# United States Department of Agriculture
# Forest Service

## Aviation Safety Alert

**No. 2005-03** August 4, 2005 

**Subject**: Fuel Management in Cessna 336/337 Series A/C

**Area of Concern:** Air Attack Operations

**Distribution:** Fire and Aviation Personnel

Recurring incidents in Cessna 336/337 series aircraft raises concern with fueling procedures, fuel system management and crew resource management for Air Attack missions. This is intended to raise awareness of a hazard inherent in the design and operation of this series of aircraft.

**FUELING:** The Cessna 336/337 wing contains three independent rubber fuel bladders that are interconnected. If equipped with dual filler necks, the inner tanks should be filled first, then move to the outer (higher) wing tank last. It is necessary to allow sufficient time for the outer tank to drain into lower center tanks, then top off the tank again. Pilots advise us that this procedure may require as much as ten minutes per wing for adequate filling/settling of all tanks and fuelers may tend to under fill these aircraft as a result.

**FS INCIDENTS:** A Cessna 336 recently lost power when one engine starved for fuel during an air attack mission. The pilot was not adequately familiar with the fuel system and the attempted air re-start was unsuccessful. The aircraft returned to a successful landing at home base on one engine. The aircraft had been serviced with fuel immediately prior to the flight but the crew did not verify that the tanks had been fully topped off.

In 2003 there were three Incidents With Potential involving misfueling and/or fuel management errors in airplanes that experienced in-flight engine failures. One of those involved a Cessna 337 on an air attack mission that experienced a failure of the front engine after approximately 3 hours in flight. The pilot had requested the C337 to be topped with fuel and used the cockpit fuel gauges to verify the service. When tested after the incident the gauges were found to be seriously in error and needing calibration.

A Cessna 337 had completed its air attack mission and was being repositioned when it experienced a dual engine failure on final approach to San Bernardino airport in 2002. There was sufficient fuel remaining to consume the entire aircraft in the ensuing post crash fire. Improper fuel system management (boost pumps and fuel tank selectors) was sited as probable cause of the dual engine failure. The pilot survived with serious injuries.

**Mitigation of Risk for Cessna 336/337 Flight Operations**

- Pilots should review the manufacturers Operating Handbook for the model they fly to familiarize themselves with the recommended settings for fuel selectors and boost pumps during the approach to landing.
- Pilots should familiarize themselves with the emergency engine re-start procedure for the make-model aircraft they operate.
- One air crew member should stay with the aircraft during fueling to ensure that tanks are fully topped off, caps are securely replaced, and all ground hazards are clear before start-up. (i.e. grounding cables, chocks, ladders)
- Pilots must verify that the proper amount and type of fuel has been provided by checking the fuel slip/receipt. Fuel should be physically sampled for its type and for contaminants.
- It is recommended that C336/337 fuel tanks be visually inspected or tested with a fuel measuring stick or sampler prior to each flight in order to verify fuel levels.
- Air Attack Group Supervisors should be familiar with fuel service procedures; should understand fuel use and flight planning; and fully participate in assuring there is adequate fuel for the mission and return to base with reserves for VFR flight.
- Do not rely solely upon the cockpit fuel gauges for estimating fuel status.

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