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UNITED STATES DEPARTMENT OF THE INTERIOR
AVIATION MANAGEMENT

AVIATION ACCIDENT PREVENTION BULLETIN

Subject: Fuel Management

Area of Concern: Single Engine Air Tankers

Distribution: Aviation Operations

Discussion: Two recent investigations highlight the danger of uncoordinated (out of trim) operations in airplanes when the fuel remaining in either wing tank is less than one-quarter full.

> On August 10, 2004 an amphibious Cessna 206 suffered a fuel-starvation induced engine failure immediately after take off following a prolonged step turn (see Aviation Accident Prevention Bulletin 05-01).
>
> On March 16, 2004, a fatal crash of a WSK PZL Mielec, M-18A Dromader occurred following a loss of engine power that may have resulted from fuel mis-management. Refer to: http://www.oas.gov/oassafty/reviews/04/04accrev.ppt, slides 20 thru 26.

In each case, evidence indicates that at least one of the wing tanks was less than one-quarter full at the time of the engine failure.

During the investigation of the Dromader accident many of the Single-Engine Airtanker (SEAT) pilots interviewed stated that they had, at some point in their careers, experienced either a total or partial loss of power in Agricultural (Ag) airplanes while maneuvering with less than one-quarter of a tank of fuel. In some of these events the pilot was able to restart the engine in flight and in other cases the pilot had to make an emergency landing, some of which resulted in accidents. The pilots explained that Ag aircraft, which we refer to as SEATs, are particularly sensitive to yaw and pitch excursions and demand a high degree of attention from the pilot to keep the aircraft in trim and the fuel load balanced between the two wing tanks.

While each make and model of single-engine airtanker has its own idiosyncrasies, yaw instability is a characteristic that all SEATs share, and which all SEAT pilots must be aware of.

Aerial firefighting combines several factors that can make fuel management in SEATS more difficult and the consequences of fuel mis-management more dangerous. These factors include, but are not limited to:

> Complex communication, navigation, and airspace requirements.
> Low altitude maneuvering flight and extended holding/loitering.
> Rugged terrain and limited areas for forced landings.

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Discussion: (Continued)

To reduce the risk of fuel starvation due to un-porting of the fuel outlet port in SEAT aircraft, operators should:

Develop an instrument crosscheck to ensure that the aircraft is in trim and fuel quantity is level between the two wing tanks. Increase your monitoring when the fuel level drops below one-half tank.
Cross-level fuel as appropriate to maintain a balance between wing tanks (i.e. avoid asymmetrical fuel loads).
Avoid conducting missions with less than one-quarter tank of fuel in either wing tank.
Avoid prolonged holding, particularly when turns are made to the same side.
Avoid operating in turbulence with less than one-quarter tank of fuel in either wing tank.

Finally, all pilots should periodically review the specific fuel management and emergency procedures addressed in their aircraft's flight/operator's manual.

/s/ Robert Galloway
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