MULTIPLE SIMULTANEOUS FAILURES OR COMMON CAUSE FAILURES

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Often an investigator is faced with a case that seems implausible. In many cases the facts will point out a situation that would have required two or more separate failures to have occurred simultaneously in order for the accident to have occurred. When neither single event is likely and they happen simultaneously there is a tendency to disbelieve that the occurrences actually happened.

An investigator may disregard the events as too improbable and therefore be stymied for a solution, or he may assume that one of the failures was pre-existing so that the second failure was really the only failure that occurred airborne.

This logic train leads to a conclusion of some sort of pre existing maintenance error, which may be totally erroneous. In other words one of the systems had to be broken before flight.

In reversing prop design there is a requirement that no single failure will cause a prop to reverse inadvertently. To accomplish this safety feature two separate devices are employed. One a governor for regular operation and a safety block to prevent unwanted reversals. Thus for an unwanted reversal to occur one would have to have a simultaneous failure of the governor, and a failure of the safety device.

If the failure rates of either part were once in 5,000 hours the chances of a simultaneous failure would be once in 25,000,000 flight hours. The odds of that happening are like the chances of sitting at home in your bathtub and being killed by a meteor. I am twice as likely to win the TEXAS Lotto. An investigator might be tempted to say that some one in the Cockpit inadvertently moved the prop to reverse or that the safety feature was out of order before the flight. The determination that the pilot elected to go flying with a defective safety system certainly brings up judgment error, pilot error and negligence. (Case closed)

Most accident investigation schools, certainly the N.T.S.B. school, teach the student to find the failures, and then determine which failure occurred first. If you apply that logic to the prop failure you would have to conclude that the prop governor failure occurred airborne, and the safety stop had been failed earlier. (The logic would be that you couldn't takeoff with an uncontrollable prop that was trying to reverse). This find the first failure mentality is so all pervasive that a goodly number of accidents have never been analyzed using newer COMMON CAUSE system safety disciplines.

It is strange too, because all you have to do to understand the concept is to attend a three day legal symposium. The day after the banquet at least 1/2 the attendees are ill. The other half are fine. Immediately the logical way to investigate is

to seek out the common cause. Within minutes the discussion will go to what did the sick eat that the well did not. The odds of a person having a sick stomach are less than 1/365 days. For there to be a roomful simultaneously shrieks common cause.

When thought of in regard to the propeller system, the common link between the prop reversing stop and the prop governor was the fact they both used the same engine oil as hydraulic fluid. It was explained that contaminants within the oil system could foul both subsystems simultaneously.

In an early version F-16 all four flight control wires for the electronic flight controls ran in the same area if not the same bundle. That screamed that a localized wire bundle fire could easily cripple the jet