

# CHICAGO O'HARE INTERNATIONAL AIRPORT



## ADVANCED AIRFIELD FAMILIARIZATION MANUAL



14 CFR PART 139.329

PREPARED BY  
CITY OF CHICAGO  
DEPARTMENT OF AVIATION  
AIRFIELD OPERATIONS

Revision  
202104/01

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## Summary of Changes

<b>Revision 201703/01</b>	<ul style="list-style-type: none"> <li>1. All graphics pertaining to nomenclature moved to supplement packet.</li> <li>2. Content Revision – <u>MANDATORY INSTRUCTION SIGNS</u></li> <li>3. Content Addition – <u>NON-MOVEMENT AREA BOUNDARY MARKING</u></li> </ul>
<b>Revision 201706/01</b>	<ul style="list-style-type: none"> <li>1. Content Revision – <u>TAXIWAY SHOULDER MARKINGS</u> – Picture Update</li> </ul>
<b>Revision 201711/01</b>	<ul style="list-style-type: none"> <li>1. Content Revision – Rescue 2 &amp; Rescue 4 locations following taxiway changes</li> </ul>
<b>Revision 201804/01</b>	<ul style="list-style-type: none"> <li>1. Content Change – Air Traffic Control Radio Phraseology</li> <li>2. Content Change – ATCT Radio Communication Procedures</li> <li>3. Content Change – Effective Communication</li> </ul>
<b>Revision 201807/01</b>	<ul style="list-style-type: none"> <li>1. Content Addition – Taxi Instructions for the Northeast Cargo Ramp</li> </ul>
<b>Revision 201809/01</b>	<ul style="list-style-type: none"> <li>1. Content Revision – Instrument Landing System (ILS) Critical Areas</li> <li>2. Content Change – opsdocs web address</li> </ul>
<b>Revision 202009/02</b>	<ul style="list-style-type: none"> <li>1. Content Revision – Rescue 2 location change</li> </ul>
<b>Revision 202011/01</b>	<ul style="list-style-type: none"> <li>1. Content Addition – Information regarding RWY 9C-27C</li> </ul>
<b>Revision 202012/01</b>	<ul style="list-style-type: none"> <li>1. Content Change – Corrected general information errors</li> </ul>
<b>Revision 202104/01</b>	<ul style="list-style-type: none"> <li>1. Content Change – Removed AOA Alert</li> </ul>

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## INTRODUCTION

This Manual was developed by the City of Chicago, Department of Aviation, Airport Airfield Operations Section (AAO). Its purpose is to implement training requirements mandated by 14 CFR 139.329, and to review important safety information relating to personnel who operate vehicles, equipment, and taxi aircraft in the movement area - runways, taxiways, and surrounding surfaces. This will enable you to understand the hazards and the controls created for your protection and for the safety of others at O'Hare International Airport. It is the responsibility of each person who works in or around the movement area to study and understand this information.

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CITY ATRIUM  
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O'HARE COMMUNICATIONS CENTER

**EMERGENCIES – 773.894.9111**

NON-EMERGENCIES – 773.894.5000

## PHONETIC ALPHABET

Character	Telephony	Pronunciation	Character	Telephony	Pronunciation
A	Alfa	(AL-FAH)	N	November	(NO-VEH-BER)
B	Bravo	(BRAH-VOH)	O	Oscar	(OSS-CAH)
C	Charlie	(CHAR-LEE)	P	Papa	(PAH-PAH)
D	Delta	(DELL-TA)	Q	Quebec	(KEH-BECK)
E	Echo	(ECK-OH)	R	Romeo	(ROW-ME-OH)
F	Foxtrot	(FOKS-TROT)	S	Sierra	(SEE-AIR-RAH)
G	Golf	(GOLF)	T	Tango	(TANG-GO)
H	Hotel	(HOH-TEL)	U	Uniform	(YOU-NEE-FORM)
I	India	(IN-DEE-AH)	V	Victor	(VIK-TAH)
J	Juliett	(JEW-LEE-ETT)	W	Whiskey	(WIS-KEY)
K	Kilo	(KEY-LOH)	X	X-ray	(ECKS-RAY)
L	Lima	(LEE-MAH)	Y	Yankee	(YANG-KEY)
M	Mike	(MIKE)	Z	Zulu	(ZOO-LOO)

Character	Telephony	Pronunciation	Character	Telephony	Pronunciation
1	One	(WUN)	6	Six	(SIX)
2	Two	(TOO)	7	Seven	(SEV-EN)
3	Three	(TREE)	8	Eight	(AIT)
4	Four	(FOW-ER)	9	Nine	(NIN-ER)
5	Five	(FIFE)	0	Zero	(ZEE-RO)

### \* NOTE \*

When referencing a **RUNWAY DESIGNATION** - numbers are spoken in single digits between 0 and 9. When combining two number characters to say a runway you would speak a single digit, followed by a single digit. For example, Runway 10L would be spoken Runway One-Zero Left, **NOT** Runway Ten Left.

# **FACILITIES FAMILIARIZATION**

Concentrations of buildings on the airport consist of the “core” or Domestic Terminal Complex, International Terminal Complex, the Hangar Alley to the north, the cargo area to the Southwest and Southeast, the Airport Maintenance Complex (AMC) to the Southeast and the Northeast Ramp to the Northeast.

The airport is also divided into landside operations and airside operations. The landside portion includes all terminal areas, access roads and the Kennedy (I-190) Expressway to Mannheim Road. The security checkpoints referred to as “Guard posts” provide access to the airside portion, where all air traffic movements take place.

## **AIRCRAFT RESCUE AND FIRE FIGHTING STATIONS**

Chicago O’Hare International Airport has four (4) Aircraft Rescue and Fire Fighting (ARFF) or rescue stations strategically located on airport property, three stations airside and one landside. O’Hare is ARFF index E.

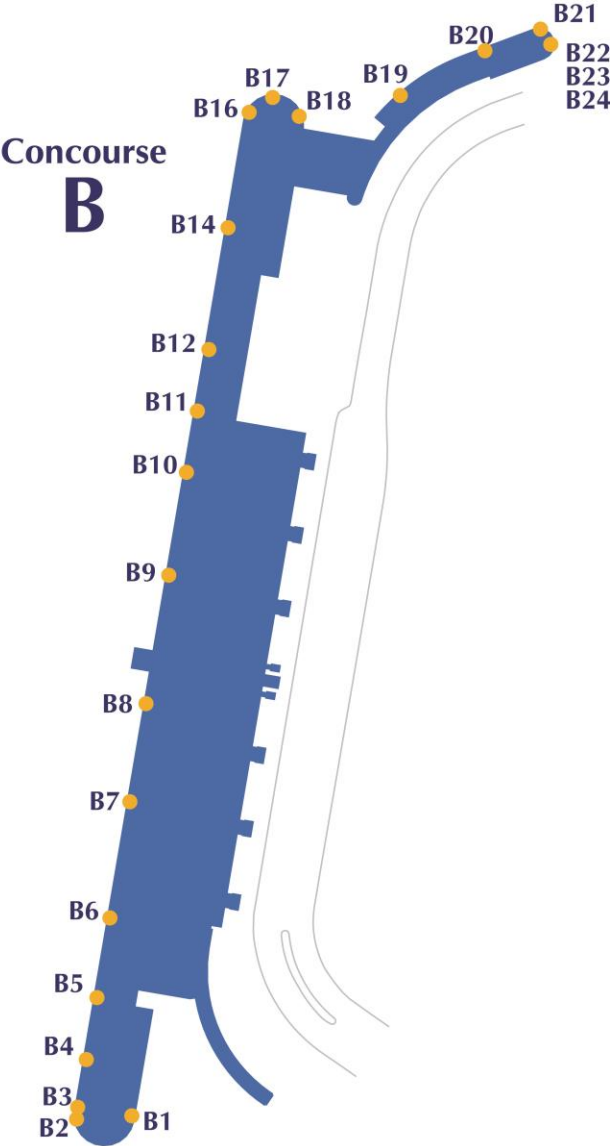
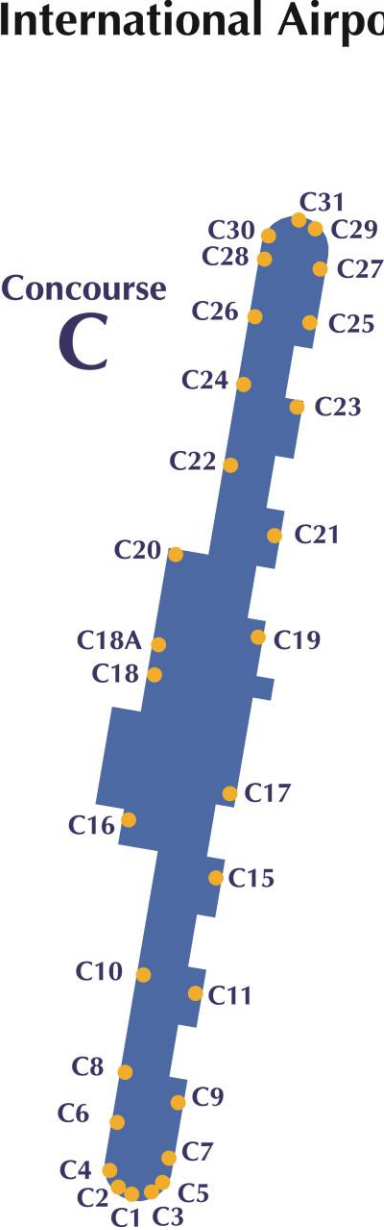
1. Rescue 1 is located on the south side of the airfield just Northwest of TWY S1
2. Rescue 2 is located on the North side of the airfield at the intersection of TWY M and TWY D
3. Rescue 3 (District 3 headquarters) is located landside, in the terminal core area off of the recirculation route just past Terminal 3
4. Rescue 4 is located on the North side of the airfield at the intersection of TWY C and TWY C PAD

## **GATES**

In this section the trainee will be exposed to the various ramp areas on the airfield, including all gates at various concourses, and their number system as an identification method to locate a certain gate. There are a total of 188 gate positions at O’Hare International Airport (ORD) which include all four (4) airline passenger terminals.

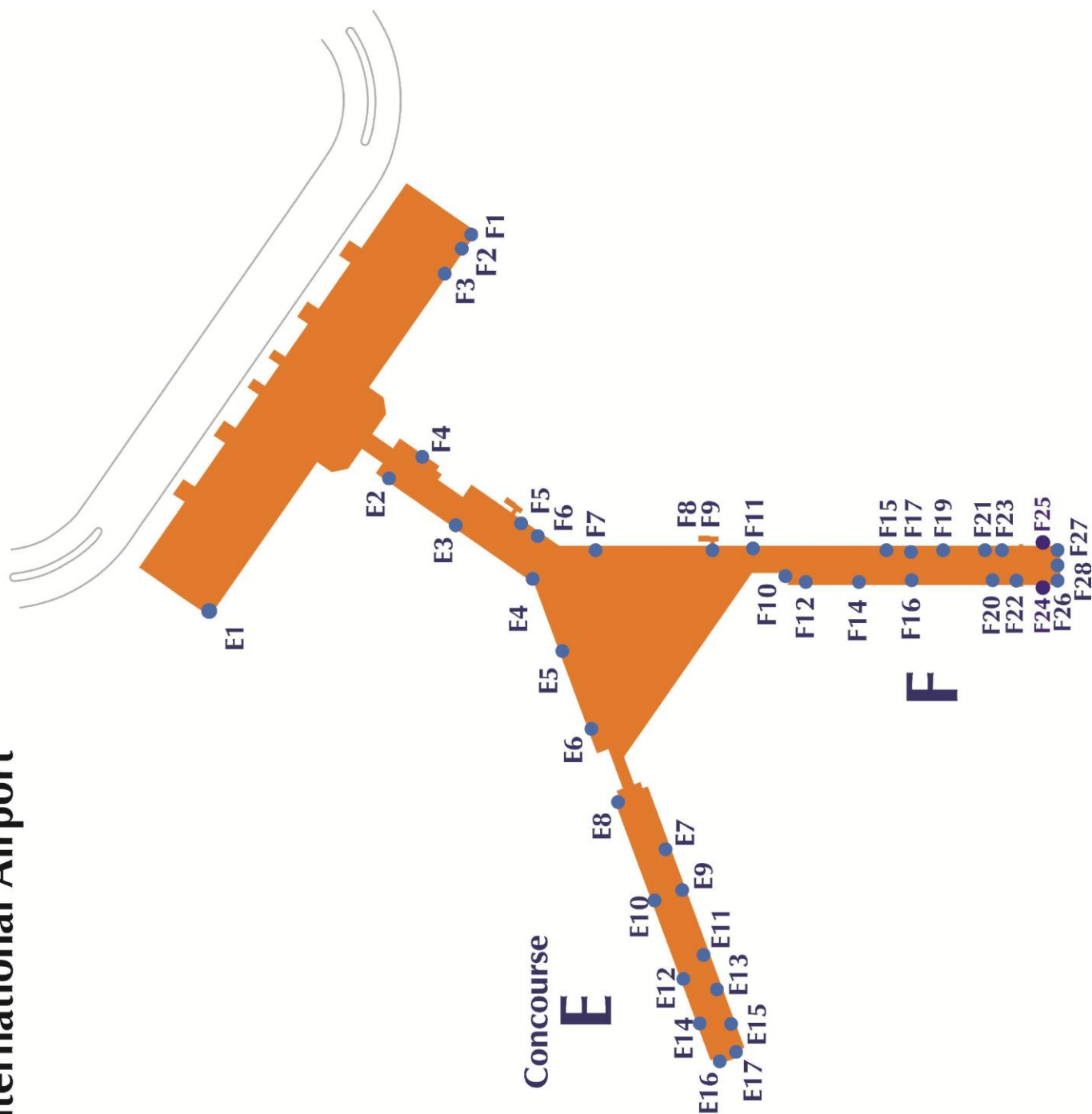
# O'Hare International Airport

## Terminal 1

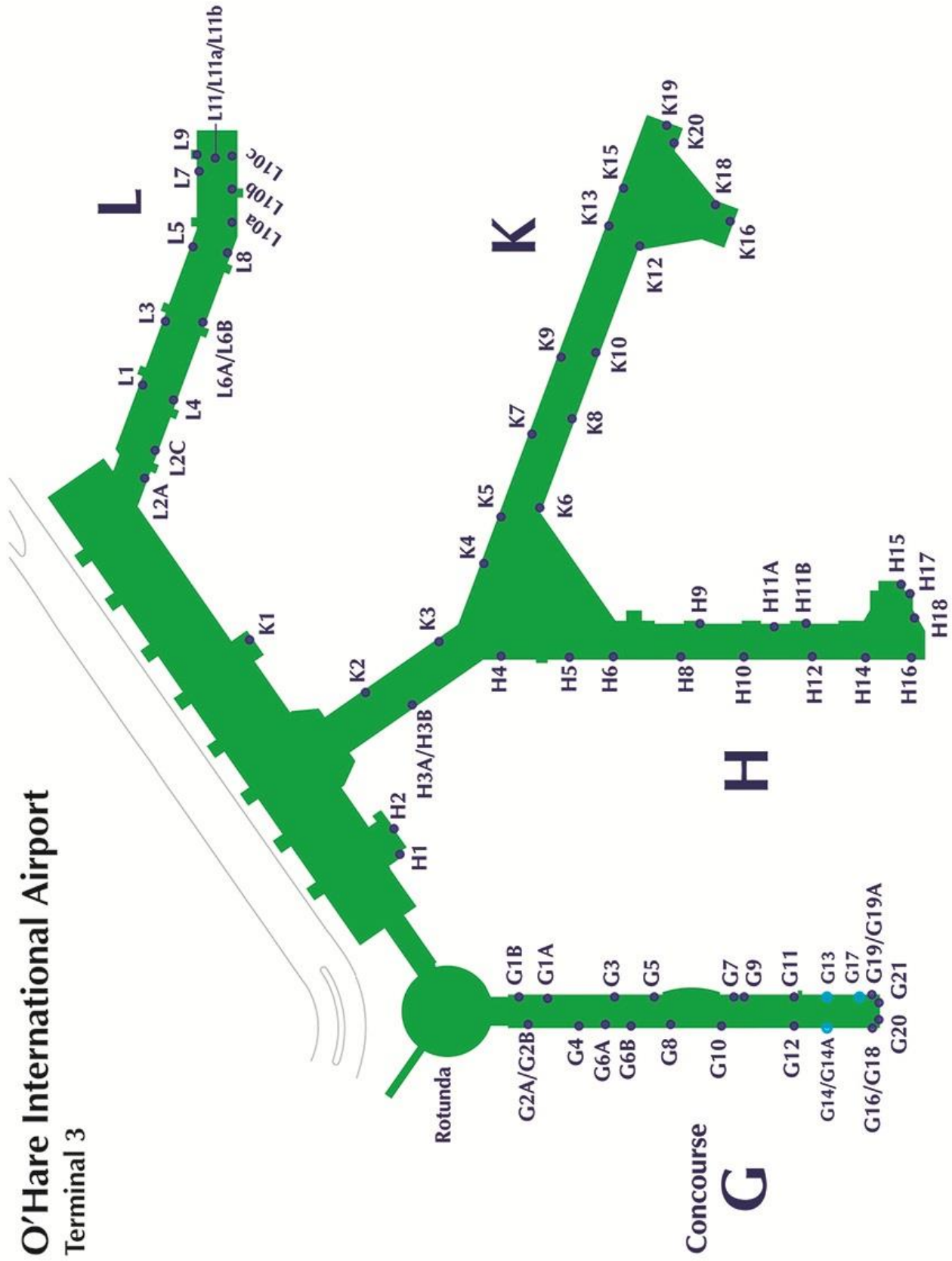


# O'Hare International Airport

## Terminal 2

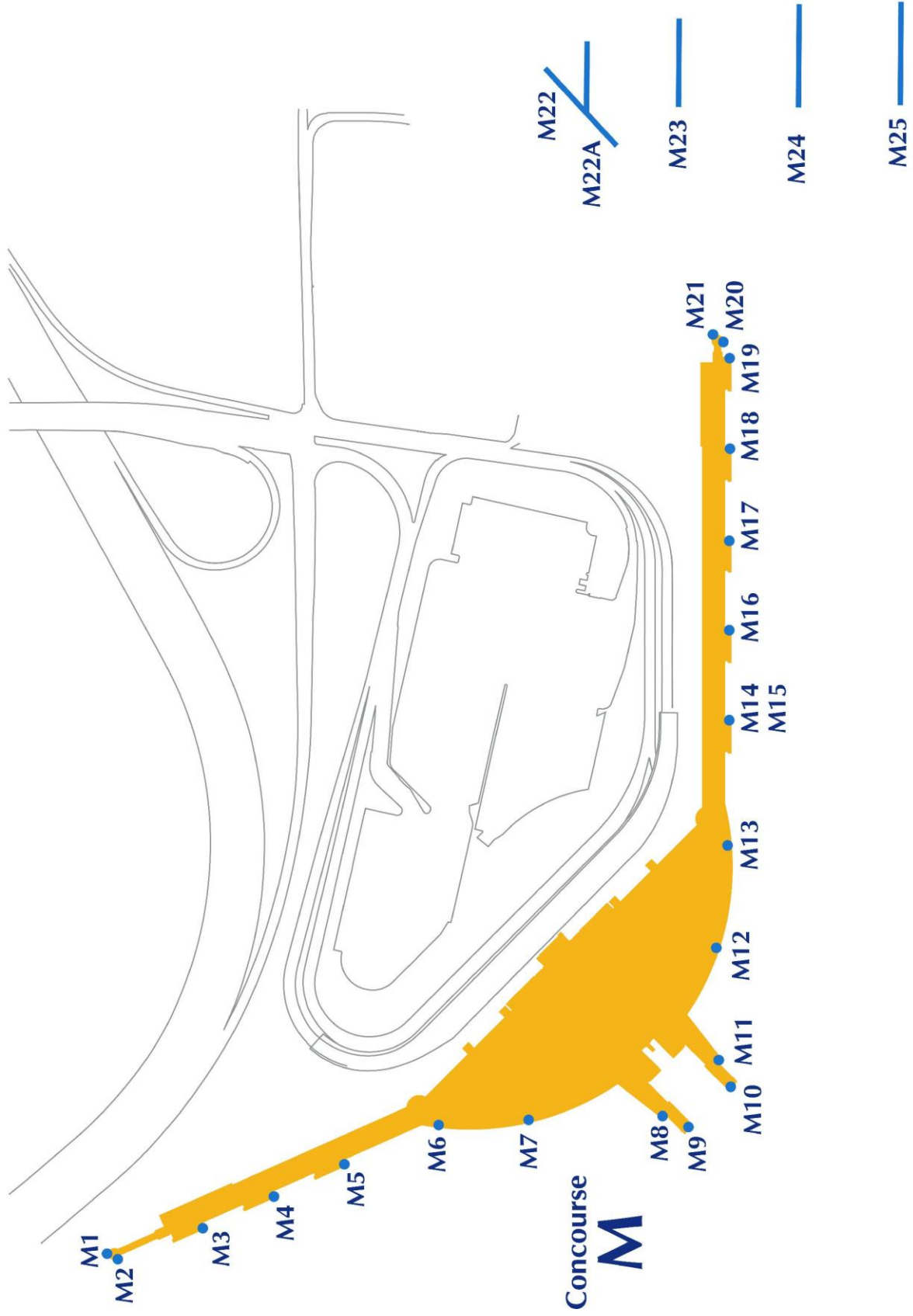


# O'Hare International Airport Terminal 3



# O'Hare International Airport

## International Terminal 5





## **CARGO FACILITIES**

Northeast Cargo is located South of the Runway 22R APCH. The buildings include: AGI, Swissport, TAS

Southwest Cargo is located South of Runway 10C-28C at Taxiway BB.

FedEx is the only cargo carrier at this location.

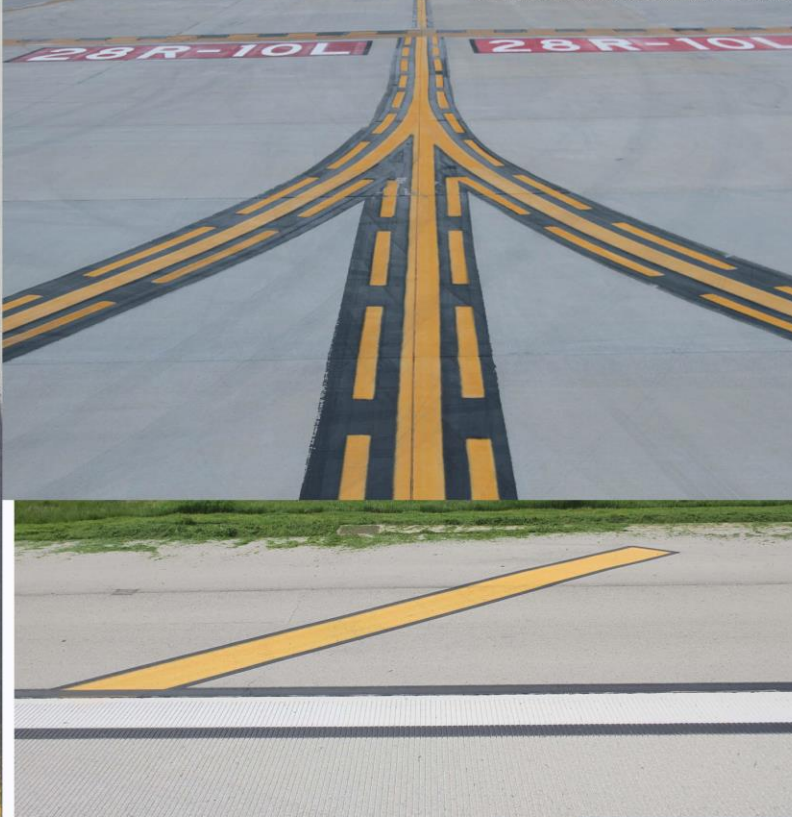
South Central Cargo is located South of Runway 10C-28C, East end of Taxiway Q and South end of Taxiway DD. United Cargo Building is the only cargo carrier at this location – leasing space to AeroUnion, British Airways, CargoLux, Cathay Pacific, Justice, Kalitta Air,

Southeast Cargo is located West of Taxiways S-1, S-2.

The buildings include: Air France Cargo, American Airlines Cargo, Delta Cargo, Federal Express (second facility), KLM Cargo, Lufthansa Cargo, Nippon Cargo, and United Parcel Service.

Chicago O'Hare Express Center: The newest facility is located directly south of the AMC Building at the corner of Mannheim and Irving Park Road. The buildings to date include: Aer Lingus, Burlington Air Freight, Air Canada, Japan Airlines, British Airways, Cathay Pacific, Alliance, Korean Air, Challenge, Varig, Fin Air, Virgin Atlantic, Turkish Airlines, Lot Polish, Iberia, Eva, Midwest Express, Harjin, Saudi Arabian Airlines, Air New Zealand, Air Jordan, Shanghai Airlines Cargo, Singapore Airlines Cargo, China Southern, Air General, Polar Air Cargo, Swissport

# AIRFIELD MARKINGS



# RUNWAY MARKINGS

## MARKING COLOR

All runway markings are **white** in color and outlined in black.

### \*\*\*\*\* EXCEPTION TO THE RULE \*\*\*\*\*

Runway intersection hold short markings, taxiways lead in / lead out lines that extend onto the runway, and runway shoulder markings (chevrons) are **yellow** in color.

## RUNWAY DESIGNATORS

- They are white in color and consist of a single digit number or two numbers and may be supplemented with a letter -

The runway landing designator marking identifies a runway end located near the runway threshold.

Types of single, dual parallel, and triple parallel runway designators:

- 1) A single-digit runway landing designation number is never preceded by a zero.
- 2) The designator number is the whole number nearest the one-tenth of the magnetic azimuth along the runway centerline when viewed from the direction of approach. For example, where the magnetic azimuth along the runway centerline is 273 degrees, the runway designator marking would be 27.
- 3) Two parallel runways having a magnetic azimuth of 270-279 degrees – the runways would be designated “27L,” “27R.”
- 4) Five parallel runways having a magnetic azimuth of 270-279 degrees – the runways would be designated “27L,” “27R,” “28L,” “28C,” “28R” or “28L,” “28R,” “27L,” “27C,” “27R.”
- 5) Six parallel runways having a magnetic azimuth of 90-99 degrees – the runways would be designated “9L,” “9C,” “9R,” “10L,” “10C,” “10R” or “28L,” “28C,” “28R,” “27L,” “27C,” “27R.” → → → → → → → → → →



“L” – indicates a “LEFT” designation

“C” – indicates a “CENTER” designation

“R” – indicates a “RIGHT” designation

### \*\*\*THE 6 EAST/WEST PARALLELS\*\*\*

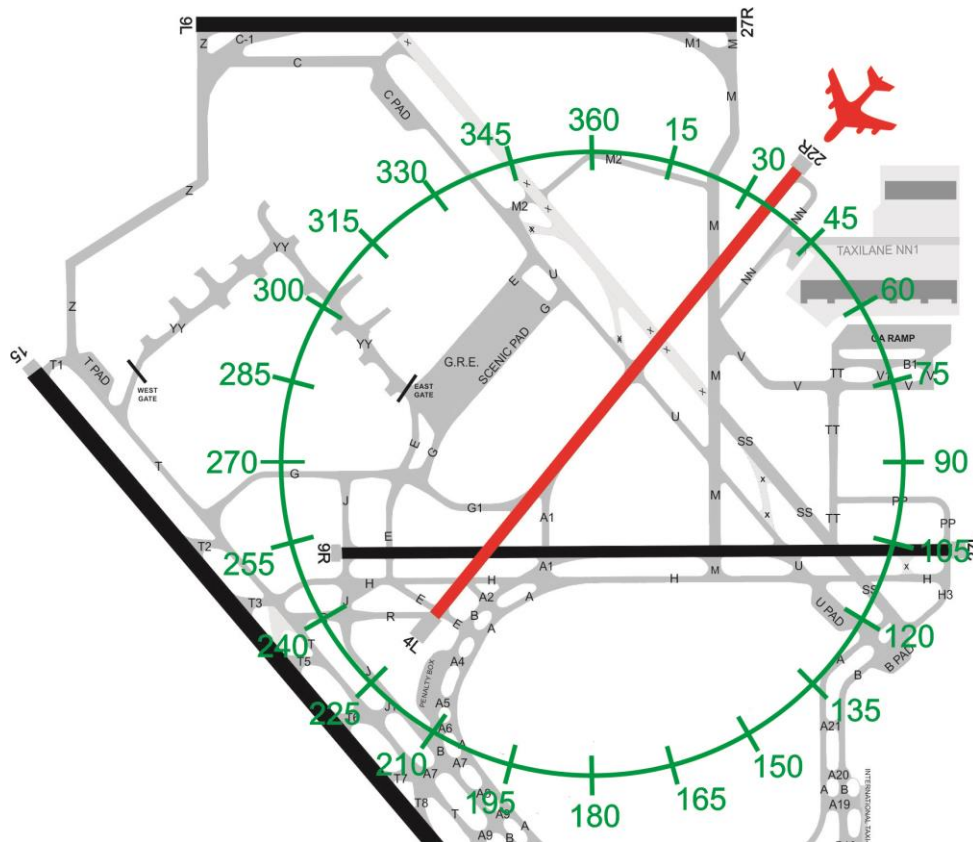
**RUNWAYS ON THE NORTH AIRFIELD:**  
**9L-27R / 9C-27C / 9R-27L**

**RUNWAYS ON THE SOUTH AIRFIELD:**  
**10L-28R / 10C-28C / 10R-28L**

# RUNWAY USE INFORMATION

Runways are identified by their magnetic compass headings. For example, runway 9L-27R is positioned directly East and West. East is 090 degrees and West is 270 degrees, thus the runway is identified as '9L-27R'. The third digit is just dropped from the magnetic heading. The 'L' and 'R' refer to left and right, indicating there are one or more parallel runway(s) with the same compass heading. The 'L' indicates that this is the LEFT parallel runway while the opposite is true for the 'R' designator. A runway with a 'C' indicates there are more than 2 parallel runways with the same magnetic heading.

All references to runways should be made in the direction the aircraft are heading. The figure below is a depiction of a compass rose with runway 4L-22R super-imposed on the diagram.



## North Airfield RWY Lengths & Widths

4L-22R – 7,500' x 150'

9L-27R – 7,500' X 150'

9C-27C – 11,245' X 200'

9R-27L – 7,967' X 150'

## South Airfield RWY Lengths & Widths

4R-22L – 8,075' X 150'

10L-28R – 13,001' X 150'

10C-28C – 10,801' X 200'

10R-28L – 7,500' X 150'



## AIRPORT REFERENCE POINT

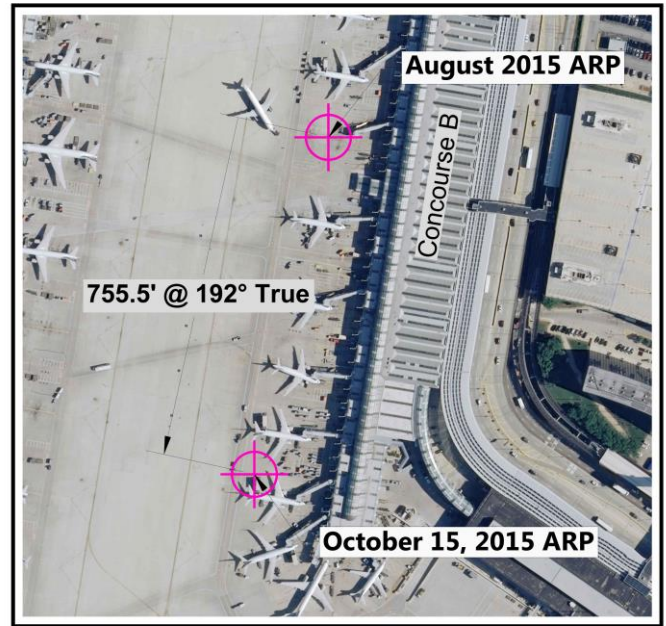
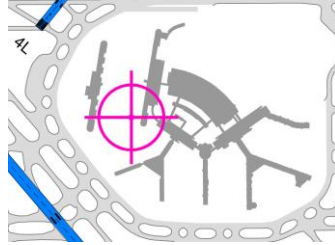
The airport reference point (ARP) geographically locates the airport horizontally. The ARP is normally not monumented or physically marked on the ground. The computation of this point uses only runway length, and do not use closed or abandoned areas. The ARP is computed or recomputed as infrequently as possible. The only time that a recomputation is needed is when the proposed ultimate development is changed.

### ARP Coordinates

Latitude N 41° 58' 38.35"

Longitude W 087° 54' 28.82"

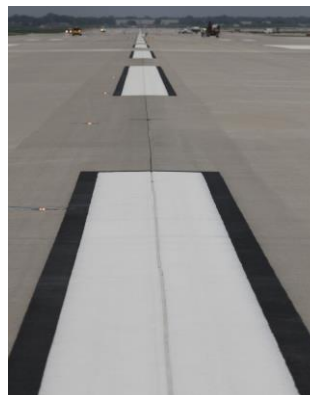
Airport Elevation: 680'



## **RUNWAY CENTERLINE MARKING**

- Are white in color and consist of uniformly spaced stripes and gaps and run the entire length of the runway between landing designation markings -

The runway centerline marking identifies the physical center of the runway width. It provides alignment guidance to pilots during takeoff and landing operations.



## **RUNWAY AIMING POINT MARKING**

- Two rectangular markings consisting of a broad white stripe –

The aiming point marking serves as a visual aiming point for landing aircraft and are located on each side of the runway centerline and approximately 1,000 feet from the runway threshold.

**\* NOTE \***

**Can be used for  
distance remaining  
information**

## **RUNWAY TOUCHDOWN ZONE MARKERS**

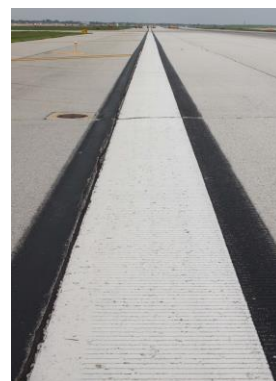
- The markings consist of symmetrically arranged pairs of white rectangular bars in groups of one, two, and three along the runway centerline -

The touchdown zone marking is a visual aid for landing aircraft that identifies the touchdown zone along a runway in 500 foot increments.

## **RUNWAY SIDE STRIPE MARKING**

- Runway side stripe marking are white and consist of two parallel stripes, one placed along each edge of the usable runway -

The runway side stripe marking provides enhanced visual contrast between the runway edge and the surrounding terrain or runway shoulders and delineates the width of suitable paved area for runway operations.



## **RUNWAY SHOULDER MARKING**

- Runway shoulder markings are yellow and located between the runway side stripe and the outer edge of the paved shoulder -

The runway shoulder marking is used as a supplement to further delineate a paved runway shoulder that is likely to be mistaken as usable runway. This marking is used only in conjunction with the runway side stripe marking.



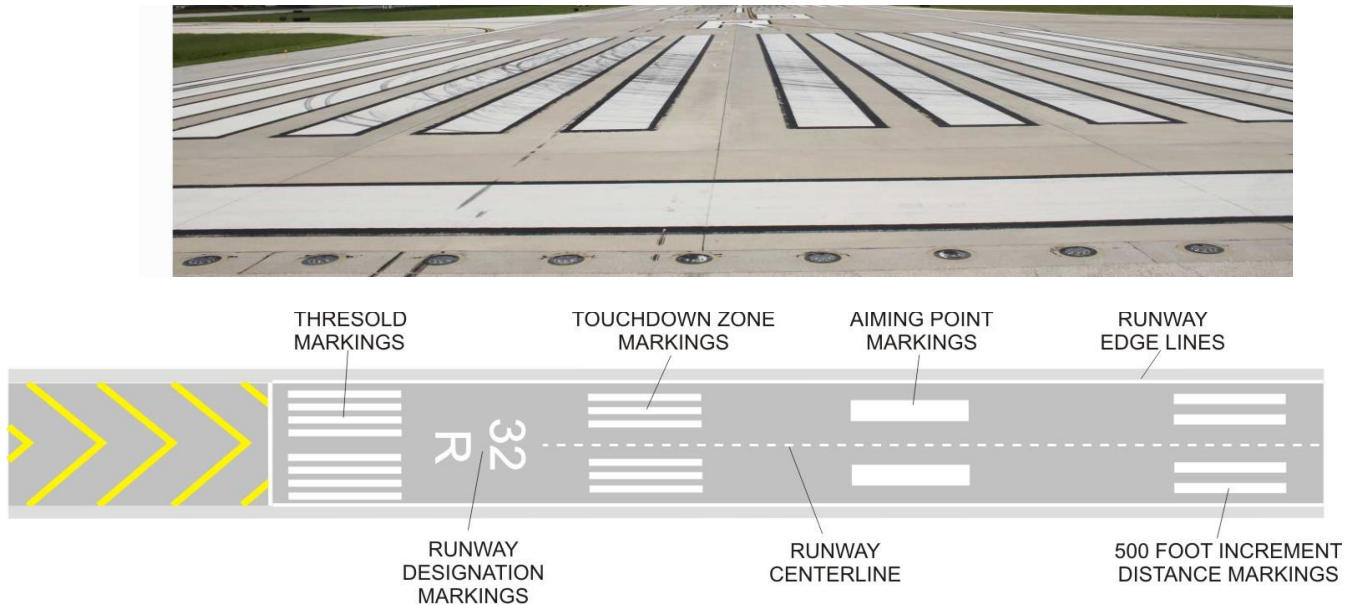
**\* NOTE \***

**Can be used for distance remaining  
information – change direction in center of  
runway**

## RUNWAY THRESHOLD MARKINGS

- They are white in color and consist of a pattern of longitudinal stripes spaced symmetrically about the runway centerline -

A runway threshold marking identifies the actual beginning point of the runway used for landings.



## RELOCATED THRESHOLD

Sometimes construction, maintenance, obstructions to navigational aids, or other activities require the threshold to be relocated towards the rollout end of the runway. When a threshold is relocated, it closes not only a set portion of the approach end of a runway, but also shortens the length of the opposite direction runway.

## RUNWAY DISPLACED THRESHOLD MARKING

A threshold that is located at a point on the runway other than the beginning. This area may be available for takeoffs in either direction and landings from the opposite direction.

### **Runway Threshold Bar Marking**

- The runway threshold bar marking is white and is an elongated rectangular bar that is located perpendicular to the runway centerline and on the landing portion of the runway –

The runway threshold bar marking delineates the beginning section of the runway available for landing from the unusable section on the approach side of the displaced threshold. The predominant case is when the threshold is displaced from the runway end. In this case white arrowheads with and without arrow shafts are required to identify the portion of the **runway** before the displaced threshold to provide centerline guidance for: 1) ground vehicles, 2) taxiing, and 3) pilots during: 1) approaches, 2) takeoffs, and 3) landing rollouts from the opposite direction.

## DEMARICATION BAR

- A demarcation bar is a 3 feet wide yellow elongated rectangular bar on a blast pad, stopway, or an aligned taxiway that is perpendicular to the runway centerline at the point of intersection with the start of the runway -

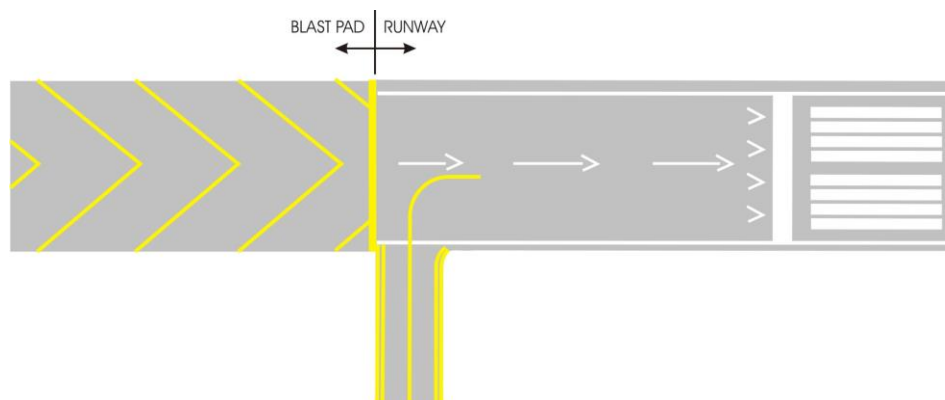
A demarcation bar delineates a runway with a displaced threshold from a blast pad, stopway, or an aligned taxiway that precedes the runway.

## CHEVRONS

- Chevron markings are yellow and located on the blast pad and stopway that are aligned with and contiguous to the runway end. The chevron scheme for an EMAS installation is also centered along the extended runway centerline -

The chevron marking identifies paved blast pads, stopways, and EMAS (engineered materials arresting systems) in relation to the end of the runway.

**Blast pads equal the runway width  
plus the shoulder widths**



BLAST PAD OR STOPWAY AND DISPLACED THRESHOLD PRECEDING A RUNWAY



## **CLOSED RUNWAYS AND TAXIWAYS**

### **PERMANENTLY CLOSED RUNWAYS AND TAXIWAYS**

For runways and taxiways which are permanently closed, the lighting circuits will be disconnected. The runway threshold, runway designation, and touchdown markings are obliterated and yellow crosses – “X’s” – are placed at each end of the runway and at 1,000 foot intervals

### **TEMPORARILY CLOSED RUNWAYS AND TAXIWAYS**

To provide a visual indication to pilots/ground vehicles that a runway is temporarily closed, crosses – “X’s” – are placed on the runway only at each end of the runway. The crosses are yellow in color.

- 1) A raised lighted yellow cross – “X” – may be placed on each runway end in lieu of the markings to indicate the runway is closed.
- 2) A visual indication may not be present depending on the reason for the closure, duration of the closure, airfield configuration and the existence and the hours of operation of an airport traffic control tower. Pilots/ground vehicles/taxi mechanics should check NOTAMs and the Automated Terminal Information System (ATIS – 135.40MHz) for local runway and taxiway closure information.
- 3) **Temporarily closed taxiways are usually treated as hazardous areas, in which no part of an aircraft may enter, and are blocked with barricades. However, as an alternative a yellow cross may be installed at each entrance to the taxiway.**



# TAXIWAY MARKINGS

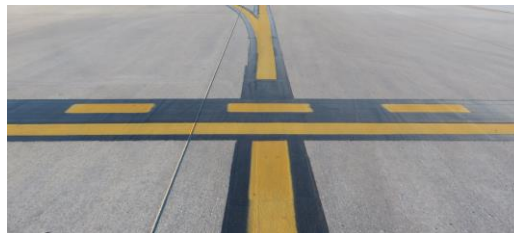
## GENERAL

All taxiways regardless of their width have a centerline marking, and whenever a taxiway intersects a runway, the taxiway will have a surface painted runway holding position marking.

## NON-MOVEMENT AREA BOUNDARY MARKING

- The non-movement area boundary marking consists of two yellow lines, one solid and one dashed. The solid line is located on the side of the non-movement area while the dashed line is located on the side of the movement area. Each line is 6 inches in width with 6-inch spacing between lines. The dashes are 3 feet in length with 3-foot spacing between dashes. -

The non-movement area boundary marking is used to delineate the movement areas under direct control by the airport traffic control tower from the non-movement areas that are not under their control.



## TAXIWAY CENTERLINE MARKING

- A single continuous yellow line with black borders on either side of the yellow line -

All taxiways regardless of their width have a surface painted taxiway centerline that provides pilots or ground vehicles visual guidance to permit taxiing along a designated path. On straight sections of a taxiway, the taxiway centerline is located along the physical centerline of the paved taxiway. On curved sections of taxiway, the taxiway centerline marking continues from the centerline marking of the straight portion of the taxiway along the curved centerline defined as the Radius of Taxiway.

The taxiway centerline marking of a taxiway remains continuous except when it intersects:

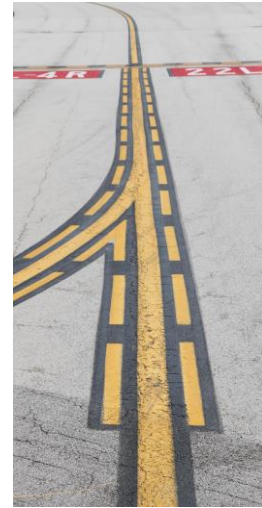
- 1) A runway holding position marking
- 2) An intermediate holding position marking
- 3) An ILS (Instrument Landing System) holding position marking
- 4) A non-movement area boundary marking



## **ENHANCED TAXIWAY CENTERLINE MARKING**

- A single continuous yellow line with two parallel lines of yellow dashes outlined in black on each side of the existing taxiway centerline extending 150 feet out from a runway holding position marking -

The enhanced taxiway centerline marking provides supplemental visual cues to alert pilots and ground vehicles of an upcoming runway holding position marking for minimizing the potential for runway incursions. This safety enhancement is **only** used on those taxiways that directly enter a runway.



## **TAXIWAY EDGE MARKINGS**

- A dual continuous or dashed yellow marking with black borders on either side of the yellow marking -

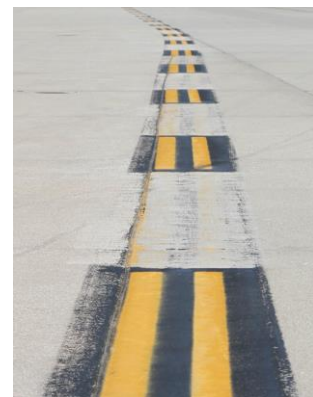
Taxiway edge markings are present whenever there is a need to separate the taxiway from a pavement that is not intended for aircraft use or to delineate the edge of the taxiway that is otherwise not clearly visible.

### **1) Continuous Taxiway Edge Markings –**

- A) Used to delineate the taxiway edge from the shoulder or some other contiguous paved surface that is not intended for use by pilots.
- B) Used to designate **NO-TAXI** islands.
- C) Continuous taxiway edge markings are never used in any operational situation that permits a pilot to cross this surface marking, for example, a taxi lane on a terminal or cargo apron.



### **2) Dashed Taxiway Edge Markings –** used where there is an operational need to define the edge(s) of a taxi route on or contiguous to a sizeable paved area that permits pilots to cross over this surface marking. A common application for this surface marking is a taxi route along the outer edge of a terminal apron or the edge of a hold pad.



## **GEOGRAPHIC POSITION MARKINGS**

- A 7-foot diameter pink circle with a black inscription surrounded by two 6-inch wide rings, one white and one black -

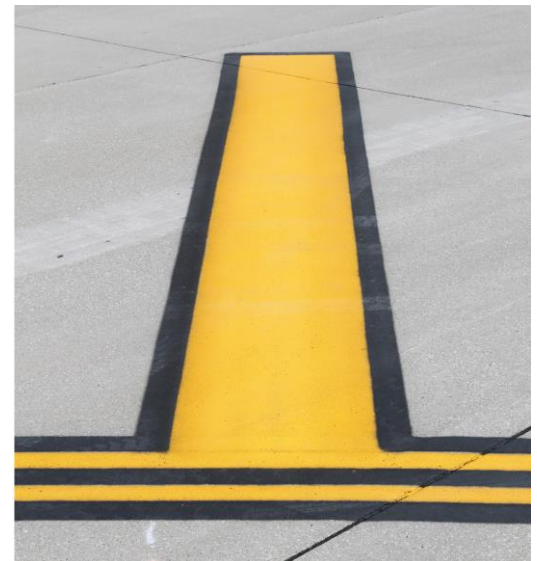
The geographic position marking (GPM) is used repeatedly along a designated taxi route to serve as an indicator of a location (*a spot*) so that pilots can confirm holding points or report their location while taxiing during periods of low-visibility operations. The GPM is designated with a black inscription that may be a single number or a number-plus-letter combination. The number used for the inscription must correspond to its sequential position along the SMGCS taxi route, i.e., 1, 2, 3, etc. The geographic position marking is **never** located at a runway holding position marking location that immediately enters the runway used for the departure.



## **TAXIWAY SHOULDER MARKINGS**

- A 3 foot wide single yellow stripe with black borders that start with the edge of the paved taxiway edge marking (painted over the black border) and extended to within 5 feet of the edge of the paved shoulder area painted using a perpendicular reference line draw from the taxiway centerline -

Aprons, hold pads, and taxiways are sometimes provided with paved shoulders to prevent ground erosion attributed to jet blast and water runoff or to minimize engine damage caused by foreign object debris. Although these shoulders are not intended for use by aircraft, conditions may exist along a taxi route that confuse pilots/ground vehicles and cause them to use the shoulders. For example, a particular taxiway curve with an extra-wide paved shoulder may confuse pilots as to which side of the painted taxiway edge marking stripe for their use. Where such conditions exist, the airport operator will paint taxiway shoulder markings to indicate the non-usable area to pilots.





## **SURFACE PAINTED TAXIWAY DIRECTION SIGNS**

- A rectangle consisting of a yellow background and black inscription that includes an arrow(s) oriented to show the approximate direction of a turn -

The surface painted taxiway direction sign is used with an arrow to provide directional guidance at an intersection when it is not possible to provide a taxiway direction sign. An exception is where operational experience had indicated that its presence at a troublesome taxiway intersection can assist flight crews or taxi mechanics in better ground navigation. The surface painted taxiway direction sign is co-located on the side of the taxiway centerline that aircraft travel – markings that indicate left turns are located on the left-hand side of the taxiway centerline while markings indicating right hand turns are located on the right-hand side of the taxiway centerline.



## **SURFACE PAINTED LOCATION SIGNS**

- A rectangle consisting of a black background and yellow inscription which includes a yellow border around the perimeter -

The surface painted taxiway location sign identifies the taxiway upon which the aircraft is located. This marking is used to supplement other signs located along the taxiway system where operational experience has indicated that its presence can assist flight crews or taxi mechanics in better ground navigation. The surface painted location signs are normally located on the right side of the taxiway centerline in the direction of travel.



## **RUNWAY HOLDING POSITION MARKINGS**

- Consist of a set of two continuous yellow lines, two dashed yellow lines, and three spaces outlined in black that are all parallel and run the width of the paved taxiway. The solid continuous lines are painted on the side where the aircraft or vehicles will hold, and the dashed lines are painted closer to the runway -

These hold position markings extend onto the shoulder to within 5 feet of the pavement edge or 25 feet onto the taxiway shoulders, whichever is longer. There are (3) three locations where runway holding position markings are encountered.

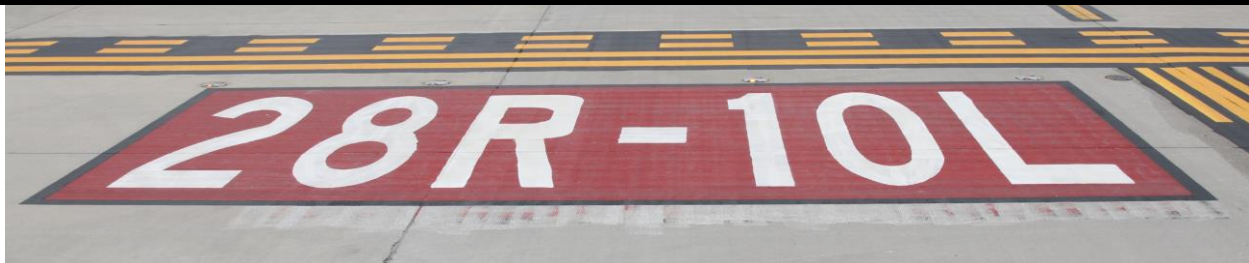
- 1) Runway holding position markings on taxiways that intersect runways
- 2) Taxiways located in runway approach areas.
- 3) Runway holding position markings on runways that intersect other runways when used for Simultaneous Operations on Intersecting Runways (SOIR) or Land and Hold Short Operations (LAHSO)



## **SURFACE PAINTED RUNWAY HOLDING POSITION SIGN**

- Consists of a white inscription with a red background, and is outlined in black -

This surface painted sign provides supplemental visual cues that alert pilots and ground vehicles of an upcoming holding position location and the associated runway designator(s) as another method to minimize the potential for a runway incursion.



## **ILS HOLDING POSTION MARKING**

- Consists of a set of two parallel yellow lines – perpendicular to the taxiway centerline – that are 2 feet wide and spaced 4 feet apart. These parallel lines are connected by perpendicular sets of two yellow lines that are 1 foot wide and spaced 1 foot apart and repeat every 10 feet – the entire marking is outlined in black -

ILS (Instrument Landing System) holding position marking 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 critical area. The intent of the marking is to protect the signal of the ILS navigational aid by identifying the holding position for CAT I (Category One) operations and protecting the approved TERPS (Terminal Instrument Procedures) for CAT II/III operations.



## **TAXIWAY/TAXIWAY INTERSECTION INTERMEDIATE HOLDING POSITION MARKING**

- Consists of a single dashed yellow line extending across the width of the taxiway outlined in black -

An intermediate holding position marking, for taxiway/taxiway intersections is used to support the operational need by the airport traffic control tower to manage taxiing aircraft through a congested intersection.



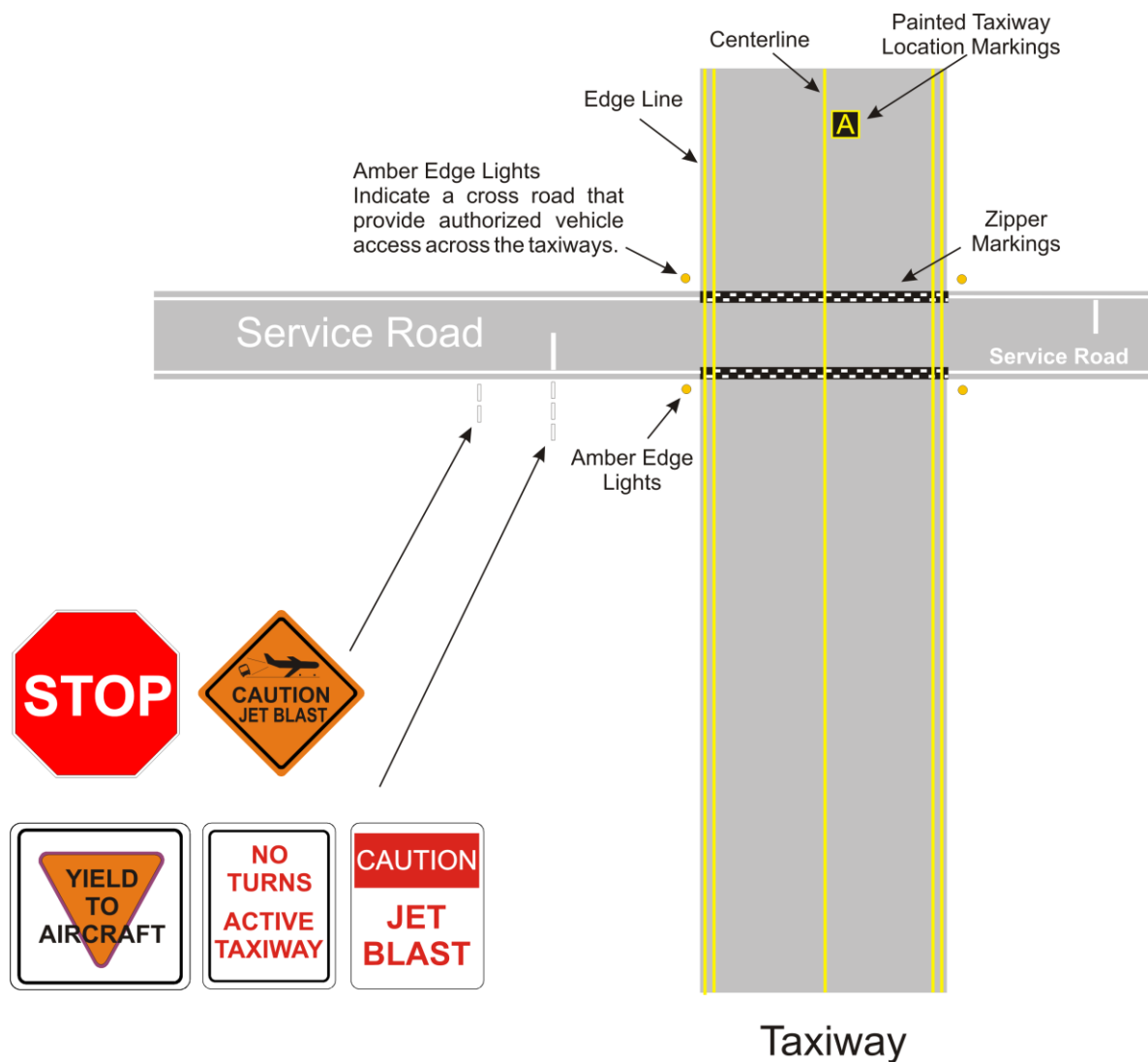
# ROADWAY MARKINGS

## ROADWAYS

Vehicle roadway markings may contain either a solid white line or zipper style markings to delineate each edge of the roadway, and a dashed yellow line to separate lanes within the edges of the roadway. Vehicle operators must obey all signs and traffic signals. Taxiways can only be crossed at service roads.

### REMEMBER!!

- 1) TAXIING AIRCRAFT ALWAYS HAVE THE RIGHT OF WAY
- 2) ALL PERSONS MUST IMMEDIATELY YIELD THE RIGHT-OF-WAY TO POLICE, AMBULANCE, FIRE DEPARTMENT, AND OPERATIONS VEHICLES. EMERGENCY VEHICLES WILL USE VISUAL AND/OR AUDIBLE SIGNALS.





## **RUNWAY SAFETY AREA SIGNS**

For vehicle service roads that enter or intersect a runway and/or a runway safety area, a retroreflective runway holding position roadway sign must be installed to help vehicle operators maintain their situational awareness when approaching runways and provide a visual reference to aid in identifying the runways. The runway designations must be arranged to indicate the direction to the corresponding runway threshold. These signs are often located on the left side for the driver of a ground vehicle to see, but may also be located on the right side.



## **TAXIWAY OBSTRUCTION FREE AREA PAVEMENT MARKINGS FOR B747-8 & A380-800**

The airport must protect for the wingtips of the new large aircraft (NLA), that fly into ORD. This is called the Taxiway Object Free Area (TOFA). Currently this is the B747-8, with the A380-800 anticipated soon. Existing infrastructure on the airport that are not able to be moved or altered to meet the current TOFA standard will control objects from being on the pavement abeam these NLA. To notify drivers to remain clear of these areas red stripes are painted on the pavement. When approaching the red stripes if you see a B747-8 or A380-800 you are to remain clear of the area. If you are not sure if the aircraft is a B747-8 or A380-800 then you are to remain clear of the area. When able, you are to pass through the area completely without stopping. There is no stopping, standing, or parking in the red striped areas. These areas can currently be found at but not limited to:

- East of Twy B between Twy A21 and the Twy B bridge in the snow melter pad adjacent to Gate M1
- Along the main service road East of Twy V4
- Along the South shoulder of the East/West Snow Road
- Along the service road North of Twy V East of TWY V7
- Along the service road Northwest of Twy S1 and Southeast of Twy S2



There are other sections on the airport that are painted with red stripes that look identical to the Taxiway Object Free Area marking mentioned above. They are painted in this manner because you will be traversing through an ILS (Instrument Landing System) area and there is no stopping, standing, or parking in those red striped areas either. These areas can currently be found at but not limited to:

- On the service road that transverses the Runway 4R Approach (between Post 3 & Post 5A).
- On the Restricted Access Road (North Perimeter Road) along side the Runway 27R Approach Glideslope.

# AIRFIELD SIGNS



# RUNWAY AND TAXIWAY GUIDANCE SIGNS

A properly designed and standardized taxiway guidance sign system is an essential component of a surface movement guidance control system. This is necessary for the safe and efficient operation of an airport.

The sign should include the following:

- \* Provide the ability to easily determine the designation or name of any taxiway on which the aircraft is located.
- \* Readily identify routes toward a desired destination.
- \* Indicate mandatory holding positions.
- \* Identify boundaries for approach areas, ILS (Instrument Landing System) critical areas, and (runway safety areas/obstacle free zones (RSA/OFZ).)

There are nine (9) types of signs installed on airfields: mandatory instruction signs, location signs, boundary signs, direction signs, taxiway end marker, destination signs, information signs and runway distance remaining signs, and vehicle roadway signs. This section is a review of AC 150/5340-18F (Standards for Airport Sign Systems). This Advisory Circular contains the FAA standards for the location and installation of signs on airport runways and taxiways.

## GENERAL INFORMATION ON TAXIWAY DESIGNATIONS

The first step in designing a taxiway guidance sign system is to develop a simple and logical method for designating taxiways. The following general guidelines should be followed:

- A.** Keep it simple and logical.
- B.** Use letters of the alphabet for designating taxiways. Optimally, designation of the taxiways should start at one end of the airport and continue to the opposite end, optimally, designation of the taxiways e.g., east to west or north to south.
- C.** Where there are more taxiways than letters of the alphabet, double letters such as "AA" may be used. However, this nomenclature can be confusing when used in pilot/controller communications. Consider using alphanumeric designations such as "A2."
- (1)** An exception is permitted for a major taxiway having numerous stub exits, such as a taxiway parallel to a runway or a taxiway adjacent to a ramp area. In such instances, the short taxiways could be designated "A4," "A5," "A6," etc.
- (2)** Numbers alone and the letters "I" and "O" are not used because they could be mistaken for a runway number.
- (3)** The letter "X" is not used because a sign with an "X" could be misconstrued as indicating a closed taxiway.



(4) Number and letter combinations should not result in confusion that might allow a taxiway designation to be mistaken for that of a runway. For example, if an airport has a runway "4L," a taxiway designation of "L4" should not be used.

D. Designate all separate, distinct taxiway segments.

E. Ensure no separate, distinct taxiway has the same designation as any other taxiway.

### MANDATORY INSTRUCTION SIGNS

- Mandatory instruction signs have a white inscription with a black outline on a red background

\*\*\*\*\*  
\*\*\*\*\*  
**NO EXCEPTIONS**  
\*\*\*\*\*  
\*\*\*\*\*

### TAXIWAY/RUNWAY INTERSECTION

This sign is located at the holding position on taxiways that intersect a runway, or on runways that intersect other runways. Holding position signs are used in conjunction with runway hold position markings.

The inscription on a holding position sign at a taxiway/runway intersection is the runway number(s), such as "28R-10L". The runway numbers are separated by a dash, and their arrangement indicates the direction to the corresponding runway threshold. For example, "27L-9R" indicates that the threshold for runway "27L" is to the left and the threshold for runway "9R" is to the right. The sign at each runway end contains the inscription only for the takeoff runway, for example runway "4R" while all other signs contain both runway designation numbers. **However, both runway designation numbers should be used on signs at runway ends where there is an operational need, such as where a taxiway crosses the runway at the runway end.** Arrows are used on holding position signs only if necessary to clarify the orientation of runways at the intersection of a taxiway with more than one runway.



## **RUNWAY/RUNWAY INTERSECTION**

Holding position signs are used to identify runway/runway intersections and are identical to the signs used for taxiway/runway intersections.



## **INSTRUMENT LANDING SYSTEM (ILS) CRITICAL AREAS**

In poor weather or low visibility conditions, when an Instrument Landing System is being used, it may be necessary to hold an aircraft on a taxiway at a location other than the normal holding position location for the runway. This is to protect the Localizer or Glide Slope Critical Area surface from an aircraft moving through or stopping in this area which can be considered a runway incursion when the ceilings are at or below 800 feet Above Ground Level (AGL). The presence of an aircraft or vehicle in an ILS (Instrument Landing System) Critical Area when the ceiling is at or below 800 feet AGL and/or visibility is 2 statute miles or less - is considered an improper presence on a protected surface and therefore possibly a runway incursion.



The inscription on a sign to indicate either the holding position for the ILS Critical Area or the POFZ (Precision Obstacle Free Zone) boundary is the same — the abbreviation "ILS".

## **NO ENTRY AREAS**

This sign indicates that entry into a particular area is prohibited to aircraft and is installed on the left side as seen by the pilot approaching the prohibited area. In some pavement configurations, it may be necessary to install the sign on the right side, or both the left and right sides.



## **RUNWAY APPROACH AREAS**

At some airports, it is necessary to hold an aircraft on a taxiway located in the approach or departure area of a runway so that the aircraft does not interfere with the operations on that runway.

The inscription on a sign for a runway approach area is the associated runway designation followed by a dash and the abbreviation "APCH". The sign is installed on taxiways located in approach areas where an aircraft on a taxiway would either cross through the RSA (Runway Safety Area) or penetrate the airspace required for the approach or departure runway (including clearway).



## **CAT II/III OPERATIONS AREAS**

This sign is used on taxiways that intersect or are parallel to runways that are used in poor weather or low visibility conditions with precision approach minimums less than CAT I ILS(Category One Instrument Landing System), and indicate where an aircraft or vehicle is to hold to ensure proper aircraft separation in these conditions.

The inscription on a holding position sign for CAT II/III operations is the associated runway designation followed by a dash and the abbreviation “CAT II/III” for Category II/III operations.



## **RUNWAY SAFETY AREA HOLDING POSITION SIGNS**

This sign is used when one runway intersects with the protected surfaces around the pavement of another runway. This protected area around a runway is known as a runway safety area (RSA), it is the surrounding surface around a runway that is suitable for an aircraft in the event of an unintentional departure from the runway pavement. Unless otherwise noted these areas are 250ft in width on either side of the runway centerline and 1,000ft beyond each runway threshold. Currently at O'Hare holding position signs used to identify runway safety area intersections are identical to the signs used for taxiway/runway intersections.

Examples:

1. RWY 4R/22L and RWY 10L/28R
2. RWY 10R/28L and TWY Y

## **DIRECTIONAL SIGNS**

- Have a yellow background with a black inscription –

The inscription identifies the designation of the intersecting taxiway(s) leading out of an intersection. Each designation is accompanied by an arrow indicating the direction of the turn.





## LOCATION SIGNS

- A location sign has a yellow inscription with a yellow border on a black background. The yellow border must be set in from the inner edge of the sign to yield a continuous black margin -

Location signs identify the taxiway or runway upon which the aircraft/ground vehicle is located.

→→→→→ **Location signs do not contain arrows** ←←←←←

### **TAXIWAY LOCATION SIGN**

- Installed along taxiways, either by themselves or in conjunction with direction signs.



### **RUNWAY LOCATION SIGN**

The inscription is the designation of the runway on which the aircraft/ground vehicle is located. This sign is installed on runways where the proximity of two runways could create confusion for pilots/ground vehicles and/or at runway/taxiway intersections used for intersection takeoffs to verify runway taken prior to departure. **This sign only contains the runway designation for the one runway end.**



### **RUNWAY APPROACH BOUNDARY SIGN**

- This sign has a yellow background with a black inscription with a graphic depicting the pavement holding position marking -

This sign faces the runway and is visible to the pilot/ground vehicles exiting the runway. This is intended to provide pilots/ground vehicles with a visual cue, to use as a guide in determining when they are "clear of the runway". The sign is typically used at controlled airports and is located on taxiways where an aircraft is required to stop upon exiting the runway.



## **ILS CRITICAL AREA/POFZ BOUNDARY AND CAT II/III OPERATIONS SIGN**

- This sign has a yellow background with a black inscription with a graphic depicting the ILS pavement holding position marking –

This sign identifies either the boundary of the ILS (Instrument Landing System) critical area, or the POFZ (Precision Obstacle Free Zone), or the holding position area for CAT II/III (Category Two/Three) operations. The sign is located adjacent to the ILS holding position marking on the pavement and can be seen by pilots leaving the critical area. This sign is another visual cue for determining when pilots are "clear of the ILS critical area".



## **RUNWAY DISTANCE REMAINING SIGN**

- These signs have a black background with a white numerical inscription and may be installed along one or both side(s) of the runway –

The most economical installation consists of double-faced signs located on runway. The signs should be placed on the left side of the runway as viewed from the most often used direction. The number indicates the distance (in thousands of feet) of landing surface remaining. The last sign will be located at least 950 feet from the runway end.



## **TAXIWAY END MARKER**

- The sign consists of an alternating yellow/black stripe inscription at a 45 degree angle –

A taxiway ending marker sign indicates that a taxiway does not continue beyond an intersection.



## DESTINATION SIGNS

- These signs have a black inscription on a yellow background and always contains an arrow -

These signs always have an arrow showing the direction of the taxiing route to that destination. These signs should be located prior to the intersection if a turn is involved. Destination signs contain information for: runways, taxiways, aprons, terminals, cargo areas, general aviation, etc.



## INFORMATION SIGNS

- An information sign has a black inscription on a yellow background -

They are used to provide the pilot/ground vehicles with information on such things as areas that cannot be seen from the control tower, applicable radio frequencies, noise abatement procedures, and other specialized information. These signs do not have to be lighted, but usually are at O'Hare International Airport (ORD).





# AIRFIELD LIGHTING



# AIRFIELD LIGHTING

## RUNWAY EDGE LIGHTS

- Predominantly white / last 2,000 feet amber colored -

Runway edge lights are elevated or in surface lights (where hyspeed exit taxiways or intersecting runways prevent elevated lights) that run the length of the runway on either side; and have a prescribed angle of emission used to define the edge of a runway. Runway lights are uniformly spaced at intervals of approximately 200 feet. ORD has a bi-directional HIRLS (High Intensity Runway Lighting System). All runways have a 5 step light intensity system, controlled remotely by the Air Traffic Control Tower (ATCT) & electrical vaults.

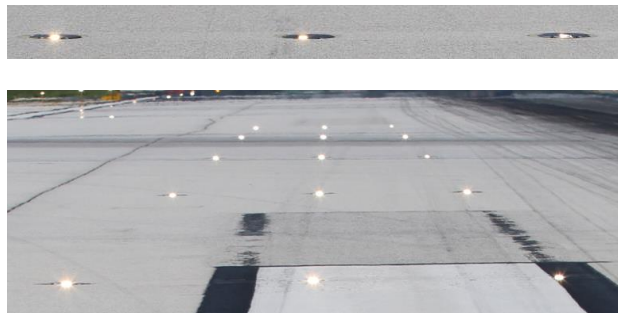


**\* NOTE \* Can be used for distance remaining information**

## TOUCHDOWN ZONE LIGHTING

- All lights are white –

Touchdown zone lights consist of 2 rows of transverse light bars located symmetrically about the runway centerline. Each light bar consists of 3 unidirectional lights facing the landing threshold. The rows of light bars extend to 3,000 feet from the threshold with the first light bars located 100 feet from the threshold.



## RUNWAY CENTERLINE LIGHTING

- Centerline lights are predominantly white except the last 3000 feet. The last 3,000 feet of the runway centerline lights are color coded to warn pilots/ground vehicles of the impending runway end. Alternating red and white lights are installed, starting with red from 3,000 feet to 1,000 feet, and red lights are installed in the last 1,000 feet of the runway –

The lights are located along the runway centerline at 50 foot equally spaced intervals.



**\* NOTE \* Can be used for distance remaining information**



## **THRESHOLD / RUNWAY END LIGHTS**

- Threshold lights emit green light outward from the runway, and emit red light toward the runway to mark the ends of the runway –

Fixed lights arranged symmetrically left and right of the runway centerline. The green lights indicate the landing threshold to arriving aircraft and the red lights indicate the end of the runway for departing aircraft/ground vehicles. The red and green lights are usually combined into one fixture and special lenses or filters are used to emit the desired light in the appropriate direction.



## **TAXIWAY CENTERLINE LIGHTING SYSTEM**

### **TAXIWAY CENTERLINE LIGHTS**

- Consists of unidirectional or bidirectional in pavement steady burning green lights installed parallel to the centerline of the taxiway -

Taxiway centerline lights provide additional taxi guidance between the runway and apron areas.



### **TAXIWAY LEAD-ON/LEAD-OFF LIGHTS**

- Consist of steady burning green/yellow lights -

Lead-off lights provide visual guidance to persons exiting the runway and are color-coded to warn pilots and ground vehicles that they are within the runway environment or instrument landing system (ILS) critical area. Alternate green and yellow lights are installed from the runway centerline (beginning with a green light) to one centerline light position beyond the runway hold or ILS critical area hold position ending with a yellow light. The fixture used prior to the runway hold or ILS critical area position must always be bidirectional: green when approached from the taxi direction and yellow when approached from the runway direction. For acute-angled exits, taxiway centerline lead-off lights begin 200 feet prior to the point of curvature of the designated taxiway path.

Lead-on lights provide visual guidance to pilots and ground vehicles entering the runway. They are the same yellow/green color pattern as lead-off lights to warn pilots and vehicle drivers that they are within the runway environment or ILS critical area.

## LAND AND HOLD SHORT LIGHTS (LAHSO)

- A row of six (6) high intensity white pulsating – in unison – lights installed across the runway –

Land and hold short lighting systems are installed to indicate the location of hold-short points on runways approved for land and hold short operations (LAHSO) - used in conjunction with LAHSO hold short markings and signs.



## TAXIWAY EDGE LIGHTS

- The taxiway edge lights emit blue light. Fixtures in the edge lighting system are located in a line parallel to the taxiway centerline not more than 10 feet outward from the edge of the full strength pavement –

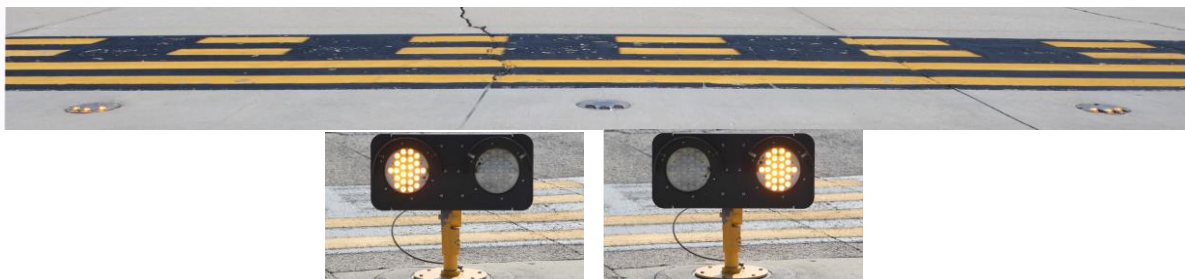
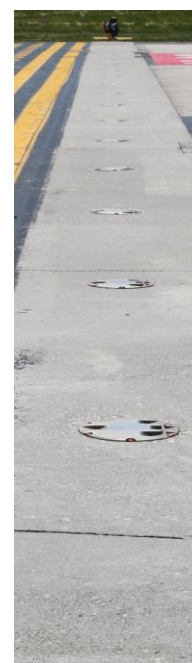
**\*\*\*\*\* EXCEPTION \*\*\*\*\*** amber lights are used where a vehicle roadway intersects with a taxiway.



## RUNWAY GUARD LIGHTS (RGL's)

- Elevated RGL's consists of two alternately illuminated, unidirectional yellow lights collocated with the runway holding position marking and are normally installed on each side of the taxiway. In-pavement RGLs consist of a row of alternately illuminated, unidirectional yellow lights centered on an imaginary line that is parallel to, and 2 feet in front of the holding side of the runway holding position marking –

Runway Guard Lights (RGLs) provide a visual indication to anyone approaching the runway holding position that they are about to enter an active runway. Elevated and in-pavement RGLs serve the same purpose. If snow could obscure in-pavement RGLs, the pavement width exceeds 150 feet, or there is an acute angle between the holding position and the direction of approach to the holding position, it may be advantageous to supplement in-pavement RGLs with elevated RGLs.





## **STOP BARS**



- A stop bar consists of a row of unidirectional in-pavement red lights and an elevated red light on each side of the taxiway –

Stop bars provide a distinctive "stop" signal to anyone approaching a runway. In-pavement stop bar lights are spaced across the entire taxiway and are centered on an imaginary line which is parallel to, and 2 feet from, the center of the fixture and the holding side of the runway holding position marking.



## **OBSTRUCTION LIGHTS**

- Consists of steady burning red lights

Obstruction lights are installed on all structures that present a hazard to air traffic to warn pilots of obstructions during hours of darkness and during periods of limited daytime visibility. An obstruction's height, size, shape, and the area in which it is located determine the position of lights on the obstruction and the number of lights required to adequately light the obstruction to assure visibility of such lighting from an aircraft at any angle of approach.



## **WIND CONES**

- Consist of an orange cone that is lighted during night time hours of operation. The wind cone must be located near the runway end so that pilots have an unobstructed view during either landing or takeoff operations. The preferred location is on the left side of the runway when viewed from a landing aircraft. However, it may be located on the right side of the runway in which conditions exist that preclude its installation on the left side -

Wind cones are intended to provide wind direction information to pilots or taxi mechanics.



## **AIRPORT ROTATING BEACON**

**- For civil land airfields only, airport rotating beacons project a beam of light in two directions, 180 degrees apart. The optical system consists of one green lens and one clear lens -**

The rotating mechanism is designed to rotate the beacon to produce alternate clear and green flashes of light with a flash rate of 24-30 flashes per minute. The main purpose of the beacon is to indicate the location of a lighted airport, and a rotating beacon is an integral part of an airfield lighting system.



# RUNWAY STATUS LIGHTS

Runway Status Lights tell pilots and vehicle operators to stop when runways are not safe. Embedded in the pavement of runways and taxiways, the lights automatically turn red when other traffic makes it dangerous to enter, cross, or begin takeoff.

## RUNWAY ENTRANCE LIGHTS

The Runway Entrance Lights (RELs) system is composed of in-pavement fixtures that are focused along the taxiway centerline and directed toward the hold line. When activated, these lights turn on red to indicate that there is high speed traffic on the runway or there is an aircraft on final approach. When it is safe to cross the runway hold bar or the system is not activated no lights will be illuminated.

- Runway Entrance Lights (RELs) are set up with the first light at the hold line followed by evenly spaced lights to the runway edge; and one additional light at the runway centerline that is in line with the last two lights before the runway edge.



## TAKEOFF HOLD LIGHTS

The Takeoff Hold Lights (THLs) system is composed of in-pavement fixtures in a double row aligned on either side of the runway centerline lighting. Fixtures are focused toward the arrival end of the runway at the "line up and wait" point and extend for 1,500 feet in front of the holding aircraft. Illuminated red lights provide a signal, to an aircraft in position for takeoff or rolling, that it is unsafe to takeoff because the runway is occupied or about to be occupied by another aircraft or ground vehicle.



# **RUNWAY STATUS LIGHTS VEHICLE PROCEDURES**

- Whenever a vehicle operator observes the red Runway Entrance Lights (RELs) illuminated, that operator will stop at the runway hold position marking and remain stopped.
- Vehicle operators may observe several cycles of the Runway Entrance Lights (RELs) turning on and off while waiting for an Air Traffic Control clearance.
- **DO NOT** proceed when the Runway Entrance Lights (RELs) have extinguished without an Air Traffic Control clearance. Runway Status Lights verify an Air Traffic Control clearance it **DOES NOT** substitute for an Air Traffic Control clearance.
- If an Air Traffic Control clearance is in conflict with the Runway Entrance Lights (RELs) - **DO NOT CROSS OVER THE RED LIGHTS**. Contact Air Traffic Control and advise that you are stopped due to red lights.
  - ex.: "Tower, City XXX is holding short of Runway 28 Right at taxiway Yankee due to red lights."
- If the vehicle is entering the runway (past the runway hold position marking) and the Runway Entrance Lights (RELs) illuminate - the vehicle should clear the runway immediately and notify the Air Traffic Control Tower.

## **ATCT LIGHT GUN SIGNALS**

### **PURPOSE & PROCEDURE**

The primary use of the light gun is to convey instructions when radio communications cannot be conducted due to an equipment malfunction. Personnel and individuals operating vehicles and equipment on airport movement areas should understand the meanings of light gun signals and use extreme caution and vigilance to prevent inadvertently following light gun signals intended for aircraft. **Personnel should always look in all directions before proceeding onto runways and movement areas used by aircraft.**

### **\*NOTE\***

**You may not notice the ATCT pointing the light gun in your direction unless you are looking in the direction of the ATCT.**

COLOR AND TYPE OF SIGNAL	MEANING	
	VEHICLES, EQUIPMENT, AND PERSONNEL	AIRCRAFT ON GROUND
Steady Green	Cleared to cross, proceed to go	Cleared for takeoff
Flashing Green	N/A	Cleared to taxi
<b>Steady Red</b>	<b>STOP</b>	STOP
Flashing Red	Clear the taxiway or runway	Taxi clear of runway in use
Flashing White	Return to starting point on airport	
Alternating Red & Green	Exercise extreme caution	

# FAA NAVIGATIONAL AIDS (NAVAIDS)

Automation and instrument landing techniques have become the primary means of enhancing the safety and efficiency of air transportation. The FAA has the statutory authority to establish, operate, and maintain navigational facilities and to prescribe standards for the operation of any of these aids which are used for instrument flight in federally controlled airspace. The Technical Operations (Tech Ops) - of the FAA, maintains all of the NAVAIDS at O'Hare International Airport (ORD). These Nav aids include both visual aids like the Approach Lighting Systems (ALS) and Visual Glideslope Indicator Systems as well as aids utilizing radio signals.

When driving near radio navigational aids, stay out of the protected areas around them to avoid interfering with their signals. If a road or taxiway is close enough to an ILS to affect it, there should be an ILS holding position sign like the one mentioned earlier.

## VISUAL AIDS TO NAVIGATION:

### APPROACH LIGHT SYSTEM

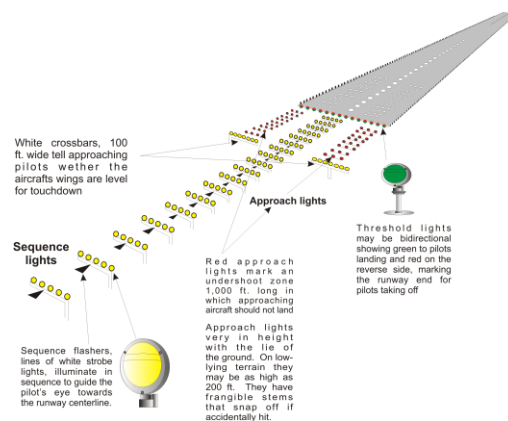
Approach Light Systems (ALS) provide the basic means to transition from instrument flight to visual flight for landing. Operational requirements dictate the sophistication and configuration of the approach light system for a particular runway.

**ALSF-2** Approach light systems with sequenced flashing lights in ILS CAT II/III configurations.

Runways: 9L / 10L / 10C / 10R / 27L / 27R / 28L / 28C / 28R

**MALSR** Medium-intensity Approach Lighting System that provides a visual lighting path for landing aircraft. The MALSR system usually is a 2,400-foot-long array of lights but can be shorter depending on local terrain and installed for use on:

Runways: 4R / 9R / 22L / 22R



### FAA THRESHOLD LIGHTS

- Green in pavement or elevated lights along the threshold of the runway -

FAA threshold lights identify the approach end of the runway.



## **VISUAL GLIDSLOPE INDICATOR SYSTEM**

### **PRECISION APPROACH PATH INDICATORS (PAPI'S)**

The Precision Approach Path Indicator (PAPI) is a light system positioned alongside the runway that consists of either two or four light arrays that provide a visual indication of an airplane's position on the glide-path for the associated runway. At O'Hare International Airport (ORD), the four light fixture setup is used.



## **ELECTRONIC RADIO SIGNAL AIDS TO NAVIGATION:**

### **INSTRUMENT LANDING SYSTEM (ILS)**

It is designed to provide an approach path for exact alignment and descent of aircraft on final approach to a runway. The system is divided functionally into three parts:

- Guidance Information**
1. Localizer for horizontal guidance or azimuth
  2. Glideslope for vertical guidance
  3. Range info from Runway threshold

**Range Information**      Provided via Marker Beacons and/or Distance Measuring Equipment (DME)

### **LOCALIZER**

The localizer provides horizontal guidance or azimuth to the runway. The localizer antenna is located in a fixed position at the opposite end of the runway approach.





## GLIDESLOPE

The glideslope provides vertical guidance to the runway. The glideslope antenna is located on either side of the runway, approximately 1,000 feet down the runway from the approach .



## DVOR/DME

DVOR/DME equipments are each part of the rho-theta air navigation system. The rho (distance from the facility) is supplied by the DME and the theta (azimuth bearing from magnetic north) is supplied by the VOR/DVOR – At ORD this equipment is used to provide non-precision approach guidance to the ends of runways.



## DME

The DME is a terminal area or enroute navigation facility that provides the pilot with a direct readout indication of aircraft distance from the identified DME. Distance Measuring Equipment (DMEs) may be installed as an ancillary aid to the Instrument Landing System (ILS.) The DME is usually co-located at the localizer (LOC) when used as a component of the ILS. DME provides pilots with a slant range measurement of distance to the runway in nautical miles. It can be co-located with a VHF Omnidirectional Range (VOR) and/or a LOC shelter.





## LOW-LEVEL WINDSHEAR ALERT SYSTEM (LLWAS)

Low-Level Windshear Alert System (LLWAS) is a network of towered sensors that detect low-level wind shear in runway corridors. It is ground-based, giving visual and audio alerts in numerical and/or graphical formats to ATC which then alert pilots.

A **Low Level Windshear Alert System** (LLWAS) measures wind speed and direction at remote sensor station sites situated around an airport.

The remote sensor data received is transmitted to a master station, which generates warnings when windshear or microburst conditions are detected. Current wind speed and direction data and warnings are displayed for approach controllers in the Terminal Radar Approach Control Facility (TRACON) and for controllers in the Air Traffic Control Tower (ATCT).

Air Traffic Controllers (ATCs) relay the LLWAS runway specific alerts to pilots via voice radio communication. LLWAS alerts assist pilots during critical phases of flight when they must determine whether to attempt to land or take off in hazardous weather conditions.



# AIR TRAFFIC CONTROL RADIO PHRASEOLOGY

When communicating with the Air Traffic Control Tower (ATCT) via tower radio, **all personnel will use the following correct phraseology:**

**Abeam** - An aircraft is "abeam" a fix, point, or object when that fix, point or object is approximately 90 degrees to the right or left of the aircraft track. Abeam indicates a general position rather than a precise point.

**Abort** -To terminate a preplanned aircraft maneuver, e.g., an aborted takeoff.

**Acknowledge** - Let me know you have **received and understand** this message.

**Advise Intentions** - State your plans.

**Affirmative** - Yes.

**Correction** - I made a mistake.

**Final** - An aircraft is on the final approach course or is aligned with a landing area.

**Go ahead** - State your request **(DOES NOT MEAN PROCEED!)**.

**Go around** - Instructions for a pilot to abort his approach to landing.

**Hold** - Stop where you are.

**Hold short of ...** - Proceed to, but stop prior to the point specified.

**Line up and wait** - The words "line up and wait" have replaced "position and hold" in directing a pilot to taxi onto a runway and await takeoff clearance.

**Negative** – No; or permission **NOT** granted; or that is **NOT** correct.

**Over** - My transmission is ended and I expect a response from you.

**Proceed** – **(1) Used on initial contact to advise the ATCT that you want to drive from point A to point B. (2) When ATCT responds to initial contact, you are authorized to begin or continue moving.**

**Read back** - Repeat the instructions you have.

**Roger** - I have received all of your last transmission **(THIS IS NOT INTERCHANGABLE WITH AFFIRMATIVE OR NEGATIVE.)**

**Say again** - Repeat what you just said.

**Standby** - The controller or pilot must pause for a few seconds. If a delay is lengthy, the caller should reestablish contact.

**Unable** - I can't do it.

**Verify** - Request confirmation of instruction or transmit correct information.

# ATCT RADIO COMMUNICATION PROCEDURES

## CONFIRMATION OF AIR TRAFFIC CONTROL TOWER (ATCT)/GROUND VEHICLE RADIO PROCEDURES

1. Use the correct radio frequency, depending on location and situation.

4R-22L Local	120.75	North Local	126.90
10C-28C Local	120.75	9L-27R Local	128.15
10L-28R Local	132.70/120.75	9C-27C Local	121.15
10R-28L Local	133.00	GC North Tower	124.125
Outbound Ground	121.75	ATIS	135.40
GC North of 10L/28R	121.90	"YY" Roller Gates	122.90
GC South of 10C/28C	118.05	<b>Emergency</b>	<b>119.25</b>
		<b>Utility Local</b>	<b>127.925</b>

## EFFECTIVE COMMUNICATION

When contacting the air traffic controller in the tower for access to proceed on a runway or when crossing a runway:

### **BEFORE INITIAL CONTACT**

- 1) Prepare yourself
- 2) Listen on frequency to ensure you are on the proper frequency
- 3) Know where you are, where you want to go, and what you want to do
- 4) Listen for a break in radio traffic, and transmit your initial contact.

### **INITIAL CONTACT**

- 1) Identify who you are calling
- 2) State your call sign
- 3) Your Location
- 4) Your Intentions – as brief as possible - including direction of travel when trans versing a runway.
- 5) Reason for your request

## CHANGES TO ATC RADIO COMMUNICATION PROCEDURES

1. The common use of the term "**to drive**" will be replaced by "**to proceed**"
2. When a vehicle contacts the ATCT to cross a runway they are to say the runway as it being used by the ATCT.
3. When you request to proceed on a runway, you must state which end you are at, and which direction you want to go, regardless of the runway direction being used.
4. The use of the approved FAA Terms "Wilco", "Copy" or "Roger" will be discouraged unless a clear understanding between the Driver/Taxi Mechanic and the ATCT is had to the intent and direction of the activity.
5. The Driver must give a FULL READ BACK of what the ATC states; or correct the read back if the intent is misunderstood.

### EXAMPLES:

#### RUNWAY CROSSING

##### RUNWAYS IN USE: 22L, 27L, 27R, 28C, 28R

Driver Transmission – "Tower, City 50, on Taxiway Mike to cross Runway 27L."

*ATC Transmission – "City 50 cross Runway 27L on Twy Mike, report clear."*

Driver transmission – "Tower, City 50 crossing Runway 27L on Twy Mike, will report clear."

Driver transmission – "Tower, City 50 clear of Runway 27L on Taxiway Mike."

#### RUNWAY CROSSING WITH HOLD SHORT INSTRUCTIONS

##### RUNWAYS IN USE: 9L, 9R, 10R, 10C, 10L

Driver Transmission – "Tower, City 876, on Taxiway Tango to cross Runway 10L."

*ATC Transmission – "City 876, hold short Runway 10L on for landing traffic."*

Driver transmission – "Tower, City 876 holding short Runway 10L."

*ATC Transmission – "City 876, traffic clears downfield, cross Runway 10L on Taxiway Tango, report clear."*

Driver transmission – "Tower, City 876 crossing Runway 10L on Taxiway Tango, will report clear."

Driver transmission – "Tower, City 876 clear of Runway 10L on Taxiway Tango."

## RUNWAY USAGE FROM OPPOSITE END WITH ERROR

### RUNWAYS IN USE: 9L, 9R, 10R, 10C, 10L

Driver Transmission – “Tower, City 40, on Taxiway Yankee to proceed onto Runway 28R westbound for inspection.”

*ATC Transmission – “City 40 hold short Runway 28R on Taxiway Yankee for departing traffic.”*

Driver transmission – “Tower, City 40 holding short Runway 28R on Taxiway Yankee.”

*ATC Transmission – “City 840 proceed onto Runway 28R from Taxiway Yankee, report clear.”*

Driver transmission – “Tower, City Four-Zero proceeding onto Runway 28R from Taxiway Yankee, will report clear.”

*ATC Transmission – “Correction, City 40, Thank you.”*

Driver transmission – “Tower, City 40 clear of Runway 28R on Taxiway AA.

## RUNWAY USAGE FROM OPPOSITE END

### RUNWAYS IN USE: 9L, 9R, 10R, 10C, 10L

Driver Transmission – “Tower, City 719, on Taxiway Whiskey 3 to proceed onto Runway 28L, westbound to retrieve an edge light.”

*ATC Transmission – “City 719 proceed onto Runway 28L from Taxiway Whiskey 3, report clear.”*

Driver transmission – “Tower, City 719 proceeding onto Runway 28L from Taxiway Whiskey 3, will report clear.”

Driver transmission – “Tower, City 719 stopping on Runway 28L momentarily just short of Taxiway W1.

*ATC Transmission – “City 719, Roger.*

Driver transmission – “Tower, City 719 proceeding on Runway 28L, will report clear.

Driver transmission – “Tower, City 719 clear of Runway 28L.

**THE SINGLE MOST IMPORTANT PART IN EFFECTIVE  
COMMUNICATION IS *UNDERSTANDING* WHAT WAS MEANT.**

# IMPORTANT THINGS TO REMEMBER

- Use standard phraseology in order to facilitate clear and concise communication.
- Be brief.
- Don't be intimidated by ATC or congested frequencies.
- If you need help – ASK!
- If you are lost – Advise Immediately.
- During an emergency or snow removal, multiple airport vehicles may be crossing a specific runway at multiple different points along that runway. It is important that you don't use a clearance from the tower intended for someone else, or acknowledge someone else's clearance.
- Be ready for instructions **OTHER THAN WHAT YOUR EXPECTING.**
- Always Proceed with caution
- Any time you are around aircraft and driving a vehicle or towing/taxing an aircraft:
  - Avoid complacency; concentrate on the tasks at hand.
  - Maintain situational awareness at all times, know your location on the airport surface.
  - Maintain and practice professionalism by utilizing standard radio phraseology and frequency discipline.
- There is one location on the airport where the runways do not physically intersect another runway, but are so close in proximity that the Runway Safety Area (RSA) of one runway intersects / overlays the other runway. The physical runway surfaces as well as the RSA are protected for landing and departing aircraft. Driving through these two areas must be coordinated with air traffic control. The two locations at O'Hare International Airport (ORD) are:
  1. Departing from Runway 10L East bound - the 1000 foot Runway 10L RSA would pass through Runway 22L.
  2. Special phraseology is used with the air traffic controller to cross or drive through these safety areas.
  3. It is important to follow this phraseology so you do not confuse the controller or use a phrase that might confuse a pilot on short final making him think that you are crossing the runway he/she has been cleared to land or depart on right in front of him/her
- When driving on the airfield and accessing runways, the following procedures should be followed under normal circumstances. Additional radio contact/permission with the ATCT may be needed since each situation is different.
- When the ATCT gives you clearance to proceed onto or across the active runway, be sure to **repeat the entire message that Air Traffic Control has given you.**
- When you receive ATC clearance and are proceeding on a runway that crosses an intersecting runway, your ATCT clearance is only good to cross that intersecting runway **ONCE**. After you initially cross the intersecting runway, you are required to call ATC for any additional crossing of that intersection.
- When exiting the runway or runways, call ATC to report you are clear of all runways

**USE SERVICE ROADS WHENEVER POSSIBLE TO AVOID MOVEMENT AREA ENCROUCHMENT.**

**WHEN DRIVING ON THE AIRFIELD, ALL VEHICLES MUST FOLLOW THE TRAFFIC PAVEMENT MARKINGS, SPEED LIMITS, AND OTHER TRAFFIC REGULATIONS. WHENEVER POSSIBLE, USE OF THE SERVICE ROAD IS PREFERRED, EVEN IF THIS WILL REQUIRE MORE TIME AND DISTANCE.**

**WHENEVER YOU ARE DRIVING IN THE MOVEMENT AREA YOU MUST:**

- ❖ USE YOUR MARS LIGHT**
- ❖ HAVE A WORKING ATCT RADIO**
- ❖ HAVE A WORKING CITY/COMPANY RADIO**
- ❖ NOT EXCEED 30 MPH DUE TO TRIGGERING AN AIRPORT MOVEMENT AREA SAFETY SYSTEM (AMASS) ALARM IN THE ATCT. (NOTE: IF REQUESTED BY ATC OR TO AVOID AIRCRAFT CONFLICT IT MAY ON RARE OCCASION BE NECESSARY TO EXCEED THE 30 MPH NORMAL LIMIT)**



# Taxi Instructions for the Northeast Cargo Ramp

The Northeast Cargo ramp facility is a non-movement area and access/egress require special operating procedures. All aircraft monitor Unicom frequency 122.95 (ramp common) prior to and during operations on the ramp. The Northeast Cargo facility ONLY has taxiway NN designated for entrance and exit of taxiway NN1.

## Arriving Aircraft

Arriving aircraft North of RWY 9R/27L will have priority if no aircraft on the cargo ramp has called and is in the process of pushback, engine start, or outbound taxi at the time of the first call. Arriving aircraft announce the following on ramp common prior to aircraft position becoming north of RWY 9R/27L:

- NE Cargo
- Airline and Flight number
- Current position and intentions with parking destinations on Northeast Cargo Ramp
- NE Cargo

If a departing aircraft responds to the callout, the arriving aircraft must advise ATC and ask where to hold its position.

## Departing Aircraft

Departing aircraft will have priority if no aircraft position is north of **RWY 9R/27L** and if no aircraft has called to enter or is taxiing on the ramp. Departing aircraft announce the following on ramp common prior to pushback:

- NE Cargo
- Airline and Flight number
- Location on Northeast Cargo Ramp and "Pushback"
- NE Cargo

If arriving aircraft responds to outbound call North of **RWY 9R/27L**, the departing aircraft must hold position at the gate until the arriving aircraft has cleared before pushback will be authorized. Departing aircraft must monitor the Unicom frequency at least five minutes prior to pushback, to avoid any possible traffic conflicts.

## Notes

1. **Prior to pushback, pilots must advise O'Hare Tower Ground Control on 121.90 of intentions**
2. A Unicom frequency 122.95 has been designated "Ramp Common"
3. No Ramp Control on "Ramp Common"
4. Monitor "Ramp Common" 122.95 and announce your intentions "In the blind"
5. **Listen carefully, Unicom Frequency 122.95 "Ramp Common" is used by both NE and SE Cargo. State NE Cargo at the beginning and end of transmission**
6. Dimensions relate to **B747-8** aircraft

# Advanced Driver Safety Alert

Effective: October 15, 2015



Advanced drivers **MUST** stop and contact ATC for clearance at all ILS Signs and Markings shown on this page when weather conditions are less than 800' ceiling and/or 2 mile visibility regardless of runway configuration.





# Advanced Driver Safety Alert

Effective: October 15, 2015



## New runway 10R-28L Critical Areas



**Critical areas for runway 10R-28L that become effective and must be protected on Thursday 10/15/15**



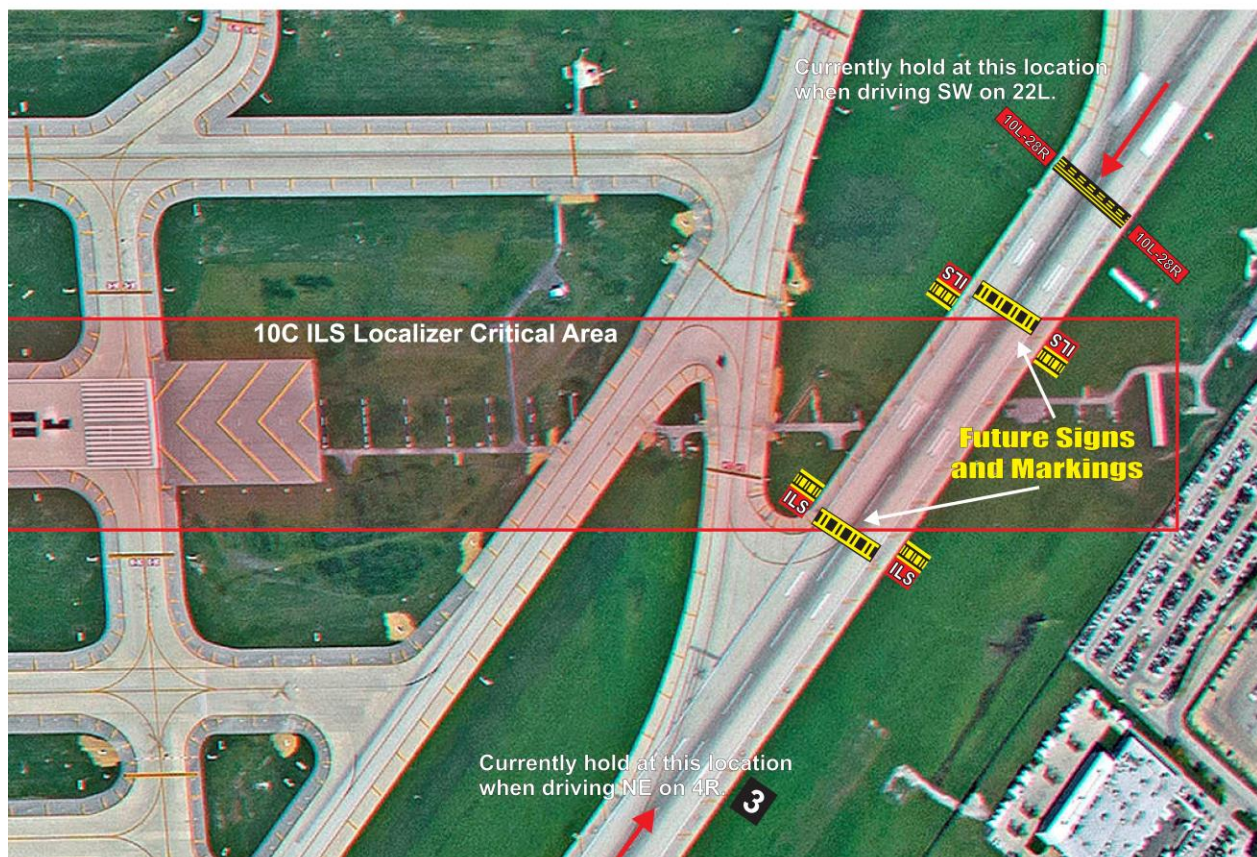
# ORD AOA Safety Alert

## Future Installation of ILS Critical Area Signs on Runway 4R-22L for the 10C Localizer.



### ISSUE:

In the near future new ILS hold signs and ILS hold bars will be installed and painted on runway 4R-22L to identify the ILS localizer critical area for runway 10C. This is a unique area on the airfield where there is an ILS critical area that intersects an active runway with no distinct signs or markings. It is important for all advanced drivers to be familiar with this area. Until the signs and markings are installed, it is still the vehicle operators responsibility to hold short of the critical localizer critical area when weather conditions are below 800' ceiling and/or less than 2 miles visibility.



Remember, this is a future change and is anticipated to be completed within the next few months.

**ILS critical areas ONLY come into effect when weather conditions fall below 800' ceiling and/or less than 2 mile visibility.**

Under current airfield conditions, vehicle operators should hold at the above indicated locations to ensure they do not enter the ILS critical area when the 10C localizer must be protected. if traveling NE on 4R hold at the **3** distance remaining sign. From the 22L apch, hold at the hold bar for the 10L-28R Approach/departure area.



# ORD AOA Safety Alert

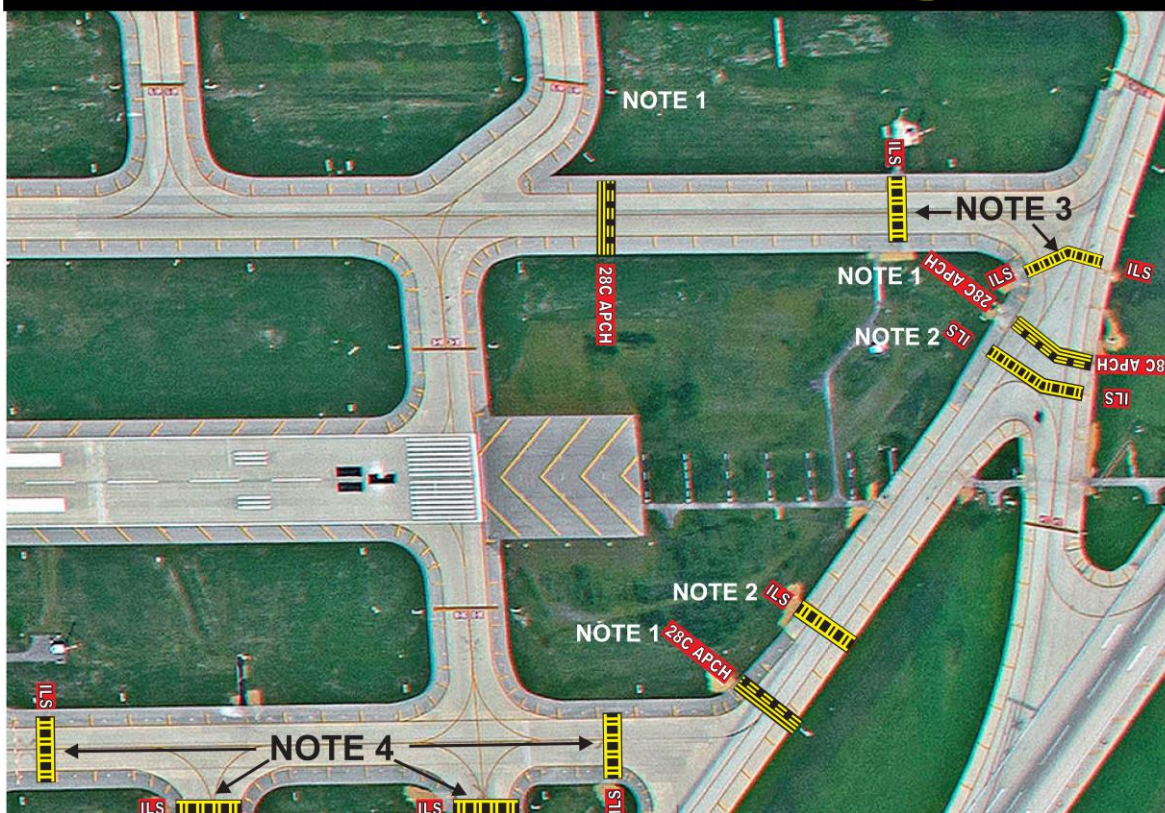
## "Y" Taxiway ILS and APCH Critical Area Clarification.



### ISSUE:

With the opening of runway 10C-28C, the "Y" taxiway has become somewhat complicated with the addition of numerous "APCH" and "ILS" signs. This graphic provides a detailed explanation on the various signs and markings on the "Y", "P", and "RR" taxiways and how each applies to vehicle operators. Become familiar with the signs and understand when they are in effect and when you need to contact the ATCT.

### \*\*\*DRIVERS EXTREME ATTENTION IS REQUIRED\*\*\*



**NOTE 1:** The "28C APCH" signs on the "Y" and "P" taxiways ONLY apply to aircraft taxi operations. Regardless of weather conditions vehicles DO NOT need to stop or call for clearance at the 28C APCH signs

**NOTE 2:** The ILS signs on the "Y" taxiway identify the 10C Localizer critical area. ALL vehicle operators MUST stop and receive ATC clearance to drive through this area when weather conditions fall below 800' ceiling and/or less than 2 miles visibility.

**NOTE 3:** The ILS signs on the "Y" and "P" taxiway identify the 28R Glide Slope critical area. ALL vehicle operators MUST stop and receive ATC clearance to drive through this area when weather conditions fall below 800' ceiling and/or less than 2 miles visibility.

**NOTE 4:** The ILS signs on the "RR", "GG" and "JJ1" taxiways identify the 28C Glide Slope critical area. ALL vehicle operators MUST stop and receive ATC clearance to drive through this area when weather conditions fall below 800' ceiling and/or less than 2 miles visibility.

**ILS critical areas ONLY come into effect when weather conditions fall below 800' ceiling and/or less than 2 mile visibility.**



# OPERATION OF GROUND VEHICLES WITHIN THE MOVEMENT AREA

Each ground vehicle authorized to operate on the movement area at the Airport shall be under direct control of the Air Traffic Control Tower (ATCT) as follows:

**ALWAYS CHECK THE STATUS OF THE AIRFIELD AND VERIFY WITH ATCT ON FREQUENCY**

## RUNWAYS

No person shall drive a Ground Vehicle on or across any runway at any time, except authorized City of Chicago employees (who are in contact with the ATCT via two-way radio and receive clearance) or person(s) who are escorted by City employees (who are in contact with the ATCT via two-way radio and receive clearance), FAA, or other CDA-AAO (Chicago Department of Aviation - Airport Airfield Operations) authorized drivers within other organizations (who are in contact with the ATCT via two-way radio and receive clearance).

## MOVEMENT AREA

- (1) Vehicle operators on the movement area shall maintain two-way radio communications between each vehicle and the ATCT; or
- (2) An escort vehicle with two-way radio shall maintain communications with the ATCT to accompany any vehicle without a radio; or
- (3) When it is not operationally practical to maintain two-way radio communications between the vehicle and the ATCT or to provide an escort vehicle, vehicles not equipped with two-way radios shall follow the procedures below:

→ Vehicle Operators shall yield the right-of-way to all aircraft **at all times**;

→ Vehicle Operators shall drive on defined service roads only;

→ Vehicle Operators shall come to a complete stop where posted, prior to crossing any and all taxiways on the service roads. Vehicles should avoid stopping in the islands between the A-(Alpha), B-(Bravo) and D-(Delta) taxiways. The crossing of these taxiways should not be initiated until the operator ensures that both taxiways can be crossed in one continuous movement

→ Vehicle operators shall obey all posted signage including “STOP”, “NO TURNS ACTIVE TAXIWAY”, “AVOID STOPPING BETWEEN TAXIWAYS” and heed warnings including CAUTION JET BLAST”;

→ Vehicle operators shall follow all regulations published in the Chicago Department of Aviation Ground Motor Vehicle Operations Regulations Manual; and Vehicle Operators shall obey the roadway signage, signals, and flag personnel.

- (4) During ILS (Instrument Landing System) conditions, remain clear of the movement area, unless access to the movement area is absolutely necessary. Then you will be required to call the ATCT (Air Traffic Control Tower) for clearance at ILS critical areas, POFZ (Precision Obstacle Free Zone) and CAT II/III (Category Two/Three) holding position markings.

## **OPERATIONS NEAR AIRCRAFT**

No person operating a ground vehicle on the AOA (Aircraft Operations Area) shall pass within twenty (20) feet of a parked aircraft if:

- 1) The aircraft is being loaded, unloaded or serviced at ground level; or
- 2) Passengers are enplaning/deplaning between the aircraft and terminal concourses; or
- 3) You are NOT the operator of an aircraft-servicing vehicle for a designated aircraft.
- 4)

## **REQT'S FOR REPOSITIONING AIRCRAFT WITHIN THE AIRPORT MOVEMENT AREA**

This information is addressed under separate cover in a document entitled:

**CHICAGO O'HARE INTERNATIONAL AIRPORT RULES, REGULATIONS, POLICIES AND PROCEDURES FOR AIRCRAFT REPOSITIONING WITHIN THE MOVEMENT AREA VIA: TOWBARLESS TOW VEHICLE (TLTV), (AKA - SUPER-TUGS), MECHANIC TAXI OPERATION, OR CONVENTIONAL TOW**

This is a living document that is amended as needed to address issues associated with repositioning aircraft within the movement area. It is located on the O'Hare "OPS Docs" website at:

<http://opsdocsord.flychicago.com>

User I.D: ops

Password: ops

The previous section of this manual corresponding to effective communication and standard phraseology is directly applicable to all vehicles, broadly construed, (which would include TLTVs and mechanics taxiing aircraft), that operate in the movement area.

## **NOISE ABATEMENT RUNWAY CLOSURE ADVISORY**

Due to noise abatement runway closures, closed taxiways and runways should be treated with extreme caution. Maintenance traffic and A/C taxiing to and from locations still use these routes, unless barricaded. Always use service roads first, unless required to drive within the movement area for airfield inspections or job duties. Night time and extreme weather conditions make it harder to see approaching aircraft. Exercise extreme caution during adverse weather conditions.

# LESSONS LEARNED

Lessons learned examples...

Always use extreme caution when driving on the AOA, taking the most direct route can lead to disaster.

On a clear night a motor truck driver was driving westbound on H Taxiway to the north airfield for an assignment, at the same time, a regional jet aircraft was taxiing from the hangars to the terminals on E taxiway. The vehicle was struck by the aircraft and dragged an excess of 150 feet before the aircraft was able to stop. The vehicle operator was extricated and both he and the taxi-mechanics operating the aircraft received minor injuries. The possibility for loss of life and the cost from lost revenue from the damaged aircraft could have been avoided by driving on service roads and only accessing the movement area when absolutely necessary.

On a sunny day two electricians parked their vehicle on the shoulder of a taxiway to work in a grass island without coordinating a closure of the area, or remaining clear of the taxiway's safety area. A taxiing B747 approached the vehicle parked on the shoulder of its taxiway, the electricians reacted and tried to signal the aircraft to stop, but were too late and an engine caught the cab of the vehicle ripping it off the vehicle. Always coordinate access to a work site with FAA ATCT if the area is open to aircraft or coordinate a closure of the area through CDA-AAO.

A dog escaped from its kennel at a terminal ramp, several airline personnel chased the dog in vehicles crossing several active taxiways and two active runways until they were stopped by CDA personnel. If you do not have access to the movement area-never leave the service roads or ramps, call Airport Airfield Operations at 773-686-2255 to report any issues involving the movement area (taxiways and runways).

# THINGS CHANGE – BECOME FAMILIAR WITH NEW CHANGES

- Look at Graphic 1: Transponder Required Pavement for the control of Runway 9L-27R, the associated taxiways, and Runway 10R-28L.

**IMPORTANT! WITHOUT FAIL, NO EXCEPTIONS - YOU MUST HAVE AN OPERATIONAL TRANSPONDER ON TO DRIVE ON Twy “C”, “C1”, “Z”, and Rwy 9L-27R when they are OPEN!** When in doubt, Call Airport Airfield Operations over the radio, or at 773-686-2255, Before you drive onto Twy “C”, or Twy “Z”. Signs have been installed on Twy “C”, northwest of the “C-Pad”, and on Twy Z, northwest corner.

**REMEMBER TO HAVE AN OPERATIONAL TRANSPONDER or**

**NO ACCESS TO Twy Z, Twy C, Twy C1, Runway 9L-27R, or Runway 10R/28L while OPEN**

- **ILS CRITICAL AREAS:**

- Look at Graphic 2: Localizer Critical Areas in Red, Glide Slope Critical Areas in Blue.
- If visibility is less than 2 miles and/or the ceiling is reported to be below 800' - All contractors and City vehicles **MUST REMAIN CLEAR OF** any of the ILS Critical Areas.
- Operations in these areas will **only** be authorized by Airport Airfield Operations over the radio dependent on the runway configuration in use.
- If in doubt, remain clear and confirm through Airport Airfield Operations at 773-686-2255.
- BEFORE you drive onto the airfield - listen to the ATIS on 135.40 Mhz or by calling 773-601-8921 and the ASOS at 773-462-0118.

















- **RUNWAY SAFETY AREAS (RSA'S)**











- Look at Graphic 3: Six Runways at ORD Pass through another Runway's Safety Area and MUST be protected under certain circumstances.
- If the runway you are on is open and controlled by the air traffic control tower (ATCT), then the tower will advise you where to hold short of, if necessary.
- If you are driving on Runway 4R/22L and the runway is closed but the tower is using Runway 10L/28R or Runway 10R/28L, call the tower to coordinate the crossing, and/or driving on Taxiway Y and using Runway 10R/28L, call the tower to coordinate the crossing.

**Simply treat the situations mentioned above as if the runways intersected.**

The **Driver is responsible to coordinate** passing **through the** shadowed **RSA's** on Graphic 3, if the runway the driver is located on is closed but the intersecting RSA runway is open.

# AIRPORT SIGN AND MARKING – QUICK REFERENCE GUIDE

EXAMPLE	TYPE OF SIGN	PURPOSE	LOCATION/CONVENTION
	Mandatory: Hold position for taxiway/runway intersection.	Denotes entrance to runway from a taxiway.	Located <u>L side</u> of taxiway within 10 feet of hold position markings.
	Mandatory: Holding position for runway/runway intersection.	Denotes intersecting runway.	Located <u>L side</u> of rwy prior to intersection, & <u>R side</u> if rwy more than 150' wide, used as taxiway, or has "land & hold short" ops.
	Mandatory: Holding position for runway approach area.	Denotes area to be protected for aircraft approaching or departing a runway.	Located on taxiways crossing thru runway approach areas where an aircraft would enter an RSA or apch/ departure airspace.
	Mandatory: Holding position for ILS critical area/precision obstacle free zone.	Denotes entrance to area to be protected for an ILS signal or approach airspace.	Located on twys where the twys enter the NAVAID critical area or where aircraft on taxiway would violate ILS apch airspace (including POFZ).
	Mandatory: No entry.	Denotes aircraft entry is prohibited.	Located on paved areas that aircraft should not enter.
	Taxiway Location.	Identifies taxiway on which the aircraft is located.	Located along taxiway by itself, as part of an array of taxiway direction signs, or combined with a runway/taxiway hold sign.
	Runway Location.	Identifies the runway on which the aircraft is located.	Normally located where the proximity of two rwys to one another could cause confusion.
	Runway Safety Area / OFZ and Runway Approach Area Boundary.	Identifies exit boundary for an RSA / OFZ or rwy approach.	Located on taxiways on <u>back side</u> of certain runway/taxiway holding position signs or runway approach area signs.
	ILS Critical Area/POFZ Boundary.	Identifies ILS critical area exit boundary.	Located on taxiways on <u>back side</u> of ILS critical area signs.
	Direction: Taxiway.	Defines designation/direction of intersecting taxiway(s).	Located on <u>L side, prior to intersection</u> , with an array L to R in clockwise manner.
	Runway Exit.	Defines designation/direction of exit taxiways from the rwy.	Located on same side of runway as exit, prior to exit.
	Outbound Destination.	Defines directions to take-off runway(s).	Located on taxi routes to runway(s). <u>Never</u> collocated or combined with other signs.
	Inbound Destination.	Defines directions to airport destinations for arriving aircraft.	Located on taxi routes to airport destinations. <u>Never</u> collocated or combined with other types of signs.
	Information.	Provides procedural or other specialized information.	Located along taxi routes or aircraft parking/staging areas. May not be lighted.
	Taxiway Ending Marker.	Indicates taxiway does not continue beyond intersection.	Installed at taxiway end or far side of intersection, if visual cues are inadequate.
	Distance Remaining.	Distance remaining info for take-off/landing.	Located along the sides of runways at 1000' increments.

EXAMPLE	TYPE OF MARKING	PURPOSE	LOCATION/CONVENTION
	Holding Position.	Denotes entrance to runway from a taxiway.	Located across centerline within 10 feet of hold sign on taxiways and on certain runways.
	ILS Critical Area/POFZ Boundary.	Denotes entrance to area to be protected for an ILS signal or approach airspace.	Located on twys where the twys enter the NAVAID critical area or where aircraft on taxiway would violate ILS apch airspace (including POFZ).
	Taxiway/Taxiway Holding Position.	Denotes location on taxiway or apron where aircraft hold short of another taxiway.	Used at ATCT airports where needed to hold traffic at a twy/twy intersection. Installed provides wing clearance.
	Non-Movement Area Boundary.	Delineates movement area under control of ATCT, from non-movement area.	Located on boundary between movement and non-movement area. Located to ensure wing clearance for taxiing aircraft.
	Taxiway Edge.	Defines edge of usable, full strength taxiway.	Located along twy edge where contiguous shoulder or other paved surface NOT intended for use by aircraft.
	Dashed Taxiway Edge.	Defines taxiway edge where adjoining pavement is usable.	Located along twy edge where contiguous paved surface or apron is intended for use by aircraft.
	Surface Painted Holding Position.	Denotes entrance to runway from a taxiway.	Supplements elevated holding position signs. Required where hold line exceeds 200'. Also useful at complex intersections.
	Enhanced Taxiway Centerline.	Provides visual cue to help identify location of hold position.	Taxiway centerlines are enhanced 150' prior to a runway holding position marking.
	Surface Painted Taxiway Direction.	Defines designation/direction of intersecting taxiway(s).	Located L side for turns to left. R side for turns to right. Installed prior to intersection.
	Surface Painted Taxiway Location.	Identifies taxiway on which the aircraft is located.	Located R side. Can be installed on L side if combined with surface painted hold sign.

Ref. AC 150/5340-1J Standards for Airport Markings, and AC 150/5340-18D Standards for Airport Signs Systems



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