NATIONAL TRANSPORTATION SAFETY BOARD
Public Meeting of July 14, 2015
(Information subject to editing)

National Air Cargo, Inc., D/B/A National Airlines, Boeing 747 400 BCF, N949CA
Bagram, Afghanistan
April 29, 2013

This is a synopsis from the NTSB's report and does not include the Board's rationale for the conclusions, probable cause, and safety recommendations. NTSB staff is currently making final revisions to the report from which the attached conclusions and safety recommendations have been extracted. The final report and pertinent safety recommendation letters will be distributed to recommendation recipients as soon as possible. The attached information is subject to further review and editing.

Executive Summary

On April 29, 2013, about 1527 local time, a Boeing 747-400 BCF, N949CA, operated by National Air Cargo, Inc., dba National Airlines, crashed shortly after takeoff from the Bagram Air Base, Bagram, Afghanistan. All seven crewmembers—the captain, first officer, loadmaster, augmented captain and first officer, and two mechanics—died, and the airplane was destroyed from impact forces and postcrash fire. The 14 *Code of Federal Regulations* Part 121 supplemental cargo flight, which was operated under a multimodal contract with the US Transportation Command, was destined for Dubai World Central - Al Maktoum International Airport, Dubai, United Arab Emirates.

The airplane's cargo included five mine-resistant ambush-protected (MRAP) vehicles secured onto pallets and shoring. Two vehicles were 12-ton MRAP all-terrain vehicles (M-ATVs) and three were 18-ton Cougars. The cargo represented the first time that National Airlines had attempted to transport five MRAP vehicles. These vehicles were considered a special cargo load because they could not be placed in unit load devices (ULDs) and restrained in the airplane using the locking capabilities of the airplane's main deck cargo handling system. Instead, the vehicles were secured to centerline-loaded floating pallets and restrained to the airplane's main deck using tie-down straps. During takeoff, the airplane immediately climbed steeply then descended in a manner consistent with an aerodynamic stall. The National Transportation Safety Board's (NTSB) investigation found strong evidence that at least one of the MRAP vehicles (the rear M-ATV) moved aft into the tail section of the airplane, damaging hydraulic systems and horizontal stabilizer components such that it was impossible for the flight crew to regain pitch control of the airplane.

The likely reason for the aft movement of the cargo was that it was not properly restrained. National Airlines' procedures in its cargo operations manual not only omitted required, safety-critical restraint information from the airplane manufacturer (Boeing) and the manufacturer of the main deck cargo handling system (Telair, which held a supplemental type

certificate [STC] for the system) but also contained incorrect and unsafe methods for restraining cargo that cannot be contained in ULDs. The procedures did not correctly specify which components in the cargo system (such as available seat tracks) were available for use as tie-down attach points, did not define individual tie-down allowable loads, and did not describe the effect of measured strap angle on the capability of the attach fittings.

In addition to National Airlines' deficient procedures for restraining special cargo loads, the NTSB found several additional areas of safety concern:

- Current Federal Aviation Administration (FAA) guidance for operators for restraining special cargo loads is inadequate. FAA Advisory Circular 120-85 contains guidance that conflicts with the safety requirements for using procedures based only on airplane manufacturer, STC-holder, or other FAA-approved data.
- Cargo handling personnel are not FAA-certificated; thus, there are no standardized procedures, training, and duty hour limitations and rest requirements for personnel who perform the safety-critical functions of loading and securing cargo. The accident loadmaster did not have adequate procedures for securing the special cargo load, and his training was provided by National Airlines, which had developed the inadequate procedures. He had also been on continuous duty for about 21 hours at the time of the accident.
- FAA inspectors who have oversight responsibilities for air carrier cargo handling operations do not have adequate training and guidance to ensure appropriate oversight of operators that transport special cargo loads. The inspectors assigned to National Airlines were unaware of the airline's deficient procedures. After the accident, the FAA initiated extensive and ongoing action, including improving inspector training, developing inspector job aids, and establishing a permanent cargo focus team to provide inspectors with direct technical validation of operator cargo procedures, documents, and support for technical decisions related to cargo.

- Nonresourced FAA surveillance items can be deferred without limitation. FAA inspectors were unable to perform any en route inspections of National Airlines' operations overseas because of State Department restrictions on inspector travel into Afghanistan. However, current FAA policy specifies no alternative inspector activities that could help mitigate risks for an operator until the surveillance tasks can be completed.

The NTSB determines that the probable cause of this accident was National Airlines' inadequate procedures for restraining special cargo loads, which resulted in the loadmaster's improper restraint of the cargo, which moved aft and damaged hydraulic systems Nos. 1 and 2 and horizontal stabilizer drive mechanism components, rendering the airplane uncontrollable. Contributing to the accident was the FAA's inadequate oversight of National Airlines' handling of special cargo loads.

After the accident, the FAA, National Airlines, and the National Air Carrier Association (NACA) took numerous actions to enhance safety both at National Airlines and across

the cargo industry.[1] Many of these actions are ongoing and directly address operator procedures for, FAA oversight of, and industry knowledge about the proper restraint and aircraft limitation considerations for securing heavy vehicle special cargo loads. Boeing also revised some of its manuals and publications and participated in NACA outreach efforts.

In addition, as a result of this accident investigation, the NTSB issues six safety recommendations to the FAA. These safety recommendations address FAA guidance for operators that handle special cargo loads; certification, training, and duty hour limitations for personnel responsible for the loading, restraint, and documentation of special cargo loads on transport-category airplanes; and FAA inspector training, oversight, and surveillance responsibilities.

Findings

1. Had the National Airlines chief loadmaster consulted the required manufacturers' weight and balance manuals, he could have determined that the intended load of five vehicles could not be properly secured in the airplane in accordance with the tall rigid cargo safety requirements; at most, only one mine-resistant ambush-protected all-terrain vehicle could be transported.

2. Although the flight crewmembers and the loadmaster were aware that the cargo moved during the previous flight, they did not recognize that this indicated a serious problem with the cargo restraint methods.

3. The airplane's loss of pitch control was the result of the improper restraint of the rear mine-resistant ambush-protected all-terrain vehicle, which allowed it to move aft through the aft pressure bulkhead and damage hydraulic systems Nos. 1 and 2 and horizontal stabilizer drive mechanism components to the extent that it was not possible for the flight crew to regain pitch control of the airplane.

4. There is no evidence that an explosive device or hostile acts were a factor in this accident.

5. Although the loadmaster did not follow National Airlines' procedures for securing the special cargo load, the procedures were deficient to the extent that, if followed, they could not have enabled him to properly load and restrain a special cargo load in accordance with the manufacturer and supplemental type certificate holder requirements.

[1] NACA is comprised of 16 air carriers that provide nonscheduled and scheduled passenger and cargo services, including services that support the US military. NACA members are National Airlines, Air Transport International, Allegiant Air, Atlas Air, Eastern Air Lines, Everts Air Cargo, Kalitta Air, Lynden Air Cargo, Miami Air International, Northern Air Cargo, Omni Air International, Southern Air, Spirit Airlines, Sun Country Airlines, USA Jet Airlines, and Western Global Airlines.

6. Although National Airlines provided the accident loadmaster with initial and recurrent training, this training was deficient to the extent that it could not have provided him the knowledge and skills necessary to properly load and restrain a special cargo load in accordance with the manufacturer and supplemental type certificate holder requirements.

7. The certification of personnel responsible for ensuring the proper loading, restraint, and documentation of special cargo loads, including requirements for their procedures, training, and duty time and hour limitations, would help ensure that these personnel properly perform their safety-critical duties.

8. The Federal Aviation Administration did not provide adequate oversight to ensure that the National Airlines cargo operations manual reflected the correct information and guidance from the airplane and cargo handling system manufacturers that specified how to safely secure the cargo.

9. The lack of clear guidance regarding Federal Aviation Administration inspector responsibility for the oversight of cargo handling personnel resulted in minimal oversight of these areas at National Airlines and enabled the persistence of critical safety deficiencies.

10. When circumstances such as Federal Aviation Administration inspector travel restrictions or resource shortfalls result in the repeated deferral of required surveillance tasks, an alternative method of risk reduction could help mitigate risks until the surveillance tasks can be completed.

Probable Cause

The National Transportation Safety Board determines that the probable cause of this accident was National Airlines' inadequate procedures for restraining special cargo loads, which resulted in the loadmaster's improper restraint of the cargo, which moved aft and damaged hydraulic systems Nos. 1 and 2 and horizontal stabilizer drive mechanism components, rendering the airplane uncontrollable. Contributing to the accident was the Federal Aviation Administration's inadequate oversight of National Airlines' handling of special cargo loads.

Recommendations

As a result of its investigation, the National Transportation Safety Board makes the following safety recommendations.

To the Federal Aviation Administration:

1. Revise the guidance material in Advisory Circular (AC) 120-85, "Air Cargo Operations," chapter 201(a)(4), to specify that an operator should seek Federal Aviation Administration (FAA)-approved data for any planned method for restraining a special

cargo load for which approved procedures do not already exist, and remove the language in the AC that states that procedures other than those based on FAA-approved data can be used.(A-15-XX)

2. Create a certification for personnel responsible for the loading, restraint, and documentation of special cargo loads on transport-category airplanes, and ensure that the certification includes procedures; training; and duty hour limitations and rest requirements consistent with other safety-sensitive, certificated positions. (A-15-XX)

3. Add a special emphasis item to Federal Aviation Administration (FAA) Order 1800.56O, "National Flight Standards Work Program Guidelines," for inspectors of 14 *Code of Federal Regulations* Part 121 cargo operators to review their manuals to ensure that the procedures, documents, and support in the areas of cargo loading, cargo restraint, and methods for securing cargo on transport-category airplanes are based on relevant FAA-approved data, with particular emphasis on restraint procedures for special cargo that is unable to be loaded via unit loading devices or bulk compartments. (A-15-XX)

4. Include specific guidance in the Federal Aviation Administration inspector handbook that defines responsibilities for principal inspectors for the oversight of an operator's loading, restraint, and documentation of special cargo loads. (A-15-XX)

5. Provide initial and recurrent training for all principal inspectors who have oversight responsibilities for air carrier cargo handling operations that specifically addresses operator cargo procedures, documents, restraint, and support for technical decisions related to special cargo loads (A-15-XX)

6. Implement temporary risk-reduction methods any time that required surveillance items for 14 *Code of Federal Regulations* Part 121 and 135 operators can be deferred, and establish appropriate limitations on surveillance deferrals. (A-15-XX)