U.S. Department
of Transportation
Federal Aviation
Administration

Advisory Circular

Subject: Ground Vehicle Operations and Mechanic Taxiing or Towing an Aircraft on Airports

Date: Draft
Initiated by: AAS-300

AC No.: 150/5210-20A
Change:

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1. PURPOSE.

This Advisory Circular (AC) and the attached appendices provide guidance to airport operators in developing training programs for safe ground vehicle operations, a mechanic taxiing or towing an aircraft, and pedestrian control on the airside of an airport. The term vehicle includes aircraft being taxied under their own power or being towed. Not all the items addressed in this document will be applicable at every airport. The Federal Aviation Administration (FAA) recommends that each item be evaluated in terms of how it may apply to the size, complexity, and scope of operation of the airport. This AC contains recommended operating procedures, a sample training curriculum (Appendix A), and a sample training manual (Appendix B).

2. BACKGROUND.

Every year there are accidents and incidents, and runway incursions involving aircraft, pedestrians, ground vehicles, and mechanics taxiing or towing aircraft at airports that lead to property damage and injury, which may be fatal. Many of these events result from inadequate security measures, a failure to maintain visual aids, a lack of such aids, and inadequate vehicle operator, and mechanic taxiing or towing aircraft training. Ground vehicle operation plans promote the safety of airport users by helping identify authorized areas of vehicle operation, outlining vehicle identification systems, addressing vehicle and operator requirements, and coordinating construction, maintenance, and emergency activities.

3. APPLICABILITY.

The overall responsibility for the operation of vehicles on an airport rests with the airport operator, and for mechanics taxiing or towing aircraft, there is a shared responsibility between the airport operator and aircraft operator. The airport operator is also responsible for compliance with the requirements of part 139 at airports holding an airport operating certificate and with the provisions of any applicable Federal grant agreements. Adherence to the provisions contained in this AC may materially assist the airport operator in complying with these requirements.

3.1 Airport Procedures and Policies for Vehicle Access.

Airport operators should establish procedures and policies concerning vehicle access and vehicle operation on the airside of the airport. Further, given the definition of an aircraft, Pilot Controller Glossary states in part: An Aircraft is a device(s) that are used or intended to be used for flight in the air. Therefore, given that a mechanic taxiing or towing an aircraft is not intended for flight, Airport operators should include mechanics in their procedures and policies concerning access on the airside of the airport. Notwithstanding that FAA Flight Standards will investigate and provide enforcement of violations of a mechanic taxiing an aircraft, on the airside of the airport. Notwithstanding that FAA Flight Standards will investigate and provide

enforcement of violations of a mechanic taxiing an aircraft, these procedures and policies should address such matters as access, vehicle operator and mechanic taxiing or towing an aircraft requirements, vehicle requirements, operations, and enforcement and should be incorporated into tenant leases and agreements.

3.2 Regulation Change.

Establishment of procedures for the safe and orderly access to the movement and safety areas and operation in those areas are required at all certificated airports, under 14 C.F.R. §139.329(b). Initial and recurrent training in procedures for access to the movement and safety areas are required for all persons under revised § 139.303(c). Additionally, initial and recurrent training is required for all persons, under revised § 139.329(e).

3.3 Ground Vehicle Operations During Construction.

Each bidding document (construction plans and/or specifications) for development work on an airport or for installation of an air navigation facility (NAVAID) should incorporate a section on ground vehicle operations on airports during construction activity. The airport operator should provide a copy of this plan to the local FAA Airways Facilities office for review. The construction plans and/or specifications should contain the appropriate provisions, as specified in Appendix 1 of AC 150/5370-2, *Operational Safety on Airports During Construction.*

4. CANCELLATION.

This AC cancels AC 150/5210-20, *Ground Vehicle Operations on Airports,* dated June 21, 2002, and Change 1 to AC 150/5210-20, dated March 31, 2008.

5. PRINCIPAL CHANGES.

Changes to this AC include the following:

a. Addresses aircraft being taxied by persons other than certificated pilots

b. Adds a definition for Airport Operations Area

c. Revises the definition for Non-Movement Area

d. Replaces the term “Apron” with “Ramp” to harmonize with the International Civil Aviation Organization (ICAO)

e. Adds definition for Vehicle or Pedestrian Deviation

f. Numerous changes to format and content throughout the document

6. COMMENTS OR SUGGESTIONS.

Send comments or suggestions for improving this AC to—

Manager, Airport Safety and Operations Division
Federal Aviation Administration ATTN: AAS-300
800 Independence Avenue SW
Washington DC 20591

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7. RELATED READING MATERIAL.

You will find additional information in the following publications:

a. 14 CFR part 139, Certification of Airports

b. Current editions of the following advisory circulars:

(1) AC 90-67, *Light Signals from the Control Tower for Ground Vehicles, Equipment, and Personnel*

(2) AC 120-57, *Surface Movement Guidance and Control System*

(3) AC 150/5210-5, *Painting, Marking, and Lighting of Vehicles Used on an Airport*

(4) AC 150/5340-1, *Standards for Airport Markings*

(5) AC 150/5340-18, *Standards for Airport Sign Systems*

(6) AC 150/5340-24, *Runway and Taxiway Edge Lighting System*

(7) AC 150/5370-2, *Operational Safety on Airports During Construction*

(8) AC 150/5210-18, *Systems for Interactive Training of Airport Personnel*

(9) AC 150/5200-30, *Airport Winter Safety and Operations*

(10) AC 150/5210-21, *Airport Surface Safety Training Programs For Mechanics and Ramp Personnel*

(11) FAA Order 5200.10, *Procedures for Conducting Investigations of Vehicle/Pedestrian Deviations*

c. To view or download an electronic copy of this AC, visit the FAA Web site at http://www.faa.gov/airports/resources/advisory circulars/.

8. VEHICLE OPERATOR REQUIREMENTS.

Vehicle operators on airports face conditions that are not normally encountered on public streets and highways. Therefore, those persons who have vehicular access to the airside and a need to be there must have an appropriate level of knowledge of airport rules and regulations. Airport operators should require vehicle operators to maintain a current driver's license and should establish a means of identification that would permit the operation of a vehicle on the airside of an airport. Any person expected to operate on the Airside should demonstrate a functional knowledge of the English language.

9. TRAINING.

9.1 Sample Training Curriculum.

Appendix A includes a sample training curriculum. This curriculum should be included in initial, and may be included in recurrent and/or remedial, instruction of airport employees, tenants, contractors, and users who have access to the airside of the airport. The airport operator should retain records of this training as long as this person is authorized to operate on the airport. Escorted access does not normally require training. The airport operators may modify these documents to meet their individual situations and may find it beneficial to have separate requirements for vehicles operated solely on an apron area and those that operate on the movement area. There also are commercial driving simulators available for airport driver training.

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9.2 Initial and Recurrent Training.

Initial training is the training provided to a new employee or airport user that would enable that person to demonstrate the ability to operate a vehicle safely and in accordance with established procedures while functioning independently on the airside. Recurrent training is the training provided to an employee or airport user as often as necessary to enable that person to maintain a satisfactory level of proficiency. Appropriate schedules for recurrent training will vary widely from airport to airport and from one employee to another. Airport operators might consider requiring annual recurrent training when a vehicle operator renews an expired airport ID badge or when a tenant renews a lease agreement. A sample Ground Vehicle Operating Familiarization Program Training Record is included in Appendix B.

9.3 On-the-Job Training.

The FAA also recommends on-the-job training before personnel have unescorted access to the airside of the airport.

9.4 Training Format.

Airports use a variety of methods for training ground vehicle operators. In some cases, airport operators delegate the requirement of employee training to airport tenants or a contractor. Some airport operators choose to include training manuals or vehicle-operating requirements as part of tenant lease or use agreements. An airport operator may choose to distribute training manual information via a Web page, videos, or booklets. Formal classroom instruction provided by the airport operator or tenant can include either personal instruction or a computer-based interactive training system. (See AC 150/5210-18.)

9.5 Testing.

Airport operators should provide a means of testing trainees on the information presented. In addition to standard question and answer classroom testing methods, the airport operators should have potential ground vehicle operators demonstrate their proficiency in operating a vehicle on the airside before authorizing driving privileges, especially if those operators will be driving on the movement area.

10. VEHICLES ON AIRPORTS.

Airport operators should keep vehicular and pedestrian activity on the airside of the airport to a minimum. Vehicles on the airside of the airport should be limited to those vehicles necessary to support the operation of aircraft services, cargo and passenger services, emergency services, and maintenance of the airport. Vehicles on the movement area should be limited to those necessary for the inspection and maintenance of the movement areas and emergency vehicles responding to an aircraft emergency on the movement area. Vehicles should use service roads or public roads in lieu of crossing movement areas whenever possible. Where vehicular traffic on airport operation areas cannot be avoided, it should be carefully controlled to insure the airport operator is controlling vehicles/men and equipment in the RSAs and that ATO must comply with the airport operators RSA safety limitations and restrictions. During low visibility conditions of ceiling 800 feet and/or visibility below 2 miles, particular detail should address the emphasis of avoiding ILS or Localizer arrays, e.g. mowing operations and snow removal. This may also be facilitated by a LOA between the airport operator and the local ATO.

10.1 Runway Crossings.

When necessary, runway crossing should occur at the departure runway end rather than the midpoint. In the event of a runway incursion, an aircraft would have more time and runway

length to react if the vehicle incursion is at the end of the runway. The aircraft might be able to come to a stop before striking the vehicle or it may be able to abort the landing.

10.2 Aircraft Operations.

Some aspects of vehicle control and identification are discussed below; however, every airport presents different vehicle requirements and problems. Every airport will require individualized solutions to prevent vehicle or pedestrian traffic from endangering aircraft operations. It should be stressed that aircraft ALWAYS have the right-of-way over vehicles when maneuvering on non-movement areas. Aircraft also have the right-of-way on the movement areas, except when the Airport Traffic Control Tower (ATCT) has specifically instructed an aircraft to hold or give way to vehicle(s) on a runway or taxiway.

10.3 Vehicle Marking and Lighting.

Vehicles that routinely operate on the airside should be marked/flagged for high daytime visibility and, if appropriate, lighted for nighttime operations. Vehicles that are equipped with marking and lighting devices should escort vehicles that are not marked and lighted. (See AC 150/5210-5.) Vehicles needing intermittent identification should be marked with magnetically attached markers, which are commercially available.

11. VEHICULAR ACCESS CONTROL.

The control of vehicular activity on the airside of an airport is of the highest importance. The airport operator is responsible for developing procedures, procuring equipment, and providing training regarding vehicle operations to ensure aircraft and personnel safety. Even with the most sophisticated procedures and equipment, vehicle operators need training to achieve safety. The airport operator should give special consideration to training temporary operators, such as construction workers, even if escort service is being provided.

11.1 Airports with an Operating ATCT.

At airports with an operating ATCT, controllers and vehicle operators should use two-way radios to control vehicles when on the movement area. To accomplish this task, the airport operator and the ATCT should develop a letter of agreement outlining standard operating procedures. When there is construction on an airport, whether federally funded or not, the airport operator should follow the ground vehicle practices contained in AC 150/5370-2.

11.2 Airports without an Operating ATCT.

At airports without an operating ATCT, two-way radio control between vehicles and fixed-based operators or other airport users should avoid frequencies used by aircraft.

11.3 Restricting Airside Access.

Inadvertent entry by vehicles onto movement and non-movement areas of an airport poses a danger to both the vehicle operator and aircraft that is attempting to land or take off or that are maneuvering on the airport. Methods for controlling access to the airside will vary depending on the type and location of the airport. The Airport Layout Plan is a useful tool for accomplishing this. Airports may erect a fence or provide for other natural or physical barriers around the entire airport in addition to providing control measures at each access gate, such as guards, magnetic card activated locks, or remotely controlled locks. Gates may either be opened/closed electronically or secured by lock and chain. Physical barriers might include natural objects, such as earthen berms, large boulders, tree trunks, and manmade culverts that could help control remote vehicle access points.

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12. VEHICLE REQUIREMENTS.

Requirements for vehicles will vary depending on the airport, the type of vehicle, and where the vehicle will be operated on the airport. An airport operator should limit vehicle operations on the movement areas of the airport to only those vehicles necessary to support the operational activity of the airport. Airport operators might find it beneficial to have separate requirements for vehicles operated solely on the apron area as opposed to those vehicles that operate on movement areas.

12.1 Vehicle Inspection Programs.

Some airports have benefited from establishing their own vehicle inspection program to assure that all vehicles are maintained in a safe operating condition. In establishing vehicle requirements, some items to consider include—

a. Marking and identification of vehicles

b. Minimum equipment requirements such as Super Tugs or specialty vehicles

c. Inclusion in all vehicles of a placard diagram depicting the airport's movement area. The diagram should display prominent landmarks and/or perimeter roads. Vehicles intended to operate within the movement area should also include a placard showing the meaning of ATCT light gun signals and airfield sign, lighting, and marking information.

d. Vehicle condition requirements and inspection

e. Appropriate insurance coverage

13. VEHICLE AND MECHANIC TAXIING OR TOWING AN AIRCRAFT OPERATIONS.

The rules and regulations pertaining to these operations should provide adequate procedures for the safe and orderly operation of vehicles and aircraft that are taxied or towed by mechanics on the airside of the airport. In developing such procedures, airport operators should consider—

a. Vehicle operators, and mechanics authorized to taxi or tow an aircraft, must be able to read, write, speak, and communicate in and understand the English language.

b. Requirements that vehicles operating on movement areas be radio equipped or escorted by a radio-equipped vehicle

c. Specific procedural requirements for vehicle operations on airports without an operating ATCT

d. Advance notice/approval for operating a non-airport owned vehicle on the movement area

e. Speed limits

f. Distracted driving - Talking/texting on mobile devices while in motion.

g. Prohibitions on—

(1) Passing other vehicles and taxing aircraft

(2) Leaving a vehicle unattended and running

(3) Driving under an aircraft except when servicing the aircraft

(4) Driving under passenger bridges

h. Requirements stipulating when vehicle lights must be operated

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i. Requirements for the use of dedicated vehicle lanes and perimeter roads whenever possible

j. Locations where vehicles may and may not park

k. Rules of right-of-way (e.g. for aircraft, emergency vehicles, other vehicles)

l. Areas where vehicles may be serviced

m. Procedures for inoperative radios while on a movement area

n. Requirements to report all accidents involving ground vehicles on the airside

o. Requirements making the vehicle operator responsible for passengers in the vehicle

14. EMERGENCY OPERATIONS AND OTHER NON-ROUTINE OPERATIONS.

Airport operators allow a number of non-routine operations to occur on the airside of the airport. Such non-routine activities include airfield construction, airshows, aircraft static displays, VIP arrivals/departures, commercial photo shoots, or a host of other activities. In addition to security requirements, airport operators should recognize and prepare for the unique challenges that arise during non-routine operations as they relate to vehicle operations. Airport operators should review non-routine operations that involve ground vehicles and develop vehicle operation procedures to accommodate these special operations.

14.1 Planning Meetings for Non-Routine Operations.

Planning meetings associated with non-routine activities offer an opportunity to review driving rules and regulations, communications and procedures, and air traffic control procedures as well as other important operational issues. These meetings should pay special attention to the following activities.

14.1.1 Airside Construction.

The airport operator should develop procedures, procure equipment, and provide training on vehicle operations to ensure aircraft safety during construction as specified in AC 150/5340-2.

14.1.2 Emergency Response/Mutual Aid.

Many airports rely on local emergency services to provide aircraft rescue and firefighting or emergency medical services. Airport operators should ensure that such emergency service providers receive initial and recurrent training in the subject areas identified in paragraph 10, Vehicle Operations, and maintain records of such training. In addition, any mutual aid agreement between the local emergency service providers and the airport operator should specify vehicle operations training requirements.

14.1.3 Snow and Ice Removal.

Airport Operators who use contractors for snow and ice control operations should ensure agreements with such contractors include vehicle operations procedures, including training requirements, consequences of non-compliance, and vehicle communications requirements. The FAA recommends that, when possible, airport operators limit contractors to non-movement areas. When an ATCT is not in operation, or there is no ATCT, procedures should be developed to advise air traffic on the Common Traffic Advisory Frequency (CTAF) of any intentions to remove snow and ice in the movement area.

14.1.4 Low-Visibility Operations.

Additional consideration should be given to vehicle operations during low visibility. Poor

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weather conditions (snow, fog, rain, etc.) may obscure visual cues, roadway markings, and airport signs. During low visibility conditions of ceiling 800 feet and/or visibility below 2 miles, particular detail should address the emphasis of avoiding ILS or Localizer arrays, e.g. mowing operations and snow removal.

14.2 Surface Movement Guidance and Control System (SMGCS).

Some airports have a Surface Movement Guidance and Control System (SMGCS), which provides guidance to, and control or regulation of, all aircraft and ground vehicles on the movement area of an airport. Guidance relates to facilities, information, and advice necessary to enable pilots of aircraft, or drivers of ground vehicles, to find their way on the airport and keep the aircraft or vehicles on the surfaces and areas intended for their use. Control or regulation means the measures necessary to prevent collisions and to ensure that the traffic flows safely. For additional information on the SMGCS and the SMGCS Plan, refer to AC 120-57.

15. SITUATIONAL AWARENESS.

There are a number of factors that hamper vehicle operator situational awareness. Situational awareness declines as a driver's attention is drawn into the vehicle or is focused on any one thing to the exclusion of everything else. Other such factors include vague or incomplete communications or a vehicle operator's personal conflicts, which may involve fatigue and stress. Running behind schedule or being over-tasked also contributes to a reduction in situational awareness. Certainly, degraded operating conditions, such as equipment malfunctions, rain, fog, or snow, may also diminish a vehicle operator's situational awareness.

15.1 Training for Situational Awareness.

There are ways to enhance situational awareness. As part of a ground vehicle operator's training program, airport operators may concentrate on having vehicle operators visually scan fixed and moving objects that may be converging into the vehicle's path. Airport operators should also promote the use of clear and concise communications by vehicle operators. Most important, airport operators should alert vehicle operators to distractions caused by social interactions while operating a vehicle on the airside.

15.2 Airside Improvements to Increase Situational Awareness.

Airport operators may also be able to increase situational awareness for vehicle operators with enhancements on the airside. Such enhancements may include establishing dedicated marked routes for vehicles that avoid high activity, congested areas, or blind spots. The elimination or relocation of fixed objects that hinder a vehicle operator's line of sight or block radio transmissions may also enhance safety. Airport operators will soon have an added aid in the fight against distractions. Soon to be incorporated in the vehicle environment Automatic Dependent Surveillance - Broadcast (ADS-B). This system enables equipped aircraft and ground vehicles to continually broadcast information, such as identification, current position, altitude, and velocity. More information on this technology will be available in a future advisory circular on Ground Vehicle ADS-B Operations. Technology can't totally replace clearing for aircraft; you must ensure that you look both ways down the runway to visually acquire aircraft landing or departing even if you have a clearance to cross.

16. ENFORCEMENT AND CONTROL.

Airport operators should establish procedures for enforcing the consequences of non-compliance,

including penalties for violations. Tenant lease or use agreements may include these enforcement provisions. Listed below are control issues that airport operators should address as part of a ground vehicle and mechanic taxiing or towing aircraft control program:

a. Implementation of a tiered identification badging system that permits easy recognition of a vehicle operator's permitted driving area privileges

b. Prohibition against transfer of registration media to a vehicle other than the one for which originally issued

c. Policies for surrendering permits to airport management when a vehicle is no longer authorized entry into a facility

d. Periodic checks to ensure that only properly authorized persons operate vehicles and only properly authorized mechanics taxi or tow aircraft on the airside

e. System to control the movement of commercial trucks and other goods conveyances onto and out of the airside of an airport

f. Briefing or training for delivery drivers if they are permitted direct access to the airside

g. Implementation of a progressive penalty policy

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Director, Office of Airport Safety and Standards

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APPENDIX A. GROUND VEHICLE ACCESS PROGRAM TRAINING CURRICULUM

A.1 PURPOSE OF TRAINING CURRICULUM.

The purpose of the Ground Vehicle and Mechanic Taxiing or Towing Access Program Training Curriculum is to provide airport operators with a comprehensive list of training topics for educating vehicle operators, and mechanics taxiing or towing aircraft who may have access to the airside of an airport. Each individual airport has unique situations that might require site-specific training. Airport operators may use this training curriculum as a guide for developing and implementing a detailed training program tailored to the airport's individual situation.

The training program provides vehicle operators and mechanics taxiing or towing aircraft with the level of training necessary for their positions so they are capable of operating safely on the airside of an airport and avoid causing a runway incursion. Specific programs may be tailored to account for the items listed below:

a. Various infield aircraft navigation aids

b. Identification of a given point on a grid map or other standard map used at the airport

c. Applicable airport rules, regulations, or procedures pertaining to vehicle operations

d. Airport layout, including designation of runways and taxiways and hot spots

e. Boundaries of movement areas

f. Interpretation and color coding of airfield signs, pavement markings, and lighting

g. Location and understanding of critical areas associated with instrument landing system (ILS) and very high frequency omnidirectional ranges (VORs)

h. Proper terminology (including phonetic alphabet) and procedures for radio communications with the airport traffic control tower (ATCT)

i. ATCT light gun signals

j. Established routes for emergency response vehicles

k. Dangers associated with jet blast and prop wash

l. Traffic patterns associated with each runway (left or right) and location of each leg; i.e., downwind, base, final, and crosswind

m. Situational awareness

A.2 TRAINING PROGRAMS FOR VEHICLE OPERATIONS ON RAMPS ONLY.

An airport operator may choose to develop customized training programs for vehicle operators, such as airline employees, who may be restricted to operating ground vehicles only on ramps areas.

A.3 AREAS OF TRAINING.

All drivers and mechanics taxiing or towing aircraft must have training in the following areas.

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A.3.1 Discussion of Runway Incursions, Airfield Safety, and Security

Training Outcome(s) – Trainee should be able to define a runway incursion, describe how to avoid causing an incursion, what they should do if involved in an incursion, and explain the benefits of airfield safety/security.

A.3.2 Definitions and Terms

Training Outcome(s) – Trainee should be knowledgeable of airport signage, runway markings, lighting, and the terms used on an airport.

A.3.3 Vehicle Operating Requirements

- **a.** Authorized Vehicles and Vehicle Identification
- **b.** Vehicle Lighting
- **c.** Vehicle Insurance
- **d.** Vehicle Inspection
- **e.** Vehicle Parking
- **f.** Accident Reporting
- **g.** Perimeter Roadways
- **h.** Aircraft Lighting

Training Outcome(s) – Trainee should be knowledgeable of ground vehicle requirements.

A.3.4 Mechanic Taxiing or Towing an Aircraft Requirements

Mechanic will provide the airport operator documentation from the mechanic's employer indicating that the certificated A&P mechanic is qualified to start, run, taxi or tow that particular type of Aircraft.

A.3.5 Rules and Regulations

- **a.** Review
- **b.** Noncompliance/Penalties

Training Outcome(s) – Trainee should be knowledgeable of ground vehicle and aircraft taxiing and towing rules and regulations.

A.3.6 Testing

- **a.** Written Test
- **b.** Practical Test

Training Outcome(s) – Trainee should be able to pass a written examination with a minimum score of 90 percent.

In addition to items a–e, instruction for drivers authorized to drive and mechanics to taxi or tow an aircraft on the movement area must-also include those subject areas identified under Airport Familiarization and Communications.

A.3.7 Airport Familiarization at least one day and one night evaluation

- **a.** Runway Configuration/Safety Area
- **b.** Taxiway Configuration/Safety Area
- **c.** Movement Areas and Non-Movement Areas

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d. Confusing Areas and designated Hot Spots

e. Airport Lighting

(1) Runway

(i) Runway Edge Lights

(ii) Touchdown Zone

(iii) Taxiway Lead-Off Lights

(iv) Threshold

(v) Runway Approach Light System

(2) Taxiway

(i) Taxiway Edge Lights

(ii) Taxiway Centerline Lights

(iii) Runway Guard Lights

f. Airfield Signage

(1) Runway Position Holding Sign

(2) Taxiway Location Sign

(3) ILS Critical Area Sign

(4) Direction Sign

(5) Distance Remaining Sign

g. Airfield Markings

(1) Runways

(i) Centerline

(ii) Edge Markings

(iii) Runway ID Numbers

(iv) Threshold Markings

(v) Hold Short Lines

(2) Taxiways

(i) Hold Lines

(ii) ILS Hold Line

(iii) Geographic Position Markings

(iv) Centerline and Enhanced Centerlines

(v) Edge Markings

(3) ILS Critical Areas

(4) Non-Movement Area Boundary Marking

h. Airport NAVAIDS and Visual Approach Aids

(1) Location

(2) Non-interference

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Training Outcome(s) – Trainee should be able to label all critical parts on the airport, identify, and explain the purpose of all marking, lighting, and signs on the airport.

A.3.8 Communications

a. Ground Vehicle, mechanic towing an aircraft, and a mechanic taxiing an aircraft Communications

(1) Radio Frequencies

(2) Procedural Words and Phrases

b. Aviation Phonetic Alphabet

c. Aviation Terminology and phrases

d. Procedures for Contacting the ATCT

e. Airfield Communications at Airports Without Operating ATCT

f. Light Gun Signals

g. Procedures for when the vehicle operator or a mechanic is lost or disoriented in the movement areas or RSA, etc.

(1) Description of Light Gun and How to Signal Tower

Training Outcome(s) – Trainee should be able to adequately send and receive radio messages

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APPENDIX B. SAMPLE GROUND VEHICLE OPERATIONS TRAINING MANUAL

NOTE: This sample training manual provides airport operators with a template for developing and implementing proposed policies or procedures for controlling ground vehicles, mechanics taxiing or towing aircraft, and equipment accessing the airside of an airport. Airport operators may use the format below but adapt the requirements to specific conditions found on the airport. The first part of the appendix could serve as driving and taxiing or towing aircraft rules and regulations that could be adopted by the airport operator who would fill in the appropriate blanks or blocks of text or revise the document for a specific airport. Section 2 would serve as a suggested driver and mechanic taxiing or towing aircraft training manual. In this section, the airport operator could add or delete information as it applies to the airport. For example, if the airport has no instrument approach, reference to the ILS signs and protection of critical areas could be deleted. Also, the airport operator is encouraged to replace illustrations of signs with those found on the airport.

Section 1. Airport Driving and Mechanic Taxiing or Towing Aircraft Rules and Regulations

1.1 Authority for Implementation of Rules and Regulations. The (NAME) Airport operates under the authority of (JURDISTICTION). (CITY/COUNTY ORDINANCE OR STATE STATUTE) has granted the (AIRPORT OPERATOR) the authority to make bylaws for the management and supervision of its airport affairs.

1.1 Applicability. This regulation applies to all users of, and persons on any portion of, the property owned or controlled by (AIRPORT OPERATOR). No persons are exempt from airport operating training requirements for operating a vehicle on the airside of an airport. Tenant organizations must be responsible for the dissemination of, accessibility to, and compliance with these rules and regulations by their employees.

These Rules and Regulations may be amended, changed, or modified by (AIPORT OPERATOR), as necessary.

1.2 Definitions. The following terms are defined as indicated in this section for the purpose of this Ground Vehicle Operation Training Manual. *(The airport operator should include only those definitions applicable to its airport and conditions.)*

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

1.2.2 Air Carrier Apron–an apron for air carriers. Only authorized personnel and vehicles may operate on this apron. Private vehicles and aircraft are prohibited from operating on it.

1.2.3 Airside/Air Operations Area (AOA)–Any area of the airport used or intended to be used for the landing, takeoff, or surface maneuvering of aircraft. An air operations area includes such paved or unpaved areas that are used or intended to

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be used for the unobstructed movement of aircraft in addition to its associated runways, taxiways, or aprons.

1.2.4 Airport Traffic Control Tower (ATCT)–operated by an appropriate authority to promote the safe, orderly, and expeditious flow of air traffic.

1.2.5 Aircraft–a device that is used or intended to be used for flight in the air.

1.2.6 Airport–(NAME) International Airport Facility, owned and operated by (AIRPORT OPERATOR), including all improvements and equipment existing or to be developed.

1.2.7 Apron–a defined area on an airport or heliport intended to accommodate aircraft for the purposes of parking, loading and unloading passengers or cargo, refueling, or maintenance.

1.2.8 Common Traffic Advisory Frequency (CTAF)–radio frequency designed for the purpose of carrying out airport advisory practices while operating to or from an airport without an operating ATCT or when the tower is closed. The CTAF may be a UNICOM, MULTICOM, FSS, or tower frequency and is identified in appropriate aeronautical publications. (See below for definitions of UNICOM, MULTICOM, and FSS.)

1.2.9 Fixed-Based 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 tie-down, pilot and passenger facilities, airframe and power plant maintenance, aircraft sales and rental, and pilot instruction.

1.2.10 Flight Service Station (FSS)–air traffic facilities that provide pilot briefings, en route communications, and visual flight rules search and rescue services; assist lost aircraft and aircraft in emergency situations; relay air traffic control clearances; originate Notices to Airmen; broadcast aviation weather and National Airspace System information; receive and process instrument flight rules flight plans; and monitor NAVAIDS. In addition, at selected locations, FSSs provide En Route Flight Advisory Service (Flight Watch), take weather observations, issue airport advisories, and advise Customs and Immigration of trans border flights.

1.2.11 Foreign Object Debris (FOD)–debris that can cause damage to aircraft engines, tires, or skin from rocks, trash, or the actual debris found on runways, taxiways, and aprons.

1.2.12 General Aviation (GA)–that portion of civil aviation that encompasses all facets of aviation except air carriers holding a certificate of public convenience and necessity.

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1.2.13 Ground Vehicle–all conveyances, and aircraft not operated for the purpose of flight, used on the ground to reposition or test aircraft, transport persons, cargo, fuel, or equipment.

1.2.14 ILS Critical Area–an area provided to protect the signals of the localizer and glideslope.

1.2.15 Incursion–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.

1.2.16 Jet Blast–jet engine exhaust or propeller wash (thrust stream turbulence).

1.2.17 Law Enforcement Officer (LEO)–any person vested with police power of arrest under Federal, state, county, or city authority and identifiable by uniform, badge, and other indication of authority.

1.2.18 Light Gun–a hand-held, directional light-signaling device that emits a bright 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.

1.2.19 Mobile Fueler–a vehicle owned and/or operated by authorized agents to pump and dispense Jet A and 100 LL fuel at (AIRPORT). This may include fuel tankers, in-to-plane fueling pumpers, and hydrant carts.

1.2.20 Movement Area–the runways, taxiways, and other areas of an airport that aircraft use for taxiing, takeoff, and landing, exclusive of loading aprons and aircraft parking areas.

1.2.21 MULTICOM–a mobile service not open to public correspondence used to provide communications essential to conduct the activities being performed or directed from private aircraft.

1.2.22 Non-movement Areas–the area, other than that described as the movement area, used for the loading, unloading, parking, and movement of aircraft on the airside of the airport (including apron areas and on airport fuel farms).

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

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

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

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1.2.26 Runway–a defined rectangular area on a land airport prepared for the landing and takeoff run of aircraft along its length.

1.2.27 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.

1.2.28 Runway Safety Area–a defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway.

1.2.29 Surface Movement Guidance and Control System (SMGCS)–a system comprising the provisions for guidance to, and control or regulation of all aircraft, ground vehicles, and personnel of the airport during low-visibility operations. Guidance relates to facilities and information necessary for pilots and ground vehicle operators to find their way about the airport. Control or regulation means the measures necessary to prevent collisions and to ensure that traffic flows smoothly and efficiently.

1.2.30 Taxiways–those parts of the airside designated for the surface maneuvering of aircraft to and from the runways and aircraft parking areas.

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

1.2.32 Uncontrolled Airport–an airport without an operating airport traffic control tower or when airport traffic control tower is not operating.

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

1.2.34 Vehicle or Pedestrian Deviation (V/PD)-any entry or movement on the airport movement area or safety area by a vehicle operator or pedestrian that has not been authorized by air traffic control (includes surface incidents involving aircraft operated by nonpilots, such as mechanics).

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

1.2.36 Very High Frequency Omnidirectional Range (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.

1.2.37 Wake Turbulence–phenomenon 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.

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1.3 Severability. If any section, subsection, subdivision, paragraph, sentence, clause, or phrase of these Rules and Regulations or any part thereof is for any reason held to be unconstitutional, invalid, or ineffective by any court of competent jurisdiction or other competent agency, such decision will not affect the validity or effectiveness of the remaining portions of these Rules and Regulations.

1.4 Violation of Rules—Penalties and Suspension of Driving or mechanic taxiing or towing an aircraft Privileges. Any person who does not comply with any of the provisions of these Rules and Regulations, or any lawful order issued pursuant thereto, will be subject to progressive penalties for repeat violations. These penalties may include being denied use of the Airport by (OPERATOR) in addition to the penalties described pursuant to Federal, state, or local authorities. *(The airport operator should tailor this section to discuss its enforcement policies.)*

1.4.1 Penalties for failure to comply with the Airside Vehicular Traffic Regulations must consist of written warnings, suspension of airside driving privileges, and/or revocation of airside driving privileges. Receipt of _____ written warnings by an operator of a vehicle in any 12-month period will automatically result in suspension of airside driving privileges. Receipt of _____written warnings in any 12-month period will automatically result in revocation of airside driving privileges.

1.4.2 Based on an evaluation of the circumstances or the severity of a particular incident or incidents, the (AIRPORT OPERATOR) reserves the exclusive right to assess any penalty it deems appropriate at any time to any individual authorized to operate a vehicle on the airside without regard to prior operating history.

1.4.3 Suspension of airside driving privileges must be no less than _____ calendar days and no greater than _____ calendar days.

1.4.4 The (AIRPORT OPERATOR) will provide a copy of all written warnings issued to an operator to the local manager of the company owning or in possession and control of the vehicle or vehicles involved in the violation(s).

1.5 The (AIRPORT OPERATOR) must require any individual involved in a runway incursion or other vehicle incident to complete remedial airfield driver training.

1.6 Regulations on the Airside of an Airport for Driver and Mechanic Taxiing or Towing an Aircraft.

1.6.1 Vehicle Operator and Mechanic taxiing or towing and aircraft **Requirements.**

a. All applicants must satisfactorily complete the applicable driver's training class before receiving an airside driver's license or badge to use in taxiing an aircraft.

b. All applicants must pass the written test with a grade of at least ___ percent. Applicants who do not pass the written test may retake the test after additional study and a ____ day period.

c. Applicants for movement area driving taxiing or towing an aircraft privileges must be required to successfully complete an airside driving taxiing or towing an aircraft test by a designated representative of (AIRPORT OPERATOR).

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d. No vehicle must be operated or mechanic taxi or tow an aircraft on the airside unless—

(1) The driver is authorized to operate the class of vehicle by an appropriate state-licensing agency or by the driver's employer through a company training/certification program.

(2) The driver properly displays an approved, airport-issued ID card with the Authorized Driver designation (*if applicable*).

e. To taxi an aircraft, the mechanic is a certificated A&P mechanic trained by the aircraft maintenance facility, owner, or aircraft operator to start, run, and taxi or tow that particular type of Aircraft. To tow an aircraft, the mechanic is trained by the operator to tow that particular aircraft model and other than towing an aircraft with a "Towbarless tractor," this is to guard against if the tow bar breaks, there is a trained person in the cockpit that can stop the aircraft.

f. No person operating or driving a vehicle on any aircraft ramp must exceed a speed greater than _____ miles per hour. Factors including, but not limited to, weather and visibility must be taken into consideration when determining safe operating speed.

g. No vehicle must pass another ground vehicle in a designated vehicle roadway.

h. No vehicle must pass between an aircraft and passenger terminal or passenger lane when the aircraft is parked at a gate position except those vehicles servicing the aircraft. All other vehicles must drive to the rear of the aircraft and must pass no closer than _____ feet (m) from any wing or tail section.

i. Moving aircraft and passengers enplaning or deplaning aircraft must have the right-of-way at all times over vehicular traffic. Vehicle drivers must yield the right-of-way.

j. No vehicle operator must enter the airside unless authorized by (AIRPORT OPERATOR) or unless the vehicle is properly escorted.

k. No vehicle operator or mechanic taxiing or towing an aircraft must enter the movement area—

(1) Without first obtaining permission of the (AIRPORT OPERATOR) and clearance from the ATCT to enter the movement area;

(2) Unless equipped with an operable two-way radio in communication with the ATCT; or

(3) Unless escorted by an (AIRPORT OPERATOR) vehicle and as long as the vehicle remains under the control of the escort vehicle.

(4) Mechanics taxiing or towing an aircraft, without the authorization of the aircraft operator, and receives ATCT clearance to enter the airport movement area.

l. No person must operate any motor vehicle that is in such physical or mechanical condition as to endanger persons or property or that the (AIRPORT OPERATOR) considers an endangerment.

m. No person must—

(1) Operate any vehicle that is overloaded or carrying more passengers than for which the vehicle was designed.

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(2) Ride on the running board or stand up in the body of a moving vehicle.

(3) Ride with arms or legs protruding from the body of a vehicle except when the vehicle was designed for such use.

n. A vehicle guide person is required whenever the vision of the vehicle operator is restricted.

o. No fuel truck must be brought into, stored, or parked within 50 feet of a building. Fuel trucks must not be parked within 10 feet from other vehicles.

p. Container carriers and tugs must tow no more carts, pods, or containers than are practical, under control, tracking properly, and safe.

q. When not serving aircraft or undertaking their intended functions, apron vehicles and equipment must be parked only in approved areas.

r. Vehicle operators must not operate or park vehicles under any passenger loading bridge.

s. No person must park a vehicle in an aircraft parking area, safety area, or gross area or in a manner that obstructs or interferes with operations in the aircraft movement area or apron area.

t. No person must park, or leave unattended, vehicles or other equipment that interfere with the use of a facility by others or prevent movement or passage of aircraft, emergency vehicles, or other motor vehicles or equipment.

u. No person must park a vehicle or equipment within ____ feet (m) of a fire hydrant or in a manner that prohibits a vehicle from accessing the fire hydrant.

v. No person must operate a vehicle or other equipment within the airside under the influence of alcohol or any drug that impairs, or may impair, the operator's abilities.

w. Each vehicle operator using an airport perimeter (security) gate must ensure the gate closes behind the vehicle prior to leaving the vicinity of the gate. The vehicle operator must also ensure no unauthorized vehicles or persons gain access to the airside while the gate is open.

x. Vehicle operators must not operate vehicles in a reckless or careless manner. A reckless or careless manner is one that intentionally or through negligence threatens the life or safety of any person or threatens damage or destruction to property.

y. Vehicles must not enter the movement area or cross runways unless the operator of the vehicle has received required training and authorization from the (AIRPORT OPERATOR) to operate on the movement area. Whenever possible, all airport vehicles must utilize the airport perimeter and service roads to transition between areas on the airport.

z. Each vehicle operator is responsible for the activities of each vehicle passenger on the airside of the airport.

1.6.2 Vehicle Regulations.

a. No vehicle must be operated on the airside unless it has proper registration in the (STATE) or is a qualified off-road vehicle that is not normally operated on public streets but has received the approval of the (AIRPORT OPERATOR).

b. All vehicles operated on the airside must have vehicle liability insurance, as

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required by the (AIRPORT OPERATOR).

c. The (AIRPORT OPERATOR) must approve tenant vehicles operated on the movement and non-movement areas. These vehicles must display a (AIRPORT OPERATOR) sticker or an airport-approved company logo that is at least _____ inches (cm) in height on the passenger and operator's doors.

d. Carts or pieces of equipment being towed or carried after darkness must have side and rear reflectors or rear lights.

e. No vehicle must be permitted on the airside unless—

(1) It is properly marked, as outlined in FAA Advisory Circular 150/5210-5, *Painting, Marking, and Lighting of Vehicles Used on an Airport.*

(2) It is in sound mechanical condition with unobstructed forward and side vision from the driver's seat.

(3) It has the appropriately rated and inspected fire extinguishers (service vehicles and fuel trucks).

(4) It has operable headlamps and brake lights.

f. Vehicles operating on the movement area must be equipped with operating amber rotating beacon or equivalent.

g. All aircraft refueling vehicles and any other vehicle 8-foot or more in width must be equipped with a flashing amber beacon and flashing front, tail, and clearance lights that are activated at all times when operating on the airside.

1.6.3 Vehicular Accidents. Operators of vehicles involved in an accident on the airport that results in injury to a person or damage to an aircraft, airport property, or a vehicle must—

a. Immediately stop and remain at the scene of the accident.

b. Render reasonable assistance, if capable, to any person injured in the accident.

c. Report the accident immediately to the (AIRPORT OPERATOR) before leaving the scene, if possible.

d. Provide and surrender the following to any responding (AIRPORT OPERATOR) personnel: name and address, airport identification card, state driver's license, and any information such personnel need to complete a motor vehicle accident report.

Section 1. Driving on the Non-Movement Areas

1.7 Non-movement areas include aprons, portions of the runway safety areas (RSA), and other areas not under control of the ATCT. Anyone authorized to operate a motorized vehicle on the airside may do so on the non-movement areas (except RSA) without being in positive radio contact with the ATCT. These areas include—

a. Service roads

b. Cargo aprons

c. General aviation apron

d. Air carrier apron(s)

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1.8 Driving. Operating within the apron areas requires the vehicle driver to exercise extreme caution as aircraft are always moving, aircraft passengers may be walking from an aircraft to the gate, and noise levels are high.

1.8.1 Vehicle drivers should—

a. Never drive between safety cones or across delineated passenger walkways.

b. Watch cockpit blind spots—pilots typically cannot see behind or below the aircraft.

c. Avoid jet blast or prop wash, which can blow debris or overturn vehicles.

d. Be aware and avoid moving propellers that can cause damage, injury, or death.

e. Be aware of other vehicle movements—you may not hear them approaching due to aircraft engine noise.

f. Yield to aircraft, passengers, and emergency vehicles, which ALWAYS have the right-of-way on the Air Operations Area of the airport.

1.8.2 When traveling on the apron, always use designated vehicle service roads. Driving close to buildings, around vehicles, or aircraft is prohibited. This policy helps to establish a predictable order to vehicle movements in congested areas and helps to ensure their visibility to aircraft and other vehicles.

1.8.3 Parked aircraft may still have their engines running, so be aware of the hazards of jet blast or prop wash, which may overturn vehicles. Before an aircraft engine is started, the aircraft's red flashing beacons must be on. In some instances, propellers and engine spinners are marked to indicate when the engine is operating. A pilot's ability to maneuver quickly on the ground is limited. Propellers and jet engines can cause significant damage and injury to personnel. In addition, cockpit visibility prohibits the pilot from seeing under the nose or behind the aircraft and limits the pilot's ability to avoid ground vehicles.

1.9 Nighttime and Poor Weather Driving Conditions. Poor weather conditions (snow, fog, rain, etc.) might obscure visual cues, roadway markings, and airport signs. Vehicle operators should remain vigilant of their surroundings and operating boundaries. Watch out for snow removal equipment and aircraft operating in the vicinity under low-visibility conditions. There are additional risks present under these conditions.

Section 2. Driving and Mechanics taxiing or Towing Aircraft on the Movement Areas

1.10 Drivers, and mechanics taxiing or towing an aircraft, who are authorized to operate on the movement area require more training and vigilance since there are dangers associated with this area that are not present on non-movement areas. In addition to the principals for driving on the non-movement area, drivers and mechanics that have access to the movement area must be cognizant of the meaning of airfield signs, markings, and lighting configurations. Additionally, they must be able to communicate with air traffic control (ATC) and be able to follow ATC directions. Airport Operator must have a MOU with the local ATCT regarding

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any specific procedures for operations on the movement areas. This includes temporary suspension of the air carrier operations to conduct daily inspections, FOD removal, etc.

1.11 ATCT Control. Movement areas are defined as the runways, taxiways, and other areas of the airport that are used for taxiing, hover taxiing, air taxiing, and takeoff and landing of aircraft, exclusive of loading aprons and aircraft parking areas. Movement areas are considered "positive control," meaning that all vehicle operators and mechanics taxiing or towing an aircraft will need permission from ATC before entering the area.

1.12 Authorized Vehicles and Mechanics Taxiing or Towing an Aircraft. Only those vehicles and mechanics taxiing or towing an aircraft, necessary for airport operations may enter a movement area. Therefore, fuel trucks, maintenance vehicles, tugs, catering trucks, and other nonessential vehicles should not be permitted to enter these areas. Exceptions may include (AIRPORT OPERATOR)-authorized vehicles with appropriately trained personnel. Airport Operations/Maintenance must coordinate all other vehicle operations within the movement areas.

1.13 Taxiways.

1.13.1 Designations. Aircraft use taxiways to move to and from the aprons and the runways. Taxiways are designated by letters or by a letter/number combination such as A, B, G2, or B3. (The Airport Operator should include a diagram of the airport here with the taxiway and runway designations.)

1.13.2 Lighting. Taxiways are lighted with **blue** edge lighting and/or reflectors. Some taxiways are also lighted with **green** in-paved, centerline lighting that also include Taxiway Lead On/Off lights, which alternate yellow/green. (*Use airport-specific example here.*)

1.13.3 Signs. The signs used on taxiways are direction, destination, location, and taxiway ending marker signs.

1.13.3.1 ***Direction and Designation Signs*** have black lettering and a directional arrow or arrows on a yellow background. The arrow indicts the direction to that taxiway, runway, or destination.

Taxiway Directional Sign

1.13.3.2 ***Location Signs*** have **yellow lettering** on a **black background**. The location sign below indicates that the operator of the vehicle/equipment is located on the named taxiway or runway.

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Taxiway Location Sign

1.13.3.3 ***Runway Safety Area/Object Free Zone (OFZ) and Runway Approach Area Boundary Signs,*** when required, identify the boundary of the runway safety area/OFZ or the runway approach area to the pilot and vehicle operator. The driver can use these signs to identify when the vehicle is clear of the runway environment. It has a **black inscription** that depicts the hold line marking on a **yellow background**.

Runway Safety Area/OFZ and Runway Approach Boundary Sign

1.13.4 ***Markings.*** Pavement markings on taxiways are always yellow. The taxiway centerline is painted on all taxiways. On the edges of some taxiways, there is a solid, double yellow line or double-dashed line. If pavements are usable on both sides of the line, the lines will be dashed; if not, the lines will be solid.

1.13.4.1 ***Enhanced Taxiway Centerline Markings*** provides supplemental visual cues to alert pilots of an upcoming runway holding position marking (Pattern A) for minimizing the potential for runway incursions. To reinforce situational awareness before entering a runway, this safety enhancement is only used on those taxiways that directly enter a runway.

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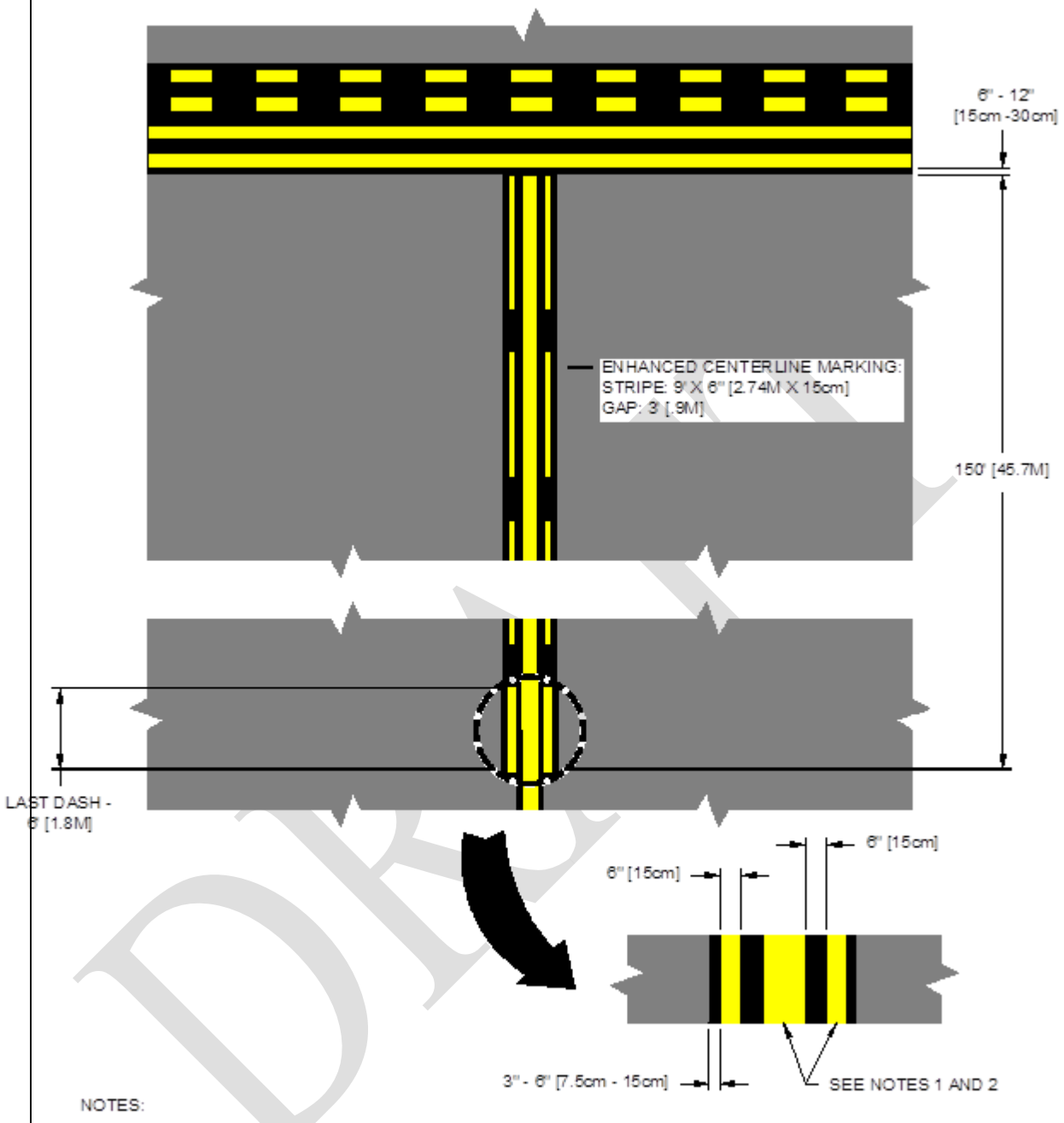
ENHANCED TAXIWAY CENTERLINE MARKINGS.



NOTES:

1. DASHED LINES FOR THE ENHANCED TAXIWAY CENTERLINE MARKING ARE 6" [15cm] IN WIDTH AND SEPARATED 6" [15cm] FROM THE TAXIWAY CENTERLINE. THIS APPLIES TO BOTH 6" [15 cm] AND 12" [30 cm] TAXIWAY CENTERLINE MARKINGS.
2. THE TAXIWAY CENTERLINE MARKINGS MAY BE SHIFTED LEFT OR RIGHT TO AVOID INTERFERENCE WITH THE TAXIWAY CENTERLINE LIGHTS.

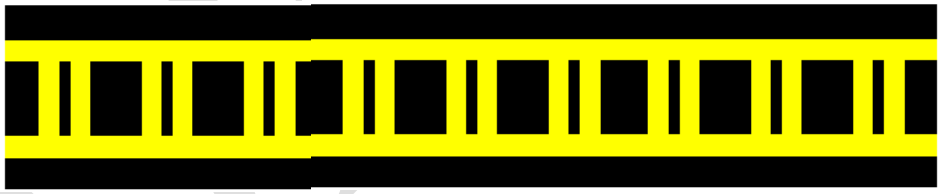
1.13.4.2 ***Runway Holding Position Markings*** are located across each taxiway that leads directly onto a runway. These markings are made up of **two solid lines and two broken yellow lines** and denote runway holding position markings. These markings are always co-located with a Runway Holding Position Sign. A vehicle operator must not cross from the solid-line side of the marking without first obtaining clearance.

Runway Holding Position Marking

1.13.4.3 ***Non-Movement Area Boundary Markings*** consist of two yellow lines (one solid and one dashed). The solid line is located on the non-movement area side, while the dashed yellow line is located on the movement area side. A vehicle operator is not to cross from the solid-line side without first contacting the ATCT and obtaining a clearance to operate on the movement area.

Non-Movement Area Boundary Marking

1.13.4.4 ***Instrument Landing System (ILS) Critical Area Holding Position Markings*** are comprised of **two parallel yellow lines** with lines running perpendicular between the two parallel yellow lines. These markings identify the location on a taxiway where an aircraft or vehicle is to stop when it does not have clearance to enter ILS critical areas. The ILS critical area must remain clear, especially in inclement weather. If a vehicle proceeds past this ILS marking, it might cause a false signal to be transmitted to the landing aircraft.



ILS Hold Position Marking

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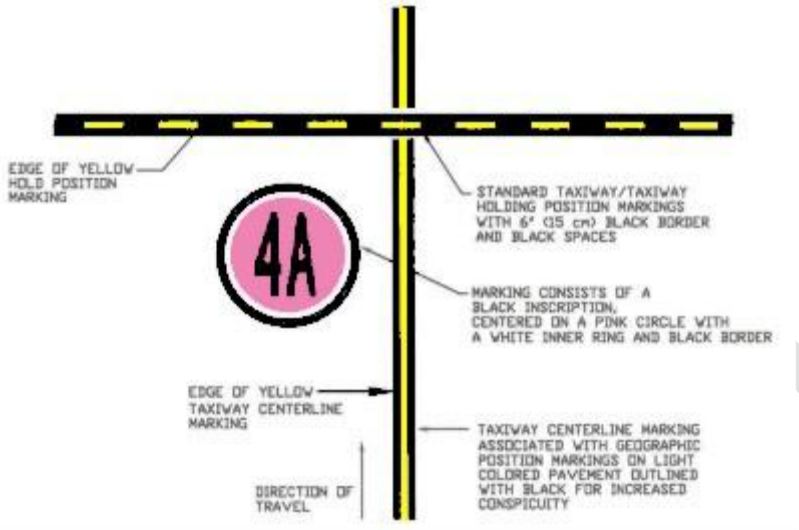
1.13.4.5 ***The geographic position marking (GPM)*** is used repeatedly along a designated taxi route to serve as an indicator of a location (*a spot*) so that pilots can confirm holding points or report their location while taxiing during periods of low-visibility operations.



Geographic Position Markings

1.14 Runways *(Use Airport Specific Examples).*

1.14.1 Designations. Runways are areas where aircraft land and take off. Runways are always designated by a number such as 1 or 19. The number indicates the compass heading of the runway. An aircraft taking off on runway 19 is headed 190 degrees. In the event of parallel runways, a letter designation is added to indicate either the right or left runway; e.g., **1L-19R, 1R-19L.**

1.14.2 Lighting. Runways are lighted with a variety of colored lights.

1.14.2.1 ***Runway Edge Lights*** are **white. If the runway has an instrument approach,** the last 2,000 feet of the runway will be yellow in color.

1.14.2.2 ***Runway Centerline Lights*** are **white** except for the last 3,000 feet of the runway, where they begin to alternate **red** and **white**. For the last 1,000 feet of runway the centerline lights are all **red**.

1.14.2.3 ***Runway Touchdown Zone Lights*** are **white.**

1.14.2.4 ***Runway End/Threshold Lights*** are split lenses that are **red/green.**

1.14.3 Signs.

1.14.3.1 ***Mandatory Holding Position Signs for Runways*** have **white numbering/lettering** on a **red background with a white border.** These are located at each entrance to a runway and at the edge of the runway safety area/obstacle-free zone and are co-located with runway holding position markings. **Do not proceed beyond these signs until clearance is given by the ATCT to enter onto the runway.**

Runway Hold Sign

1.14.3.2 ***Instrument Landing System (ILS) Holding Position Signs*** have **white letters** on a **red background with a white border.** These signs tell pilots and vehicle operators where to stop to avoid interrupting a type of navigational signal used by landing aircraft. This is a critical area, and a vehicle/equipment operator must remain clear of it (*use airport-specific policy*). If a vehicle proceeds pass this microwave landing system/ILS marking, it may cause a false signal to be transmitted to the landing aircraft

ILS Hold Sign

1.14.3.2.1 ***Holding Position Signs for Runway Approach Areas.*** The inscription on a sign for a runway approach area is the associated runway designation followed by a dash and the abbreviation APCH for approach. This sign has **white numbering** on a **red background** with a **white border.** The sign is installed on taxiways located in approach areas where an aircraft on a taxiway would either cross through the runway safety area or penetrate the airspace required for the approach or departure runway.

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Approach Sign

1.14.3.2.2 ***Runway Distance Remaining Signs*** provide distance remaining information to pilots during takeoff and landing operations. They have **white numbering** on a **black background. The number on the sign provides the remaining runway length in 1,000-foot increments.**

Runway Distance Remaining Signs

1.14.3.2.3 ***Runway Exit Sign*** is a destination sign located prior to the runway/taxiway intersection on the side and in the direction of the runway where the aircraft is expected to exit. This sign has **black lettering** and a **directional arrow** on a **yellow background.**

Runway Exit Sign

1.14.4 Markings.

1.14.4.1 ***Pavement markings on a runway are white.*** Runway Threshold Markings and Runway Threshold Bars, Runway Aiming Point Markings, Runway Designation Markings, Runway Touchdown Zone Markings, Runway Centerline Markings, Runway Side stripes, and Displaced Threshold Markings are white. The only nonwhite lines on a runway are yellow lead-in/-off lines that extend from the runway centerline and hold lines for a specific operation known as land and hold short.

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Section 3. Communications

1.15 Any vehicle driving and mechanics taxiing or towing an aircraft, on the **movement areas (runways and taxiways) must** be in contact with the ATCT or capable of monitoring and transmitting on the CTAF. Vehicle operators and mechanics taxiing or towing an aircraft, must always monitor the appropriate radio frequency when in the movement areas on controlled airports. Permission must be requested and clearance given prior to driving, taxiing or towing an aircraft on a movement area. A vehicle that is equipped with a radio and a driver who is movement area qualified may escort vehicles or a mechanic towing an aircraft without radios, these vehicles must stay under the control of the escort at all times. When a movement area is closed for construction, vehicles may traverse that area without ATCT contact but must be escorted if their travels require them to cross an active movement area.

1.16 The ATCT controller may use separate or common radio frequency to control all ground traffic, vehicle and aircraft, on the movement areas. The frequency is only to be used to get clearance onto and off the movement areas. When the ATCT is closed, the CTAF should be used to announce a driver's intentions when operating within the movement area.

1.17 Phraseology. Vehicle operators and mechanics taxiing or towing an aircraft, must contact the ATCT ground controller each and every time they proceed onto or leave the movement area. When proceeding onto a movement area, vehicle operators and mechanics taxiing or towing an aircraft, must tell the controller three things: **WHO you are, WHERE you are, and WHAT your intentions are.** Vehicle operators must always acknowledge all communications with ATC phraseology i.e. read back the clearance with their vehicle, tug or aircraft identification so ground control and other persons know that the message was received. **Vehicle operators must always give aircraft and ground control transmissions priority unless an emergency exists.** Very high frequency frequencies are for the primary use of aircraft and ATCT personnel. Some typical transmissions are as follows:

- Vehicle: (AIRPORT NAME) ground control, this is Airport 21 vehicle at Charlie 6. Request permission on all taxiways for a pavement inspection."
- Vehicle: (AIRPORT NAME) ground control, this is Airport 21 vehicle at Taxiway Alpha. Request clearance south on runway 19 right for a light inspection."
- Mechanic taxiing or towing an aircraft: (AIRPORT NAME) ground control, this is (Airline Mechanic taxi, and Aircraft identification number, at, blast fence, gate#, apron name, request taxi (or tow) to gate#, or terminal name.

Reply transmissions may be brief, such as—

- ATCT:"Airport 21 vehicle, hold short of runway 19 right."
- Driver:"Airport 21 vehicle holding short of runway 19 right."
- ATCT:"Airport 21 vehicle cleared off south on runway 19 right."

  "Please expedite, landing aircraft on a 10 mile final for runway 19 right."
- Driver:"Airport 21 vehicle cleared off south on runway 19 right, will expedite."
- Driver:"Ground control, Airport 21 vehicle is off of runway 19 right.

ATCT Communication with Mechanic taxiing or towing an Aircraft.

- ATCT: "Sunrise 21, N1234, or tug XXX, taxi/tow to terminal 5, via taxiway A, C, Z. (If the clearance includes to hold short of a runway, hold short of that specific runway)

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- Mechanic: "Sunrise 21, N1234, or tug XXX, taxi/tow to terminal 5, via A, C, Z. (If the clearance includes to hold short of a runway, repeat the runway to hold short of.) "Terminal hold short of runway 19 right."

NOTE: If you are unsure what the controller has said, or if you don't understand an instruction, you should ask the controller to repeat it. Good communications only occur when each party knows and understands what the other is saying.

1.18 Common Use Phrases. (Reference Pilot Controller Glossary Aeronautical Information Manual)

What Is Said:	**What It Means:**
Acknowledge	Let me know you have received and understand this message.
Advise Intentions	Let me know what you plan to do and do not do it until ATCT provides authorization.
Affirmative	Yes.
Correction	An error has been made in the transmission, and the correct version follows.
Go Ahead	Proceed with your message only.
Hold/Hold Short	Phrase used during ground operations to keep a vehicle or aircraft within a specified area or at a specified point while awaiting further clearance from air traffic control.
How do you hear me?	Question relating to the quality of the transmission or to determine how well the transmission is being received.
Immediately or without delay	Phrase used by ATC when such action compliance is required to avoid an imminent situation.
Negative	"No" or "permission not granted" or "that is not correct."
Out	The radio conversation is ended, and no response is expected.
Over	My radio transmission is ended, and I expect a response.
Read Back	Repeat my message to me.
Roger	I have received all of your last transmission.
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.
Unable	Indicates inability to comply with a specific instruction, request, or clearance.

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What Is Said:	What It Means:
Verify	Request confirmation of information.
Wilco	I have received your message, understand it, and will comply with it.

1.19 Phonetic Aviation Alphabet. Because some letters have similar sounds, like B and P, the international aviation industry uses the following words to reduce confusion. For example; Taxiway B would be referred to as Taxiway Bravo on the radio.

A ALFA
B BRAVO
C CHARLIE
D DELTA
E ECHO
F FOX-TROT
G GOLF
H HOTEL
I INDIA
J JULIET
K KILO
L LIMA
M MIKE
N NOVEMBER
O OSCAR
P PAPA
Q QUEBEC
R ROMEO
S SIERRA
T TANGO
U UNIFORM
V VICTOR
W WHISKEY
X X-RAY
Y YANKEE
Z ZULU

1.20 ATCT Light Gun Signals. Air traffic controllers have a backup system for communicating with aircraft or ground vehicles if their radios stop working. The controller has a light gun in the tower that can send out different colored lights to tell the pilot or driver what to do. If a vehicle operator or mechanic taxiing or towing an aircraft experiences a radio failure on a runway or taxiway, the operator should vacate the runway as quickly and safely as possible and contact the ATCT by other means, such as a cellular telephone, and advise the ATCT of the situation. If this is not practical, then the driver, or mechanic taxiing or towing an aircraft after vacating the runway, should turn the vehicle, tug or aircraft toward the tower and start flashing the vehicle, tug, or aircraft landing lights headlights and wait for the controller to signal with the light gun.

ATC Light Signals, and their meaning, are as follows:

Meaning

Color and type of signal	Aircraft on the ground	Aircraft in flight	Movement of vehicles, equipment and personnel
Steady green	Cleared for takeoff	Cleared to land	Cleared to cross; proceed; go

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Color and type of signal	Aircraft on the ground	Aircraft in flight	Movement of vehicles, equipment and personnel
Flashing green	Cleared to taxi	Return for landing (to be followed by steady green at the proper time)	Not applicable
Steady red	Stop	Give way to other aircraft and continue circling	Stop
Flashing red	Taxi clear of landing area or runway in use	Airport unsafe- Do not land	Clear the taxiway/runway
Flashing white	Return to starting point on airport	Not applicable	Return to starting point on airport
Alternating red and green	General Warning Signal- Exercise Extreme Caution	General Warning Signal- Exercise Extreme Caution	General Warning Signal- Exercise Extreme Caution

1.21 Safety. The FAA defines runway incursion 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.**

1.21.1 Runway Incursions. Runway incursions are primarily caused by error in one or more of the following areas:

- Pilot//Mechanic taxiing or towing an aircraft /ground vehicle/controller communications
- Airport unfamiliarity
- Loss of situational awareness and not using a current airport diagram

An example of an incursion is a vehicle at an airport with an operating ATCT straying onto a runway in front of an aircraft causing the pilot to take an action to avoid a collision.

1.21.2 Right-of-Way. When driving on the airfield, vehicle operators and mechanics taxiing or towing an aircraft need to always be aware of their location and the meaning of all pavement markings, lights, and signs. When on the aprons and taxiways, stay away and steer clear of aircraft. **Aircraft always have the right-of-way.**

NOTE: Any individual involved in a runway incursion should receive remedial airfield drivers/ Mechanic taxiing or towing an aircraft training given by the (AIRPORT OPERATOR). Remedial drivers training is not in lieu of the airport operators established consequences of non-compliance with the airport operator's drivers training program, remedial drivers training is in addition to the airport operator's implementation of a progressive penalty program. Remedial drivers training is not considered acceptable consequences of noncompliance

This is an appropriate place to describe an individual airport's runway and taxiway identification system. In addition to the system description, the FAA recommends that the airport operator provide a runway (RY) and taxiway (TWY) diagram, especially if the airport's identification system varies from the norm or is otherwise complicated.

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SAMPLE

GROUND VEHICLE OPERATING & MECHANIC TAXIING OR TOWING AN AIRCRAFT FAMILIARIZATION PROGRAM

TRAINING RECORD

Employee's Name: _____

Employee's Position: _____

Company Name: _____

Social Security Number: _____

Driver's License State and Number: _____

Driver's License Expiration Date: _____

I agree to abide by all rules and regulations prescribed for the operations of a vehicle within the airport operations area.

Vehicle Operator: As of this time, I certify that I hold a current and valid driver's license. If for any reason my license becomes invalid, I will notify the (AIRPORT OPERATOR) immediately.

Mechanic taxiing or Towing an Aircraft: I certify that I hold a current and valid FAA A&P certificate, are authorized by my maintenance facility or operator to taxi or tow their aircraft and trained by my company to start, run, and taxi or tow that particular type of Aircraft. Further, the operator and mechanic will ensure that during an aircraft towing operation, a trained mechanic or pilot will attend the aircraft controls during the operation. If for any reason my company authorization becomes invalid, I will notify the (AIRPORT OPERATOR) immediately.

Sign your name and indicate today's date below:

_____ _____

(NAME) (DATE)

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PERMITTED VEHICLE OPERATING AREAS

Location

[ ] General Aviation Apron
[ ] Air Carrier/Terminal Apron
[ ] Firehouse
[ ] Air Cargo
[ ] Tie-downs
[ ] General Aviation Hangars
[ ] All Areas

I certify that the above named individual has satisfactorily completed the Driver and Mechanic Taxiing or Towing an Aircraft Training Program.

Instructor's Signature: _____

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