Introduction

Recognizing the need to provide familiarization and testing for non flight-crew personnel who are involved in repositioning aircraft, Los Angeles World Airports (LAWA) has established the Aircraft Surface Movement Program. This program presents guidelines and procedures designed to enhance safety and efficiency of all aircraft surface movement operations.

In addition, implementation of this program is intended to assist in the elimination of Runway Incursions.

A Runway Incursion is defined as “any occurrence at an aerodrome involving the incorrect presence of an aircraft, vehicle or person on the protected area of a surface designated for the landing and take-off of aircraft.”

Runway incursions can result in aircraft collision. Such collisions, when occurring in the runway environment, are often catastrophic. An example of this collision hazard is the accident which involved two Boeing 747 aircraft which collided on a runway in the Canary Islands, resulting in the worst accident in the history of commercial aviation, in terms of lives lost in a single accident.

In order to minimize the risk of a runway incursion, it is extremely important that all persons who conduct aircraft surface movement operations have a thorough understanding of the runway and airfield layout at Los Angeles International Airport (LAX) as well as familiarity with applicable ATC procedures.

The objectives of this program are:

- Identifying proper methods and procedures for the safe, surface movement of aircraft at LAX.

- To disseminate information which provides aircraft surface movement operators with familiarization and knowledge of acceptable aircraft movement practices.

- To test for knowledge to ensure that all personnel who perform aircraft surface movement operations at LAX have a basic understanding of acceptable procedures.

Participation in this program and successful completion of a mandatory test is required for all persons responsible for aircraft surface movement activity at LAX. Successful completion of the Aircraft Surface Movement Program and testing process will result in the issuance of an Aircraft Surface Movement Icon on the LAX Security Identification Badge. Only the individuals who have successfully completed the Aircraft Surface Movement Program will be permitted to conduct aircraft surface movement operations at LAX.

This study guide contains basic information that should be thoroughly understood by all persons who attend the Aircraft Surface Movement class offered by the LAWA Airfield Operations Division.

This material is divided into three sections:

Section one contains information regarding movement areas and ramps, which aircraft surface movement operators must be familiar with.

Section two contains information specific to LAX, including the designations of movement areas, surface markings, airfield signage and lighting.

Section three contains information regarding proper aviation terminology, phraseology and communication on aviation VHF radio equipment.

This mandatory course will also provide additional information in each of the three areas outlined in the study guide.

Section 1

Movement Areas/Ramps

Movement areas are defined as runways, taxiways and taxilanes on an airport, which are used for taxiing, takeoff and landing of aircraft.

Identified below are the types of movement areas found on the airfield at LAX.

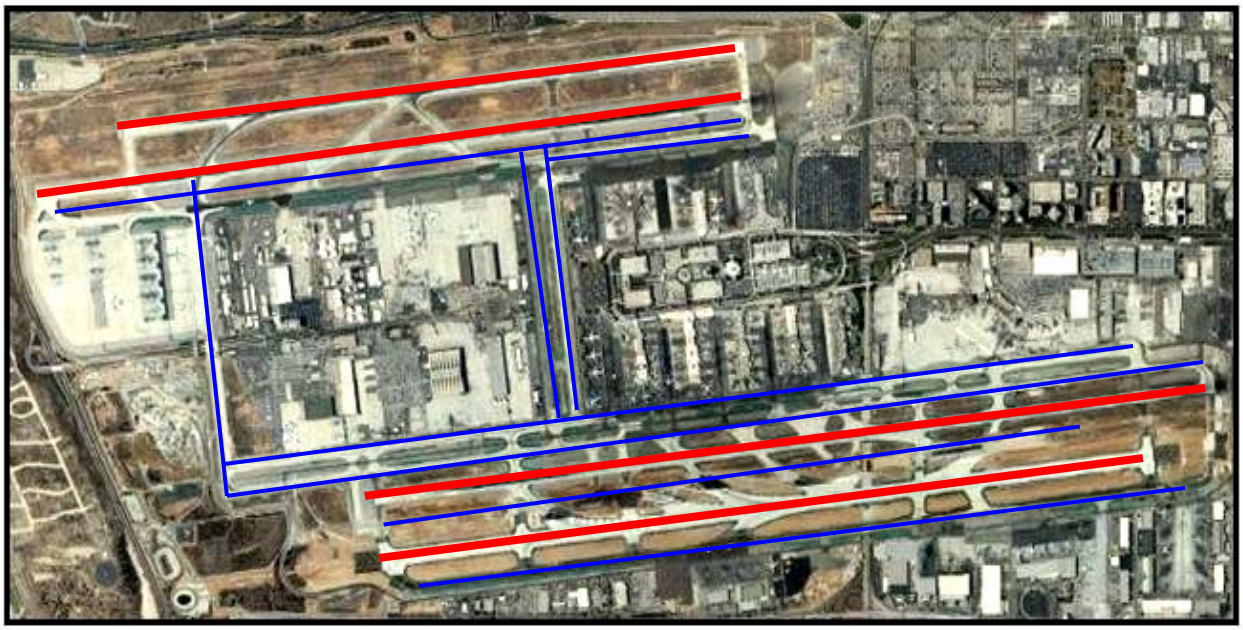
- **Runway** – A rectangular paved surface on an airport designed for the take-off or landing of aircraft.

- **Taxiway** – A paved surface designed for the movement of aircraft from one part of an airport to another.

- **Taxilane** (Alley/Alleyway) – A paved surface used for access between taxiways and Ramp/Apron (Gate) areas.

Movement areas at LAX are shown in the aerial photograph below:

Note: LAX is divided into two separate airfield complexes known as the North and South Complex. These complexes are separated by the Central Terminal Area and airline maintenance facilities.



Ramp/Apron Areas

Ramp/Apron areas are designed for parking, loading/unloading, and servicing of aircraft. They are not part of a movement area. The areas surrounding the terminal buildings, maintenance facilities, and south complex cargo facilities are all considered ramp/apron areas. See the example below.

Terminal 4

South Pads (Cargo Parking)

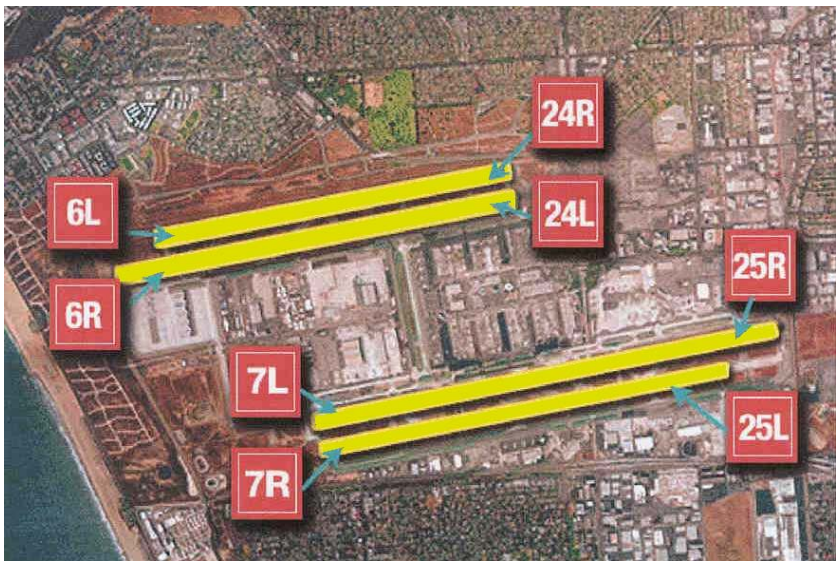
Section 2

Runways

- Runway designations are based on a runway's magnetic heading using the 360-degree compass system. Runways may be used in two directions (wind direction considered), resulting in the need for two runway designations. Each designation has a difference of 180 degrees.

  Therefore, a runway which is designated as Runway 180/360 degrees (drop third digit) would be oriented in the north/south direction. If aircraft were conducting take-off or landing operations to the north, the runway in use would be designated as Runway 36. If the same runway were being used by aircraft conducting take-off or landing operations to the south, then the same runway would be designated as Runway 18.

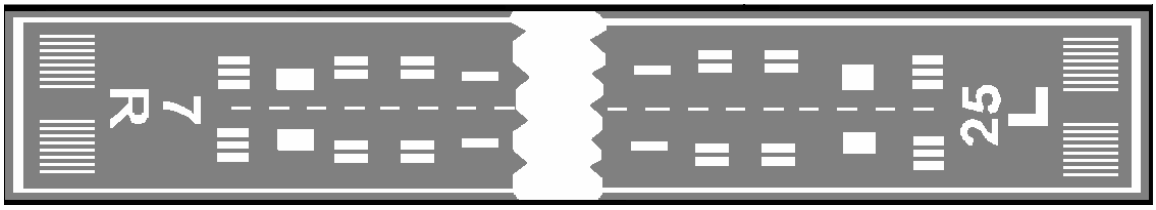
- At LAX, the runways located on the North Complex are designated as Runway 24L/6R and Runway 24R/6L. The runways on the South Complex are designated as Runway 25L/7R and Runway 25R/7L. (See diagram below).



Runway Markings

- Runway surface markings are white.

- Runway markings include centerline stripes, edge-lines, threshold stripes and runway designation markings (See diagram on next page).



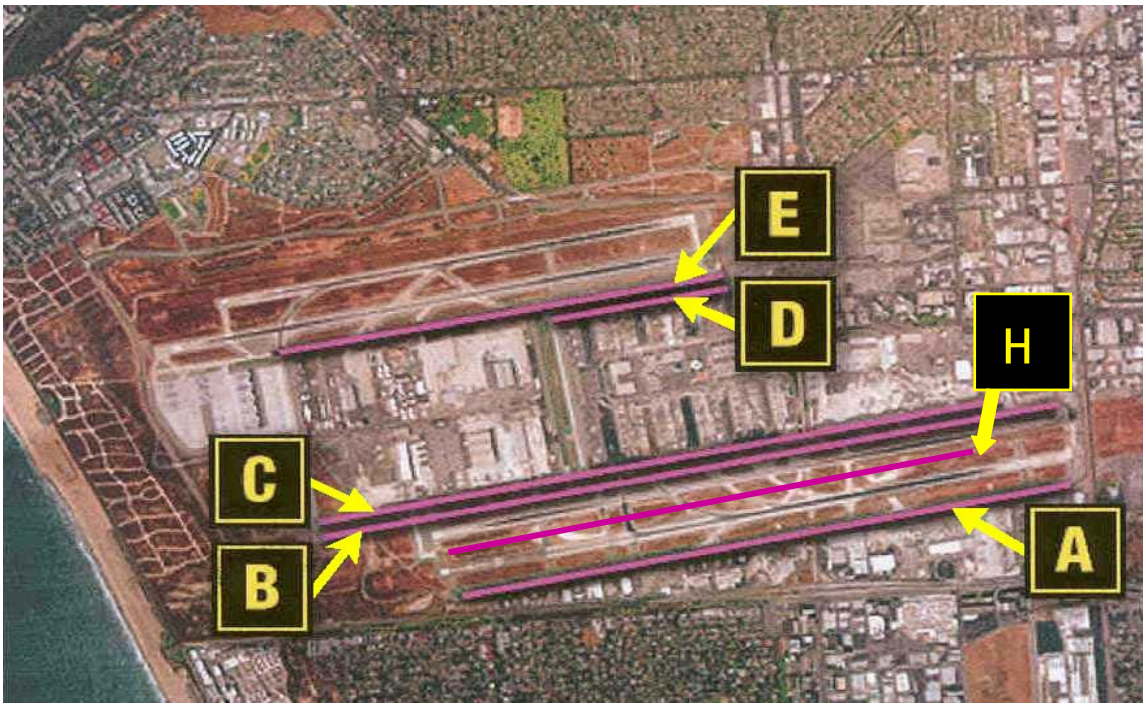
Runway Lighting

- Runway lighting is white.

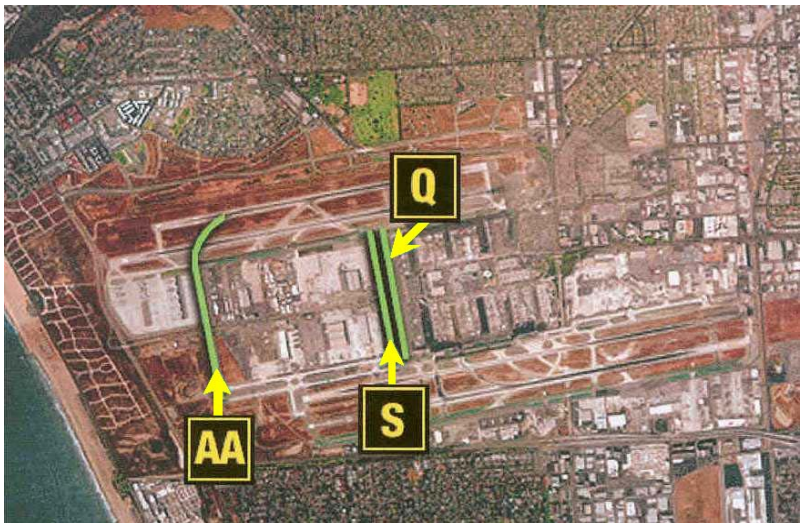
- Runway lighting consists of centerline lighting, edge lighting and touchdown zone lighting.

Taxiways

- LAX has six east-west oriented taxiways. These are Taxiways Alpha (A), Bravo (B), and Charlie (C), Hotel (H) located on the South Complex, and Taxiways Delta (D) and Echo (E) which are located on the North Complex (refer to the map below).



- Three taxiways connect the North and South Complexes at LAX. These taxiways are designated as Quebec (Q), Sierra (S) and Alpha-Alpha (AA) (refer to the map on the next page).



- The remaining taxiways at LAX are used by aircraft to taxi onto or off the runways or into ramp/apron areas or taxilanes.

Taxiway Markings

- Taxiway surface markings are yellow.

- Markings include the single solid yellow centerline and the double yellow edgelines.

- Green or unpainted areas beyond the double yellow edgelines may not be re-enforced and are not intended for aircraft use.

Taxiway Lighting

- Taxiways have blue edge lights and/or green centerline lights.
- Mandatory Runway-Hold Lines are painted yellow and illuminated with in-pavement amber guard lights. In-pavement amber guard lights are flush mounted into the surface together with the hold line.
- Elevated Runway Guard Lights (yellow, alternating flashing lights) are placed to the sides of a runway/taxiway intersection adjacent to the painted hold lines.

Taxilanes

Taxilanes, also referred to as alleys or alleyways, are situated at various locations at LAX. Most taxilanes are in the passenger terminal area between each terminal building concourse. Taxilanes are movement areas that are used by aircraft to transition from taxiways to the ramp/apron areas.

Taxilanes at LAX are depicted to the left.

Airfield Signs and Surface Markings

Airfield signs, surface markings, and lighting are visual aids designed to guide operations on movement areas. The colors and sizes of signs and surface markings are significant.

Signs

Mandatory Instruction Signs have a red background with white lettering. These signs denote the entrance to a runway, approach area or critical area.

Location Signs have a black background with yellow inscriptions and a yellow border. Location signs provide taxiway identification and are installed to be highly visible, usually on the left side of the movement area. Location signs are often combined or co-located with other types of signs.

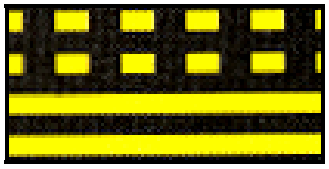
Direction Signs have a yellow background with black inscriptions and arrows. Direction signs are placed before an intersection to identify the intersecting taxiway(s). The arrows indicate the usable direction of the intersecting

Destination Signs have a yellow background with black inscriptions and arrows that point in the direction of a specific location on the airfield.

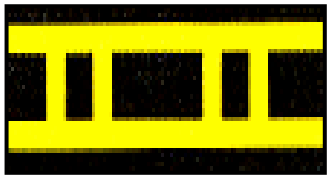
Information Signs have a yellow background with black inscriptions. Information signs provide various types of advisories.

Surface Markings

At the intersection where a taxiway meets a runway, markings called **Hold Lines** (Hold Position Markings) are installed. Hold Lines consist of two solid yellow lines followed by two segmented yellow lines. Aircraft must hold on the "solid" side of the hold line. This is also the location at an intersection where the mandatory instruction sign identifying the runway is placed. ATC authorization is required to continue beyond the hold lines.



Instrument Landing System (ILS) Hold Lines (ILS Hold Position Markings) are painted onto the surface at locations where it is necessary to keep aircraft and vehicles on the ground from interfering with the signals transmitted from the ILS. Therefore, the ILS hold lines are placed farther from the runway than the normal hold lines. For this reason, when ILS approaches are in progress during periods of low visibility, aircraft may be instructed by ATC to "hold short of the ILS critical area".



At the intersection where a taxiway meets a service road, **Vehicle Roadway Markings (Zippers)** delineate all roadways located on or that cross areas intended for use by aircraft.

Enhanced Taxiway Centerline Markings are painted at all intersections where a taxiway centerline leads up to a runway hold bar. This marking adds visual awareness to the pilot as the aircraft approach the runway environment.

Extension of the Runway Holding Position Markings are enhancements that allow better visibility for pilots operating large aircraft in Design Group V and VI. The flight crew can look out of either window and clearly identify their aircraft's position relative to the surface painted hold bar.

Section 3

Air Traffic Control Procedures and Radio Phraseology

It is essential to safety that all personnel responsible for aircraft movements at LAX be thoroughly familiar with Air Traffic Control procedures and radio phraseology. Correct phraseology and radio technique should be used in all communications with ATC/Ramp Tower. Use of correct radio techniques will reduce frequency congestion, allow for a more efficient flow of aircraft movements, and reduce miscommunications.

Transmitting on Aviation VHF Frequencies

When using an aviation VHF radio, it is important to communicate in a clear and concise manner so that ATC/Ramp Tower understands your transmission. Use of slang, CB or police jargon should be avoided. Transmissions should be brief yet complete enough to adequately convey the message to ATC/Ramp Tower.

There are a few simple procedures that should be utilized before transmitting on the VHF radio:

Prior to transmitting, the radio should be checked for the correct frequency and volume setting.

Next, the frequency should be briefly monitored to determine that no one else is transmitting or waiting for a read-back. Monitoring the frequency prior to transmitting helps in establishing a mental picture of the current situation,

commonly called situational awareness. This procedure will also minimize two or more parties transmitting at the same time.

Next, verify that the microphone selector switch is set to the proper radio. This will help reduce the number of instances where one frequency is being monitored and another is being inadvertently transmitted on.

Prior to transmitting, consider what you are going to say, and use the following

WHO/ WHERE/ WHAT format:

- **WHO** you are
- **WHERE** you are on the airport
- **WHAT** you are requesting, or intending to do

To minimize confusion between similar sounding letters, a standardized aviation phonetic alphabet has been adopted for use by the International Civil Aviation Organization (ICAO). Air Traffic Control will use this phonetic during all transmissions to identify taxiways. The phonetic alphabet is shown below, and must be memorized:

ICAO Phonetic Alphabet

A	Alfa	**N**	November
B	Bravo	**O**	Oscar
C	Charlie	**P**	Papa
D	Delta	**Q**	Quebec
E	Echo	**R**	Romeo
F	Foxtrot	**S**	Sierra
G	Golf	**T**	Tango
H	Hotel	**U**	Uniform
I	India	**V**	Victor
J	Juliet	**W**	Whiskey
K	Kilo	**X**	X-ray
L	Lima	**Y**	Yankee
M	Mike	**Z**	Zulu

LAX Air Traffic Control VHF Frequencies

Automatic Terminal Information Service (ATIS)	133.80
Ground Control- North Complex	121.65
Ground Control- South Complex	121.75
Tower- North Complex	133.90
Tower- South Complex	120.95
Metering	120.35

LAX Airline Operated Ramp Tower VHF Frequencies

Alaska Ramp Tower (Taxilane D-10)	130.85
American Ramp Tower (Taxilane C-10)	129.32
Delta Ramp Tower (Taxilanes C-8 and C-9)	131.45
United Ramp Tower (Taxilane C-6)	129.40
United Ramp Tower (Taxilane C-7)	129.50

General Rules to Follow While Moving Aircraft

Ensure that all available pertinent information regarding airport construction, movement area closures and applicable VHF frequencies has been reviewed. Know where you are, where you are going, and how to get there.

- Use correct radio technique and phraseology. **Read back all "Hold Short" and runway crossing instructions verbatim.**

- Maintain a **"sterile"** cockpit. Do not become absorbed in unrelated tasks or non-essential conversations while on movement areas.

- If you are unsure of your position on the airfield, **stop** and ask for assistance.

- Continuously monitor the appropriate VHF frequency.

- Ensure that you fully understand your taxi/tow instructions. If you are unsure, ask for clarification and **do not move** until you completely understand your instructions.

- Report any deteriorating/confusing airfield signs, surface markings or lighting to LAX Airfield Operations, or FAA at an appropriate time.

Phraseology

Use of correct radio phraseology enhances safety and saves time. Reprinted below are examples of some of the most common terms:

ACKNOWLEDGE - Let me know that you have received my message.

ADVISE INTENTIONS - Tell me what you plan to do.

AFFIRMATIVE - Yes.

CONFIRM - My version is…is that correct?

CORRECTION - An error has been made in the transmission and the correct version follows.

GO AHEAD - Proceed with your message. Not to be used for any other purpose.

HOLD - Stop where you are.

HOLD SHORT OF… - Proceed to, but stop before reaching a specific point.

NEGATIVE - "No," or "permission not granted," or "that is not correct."

PROCEED - You are authorized to begin or continue moving.
READ BACK - Repeat my message back to me.

ROGER - I have received all of your last transmission. It should not be used to answer a question requiring a yes or a no answer.

SAY AGAIN - Used to request a repeat of the last transmission. Usually specifies transmission or portion thereof not understood or received.

STAND BY - Means the controller or pilot must pause for a few seconds, usually to attend to other duties of a higher priority. Also means to wait as in "stand by for clearance." If the delay is lengthy, the caller should reestablish contact.

UNABLE - Indicates inability to comply with a specific instruction, request, or clearance.

VERIFY - Request confirmation of information; e.g. "verify cleared to cross Runway 25R."

WILCO - I have received your message, understand it, and will comply with it.