Bell Helicopter TEXTRON

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At your request, I asked the various functional groups at Bell, flight training, rotor design, and controls and hydraulics to consider the theories identified by you and any other theoretical explanations for the condition, which is claimed to have resulted in the occurrence, an uncommanded rollover through 360 degrees in the space of one-quarter of a second. These groups were read the relevant excerpts from the Preliminary NTSB Report and briefed on the accident scenario by the undersigned. Their thinking may be summarized as follows:

(1) Each group felt that the description of the occurrence was consistent with a dynamic rollover condition.

(2) The Controls & Hydraulics design group advised that the 206L-1 servo actuators for the flight controls are dual concentric spool valves that have not, in their experience, ever been known to experience a 'hard over'. Further, the group advised that the hydraulic system pump outlet pressure for the 206L series is 600 psi, with pressure available to the servos 80% of pump pressure or 480-psi. Depending upon the exact load on the aircraft, in a hover condition the estimated maximum uncommanded motoring of the actuator (or hard-over) rate is ½ stroke in 1 second. In addition, to obtain an uncommanded snap roll to the right, the two cyclic actuators would have to go "hard over" in opposite direction at the same time.

The flight control actuators are mechanically linked through control tubes/linkage, thus in a hard-over condition the mechanical linkage would force the cyclic stick to move/motor. The pilot reported that he felt no uncommanded motoring and that the cyclic stick did not move.

With the aircraft at a 3' hover, the rotor radius is 18.5, skid to rotor height is 12', and the aircraft must roll approximately 45-degrees to contact the rotors with the ground. At an estimated roll rate of 15°/sec it would take approximately 3 seconds for the rotor to contact the ground.

In summary, based upon the information at hand, the Controls & Hydraulics design group is of the opinion that an actuator induced roll is not a possibility. To date the hydraulic actuator test have not been tested, but are scheduled for a tentative date of May 9, 2001.

(3) The Rotor design group stated that few things could cause such a violent and sudden roll rate.
They speculated that it was possible a sudden failure in the pitch control system or the sudden loss of a large portion of a main rotor blade could produce a violent roll. However, based upon the information at hand, neither of these events occurred."

Based on reported information provided by the investigative team, the metallurgical examination of the pitch control linkages determined all the fractures to be overload failures. The main rotor blades had experienced separations typical of ground contact. A recommendation out of the rotor design group would be to re-examine the fracture surfaces for the flight control system.

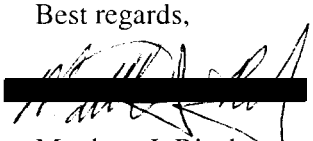
(4) The pilots group stated that based on the information provided, the circumstances appear to be
indicative of either, dynamic rollover or some type of rolling wind phenomenon associated with mountainous areas and/or thunderstorms. The report of rain before the accident raised questions as to the possibility the right aft skid sticking in the mud and causing a pivot point. The reported information places the ground witnesses on the left side of the aircraft, who would most likely only see the left skid rise in what may have appeared to be in a normal hover/takeoff condition.

The ground scars being destroyed by vehicle and people traffic, and any additional rain that occurred after the accident could only discount the lack of physical evidence.

The pilots are not aware of any pilot commanded input that would result in such a rapid roll rate.

The information provided is based on preliminary information included in the LAX00GA286 preliminary report and information provided to Bell Helicopter by the Investigation team.

Best regards,



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Attach:
LAX00GA286