

New England Airport Driver Training Program

DRAFT

Preface and Acknowledgements

Runway incursions and surface incidents pose a serious and growing threat to safety at our airports. Almost all known runway incursions and surface incidents can be linked to human error in the complex airport environment. Preventing these incidents is the responsibility of everyone in the aviation community, from the FAA Administrator to the most recently hired airport employee. Each of us can be part of the solution to this growing safety problem.

The airport surface environment is complex and dynamic, and to reduce human error in this environment, we must address the education, training and awareness of those who operate on the airport surface. Therefore, the need for an Airport Driver Training Program at every airport seems to be obvious, yet until now, there has been no standard in the industry for how Airport Driver Training Programs are developed, implemented or reviewed. The purpose of this guide is to provide comprehensive training materials for enhancing airfield driver training. This guide is intended to go hand in hand with a Best Practices Pamphlet that provides additional runway safety assistance for airport operators.

All Airport Driver Training Programs are intended to prepare employees for operating safely on the airport's surface. Whether you are developing a driver-training program for the first time, or revising a current program, it is important to keep in mind that the set of variables comprising a driver-training program are unique for each airport. The elements of each program must address the specific needs and complexity of the individual airport. Although a one-size-fits-all driver-training program can not accommodate the wide differences among airports, there are many things that all airports have in common and there are many common ingredients that should be part of any well-developed airport driver-training program. This guide presents those many common ingredients.

Airport operators should use this guide only as a model. Each operator must design or enhance their own program to best meet the individual needs and circumstances at their airport. It is intended that the elements in this guide will be used to complement an entire airport driving training program.

Throughout this guide you will see italicized comments and recommendations. They are directed to airport operators who are developing or revising a driver-training program. The "voice" behind these italicized comments is that of the New England Driver Training Working Group. This industry working group is comprised of representatives of four divisions of FAA (Airports, Air Traffic, Airway Facilities, and Flight Standards) and four New England airports. As a group, we attempted to provide recommendations and hints for improving the training materials currently used at your airport.

By providing references and links to applicable web sites and Advisory Circulars, we hope that users will take advantages of the resources available, and continue to update their

programs as the aviation industry and airport standards continue to change. This document is not a Federal Regulation, nor an Advisory Circular, but rather a compilation of material the airport community has to offer. We thank all those who have shared their expertise with us and encourage you to continue sharing safety ideas and information among the airport community.

We gratefully acknowledge all the dedicated professionals who have provided us with manuals, assistance and expertise, and in particular, the following airports:

*Birmingham International Airport
Boston Logan International Airport
Chicago O'Hare International Airport
Groton New London Airport
L. G. Hanscom Field
Manchester Airport
Phoenix Sky Harbor International Airport
Teterboro Airport
T. F. Green Airport
Tweed New Haven Airport
Waterbury Oxford Airport*

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Introduction

Every year there are many accidents and incidents involving aircraft and vehicles on airports that result in property damage, personal injury and sometimes death. With the increasing number of these incidents being reported in recent years, airport operators are being asked to review and evaluate how and when they permit access to aircraft operating areas, and how they conduct training for authorized personnel. Although these incidents are often the result of unfamiliarity with the airport environment and airport rules for ground vehicles, airport operators are still faced with deciding what kind of training is appropriate. This guide is designed to acquaint the reader with basic airport rules and regulations for operating a ground vehicle at the Sample Airport. The information contained in this guide, combined with actual field training provided by a qualified supervisor or designated vehicle driver training personnel, will provide sufficient knowledge and skill to pass an airfield driver's test and operate vehicles safely at the Sample Airport.

Application

The rules and regulations contained in this guide apply to all persons authorized to operate a ground vehicle within the Air Operations Area (AOA) of the Sample Airport. The Air Operations Area consists of both movement and non-movement areas and also includes Vehicle Service Roads, Airport Perimeter Roads and Aircraft Parking Aprons. The rules contained in this guide may be in addition to Federal Aviation Regulations and applicable state and local ordinances and laws, which remain in full force and effect.

Authorized Personnel and Personnel Identification

All persons operating a ground vehicle or other motorized equipment on the AOA at Sample Airport must display a Sample Airport Authority issued identification badge unless they are operating on the AOA under the direct escort of someone displaying the correct badge. The displayed badge must show the designation as "driver" and be color-coded for non-movement areas only or for both movement and non-movement areas. The required identification must be displayed on the outermost garment. The Sample Airport has certain restricted areas known as SIDA, Security Identification Display Areas, which require display of identification media required by FAA Security regulations. The Sample Airport also has restricted lease areas in which only employees and personnel authorized by the lessee may enter. You should be aware of the SIDA and restricted areas at Sample Airport and the conditions stipulated for entry in to those areas. You should also be able to identify the boundaries of those areas for which you are authorized to work in. Whether or not you are in a SIDA, if at any time, you see someone in the AOA that looks as if they do not belong, you should alert the attention of Sample Airport Authority.

Requirements for Licensing

The current trend in airport driver training is to provide tiered training and permits for different types or levels of drivers. For such airports, it is typical that the lowest tier drivers are only authorized to drive on the aircraft aprons, but not on any taxilane, taxiways, runways or perimeter roads. The second tier drivers, such as persons who operate tugs for aircraft relocations, may have additional driving privileges as required by their job function. Typically the second tier is authorized to drive on aircraft aprons, designated taxilanes and perimeter roads. The highest tier of drivers, in addition to the above, is authorized to drive on all movement areas. A multi tier drivers program would make sense for most large airports, but may not be needed at smaller and non-towered airports.

At the Sample Airport, there are three tiers of drivers. Tier One drivers may only drive on aircraft parking aprons as designated on the airport diagram. Tier Two drivers may additionally drive on the taxilane adjacent to the air-carrier-parking apron and on the airport perimeter road. Tier Three drivers are authorized to drive on all airport movement and non-movement areas. At the Sample Airport, all drivers are tested and licensed as described in the section Airport Driver Training.

Runway Safety

Runway Incursions

Runway Incursions and surface incidents occur when there are unauthorized movements of a person, vehicle or aircraft on the airport movement area. A runway incursion is “any occurrence at an airport with an ATCT, involving an aircraft, vehicle, or person or object on the ground, that creates a collision hazard or results in a loss of separation with an aircraft taking off, intending to take off, landing, or intending to land”. For example, if an aircraft intending to land is directed to “go around” when within one mile of the landing threshold due to an aircraft, vehicle, pedestrian or object on the runway, the incident is classified as a *runway incursion*. On the other hand, if the aircraft on final approach was sent around when a mile or more from the threshold, the incident is classified as a *surface incident*. A surface incident is “any event where unauthorized or unapproved movement occurs within the movement area, or an occurrence in the movement area associated with the operation of an aircraft that affects or could affect the safety of flight.”

Though relatively few in number when compared to the massive amount of traffic that moves safely through our nation’s airports every day, runway incursions are a unique problem. Not only do runway incursions have the potential to put lives at risk, they also take place in a complex and dynamic environment, which makes isolating root causes a difficult task.

Runway incursions are caused by Pilot Deviations (PD), Vehicle/Pedestrian Deviations (V/PD), and controller Operational Errors (OE). Regardless of whom the incursions are attributed to, incursions occur, at the simplest level, because people make mistakes. Humans are superbly skilled at making decisions under a wide range of circumstances but, for a variety of reasons, they are also fallible. Consider this human vulnerability within the context of the numerous variables that may contribute to human error and you can appreciate the problem. Its not just a pilot, controller, or vehicle operator problem, it is a problem that all of us in the aviation community share. As the aviation industry continues to grow and aircraft and vehicles continue to mix in increasingly congested environments, the potential for incursions increases and the margin of safety decreases. We must all remain vigilant and be cognizant of potential factors that increase risk (such as decrease visibility in bad weather). We must do all we can to keep runway incursions and surface incidents from happening at our nations’ airports. Together we can make a difference in runway safety.

Definitions

Accident - a collision between one aircraft or vehicle and another aircraft, vehicle, person or object which results in property damage, personal injury, or death.

Air Carrier Ramp - ramp for scheduled air carriers. Only authorized personnel and vehicles are allowed to operate on this ramp. Private vehicles and private aircraft are prohibited from operating on the Air Carrier Ramp.

Aircraft Incident – an occurrence, other than an accident, associated with the operation of an aircraft that affects or could affect the safety of operations.

Air Operations Area (AOA) - those areas that encompass the runways, taxiways, aprons and other areas of the airport intended to be used by aircraft for taxiing, takeoff, landing, maneuvering, and parking. Also operating on the AOA are the vehicles necessary to service aircraft operations.

Airport Traffic Control Tower (ATCT) - a facility that uses primarily air to ground communications to provide Air Traffic Control services to aircraft and vehicles operating in the vicinity of an airport or on the movement area. Authorizes aircraft to land or takeoff at the airport controlled by the tower.

Airport – the Sample Airport and all improvements and equipment contained within the Sample Airport boundary lines.

Airport Employee - authorized personnel of all organizations, activities and governmental agencies located on or connected with the operation, maintenance and servicing of the airport.

Airport Surface Detection Equipment (ASDE) - radar equipment specifically designed to detect all principal features on the surface of an airport, including aircraft and vehicular traffic, and to present the entire image on a radar indicator console in the control tower. Used to augment visual observation by tower personnel of aircraft and/or vehicular movements on runways and taxiways.

Airport Movement Area Safety System (AMASS) - a software enhancement to ASDE radar that provides logic predicting the path of aircraft landing and/or departing, and aircraft and/or vehicular movements on runways.

Apron or Ramp - a defined area on an airport or heliport intended to accommodate the parking and servicing of aircraft, the loading and unloading of passengers and cargo, refueling, maintenance and other servicing operations.

Automatic Terminal Information Service (ATIS) - The continuous broadcast of recorded information. Its purpose is to improve controller effectiveness and to relieve frequency congestion by automating the repetitive transmission of essential but routine information.

Blast Fence - a barrier that is used to divert or dissipate jet or propeller blast.

Blind Spot - an area from which radio transmissions and/or radar echoes cannot be received. The term is also used to describe portions of the airport not visible from the control tower.

Blocked - phraseology used to indicate that a radio transmission has been distorted or interrupted due to multiple simultaneous radio transmissions.

Call Up - initial voice contact between an Air Traffic Control facility and an aircraft or vehicle, using the identification of the unit being called and the unit initiating the call.

Common Traffic Air Frequency (CTAF) -A designated air band radio frequency used for coordination of air and ground vehicle operations in an environment that is not under the control of an ATCT. Coordination is achieved by observance of pilot and vehicle operator advisory transmissions.

Compass Rose - a circle, graduated in degrees, printed on some charts or marked on the ground at an airport. It is used as a reference to either true or magnetic direction.

Displaced Threshold - a threshold for landing that is located at a point on the runway other than the designated beginning of the runway.

Expedite - used by ATC when prompt compliance is required to avoid the development of an imminent situation.

Fixed Base Operator (FBO) - a person, firm or organization engaged in a business that provides a range of basic services to general aviation. Services may include the sale and dispensing of fuel, line services, aircraft parking and tiedown, pilot and passenger facilities, airframe and power plant maintenance, pilot instruction, aircraft sales and rentals.

Foreign Object Damage (FOD) - damage caused by rocks and other debris. FOD is commonly used as an acronym for foreign object debris, as well.

General Aviation - that portion of civil aviation which encompasses all facets of aviation except air carriers holding an air carrier certificate.

Helipad - a small, designated area, usually with a prepared surface, on a heliport, or airport used for takeoff, landing, or parking of helicopters.

High Speed Taxiway - a long radius taxiway designed to expedite aircraft turning off the runway after landing, thus reducing runway occupancy time.

R(T)CAs - potentially confusing areas that may exist in an airport layout.

Instrument Landing System (ILS) - a navigational aid composed of a localizer antenna and a glideslope antenna, which provides vertical and horizontal guidance to aircraft approaching the runway.

ILS Critical Area - an area provided in order to protect the signals of the localizer and glideslope.

Immediately - used by ATC or pilots when such action compliance is required to avoid an imminent situation.

Incursion - any occurrence at an airport involving an aircraft, vehicle, person, or object on the ground that creates or may create a collision hazard or results in loss of separation with an aircraft taking off or intending to take off, landing or intending to land.

Jet Blast - jet engine exhaust (thrust stream turbulence).

LAHSO - an acronym for Land and Hold Short Operations. These operations include landing and holding short of an intersecting runway, a taxiway, a predetermined point, or an approach/departure flight-path.

Light Gun - a handheld directional light-signaling device, which emits a brilliant narrow beam of white, green, or red light as, selected by the tower controller. The color and type of light transmitted can be used to approve or disapprove anticipated pilot or vehicle actions where radio communication is not available. The light gun is used for controlling traffic operating in the vicinity of the airport and on the airport movement area.

Mobile Fueller – vehicles owned and/or operated by authorized agents to pump and dispense Jet A and 100 LL fuel at the Sample Airport. This may include fuel tankers, in-to-plane fueling pumpers and hydrant carts.

Movement Area - the runways, taxiways, and other areas of an airport which are utilized for taxiing, air taxiing, takeoff, and landing of aircraft, exclusive of loading ramps and parking areas. At airports and heliports with a tower, specific approval for entry onto the movement area must be obtained from Air Traffic Control.

Navigational Aid - any visual or electronic device, airborne or on the surface, which provides point-to-point guidance information or position data to aircraft in flight.

Non Movement Areas – taxilanes, aprons and other areas not under the control of air traffic.

Obstruction Light - a light or one of a group of lights, usually red or white, mounted on a surface structure or natural terrain to warn pilots of the presence of an obstruction.

Operator - any person who is in actual physical control of an aircraft or motor vehicle.

Owner - a person who holds the legal title of an aircraft or a motor vehicle.

Restricted Areas - areas of the airport posted to prohibit or limit entry or access by the general public. All areas other than public areas.

Runways -those parts of the AOA used for the takeoff and landing of aircraft.

Runway Safety Action Team (RSAT) – a team consisting of FAA and industry experts that conduct on-site evaluations at airports experiencing an unusually high incidence of runway incursions or related surface incidents.

Runway in Use or Active Runway - any runway or runways currently being used for takeoff or landing. When multiple runways are used, they are all considered active runways.

Runway Safety Area - a defined prepared surface surrounding the runway, intended to reduce the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway. No objects may be placed or left in the safety area except those that are required by their function to be in that location (such as runway lights and signs).

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." The caller should reestablish contact if a delay is lengthy. "Stand by" is not an approval or denial.

Stopway - an area beyond the takeoff runway and centered upon the extended centerline of the runway, able to support the airplane during an aborted takeoff, without causing structural damage to the airplane, and designated by the airport authorities for use in decelerating the airplane during an aborted takeoff.

Surface Incident – any event where unauthorized or unapproved movement occurs within the movement area or an occurrence in the movement area associated with the operation of an aircraft that affects or could affect the safety of flight.

Taxi - the movement of an airplane under its own power on the surface of an airport

Taxiways - those parts of the AOA designated for the surface maneuvering of aircraft to and from the runways and aircraft parking areas.

Tie Down Area – an area used for securing aircraft to the ground.

Touchdown Zone - the first 3,000 feet of the runway beginning at the threshold.

Unable - indicates inability to comply with a specific instruction, request, or clearance.

UNICOM - a non-government communication facility which may provide airport information at certain airports. Locations and frequencies of UNICOMs are shown on aeronautical charts and publications.

Verify - request confirmation of information.

Vehicle Service Road - a designated roadway for vehicles in a non-movement area.

Visibility - the ability, as determined by atmospheric conditions and expressed in units of distance, to see and identify prominent unlighted objects by day and prominent lighted objects by night. Visibility is reported as statute miles, hundreds of feet or meters.

VOR - a ground-based electronic navigation aid transmitting very high frequency navigation signals, 360 degrees in azimuth, oriented from magnetic north. Used as the basis for navigation in the National Airspace System.

Wake Turbulence - phenomena resulting from the passage of an aircraft through the atmosphere. The term includes vortices, thrust stream turbulence, jet blast, jet wash, propeller wash, and rotor wash both on the ground and in the air.

Vehicle Operating Requirements

(The following is an example of how the Sample Airport controls the number of vehicles on the AOA. This system may or may not be applicable to your situation. Each airport should evaluate what system meets the requirements of their local entities to provide a safe operating environment).

Authorized Vehicles and Vehicle Identification

All vehicles authorized to operate on the AOA must clearly display a current and valid Sample Airport Authority AOA sticker unless otherwise authorized or approved.

Upon prior approval from Sample Airport Authority, certain Air Carrier, Aircraft Services, Construction, FAA and FBO owned vehicles displaying the logo of the approved organization may not be required to display an AOA sticker.

Ground vehicles authorized to operate on the movement areas and safety areas at the Sample Airport are limited to only those vehicles necessary for airport operations and include the following:

Airport owned vehicles equipped with a rotating beacon and radio for communications with the ATCT.

FAA vehicles equipped with a rotating beacon and radio for communications with the ATCT.

Authorized construction vehicles when operating under airport procedures for construction vehicles and properly equipped.

Any other vehicles requiring access to the movement areas and safety areas when escorted by a properly equipped airport vehicle.

Vehicle Insurance

The Sample Airport Authority requires that all applicants for an AOA vehicle sticker show proof of vehicle insurance. The proper insurance must be maintained at all times that the vehicle is operated on the Sample Airport AOA. Proof of State Registration may also be required for privately owned vehicles authorized to operate on the AOA.

Vehicle Inspection

All vehicles utilized on the airport should have the equivalent of a state vehicle safety inspection. All vehicles must meet all of the vehicle inspection requirements of the organization by which they are owned or operated. All fuel service vehicles must meet the inspection requirements for fuel-service vehicles at Sample Airport

Daily vehicle inspections should ensure that the following items are functioning properly:

- ◆ Vehicle lights
- ◆ Vehicle horns
- ◆ Mirrors
- ◆ Fuel gauges and other operating systems
- ◆ Brakes and emergency brakes. Wheel chocks may not be used in lieu of a working emergency brake.
- ◆ Tires for condition and treads for debris that may cause FOD
- ◆ Sufficient fuel for the scheduled operation plus a reasonable reserve

In addition, if the vehicle will operate in or near the movement area at the Sample Airport, it should be equipped with the following:

- ◆ A working 2-way VHF radio for contact with the ATCTower unless operating under the escort of another vehicle meeting this requirement.
- ◆ A rotating amber beacon or strobe, except for approved construction vehicles displaying a checkered flag, or vehicles under escort of another vehicle meeting this requirement.
- ◆ Distinct markings that enable the ATCT to identify the vehicle
- ◆ A placard identifying the Light Gun Signals that may be received from the ATCT.
- ◆ A copy of the Airport Diagram.

(Refer to Advisory Circular 150/5210-5, Painting, Marking and Lighting of Vehicles used on an Airport)

Vehicle Parking

All vehicles should be parked in areas identified by the airport operator, well clear of runways, taxiways, aircraft run-up areas and any areas that may pose a danger of jet or propeller blast. Park with the engine off, with the vehicle in “PARK” and the emergency brake set. Leave vehicle keys in the ignition if practicable and stay clear of fire lanes and routes likely to be taken by emergency rescue vehicles and equipment.

Accident reporting

All accidents must be reported to the Sample Airport Authority immediately. Even the smallest incident between a vehicle and an aircraft can have a serious affect on the safety of flight. Accidents should be reported by calling the Sample Airport Authority Operations Office at the designated telephone number. Persons involved in the incident must remain at the accident scene until Operations Personnel or Airport Police have finished gathering information, questioning witnesses and taking pictures if necessary. Often, damage reports will have to be completed by the airport and the airlines or other companies whose vehicles and aircraft were involved.

(At the Sample Airport, operations personnel responding to an accident will review the incident checklist, as included in the Airport Best Practices Booklet).

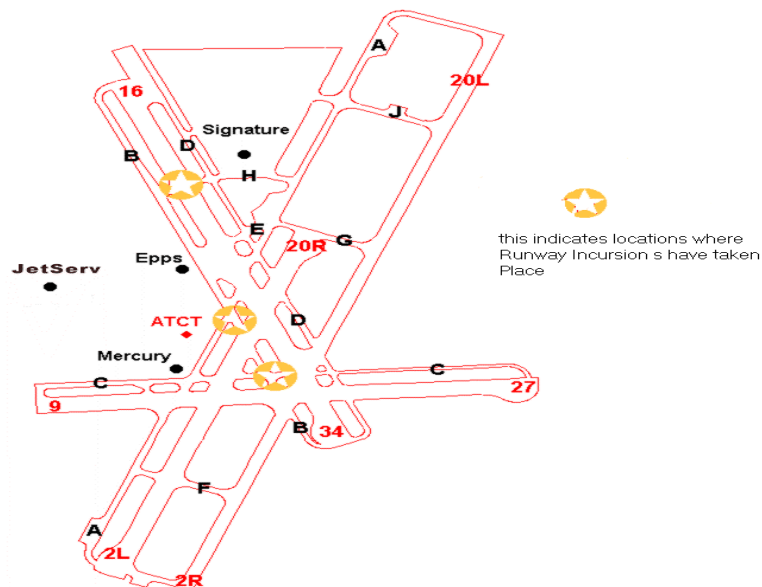
Airport Familiarization

Airfield Diagram

Attached is an airfield diagram depicting the general layout of the Sample Airport. The runways and their designations are shown along with all of the taxiway designations, apron designations and locations of major facilities, such as the Cargo Terminal, the Air Carrier Terminal, the General Aviation Terminal, the ARFF Station, and the ATCT.

(A current airport diagram and gate layout if applicable, should be provided for your airport. Each vehicle operating on the airport operations area should have a current airport diagram “installed” in a prominent location. Drivers should be trained to use the diagram for reference when accepting air traffic clearances in the movement areas and for reference in remaining clear of a movement area when driving in uncontrolled areas. The delineation of the boundary between movement areas and non-movement areas should be clearly displayed on the diagram. We also recommend that R(T)CAs, blind spots, and confusing areas be shown on the airport diagram or provided graphically to drivers in another format.)

Suggested sources for airport diagram include: a copy of an expanded airport diagram provided for your airport in the U.S. Government Terminal Procedures publication, Airport Layout Plan, project drawings prepared by an aviation consultant for the airport. It may be necessary to tailor additional charts or inserts to depict difficult areas, access roads, ramps, etc. (it should be noted that non-government, commercially prepared diagrams may be copyright protected and should not be photocopied without permission.)



Runway or Taxiway Cautionary Areas

Airport layouts in the United States range from the simple straightforward layouts of a single runway with two or three exit taxiways to the much more complex layouts found at large airports such as Dallas, Chicago and Boston. The greater the complexity, the more likely there are Runway or Taxiway Cautionary Areas (RCA or TCA) or potentially confusing areas may exist in the layout. Generally, problem intersections that are identified as R(T)CA's are those that have extra wide pavement, acute angles, more than two intersecting taxiways, more than two intersecting runways and taxiway combination intersections, and hold positions located where pilots are not expecting a hold position.

R(T)CA's may pose as much of a problem for vehicles as aircraft, which typically operate at higher speeds. All vehicle drivers authorized to operate on the movement area should be aware of the existing R(T)CA's and be trained on how to safely navigate them.

(In this section, Airport Managers may choose to identify specific R(T)CA's on their own airport. When doing so, try to evaluate the nature of the problem area and determine possible corrective measures. During the evaluation of R(T)CAs, management should examine problem intersections at the airport for the following:

- ◆ *Adequacy of existing visual aids*
- ◆ *Confusing visual aids*
- ◆ *The need for additional visual aids or enhancements to visual aids*
- ◆ *The need to relocate, cant or remove existing signs or markings*
- ◆ *Possible pavement reconfigurations for longer term correction*

Changes or enhancements to existing marking and signage are the most common recommendations made to mitigate problem intersections).

Blind Spots

The term 'blind spot' is used to describe an area from which radio transmissions and/or radar echoes cannot be received. The term is also used to describe portions of the airport not visible from the control tower. Typically, blind spots are created by service roads aligned closely to hangars or other buildings, or alleyways emerging from underneath terminal buildings. In these locations, vehicles approaching the spot from separate directions may not be able to see their conflicting traffic until directly at the corner itself. Caution must always be used when operating in these areas. Remain alert to the unpredictable or unexpected actions of other operators at these locations. At the Sample Airport, there is a blind spot where the vehicle service road passes the second row of 'T' Hangars on the general aviation side of the airport. As with R(T)CA's, drivers should be trained to safely maneuver through these areas.

Confusing Areas

Typically, other confusing areas exist around airports. For example, airport perimeter roads that exit the aprons close to, or parallel to, a taxiway can appear to be confusing, particularly at night and for novice drivers. Islands and vehicle service roads painted on large expansive aprons may be difficult to see at night or in wet conditions. All airport vehicle operators should be made aware of the confusing areas on the airport and maintain a clear sense of awareness about where they are and where their vehicle is headed at all times.

Movement Areas and Non-movement Areas

The movement area of an airport consists of the runways and taxiways. It is that portion of the airport in which the movement of aircraft and vehicles is controlled by the issuance of clearances from the ATCT. The non-movement area of the airport consists of all the remaining surfaces, including aprons, gate areas, remote deicing areas, service roads and designated portions of taxilanes that do not fall under the control of the ATCT. That portion of the runway safety area outside the dimensions of the runway is non-movement. At the Sample Airport, the boundary between the movement and non-movement areas of the airport is designated with a movement area boundary line. Only airport authorized individuals with authorization from the ATCT may drive on the movement areas. Pedestrians and bicycles are never allowed on the movement area.

(Airports that have a Letter of Agreement with their Control Tower may want to include a copy of that agreement in this section and will most certainly want to include a copy of the diagram that delineates the boundary between the movement and non-movement areas).

Insert a picture of your movement area boundary line marking.



Non-movement Area Boundary Marking

Airport Lighting

(Use the following links to check the referenced material for currency when building or updating your airport driver training manual or other documents
(www.faa.gov/arp/150acs.htm and www.faa.gov/Atpubs/aim/index.htm).

Uniform standards for lighting and visual aids combine together to enhance the efficiency and safety of air transportation. There are a wide variety of components that make up the lighting aids at an airport. The standards for these components can be found in these FAA Advisory Circulars:

AC 150/5340-24, Runway and Taxiway Edge Lighting System

AC 150/5340-28, Low Visibility Taxiway Lighting Systems

AC 150/5340-4C, Installation Details for Runway Centerline and Touchdown Zone Lighting Systems

Runway Edge Lights

Runway Lights define the lateral limits of the runway and are uniformly spaced along the runways at intervals of approximately 200 feet. Medium Intensity Runway Lights can normally be set to three light levels or ‘steps’ and High Intensity Runway Lights can be set to five levels. The edge light lenses are white, except on the last 2000 feet of an instrument runway or one-half of the runway length, whichever is less. In these sections, amber light is substituted for white light.

Runway Centerline Lighting (RCLS)

Flush mounted centerline lights define the center of the runway and are spaced at 50 foot intervals beginning 75 feet from the landing threshold and extending to within 75 feet of the opposite end of the runway. The centerline lighting system is designed flush to facilitate landings, rollouts and takeoffs under adverse day and night visibility conditions. The centerline light lenses are white, except the last 3000 feet as viewed from takeoff. The first 2000’ of this last 3000’ foot segment should be alternating red and white lenses with the last 1000 feet solid red lenses.

Touchdown Zone Lighting (TDZL)

White Touchdown Zone Lights define the landing portion of the runway and consist of two rows of transverse light bars located symmetrically around the runway centerline, normally at intervals of 100 feet. The system of flush mounted lights, begins at the runway landing threshold and extends 3000 feet from the approach.

Runway Threshold Lights

These lights define the beginning and end of the runway available and are arranged symmetrically left and right of the runway centerline. For instrument runways, there are four threshold lights one either side of the centerline; other runways will have three lights on

either side. The lights consist of a split lens, with green appearing on the approach side and red appearing on the opposite or rollout side.

Runway Guard Lights

Runway guard lights are installed at taxiway/ runway intersections, located concurrently with the runway holding position marking. They may be elevated or flush mounted flashing yellow lights. These lights alert aircraft and vehicles to the entrance of a runway.

Taxiway Edge Lights

Taxiway edge lights are used to outline the edges of taxiways and taxilanes during periods of darkness and reduced visibility conditions. These fixtures emit blue light.

Taxiway Centerline Lights

Taxiway centerline lights are used to facilitate taxiing aircraft under low visibility conditions and are occasionally used in lieu of taxiway edge lights. They are located along the centerline in both straight and curved portions of taxiways and on designated taxiing paths along portions of runway (leadoff lights) ramp and apron areas. Taxiway centerline lights are steady burning and emit green light.

Airfield Signs

All personnel authorized to drive on the movement area must be knowledgeable of FAA signage standards.

For the basics on airfield signs, look for the following Advisory Circulars, which are available on the FAA Headquarters Office of Airports web site under the Airport Safety selection at: <http://www.faa.gov/arp/150acs.htm>.

AC 150/5340-18x, Standards for Airport Sign Systems

AC 150/5345-44x, Specifications for Taxiway and Runway Signs

Basic Airfield Signs

There are four basic types of airfield signs: mandatory hold position signs, location signs, destination signs and informational signs. Mandatory signs appear as white lettering on a red background and are only used to indicate a hold position for a runway or group of runways, or to indicate an ILS hold position. No one may proceed past a red mandatory sign without explicit clearance from the operating ATCT.

The following show a typical Runway Holding Position Sign found at the approach end of Runway 33, a Runway Holding Position Sign co-located with a Taxiway Location Sign and an ILS Hold Position Sign.

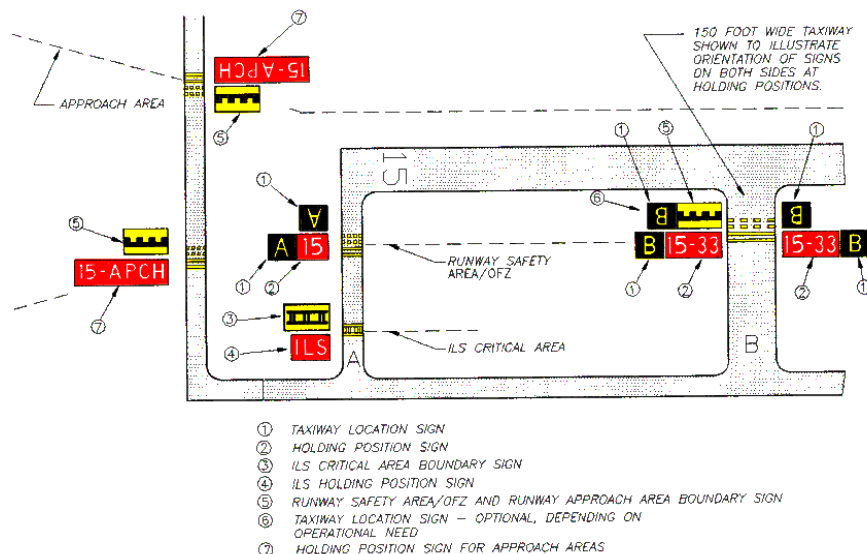


Location signs appear as yellow lettering on a black background and are used to indicate the name of the taxiway that you are on. Destination signs appear as a yellow sign with black lettering and an arrow indicating the direction. If you saw such a sign with the letter “B” and an arrow pointing to the right, then Taxiway Bravo would be to your right or the next right turn. Informational signs may indicate an FBO, an apron, noise restrictions or other pertinent information.

The following show a Location Sign for Taxiway Tango, a Destination Sign for Taxiway Alpha and an Informational Sign for the Military Apron.



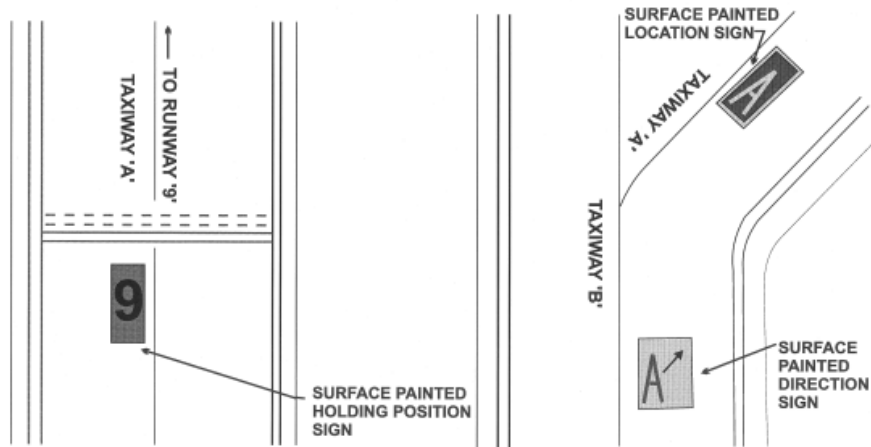
(Insert pictures of a mandatory hold sign, a location sign, a destination sign and an informational sign. For taxiway/runway configurations that have nonstandard or difficult to perceive signs, photographs may prove the most useful for reference).



Surface Painted Signs

In certain situations at some airports, usually to make a runway hold position stand out, the mandatory red hold position sign is also painted on the surface of the taxiway to supplement the signs located at the holding position. Taxiway direction and location signs may also be painted on the surface of a taxiway. They are used when it is not possible to provide a direction sign at a complex intersection or to supplement existing signs at locations where several taxiways diverge from a given intersection and the use of signs alone may still leave a measure of confusion.

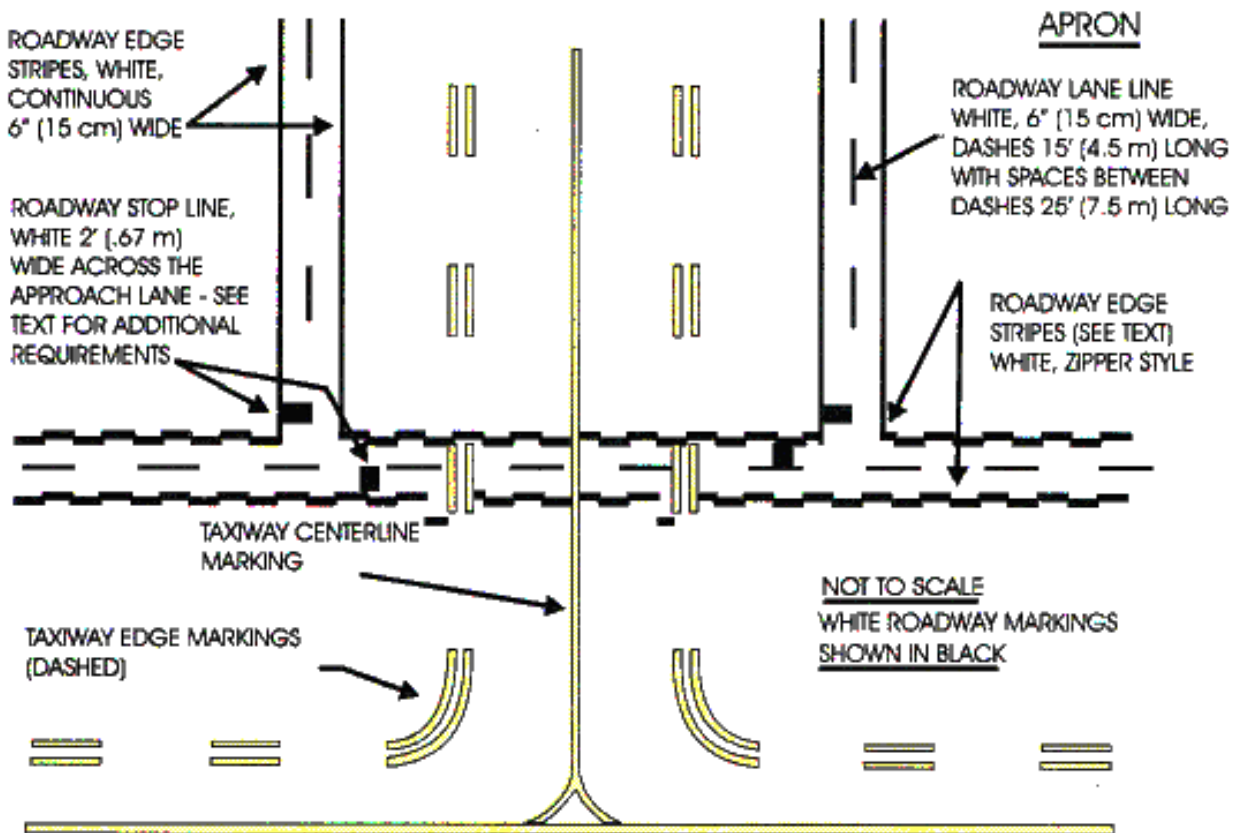
(Insert pictures of Surface Painted Signs here. The diagram below may be useful in explaining how Hold Position Markings and Surface Painted Signs are used in conjunction with each other.)



Vehicle Roadway Markings and Signs

Markings and signs not located on an aircraft maneuvering area conform whenever possible to U.S. Department of Transportation standards. Typically you will see solid white lines to depict the edge of vehicle roadways, and standard stop signs or yield signs where appropriate. A white “zipper” marking may appear to delineate the edges of a vehicle roadway at airports where roadway edges need enhanced delineation.

(Insert here pictures of roadway markings or use the diagram below.)



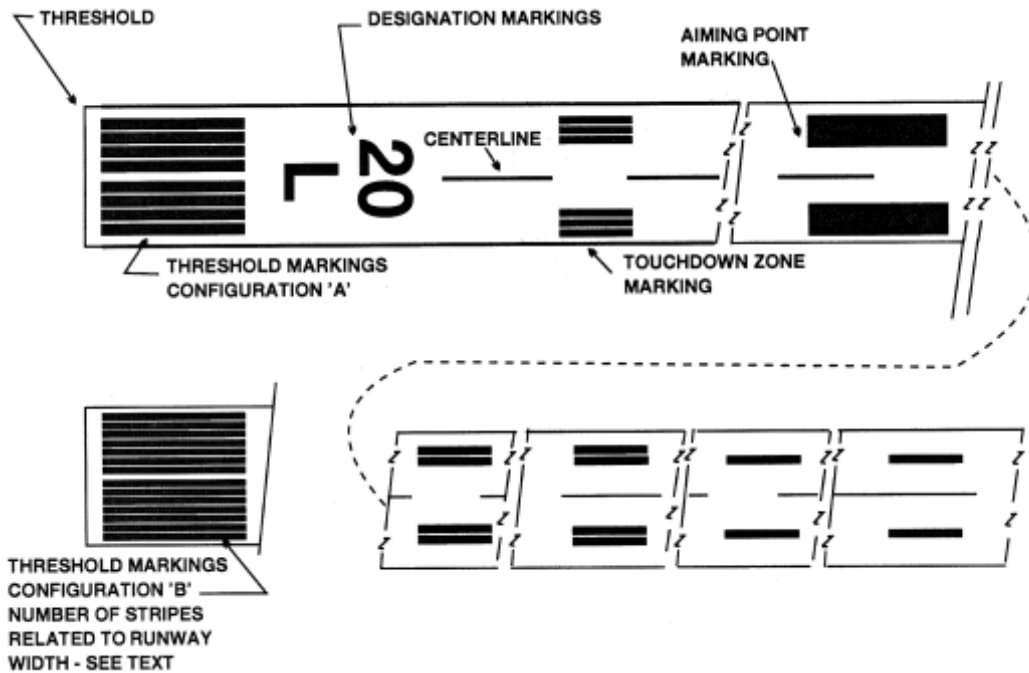
Airfield Markings

Knowing and understanding airport markings is the cornerstone to safe surface operations.

(Describe the airfield markings for your airport. The current standards for airfield markings can be found in Advisory Circular 150/5340, Standards for Airport Markings. Depending upon the complexity, standard AIM references found in AIM Chapter 2, Section 3 may be the most useful. For taxiway/runway configurations that have nonstandard or difficult to perceive marking, photographs may prove the most useful for reference.)

Runway Markings

All runway markings are white except for hold short markings at runway intersections, taxiway lead-in lines that extend onto the runway, and runway chevrons depicting a blast pad or unusable section of pavement. The following diagram depicts most of the commonly used runway markings.



Runway Designators

Runway numbers and letters are determined from the approach direction. Runways are numbered according to the magnetic alignment of the runway centerline rounded to the nearest tenth, measured clockwise from magnetic north. When there are multiple runways in a parallel configuration, letters are used to differentiate between left (L), right (R), or center (C).

Runway Centerline Marking

The runway centerline identifies the center of the runway and provides alignment guidance during takeoff and landings. The centerline consists of a line of uniformly spaced stripes and gaps.

Runway Side Stripes

The side stripes define the lateral limits of the runway and run the full length of the runway pavement available for landing and takeoff operations. Runway side stripes are white.

Runway Threshold Markings

These markings identify the beginning of the runway that is available for landing. It consists of longitudinal white stripes, 150 feet long that are spaced symmetrically about the runway centerline.

Runway Aiming Points and Touchdown Zone Markings

Aiming points appear as a pair of rectangular boxes arranged either side of runway centerline located approximately 1000 feet from the leading edge of the runway landing threshold. The aiming points together with touchdown zone markings provide a frame of reference to landing pilots. The aiming point serves as a visual aiming point for a landing aircraft. The touchdown zone markings identify the touchdown zone and are coded to provide distance information in 500-foot increments. The touchdown zone markings are symmetrically arranged in pairs either side of runway centerline.

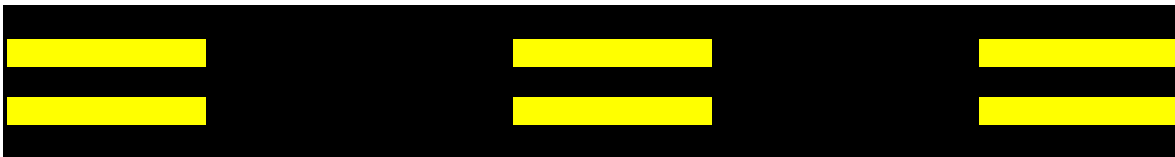
Taxiway Markings

Taxiway markings are always yellow, including the centerline, taxiway edge markings, and runway hold position markings. The centerline is a single continuous line that provides a visual clue for taxiing to ensure wing-tip clearance. The edge markings are typically used when the taxiway edge does not correspond with the edge of the pavement.

Insert here picture of Taxiway Centerline marking



Taxiway Centerline Marking

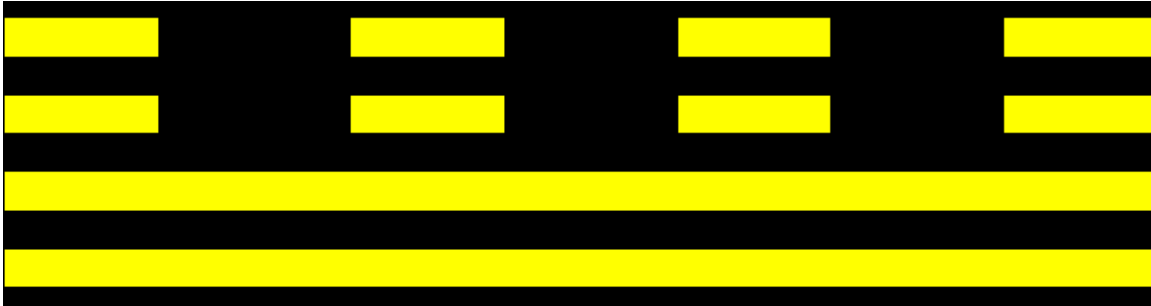


Taxiway Edge Marking

Runway Hold Position Markings

These markings identify the location where an aircraft or vehicle **MUST** stop when the operator does not have clearance to proceed onto the runway. They consist of four yellow lines, two solid and two dashed, spaced 12 inches apart and extending across the width of the taxiway or runway. The solid lines are always on the side where the aircraft or vehicle is supposed to hold. They may be located on a taxiway, runway or runway approach area.

Insert here picture of Hold Position marking.

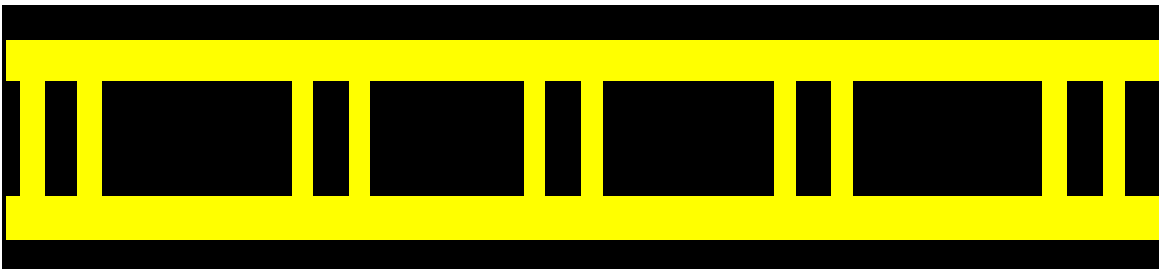


Runway Hold Position Marking

ILS Critical Areas

Under certain weather conditions of low visibility, pilots may utilize an Instrument Landing System (ILS) that provides vertical and horizontal guidance to aircraft approaching the runway. The ILS, utilizing two types of antennae, transmits the location of the runway via a radio signal to a receiver in the arriving aircraft. The antennae used are the localizer antennae and the glideslope antennae. Each of these emits radio signals critical to the operation of the system. The signals can be easily distorted by obstructions and therefore, certain areas, called ILS Critical Areas, are provided in order to protect the signals. The ILS Critical Area may be delineated on a taxiway or apron by Holding Position Markings for ILS. These markings identify the location where an aircraft or vehicle is supposed to stop if it does not have clearance to enter the ILS Critical Area. The markings, which are located perpendicular to the taxiway centerline, are yellow and appear similar to a ladder.

Insert here picture of the ILS Hold Position marking.



ILS Hold Position Marking

Airport Nav aids

Various types of air navigation aids are in use today, each serving a special purpose. These aids have varied owners and operators, including the Federal Aviation Administration (FAA), the military services, private organizations, individual states and foreign governments. The FAA has the statutory authority to establish, operate, and maintain air navigation facilities, and to prescribe standards for the operation of any of these aids, which are used for instrument flight in federally controlled airspace.

(Describe the navigation and visual aids at your airport and where they are located. To access general information and graphics to include in your manual, use the following links: (www.faa.gov/arp/150acs.htm and www.faa.gov/Atpubs/aim/index.htm). An alternative suggestion is to take digital pictures of the various aids at your airport to emphasize the actual location and make them more recognizable to your drivers).

Airport Rotating Beacon

This visual NAVAID helps pilots to locate the airport. The beacon consists of alternating green and white lights used to indicate a civil airport. The Sample Airport's rotating beacon is located on top of the terminal building.

Visual Approach Slope Indicators (VASI)

This system of lights indicates an aircraft's angle of approach and helps to prevent an overshoot or undershoot of the runway. The system consists of parallel rows of lights angled to project a white beam above the ideal approach path, and a red beam below the ideal approach path. If the pilot is approaching at the correct angle, he will see red lights above white lights. If all the lights are white the aircraft approach is too high and if all appear red, the aircraft is too low.

Other Aids to Navigation

If applicable to your airport, other information may be provided in this section of the training manual that describes the basic purpose and location of other airport landing aids. Such items may include: Approach Light Systems (ALS); Glide Slope Antennae and shackles; ILS Localizers and shackles; Non Directional Beacon (NDB) antennae; Precision Approach Path Indicator (PAPI); Runway End Identifier Lights (REIL) and Stop Bar Lights.

Airport Communications

Ground Vehicle Communications

All vehicles operating on the movement areas and safety areas at the Sample Airport must be equipped with a two-way radio, or escorted by a properly equipped vehicle, allowing communications with ATCT on ground frequency (*such as 121.7*) and local tower frequency (*such as 118.7*).

Aviation Phonetic Alphabet

The Aviation Phonetic Alphabet is used in communications for continuity and clarity between the Control Tower and all aircraft and vehicles operating on the airport surface area and to reduce confusion. Because some letters sound similar, the following words are used to reduce confusion. For example, taxiway B would be referred to as taxiway Bravo.

A	Alpha	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

Aviation Terminology

Acknowledge - Let me know you have received and understand this 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. The correct version is...

Expedite / without delay - With a sense of urgency, proceed with approved instructions in a rapid manner

Go ahead - State your request (never means "proceed")

Hold - Stop where you are.

Hold short of... - Proceed to, but hold short of a specific point.

Immediately -Used by Air Traffic Control when compliance with such action is required to avoid an imminent situation.

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 is not a yes or no answer)

Say again - Repeat what you just said

Stand by – Wait. I will get back to you. (Stand by is not an approval or a denial)

Unable - I can't do it

Verify - Request confirmation of information

Without delay - With a sense of urgency, proceed with approved instructions in a rapid manner

Wilco - I have received your message, understand it, and will comply

Procedures for Contacting the ATCT

Prior to entering upon any aircraft movement areas, radio contact must be established with the controlling ATCT. Establish initial contact on the appropriate VHF frequency at the Sample Airport stating “*who you are, where you are and where you want to go*”. Do not proceed on to the movement area until you have permission from the ATCT. If requested to “HOLD SHORT” of a runway, taxiway, or other area, you MUST acknowledge the hold short instruction by repeating it back to the controller.

The following examples represent an introduction to proper and effective phraseology when communicating with the Airport Traffic Control Tower. It is recommended that Airport Management coordinate with the local Control Tower Management to request assistance for an airfield driver workshop. Workshops that offer instruction in the use of proper phraseology should be part of the airport driver training curriculum.

Taxiways are designated phonetically:

“Taxiway ALPHA”, “Taxiway FOXTROT”, “Taxiway ROMEO”, etc.

Runways are designated numerically in relation to the magnetic heading. For simplicity, the runway designation is reduced to two (2) numerals:

“Runway two-seven (27)” is shortened from the magnetic heading 270 degrees and runs from the east to the west on a heading of 270 degrees.

“Runway four (4)” is shortened from the magnetic heading 040 degrees and runs from the southwest to the northeast on a heading of 040 degrees.

When communicating with the Control Tower, use the Aviation Phonetic Alphabet to describe the vehicle’s location or position and for specific requests for access to taxiways or runways:

VEHICLE (City 22): “Tower, City Two-Two.”

CONTROL TOWER: “City Two-Two, go ahead.”

VEHICLE (City 22): “City Two-Two at taxiway foxtrot (TWY F) to cross Runway two-six left (RWY 26L).”

Always acknowledge clearances issued by the Control Tower to cross a taxiway or runway by repeating the clearance:

CONTROL TOWER: “ Operations Two-Four, cross runway two-six left.”

VEHICLE (Operations 24): “Operations Two-Four crossing runway two-six left.”

When receiving a clearance to cross or operate on a taxiway or active runway, always call the Control Tower and report when clear:

VEHICLE (Mower 65): “Tower, Mower Six-Five, clear of runway two-six left.”

ALWAYS READ BACK “**HOLD SHORT**” INSTRUCTIONS ISSUED BY THE CONTROL TOWER:

CONTROL TOWER: “OPS one, proceed via taxiway Charlie, hold short of runway two seven (RWY 27).”

VEHICLE (OPS 1): “OPS one, roger, via taxiway Charlie, hold short of runway two seven.”

Airfield Communications without an ATCT

Not all airports have operating ATCT, and some airports with Control Towers have towers that are not open 24 hours per day. The following procedures apply to all airports with no ATCT and at airports with an ATCT during non-tower hours.







When operating at an airport without a Control Tower or at the Sample Airport while the ATCT is closed, you should broadcast your intentions on the appropriate Common Traffic Advisory Frequency (CTAF), prior to movement on the movement area. CTAF is a frequency designed for the purpose of carrying out airport advisory practices while operating to or from an airport without an operating control tower. CTAF may be a UNICOM, Multicom, FSS or tower frequency and is identified in appropriate aeronautical publications,

such as Sectional Charts and the Airport Facility Directory. Operators who remain on the movement area for prolonged periods of time; such as during snow removal or a lighting inspection, should continually announce their presence on the movement area every few minutes. When circumstances allow, it may be preferable to NOTAM “closed” the effected area until the work is completed. In all situations, the vehicle operator is ultimately responsible for the safe movement on the movement area. Broadcast your intentions, look and LISTEN for other traffic, and most importantly, be aware of the movement area environment before proceeding.

(Refer to Advisory Circular 90-42, Traffic Advisory Practices at Airports without Operating Control Towers.)

Light Gun Signals

In the event of radio failure, Air Traffic Controllers use a Light Gun with different colors as a backup system for communicating with pilots and vehicle drivers. In the event of radio failure or lost communication when working on a runway or taxiway, immediately exit the movement area via the shortest route (this may be into the grass area between the movement areas). Turn the vehicle towards the tower, flash the vehicle headlights and await the controller's Light Gun signal.

ATCT LIGHT GUN SIGNALS	
COLOR AND TYPE OF SIGNAL	MOVEMENT OF VEHICLES, EQUIPMENT & PERSONNEL
STEADY GREEN 	CLEARED TO CROSS, PROCEED OR GO
FLASHING GREEN 	NOT APPLICABLE
STEADY RED 	STOP
FLASHING RED 	CLEAR THE TAXIWAY / RUNWAY
FLASHING WHITE 	RETURN TO STARTING POINT ON AIRPORT
ALTERNATING RED / GREEN 	EXERCISE EXTREME CAUTION

This may take some time if the controller's attention is directed towards another part of the airport. Alternatively, try another frequency (switch between the tower or "local control" frequency and the ground frequency) or telephone the tower if you have access to a phone. **BE PATIENT!** Even a failed radio is not an excuse for proceeding without a proper clearance.

Driving on the Airport

Rules of Operation

The following rules are typical to those in place at most Part 139 Certificate Airports and apply to the operation of all vehicles inside the Air Operations Area (AOA) at the Sample Airport. *(Each airport has to evaluate what rules will work best for their situation. Yours may include some of these rules but are not limited to the following.)*

1. Always travel within designated lanes in a single lane of traffic only (in each direction) when in the terminal area.
2. Always adhere to all traffic signals and signs.
3. Always use the authorized service roads whenever possible
4. Do not operate vehicles or any other equipment in the vicinity of a fuel spill other than authorized emergency vehicles.
5. Vehicles parked in the immediate vicinity of an aircraft must be parked in such a way as to be facing away from the aircraft with the emergency brake set.
6. Do not drive, push or place any equipment under any part of the aircraft unless to perform the special services for which the equipment is designated. Equipment shall be positioned so that adequate clearances are maintained to protect for possible movement of flight control surfaces, such as flaps, etc.
7. Taxicabs, busses, limousines, and other motor vehicle carriers for hire shall load and unload passengers only at locations designated by Airport Operations
8. Do not allow anyone to stand up, or ride on the running board, or ride on a vehicle with his/her arms or legs protruding from the body of a moving vehicle, unless such motor vehicle is so specifically designed and designated.
9. Vehicle operators of any motor vehicle (including forklifts, tractors, tugs, and belt loaders) shall not carry passengers unless the vehicle is equipped with approved seats as appropriate for passengers.
10. Never allow anyone to disembark from a moving vehicle until it has come to a complete stop.

11. Do not allow anyone to ride in any towed or pushed unit unless such a vehicle is designed for passenger transport.
12. Never park a motor vehicle or other equipment in such a way that it might interfere with, or prevent, the passage or movement of aircraft, emergency equipment or other motor vehicles.
13. Do not back up a truck or other construction or motorized vehicle ground equipment (excluding private passenger automobiles and small baggage tractors) unless a guide-man is positioned to assist the back-up operation.
14. All vehicles when approaching from opposite directions shall pass to the right of each other and not stop when opposite each other.
15. All operators shall obey all posted regulatory signs and traffic signals and all instructions by the Control Tower, the Airport Operations Manager, or by an officer in charge of traffic control and enforcement.
16. Never operate a motor vehicle within the Sample Airport AOA in a reckless manner or with a disregard for the safety of other persons or property.
17. Never discard objects from any vehicle, either standing or in motion, at anytime.
18. Never clean, repair, maintain, or overhaul any motorized vehicle or other equipment, other than in an approved shop area, except for those repairs necessary to remove such motor vehicles or equipment to a repair facility.
19. Smoking is prohibited, both inside and outside of vehicles, anywhere in the AOA, including all ramp areas, taxiways, and runways.
20. Never operate a motor vehicle unless the vehicle headlights and taillights are kept illuminated between the hours of sunset and sunrise and at all times when passing through unlighted areas or when visibility is poor.
21. Never operate a motor vehicle if packages, equipment or an extended superstructure obstructs the driver's forward vision.
22. When entering and exiting terminal tug tunnels, operators may have restricted visibility and should use caution for other vehicle traffic entering and exiting these areas.
23. Exercise extreme caution for aircraft entering and exiting ramp areas and taxiways that cross vehicle traveled routes.

24. Exercise extreme caution for numerous persons on foot and small aircraft when traversing the general aviation parking ramps.
25. Exercise extreme care to insure that all equipment is secure from jet blast at all times.
26. Never cross pedestrian and passenger access routes between aircraft and the terminal except those vehicles servicing the aircraft. All other vehicles must travel behind the aircraft at a safe distance.
27. Never park any motor vehicle or other equipment in such a way as to block access to any fire hydrant, emergency fuel shut off device or other fire control equipment.

Speed Limits

1. Never operate any vehicle, other than an emergency vehicle proceeding in response to an alarm, within the AOA perimeter, at a speed greater than twenty miles per hour except as otherwise posted.
2. Never operate a motor vehicle on aircraft ramps, or in close proximity to parked or taxiing aircraft, or adjacent to buildings or obscured areas at a speed greater than ten miles per hour.
3. Never operate a motor vehicle in the terminal baggage areas or within twenty-five feet of a parked or taxiing aircraft at a speed that is greater than normal walking speed, or in a manner, which is considered unsafe or unreasonable.
4. To insure positive brake action on slippery surfaces, operators shall use extreme caution and reduce speed to allow for proper vehicle control.
5. Specified speed limits shall not relieve the operator of exercising caution and positive control at all times, particularly during hours of darkness, diminished visibility and abnormal weather or surface conditions

Emergency Vehicles

All vehicle operators operating a motor vehicle within the AOA perimeter shall immediately yield the right of way to all police, ambulance, fire department, and other emergency vehicles giving visual signals or audible alarms.

Operators of emergency vehicles should exercise extreme caution for unexpected movements of other vehicles, pedestrians and aircraft. Even in an emergency situation, taxiing aircraft may not give way to emergency vehicles unless specifically instructed to do so by the ATCT. When responding to an emergency aircraft on a runway, operators of emergency vehicles

must ascertain that they have clearance on the runway before proceeding past the hold position marking.

Operating near Aircraft

1. Aircraft ALWAYS have the right of way at all times over all ground vehicles, including emergency vehicles.
2. Use caution (especially at night) for wing tips of parked aircraft that may overlap vehicle service lanes on the terminal ramp.
3. Never operate a motor vehicle in such a way as to pass directly under the wings, nose, or tail area of an aircraft unless said equipment will be used in servicing the designated aircraft.
4. Other than the operator of a vehicle servicing the designated aircraft, do not operate a motor vehicle so as to pass within twenty feet of a parked aircraft. In the case of an aircraft being serviced, loaded, or unloaded at ground level, vehicles shall not be driven between the aircraft and the terminal building.
5. Never park a motor vehicle or other equipment in the operational path of a Jet-way or aircraft loading bridge at any time.
6. All trucks and equipment operating on the Airport in connection with the servicing of aircraft must be parked only in designated areas and in such a manner that permits departure from the parking area in a forward direction.
7. Operators must exercise caution for aircraft tires and brakes on aircraft that have just landed. Because tires and brakes can be hot and dangerous, persons that must approach the aircraft should do so from the front or rear, and never from the side. Aircraft brakes may explode with great force, blasting hot metal to each side of the wheel.
8. Motorized equipment may not be positioned within ten (10) feet of the aircraft fuel vents during the refueling operation.
9. Vehicle operators shall exercise extreme caution for aircraft fueling operations and ensure that adequate separation is maintained between them and all mobile fuel vehicles, fuel hydrant carts and fuel hydrants when in operation.

Aircraft under tow

1. All persons operating a tug towing an aircraft shall be properly trained in towing operations.
2. FBO and airline representatives must ensure that aircraft under tow will be maneuvered safely to and from their parked positions.
3. Ramp personnel responsible for the towing operation shall ensure proper wingtip clearances are kept at all times. If a conflict arises, personnel must take the appropriate steps to guarantee safety.
4. Any personnel that is authorized to tow an aircraft into a movement area shall ensure that all persons assisting in the tow of the aircraft are equipped with radios capable of communicating with the tow vehicle. In order to maintain a method of clear communications, at least one of the persons involved in the tow of the aircraft shall be equipped with a two way radio capable of communicating with the ATCT or with a radio capable of communicating with an escort vehicle so equipped. Hand signals shall not be used in a tow operation on a movement area.

Guidemen and Wingwalkers

The purpose of guidemen and wingwalkers is to ensure that adequate clearance is maintained between the tail and wing tips of the moving aircraft and all other aircraft, vehicles and equipment. Air Carrier and Cargo Ramp parking areas are especially congested with personnel and service equipment, and therefore the maneuvering of a large aircraft to and from the gate demands the utmost attention to safety of all persons involved. Wing walkers must maintain a positive means of communicating with the tug operator at all times during a pushback and likewise, the tug operators must remain vigilant for the signals and communications of possible hazards from the wingwalkers assisting in the movement of the aircraft.

Escorting Procedures

The following requirements are necessary for providing AOA escorts:

1. Tenants and leaseholders at the sample Airport are authorized to provide escorts *only* to and from their lease areas.
2. Tenants escorts must use the closest authorized or assigned gates for vehicles entering their lease area. Visitors under escort must be met at the gate entrance and escorted back to the gate each time they enter the AOA.

3. All tenants providing escorts are solely responsible to ensure all persons and vehicles under escort follow all rules and regulations governing vehicle operations at the Sample Airport.
4. All tenants must ensure that service vehicles and persons being escorted remain with an authorized escort provider of that tenant at all times. The escort vehicle has full responsibility to insure that visitors under escort remain with the escort vehicle. If the visitor deviates from the escort path, it is the operator's responsibility to apprehend the vehicle under escort before a deviation occurs.
5. Authorized escort providers must display a valid Security (SIDA) Badge for the Sample Airport.
6. Only Sample Airport Operations personnel or other authorized persons and vehicles may provide escort to vehicles and persons requiring access to the movement area.

Runway Safety Area Operations

The operation of vehicles in the Runway Safety Area (RSA) should be rather limited and is generally restricted to vehicles that must be in the RSA either to maintain the RSA itself (such as mowers) or to gain access to equipment located in the RSA. Runway lights, visual approach slope indicators, and instrument landing system (ILS) and glide slope antennae may be fixed by their function to locations within the limits of the RSA. Other equipment such as glide slope and ILS equipment shelters and various weather monitoring devices may be located just outside the limits of the RSA, often between 250 feet to 350 feet from the runway centerline.

The purpose of the runway safety area is to provide support for the occasional passage of an aircraft resulting from an overshoot, undershoot or other excursion from the runway surface. Thus, the safety area should be a smooth, unrutted surface, free of objects that might cause damage to an aircraft or its landing gear. It is essential for the safety of aircraft using the runway that the safety area remain as pristine as possible. At airports certificated under FAR 139, vehicles and objects may not be in the RSA during an air carrier operation. When it is essential to perform work in the RSA, it is best to close the affected runway if possible, or at a minimum, restrict the use of the runway to non air- carrier aircraft.

It is imperative that all vehicle drivers, who have access to the movement area, are aware of the physical boundary limits of the RSA. It is also important to remember that whenever personnel are working in the RSA, it is NOT the responsibility of Air Traffic to provide or deny clearances to the Runway Safety Area. This is because the RSA is not considered movement area. It is the responsibility of the 139 airport operator to maintain the RSA clear of objects and vehicles during air carrier operations. (*Reference 139.309 b4*)

Drivers of vehicles working in the RSA close to the runway, such as those involved in mowing operations, must be particularly cautious and listen carefully to radio instructions from the ATCT. At the Sample Airport, mower operators working inside the RSA of the general aviation runway must wear headphones to enhance their ability to monitor Air Traffic instructions. At the Sample Airport, no vehicles are allowed to operate within the RSA during air carrier operations.

Runway Crossings

What if?

You should be prepared to deal with the unexpected whenever operating on a vehicle on the AOA. Equipment will fail, people do make mistakes, and mishaps occur. In any event, always keep calm and use common sense with a regard for airport safety. If your vehicle breaks down on a non-movement area, get someone's attention and notify your supervisor immediately to provide assistance. If the breakdown occurs on the movement area, you must notify the controller in the ATCT immediately. Attempt to remove the vehicle to the edge of the taxiway to allow aircraft and other vehicles to pass you if possible. Notify your supervisor by company radio or wireless phone so that the vehicle can be cleared to a non-movement area as soon as possible. Do not abandon your vehicle on the movement area! If your radio fails, orient yourself towards the ATCT for light gun signals. If any mandatory safety equipment on the vehicle fails, such as headlights for night operations, rotating beacon for movement area operations, or vehicle brakes, notify your supervisor and remove the vehicle from service. Never continue to use a vehicle with inoperative safety devices.

Vehicle Violations and Consequences

The Sample Airport Operations Department enforces the rules and regulations regarding vehicle safety on the Airport Operations Area, including all service roads, aircraft parking aprons and the movement area. A Notice of Violation will be issued for any observed violation of any rules, regulations and laws established for the safe and orderly conduct of motor vehicles while on the AOA. At the Sample Airport all violators, even those with minor infractions, are required to complete re-current ground vehicle training prior to being allowed to operate a vehicle on the AOA again.

At most airports with 139 certificates, airport officials have the authority to impose fines and other penalties for violations of the airport driving regulations. At the Sample Airport, the penalties for violations are:

AIRPORT DRIVER TRAINING GUIDE

First non movement area violation	Employer is subject up to \$100 fine and violator must complete recurrent training
Second non movement area violation	Employer is subject up to \$200 fine and violator must complete recurrent training
Third non movement area violation	Employer is subject up to \$200 fine and violator will loose driving privileges
First movement area violation	Employer is subject to \$200 fine and violator must complete recurrent training
Second movement area violation	Employer is subject to \$200 - \$500 fine, violator must complete recurrent training and violator's driving privileges will be restricted to non movement area

The Sample Airport reserves the right to immediately revoke the driving privileges of violators who cause a serious accident or incident such as a runway incursion.

Beyond the penalties imposed by the Sample Airport, there may be many other serious consequences as a result of an operator's failure to adhere to the airport's regulations for ground vehicles. These other consequences may include injury, death, damage to a vehicle, aircraft damage, loss of air traffic controller time, air carrier delays, investigative resources expended, lost operational time, aircraft down time, penalties imposed and lost employment.

Airport Driver Training

Initial and Recurrent Training

The initial training received by a new airport employee sets the tone for how that employee will approach all future training on the subject. The importance of safety and responsibility cannot be stressed too much. A license to drive at the Sample Airport is a privilege not to be taken lightly. A serious and educational approach is an essential element of vehicle training. Another important element of a formal ground vehicle training program is recurrent training. Recurrent training is necessary to ensure that vehicle operators remain familiar with vehicle procedures and any changes related to ground vehicle operations that occurred in the previous year. Seasonal vehicle operators, such as airline employees who drive deicing equipment to remote deicing pads or those who operate snow removal equipment, need to receive recurrent training just prior to the start of snow and ice conditions. Recurrent training also places additional emphasis on the importance of safe ground vehicle operations in addition to addressing changes.

Day, Night and Low Visibility Operations

If you have to drive at night, it's a good idea to take someone with you the first couple of times, who is familiar with how the airport looks at night. The airport will look very different at night and in poor or limited visibility. Whenever driving at night or in bad weather, allow yourself a little extra travel time and drive slower than you normally would. At the Sample Airport, night time drivers are required to have completed a night time "check-out" drive before operating a vehicle alone during hours of darkness.

Under winter conditions, lights, signs and markings may be obscured by snow. Braking action will be greatly diminished, and all surfaces will be slippery due to the presence of ice, snow, slush and even de-icing fluids. Snow removal equipment may be operating in low visibility conditions and may not see your vehicle. Use extreme caution; remember that there are extra risks present.

(Airports with approved SMGCS plans should include appropriate information applicable to drivers authorized to operate vehicles when SMGCS is in effect. Refer to Advisory Circular 150/120-57).

Driver Testing

All drivers will be tested in accordance with the type of driving permit for which they have completed training. Testing may include any items from the appropriate tier syllabus as designated by Sample Airport Operations.

All drivers must successfully complete:

- Classroom indoctrination session which includes airport driving videos
- Pass a written airport specific test

Tier Two and Tier Three Drivers must successfully complete:

- Observation and ride along with an appropriately licensed tier two or three driver
- Practical “hands on” training driving test on applicable airport areas. The practical test will be administered under the supervision of Sample Airport Operations.

Tier Three Drivers must successfully complete:

- An oral examination of key items
- A practical driving test on the movement area
- Demonstrate proficiency in aviation terminology and alphabet and VHF radio procedures
- Demonstrate adequate situational awareness on the airfield at all times

Training Checklist

(Airports may wish to include training checklists that include the items listed in Recommended Best Practices or similar to the checklist used at the Sample Airport).

Sample Airport Training Curriculum for Tier Three Drivers

All personnel applying for tier three driving permits must complete training and testing to demonstrate proficiency in each of the following areas:

- Personnel requirements
- Vehicle requirements
- Definitions
- Airport Familiarization
- Introduction to Airport Rules & Regulations
- FOD control
- Airport Security
- Consequences
- Tier One Regulations
- Tier Two Regulations
- Non Movement Area check out ride
- Tier Three Regulations and the Movement Area
- Runway Safety Areas
- Communications

- Escorting in the Movement Area
- Confusing Areas and R(T)Cas
- Movement Area check out ride
- Night time check out ride

Maintaining Airport Safety

Foreign Object Damage (FOD)

Damage caused by rocks and other debris is called foreign object damage (FOD.) FOD is commonly used as an acronym for foreign object debris, as well. A jet engine can ingest trash and other debris into the engine, causing extensive damage. If an engine ingests an object, during the take-off phase of operation, the result may be catastrophic if the engine fails or flies apart. Trash on a movement area may also puncture tires, dent or puncture wings, or damage other parts of an aircraft. Rocks can also be a serious problem. A rock sucked into a jet engine can shred turbine blades in a matter of seconds. A rock striking a propeller can cause severe damage to the propeller. If a propeller at a high velocity launches a rock, it can gravely injure anyone unlucky enough to be in its path.

You can make our airport a safer place by removing all FOD and ensuring it is placed in a covered container that can't be blown over by wind or jet blast. It is the responsibility of all leaseholders, to ensure that their leased portion of the ramp or apron is routinely inspected for FOD.

Vehicle drivers can do their part to prevent FOD by examining vehicle tires for soil and mud deposits under a vehicle that can contaminate the aircraft movement areas. All operators should clear their vehicles of trash several times a day. All vehicles operated on the AOA must be equipped with a lidded container for depositing FOD and trash as it is encountered during the operation of the vehicle. All operators should pick up foreign debris and trash whenever it is detected. Maintain a continuous lookout for, and remove all FOD that may present a safety hazard. ***FOD prevention is everyone's responsibility!*** For more information, refer to Advisory Circular 150/5380-5B, Debris Hazards at Civil Airports.

Gate Cards and AOA Access

No person shall operate any motor vehicle within the AOA unless such operation is directly related to an aviation activity on the airport, or to the business activity of the Sample Airport.

Such vehicles may include, but are not limited to the following:

- Airline equipment
- Catering vehicles
- FAA maintenance and security vehicles
- Fixed-base operator (FBO) service vehicles
- Sample Airport Authority vehicles

Authorized snow removal equipment
Authorized construction vehicles
Other vehicles escorted by authorized escort providers

The use of motorcycles and bicycles are not permitted on the AOA

Except for passengers or crew members in the process of enplaning or deplaning an aircraft, NO person shall enter the Security Identification Display Area (SIDA) portion of the AOA without displaying valid identification issued by the Airline (only in an airline lease area) or by the Sample Airport Authority.

The use of gates to access the AOA shall be restricted to authorized personnel employed by authorized tenants of the Sample Airport Authority. Gate cards shall not be transferred to other users and any misconduct in the use of gate cards shall be grounds for revocation of AOA access privileges. A complete discussion of airport security issues involving the use of gate cards may be found in the Sample Airport Authority's Security Manual if applicable.

Contractor Issues

The issues affecting contractors working on the AOA may seem to be somewhat unique amongst typical operations at an airport, yet the basic precautions and rules applicable to all operations in the AOA also apply to outside contractors.

Who are these contractors? Most often we find that the list of contractors includes personnel from a host of professions including, but certainly not limited to: airport designers; concrete and asphalt pavers; electricians; engineers; environmental specialists; ground water and air quality specialists; surveyors; wildlife biologists and technicians; and weather and navigational aid specialists. What all these contractors have in common is the limited amount of time they actually spend working on an airport. For many, this may amount to as little as a few hours or a day. They're not based at the airport and may only need access to the AOA for a limited period of time. Often, they have little, if any aviation background. Despite the brief amount time these contractors may require access to your airport, it is critical that escort procedures and AOA procedures be thoroughly explained to contractors and their employees BEFORE allowing access. Their actions on the AOA should be closely monitored. Cordoning off designated work areas with frangible stakes or flags may be helpful in controlling contractors and reducing the risk of inadvertent entry into unauthorized areas.

Another factor to consider when preparing for airfield contractors pertains to the nature of the work being performed. Wildlife contractors, for example, may become fixated on the presence and movements of wildlife and may not always be attuned to aircraft movements or the boundaries of the Runway Safety Area. Construction employees may become tunnel visioned by the nature of their work, such as laying out electrical cable or grinding asphalt,

and are often working in a dusty or reduced visibility area. Safety precautions must be taken to anticipate the unique situations facing each of these contractors and should be addressed by the airport operator with assistance from the contractor PRIOR to allowing access. The ATCT supervisor should be advised of contractors working on the airfield. Where will they be? How long will they be there? What is the nature of their work? Prior coordination will usually prevent confusion and misunderstandings later on when the work is under way.

Construction Issues

Construction on an airport presents its own unique set of variables and increased risk to normal airport operations. Thorough construction safety plans should be developed and approved well in advance of the construction project. An important consideration often overlooked, is the effect that closed runways, taxiways and aprons have on the remaining operations of the airport. If a parallel taxiway is closed, an increased traffic load can be expected on the adjacent apron, which may further reduce the available maneuvering room for aircraft that normally park or load on this apron. Fuel trucks, tugs, catering and other service vehicles will all be impacted to varying degrees by this reduced maneuvering room.

Access for emergency vehicles may be changed or hindered by the temporary impacts of construction. It is imperative that emergency access be addressed in the planning phase of the project to assure that right of way for emergency vehicles is not only maintained at all times, but that emergency service providers are constantly aware of changing conditions and entry points.

Each airport operator and each construction project will have a unique set of circumstances and variables to consider when developing a construction safety plan. Nevertheless, some of the following basic precautions should be considered. All construction personnel should be allowed to gain access to and from the construction site ONLY via routes and gates designated by the Sample Airport Authority. Entry should be limited to such periods of time as specified in the construction contract.

No motor vehicle or other construction equipment under the supervision of a construction contractor should be allowed to remain at the work site at the end of the working day, unless specifically authorized. When authorized to remain on the airport, equipment should not be parked overnight in any position or location where it constitutes an actual or potential hazard to aircraft or motor vehicles at the airport.

Only persons specifically trained and authorized should be allowed to operate construction equipment on or across any active taxiway or runway at the airport. Authorized vehicles and equipment must be escorted across or on to any movement area by an authorized escort motor vehicle equipped with a two-way radio in contact with the ATCT. Persons who are authorized to operate construction equipment on movement areas at the Sample Airport will

be required to complete Sample Airport Authority Ground Vehicle Operator Training prior to commencing construction activity.

For most major construction projects, a special Driver training Program developed specifically for the construction personnel should be developed and implemented. The job of maintaining airfield safety during airport construction is not something that can be delegated solely to the Resident Engineer. Maintaining and awareness for safety is everyone's job, and that sense of safety concern must be built in to training from day one.

(For more information about construction on airports, refer to Advisory Circular 150/5370-2C, Operational Safety on Airports During Construction).

What if something goes wrong?



It is the purpose of any Driver Training Program to educate drivers to be alert for the dangers around them. Increased vigilance is often the key to preventing mishaps from occurring to begin with. Yet, despite all our best efforts, you should still be prepared to deal with the unexpected whenever operating a vehicle on the AOA. Equipment will fail, people do make mistakes and mishaps occur. In any event, always keep calm and use common sense with a regard for airport safety.

If your vehicle breaks down in a non-movement area, get someone's attention and notify your supervisor immediately to provide assistance. If any mandatory safety equipment on the vehicle fails, such as headlights for night operations, rotating beacon for movement area operations, or vehicle brakes, notify your supervisor and remove the vehicle from service. Never continue to use a vehicle with inoperative safety devices.

If the breakdown occurs on the movement area, you must notify the controller immediately. Attempt to remove the vehicle to the edge of the taxiway to allow aircraft and other vehicles to pass you if possible. Notify your supervisor by company radio or wireless phone so that the vehicle can be cleared to a non-movement area as soon as possible. Do not abandon your vehicle on the movement area! If your radio fails, orient your vehicle towards the control tower and watch for light gun signals.

Education, training and awareness are the best tools we have for preventing adverse performance. Airport surface safety is everyone's responsibility!