



# National Transportation Safety Board Aviation Accident Final Report

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<b>Location:</b>	Detroit, MI	<b>Accident Number:</b>	CHI08LA071
<b>Date &amp; Time:</b>	01/09/2008, 0749 EST	<b>Registration:</b>	N349NB
<b>Aircraft:</b>	Airbus Industrie A319-114	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>		<b>Injuries:</b>	73 None
<b>Flight Conducted Under:</b>	Part 121: Air Carrier - Scheduled		

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## 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 diverted from the task when another mechanic asked for assistance.

### Findings

Occurrence #1: AIRFRAME/COMPONENT/SYSTEM FAILURE/MALFUNCTION  
Phase of Operation: APPROACH - FAF/OUTER MARKER TO THRESHOLD (IFR)

#### Findings

1. 1 ENGINE
2. (C) COOLING SYSTEM,COWLING - UNLATCHED
3. (C) PROCEDURES/DIRECTIVES - NOT FOLLOWED - OTHER MAINTENANCE PERSONNEL
4. (F) DIVERTED ATTENTION - OTHER MAINTENANCE PERSONNEL
5. (C) COOLING SYSTEM,COWLING - SEPARATION

## Factual Information

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>	Seatbelt, Shoulder harness
<b>Instrument Rating(s):</b>	Airplane	<b>Second Pilot Present:</b>	Yes
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	
<b>Medical Certification:</b>	Class 1 With Waivers/Limitations	<b>Last Medical Exam:</b>	09/01/2007
<b>Occupational Pilot:</b>		<b>Last Flight Review or Equivalent:</b>	07/01/2006
<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>	Multi-engine Land; Single-engine Land	<b>Seat Occupied:</b>	Rear
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	Seatbelt, Shoulder harness
<b>Instrument Rating(s):</b>	Airplane	<b>Second Pilot Present:</b>	Yes
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	
<b>Medical Certification:</b>	Class 1 Without Waivers/Limitations	<b>Last Medical Exam:</b>	03/01/2007
<b>Occupational Pilot:</b>		<b>Last Flight Review or Equivalent:</b>	04/01/2007
<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 Manufacturer:</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>	No
<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>	07/01/2007, Continuous Airworthiness	<b>Certified Max Gross Wt.:</b>	155200 lbs
<b>Time Since Last Inspection:</b>	317 Hours	<b>Engines:</b>	2 Turbo Fan
<b>Airframe Total Time:</b>	15029 Hours	<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
<b>Operator:</b>	NORTHWEST AIRLINES INC	<b>Air Carrier Operating Certificate:</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 Conditions	<b>Condition of Light:</b>	Day
<b>Observation Facility, Elevation:</b>	DTW, 645 ft msl	<b>Observation Time:</b>	0753 EST
<b>Distance from Accident Site:</b>	1 Nautical Miles	<b>Direction from Accident Site:</b>	270°
<b>Lowest Cloud Condition:</b>		<b>Temperature/Dew Point:</b>	4°C / -1°C
<b>Lowest Ceiling:</b>	Broken / 3800 ft agl	<b>Visibility</b>	10 Miles
<b>Wind Speed/Gusts, Direction:</b>	15 knots, 280°	<b>Visibility (RVR):</b>	
<b>Altimeter Setting:</b>	29.9 inches Hg	<b>Visibility (RVV):</b>	
<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>	0618 EST	<b>Type of Airspace:</b>	

## Airport Information

<b>Airport:</b>	Detroit Metro (DTW)	<b>Runway Surface Type:</b>	Unknown
<b>Airport Elevation:</b>	645 ft	<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>	42.212500, -83.353333

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Pamela S Sullivan	<b>Adopted Date:</b>	05/28/2008
<b>Additional Participating Persons:</b>	Dana Carver; Federal Aviation Administration; Detroit, MI		
<b>Publish Date:</b>			
<b>Investigation Docket:</b>	NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at <a href="mailto:pubinq@ntsb.gov">pubinq@ntsb.gov</a> , or at 800-877-6799. Dockets released after this date are available at <a href="http://dms.nts.gov/pubdms/">http://dms.nts.gov/pubdms/</a> .		

The National Transportation Safety Board (NTSB), established in 1967, is an independent federal agency mandated by Congress through the Independent Safety Board Act of 1974 to investigate transportation accidents, determine the probable causes of the accidents, issue safety recommendations, study transportation safety issues, and evaluate the safety effectiveness of government agencies involved in transportation. The NTSB makes public its actions and decisions through accident reports, safety studies, special investigation reports, safety recommendations, and statistical reviews.

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