National Transportation Safety Board
Aviation Accident Final Report

Location:	SEATTLE, WA	**Accident Number:**	SEA00LA046
Date & Time:	02/19/2000, 2137 PST	**Registration:**	N811CK
Aircraft:	McDonnell Douglas DC-8-63F	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	5 None
Flight Conducted Under:	Part 121: Air Carrier - Non-scheduled		

Analysis

Before the accident flight, company maintenance personnel performed work on all four of the aircraft's engine thrust reversers. One mechanic working on the thrust reversers went off-shift before closing the number 2 cowl, and asked another mechanic to close the cowl for him. The second mechanic subsequently lowered the number 1 and 2 cowl doors but was unable to secure and lock them. He reported to mechanics on the next shift that all four engine cowls needed to be secured, and annotated this in the shift turnover log. When mechanics from the next shift arrived to close the cowls, they observed the number 1 and 2 cowls closed but did not review the shift turnover log and did not check to ensure the number 1 and 2 cowls were latched. The flight engineer also failed to detect the unlatched cowls on his preflight inspection, despite detailed procedures in the company flight operations manual for preflight inspection of the cowls (including ensuring they are latched.) The flight crew subsequently initiated a takeoff with the number 1 and 2 engine cowls unsecured. The number 1 and 2 cowls departed the aircraft during, and shortly after, takeoff, substantially damaging the aircraft's left wing and left horizontal stabilizer. The flight subsequently returned to the departure airport and landed without further incident.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: Inadequate inspection of the number 1 and 2 engine cowls by company maintenance personnel and inadequate preflight inspection by the flight engineer, resulting in unsecured cowls separating from the aircraft during takeoff. A factor was unsecured number 1 and 2 engine cowls.

Findings

Occurrence #1: MISCELLANEOUS/OTHER
Phase of Operation: TAKEOFF

Findings
1. (F) NACELLE/PYLON,ATTACHMENT - NOT SECURED
2. (C) MAINTENANCE,INSPECTION - INADEQUATE - COMPANY MAINTENANCE PERSONNEL
3. (C) AIRCRAFT PREFLIGHT - INADEQUATE - FLIGHT ENGINEER
4. NACELLE/PYLON,ATTACHMENT - SEPARATION

Factual Information

On February 19, 2000, approximately 2137 Pacific standard time, Connie 8102, a Boeing (formerly McDonnell Douglas) DC-8-63F airplane (N811CK) being operated by Kitty Hawk International, Inc. on a 14 CFR 121 non-scheduled international cargo flight from Seattle-Tacoma International Airport, Seattle, Washington, to Anchorage, Alaska, lost its number 1 and 2 engine cowlings on takeoff from Seattle. Following the separation of the number 1 and 2 cowlings, the flight returned to Seattle-Tacoma International and landed without further incident. There were no injuries to the airline transport pilot-in-command, first officer, or flight engineer aboard the aircraft, nor were any injuries reported to persons on the ground. However, post-accident inspection of the aircraft revealed substantial damage to the aircraft's left wing and left horizontal stabilizer. Visual meteorological conditions were reported at Seattle-Tacoma International at 2156, and an instrument flight rules (IFR) flight plan had been filed for the flight.

The aircraft maintenance log indicated that on the previous flight (from Anchorage to Seattle, arriving at 0718), the flight crew had written up discrepancies that the number 2 engine would not go into reverse thrust, and that the captain's course deviation indicator (CDI) was frozen. The frozen captain's CDI was determined to be a non-deferrable, Aircraft-on-Ground (AOG) item. There was also a deferred maintenance item (DMI) on the number 1 thrust reverser. Due to concerns expressed by the captain of the incoming flight about the operability of the thrust reversers in consideration of icy runway conditions at Anchorage, maintenance also decided to lube, inspect, and check all four thrust reversers for proper operation. In an interview with an FAA inspector and a written statement, the company mechanic assigned to work on the number 2 thrust reverser and the frozen CDI problem (who reported his regular shift was from 0430 until 1300) stated that troubleshooting the CDI problem took several hours. He reported that during his time on shift, he also completed the work on the number 2 thrust reverser. He stated that when he was informed that the CDI problem had been fixed, "I realized that I no longer had an AOG [aircraft] and that I had already worked 3 hours of overtime and had not taken a lunch." He reported that he asked the mechanic working on the number 1 thrust reverser to finish up the aircraft and close all engine cowls, and that he then signed off the number 2 thrust reverser in the maintenance log and left for the day. (This mechanic stated that he worked until 1645 on this shift, 3 hours and 45 minutes past the end of his normal shift.) This mechanic reported that when he left, all cowlings were wide open and held open by their hold-open rods.

The mechanic who worked on the number 1 thrust reverser, and who was asked by the first mechanic to close all engine cowls, reported in a written statement that he lowered the number 1 and 2 cowling doors, but that he and another mechanic were unable to secure and lock the doors. He stated that about 1600, they returned to the shop for assistance in locking and securing the cowling doors. He stated that at that time, he entered in the turnover log that all four cowling doors required securing, and also verbally reported this to two other mechanics from the next shift. A copy of the first shift end-of-shift turnover log for the day of the accident indicated "811CK requires all 4 cow [sic] doors secured."

One of the company mechanics who took the turnover report on the cowl doors from the first-shift mechanic stated that at about 1530, he received a tie-in from that mechanic (the one assigned to the number 1 thrust reverser) that all cowlings on N811CK needed to be closed. He stated, however, that he did not review the tie-in log. This mechanic told an FAA inspector he

reported for work at 1500 on the day of the accident, and that on the previous shift he was scheduled to go off duty at 0130 but actually worked until 0800. He stated he then went home but was unable to sleep and reported back for his regular duty at 1500. He stated his primary duty that day was a Boeing 747 (B-747) and that he did not get to N811CK until about 1630 or 1645. He stated that at that time, he noted that the cowlings for the number 1 and number 2 engines were closed and that those for the number 3 and 4 engines were wide open. He reported that he assisted in closing the number 3 engine cowl, but did not check the number 1 or number 2 cowlings to ensure that they were secured. He subsequently reviewed the paperwork for N811CK and signed the airworthiness release for the aircraft. (A review of the aircraft logs disclosed no specific documentation that the number 1 or 2 cowlings had either been opened or closed.)

In written statements, other company mechanics who stated they went out to help close the number 3 and/or number 4 cowlings (after the first shift mechanic reported that all four cowlings needed to be secured) reported that upon arrival at the aircraft, they observed the number 1 and 2 cowling doors closed and the number 3 and 4 cowling doors open. None of the mechanics indicated in their statements that they checked that the number 1 or 2 cowlings were latched, although the individual who marshaled the aircraft out on the accident flight indicated that he performed a "basic walk-around" of the aircraft prior to marshaling it out.

The captain reported that his first indication of any problems was at rotation, when the number 2 engine N2 (high pressure section) RPM indication went to zero and the number 2 engine generator light came on. He stated he also noticed the aircraft roll left slightly at that time. The captain reported that he and his crew were diagnosing the problem when the control tower called and notified him that his aircraft had left debris on the runway during takeoff. The captain stated that he then called company headquarters in Ypsilanti, Michigan, and decided to return to Seattle-Tacoma International.

The captain stated that the preflight walk-around inspection on the aircraft is done by the flight engineer. The flight engineer reported in a written statement that the cowlings were closed when he arrived at the aircraft, that he observed no abnormalities during the exterior preflight inspection, and that "All engine cowlings [were] verified closed and latched prior to takeoff."

The number 1 and 2 engine cowls completely departed the aircraft during the accident sequence. Several cowl sections were found on the Seattle-Tacoma International Airport runway; two cowling sections were also found in a residential area in the Browns Point area of Tacoma, Washington, approximately 10 nautical miles south-southwest of the airport. The cowling sections left on the runway were returned to Kitty Hawk's facility at the airport and secured pending examination by NTSB and FAA investigators. The sections which fell into the Browns Point area were recovered by an FAA inspector and returned to Kitty Hawk after examination by NTSB and FAA investigators. NTSB and FAA investigators examined all recovered cowl sections on February 23, 2000. No cowl sections were attached to each other by any latch mechanisms, and no evidence of distress to any latches, latching pins, or associated areas was observed. Of four latches observed on the sections left on the runway, three were observed in the unsecured position and one was observed in the latched position (but not engaged to its mating latch pin); however, a Kitty Hawk maintenance representative reported to the NTSB that the latch found in the latched position had been in the unsecured position when returned, and that the airline's personnel had left it in the latched position in the course of demonstrating/practicing its operation. Both of the two latches observed on one of

the sections recovered from the Browns Point area were observed to be in the unsecured position.

The company's Flight Operating Manual contains detailed procedures for checking the engine cowlings and doors during the preflight walk-around inspection as follows: "Check engine cowl for general condition and properly secured. Check nacelle latches through cowl inspection holes. Nacelle latch pins and hooks should be engaged. DC-8-62/63 check square button in recessed area of lock is flush, cowl seam even and secure...."

Pilot Information

Certificate:	Airline Transport; Flight Engineer	**Age:**	50, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	Seatbelt, Shoulder harness
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	
Medical Certification:	Class 1 Valid Medical--w/ waivers/lim.	**Last Medical Exam:**	10/22/1999
Occupational Pilot:		**Last Flight Review or Equivalent:**	
Flight Time:	8800 hours (Total, all aircraft), 7200 hours (Total, this make and model), 7000 hours (Pilot In Command, all aircraft), 239 hours (Last 90 days, all aircraft), 56 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Manufacturer:	McDonnell Douglas	**Registration:**	N811CK
Model/Series:	DC-8-63F DC-8-63F	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	No
Airworthiness Certificate:	Transport	**Serial Number:**	46147
Landing Gear Type:	Retractable - Tricycle	**Seats:**	5
Date/Type of Last Inspection:	02/17/2000, Continuous Airworthiness	**Certified Max Gross Wt.:**	353000 lbs
Time Since Last Inspection:	20 Hours	**Engines:**	4 Turbo Jet
Airframe Total Time:	46087 Hours	**Engine Manufacturer:**	P&W
ELT:	Installed, not activated	**Engine Model/Series:**	JT3D-7A
Registered Owner:	KITTY HAWK INTERNATIONAL INC.	**Rated Power:**	19000 lbs
Operator:	KITTY HAWK INTERNATIONAL INC.	**Air Carrier Operating Certificate:**	Supplemental
Operator Does Business As:	AMERICAN INTERNATIONAL AIRWAYS	**Operator Designator Code:**	K4HA

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	**Condition of Light:**	Night/Dark
Observation Facility, Elevation:	SEA, 429 ft msl	**Observation Time:**	2156 PST
Distance from Accident Site:	0 Nautical Miles	**Direction from Accident Site:**	0°
Lowest Cloud Condition:	Clear / 0 ft agl	**Temperature/Dew Point:**	6°C / -5°C
Lowest Ceiling:	None / 0 ft agl	**Visibility**	10 Miles
Wind Speed/Gusts, Direction:	11 knots, 100°	**Visibility (RVR):**	0 ft
Altimeter Setting:	29 inches Hg	**Visibility (RVV):**	0 Miles
Precipitation and Obscuration:			
Departure Point:	(SEA)	**Type of Flight Plan Filed:**	IFR
Destination:	ANCHORAGE, AK (ANC)	**Type of Clearance:**	IFR
Departure Time:	2137 PST	**Type of Airspace:**	Class B

Airport Information

Airport:	SEATTLE-TACOMA INTL (SEA)	**Runway Surface Type:**	Asphalt
Airport Elevation:	429 ft	**Runway Surface Condition:**	
Runway Used:	16L	**IFR Approach:**	
Runway Length/Width:	11900 ft / 150 ft	**VFR Approach/Landing:**	

Wreckage and Impact Information

Crew Injuries:	5 None	**Aircraft Damage:**	Substantial
Passenger Injuries:	N/A	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	5 None	**Latitude, Longitude:**	

Administrative Information

Investigator In Charge (IIC):	GREGG NESEMEIER	**Adopted Date:**	05/18/2001
Additional Participating Persons:	DEAN HAMILTON; RENTON, WA		
Publish Date:			
Investigation Docket:	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 pubinq@ntsb.gov, or at 800-877-6799. Dockets released after this date are available at http://dms.ntsb.gov/pubdms/.		