



U.S. Department
of Transportation

**Federal Aviation
Administration**

SAFO

Safety Alert for Operators

SAFO 10020

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Flight Standards Service
Washington, DC

http://www.faa.gov/other_visit/aviation_industry/airline_operators/airline_safety/safo

A SAFO contains important safety information and may include recommended action. SAFO content should be especially valuable to air carriers in meeting their statutory duty to provide service with the highest possible degree of safety in the public interest. Besides the specific action recommended in a SAFO, an alternative action may be as effective in addressing the safety issue named in the SAFO.

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).

Background: On May 30, 2009, a Bell 47G-2 helicopter operating under part 137 was being refueled with the engine running (hot fueling) when the ground crew spilled fuel onto the engine while trying to untangle a kink in the hose. The helicopter quickly caught fire and the pilot sustained serious injuries as a result. Additionally, on September 9, 2008, a Bell 206-B helicopter, operating under part 137, sustained substantial damage while conducting hot fueling and chemical loading simultaneously. After fueling was complete, but with the chemical hose still attached, the ground crew mistakenly gave an "all clear" hand signal to the pilot. As the pilot ascended, the chemical hose caused the helicopter to pitch nose down and roll to the right, contacting the ground.

Recommended Action: Hot fueling/loading can be extremely hazardous and is not recommended except when absolutely necessary due to the nature of the operation. Operators who conduct hot fueling/loading should develop standard operating procedures (SOP) for flight and ground crew personnel. The operator's procedures should address the following guidelines:

- The Federal Aviation Administration (FAA) recommends that hot fueling be conducted only by aircraft utilizing JET A or JET A-1 fuel types. If strict operating procedures are not followed, hot fueling of aircraft utilizing AvGas can be extremely hazardous due to its low flash point. Aircraft being fueled while an engine is operating should have all potential ignition sources located above the fuel inlet port(s) and above fuel vent or tank openings. Sources of ignition include, but are not limited to: engines, exhausts, auxiliary power units (APU), and combustion-type cabin heater exhausts. In accordance with 14 Code of Federal Regulations (14 CFR) section 91.9, hot fueling is not permitted if the Airplane or Rotorcraft Flight Manual contains an associated operating limitation.
- 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. The pilot should unbuckle all restraints, and be prepared to immediately shut-down the engine and egress the

aircraft, if necessary. The pilot should not conduct any extraneous duties during hot fueling/loading. Other personnel should not be on-board the aircraft during hot fueling/loading.

- Only designated personnel, with proper training in hot fueling/loading operations, should operate fueling or chemical loading equipment. The operator's written procedures should include: precautions for safe handling of the fuel or chemical, emergency shutoff procedures, fire extinguisher use, hand signal use, and precautions regarding moving propeller and rotor blades.
- At least two ground personnel should be present during hot fueling/loading. One person conducts the fueling/loading, while the other stands by prepared to activate the fuel/chemical emergency shutoff and handle fire extinguishers if necessary. The aircraft should remain well clear of the fuel source, and at no time should the aircraft wing or helicopter blades extend over the fueling source
- Before fueling, the aircraft must be bonded to the fuel source to equalize static electricity between the fuel source and the aircraft. Grounding of the aircraft and/or fuel truck is no longer recommended because it does not prevent sparks at the fuel source, and the grounding cable may not be sufficient to discharge the electrical current.
- All doors, windows, and access points allowing entry to the interior of the aircraft that are adjacent to, or in the immediate vicinity of, the fuel inlet ports should be closed and should remain closed during fueling operations.
- Fuel should be dispensed into an open port only from approved deadman-type nozzles, with a flow rate not to exceed 10 gallons per minute (38 liters per minute). Close port pressure fueling ports are preferable because the potential for spillage is reduced.
- A fire extinguisher of an appropriate type and size for the fueling operation must be within easy reach of ground personnel at all times during hot fueling operations. Operators who conduct hot fueling should also equip the aircraft with a fire extinguisher in the cockpit, if possible.
- When fueling/loading is complete, the pilot must ensure that the seatbelt and shoulder harness are properly re-secured as necessary prior to any aircraft movement.
- Operators should include this SAFO in initial and recurrent training programs for pilots and ground personnel.

References:

- Aeronautical Information Manual (AIM) – Helicopter Rapid Refueling,
- AC 00-34A, *Aircraft Ground Handling and Servicing*,
- National Fire Prevention Association (NFPA) 407, *Standard for Aircraft Fuel Servicing*,
- Include review of this SAFO in initial and recurrent training, and flight reviews.

Contact: Questions or comments concerning this SAFO can be directed to the General Aviation and Commercial Division, AFS-800, via phone at 202-267-8212.