principal Changes

- Counterpoise (Lightning Protection System)
 - Paragraph incorporates a rewrite for Counterpoise Lightning Protection System to simplify “equipotential” and “isolation methods” for airfield lighting counterpoise installation.
- Vault
 - Incorporates vault recommendations per National Fire Protection Association (NFPA) National Electric Code (NEC) guidelines.
- Installation of Cables
 - Incorporates National Electric Code recommendations regarding “Installation of Cables”.



EB-98

“Infrared Specifications for Aviation Obstruction Light Compatibility with Night Vision Goggles”



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EB-98

- Engineering Brief allows infrared emitters to be included in LED obstruction lighting fixtures.
- Engineering brief determines performance specifications for IR emitters to be incorporated into LED obstruction light fixtures.
- The specifications for the IR emitters support the operational requirement for LED-lit obstruction lights to be visible to operators in AC 7460-1 “Obstruction Marking and Lighting”.



Infrared Specifications for LED L-810, L-864 and L-885 LED Obstruction Lights

IR Wavelength (nominal)	Applicability	IR Vertical Beam Width	IR Radiant Intensity
800-900 nm	L-810 (L)	$\geq 10^\circ$ *	Minimum: 4 mW/sr
	L-864 (L) and L-885 (L)	$\geq 3^\circ$	Minimum: 246 mW/sr

* The center of the vertical beam spread should be between +4 and +20 degrees.



EB-95

“Additional Siting and Survey considerations for Precision Approach path Indicator (PAPI) and Other Visual Glide Slope Indicators (VGSI)”



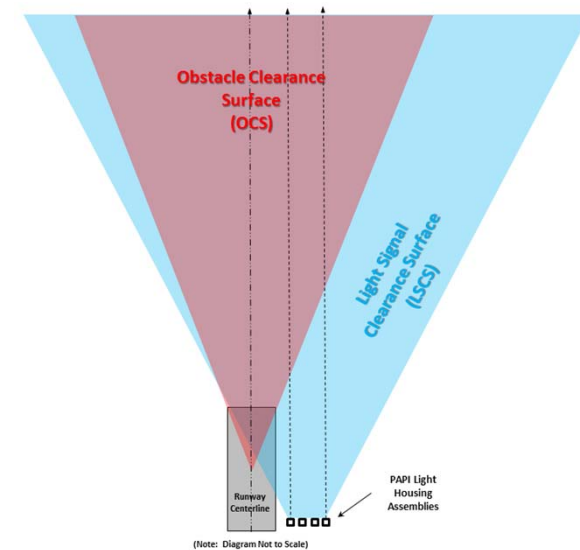
New requirements in FAA Order 8200.1D

- **FAA Order 8200.1D, *United States Standard Flight Inspection Manual*, defines PAPI Obstacle Clearance Surface (OCS) penetration evaluation criteria to be checked by the flight inspectors during the PAPI commissioning process. The updated document defines two new requirements:**
 - FAA Flight Inspection will evaluate OCS penetrations to 8 nm from threshold for Type L-880 (4-box) PAPI, and may be reduced to 4 nm for a Type L-881 (2-box) PAPI.
 - Extends the evaluation of the obstacle clearance within the lateral limits of the visible light beam, even if it means **going outside the standard 10 degree to 10 degree obstacle protection area centered on the runway.**



EB-95

- New OCS penetration evaluation criteria defined in the updated FAA Order 8200.1D has caused several failed FAA flight inspections during airport PAPI commissioning.
- EB 95 clarifies these new OCS penetration evaluation criteria.
 - EB-95 defines a new survey methodology to ensure that there is no obstruction inside the “lateral limit of the visible light beam”.
 - EB-95 defines appropriate baffle angles to meet the new PAPI OCS penetration evaluation requirements.



FAA Signage & Markings Update

IES ALC Fall 201 Technology Meeting

Dallas, TX

October 23-26, 2017

Tom Mai

FAA, Office of Safety and Standards

Airport Engineering Division (AAS-100)

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Agenda

- **AC 150/5340-18G**
- **AC 150/5340-1M**
- **Q & A**



AC 5340-18G (Draft Rev G)

Standards for Airport Sign Systems

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Advisory Circular

Subject: Standards for Airport Sign Systems

Date: Draft

AC No: 150/5340-18G

Initiated by: AAS-100

Change:

1 Purpose.

This Advisory Circular (AC) contains the Federal Aviation Administration (FAA) standards for the siting and installation of signs on airport runways and taxiways.

2 Cancellation.

This AC cancels AC 150/5340-18F, *Standards for Airport Sign Systems*, dated August 16, 2010.

3 Background.

This AC incorporates mandatory hold signs that reflect changed standards for the Precision Obstacle Free Zone (POFZ) and Category (CAT II/III) operations. These changes correspond to revisions to AC 150/5300-13, *Airport Design*, that change the Precision Object Free Area (POFA) to the POFZ and incorporate new separation standards for taxiways that **are used for** parallel runways **during** certain low visibility operations.

The Federal Aviation Administration (FAA) also has revised low visibility operation procedures; these revised procedures require that the POFZ be clear when an aircraft on a vertically guided final approach is within 2 nautical miles of the runway threshold and the reported ceiling is below 250 feet (75 m) and/or visibility less than a ¾ statute mile (runway visual range below 4,000 feet (1 km)). If the POFZ is not clear, the minimum authorized height above ground (HAAG) and visibility are 250 feet and ¾ statute



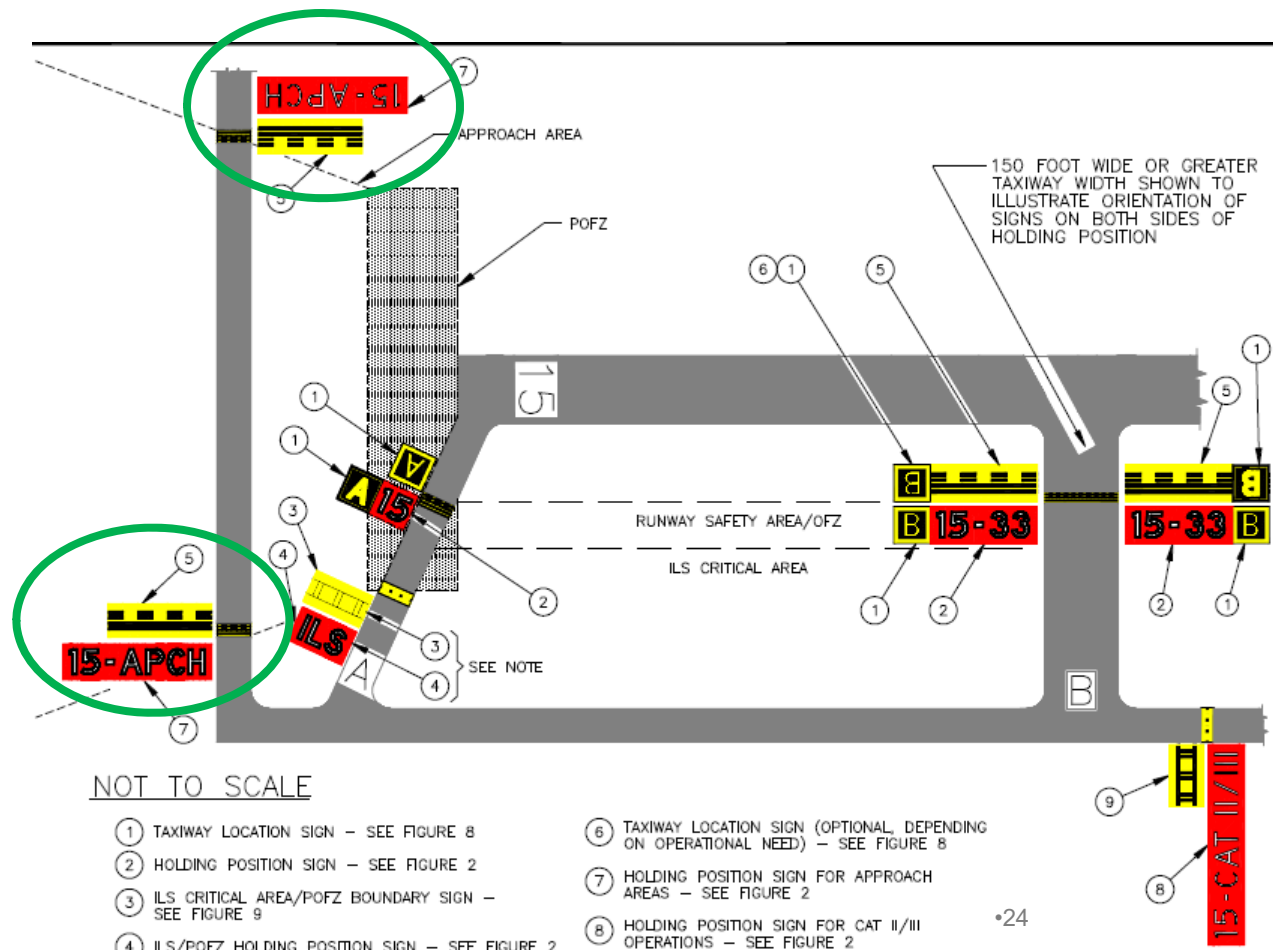
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Draft AC 5340-18G, Standards for Airport Sign Systems-Principal Changes

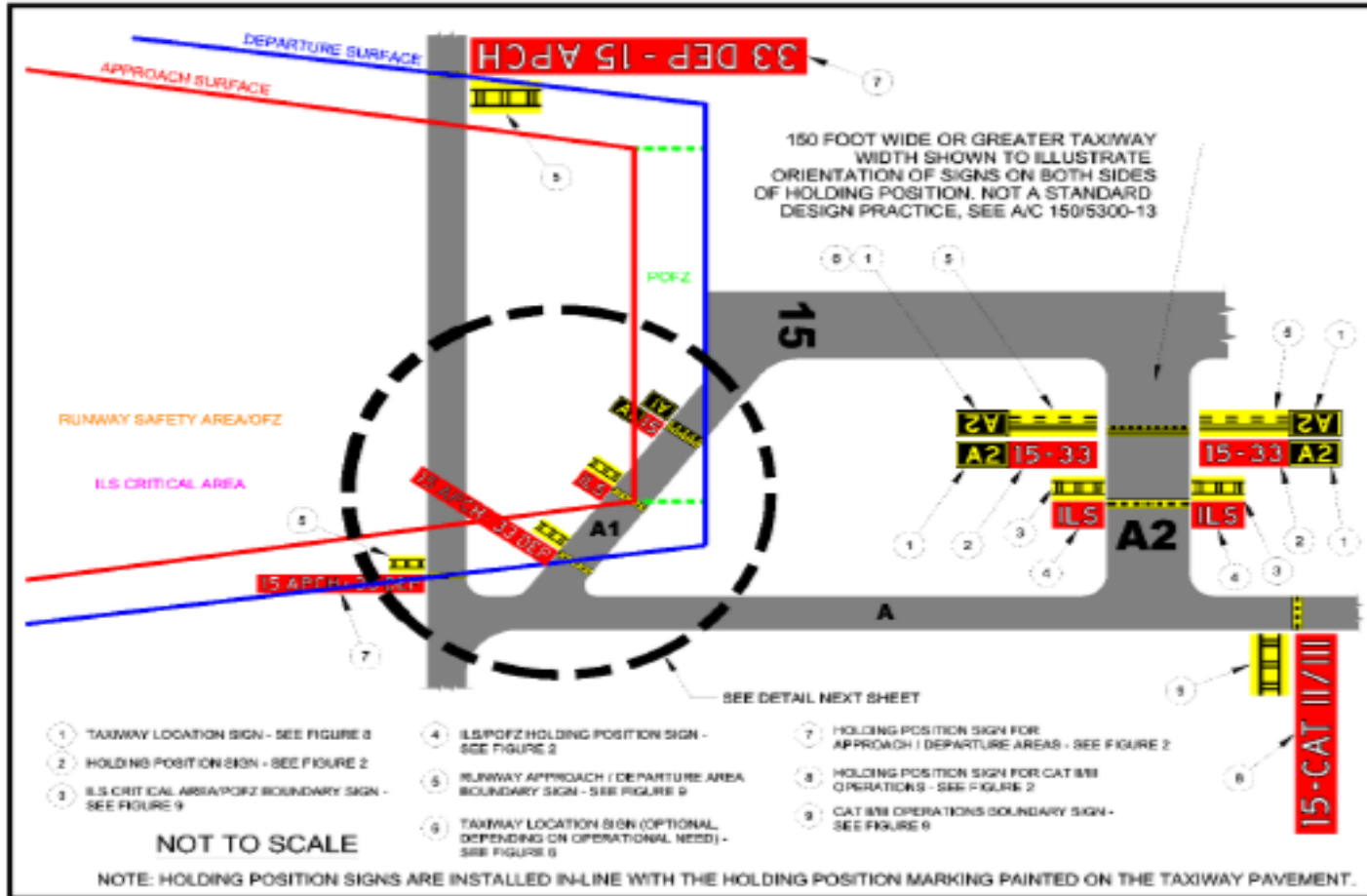
- **Introduce new “Approach” signs**
- **Incorporate EB 89, Clarifications of Taxiway Nomenclature**
- **Clarifications with examples**

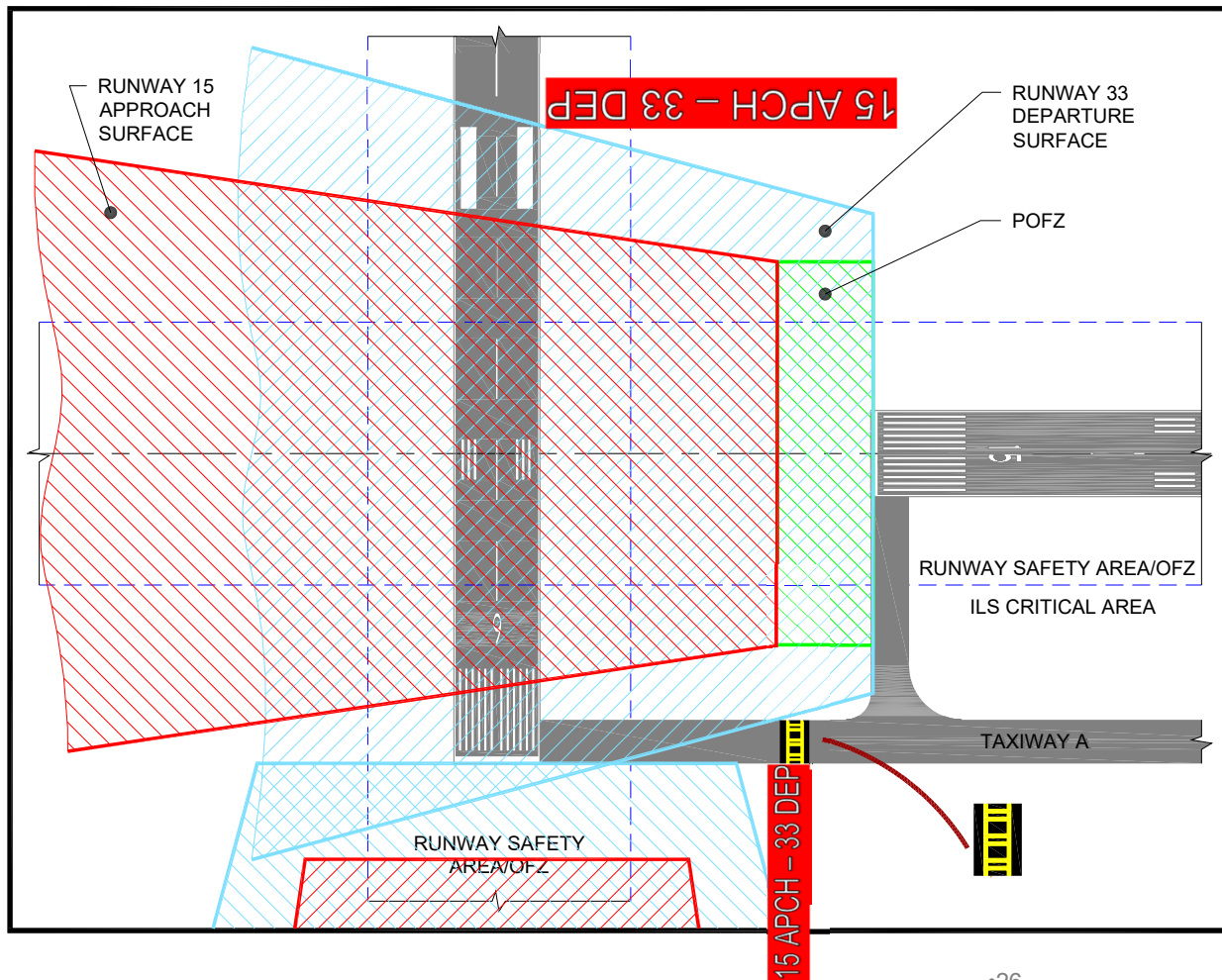


Current Standard, AC 150/5340-18F, Fig 3



Proposed Standards, AC 5340-18G





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Examples of New Signs

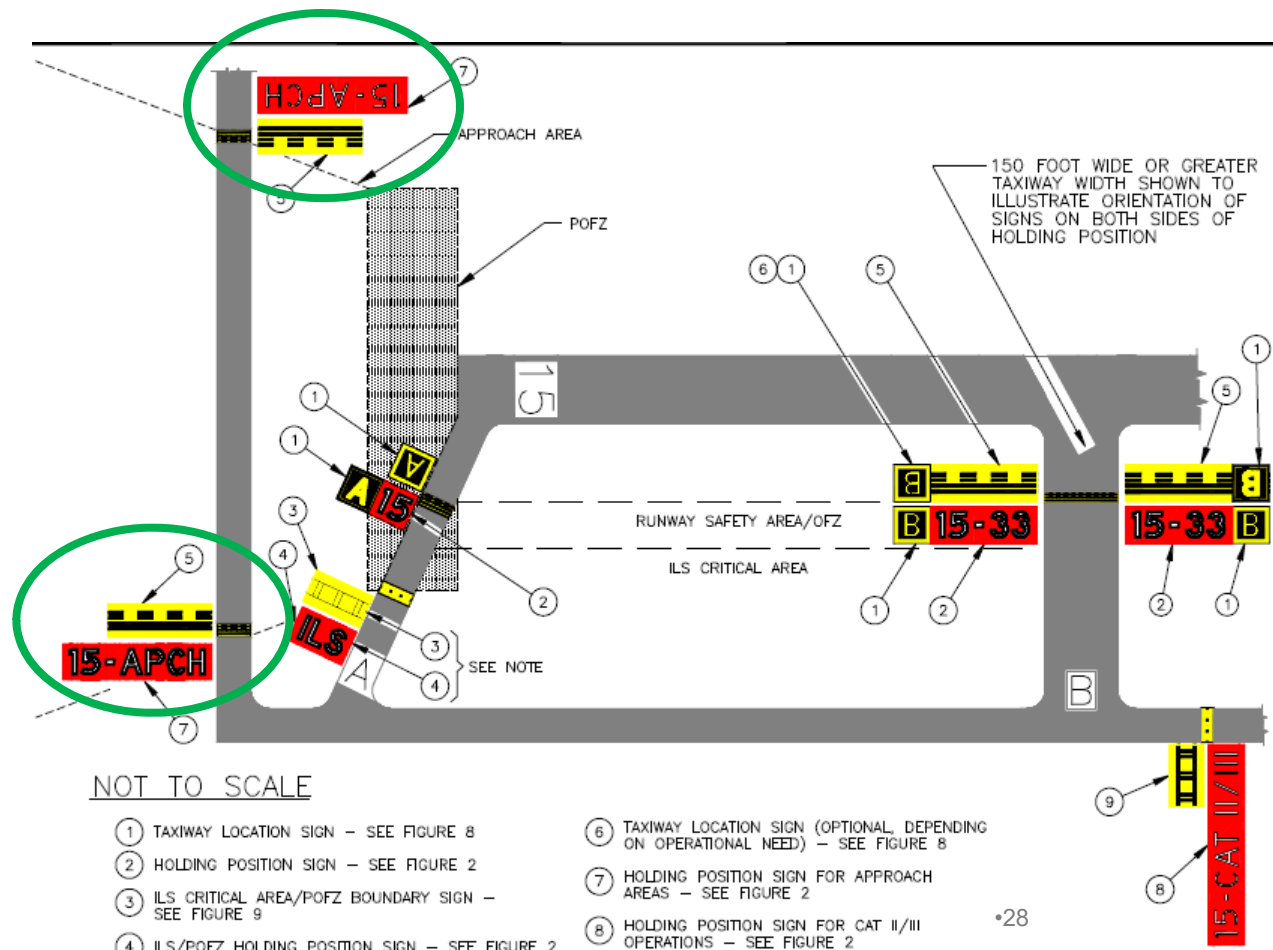


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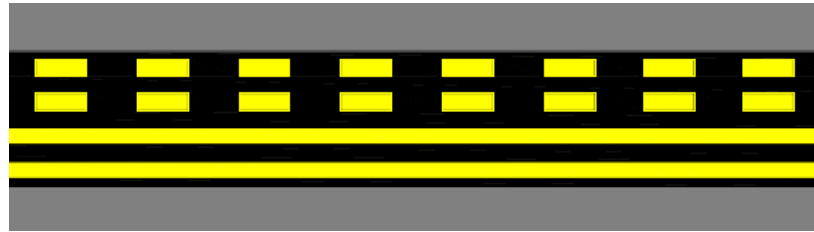
Current Standard, AC 150/5340-18F, Fig 3



Existing Mandatory Instruction Signs With Markings

15 - 33

15 - APCH



•AC 150/5340-18F, Para 5:

•Mandatory instruction signs have a **white** inscription with **black outline** on a **red** background. They denote taxiway/runway intersections, runway/runway intersections, ILS critical areas, CAT II/III operations areas, POFZ boundaries, runway approach areas, military landing zones and no entry areas. At controlled airports (i.e., airports with an operating air traffic control tower), vehicles and aircraft are **required to hold at these signs unless cleared by air traffic control**.

•AC 150/5340-1K

•3.3. CASE 3 – APPLICATIONS OF PATTERN A FOR THE RUNWAY HOLDING POSITION MARKING ON TAXIWAYS.

•a. Purposes:

•....For a taxiway that **intersects** a runway at an airport with an operating airport traffic control tower (ATCT), the Pattern A marking scheme identifies the location on a taxiway where pilots and vehicle drivers **are to stop until they receive a clearance from ATCT to proceed onto the runway**.

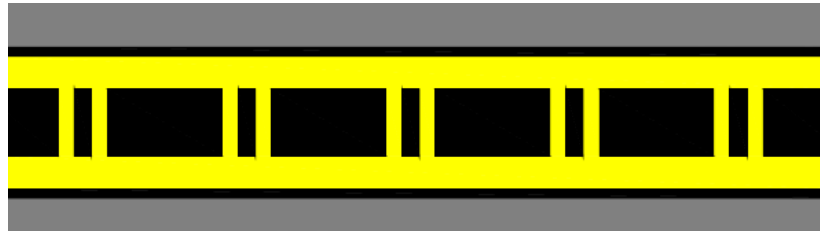
•.....For a taxiway that does **not intersect** a runway but **crosses through a runway approach area or the runway safety area**, the Pattern A marking scheme identifies the location on a taxiway where pilots and vehicle drivers **are to stop to receive clearance from the airport traffic control tower before proceeding through the protected area**.



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Existing Mandatory Instruction Signs With Markings

ILS
15-CAT II/III



- AC 150/5340-18F, Para 5:

- Mandatory instruction signs have a **white** inscription with **black outline** on a **red** background. They denote taxiway/runway intersections, runway/runway intersections, ILS critical areas, CAT II/III operations areas, POFZ boundaries, runway approach areas, military landing zones and no entry areas. At controlled airports (i.e., airports with an operating air traffic control tower), vehicles and aircraft are **required to hold at these signs unless cleared by air traffic control**.

- AC 150/5340-1K

- 3.4. CASE 4 – APPLICATIONS OF PATTERN B FOR THE ILS/MLS HOLDING POSITION MARKING.

- a. Purposes. Pattern B for the ILS/MLS holding position marking as shown in figure 12 identifies the location on a taxiway or holding bay where a pilot or vehicle driver **is to stop when they have received instructions from the airport traffic control tower (ATCT) to hold before entering an ILS/MLS critical area**. The intent of the marking is to protect the signal of the ILS/MLS navigational aid by identifying the holding position for CAT I operations and protecting the approved TERPS for CAT II/III operations.

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APPROACH HOLD ISSUES

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APPROACH HOLD ISSUES

- There are inconsistencies in implementing approach hold signs, marking and procedures among the nation's airports, causing confusion among ATC, pilots, airport operators and cert inspectors.
- Protect other areas such as RSA, approach, departure, or other critical surfaces of a runway intersecting with another runway's RSA or critical surfaces.

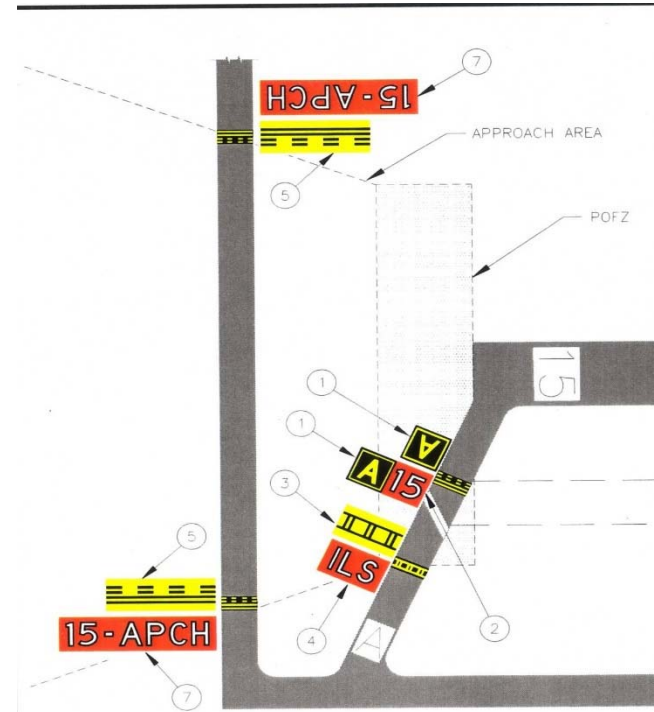
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APPROACH HOLD ISSUES (CONT.)

- Standard (regular) hold short markings in conjunction with approach hold sign result in pilot confusing if crossing hold short markings requiring ATCT clearance
- Most pilots expect hold short markings to be located in the vicinity of a runway entrance. Both the approach hold & POFZ hold marking positions may cause confusion when the hold is not associated directly with a runway entrance or it's a long distance from the rwy.



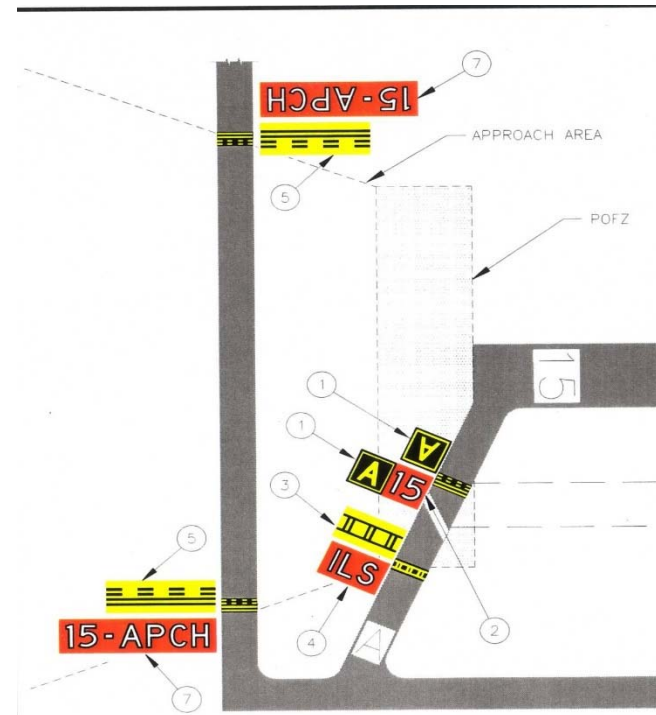
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APPROACH HOLD ISSUES (CONT.)

- Having only one rwy indicated on the approach hold sign causes confusion when the approach hold is used for protection with departing traffic at the other end of the runway.
- Requiring specific clearance to pass a holding position marking when the associated runway is not active will unnecessarily increase air traffic controller workload.



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FAA Approach Hold Workgroup/Panel

- **Approach Hold Workgroup was established in 2011 to identify the issues & concerns with the approach areas.**
 - Chaired by RSO
 - Workgroup members: FAA internal, NATCA & Industry (AAAE, ACI, ALPA)
 - Proposed changes to Approach Signs
- **To implement the proposed changes, SRMP was formed in Oct 2012 to complete the SRM process**
 - ATO's SRMD, Approach Hold Document Change Proposal SRMD (10/22/13)
 - Approach Hold Signs & Markings SRMD (Sept 2017)



Airport Office (AAS) Activities/ Progress

- Tech Center R&D project research was launched in 2013 to validate new signs and markings as recommended in the Safety Risk Management Document (SRMD) from the Approach Hold Workgroup.
 - Evaluation of Enhanced Visual Cues for Runway Approach and Runway Safety Areas Final Report (April 2016)
 - Runway Approach Hold Area Signage and Marking Study Tech Note (June 2017)
- Revise/update appropriate signs/markings (on-going)
 - Draft AC 5340-1M, Standards for Airport Markings
 - Published tentatively **November 2017**
 - Implementation planned **November 2018 (or 1 year after AC publication)**
 - Draft AC 5340-18G, Standards for Airport Sign Systems
 - Currently Coordination with Industry for Comment- **Due November 10, 2017**
 - **Safety Case Study and Cost Estimate- on-going**
 - Published tentatively **December 2017**
 - Implementation planned for **2 YEARS** after the publication date.



R&D Study Overview

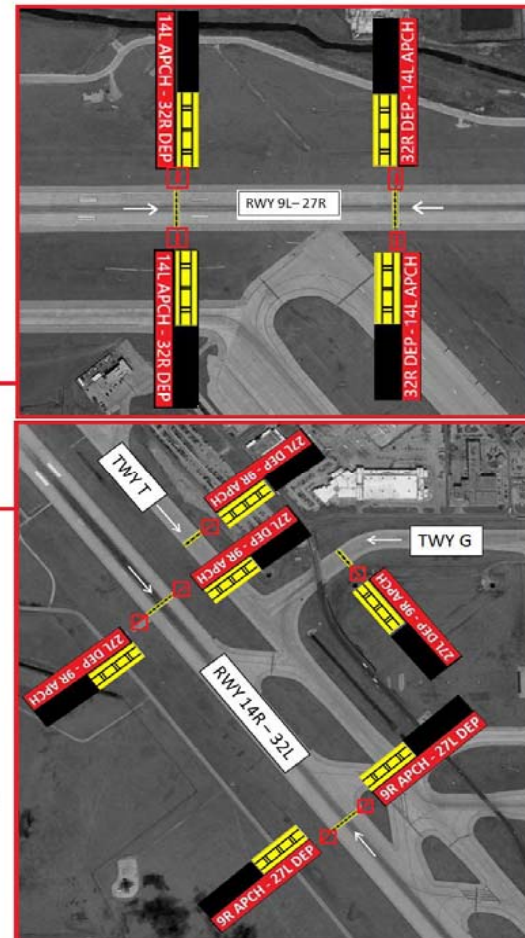
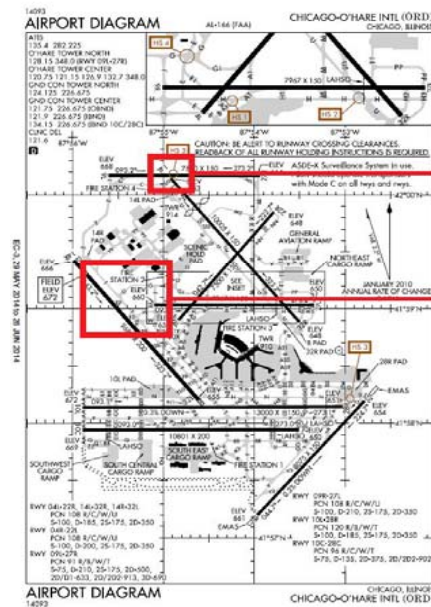
- FAA Airport Safety R&D Branch is conducting evaluations of new signage, surface markings, and ATC phraseology at three airports:
- Chicago O'Hare International Airport (ORD)
 - Installed July 2014
- Cleveland Hopkins International Airport (CLE)
 - Installed October 2014
- Nashville International Airport (BNA)
 - Installed: June 2015

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Chicago O'Hare International Airport (ORD) R&D Testing Locations



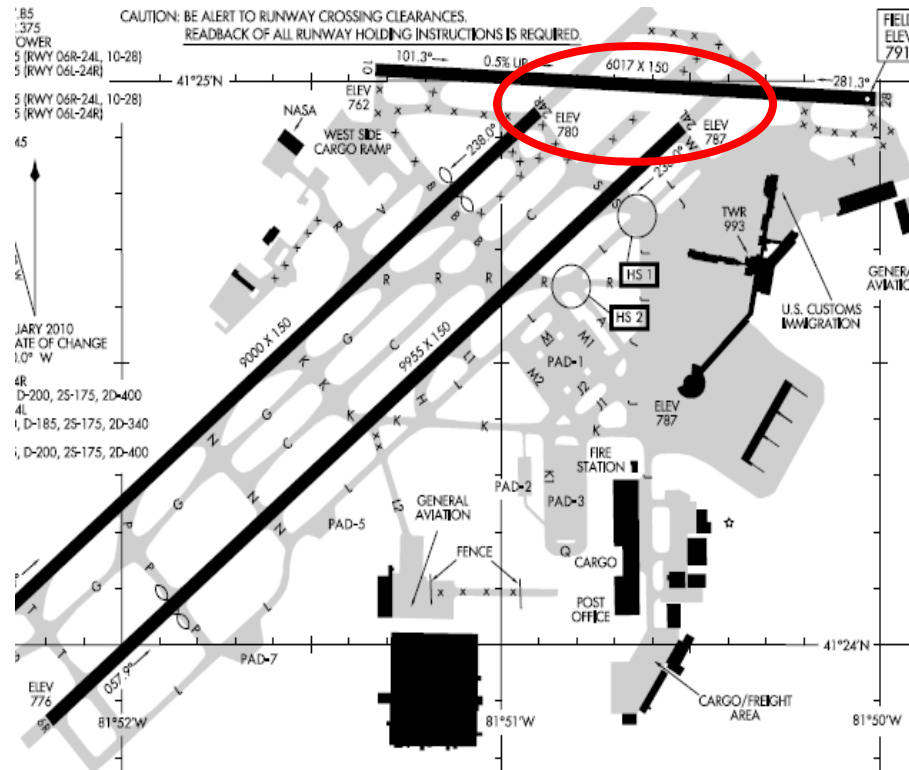
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Cleveland Hopkins International Airport (CLE) R&D Testing Locations

8 signs and 4 markings on runway 10-28 have been changed.



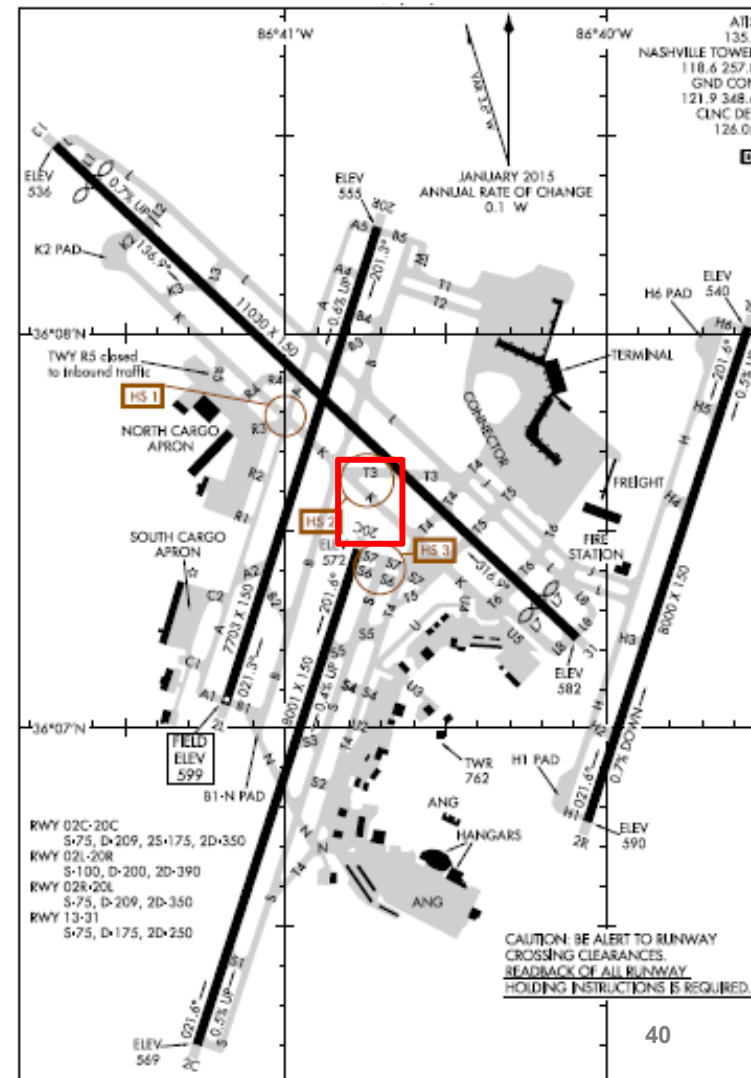
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Nashville International Airport (BNA) R&D Testing Locations

Holding position signs and surface markings protecting the approach/departure surfaces for RWY 2C-20C will be modified for this evaluation.



AC 5340-18G Draft, Standards for Airport Sign Systems-Principal Changes

- Introduce new “Approach” signs
- In corporate EB 89, Clarifications of Taxiway Nomenclature
- Update drawings

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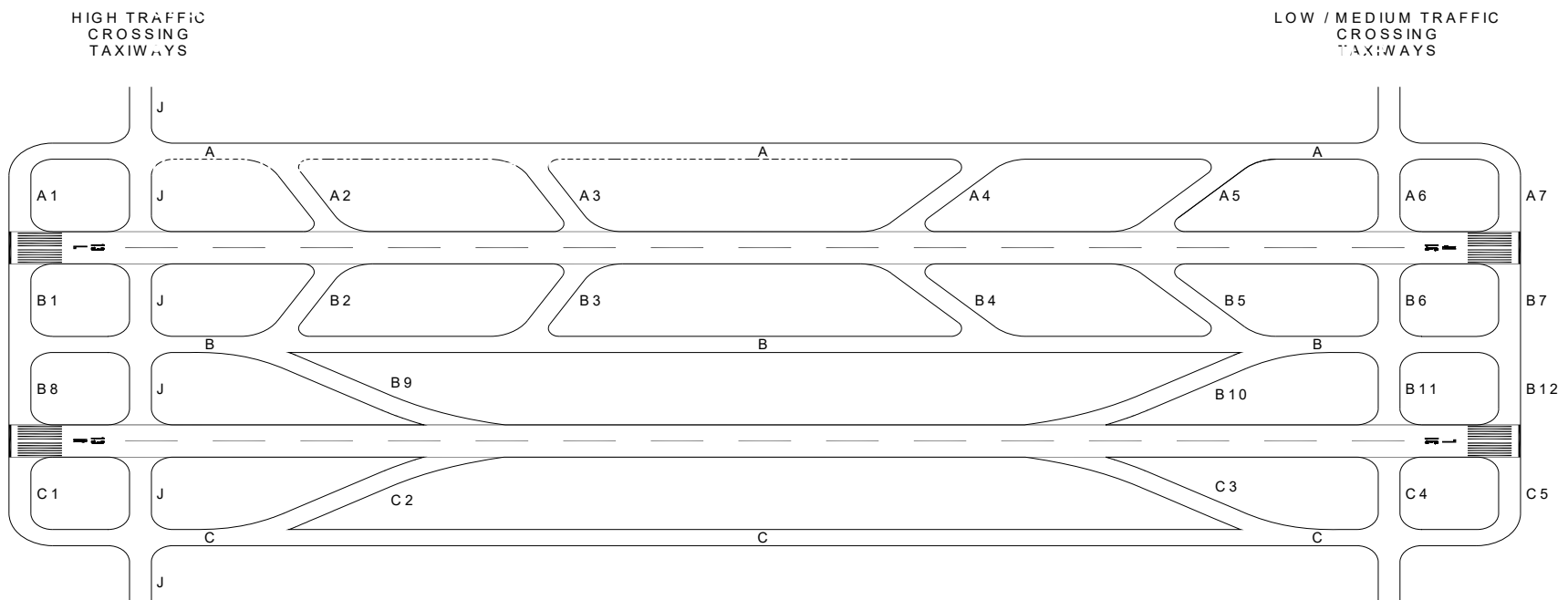


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EB 89- Taxiway Naming Standards



EB 89- Taxiway Naming Standards

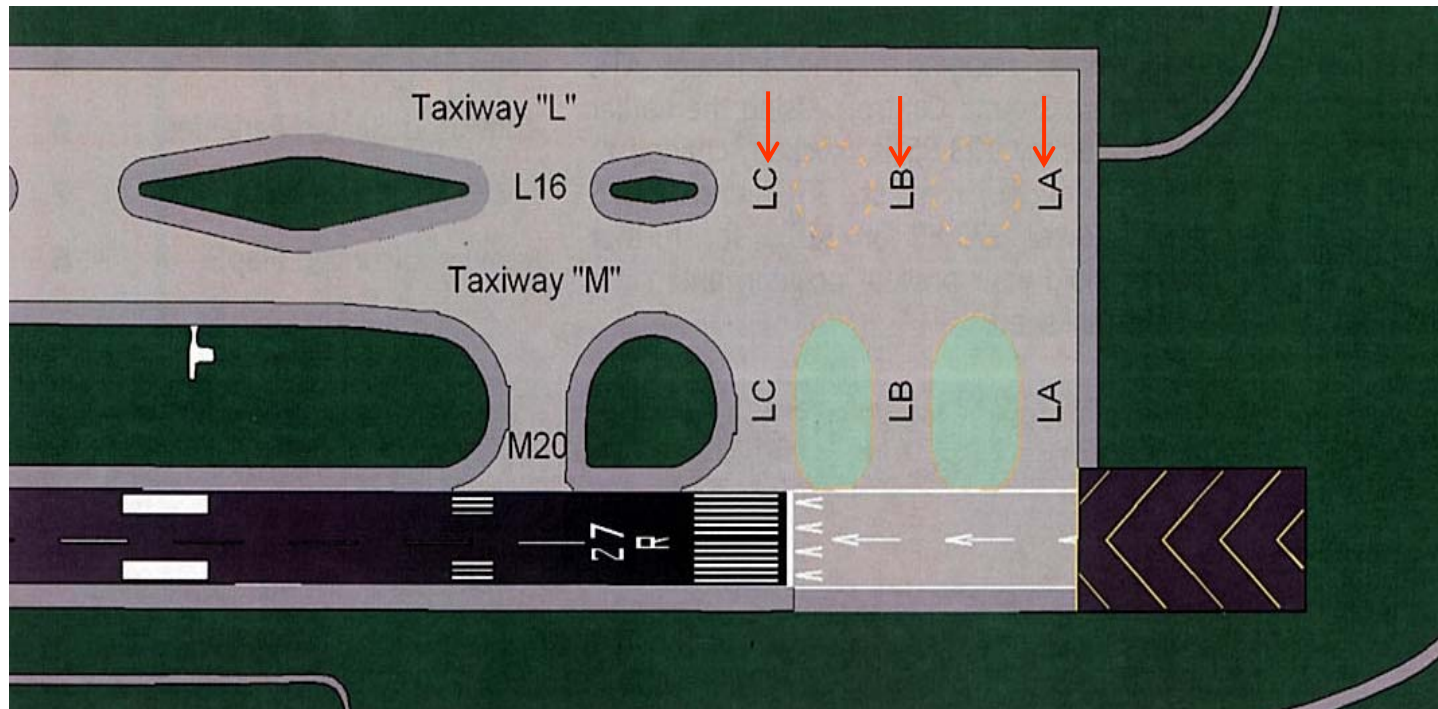
d. After all available single alphabet letters have been utilized, then designate taxiways with **double-same** alphabet letters (for example, AA, BB, ..., ZZ). **Double-different** alphabet letters (e.g., AB, CD,.... ZW) taxiway designations are **not allowed**.





Double-different

not allowed



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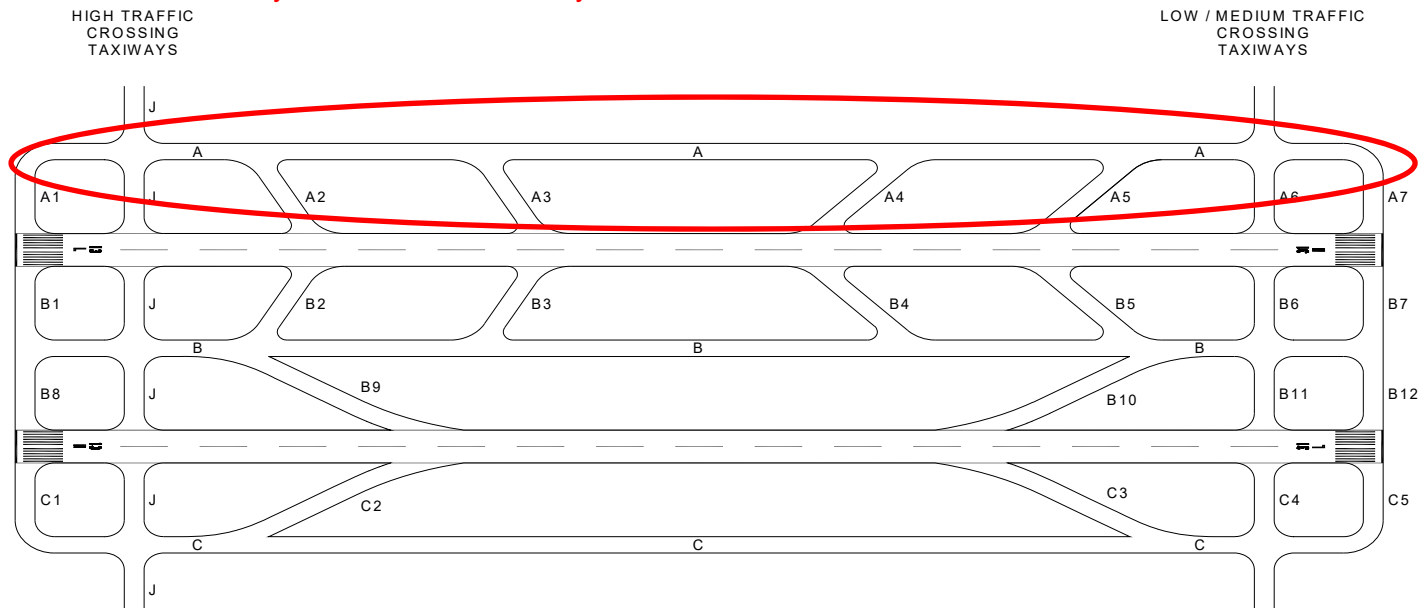


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•EB 89- Taxiway Naming Standards

- e.(2) For a runway with a parallel taxiway, the entrance and exit taxiways located at the ends and along the runway must use alphanumeric designators and follow an increasing, sequentially numbered pattern from one runway end to the other runway end, such as A1, A2, ..., A5.



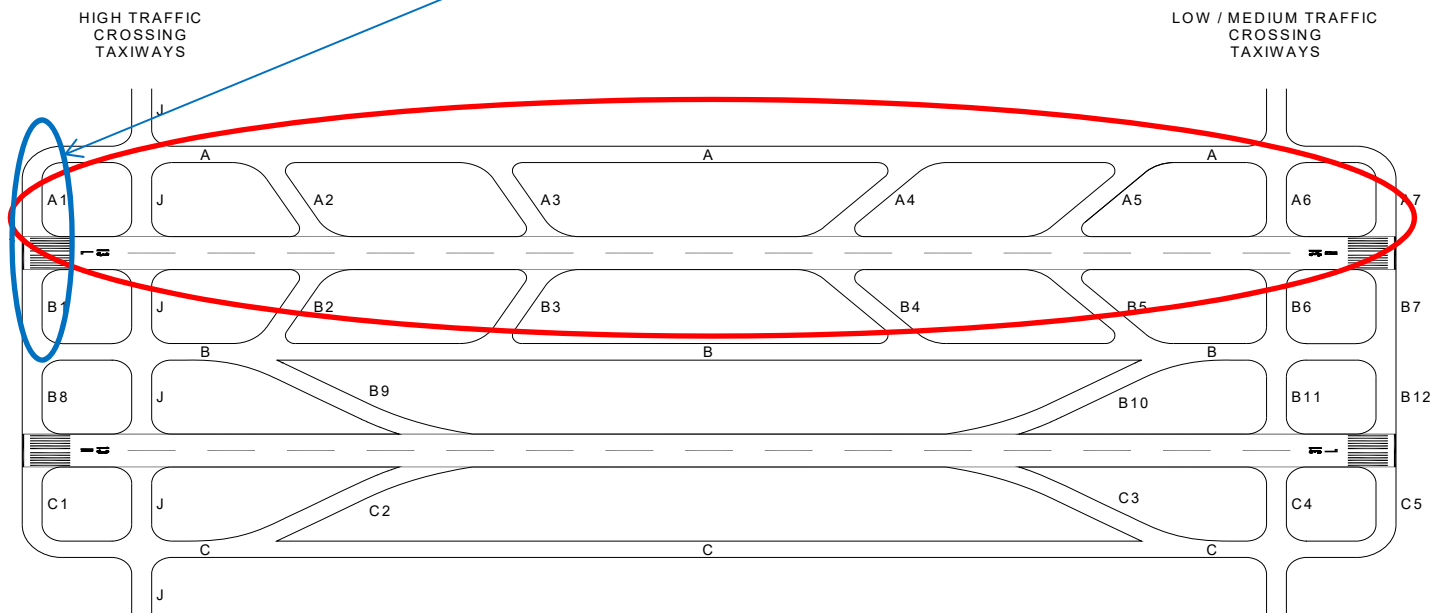
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•EB 89- Taxiway Naming Standards

- e.(3) For a runway with parallel taxiways on opposite sides of the runway, entrance taxiways at the same runway end must use their respective parallel taxiway's single alphabet designation with the addition of a numeric designation, such as A1 and B1. In this situation, the numeric designation on opposite sides of the runway can be the same or different, (for example A1 and B1, or A1 and B5).



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SUMMARY

- Draft AC 5340-18G, Standards for Airport Sign Systems
 - Currently Coordination with Industry for Comment- Due November 10, 2017
 - Safety Case Study & Cost Estimate- on-going
 - Published tentatively December 2017
 - Implementation planned for 2 YEARS after the publication date.
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Q & A



THANK YOU!



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