



# Interagency Aviation Lessons Learned



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**Subject: Unauthorized Flight Techniques**

**Area of Concern: Flight Safety**

**Distribution: All Aviation Activities**

**Discussion:** Have you ever wondered what the difference is between a procedure and a technique? Procedures or standard operating procedures (SOPs) are written, published and tested procedures that are to be consistently applied. SOPs identify and describe the standard tasks and duties of a flight crew for each flight phase, including what to do and when to do it under both normal and abnormal operating conditions.

A technique is any method or manner of accomplishing something or doing an activity that involves practical skills; skills developed through training and practice.

More often than not, techniques not developed through training and practice have undesirable outcomes. Case in point: A single engine aircraft experienced an inadvertent, pilot induced in-flight engine shutdown while conducting a low altitude survey with five people on board. Here's the rest of the story:

Approximately one hour and twenty minutes into the flight, the pilot crested a mountain ridge and began to descend over the other side into the valley below. A proven technique for ridge crossing followed by a steep descent, is to reduce the power lever to idle, increase/maintain propeller RPM to maximum and select full flaps. This is also the approved procedure for an emergency descent.

In an effort to increase the rate of descent, the pilot elected to retard the fuel condition lever from high idle to low idle. Keep in mind that the Pilot Operating Handbook (POH) states that, after start, the fuel condition lever should be placed in the high idle position. It does not permit operations in the low idle position in flight. The engine shutdown occurred when turbulence forced the pilots hand down subsequently forcing the fuel condition lever back around the stop gate into the cutoff position.

The pilot maintained control of the aircraft and, in accordance with the Pilot Operating Handbook (POH), returned the fuel condition lever forward to the low idle position in an attempt to restart the engine. The engine failed to restart so the pilot moved the fuel condition lever back to the cutoff position and executed a successful starter-assisted airstart. With the engine now running, the pilot continued the mission.

During the investigation, a similar profile was flown in a simulator in order to compare descent rates between low idle and high idle. It was discovered that the descent rate in low idle range was actually less than when the fuel condition lever was in high idle range. These rates of descent differed from 3200 feet per minute to 3600 feet per minute, respectively. The difference was primarily due to the increased blade angle and subsequent aerodynamic drag vice the Ng (engine) speed.

Lessons are best learned when there are no injuries to people or damage to aircraft. In this event, the pilot remained calm during the in-flight emergency and the aircraft did not sustain any damage or engine exceedance. Incredibly, the four other aircrew on board did not realize that the pilot had shut down and then restarted the engine. It wasn't until two days later that they were told what happened. Good Crew Resource Management (CRM) principles involve communication and empowering the crew to participate in emergencies. That participation could be in a variety of ways that may not involve flying the aircraft (i.e. calling in location to dispatch, readying the cabin, looking for clear areas to land, limiting non-essential conversation, assisting with checklists, etc). They have a right to know when an emergency is in progress.

After the engine was restarted, the mission should have been terminated. The pilot should have diverted to the nearest suitable airport to de-brief what happened and ensure the aircraft was in an airworthy condition. Management should have been notified in order to allow the appropriate authority to determine what happens next.

**Lessons Learned:**

1. Approved flight procedures are developed to ensure the safety of all on board. Using untested and unapproved techniques is hazardous to flight safety.
2. CRM is a valuable tool for flight safety and mission effectiveness. It enables crew members to identify existing and potential threats and to develop, communicate, and implement plans and actions to avoid or mitigate threats. Using CRM methods affords an aircrew's ability to improve mission management, mitigate human errors, improve morale, and enhance efficiency of operations.

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