

## CIVIL AERONAUTICS BOARD

**ACCIDENT INVESTIGATION REPORT**

Adopted: October 20, 1949

Released: October 20, 1949

**NORTHEAST AIRLINES, INC.—PORTLAND, MAINE—AUGUST 11, 1949**

A Northeast Airlines' Convair 240, NC 91241, operating as Flight 812A, was involved in an accident while making a landing at Portland, Maine, at approximately 2117 EST, August 11, 1949. The extremely hard landing, which resulted in major structural damage, was immediately followed by fire which destroyed the aircraft. The crew of three and the 25 passengers, including one infant, were evacuated without injury.

Flight 812A departed Logan Field, Boston, at 2042 on a VFR flight plan with a crew consisting of Captain Roderick O. Cote, First Officer Henry B. Wightman, and Stewardess Patricia Donnellan. The aircraft's gross weight of 35,031 pounds at takeoff was within allowable limits and the load was properly distributed with respect to the center of gravity.

The trip from Boston was routine and at 2112 the flight contacted the Portland tower and received landing instructions as follows "Northeast 812 Able cleared to enter traffic pattern Runway 20. Wind east variable southeast 5. The altimeter 2998. Check on base leg." At 2116 the flight reported turning into final approach and was cleared to land on Runway 20. As the aircraft passed over the approach end of the runway, at an estimated altitude of 20 to 25 feet and an indicated airspeed of 120 mph, the throttles were brought back to what was expected to be the closed position, preparatory to landing. However, due to malfunctioning of the propeller reverse lock mechanism, the throttles were actually brought back beyond the closed position and into the propeller reverse pitch position instead. This unexpected reversal of propeller pitch in flight resulted in an extremely hard landing 237 feet past the approach end of the runway with serious damage to the air-

craft structure. The airplane, however, continued along the runway a distance of 1,065 feet from the point of initial impact before it came to rest. Fuel which had been spilled along the runway was ignited by sparks from the damaged aircraft and propellers scraping along the runway surface. The fire became concentrated for a period on the right side adjacent to the right engine and right wing root, but subsequently enveloped the major portion of the aircraft. All passengers were evacuated in an orderly manner through the rear cabin exit door. The captain and first officer made their escape through the left cockpit window after all effective action possible had been taken to control the fire. The airport fire equipment arrived shortly thereafter but was unable to extinguish the fire before the aircraft had been damaged beyond economical repair.

From the facts developed by the investigation it was conclusively established that the propellers went into the reverse pitch position while the aircraft was still airborne.

The propeller reversing pitch system includes an electrical switch located on the structure of the left main landing gear. A relative movement of the landing wheel strut of approximately one-half inch, resulting from the airplane weight upon the wheels, closes this switch which energizes a solenoid. This in turn unlocks the throttle reversing mechanism thus permitting rearward movement of the throttles into the reverse propeller pitch position.

The throttle lock on the reversing mechanism can also be manually operated from the cockpit. This is accomplished by withdrawing about one inch a "T" handle manual override control, which is conveniently located on the cockpit control pedestal. This control is inter-connected mechanically to the solenoid plunger and its outward movement has the

\*All times referred to herein are Eastern Standard based on the 24-hour clock.

same effect on the throttle lock as does the energizing of the solenoid.

The solenoid plunger and manual override control mechanism is spring loaded to return it to its original position when the solenoid is de-energized. In this position the propeller pitch reversing mechanism is locked. This prevents the throttle being unintentionally moved into the pitch reversing range while the airplane is airborne. Investigation revealed that in this instance, due to improper adjustment of the solenoid plunger travel, there resulted a mechanical binding of the plunger in the coil bore which, plus the effect of residual magnetism, left the throttles free to be retarded past the idle detent position into the reverse pitch range. This occurred when the throttles were closed preparatory to the landing at Portland.

The manual override handles are conveniently located on the control pedestal but with the usual cockpit lighting their position is not readily discernible at night. As a result of this accident a positive determination of position of this control was added by Northeast Airlines to its "before landing" cockpit check list and on August 22 a Civil Aeronautics Administration Airworthiness Directive made such a check mandatory on all Convair Model 240 airplanes incorporating activated reversing propellers.

The airplane, carrier, and crew were properly certificated for the flight involved. The airplane had accumulated a total time of 506 21 since manufacture on

April 1, 1949. An examination of the maintenance records did not disclose any instances of malfunctioning which required solenoid plunger travel or connecting mechanism adjustments to be made since the plane was received from the manufacturer. However, since the accident the manufacturer on September 9, 1949 issued Service Bulletin #240-273 "...to assure positive engagement of the solenoid operated throttle reverse stops when electrical power is off and to provide latest rigging procedure for the throttle reverse linkage."

Captain Cote held an airline pilot certificate and had flown approximately 11,516 hours, 285.10 of which were in the aircraft involved. First Officer Wightman held a pilot certificate with commercial and instrument ratings. His total pilot time was 1,770 hours of which 105 were in the aircraft involved.

#### Probable Cause

The Board determines that the probable cause of this accident was failure of the throttle locking device to function properly thus permitting the movement of the throttles beyond the stop into the propeller reverse pitch position.

BY THE CIVIL AERONAUTICS BOARD

/s/ JOSEPH J O'CONNELL, JR.

/s/ OSWALD RYAN

/s/ JOSH LEE

/s/ HAROLD A JONES

/s/ RUSSELL B. ADAMS