



# National Transportation Safety Board

Washington, D.C. 20594  
Safety Recommendation

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**Date:** January 11, 1995

**In reply refer to:** A-94-218 through -222

Honorable David R. Hinson  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

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On March 1, 1994, about 1340 Japanese Standard Time, Northwest Airlines flight 18, a B-747, flying from Hong Kong to John F. Kennedy International Airport, Jamaica, New York, with an intermediate stop at New Tokyo International Airport, Narita, Japan, stopped on a taxiway at Narita with the front of the No. 1 engine touching the ground. The lower forward engine nose cowl had been ground away as it dragged along the runway. A fire near the No. 1 engine was rapidly extinguished by local fire fighters, and all passengers remained aboard. They were subsequently deplaned about 30 minutes after the airplane came to a stop on the taxiway. There were no injuries.<sup>1</sup>

The Safety Board conducted this special investigation because of the ramifications to the U.S. aviation industry of the maintenance anomaly that precipitated the accident. The report addresses the activity at the Northwest Airlines maintenance facility that led to the accident and only briefly describes the operational aspects of the flight and landing at Narita.

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<sup>1</sup>For more detailed information, read Special Investigation Report--"Maintenance Anomaly Resulting in Dragged Engine During Landing Rollout, Northwest Airlines, Inc., Flight 18, Boeing 747-251B, N637US, New Tokyo International Airport, Narita, Japan, March 1, 1994" (NTSB/SIR-94/02)

The accident and the events leading up to it are being investigated by the Japanese Aircraft Accident Investigation Commission (JAAIC), in accordance with procedures outlined in Annex 13 to the Chicago Convention on International Civil Aviation. The Safety Board assisted the JAAIC, also in accordance with Annex 13, by gathering data at the Northwest Airlines maintenance base in Minneapolis/St. Paul, Minnesota, on the maintenance activity affecting the airplane.

The evidence indicates that several important maintenance procedures were either not followed or were followed incorrectly during the maintenance and inspection of the airplane. On February 20, 1994, after all "C" check maintenance actions were considered to have been completed, the airplane was dispatched for revenue flights. After the airplane was returned to service, it completed 14 cycles without incident, prior to the accident flight. The No. 1 pylon diagonal brace aft fuse pin migrated out of the fitting at some point during the 14 flights, and the upper link fuse pin failed in overload during rollout at Narita.

The Safety Board determined that the secondary retainers for the aft fuse pins on the No. 1 and No. 4 engine pylon diagonal braces had been removed as part of the maintenance "C" check to permit nondestructive testing of the diagonal brace end fittings. The secondary retainer for the No. 1 pylon diagonal brace fuse pin was never reinstalled. The diagonal brace aft fuse pin primary retainers from the No. 1 and No. 4 diagonal braces were also removed. The reason for their removal was not identified, and the primary retainer for the No. 1 pylon diagonal brace was also never reinstalled.

As a result of this special investigation, the Safety Board concluded that maintenance and inspection personnel who worked on the airplane were not adequately trained and qualified to perform the required maintenance and inspection functions. In addition, the work environment for the heavy maintenance of the airplane was inadequate and contributed to an error-producing situation for the workers.

Some of the Safety Board's findings from this special investigation are as follows:

- The inspector who performed the nondestructive testing inspection of the No. 1 pylon diagonal brace fitting properly completed the inspection, but he improperly signed off on several subsequent steps of the centralized interactive text

system (CITEXT) instruction card. This could have led other maintenance and inspection personnel to interpret that the maintenance actions on the fuse pin retainers on engine No. 1 had been completed when they had not.

- The "OK to Close" inspection of the pylon area was hampered by inadequate lighting and perceived dangers of the scaffolding.
- The CITEXT used by Northwest Airlines was inadequate because it lacked the pertinent information contained in the FAA-approved maintenance manual, it did not follow Northwest Airlines' General Engineering and Maintenance Manual (GEMM) policy, and it did not contain specific instructions for actions, components, or systems that were specific to the B-747 No. 1 engine pylon.
- Mechanics and inspectors of Northwest Airlines did not adequately understand the application of the CITEXT and red OM 249 tag systems for critical maintenance items.
- Maintenance supervisors and managers of Northwest Airlines failed to ensure that the work practices of the mechanics and inspectors were conducted in accordance with the approved maintenance manual.
- The lack of adequate and organized storage of removed parts contributed to the failure to reinstall the fuse pin retainers.
- FAA oversight of the maintenance facility at Northwest Airlines failed to detect deviations in red OM 249 tag procedures.
- FAA inspectors failed to apply FAA-developed human factors elements and allowed an inadequate work environment in the hangar to exist.

Therefore, as a result of its investigation of this accident, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Review the Northwest Airlines CITEXT system, and, where practical, require modification of those sections that refer to actions, components, or systems that are specific to particular airplanes to ensure that the maintenance action requested conforms to the maintenance action required for the specific airplane. (Class II, Priority Action) (A-94-218)

Apply human engineering principles to the evaluation of computer-generated work card systems to ensure that they include all of the critical information contained in, and are consistent with, the FAA-approved maintenance manuals. (Class II, Priority Action) (A-94-219)


Inform other airlines operating in the U.S., and foreign airworthiness authorities, of the circumstances of this accident and require them to implement corrective actions, where necessary, to prevent the maintenance program deficiencies noted in this accident. (Class II, Priority Action) (A-94-220)

Assess the work environments in which carriers operating under 14 Code of Federal Regulations Part 121 perform their maintenance to identify human factors-related impediments to the effective performance of maintenance and inspections, such as inadequate lighting, potentially hazardous scaffolding, and inadequate and unorganized parts storage during maintenance activity, and require those carriers to correct the deficiencies. (Class II, Priority Action) (A-94-221)

Direct operators of Boeing 747 airplanes to paint the inside surfaces of the engine pylon fuse pins a conspicuous color such as red. (Class II, Priority Action) (A-94-222)

Also, the Safety Board issued Safety Recommendations A-94-223 through - 226 to Northwest Airlines.

Chairman HALL and Member HAMMERSCHMIDT concurred in these recommendations. Member LAUBER did not participate.

By:   
Jim Hall  
Chairman