

DOCKET NO. **SA- 516**

EXHIBIT NO. **15C**

**NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C**

**METALLURGIST'S FACTUAL REPORT  
Report No. 97-82**

**Section 41 / 42 Joint, Forward Cargo Door**

# NATIONAL TRANSPORTATION SAFETY BOARD

Office of Research and Engineering  
Materials Laboratory Division  
Washington, D.C. 20594



April 22, 1997

METALLURGIST'S FACTUAL REPORT

Report No. 97-82

## A. ACCIDENT

Place : East Moriches, New York  
Date : July 17, 1996  
Vehicle : Boeing 747-100  
NTSB No. : DCA96-M-A070  
Investigator : Al Dickinson, AS-10

## B. COMPONENTS EXAMINED

Section 41 / Section 42 joint, Lower Lobe Forward Cargo Door


## C. DETAILS OF THE EXAMINATION

The joint between manufactured sections 41 and 42 is located at station (STA) 520. The fuselage skin at this location is butted together with a strap on the inside of the skin. Stringers (S) aft of STA 520 (section 42) have a "hat" cross section, while stringers forward of STA 50 (section 41) have a "Z" shape. The stringers across STA 520 are connected with splices. The frame at STA 520 is added in sections and is larger than the typical nearby frames. The forward edge of the lower lobe forward cargo door is located several feet aft of STA 520 on the lower right side of the fuselage. The STA 520 joint and cargo door were examined on the reconstructed airplane.

The joint at STA 520 was not separated across the top of the airplane (between S-2AL and S5R), along portions of the right side (between S-19R and S-28R and between S-40R and S-45R), and along portions of the left side (between S-18L and S-39L and between S44L and S-47L). The portions of the STA 520 joint that were separated were examined for evidence of preexisting fatigue or other preexisting damage. All fractures were typical of overstress separations, and no evidence of fatigue, fretting, or significant corrosion was noted.

Examination of the lower lobe forward cargo door showed that all eight of the door latching cams remain attached (along with pieces of the door itself) to the pins along the lower door sill.

Overall examination of the forward portion of the airplane showed that sections 41 and 42 contained uniform crushing damage that extended from S-39L across the bottom of the fuselage and up above the right side main cabin window belt to S-14R. This crushing damage is consistent with the intact forward portion of the airplane (including sections 41 and 42) impacting the water with a right wing low attitude. The lower lobe forward cargo door was in the crush area.



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