



# Aviation Investigation Final Report

---

<b>Location:</b>	Detroit, Michigan	<b>Accident Number:</b>	CHI08LA071
<b>Date &amp; Time:</b>	January 9, 2008, 07:49 Local	<b>Registration:</b>	N349NB
<b>Aircraft:</b>	Airbus Industrie A319-114	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>	Sys/Comp malf/fail (non-power)	<b>Injuries:</b>	73 None
<b>Flight Conducted Under:</b>	Part 121: Air carrier - Scheduled		

---

## Analysis

The accident flight was the first one for the airplane after having maintenance performed on the number two (right) engine during the previous evening. The first officer reported the engine cowls were flush and he did not see any "hanging" cowl latches when he looked underneath the engine cowls during the preflight. The captain reported the preflight, taxi, and takeoff were normal. During climb out the lead flight attendant informed the pilots that a passenger reported that the number two engine cowling was flapping after takeoff. The captain then began to monitor the N1 vibration indications on the number two engine. He reported that the vibration was approximately double the indication from the number one engine, but the indicator was not flashing, nor had it turned amber. The captain reported that during cruise flight the number two engine vibration decreased and about 20 minutes after they leveled off, the airplane shuddered. He reported the remainder of the flight was normal until they were taxiing after landing and the lead flight attendant called the cockpit stating that "part of the right engine had come off." Half of the engine cowl departed the airplane when it was on a one mile final. The other half departed the airplane as it touched down. Another airplane subsequently contacted this part of the cowling when it landed after the accident airplane. Contract maintenance personnel reported they changed the N1 sensor on the number two engine. They reported they shut the fan cowling, but did not latch it as they still needed to perform an engine run and check for leaks. They performed the engine run and were in the cockpit when another mechanic asked for help on another airplane. The mechanics left the accident airplane to assist the other mechanic. Neither mechanic returned to the accident airplane to either latch or verify that the fan cowling had been latched. The aircraft maintenance manual (AMM) instructions for replacing the N1 sensor states, "Close the fan cowl doors (Ref. AMM TASK 71-13-00-410-040)." This task was not completed prior to the airplane being returned to service. The separated cowling contacted the right side of the horizontal stabilizer which resulted in substantial damage to the stabilizer. In addition, the fan cowl doors, number two engine pylon, the number two engine reverser, and the right wing number one slat were damaged.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The separation of the engine cowling which resulted from maintenance personnel failing to follow maintenance procedures in that they did not latch the engine cowling following the maintenance inspection. A factor associated with the accident was their attention was divereted from the task when another mechanic asked for assistance.

### Findings

<b>Personnel issues</b>	Attention - Maintenance personnel
<b>Aircraft</b>	Engine cowling system - Failure
<b>Personnel issues</b>	Forgotten action/omission - Maintenance personnel

## Factual Information

### History of Flight

Approach	Sys/Comp malf/fail (non-power) (Defining event)
----------	---

On January 9, 2008, at 0749 eastern standard time, an Airbus Industrie A319-114, N349NB, operated by Northwest Airlines as flight 853, experienced an engine fan cowling separation while on approach to land on runway 27R at the Detroit Metro Airport (DTW), Detroit, Michigan. The pilot, co-pilot, 3 flight attendants, and 68 passengers on board were not injured. The airplane received substantial damage. The domestic passenger flight was being operated under 14 Code of Federal Regulations Part 121. The flight was operating in visual meteorological conditions and an instrument flight plan was filed. The flight originated from LaGuardia Airport (LGA), New York, New York, at 0618.

The accident flight was the first one for the airplane after having maintenance performed on the number two (right) engine during the previous evening. The first officer reported he used a flashlight when conducting his preflight inspection of the airplane as it was still dark outside. He reported the engine cowlings were flush, and he did not see any "hanging" cowl latches when he looked underneath the engines.

The captain reported that the logbooks indicated the number two engine vibration monitor had been replaced during the previous night. He reported the preflight, taxi, and takeoff were normal. The captain reported that during climb out the cockpit received a call from the lead flight attendant who informed them that a passenger reported that the number two engine cowling was flapping after takeoff. A pilot-passenger who was sitting behind this passenger reportedly did not see the cowling move, nor did the flight attendants when they looked out the window. The captain reported he then began to monitor the N1 vibration indications on the number two engine. He reported that the number two engine vibration was approximately double the indication from the number one engine, but the indicator was not flashing nor had it turned amber. During cruise flight the number two engine vibration decreased to equal that of the number one engine. The captain reported that about 20 minutes after they leveled off, the airplane shuddered as if flying through wake turbulence. The captain reported he then reviewed the logbooks and noticed previous write-ups regarding engine vibration, so he sent an AIRINC Communications Addressing and reporting System (ACARS) maintenance message regarding the current vibration. He reported the remainder of the flight was normal until they were taxiing after landing and the lead flight attendant called the cockpit stating that "part of the right engine had come off." The first officer called ground control to warn them that there might be debris on the runway. The crew then shut down the number two engine and taxied to the gate.

The pilot of another airplane later reported seeing part of the engine cowling come off when

flight 853 was on a 1-mile final. The other half of the engine cowling was found on the runway and was contacted by an airplane that landed after the accident airplane.

Contract maintenance personnel reported they changed the N1 sensor on the number two engine during the evening prior to the accident. They reported they then shut the fan cowling, but did not latch it as they still needed to perform an engine run and check for leaks. After the engine run was performed, one of the mechanics thought that the other had latched the fan cowling when in fact he had not. While they were doing another task in the cockpit, another mechanic asked for help at another gate. The mechanics left the accident airplane to assist the other mechanic. Neither mechanic returned to the accident airplane to either latch or verify that the fan cowling had been latched.

The maintenance log stated the N1 speed sensor was removed and replaced in accordance with aircraft maintenance manual (AMM) 77-11-10. This section of the AMM states, "Close the fan cowl doors (Ref. AMM TASK 71-13-00-410-040)." According to the maintenance personnel, this task was not completed prior to the airplane being returned to service.

The separated cowling contacted the right side of the horizontal stabilizer which resulted in substantial damage to the stabilizer. In addition, the fan cowl doors, number two engine pylon, the number two engine reverser, and the right wing number one slat were damaged.

### Pilot Information

<b>Certificate:</b>	Airline transport; Flight engineer	<b>Age:</b>	52, Male
<b>Airplane Rating(s):</b>	Multi-engine land	<b>Seat Occupied:</b>	Left
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	
<b>Instrument Rating(s):</b>	Airplane	<b>Second Pilot Present:</b>	Yes
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	No
<b>Medical Certification:</b>	Class 1 With waivers/limitations	<b>Last FAA Medical Exam:</b>	September 1, 2007
<b>Occupational Pilot:</b>	Yes	<b>Last Flight Review or Equivalent:</b>	July 1, 2006
<b>Flight Time:</b>	13615 hours (Total, all aircraft), 8079 hours (Total, this make and model), 6797 hours (Pilot In Command, all aircraft), 281 hours (Last 90 days, all aircraft), 88 hours (Last 30 days, all aircraft), 4 hours (Last 24 hours, all aircraft)		

## Co-pilot Information

<b>Certificate:</b>	Airline transport; Commercial; Flight engineer	<b>Age:</b>	46, Male
<b>Airplane Rating(s):</b>	Single-engine land; Multi-engine land	<b>Seat Occupied:</b>	Rear
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	
<b>Instrument Rating(s):</b>	Airplane	<b>Second Pilot Present:</b>	Yes
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	No
<b>Medical Certification:</b>	Class 1 Without waivers/limitations	<b>Last FAA Medical Exam:</b>	March 1, 2007
<b>Occupational Pilot:</b>	Yes	<b>Last Flight Review or Equivalent:</b>	April 1, 2007
<b>Flight Time:</b>	7161 hours (Total, all aircraft), 4103 hours (Total, this make and model), 232 hours (Last 90 days, all aircraft), 66 hours (Last 30 days, all aircraft), 4 hours (Last 24 hours, all aircraft)		

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	Airbus Industrie	<b>Registration:</b>	N349NB
<b>Model/Series:</b>	A319-114	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>		<b>Amateur Built:</b>	
<b>Airworthiness Certificate:</b>	Transport	<b>Serial Number:</b>	1815
<b>Landing Gear Type:</b>	Retractable - Tricycle	<b>Seats:</b>	132
<b>Date/Type of Last Inspection:</b>	July 1, 2007 Continuous airworthiness	<b>Certified Max Gross Wt.:</b>	155200 lbs
<b>Time Since Last Inspection:</b>	317 Hrs	<b>Engines:</b>	2 Turbo fan
<b>Airframe Total Time:</b>	15029 Hrs at time of accident	<b>Engine Manufacturer:</b>	CFM International
<b>ELT:</b>	Installed, not activated	<b>Engine Model/Series:</b>	CFM56-5-A5
<b>Registered Owner:</b>	NORTHWEST AIRLINES INC	<b>Rated Power:</b>	23500 Lbs thrust
<b>Operator:</b>		<b>Operating Certificate(s) Held:</b>	Flag carrier (121)
<b>Operator Does Business As:</b>	Northwest Airlines	<b>Operator Designator Code:</b>	NWAA

## Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Visual (VMC)	<b>Condition of Light:</b>	Day
<b>Observation Facility, Elevation:</b>	DTW,645 ft msl	<b>Distance from Accident Site:</b>	1 Nautical Miles
<b>Observation Time:</b>	07:53 Local	<b>Direction from Accident Site:</b>	270°
<b>Lowest Cloud Condition:</b>		<b>Visibility</b>	10 miles
<b>Lowest Ceiling:</b>	Broken / 3800 ft AGL	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	15 knots /	<b>Turbulence Type Forecast/Actual:</b>	/
<b>Wind Direction:</b>	280°	<b>Turbulence Severity Forecast/Actual:</b>	/
<b>Altimeter Setting:</b>	29.89 inches Hg	<b>Temperature/Dew Point:</b>	4°C / -1°C
<b>Precipitation and Obscuration:</b>	No Obscuration; No Precipitation		
<b>Departure Point:</b>	NEW YORK, NY (LGA )	<b>Type of Flight Plan Filed:</b>	IFR
<b>Destination:</b>	DETROIT, MI (DTW )	<b>Type of Clearance:</b>	IFR
<b>Departure Time:</b>	06:18 Local	<b>Type of Airspace:</b>	

## Airport Information

<b>Airport:</b>	Detroit Metro DTW	<b>Runway Surface Type:</b>	
<b>Airport Elevation:</b>	645 ft msl	<b>Runway Surface Condition:</b>	Unknown
<b>Runway Used:</b>	27R	<b>IFR Approach:</b>	Visual
<b>Runway Length/Width:</b>	8700 ft / 200 ft	<b>VFR Approach/Landing:</b>	

## Wreckage and Impact Information

<b>Crew Injuries:</b>	5 None	<b>Aircraft Damage:</b>	Substantial
<b>Passenger Injuries:</b>	68 None	<b>Aircraft Fire:</b>	None
<b>Ground Injuries:</b>	N/A	<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	73 None	<b>Latitude, Longitude:</b>	42.212501,-83.353332

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Sullivan, Pamela
<b>Additional Participating Persons:</b>	Dana Carver; Federal Aviation Administration; Detroit, MI
<b>Original Publish Date:</b>	May 28, 2008
<b>Last Revision Date:</b>	
<b>Investigation Class:</b>	<a href="#">Class</a>
<b>Note:</b>	
<b>Investigation Docket:</b>	<a href="https://data.nts.gov/Docket?ProjectID=67425">https://data.nts.gov/Docket?ProjectID=67425</a>

The National Transportation Safety Board (NTSB) is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant events in other modes of transportation—railroad, transit, highway, marine, pipeline, and commercial space. We determine the probable causes of the accidents and events we investigate, and issue safety recommendations aimed at preventing future occurrences. In addition, we conduct transportation safety research studies and offer information and other assistance to family members and survivors for each accident or event we investigate. We also serve as the appellate authority for enforcement actions involving aviation and mariner certificates issued by the Federal Aviation Administration (FAA) and US Coast Guard, and we adjudicate appeals of civil penalty actions taken by the FAA.

The NTSB does not assign fault or blame for an accident or incident; rather, as specified by NTSB regulation, “accident/incident investigations are fact-finding proceedings with no formal issues and no adverse parties ... and are not conducted for the purpose of determining the rights or liabilities of any person” (Title 49 *Code of Federal Regulations* section 831.4). Assignment of fault or legal liability is not relevant to the NTSB’s statutory mission to improve transportation safety by investigating accidents and incidents and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report (Title 49 *United States Code* section 1154(b)). A factual report that may be admissible under 49 *United States Code* section 1154(b) is available [here](#).