



Interagency Aviation Accident Prevention Bulletin



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Page 1 of 2

Subject: Smoke Column Hazards

Area of Concern: Fire Suppression Operations

Distribution: All Aviation Activities

Discussion: In a recent accident in California, a non-federal firefighting helicopter was conducting water drops supporting residential structure protection when the pilot flew into a smoke column. The helicopter began an uncommanded yaw to the right and rate of descent increased. The pilot reported that he released the water but had minimal control of the helicopter. The main rotor blades, tail boom and tail rotor all impacted trees during the sequence. After hitting the trees, the uncommanded yaw



appeared to decrease. The pilot was able to regain control of the helicopter and flew approximately one mile, landing safely at a school athletic field. The pilot reported no pre-impact mechanical issues or malfunctions that would have precluded normal operation ([NTSB ANC17LA051](#)).

Smoke columns are the vertical development of smoke emitting from a fire and represent an ascending air column (updraft). It is imperative that aircrews understand the hazards associated with smoke columns during aerial firefighting operations, regardless of aircraft type. The SAFECOM database has at least 14 inter-agency submissions in the last ten years involving safety issues with both fixed-wing and helicopters operating in or near smoke columns. Here are a few key points to keep in mind:

- Smoke columns can present inadvertent instrument meteorological conditions (IMC), which are especially dangerous when flying low over terrain.

- Loss of horizontal and vertical visibility and situational awareness is possible during inadvertent IMC, which can result in controlled flight into terrain (CFIT) or spatial disorientation.
- The hot temperatures in a smoke column can significantly reduce aircraft performance. The increase in density altitude can result in hazardous conditions for helicopters such as a loss of tail rotor effectiveness (LTE), settling with power, and decreased power available. The density altitude for performance planning does not include the temperatures of the superheated gases that exist inside of a smoke column.
- With the extremely hot temperature in the smoke column, aircraft components (such as composites, plastics, electronics, etc.) could sustain heat damage.
- With the vertical development of the smoke column, foreign object debris (FOD) such as ash, trash, and tree branches can be present, causing damage to aircraft. Additionally, FOD ingestion into critical components (pitot tubes, temperature sensors, engine compressors, etc.) can have catastrophic results.
- Aircrew members can be exposed to smoke inhalation while in the smoke column.
- The hazards listed above are present for all smoke columns, regardless of size.
- Coordinate with aerial supervision and/or ground operations personnel on appropriate ingress and egress routes for suppression drops that avoid flying through a smoke column and where the aircrew can positively identify the hazards along with the start and exit point of the drop. Review [IASA 16-02](#) “How to Properly Refuse Risk in Aviation.”
- Always utilize standard aviation “see and avoid” visual flight rules (VFR) procedures when conducting drops near smoke columns. Minimum altitudes, operating airspeeds, terrain, and environmental factors must always be considered. Review [IASA 17-03](#) “Aircraft Operations in Poor Visibility.”

Where there’s smoke, there’s fire. So stay clear!

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