

Statement of Phone Conversation
May 19, 2011
PHI Helicopter Accident

I was asked to sit in on a conference call with ASI Mike Pender and ASI Paul Keesler along with the pilot of the PHI helicopter and the Director of Safety of PHI.

The phone conversation began at 9:00am. The Director of PHI Safety provided us with a picture of the landing platform where the accident took place. The pilot began to tell us his story leading up to the accident and the events afterward. The pilot stated that during that day he made two previous landings on the platform and no issues were noted. He was accompanied by a Safety Pilot that was required by the contracting company to have on all flights.

During the day the wind was estimated to be 10 knots across the platform and from the west/southwest.

On the third flight on which the accident happened the helicopter had the pilot, the safety pilot and one passenger. The pilot estimated they were "a couple of hundred pounds" under gross weight and the helicopter was operating in normal engine parameters. They picked up off the pad and began a normal departure when he noticed he applied full left pedal to counteract a right turn. The helicopter proceeded to turn right and began accelerating in the turn. The pilot commented it was as if the tail rotor pedal control was inoperative. He immediately lowered collective and reduced throttle, the helicopter impacted the water to the side of the oil rig. A fishing boat nearby came over and assisted the two pilots and passenger out of the water and to safety.

I asked the pilot what direction the wind was coming from right before the uncommanded rotation began. He stated it was coming from the left front quarter of the helicopter. This would have put the helicopter into what is known as "Main Rotor Disc Interference"

From the Rotorcraft Flying Handbook (FAA-H-8083-21)

**UNANTICIPATED YAW / LOSS OF TAIL
ROTOR EFFECTIVENESS (LTE)**

Unanticipated yaw is the occurrence of an uncommanded yaw rate that does not subside of its own accord and, which, if not corrected, can result in the loss of helicopter control. This uncommanded yaw rate is referred to as loss of tail rotor effectiveness (LTE) and occurs to the right in helicopters with a counterclockwise rotating main rotor and to the left in helicopters with a clockwise main rotor rotation. Again, this discussion covers a helicopter with a counter-clockwise rotor system and an antitorque rotor. LTE is not related to an equipment or maintenance malfunction

and may occur in all single-rotor helicopters at airspeeds less than 30 knots. It is the result of the tail rotor not providing adequate thrust to maintain directional control, and is usually caused by either certain wind azimuths (directions) while hovering, or by an insufficient tail rotor thrust for a given power setting at higher altitudes.

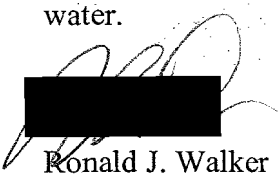
For any given main rotor torque setting in perfectly steady air, there is an exact amount of tail rotor thrust required to prevent the helicopter from yawing either left or right. This is known as tail rotor trim thrust. In order to maintain a constant heading while hovering, you should maintain tail rotor thrust equal to trim thrust. The required tail rotor thrust is modified by the effects of the wind. The wind can cause an uncommanded yaw by changing tail rotor effective thrust. Certain relative wind directions are more likely to cause tail rotor thrust variations than others. Flight and wind tunnel tests have identified three relative wind azimuth regions that can either singularly, or in combination, create an LTE conducive environment. These regions can overlap, and thrust variations may be more pronounced. Also, flight testing has determined that the tail rotor does not actually stall during the period. When operating in these areas at less than 30 knots, pilot workload increases dramatically.

MAIN ROTOR DISC INTERFERENCE (285-315°)

Winds at velocities of 10 to 30 knots from the left front cause the main rotor vortex to be blown into the tail rotor by the relative wind. The effect of this main rotor disc vortex causes the tail rotor to operate in an extremely turbulent environment. During a right turn, the tail rotor experiences a reduction of thrust as it comes into the area of the main rotor disc vortex. The reduction in tail rotor thrust comes from the airflow changes experienced at the tail rotor as the main rotor disc vortex moves across the tail rotor disc. The effect of the main rotor disc vortex initially increases the angle of attack of the tail rotor blades, thus increasing tail rotor thrust. The increase in the angle of attack requires that right pedal pressure be added to reduce tail rotor thrust in order to maintain the same rate of turn. As the main rotor vortex passes the tail rotor, the tail rotor angle of attack is reduced. The reduction in the angle of attack causes a reduction in thrust and a right yaw acceleration begins. This acceleration can be surprising, since you were previously adding right pedal to maintain the right turn rate. This thrust reduction occurs suddenly, and if uncorrected,

develops into an uncontrollable rapid rotation about the mast. When operating within this region, be aware that the reduction in tail rotor thrust can happen quite suddenly, and be prepared to react quickly to counter this reduction with additional left pedal input.

It is in my opinion after hearing the pilot comment on the accident and given conditions that he entered into LTE and then attempted to recover when the aircraft impacted the water.



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