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Ground Vehicle Operations at Aerodromes

1. PURPOSE

This Advisory Circular (AC) and the attached appendices provide guidance to Aerodrome operators in developing training programs for safe ground vehicle operations and pedestrian control on the airside of an Aerodrome. This includes both movement area and perimeter roads. Not all the items addressed in this document will be applicable at every Aerodrome. This AC contains recommended operating procedures, a sample training curriculum (Appendix A), and a sample training manual (Appendix B).

2. REFERENCES

- 2.1 MCAR Part 139, Section 1 - Aerodrome Certification
- 2.2 MCAR Part 139, Section 2 - Aerodrome Standards
- 2.3 ICAO Annex 14 Volume 1 - Aerodrome Design & Operations
- 2.6 ICAO Doc 9870 (Manual on the Prevention of Runway Incursions)
- 2.7 ICAO Doc 9476 (Manual of Surface movement Guidance and Control Systems)
- 2.8 ICAO Doc 9137 Part 8 (Airport Operational Services)
- 2.9 ICAO Doc 9859 (Safety Management System)

3. Cancellation

DCA-AC-AGA 06/09, Ground Vehicle Operations at Aerodromes dated on 1st October 2009, is cancelled.

4. APPLICABILITY

The overall responsibility for the operation of vehicles on an Aerodrome rests with the Aerodrome operator. The aerodrome operator is also responsible for compliance with

the Myanmar Aircraft Rules and Myanmar Civil Aviation Requirements, Part 139 - Section 1 and Section 2. Adherence to the provisions contained in this AC may materially assist the aerodrome operator in complying with these requirements.

5. REQUIREMENTS

a) All aerodrome operators should establish procedures and policies concerning vehicle access and vehicle operations on the airside of the aerodromes. These procedures and policies should address such matters as access, vehicle operator requirements, vehicle requirements, operations, and enforcement and should be incorporated into tenant leases and agreements if any.

b) Establishment of procedures for the safe and orderly access to the movement area and operation in that area is required at certificated aerodromes. Initial and recurrent training in procedures for access to the movement area is required for Aerodrome personnel. Only initial training is required for tenant, contractor employees and ground service operators. However, regular recurrent training is strongly recommended for all persons with access to the movement area.

c) Each bidding document (construction plans and/or specifications) for development work on an Aerodrome or for installation of an air navigation facility (NAVAID) should incorporate a section on ground vehicle operations on Aerodromes during construction activity. The aerodrome operator should provide a copy of this plan to CAA for review. The construction plans and/or specifications should contain the appropriate provisions.

6. VEHICLE OPERATOR REQUIREMENTS

Vehicle operators on aerodromes face conditions that are not normally encountered during highway driving. Therefore, those persons who have vehicular access to the movement area of the aerodrome must have an appropriate level of knowledge of aerodrome rules and regulations. Aerodrome 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 aerodrome. Any person expected to operate on the movement area should demonstrate a functional knowledge of the English language.

7. TRAINING

Appendix A includes a sample training curriculum. This curriculum should include initial and/or remedial instruction of all personnel who have access to the airside of the

aerodrome. The curriculum should also include annual recurrent instruction for all personnel who have access to the movement area. The Aerodrome operator should retain records of this training as long as this person is authorized to operate on the Aerodrome. Escorted access does not normally require training. Aerodrome operators may modify these documents to meet their individual needs. It may also be advantageous to develop customized programs for vehicles operators who only access ramp areas and those who operate on the movement area.

Initial training is the training provided to a new employee or aerodrome 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 aerodrome 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 Aerodrome to Aerodrome and from one employee to another, however, under no circumstances no recurrent training intervals for personnel authorized to drive on the movement area should extend beyond one year.

Aerodrome operators might consider requiring annual recurrent training when a vehicle operator renews an expired Aerodrome ID badge or when a tenant renews a lease agreement. A sample Ground Vehicle Operating Familiarization Program Training Record is included in Appendix B. Aerodrome operators should provide a means of testing trainees on the information presented. In addition to standard question and answer classroom testing methods, the Aerodrome 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. It is also recommended that on-the-job training be completed before personnel have unescorted access to the airside of the aerodrome.

8. VEHICLES ON AERODROMES

Aerodromes operators should keep vehicular and pedestrian activity on the airside of the Aerodrome to a minimum. Vehicles on the airside of the aerodrome should be limited to those vehicles necessary to support the operation of aircraft services, cargo and passenger services, emergency services, and maintenance of the aerodrome. 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 Aerodrome operation areas cannot be avoided, it should be carefully controlled. 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. Some aspects of vehicle control and identification are discussed below; however, every aerodrome presents different vehicle requirements and problems. Every aerodrome 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 moving on the maneuvering areas. Aircraft also have the right-of-way on the movement areas, except when the Aerodrome Traffic Control (ATC) has specifically instructed an aircraft to hold or give way to vehicle(s) on a runway or taxiway. Vehicles that routinely operate on the airside should be marked/flagged for high daytime visibility and, if appropriate, lighted for night time operations. Vehicles that are equipped with marking and lighting devices should escort vehicles that are not marked and lighted. Vehicles needing intermittent identification should be marked with magnetically attached markers.

9. VEHICULAR ACCESS CONTROL

The control of vehicular activity on the airside of an aerodrome is of the highest importance. The aerodrome operator is responsible for developing procedures, procuring equipment, and providing training regarding vehicle operations to ensure aircraft and personnel safety. At aerodromes with an operating ATC, controllers and vehicle operators should use two-way radios to control vehicles when on the movement area. To accomplish this task, the aerodrome operator and the ATC should develop a letter of agreement outlining standard operating procedures. At un-manned aerodromes, two-way radio control between vehicles and fixed-based operators or other Aerodrome users should avoid frequencies used by aircraft. Even with the most sophisticated procedures and equipment, vehicle operators need training to achieve the proficiency to operate safely. The Aerodrome operator should give special consideration to training temporary operators, such as construction workers, even if escort service is being provided. Inadvertent entry by vehicles onto movement and non-movement areas of an Aerodrome poses a danger to both the vehicle operator and

aircraft that is attempting to land or take off or that are maneuvering on the Aerodrome. The Aerodrome Layout Plan is a useful tool for accomplishing control of access to airside. Aerodromes may erect a fence or provide for other natural or physical barriers around the entire aerodrome 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.

10. VEHICLE REQUIREMENTS

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

In establishing vehicle requirements, some items to consider include –

- a) Permit to operate on the airside area of aerodrome
- b) Marking and identification of vehicles
- c) Minimum equipment requirements
- d) Inclusion in all vehicles of a placard diagram depicting the Aerodrome'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 ATC light gun signals and airfield sign and marking information.
- e) Vehicle condition requirements and inspection
- f) Insurance coverage

11. VEHICLE OPERATIONS

The rules and regulations pertaining to vehicle operations should provide adequate procedures for the safe and orderly operation of vehicles on the airside of the aerodrome. In developing such procedures, aerodrome operators should consider—

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

- b) Specific procedural requirements for vehicle operations on Aerodromes without an operating ATC
- c) Advance notice/approval for operating a non-Aerodrome owned vehicle on the movement area
- d) Speed limits
- e) 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
- f) Requirements stipulating when vehicle lights must be operated
- g) Requirements for the use of dedicated vehicle lanes and perimeter roads whenever possible
- h) Locations where vehicles may and may not park
- i) Rules of right-of-way (e.g. for aircraft, emergency vehicles, other vehicles)
- j) Areas where vehicles may be serviced
- k) Procedures for inoperative radios while on a movement area
- l) Requirements to report all accidents involving ground vehicles on the airside
- m) Requirements making the vehicle operator responsible for passengers in the vehicle

12. EMERGENCY OPERATIONS AND OTHER NON-ROUTINE OPERATIONS

Aerodrome operators allow a number of non-routine operations to occur on the airside of the aerodrome. 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, aerodrome operators should recognize and prepare for the unique challenges that arise during non-routine operations as they relate to vehicle operations.

Aerodrome operators should review non-routine operations that involve ground vehicles and develop vehicle operation procedures to accommodate these special operations. Planning meetings associated with such 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:

- a. **Airside Construction.** The aerodrome operator should develop procedures, procure equipment, and provide training on vehicle operations to ensure aircraft safety during construction as specified in published Advisory Circular.
- b. **Emergency Response/Mutual Aid.** Many aerodromes rely on local emergency services to provide aircraft rescue and firefighting or emergency medical services. Aerodrome 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 aerodrome operator should specify vehicle operations training requirements.
- c. **Low-Visibility Operations.** Additional consideration should be given to vehicle operations during low visibility. Poor weather conditions (fog, rain, etc.) may obscure visual cues, roadway markings, and Aerodrome signs. of aircraft, or drivers of ground vehicles, to find their way on the Aerodrome and keep the aircraft or vehicles on the surfaces and areas intended for their use. If aerodromes 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 aerodrome. Guidance relates to facilities, information, and advice necessary to enable pilots of aircraft, or drivers of ground vehicles, to find their way on the aerodrome 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.

13. 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 or fog may also diminish a vehicle operator's situational awareness.

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

Aerodrome 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.

14. ENFORCEMENT AND CONTROL

Aerodrome 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 aerodrome operators should address as part of a ground vehicle 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 aerodrome management when a vehicle is no longer authorized entry into a facility
- d) Periodic checks to ensure that only properly authorized persons operate vehicles on the airside.
- e) System to control the movement of commercial trucks and other goods conveyances onto and out of the airside of an Aerodrome
- f) Briefing or training for delivery drivers if they are permitted direct access to the airside
- g) Implementation of a progressive penalty policy.

Director General

Department of Civil Aviation

GROUND VEHICLE ACCESS PROGRAM TRAINING CURRICULUM

NOTE: The purpose of the Ground Vehicle Access Program Training Curriculum is to provide Aerodrome operators with a comprehensive list of training topics for educating vehicle operators who may have access to the airside of an aerodrome. Each individual aerodrome has unique situations that might require site-specific training. Aerodrome operators may use this training curriculum as a guide for developing and implementing a detailed training program tailored to the Aerodrome's individual situation.

The purpose of a training program is to provide vehicle operators with the level of training necessary for their positions so they are capable of operating safely on the airside of an Aerodrome. Specific programs may be tailored to account for the items listed below:

- 1) Various infield aircraft navigation aids
- 2) Identification of a given point on a grid map or other standard map used at the aerodrome
- 3) Applicable Aerodrome rules, regulations, or procedures pertaining to vehicle operations
- 4) Aerodrome layout, including designation of runways and taxiways
- 5) Boundaries of movement areas
- 6) Interpretation and color coding of airfield signs, pavement markings, and lighting
- 7) Location and understanding of critical areas associated with instrument landing system (ILS) and very high frequency omni-directional ranges (VORs)
- 8) Proper terminology (including phonetic alphabet) and procedures for radio communications with the air traffic control tower (ATC)
- 9) ATC light gun signals
- 10) Established routes for emergency response vehicles
- 11) Dangers associated with jet blast and prop wash
- 12) Traffic patterns associated with each runway (left or right) and location of each leg; i.e., downwind, base, final, and crosswind
- 13) Situational awareness

An aerodrome operator may choose to develop customized training programs for vehicle operators who are restricted to operating ground vehicles only on ramps and apron areas.

AREAS OF TRAINING

All drivers should have training in the following areas:

1. Runway Incursions, Airfield Safety, and Security

Training Outcome(s) – Trainee should be able to define a runway incursion and explain the benefits of airfield safety/security.

2. Definitions and Terms used on an Aerodrome.

Training Outcome(s) – Trainee should be knowledgeable of the terms used on an Aerodrome.

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

4. Rules and Regulations

a) Review

b) Noncompliance/Penalties

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

5. 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 or other minimum passing score agreed to by the airport operator and the regulatory authority.

In addition to items 1–5, instruction for drivers authorized to drive on the movement area should also include those subject areas identified under Aerodrome Familiarization and Communications.

6. Aerodrome Familiarization

- a. Runway Configuration/Safety Area
- b. Taxiway Configuration/Safety Area
- c. Movement Areas and Non-Movement Areas
- d. Confusing Areas
- e. Aerodrome Lighting

(1) Runway

- Runway Edge Lights
- Touchdown Zone Lights
- Threshold Lights
- Runway Approach Lighting System
- Centre Line Lights
- End Lights
- Threshold & Wing Bar Lights
- Rapid Exit Taxiway Indicator Lights

(2) Taxiway

- Taxiway Edge Lights
- Runway Guard Lights
- Stop Bars Lights
- Taxiway Centre Line Lights

f. Aerodrome Signs

- Runway Holding Position Sign
- Taxiway Location Sign
- ILS Category I, II or III Holding Position Sign
- Direction Sign
- Distance Remaining Sign
- Information Sign
- Mandatory Instruction Sign

g. Aerodrome Markings

(1) Runways

- Centerline Marking

- Edge Marking
- Runway Designation Marking
- Threshold Marking
- Touch Down Zone Marking
- Aiming Point Marking

(2) Taxiways

- Hold Position Marking
- Geographic Position Marking
- Centerline & Enhanced Centerline Marking
- Side Strip Marking

(3) ILS Critical Areas

(4) Non-Movement Area Boundary Marker

h. Aerodrome NAVAIDS and Visual Approach Aids

- Location
- Non-interference

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

7. Communications

- a) Ground Vehicle Communications
- b) Radio Frequencies
- c) Procedural Words and Phrases
- d) Radiotelephony Spelling/Phonetic Alphabet
- e) Aviation Terminology
- f) Procedures for Contacting the ATCT
- g) Airfield Communications at Aerodromes Without Operating ATCT
- h) Light Gun Signals
- i) Description of Light Gun and How to Signal Tower
- j) Lost Communications Procedures

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

SAMPLE GROUND VEHICLE OPERATIONS TRAINING MANUAL

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

Section 1. Aerodrome Driving Rules and Regulations

1.1 Authority for Implementation of Rules and Regulations rest to Aerodrome operators.

1.2. Applicability. This rule applies to all users of, and persons on any portion of, the property owned or controlled by the aerodrome operator. No persons are exempt from aerodrome operating training requirements for operating a vehicle on the airside of an aerodrome. Tenant organizations shall be responsible for the dissemination of, accessibility to, and compliance with these rules and regulations by their employees. These Rules may be amended, changed, or modified by aerodrome operator, as necessary.

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

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

1.3.2. Airside—the movement area of an airport, adjacent terrain and buildings or portions thereof, access to which is controlled.

- 1.3.3. Aerodrome Traffic Control (ATC)**—a service to promote the safe, orderly, and expeditious flow of air traffic.
- 1.3.4. Aircraft**—Any machine that can derive support in the atmosphere from the reactions of the air other than the reactions of the air against the earth's surface.
- 1.3.5. Aerodrome**—a defined area on land or water (including any buildings, installations and equipment) intended to be used either wholly or in part for the arrival, departure and surface movement of aircraft.
- 1.3.6. Apron** means a defined area, on an aerodrome, intended to accommodate aircraft for purposes of loading or unloading of passengers, mail, or cargo, fuelling, parking or maintenance.
- 1.3.7. 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.
- 1.3.8. 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.
- 1.3.9. 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.
- 1.3.10. Ground Vehicle**—all conveyances, except aircraft, used on the ground to transport persons, cargo, fuel, or equipment.
- 1.3.11. ILS Critical Area**—an area provided to protect the signals of the localizer and glide-slope.
- 1.3.12. Incursion**—any occurrence at an Aerodrome involving the incorrect presence of an aircraft, vehicle or person or object on the protected area of a surface designated for the landing and take-off aircraft.
- 1.3.13. Jet Blast**—jet engine exhaust or propeller wash (thrust stream turbulence).
- 1.3.14. Aviation Police (AVPOL)**—any person vested with police power of arrest under State authority and identifiable by uniform, badge, and other indication of authority.

- 1.3.15. 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 Aerodrome and on the Aerodrome movement area.
- 1.3.16. Mobile Fueler**—a vehicle owned and/or operated by authorized oil company to pump and dispense Jet A fuel at (AERODROME). This may include fuel tankers, in-to-plane fueling pumpers, and hydrant carts.
- 1.3.17. Movement Area**—that part of the of the aerodrome to be used for take-off, landing and taxiing of aircraft, consisting of the manoeuvring area and apron.
- 1.3.18. Operator**—any person who is in actual physical control of an aircraft or a motor vehicle.
- 1.3.19. Owner**—a person who holds the legal title of an aircraft or a motor vehicle.
- 1.3.20. Restricted Areas**—areas of the Aerodrome posted to prohibit or limit entry or access by the general public. All areas other than public areas.
- 1.3.21. Runway**—a defined rectangular area on a land aerodrome prepared for the landing and takeoff run of aircraft .
- 1.3.22. 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.
- 1.3.23. 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.
- 1.3.24. 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 aerodrome during low-visibility operations. Guidance relates to facilities and information necessary for pilots and ground vehicle operators to find their way about the aerodrome. Control or regulation means the measures necessary to prevent collisions and to ensure that traffic flows smoothly and efficiently.

1.3.25. Taxiway— means a defined path on a land aerodrome established for the taxiing of aircraft and intended to provide a link between one part of the aerodrome and another, including-

- (a) an aircraft stand taxi lane, which is a portion of an apron designated as a taxiway and intended to provide access to aircraft stands only
- (b) an apron taxiway, which is a portion of a taxiway system located on an apron and intended to provide a through taxi route across the apron;
- (c) a rapid exit taxiway, which is a taxiway connected to a runway at an acute angle and designed to allow landing aircraft to turn off at higher speeds than are achieved on other taxiways thereby minimizing runway occupancy times.

1.3.26. Vehicle Service Road—a designated roadway for vehicles in a movement and other areas.

1.3.27. Very High Frequency Omni-directional 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 Flight Information Region (FIR).

1.3.28. 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.

1.4. Violation of Rules—Penalties and Suspension of Driving 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 established by aerodrome operator.

1.5. Aerodrome operator shall require any individual involved in a runway incursion or other vehicle incident to complete remedial airfield driver training.

1.6. Driver Regulations on the Airside of an Aerodrome

1.6.1. Vehicle Operator Requirements

1. All applicants must satisfactorily complete the applicable driver's training class before receiving an airside driver's license.

2. All applicants must pass the written test with a grade of at least 80 percent. Applicants who do not pass the written test may retake the test after additional study within a 90 day period.
3. No vehicle shall be operated on the airside unless—
 - a) The driver is authorized to operate the class of vehicle by an appropriate state-licensing agency.
 - b) The driver properly displays an approved, Aerodrome pass and the Authorized Driver Permit (ADP).
4. The driver of vehicle shall follow strictly to the speed limits, indicated by road signs and markings. No person operating or driving a vehicle within the airside shall exceed the speed limit as follows;

-Within 15 meters of aircraft stand km/h	5
-Within the Baggage Handling Area km/h	10
-On roadways in the vicinity of aircraft stand / on any aircraft apron km/h	25
-On roadways more than 15m away from km/h aircraft stand and along the perimeter roadways.	40
5. No vehicle shall 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 shall pass no closer than 5 m from any wing or tail section.
6. Moving aircraft and passengers embarking and disembarking an aircraft shall have the right-of-way at all times over vehicular traffic. Vehicle drivers must yield the right-of-way.
7. No vehicle operator shall enter the airside unless authorized by Aerodrome operator or unless the vehicle is properly escorted.
8. No vehicle operator shall enter the manoeuvring area-
 - a) Without first obtaining permission of the (AERODROME OPERATOR) and clearance from the ATC to enter the manoeuvring area;

- b) Unless equipped with an operable two-way radio in communication with the ATC
9. No person shall operate any motor vehicle that is in such physical or mechanical condition as to endanger persons or property or that aerodrome operator considers an endangerment.
 10. No person shall—
 - a) Operate any vehicle that is overloaded or carrying more passengers than for which the vehicle was designed.
 - b) Ride on the running board or stand up in the body of a moving vehicle.
 - c) Ride with arms or legs protruding from the body of a vehicle except when the vehicle was designed for such use.
 11. A vehicle guide (person) is required whenever the vision of the vehicle operator is restricted.
 12. No fuel truck shall be brought into, stored, or parked within 15 m of a building. Fuel trucks must not be parked within 5 m from other vehicles.
 13. Container carriers and tugs shall tow no more carts, pods, or containers than are practical, under control, tracking properly, and safe.
 14. When not serving aircraft or undertaking their intended functions, ramp vehicles and equipment shall be parked only in approved areas.
 15. Vehicle operators shall not operate or park vehicles under any passenger loading bridge.
 16. No person shall 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.
 17. No person shall 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.
 18. No person shall park a vehicle or equipment within 10 m of a fire hydrant or in a manner that prohibits a vehicle from accessing the fire hydrant.
 19. No person shall 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.

20. Each vehicle operator using an Aerodrome perimeter (security) gate shall ensure the gate closes behind the vehicle prior to leaving the vicinity of the gate. The vehicle operator shall also ensure no unauthorized vehicles or persons gain access to the airside while the gate is open.
21. Vehicle operators shall 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.
22. Vehicles shall not enter the movement area or cross runways unless the operator of the vehicle has received required training and authorization from airport operator to operate on the movement area. Whenever possible, all Aerodrome vehicles shall utilize the Aerodrome perimeter and service roads to transition between areas on the Aerodrome.
23. Each vehicle operator is responsible for the activities of each vehicle passenger on the airside of the Aerodrome.

1.7 Vehicle Regulations

1. No vehicle shall be operated on the airside unless it has proper State registration or is a qualified off-road vehicle that is not normally operated on public streets but has received the approval of aerodrome operator.
2. All vehicles operated on the airside must have vehicle liability insurance, as required by aerodrome operator.
3. The aerodrome operator must approve tenant vehicles operated on the movement and other areas. These vehicles must display a car sticker.
4. Carts or pieces of equipment being towed or carried after darkness must have side and rear reflectors or rear lights.
5. No vehicle shall be permitted on the airside unless—
 - a. It is properly marked, as outlined in Painting, Marking, and Lighting of Vehicles Used on an Aerodrome.
 - b. It is in sound mechanical condition with unobstructed forward and side vision from the driver's seat.
 - c. It has the appropriately rated and inspected fire extinguishers (service vehicles and fuel trucks).
 - d. It has operable headlamps and brake lights.

6. Vehicles operating on the movement area shall be equipped with operating amber rotating beacon or equivalent.
7. All aircraft refueling vehicles and any other vehicle 2.5 m or more in width shall 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.

1.8 Vehicular Accidents. Operators of vehicles involved in an accident on the Aerodrome that results in injury to a person or damage to an aircraft, Aerodrome property, or another vehicle shall—

1. Immediately stop and remain at the scene of the accident.
2. Render reasonable assistance, if capable, to any person injured in the accident.
3. Report the accident immediately to aerodrome operator before leaving the scene, if possible.
4. Provide and surrender the following to any responding aerodrome operator's personnel: name and address, Aerodrome pass, ADP, and any information such personnel need to complete a motor vehicle accident report.

Section 2. Driving on the Movement and Other Areas

2.1. Driving. Operating within the apron and ramp 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.

Vehicle drivers should—

- 2.1.1. Never drive between safety cones or across delineated passenger walkways.
- 2.1.2. Watch cockpit blind spots—pilots typically cannot see behind or below the aircraft.
- 2.1.3. Avoid jet blast or prop wash, which can blow debris or overturn vehicles.
- 2.1.4. Be aware and avoid moving propellers that can cause damage, injury, or death.
- 2.1.5. Be aware of other vehicle movements—you may not hear them approaching due to aircraft engine noise.
- 2.1.6. Yield to aircraft, passengers, and emergency vehicles, which ALWAYS have the right-of-way on any portion of the Aerodrome.

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.

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.

2.2. Nighttime and Poor Weather Driving Conditions. Poor weather conditions (fog, rain, etc.) might obscure visual cues, roadway markings, and Aerodrome 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.

2.3. Driving on the Manoeuvring Area. Drivers who are authorized to drive on the manoeuvring area require training and vigilance since there are dangers associated with this area. Drivers who have access to the manoeuvring 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 instructions.

2.3.1. **ATC Control.** Manoeuvring area is defined as the part of the aerodrome to be used for the take-off, landing and taxiing of aircraft, excluding the aprons. Manoeuvring area is considered — “positive control,” meaning that all vehicle operators will need permission from ATC before entering the area.

2.3.2. **Authorized Vehicles.** Only those vehicles necessary for Aerodrome operations may enter a manoeuvring area. Therefore, fuel trucks, maintenance vehicles, tugs, catering trucks, and other non-essential vehicles should not be permitted to enter these areas. Exceptions may include (AERODROME OPERATOR) — authorized vehicles with appropriately trained personnel. Aerodrome Operations/Maintenance shall coordinate all other vehicle operations within the manoeuvring areas.

2.5 Taxiways.

- 2.5.1. **Designations.** Aircraft use taxiways to move to and from the aprons and the runways. Taxiways will be designated by letters or by a letter/number combination as determined by aerodrome operator. (The Aerodrome Operator should include a diagram of the Aerodrome here with the taxiway and runway designations.)
- 2.5.2. **Lighting.** Taxiways are lighted with **blue** edge lighting and/or reflectors. Some taxiways are also lighted with **green** in-paved, centerline lighting. (Use Aerodrome-specific example here.)
- 2.5.3. **Signs.** The signs used on taxiways are direction, destination, location, and no entry signs.
- 2.5.4 **Direction and Designation Signs** have **black lettering** and a **directional arrow** or **arrows** on a **yellow background**. The arrow indicates the direction to that taxiway, runway, or destination.
- 2.5.5 **Taxiway Directional Signs** have **black lettering** and a **directional arrow** or **arrows** on a **yellow background**.
- 2.5.6 **Taxiway Location Signs** have **yellow lettering** on a **black background with yellow border**.
- 2.5.7 **Runway Vacated 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 holdline marking on a **yellow background**.
- 2.5.8. **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.
- 2.5.9 **Runway Holding Position Markings Pattern A** 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 from ATC.

2.5.10 **ILS Critical Area Runway Holding Position Markings Pattern B** 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/sensitive areas. The ILS critical/sensitive 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.

2.6 Runways (Use Aerodrome Specific Examples).

2.6.1. **Designations.** Runways are areas where aircraft land and take off. Runways are always designated by a number such as 01 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., 01L-19R, 01R-19L.

2.6.2. **Lighting.** Runways are lighted with a variety of colored lights.

- a) **Runway Edge-lights** are **white**. If the runway has an instrument approach, the last 600 m of the runway will be yellow in color.
- b) **Runway Centerline Lights** are **white** except for the last 900 m of the runway, where they begin to alternate **red** and **white**. For the last 300 m of runway the centerline lights are all red.
- c) **Runway Touchdown Zone Lights** are **white**.
- d) **Runway End/Threshold Lights** are split lenses that are **red/green**.

2.6.3. **Signs.**

- a) **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.**
- b) **ILS Category I, II or III Holding Position Signs** have **white numbers / 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/sensitive area, and a vehicle/equipment operator must remain clear of it (use Aerodrome-

specific policy). If a vehicle proceeds pass this ILS critical/sensitive area, it may cause a false signal to be transmitted to the landing aircraft.

- c) **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.
- d) **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**.

2.6.4. Markings.

Pavement markings on a runway are white. Runway Threshold Markings and Runway Threshold Bars (Transverse Stripe Markings), 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 holdlines for a specific operation known as land and hold short.

Section 3. Communications

3.1. Any vehicle driving on the manoeuvring areas (runways and taxiways) must be in contact with the ATC or must be escorted by a vehicle which in contact with ATC. Vehicle operators must always monitor the appropriate radio frequency when in the manoeuvring areas on controlled Aerodromes. Permission must be requested and clearance given prior to driving on a manoeuvring area. A vehicle that is equipped with a radio may escort vehicles without radios. When a manoeuvring area is closed for construction, vehicles may traverse that area without ATC contact but must be escorted if their travels require them to cross an active manoeuvring area.

3.2. The ATC controller may use separate or common radio frequency to control all ground traffic, vehicle and aircraft, on the manoeuvring areas. The frequency is only to be used to get clearance onto and off the manoeuvring areas.

3.3. Phraseology. Vehicle operators must contact the ATC each and every time they proceed onto or leave the manoeuvring area. When proceeding onto a manoeuvring area, vehicle operators must tell the controller three things: **WHO you are, WHERE you are, and WHAT your intentions are.** Vehicle operators must always acknowledge all communications so ground control and other persons on the listening watch 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 ATC personnel.

3.4. Common Use Phrases.

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.
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 read?	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.

Verify Request confirmation of information.
Wilco I have received your message, understand it, and will comply with it.

3.5 Radiotelephony Spelling 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 N	N	OVEMBER
B	BRAVO	O	OSCAR
C	CHARLIE	P	PAPA
D	DELTA	Q	QUEBEC
E	ECHO	R	ROMEO
F	FOX-TROT	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

3.6. ATC 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 experiences a radio failure on a runway or taxiway, the operator should vacate the runway as quickly and safely as possible and contact the ATC by other means, such as a cellular telephone, and advise the ATC of the situation. If this is not practical, then the driver, after vacating the runway, should turn the vehicle toward the tower and start flashing the vehicle headlights and wait for the controller to signal with the light gun.

Light gun signals, and their meaning, are as follows:

Steady Green	OK to cross runway or taxiway.
Steady Red	STOP!
Flashing Red	Clear the runway or taxiway.
Flashing White	Go back to where you started.
Alternating Red and Green	Use extreme caution.

3.7. Safety. Runway incursion is —Any occurrence at an Aerodrome involving the incorrect presence of an aircraft, vehicle or person on the protected area of a surface designated for the landing and take off of aircraft.

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

- Pilot/ground vehicle/controller communications
- Aerodrome familiarity
- Loss of situational awareness

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

When driving on the airfield, vehicle operators 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 driver's training given by Aerodrome Operator.

SAMPLE
GROUND VEHICLE OPERATING FAMILIARIZATION PROGRAM
TRAINING RECORD

Employee's Name:
Employee's Position:
Company Name:.....
Social Security Number:.....
Driver's License Number:.....
Driver's License Expiration Date:.....

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

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 Aerodrome Operator immediately.

Sign your name and indicate today's date below:

.....
(NAME) (DATE)
.....
.....

PERMITTED VEHICLE OPERATING AREAS

Location

- General Aviation Ramp
- Air Carrier/Terminal Ramp
- Firehouse
- Air Cargo
- Tie-downs
- General Aviation Hangars
- All Areas

I certify that the above named individual has satisfactorily completed the Driver Training Program.

Instructor's Signature: _____