National Transportation Safety Board
Aviation Incident Final Report

Location:	Dulles, VA	**Incident Number:**	NYC05IA093
Date & Time:	06/08/2005, 2137 EDT	**Registration:**	N40SZ
Aircraft:	Saab-Scania AB (Saab) 340A	**Aircraft Damage:**	Minor
Defining Event:		**Injuries:**	30 None
Flight Conducted Under:	Part 121: Air Carrier - Scheduled		

Analysis

During the approach, the flightcrew was unable to get the right main landing gear extended and locked. After several attempts, while conferring with the checklist and company personnel, the flightcrew performed an emergency landing with the unsafe landing gear indication. During the landing, the right main landing gear slowly collapsed, and the airplane came to rest off the right side of the runway. Examination of the right main landing gear revealed that the retract actuator fitting was secured with two fasteners, a smaller bolt, and a larger bolt. The nut and cotter key were not recovered with the smaller bolt, and 8 of the 12 threads on the smaller bolt were stripped consistent with an overstress pulling of the nut away from the bolt. The larger bolt was bent and separated near the head, consistent with a tension and overstress separation as a result of the smaller bolt failure. The overstress failures were consistent with the right main landing gear not being locked in the extended position when aircraft weight was applied; however, examination of the right main landing gear down lock system could not determine any pre-impact mechanical malfunctions. Further, the right main landing gear retract actuator was tomography scanned, and no anomalies were noted. The unit was then functionally tested at the manufacturer's facility, under the supervision of an FAA inspector. The unit tested successfully, with no anomalies noted.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this incident to be: Failure of the right main landing gear to extend and lock for undetermined reasons, which resulted in the right main landing gear collapsing during touchdown.

Findings

Occurrence #1: AIRFRAME/COMPONENT/SYSTEM FAILURE/MALFUNCTION
Phase of Operation: APPROACH

Findings
1. LANDING GEAR,MAIN GEAR - FAILURE
2. GEAR DOWN AND LOCKED - NOT POSSIBLE

Occurrence #2: GEAR COLLAPSED
Phase of Operation: EMERGENCY LANDING

Occurrence #3: ON GROUND/WATER ENCOUNTER WITH TERRAIN/WATER
Phase of Operation: EMERGENCY LANDING

Findings
3. TERRAIN CONDITION - RUNWAY

Factual Information

On June 8, 2005, at 2137 eastern daylight time, a Saab 340A, N40SZ, operated by Shuttle America Corp. as United Express flight 7564, sustained minor damage during an emergency landing at Washington Dulles International Airport (IAD), Dulles, Virginia. There were no injuries to the 3 crewmembers and 27 passengers. Visual meteorological conditions prevailed for the flight that originated from Westchester County Airport (HPN), White Plains, New York. An instrument flight rules flight plan was filed for the air carrier flight conducted under 14 CFR Part 121.

According to the captain, the airplane was approaching IAD when the flightcrew attempted to extend the landing gear. A yellow transit light cockpit indication was observed, which alerted the flightcrew that the right main landing gear had not fully extended and locked. After "recycling" the landing gear, the flightcrew noted the same anomaly.

The flightcrew advised air traffic control (ATC) of the problem, performed a missed approach, and climbed to 3,000 feet over the airport. While circling the airport, the flightcrew performed all relevant checklists in the quick reference handbook (QRH); however, they could not correct the anomaly. In addition, the flightcrew performed a low pass over the airport. Ground personnel observed the gear extended, but could not confirm that it was locked in the fully extended position.

The flightcrew also contacted their company twice to discuss the problem. The decision was made to perform an emergency landing with the unsafe landing gear indication. After completing the emergency checklist items in the QRH, the flightcrew performed an emergency landing on runway 19L. During the landing, the right main landing gear slowly collapsed, and the airplane came to rest in a grassy area off the right side of the runway. An emergency evacuation of the airplane was performed successfully, and no serious injuries were reported.

The airplane was equipped with a cockpit voice recorder (CVR) and flight data recorder (FDR), which were forwarded to the Safety Board's vehicle recorders laboratory for readout. Data on the recorders confirmed the captain's statement.

Components of the right main landing gear were examined at the Safety Board's materials laboratory. The right main landing gear retract actuator fitting was secured with two fasteners, a smaller bolt (part number AIR 134736) and a larger bolt (part number AIR 124792). The nut and cotter key were not recovered with the smaller bolt, and 8 of the 12 threads on the smaller bolt were stripped consistent with an overstress pulling of the nut away from the bolt.

The larger bolt was bent and separated near the head, consistent with a tension and overstress separation as a result of the smaller bolt failure. The overstress failures were consistent with the right main landing gear not locked in the extended position while aircraft weight was applied to it; however, examination of the right main landing gear down lock system could not determine any pre-impact mechanical malfunctions.

Further, the right main landing gear retract actuator was subjected to x-ray computed tomography (CT) and digital scanning under the direction of the Safety Board. The CT scan did not reveal any anomalies with the actuator. The unit was then functionally tested at the manufacturer's facility, under the supervision of an FAA inspector. The unit tested successfully, with no anomalies noted.

The airplane was maintained under a continuous airworthiness maintenance program, and had accumulated about 164 hours of operation since its last inspection, which was performed on April 30, 2005.

Pilot Information

Certificate:	Airline Transport	**Age:**	32, 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:**	No
Medical Certification:	Class 1 None	**Last Medical Exam:**	02/01/2005
Occupational Pilot:		**Last Flight Review or Equivalent:**	02/01/2005
Flight Time:	4673 hours (Total, all aircraft), 3476 hours (Total, this make and model), 2660 hours (Pilot In Command, all aircraft), 205 hours (Last 90 days, all aircraft), 85 hours (Last 30 days, all aircraft), 6 hours (Last 24 hours, all aircraft)		

Co-Pilot Information

Certificate:	Commercial	**Age:**	32, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	None	**Restraint Used:**	Seatbelt, Shoulder harness
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	Airplane Multi-engine; Airplane Single-engine; Instrument Airplane	**Toxicology Performed:**	No
Medical Certification:	Class 1 Without Waivers/Limitations	**Last Medical Exam:**	05/01/2005
Occupational Pilot:		**Last Flight Review or Equivalent:**	10/01/2004
Flight Time:	2050 hours (Total, all aircraft), 620 hours (Total, this make and model), 1300 hours (Pilot In Command, all aircraft), 249 hours (Last 90 days, all aircraft), 71 hours (Last 30 days, all aircraft), 5 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Manufacturer:	Saab-Scania AB (Saab)	**Registration:**	N40SZ
Model/Series:	340A	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	No
Airworthiness Certificate:	Transport	**Serial Number:**	40
Landing Gear Type:	Retractable - Tricycle	**Seats:**	
Date/Type of Last Inspection:	04/01/2005, Continuous Airworthiness	**Certified Max Gross Wt.:**	28000 lbs
Time Since Last Inspection:	164 Hours	**Engines:**	2 Turbo Prop
Airframe Total Time:	41441 Hours	**Engine Manufacturer:**	General Electric
ELT:	Installed, activated, did not aid in locating accident	**Engine Model/Series:**	CT75A2
Registered Owner:	Lambert Leasing	**Rated Power:**	1735 hp
Operator:	Shuttle America Corporation	**Air Carrier Operating Certificate:**	Flag carrier (121)
Operator Does Business As:	United Express	**Operator Designator Code:**	UHLA

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	**Condition of Light:**	Night
Observation Facility, Elevation:	IAD, 131 ft msl	**Observation Time:**	2151 EDT
Distance from Accident Site:	0 Nautical Miles	**Direction from Accident Site:**	0°
Lowest Cloud Condition:	Few / 20000 ft agl	**Temperature/Dew Point:**	24°C / 17°C
Lowest Ceiling:	None	**Visibility**	10 Miles
Wind Speed/Gusts, Direction:	4 knots, 200°	**Visibility (RVR):**	
Altimeter Setting:	29.99 inches Hg	**Visibility (RVV):**	
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	White Plains, NY (HPN)	**Type of Flight Plan Filed:**	IFR
Destination:	Dulles, VA (IAD)	**Type of Clearance:**	IFR
Departure Time:	1930 EDT	**Type of Airspace:**	

Airport Information

Airport:	Washington Dulles Internationa (IAD)	**Runway Surface Type:**	Asphalt
Airport Elevation:	313 ft	**Runway Surface Condition:**	Dry
Runway Used:	19L	**IFR Approach:**	Visual
Runway Length/Width:	11500 ft / 150 ft	**VFR Approach/Landing:**	Full Stop; Traffic Pattern

Wreckage and Impact Information

Crew Injuries:	3 None	**Aircraft Damage:**	Minor
Passenger Injuries:	27 None	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	30 None	**Latitude, Longitude:**	38.944444, -77.455833

Administrative Information

Investigator In Charge (IIC):	Robert J Gretz	**Adopted Date:**	08/29/2006
Additional Participating Persons:	Mark Kramer; FAA FSDO-27; Dulles, VA Lee Hayes; Shuttle America; Fort Wayne, IN Bo-Goran Windoff; Saab Aircraft; Sweden,		
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/.		