



Interagency Aviation Lessons Learned



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Subject: Flight Safety - Operational Pauses

Area of Focus: Supervisory Oversight, Airworthiness, Operational Risk Management

Distribution: All Aviation Operations

Discussion: Tree Strike During Single-Engine Scooper Water Drop (Repeated Occurrence)

Summary of Event: During aerial firefighting operations, a DOI-carded single-engine scooper struck the top of a tree during a water drop. The pilot returned to base and landed safely. The investigation found that earlier in the week, the same pilot experienced a similar tree strike on a separate mission. Following the first tree strike, the trailing aircraft visually confirmed damage, however, the pilot performed an additional drop before returning to base.

Contributing Factors:

- Inadequate obstacle/terrain height judgment at low altitude.
- Plan continuation bias or continuing flight despite confirmed damage.
- Task saturation and high workload during dynamic fire environment.
- Complacency due to prior experience in firefighting.
- Suboptimal CRM: trail aircraft's damage report did not trigger immediate termination or return to base decision.

This incident shows how continuing flight operations following abnormal or unexpected events can introduce elevated risk to aviation safety. Although hazards such as terrain and vegetation are inherent to aerial firefighting operations, effective risk management is required to prevent those hazards from culminating into mishaps. In this case, the absence of a deliberate pause to reassess risk allowed the same conditions and behaviors to persist, ultimately contributing to a second event.

[NWCG PMS 505](#) establishes a minimum drop height of 60 feet above the top of vegetation for single-engine airtanker drops. This altitude attempts to balance safety with drop effectiveness. A safety stand-down following the first tree strike would have provided an opportunity to review drop height standards, obstacle clearance requirements, approach paths, asset selection, and decision-making expectations that reinforce appropriate risk management principles.

Pilots and witnesses to unsafe events, such as tree strikes, must report these occurrences so that aviation managers and supervisors can take action. All entities have a responsibility in accident prevention. When uncertainty exists, stopping the mission to assess risk and verify readiness before returning to flight is essential. Again, this missed opportunity allowed the same conditions and behaviors to continue, ultimately leading to the second event.

Lessons Learned

Aerial firefighting missions are dynamic, high-tempo, and important, but most are not directly associated with a lifesaving outcome. Aviation safety principles are well established, yet perceived mission urgency can sometimes overshadow sound decision-making.

1. Review standards during operational pauses: Operational pauses provide an opportunity to deliberately review applicable standards, including altitude management, obstacle clearance, and decision-making considerations. Incorporating a brief after-action review (AAR) into these pauses can help crews maintain shared situational awareness, reinforce expectations, and ensure continued alignment with mission objectives as conditions evolve.
2. Avoid operational momentum: Mission urgency can never outweigh safety. The perception that “one more drop” will significantly change the outcome can introduce unnecessary risk. Recognizing when operational momentum is building allows crews and leadership to pause, reassess conditions, and prioritize long-term safety over short-term gains.
3. Normalize safety aborts. Aborting a drop is a positive safety outcome, not a failure.
4. In-flight damage assessments are not sufficient: In-flight visual observations can help crews assess immediate controllability and provide valuable information to determine where and how a flight should terminate, however, they are not a replacement for inspection by qualified maintenance personnel. Additionally, a pilot performance assessment may be required as well. Continued operations beyond a safe landing require appropriate evaluation by both maintenance and operations management in order to verify airworthiness of the aircraft and continued operations for the pilot.

Safety resides with proper reporting and decisive leadership. At the first indication or confirmation of a tree strike, cease operations and return to land without delay. Speak up, enforce good CRM standards, and never sacrifice safety margins for tactical success.

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