

SAFO 1020 **Date: 11/23/2010**

Subject 14 CFR, parts 91, 133, and 137 and hot fueling/loading

Purpose: This SAFO highlights current guidance and best-practices for Title 14 Code of Federal Regulations (14 CFR) parts 91, 133, and 137 operators that conduct fueling or chemical loading with the engines running (hot fueling/loading).

Recommended Action: Hot fueling/loading can be extremely hazardous and is not recommended except when absolutely necessary due to the nature of the operation.

An appropriately certificated and rated pilot should be at the flight controls during the entire hot fueling/loading process with controls appropriately adjusted to prevent aircraft movement.

Other personnel should not be on-board the aircraft during hot fueling/loading.

AC-91-32B SAFETY IN AND AROUND HELICOPTERS, 06/02/1997

13. RAPID REFUELING. Rapid refueling is a refueling operation conducted while engines and/or rotor blades are turning. Normally, helicopter rotor blades should be stopped before refueling begins. Both the aircraft and the refueling unit should be properly grounded and the pilot should ensure that the proper grade of fuel and correct additives are dispensed into the helicopter fuel system. While it is generally discouraged, rapid refueling of turbine-powered aircraft can be accomplished safely in some types of operations if conducted under carefully controlled conditions by properly trained personnel. Some operators elect to use rapid refueling procedures in order to reduce thermal stress, avoid hot-starts, and keep engine cycles and starts to a minimum. Air tour flights, flights conducted under the provisions of part 133 or 137, and similar operations conducting rapid refueling operations should ensure that all personnel adhere strictly to safe operating practices. Reciprocating engine-powered aircraft fueled with avgas **SHOULD NEVER** be rapid refueled because gasoline is highly flammable.

a. Training. All personnel and flight crewmembers who will be involved in rapid refueling procedures should be trained in safe techniques and procedures before conducting such operations. Initial and recurrent ground training on rapid refueling should be included in the operator's training program and specify each person's duties and responsibilities. Training should include all of the specific engine manufacturer's recommendations and/or procedures regarding checking fluid levels, cool down times, and other pertinent items for extended-period operations. Additionally, the training should include the following topics:

- (1) Characteristics of jet fuel.
- (2) Fuel quality control procedures.
- (3) Operation of fuel vehicles and fuel tanks.
- (4) Avoidance of rotor blades.
- (5) Communications with the pilot.
- (6) Fuel spill procedures.
- (7) Proper grounding of the aircraft.
- (8) Personal injury response.

b. Passenger Safety. The marshalling and containment of passengers is a major consideration in rapid

refueling operations. It is imperative that the operator develop appropriate procedures to ensure the safety of passengers during rapid refueling operations.

c. Guidelines. The following guidelines are general safe operating procedures. Flightcrew and ground crew members should refer to the aircraft flight manual and other guidance developed by the helicopter manufacturer for refueling procedures that are unique to a specific helicopter. Helicopter fueling while onboard engines are operating should be permitted only under the following conditions:

- (1) Only turbine-powered helicopters fueled with Jet A or Jet A-I fuels should be fueled while an onboard engine is operating.
- (2) Helicopters to be refueled while an onboard engine is operating should have all sources of ignition of potential fuel spills located above the fuel inlet port(s). Ignition sources include, but are not limited to, engines, engine exhausts, auxiliary power units (APU), and combustion-type cabin heater exhausts.
- (3) A Federal Aviation Administration (FAA) certificated pilot qualified in the helicopter must be at the aircraft controls during the entire fuel servicing process.
- (4) Passengers should be deboarded to a safe location before rapid refueling operations begin unless the PIC deems it necessary for passenger safety that they remain aboard. If passengers remain aboard the aircraft during fuel servicing, at least one person (other than the PIC) trained in emergency evacuation procedures should be aboard. The operator should establish specific procedures covering emergency evacuation under such circumstances.
- (5) Smoking must be prohibited in and around the helicopter during ALL refueling operations. Fueling personnel should not carry cigarette lighters, matches, or any type of sparking ignitor device on their person while fueling.
- (6) Passengers should not board or deplane during rapid refueling operations. No passengers should be allowed within 100 feet of the helicopter during any rapid refueling operation.
- (7) Only designated personnel, properly trained in rapid refueling operations, should operate the fueling equipment. Written procedures should include guidelines for safe handling of the fuel and equipment.
- (8) Persons not directly involved with the refueling operation should be kept clear of the refueling area.
- (9) All doors, windows, and access points that allow entry to the interior of the helicopter and are adjacent to or in the immediate vicinity of the fuel inlet ports should be closed and kept closed during refueling operations. Fumes must be adequately vented from the aircraft cabin during fueling operations.
- (10) Fuel should be dispensed from approved "dead-man" type nozzles with a flow rate not to exceed 10 gallons-per-minute (38 Liters-per-minute). When fuel is dispensed from fixed piping systems, the hose cabinet should not extend into the rotor space. A curb or other approved barrier shall be provided to restrict the fuel servicing vehicle from coming closer than 10 feet (3 Meters) to any helicopter rotating components. If a curb or approved barrier cannot be provided, fuel servicing vehicles should be kept 20 feet (6 Meters) beyond any helicopter rotating components, and a trained person should direct the fuel servicing vehicle's approach and departure.