



Southwestern Region Aviation Lessons Learned High Impact Tail Rotor Strike Incident With Potentail May 21st, 2014



Mission

At approximately 1345 PDT, a Sikorsky CH-54 experienced a tail rotor blade strike during a water drop mission on the Slide Fire on the Coconino National Forest. The helicopter, operating under an Exclusive-Use contract, was coordinating water drops with ground resources on Division P when the tail rotor blades and horizontal stabilizer struck a pine tree. This fire was being managed by a local Type 3 Incident Management Team (IMT); however the fire was still emerging and an ordered IMT1 was scheduled to take command at 2000. Air Attack was on scene when this incident occurred.

Sequence of events

The event aircraft was assigned to the Slide Fire for water drop missions. The flight crew contacted ATGS and began working the head of the fire for a fuel cycle (14 drops). At the completion of the fuel cycle, the flight crew returned to Flagstaff for fuel and lunch. When back out over the fire, the helicopter made one drop at the head. The flight crew went to the dip site for more water and when they returned to the head, the wind had shifted and smoke had reduced visibility. The flight crew made the decision to leave the area and the ATGS re-directed them to the east flank and to work with a ground contact for water drops.

The smoke was such that the flight crew had to fly around the smoke a bit to get to the next working area. The flight crew made radio contact with the ground contact and began to coordinate on the drop needed. The drop was in a deep canyon. The flight crew located the ground contact and asked if the drop area was clear. The contact indicated the drop was clear and the flight crew began the drop run. The drop zone was not clear and the flight crew had to abort the run and perform a "go-around". The flight crew discussed with the contact the need to be completely clear of the drop zone.

The helicopter turned around again and the flight crew set up for the drop. The drop was made at about 45 knots. The flight crew stated, "We were hit with a wind gust either as we were dropping or just afterwards. We were blown down and to the right into a pine tree. We heard a low pop and flew out of the canyon. We checked around to see if we could see any damage". Pilots indicated that the on-site winds were from the southwest 13 mph with gusts between 28-37 mph.

The co-pilot was able to stick his phone outside and take photographs towards the aft of the aircraft. From the photos, they were able to see damage to the horizontal stabilizer. The flight crew felt no abnormal flight characteristics or vibrations. With terrain and houses below, they made the decision to continue on to the airport rather than attempt an off-site landing. The flight crew notified ATGS that they were returning to the airport to address a potential problem. ATGS did not see the rotor strike and was not aware of the event. The ATGS asked if they should follow the helicopter into the airport. The flight crew declined as they were already in communication with the airport tower with the Mode C transponder activated. The flight crew returned to the Flagstaff airport and assessed the damage.

The ground contact was also not aware of the tail rotor strike. From his perspective, the ship made one load and had to return.

The Helicopter Manager notified the Regional Aviation Safety Manager (RASM) directly, The RASM made notifications to the Region, Washington Office and Forest.

Response

The Regional Aviation Safety Manager notified and reported the incident to the Washington Office. The NTSB classified this event as a non-event. The Region requested an Incident with Potential (IWP) investigation be completed. The Investigation team was formed and developed this report for Lessons Learned.

Injuries

There were no injuries to any personnel involved in this incident with potential (IWP)

Damage

All four tail rotor blade tip caps were damaged as a result of contact with the tree. One tail rotor blade had damage that required replacement as it was not field repairable. The horizontal stabilizer was damaged from contact with the tree and also required replacement. The tail rotor drive hub, tail rotor gear box and all tail rotor drive shafts and hanger bearing assemblies were inspected with no defects noted. Post inspection review of the maintenance manual confirmed that the aircraft experienced a “high impact tail rotor strike” and not sudden stoppage.

Findings

- All participants were qualified to perform the function they were in at the time of the incident.
- Both pilots were within duty and flight limitations.
- Wind speed was 13 miles per hour with gusts up to 24 miles per hour. Weather information was taken from Flagstaff RAWS, 7 miles from incident location.
- Incident occurred at a pressure altitude of around 5800 feet.
- Visibility was reduced due to smoke.
- The Air Attack platform had a trainee and a qualified ATGS (no factor).

Lessons Learned

- Conduct a low level recon of the area before the drop; give consideration to wind and terrain and ensure wind conditions do not exceed aircraft limitations.
- Pilots should consider wind and gust limitations when dropping in a canyon, as the canyon funnels air increasing wind speed and creating erratic conditions.
- In a deep terrain canyon, consider utilizing a bucketed aircraft;
 - In most cases this will prevent the aircraft from having to go below a canopy.
- Any line personnel that may be required to coordinate water dropping missions, should practice relaying wind speed and target descriptions to enhance operational safety.
- Ground resources should “clear the line” and verify line is clear, before any “live drop runs” to prevent a “go-around” or injury.
- Pilots should not get drawn into the desire to please the customer. They have the responsibility (and authority) to decline any mission that appears hazardous.
- All personnel should understand and know the local Emergency Response Plan for the area they are working to ensure proper notifications are made.
- The ATGS must be notified with “accurate descriptive information” when unplanned events happen, so the following benefits can occur;
 - ATGS can follow aircraft in to ensure no delay in emergency response time
 - ATGS can assist in assessing aircraft damage
 - ATGS can assist in emergency landing locations

- When unplanned events occur, communication with the local unit and/or Incident Management Team needs to happen to facilitate the notification and investigation processes.
- Transitions are known to inherently hold higher risk; all personnel should be extremely vigilant during this time period. Maintain a clear chain of command until new team has control of the fire.
- Helicopter managers and pilots should review the Interagency Helicopter Operations Guide, Chapter 6.2 Wind Restrictions for Types 1 - 3 Helicopters (see Figure 1, below).
- All pilots should review section C-10(b)(2) of the contract which states, "The Pilot is responsible for computing the weight and balance for all flights and for assuring that the gross weight and center of gravity do not exceed the aircrafts limitations.
- All pilots are reminded that the USFS Practical Test Standards require the following;
 - Snorkel/fixed tank (p). Maintains approach angle that ensures obstacle clearance (minimum 50 feet).
 - Snorkel/Fixed Tank (g). Maintains adequate obstacle clearance and appropriate flight paths and speeds with snorkel.
- After a mishap occurs, pilots need to access landing at the closest available landing area, even if it is off-site, as in most cases precautionary landing is the lowest risk choice.

Had I been told the aircraft hit a tree, I would have followed it in ~
ATGS



Image identifying damage to Horizontal Stabilizer which required replacing.

Image identifying damage to tail rotor blade tip. One tail rotor blade had damage that required replacement as it was not field repairable.



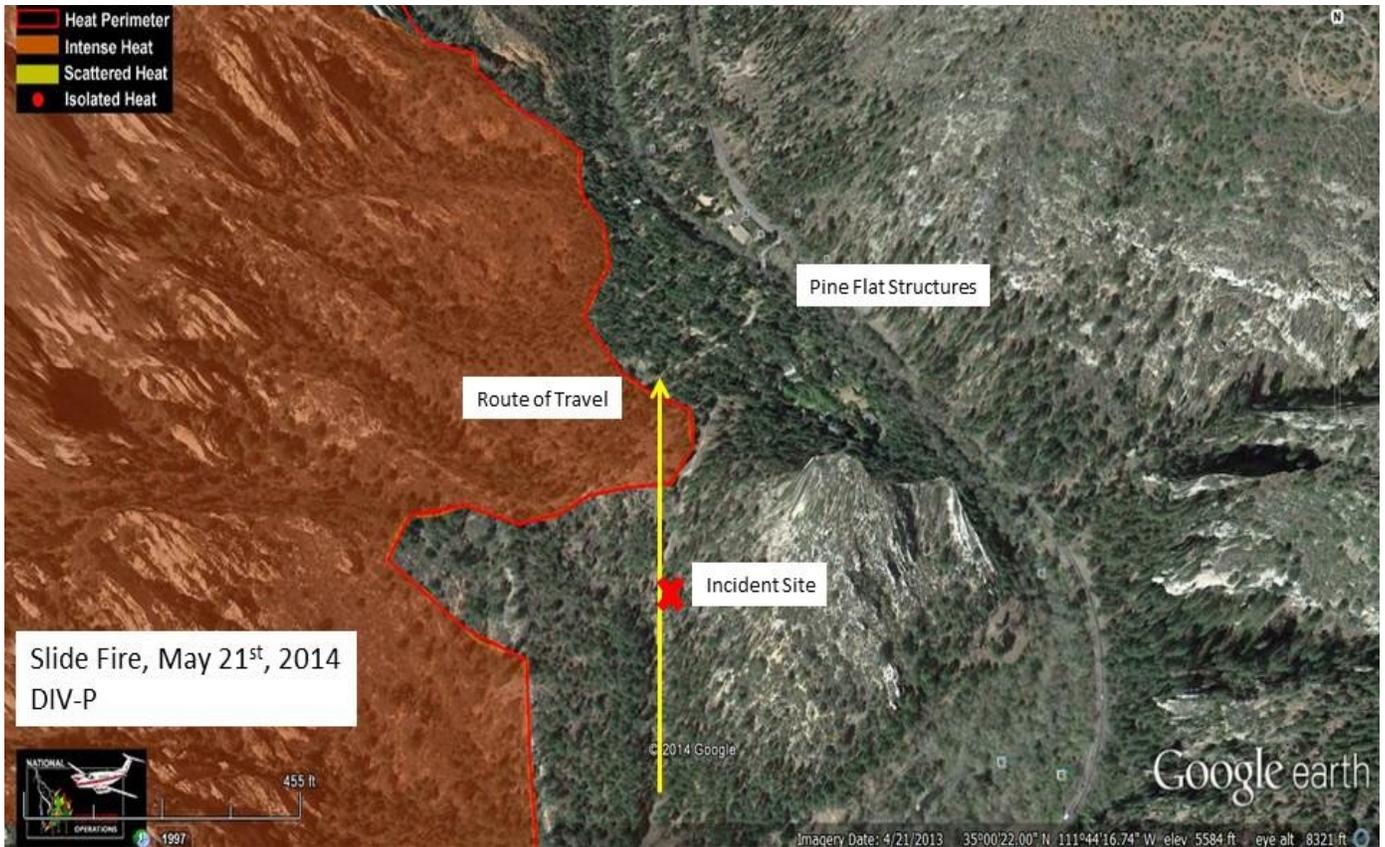


Figure 1

Interagency Helicopter Operations Guide - February 2013
Chapter 6

A. Flight Above 500' AGL.

Flights more than 500 feet above the surface are allowed in winds up to 50 knots for all types of helicopters.

B. Flight Below 500' AGL.

1. Type 1 (Heavy) and Type 2 (Medium) Helicopters. Steady winds shall not exceed 40 knots or a maximum gust spread of 15 knots.
2. Type 3 (Light) Helicopters. Steady winds shall not exceed 30 knots or a maximum gust spread of 15 knots.

Chart 6-2: Wind Restrictions For Types 1-3 Helicopters

FLIGHT ABOVE GROUND LEVEL	FLIGHT PERMITTED IN WINDS LESS THAN / MAXIMUM GUST SPREAD (in knots)		
	TYPE 1	TYPE 2	TYPE 3
MORE THAN 500' AGL	50 / NA	50 / NA	50 / NA
LESS THAN 500' AGL	40 / 15	40 / 15	30 / 15