
SUBJECT: AIRCRAFT GROUND AND HANDLING SERVICES

DATE: 24/09/2015

1. OBJECTIVE

- 1.1.1 This circular contains information and guidance for the servicing and ground handling of aircraft.
- 1.1.2 It contains also generally accepted information and safety practices that may help prevent injuries to personnel and damage to aircraft.

2. BACKGROUND

- 2.1.1 The aviation industry has found through experience that firm safety practices deter accidents.
- 2.1.2 Air operators may carry out ground handling services of their own aircraft or contract out such services to other organisations. In either case, the responsibility for compliance with the approved program and procedures for aircraft ground handling services rests with the air operator.
- 2.1.3 The air operator shall ensure that personnel involved with aircraft ground handling services are adequately trained in carrying out their duties effectively and efficiently and in accordance with the approved program and procedures, and applicable regulatory requirements.

3. AIRCRAFT GROUND HANDLING SYSTEMS

- 3.1.1 An air operator shall ensure that a system of aircraft ground handling is established. This system should have the following:
 - (1) Organization and Management
 - (2) Manuals and Documentation
 - (3) Quality Assurance
 - (4) Training Programmes
 - (5) Contracted Services
 - (6) Incident Response
 - (7) Weight and Balance

- (8) Ramp Operations
- (9) Dangerous Goods Handling
- (10) Passenger Services
- (11) Airport Facilities
- (12) Baggage Services
- (13) Cabin Services
- (14) Ground Support Equipment

3.1.2 Organization and Management

- (1) The Operator shall have a safety management system that includes: policy, purpose, applicability, responsibilities, training, operating procedures, risk management, audits, inspections, performance monitoring, emergency response, risk assessment and hazard/mishap evaluation.
- (2) The Operator shall have a system for the management of personnel assigned to its ground handling operations, to include assurance of appropriate competence, training, education, skills, and experience.
- (3) The Operator shall have an organization and management system, including definition of responsibilities and authority, for the management of all ground handling functions associated with ramp operations, passenger services, baggage services, cabin services, weight and balance control, ground support equipment and fuel services.

3.1.3 Manuals and Documentation

- (1) The Operator shall have an operating manual containing corporate standards that meet Operator and applicable Regulatory requirements, and include policies, processes, procedures and practices for all ground handling operations.
- (2) The Operator shall have a process to ensure the availability of the operating manual, in a readily usable version, at each location where ground handling operations are conducted.
- (3) Where the Operator uses the services of an external ground handling agent or service provider, the Operator shall have a legal contract with the agent or provider that specifies details for applicability of and compliance with the operating standards of the Operator.
- (4) The Operator shall have a process to ensure that a current copy of the IATA Dangerous Goods Regulations (DGR) is always available at appropriate ground handling facilities.
- (5) The Operator shall have a process to ensure applicable external ground handling agents or service providers receive current manuals and revisions on a timely basis.

3.1.4 Quality Assurance

- (1)** The Operator shall have an internal evaluation (audit) programme, applicable to all areas of ground handling operations, to ensure compliance with Operator and applicable Regulatory requirements.

- (2) The Operator shall have a system that ensures areas of non-compliance are addressed, determined either through the audit process or operational experience, including responsibilities and associated time-lines for corrective action.

3.1.5 Training Programmes

- (1) The Operator shall have training programmes that include initial and recurrent training to ensure that employees engaged in ground handling operations establish and retain their effectiveness in carrying out assigned duties. Such training programmes of the Operator shall have:
 - (a) Operator and Regulatory approval, as applicable;
 - (b) recurrent training at an interval not to exceed 24 months from the date of previous training;
 - (c) a process of qualification through written, oral and/or practical evaluation.
- (2) The Operator shall have a process for reviewing and updating training programmes to ensure:
 - (a) continuous improvement and effectiveness;
 - (b) incorporation of the latest regulatory and operational changes in a timely manner.
- (3) The Operator shall have a system for maintaining training records that provides for retention, identification, storage, protection, retrieval, and disposition of records.
- (4) The training programmes of the Operator shall be structured to ensure that personnel engaged in all areas of ground handling operations receive training consistent with their functional responsibilities. The content of the training programmes shall include the following:
 - (a) familiarization training on general provisions associated with ground handling operations;
 - (b) in-depth training on requirements, including policies, procedures and operating practices associated with specific job functions and responsibilities;
 - (c) safety training on the hazards associated with ground handling operations;
 - (d) Dangerous Goods training in accordance with applicable requirements of the State in which personnel carry out such duties, or if there are no such requirements, the requirements of the current edition of the IATA DGR.
- (5) The Operator shall have a training programme to ensure awareness and recognition of undeclared dangerous goods for applicable ground handling personnel even if the Operator does not accept dangerous goods shipments.
- (6) The Operator shall include in its training programmes the safety elements that follow:
 - (a) safety management awareness;
 - (b) human factors;

- (c) rules and regulations;
- (d) accidents and incidents;
- (e) personal protection;
- (f) workplace hazards;
- (g) equipment operation;
- (h) housekeeping;
- (i) emergency situations;
- (j) airside markings.

3.1.6 Contracted Services

The Operator shall have a surveillance or oversight programme applicable to external ground handling agents or service providers to ensure that all ground handling operations performed for the Operator are conducted in conformity with Operator and applicable Regulatory requirements.

3.1.7 Incident Response

- (1) The Operator shall have procedures for use by ground handling personnel in response to a spill or leakage on the aircraft, on the ramp, or in the cargo facility during the transportation of cargo.
- (2) The Operator shall have procedures for response to ground handling accidents and incidents.
- (3) The Operator shall have a system to ensure retention of records of ground accidents and incidents for a minimum of two years.
- (4) The Operator shall have procedures for the handling of on-ground emergencies, including aircraft evacuation, bomb threats, facility evacuation and natural disasters.

3.1.8 Weight and Balance

- (1) The Operator shall have a process to ensure that current and correct aircraft weight and balance manuals and/or computer programmes are utilized to produce weight and balance calculations.
- (2) The Operator shall have a process for preparing and recording weight and balance calculations prior to flight to ensure that a planned load is properly distributed, safely secured, and within aircraft weight and balance limitations.
- (3) The Operator shall have a process for retention of completed weight and balance planning records for a minimum of three months.
- (4) The Operator shall have a process that ensures production of a load manifest for each flight that contains the weight of the aircraft fuel, cargo, baggage, passengers and crew.

- (5) The Operator shall have a process that ensures actual aircraft loading is accomplished in accordance with the load plan, and that changes or adjustments to the planned load are properly coordinated with appropriate load planners and cargo loaders.
- (6) The Operator shall have a procedure for ground handling personnel to provide the Pilot in Command with written information of special loads, including dangerous goods, as soon as practical before the departure of the flight.

3.1.9 Ramp Operations

- (1) The Operator shall have a programme that ensures a designated individual is responsible for supervision and oversight of ramp operations.
- (2) The Operator shall have a programme that specifies safety procedures for ramp operations around the aircraft.
- (3) The Operator shall have procedures for aircraft ramp movement operations, including communication using IATA -recommended hand signals where appropriate.
- (4) The Operator shall have a process for aircraft lavatory service that prevents the possibility of “blue ice” formation and accumulation.
- (5) The Operator shall have procedures that ensure all servicing doors and panels are checked and closed prior to aircraft operation.
- (6) The Operator shall have a programme for pushing and towing aircraft, and such programme *should* be consistent with IATA recommendations.
- (7) The Operator shall have a process that ensures aircraft are checked for damage on arrival and before departure.
- (8) The Operator shall have a process for securing the aircraft at the completion of ground handling and servicing functions on overnight/lay-over aircraft.

3.1.10 Dangerous Goods Handling

- (1) The Operator shall have a programme that designates responsibility to a qualified individual for ensuring the correct loading location of dangerous goods onboard the aircraft.
- (2) The Operator shall have procedures for loading and securing dangerous goods in the aircraft in such a manner that will prevent movement in flight that could change the orientation of or cause damage to the package.

3.1.11 Passenger Services

- (1) The Operator shall have a system that requires all originating passengers and their cabin baggage to be screened prior to boarding an aircraft.
- (2) The Operator shall have a programme that ensures passenger service personnel are aware of the need to question passengers on the contents of their baggage with respect to hidden dangerous goods and security procedures, where applicable.
- (3) The Operator shall have signs posted at passenger check-in locations indicating the prohibition of dangerous goods in checked baggage.

- (4) The Operator shall have a process that requires passengers to present a passport, visa, or other documents at check-in for the purposes of identification and entry into international airports, when applicable.
- (5) The Operator shall have a control process to ensure that un-issued boarding passes and baggage tags are secured from unauthorized use.

3.1.12 Airport Facilities

- (1) The Operator shall have a process to ensure the existence of facilities and services to the needs of the elderly and disabled, including the availability of wheel chairs, passenger movers and medical assistance.
- (2) The Operator shall have a process to ensure the existence of facilities with communication devices for messages, flight information and emergency information to all passengers.

3.1.13 Baggage Services

- (1) The Operator shall have a programme for the recovery of lost baggage.
- (2) The Operator shall have a process that ensures unclaimed baggage is forwarded to a central storage facility after approximately five days.

3.1.14 Cabin Services

- (1) The Operator shall have a process for the cleaning and disinfecting of potable water service equipment.
- (2) The Operator shall have a process for securing the aircraft cabin at the completion of cabin cleaning, particularly on overnight/lay-over aircraft.

3.1.15 Ground Support Equipment

- (1) The Operator shall have a preventive maintenance programme for ground support equipment.
- (2) The Operator shall establish a system for recording all maintenance completed on ground support equipment.

4. PROCEDURES

4.1.1 **Directing movement of aircraft.** The person directing an aircraft that is being taxied should stay far enough ahead and to the left of the aircraft for the pilot to have an unobstructed view of him.

- (1) Use the standard hand signals illustrated in Implementing Standard: 8.H.255(h)(2) of the Civil Aviation Regulations (CV-CARs).
- (2) When directing aircraft during darkness or inclement weather, the signalman should use illuminated or reflective wands.

- (3) Movement of aircraft in congested areas should be avoided. However, when necessary, additional signalmen should be stationed near the aircraft wingtips to assure that adequate clearance is maintained.

4.1.2 **Parked aircraft.** When an aircraft is parked, the main gear wheels should be chocked fore and aft. If the aircraft is to remain overnight or if winds are expected, flight control locks should be used.

- (1) While turbine powered aircraft are not in service or being worked on, engine plugs should be installed to prevent damage from dust, debris, nesting birds, etc.
- (2) Ground personnel should develop a habit of making a visual check of the aircraft as soon as it is parked and secured. Before the flight crew departs, advise them of any unsafe condition that may have been observed and determine the nature of services that will be required for the next flight. This procedure may prevent unwarranted delays of the next departure or possible in-flight failures. Examples of conditions that may be observed are: low or flat tires; cracked windows; nicked propeller blades; loose propeller spinners; oil and fuel leaks; damaged flight surfaces; etc.

CAUTION: *Propellers have injured many people in a moment of carelessness. When it becomes necessary to position propellers, they should be handled as if the engine is going to start. Before moving a propeller, always check to be sure the ignition switches are in the "off" position, and the throttle and mixture control levers are in the "closed" position. Always stand clear of propeller blade path, particularly when moving the propeller, because of a possible inadvertent engine start. Particular caution should be practised around warm engines.*

4.1.3 **Tiedown of aircraft.** It is a good practice to always tiedown small aircraft after each flight and large aircraft when unusually high winds are expected. When not in use, wheel chocks, tiedown ropes, or chains, and other equipment, may be stored safely near the wing tiedown anchor points on the ramp. These are usually located outside of the aircraft wheel traffic pattern. Wheel chocks should be painted a bright colour so they can be easily seen.

4.1.4 **Towing of aircraft.** When towing aircraft, the proper tow bar must be used. The wrong type of tow bar, or makeshift equipment, can cause damage to the aircraft. Persons performing towing operations should be thoroughly familiar with the procedures that apply to the type of aircraft to be moved. Particular care must be exercised when pulling or pushing an aircraft with a tow vehicle.

- (1) One should never tow an aircraft in congested areas without signalmen to assist in determining that there is adequate clearance.
- (2) No less than two people should be used to tow large aircraft, including a qualified person in the cockpit to operate the aircraft brakes, and a qualified tow vehicle operator. One person should be able to safely move a light aircraft with a hand operated power-towing device or tow bar provided for the aircraft.
- (3) The person operating the tow vehicle should assure that the nose wheel scissors or tail wheel lock is disengaged, when applicable, before attempting to move the aircraft. The person operating the tow vehicle should also make certain that the nose wheel swivelling limits are not exceeded during the towing operation.
- (4) The aircraft engines should not, under normal circumstances, be operated during towing operations. However, the procedure of pushing transport aircraft away from terminal gates,

used by air transport operators for dispatch, is an exception. If engines are operated during towing operations, procedures will be needed to keep personnel away from rotating propellers and away from the danger zones of jet engines.

- (5) Prior to movement of any aircraft, all landing gear struts and tires should be properly inflated and brake pressure built up when applicable.
- (6) The tow vehicle operator should avoid sudden starts and stops. The aircraft brakes should be applied only in an emergency, on command from the tow vehicle operator or his signalman.
- (7) Clearance must be obtained from the airport control tower, either by appropriate radio frequency or by prior arrangement through other means, before moving aircraft across runways or taxiways.

4.1.5 Taxiing of aircraft. Only rated pilots or other qualified persons should be authorised to taxi aircraft. Persons authorised to taxi aircraft should be familiar with the airport control communications procedures and radio frequencies.

4.1.6 Aircraft fuelling. Improper fuelling procedures may cause aircraft accidents and in-flight incidents. If operators of fuelling facilities establish procedures for safe and proper fuelling of aircraft and fuelling personnel follow these procedures, many aircraft accidents or incidents will be prevented. Fuelling personnel should be familiar with the fuel requirements for the models and types of aircraft that they are servicing. The following paragraphs contain a description of problems that may be encountered in fuelling aircraft and recommended procedures for combating these problems.

(1) Water in the Fuel.

(a) Water occurs in aviation fuels in three forms:

- (i) Dissolved water occurs similar to the humidity in the atmosphere that converts to droplets and settles out as the fuel temperature decreases during flight.
 - (ii) Suspended water appears in the form of droplets that reflect light. High concentration of droplets will cause fuel to have a cloudy or hazy appearance.
 - (iii) Solid bodies of water may be caused by leakage of storage tanks, leaking filler neck seals, or the settling out of suspended water droplets.
- (b) Accumulation of water. There is no way of preventing the accumulation of water formed through condensation in fuel tanks. The accumulation is certain, and the rate of accumulation will vary; so it is recommended that storage tanks, fuel truck tanks and aircraft fuel tanks be checked DAILY for the presence of water. Any water discovered should be REMOVED immediately. In addition to the daily water check, fuel tanks should be CHECKED AFTER EACH DELIVERY as insurance against inadvertent water contamination.
- (c) The minimum settling time. Adequate settling time is NECESSARY for accurate testing. The minimum settling time for aviation gas is 15 minutes per foot-depth of fuel and 60 minutes per foot-depth of turbine fuel.
- (d) Water checks of storage tanks and fuel trucks may be made by attaching water detecting paste, or litmus paper, to the bottom of the tank dip stick.

- (i) Push the dipstick to the bottom of the tank and hold for 30 seconds. When the stick is removed, the detecting paste or litmus paper will have changed colour if water is present.
 - (ii) The source of excessive amounts of water must be determined and corrected before further use of fuel from the tank.
- (2) Rust and scale dislodged from the inside of fuel storage tanks may enter the aircraft fuel tanks and clog systems. Turbine fuel tends to dislodge rust and scale and carry the particles in suspension. Because of this, fuel dispensing equipment filters should be serviced frequently. Aviation gasoline should not be stored in tanks or equipment that have been used for turbine fuel storage.
- (3) Micro-organic growth thrives in turbine fuel and appears as a soapy, slippery slime on the inside surfaces of fuel storage tanks. Micro-organisms of bacteria and fungi multiply rapidly and may cause serious corrosion in aircraft fuel tanks, as well as clog fuel filters, screens, and control units. Therefore, turbine fuel storage tanks should be checked frequently for the presence of slime or micro-organic growth. If found, the tank should be cleaned thoroughly to assure removal of the micro-organic growth and prevent further contamination.
- (4) Dirt, lint, and dust may collect on fuel dispensing hose nozzles when proper storage receptacles are not used. Fuel hose nozzles should not be stored in such a manner that dirt or moisture will collect in them. Always check the nozzle for dirt and water before using it.
- (5) Contamination with other types or grades of fuel can cause aircraft engine damage and possible failure in flight. Turbine fuels mixed with aviation gasoline reduce the antiknock and volatility of fuels required for reciprocating engines. Quantities of aviation gasoline mixed with turbine fuels will cause damaging lead deposits to collect in jet engines when used indiscriminately. Transportation or storage of turbine fuel in tanks previously used for storage or transportation of aviation gasoline is not recommended as contamination from rust and scale, or a possible change of fuel specification, may result.
- (6) Additives. Certain turbine engine powered aircraft require the use of fuel containing anti-icing additives. Therefore, fuel personnel must know whether or not the fuels they dispense contain additives. When anti-icing additives are to be added to the fuel, the manufacturer's instructions (usually printed on the container) should be followed to assure proper mixture. Anti-icing additive content in excess of 0.15% by volume of fuel is not recommended as higher concentration can cause the aircraft fuel capacitance system to give erroneous indications. Concentrations of at least 0.05% additive by volume of fuel are effective in eliminating microbial growth.
- (7) Fuel Dispensing Equipment. Fuel servicing vehicles should be conspicuously and legibly marked to indicate the type and grade of fuel.
 - (a) Markings should be displayed on each side and on the rear of the vehicle in **CONTRASTING** colours.
 - (b) Fuel hydrants and pit installations should be identified similarly, according to type of fuel and grade.
 - (c) Turbine fuelling vehicles should be marked to show whether or not anti-icing additives are contained in the fuel being dispensed.

- (d) Leaking or otherwise defective pumping equipment, plumbing, hoses, nozzles, and grounding cables of fuel dispensing vehicles and stationary facilities should be repaired before further use. Fuel/nozzle/lever stop notches should be removed to avoid the possibility of an inadvertent blocking open of the valve.
 - (e) Fuel dispensing vehicles, and stationary facilities, should be equipped with appropriate fire extinguishers, fire blankets, static grounding cables, explosion proof flashlights, and ladders. Fire extinguishers should be located so they are accessible from either side of the vehicle and remote from probable fire hazard.
 - (f) Fuelling vehicles should be positioned as distant from the aircraft as permitted by the length of the fuel dispensing hose. Mobile units should be parked parallel to or heading away from the aircraft wing leading edge, so it may be moved away quickly in the event of an emergency. When the fuelling operation is completed, the fuelling vehicle should be parked at least fifty feet from aircraft or buildings and positioned in a manner to permit removal from the area without delay.
- (8) Fuelling procedures. Fuelling personnel should first check with the flight crew to determine the type and grade of fuel required, including additives for the aircraft. It is a good practice to have the pilot sign a request for service, identifying the grade and quantity of fuel desired. In the absence of the flight crew, fuelling personnel should check the placard located near the aircraft fuel tank filler port, or the aircraft owner's manual that is usually carried in the aircraft, to determine the type and grade of fuel required.
- (a) Check to ensure that:
 - (i) No electrical or radio equipment in the aircraft is energised or being maintained while fuel is being dispensed into the aircraft, except those switches that may require energising to operate fuel selector valves and quantity gauge systems.
 - (ii) Qualified personnel should be stationed at the aircraft fuel control panel during pressure fuelling operations.
 - (iii) Fuelling personnel should not carry objects in the breast pockets of their clothing when servicing aircraft or filling fuel service vehicles because loose objects may fall into fuel tanks.
 - (iv) Matches or lighters should never be carried during fuelling operations.
 - (v) Because of the high lead content, direct fuel contact with skin or the wearing of fuel saturated clothing should be avoided. Skin irritation or blisters may result from direct contact with fuel.
 - (vi) Immediate medical attention should be sought if fuel enters the eyes.
 - (vii) In the event of fuel spillage, discontinue fuelling operations until the spill can be removed, using proper safety precautions.
 - (b) Fuelling from mobile equipment. The fuelling crew should follow the following sequence:
 - (i) Connect a grounding cable from the fuelling vehicle to a satisfactory ground. Grounding posts usually consist of pipes or rods driven far enough into the ground to result in a zero potential.

- (ii) Connect a ground cable from ground to the aircraft (on landing gear axle or other unpainted surface). Do not attach ground cables to the propeller or radio antenna.
- (iii) Connect a grounding cable from the fuelling vehicle to the aircraft. The fuelling vehicle may be equipped with a "T" or "Y" cable permitting ground attachment first and grounding of the aircraft with the other end.
- (iv) Connect a grounding cable from the fuel nozzle to the aircraft before removing the aircraft tank cap. This bond is most essential and needs to be maintained throughout the fuelling operation and until the fuel cap is replaced.

CAUTION: *Conductive-type fuel hose does not provide a satisfactory method of bonding.*

- (v) The fuel dispensing equipment-grounding cables should be removed in the reverse order of the sequence outlined above.
- (c) Fuelling from hydrants, pits, and cabinets.
- (i) Connect the grounding cable from the dispenser to the aircraft.
 - (ii) Connect the grounding cable from the hose nozzle to the aircraft before removing the fuel cap.
- (d) Overwing fuelling. The fuel filler hose should be draped over the wing leading edge. Never lay the fuel filler hose over the wing trailing edge because aircraft structural damage may result. A simple rubber shower mat may be used to provide protection for wing leading edges during fuel operation. Step ladders or padded upright ladders may be used to provide easy access to high wing and large aircraft. Standing on wing surfaces should be avoided and never stand on wing struts. Hold the fuel nozzle firmly while it is inserted in the fuel tank filler neck and never block the nozzle lever in the open position. Be sure that fuel filler caps are replaced and securely latched when fuelling is completed.
- (e) Underwing fuelling. Discharge possible static build-up in the fuel dispensing hose by touching the pressure nozzle to an unpainted part of the aircraft, such as a landing gear axle, before attaching to the aircraft filler receptacle. No static ground wire between the filler nozzle and the aircraft is necessary.
- (f) The aircraft fuel tank sumps should be drained before each fuel servicing to remove water that may have accumulated from condensation or entered the tank during fuelling operations. Draining fuel sumps immediately after fuelling serves little purpose because the agitation action of fuel entering the tank may suspend water and contaminants - which can remain suspended for many minutes and may not settle out until the aircraft is airborne.

4.1.7 Servicing of oxygen systems. Certain precautions should be observed whenever aircraft oxygen systems are to be serviced.

- (1) Before servicing any aircraft with oxygen, consult the specific aircraft service manual to determine the type of equipment required and procedures to be used.
- (2) Oxygen system servicing should be accomplished only when the aircraft is located outside of hangars.

- (3) Personal cleanliness and good housekeeping are imperative when working with oxygen. Oxygen under pressure and petroleum products create spontaneous results when they are brought in contact with each other. Service people should be certain to wash oil and grease (including lip salves, hair oil, etc.), and dirt from their hands before working around oxygen equipment. It is also essential that clothing and tools are free of oil, grease, and dirt.
- (4) Aircraft with permanently installed oxygen tanks usually require two persons to accomplish servicing of the system. One man should be stationed at the service equipment control valves, and the other stationed where he can observe the aircraft system pressure gauges.
- (5) Oxygen system servicing is not recommended during aircraft fuelling operations or while other work is performed that could provide a source of ignition.
- (6) Oxygen system servicing while passengers are on board the aircraft is not recommended.

