CANYON STATE AERO LLC
[redacted]
Gilbert, AZ 85296
[redacted]

11/03/2013

To: Tom Little
NTSB

Tom,
After examining all of the NTSB data and reading the records of interview from first responders Mr. Cottrell and Mr. Ponce stating that the tail rotor blades were still spinning at high rpm even after the main rotors had stopped leads me to believe that the tail rotor drive shaft was still connected to the main transmission pinion through the driven spline right up to impact.

By virtue of design of the Hughes 269C tail rotor power train drive system, as we discussed in the telephone conference, even if the aft pinion nut was missing, the bumper plug in the forward part of the tail rotor drive shaft would prevent any decoupling between the tail rotor drive shaft and main transmission.

At the approximate time of the accident, winds were 180@8 gusting to 16 kts. at KPHX and 170@8 gusting to 20 kts at KDVT and 30 degrees centigrade. The crash occurred approximately halfway between these two locations.
I think that it is possible for vortex ring state to have occurred and was misinterpreted as a loss of the tail rotor. As you know settling with power is the most common cause of all helicopter accidents. In vortex ring state, the helicopter vibrates at a very high rate. You may be familiar with the term “Hughes Tailspin” which is a nickname for this phenomenon.

At this point the helicopter was put into an autorotation in a very precarious location. At this altitude it only took seconds to near the house at which time the throttle was probably rotated to full and the collective was pulled full up aggravating the situation even more, at which time the helicopter impacted the house. Inertia still kept the helicopter moving forward and the roof collapsed under the load sending it down into the block wall where the main rotors came to a stop. This sudden stoppage of the main rotors with the tail rotor still developing full rpm caused the tail rotor driveshaft to be severed just aft of the forward assembly.
I think that the crack explained in the NTSB lab data on the aft pinion spline migrated all the way through at this point on impact with the tremendous force being exerted on it.
The driven spline and forward part of the drive shaft damage also occurred at the point when the tail boom was thrust upward upon impact as indicated by the irregular, not circular damage.

My hope is that collectively we can find the true correct cause of this accident as to avert it in the future.

Respectfully
Jan Sandberg
Canyon State Aero LLC

CANYON STATE AERO LLC
[redacted]
Gilbert, AZ 85296
[redacted]

12/24/2013

To: Tom Little
NTSB

Tom,
I have enclosed the Sikorsky P.O.H (Pilot Operating Handbook) tail rotor failure section under emergency procedures. Regardless of the cause of the inflight problem with N380TL, the proper P.O.H. procedures needed to be followed:

Tail Rotor Failure

-9. TAIL ROTOR FAILURE

- Different types of failure may require slightly different techniques for optimum success in recovery.
- General Corrective Action:
    - Complete loss of tail rotor thrust:
        - Failure is normally indicated by an uncontrollable (by pedal) yawing to the right
    - In Forward Flight
        - Reduce power by lowering collective.
        - Adjust airspeed to 50 to 60 knots.
        - Use left lateral cyclic in combination with collective pitch to limit left sideslip to a reasonable angle.

- - - If conditions permit, place the twistgrip in the IDLE position once a landing area is selected, and perform a normal autorotation. Plan to touch down with little or no forward speed.

WARNING

WHEN HOVERING AT ALTITUDES WITHIN OR ABOVE THE CROSS-HATCHED AREAS DEPICTED ON THE HEIGHT VELOCITY DIAGRAM (FIG. 5-2), IT IS NECESSARY TO REDUCE ALTITUDE TO 7 FEET OR LESS PRIOR TO PLACING THE TWISTGRIP IN THE GROUND IDLE POSITION AND PERFORMING A HOVERING AUTOROTATION.

- - While at a hover: Place the twistgrip in the IDLE position and perform a hovering autorotation.

- - Tail Rotor Control Failure - Fixed Pitch Setting:

- - - Adjust power to maintain 50 to 60 knots airspeed.

- - - Perform a shallow approach and running landing to a suitable area, touching down into wind at a speed between effective translational lift and 30 knots. Directional control may be accomplished by small adjustments in throttle and/or collective control.

Respectfully
Jan Sandberg
Canyon State Aero LLC