



National Transportation Safety Board Aviation Accident Final Report

Location:	Ft. Lauderdale, FL	Accident Number:	NYC08LA091
Date & Time:	02/01/2008, 1542 EST	Registration:	N3RP
Aircraft:	North American Rockwell Corp. NA-265-80	Aircraft Damage:	Substantial
Defining Event:	Ground collision	Injuries:	1 Minor, 2 None
Flight Conducted Under:	Part 91: General Aviation - Ferry		

Analysis

The Rockwell International Sabreliner had just been released from the repair station following several months of maintenance, primarily for structural corrosion control and repair. According to the pilots, they began to taxi away from the repair station. Initially, the brakes and steering were satisfactory, but then failed. The airplane then contacted several other airplanes and a tug with an airplane in tow, before coming to a stop. The airplane incurred substantial damage as a result of the multiple collisions. Neither crewmember heard or saw any annunciators to alert them to a hydraulic system problem. Postaccident examination revealed that there was no pressure in the normal hydraulic system, as expected, and that the auxiliary system pressure was adequate to facilitate emergency braking. Additional examination and testing revealed that the aural warning for low hydraulic system pressure was inoperative, but all other hydraulic, steering, and braking systems functioned properly. Both the pilot and copilot were type-rated in the Sabreliner, and each had approximately 350 hours of flight time in type. Neither crewmember had any time in Sabreliners in the 90 days prior to the accident. Operation of the emergency braking system in the airplane required switching the system on, waiting for system pressure to decrease to 1,700 pounds per square inch (psi), pulling the "T" handle, and then pumping the brake pedals 3 to 5 times. In addition, the system will not function if both the pilot's and copilot's brake pedals are depressed simultaneously. The investigation did not uncover any evidence to suggest the crew turned on the auxiliary hydraulic system, or waited for the system pressure to decrease to 1,700 psi in their attempt to use the emergency braking system.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The depletion of pressure in the normal hydraulic system for an undetermined reason, and the pilots' failure to properly operate the emergency braking system. Contributing to the accident was an inoperative hydraulic system aural warning.

Findings

Aircraft	Hydraulic power system - Not specified (Cause) Hydraulic, indicating system - Malfunction (Factor) Hydraulic, auxiliary system - Incorrect use/operation (Cause)
Personnel issues	Use of equip/system - Flight crew (Cause)

Factual Information

On February 1, 2008, about 1542 eastern standard time, a Rockwell International NA-265-80, N3RP, was substantially damaged when it collided with three other airplanes while taxiing for departure at Fort Lauderdale Executive Airport (FXE), Fort Lauderdale, Florida. The three pilots on board two of the affected airplanes were not injured, and an airport tug driver received minor injuries. The positioning flight was being operated under the provisions of 14 Code of Federal Regulations Part 91. Visual meteorological conditions prevailed at the time of the accident, and an instrument flight rules (IFR) flight plan was filed.

According to the pilot, the NA-265-80 (Sabreliner) was inactive since October 2007, due to extensive maintenance to repair corrosion. The pilot and copilot were to move the airplane to the operator's home base at Hernando County Airport (BKV), Brooksville, Florida, after the maintenance was completed. The repair station informed the pilot about 1 1/2 weeks prior to the accident that the repairs were nearly completed, and that he would be able to pick up the airplane by January 30. The pilot and copilot arrived in Fort Lauderdale a few days prior to January 30, in order to be prepared to move the Sabreliner once it was released by the repair station.

The repair station released the Sabreliner to the pilots on February 1. The Sabreliner was located on the repair station ramp in the northwest corner of FXE. The pilot and copilot boarded the airplane, started the auxiliary power unit (APU), and started both engines. According to the copilot, he read the checklists, and he and the pilot executed the items.

According to recorded air traffic control tower (ATCT) information, about 1540, the Sabreliner began to taxi out, and contacted the FXE ATCT ground controller to coordinate maneuvering around a Cessna Caravan that was headed in the opposite direction on the same ramp. The ground controller replied "...don't have you in sight if you guys are in the foxtrot one ramp that is uncontrolled." The accident crew responded that they were aware of that, but that they wanted to "get out of the way" of the Caravan. Ground control then asked for the accident crew's intentions, and at 1542:04, the accident crew replied "taxi out for departure and I'll get the clearance as soon as I get clear of the Caravan." At 1542:50 the Caravan pilot broadcast "mayday mayday mayday watch out watch out watch out" on the ground control frequency.

According to the pilot of the Caravan, he had deplaned his passengers and was taxiing his airplane to its parking location. Since the Sabreliner was blocking his intended path, the Caravan pilot stopped to let the Sabreliner pass. He saw the Sabreliner begin coming towards him, and the left wing of the Sabreliner then struck the Caravan's rotating propeller. The Sabreliner continued moving at a speed that the Caravan pilot estimated to be 10 knots. On the same ramp, a DH-125 was being towed by a tug, and the Caravan pilot saw the two persons who were on the tug jump off it while it was still in motion. The Sabreliner struck the DH-125 and the tug, and continued to move forward until it struck another, stationary Sabreliner. The Caravan pilot estimated that the accident Sabreliner had traveled 20 to 30 yards beyond the Caravan before it finally stopped. The Caravan pilot notified the ATCT of the event, and requested fire and rescue assistance.

In his postaccident statement, the Sabreliner pilot indicated that "all gauges...were indicating correctly and all systems were operating normal[ly]." Both he and the copilot stated that the airplane, including braking and steering systems, was functioning normally during the initial taxi, that all appropriate checklists had been complied with, and that the auxiliary power unit

was shut down for taxi. When the Sabreliner was abeam the Caravan, the Sabreliner started to drift to the left, and the pilot attempted to correct the drift. The pilot said that the airplane "did not respond" to his steering commands, and that the brakes were "not functioning properly." The copilot stated that "the brakes failed" and that application of the emergency brake was "to no avail." Neither crewmember heard or saw any annunciations to alert them to a hydraulic system problem.

PERSONNEL INFORMATION

The pilot of the Sabreliner held an airline transport certificate with an instrument airplane rating, and type ratings in the Sabreliner and Lear 25. He reported 8,500 total hours of flight experience, with 350 hours in the accident airplane make and model. He reported that he had no flight time in Sabreliners in the past 90 days. His most recent flight review was accomplished in August 2007, and his most recent Federal Aviation Administration (FAA) first-class medical certificate was issued in October 2007. The pilot was employed by the operator.

The copilot of the Sabreliner held an airline transport certificate with an instrument airplane rating, and type ratings in several airplanes, including the Sabreliner. He reported 14,400 total hours of flight experience, with 360 hours in the accident airplane make and model. He reported that he had no flight time in Sabreliners in the past 90 days. His most recent flight review was accomplished in September 2007, and his most recent FAA second-class medical certificate was issued in August 2007. The copilot stated that he was not an employee of the operator of the accident airplane, and that he primarily flew Learjets for another operator.

AIRPLANE INFORMATION

According to FAA records, the Sabreliner was manufactured in 1977, and was registered to the current operator on December 26, 2007. According to the Sabreliner maintenance manual (MM), the airplane was equipped with two hydraulic systems; the normal system, and the auxiliary system. Operating pressure for both systems was 3,000 pounds per square inch (psi). The normal system powered the nose wheel steering (NWS), the wheel brakes, and other systems. The auxiliary system was for "emergency or alternate use" in case of "normal system power failure." The auxiliary system provided "sufficient fluid and pressure" to operate the NWS and wheel brakes "for a limited number of operations." Each hydraulic system was equipped with a dedicated accumulator, and the accumulators stored fluid at the system working pressure of 3,000 psi. The MM stated that the normal system accumulator could "be used as a limited source of pressure in case of pump failure or when the pump is not operating."

The hydraulic systems control switches were located on the overhead switch panel in the cockpit. The two pressure gauges for the hydraulic systems were located at the bottom of the center instrument panel. These gauges were approximately 1 inch in diameter, and were situated immediately below the airborne radar control and display unit, which protruded approximately 1 inch beyond the instrument panel. The hydraulic pressure annunciator light was one of 52 separate warning lights, each approximately 1/4 inch by 3/4 inch, grouped on the annunciator panel. The annunciator panel was located on the lower left corner of the copilot's instrument panel. Two master caution annunciator lights, one on the pilot's side, and one on the copilot's side, were located below the instrument panel glareshield. The emergency brake was a "T" handle located on the forward right corner of the lower/aft pedestal panel,

approximately at the copilot's hip when seated normally. The handle is pulled up and rotated counterclockwise to enable the emergency braking system.

According to the FAA and repair station personnel, the airplane had been undergoing maintenance for several months at the facility; this work was primarily corrosion correction and control activities. According to the FAA, a review of the repair station's records for the accident airplane indicated "that the hydraulic system was not opened" and that "fluid was added to the hydraulic fluid reservoir."

METEOROLOGICAL INFORMATION

The 1553 FXE weather observation recorded winds from 130 degrees at 10 knots, visibility 10 miles, scattered clouds at 6,900 feet, temperature 27 degrees Celsius (C), dew point 15 degrees C, and altimeter setting of 30.12 inches of mercury.

COMMUNICATIONS

A transcript of the communications between the accident airplane crew and FXE ground control indicated that the crew was planning to obtain an IFR clearance and then taxi out for departure. The communications also indicated that the collision occurred in a non-movement area of the airport, meaning that ground control was not responsible for aircraft control or separation in this area.

FLIGHT RECORDERS

The accident airplane was equipped with a B&D Instruments and Avionics cockpit voice recorder (CVR). The date stamped in the "Replace Beacon By End Of" location on the underwater locator beacon placard was March 2007. The CVR was removed from the airplane and sent to the National Transportation Safety Board Recorders Laboratory in Washington, D.C. for readout. This model was designed to record 30 minutes of analog audio on a continuous loop tape in a four-channel format. The CVR housing did not sustain any heat or structural damage. Internal inspection of the unit revealed that the tape transport was jammed by recording tape wrapped around a post, and a portion of the tape was damaged and unusable. The tape contained approximately 8 minutes of usable data. The audio information that was recovered did not pertain to the accident sequence.

WRECKAGE AND IMPACT INFORMATION

Sabreliner N3RP sustained substantial damage to both wings, the left engine nacelle, and airplane nose. Sabreliner N430MP sustained substantial damage to its right wing and right fuselage. The DH-125 sustained damage to its fuselage. The Caravan sustained damage to its propeller.

ADDITIONAL INFORMATION

Flight Plan

According to Lockheed Martin Flight Services, at 1455 on the day of the accident, an IFR flight plan was filed for the accident Sabreliner. The flight plan listed a proposed departure time of 1500 for a flight from FXE to BKV, with two persons on board. The flight plan identified the accident pilot as the pilot-in-command of the planned flight.

Recent Maintenance Activity

One airplane maintenance record entry, dated January 31, 2008, indicated that the repair station had completed several structural repairs, and replaced multiple electrical, engine, and other system components. Another entry with the same date indicated that the airplane had been inspected in accordance with four separate continuing airworthiness inspections. The "24 month/1500 hour/3000 cycle" inspection was the longest-interval inspection of the four inspections listed in the entry.

Pilot's Checklist Information

Items 8 and 9 of the "Before Starting Engines" checklist respectively specified that the normal system hydraulic pump switch was to be in the "Guarded AUTO" position, and the auxiliary hydraulic system switch was to be in the "OFF" position. Item 6 of the "Starting Engines" checklist stated "Hydraulic pressure.....Check." Item 3 of the "Before taxi" checklist stated "Auxiliary hydraulic system.....Check/off."

A page in the "Emergency Procedures" section of the pilot's checklist manual was entitled "BRAKE FAILURE." This page contained three discrete steps, and three additional notes regarding the system and procedures. The first step contained two items; the auxiliary hydraulic system switch was to be placed in the "ON" position, and then the pilots were to wait until the system pressure "drops to 1,700 psi." The second step was to pull the emergency brake T-handle. The third step stated "Pump pedals approximately 3 to 5 times for braking pressure. If pedals are released completely, they must be pumped again for braking pressures." The third "NOTE" stated in part that "...Emergency braking procedures (pumping action) cannot be accomplished if the opposite set of brake pedals is being depressed."

FAA Examination and Testing

On February 5, 2008, FAA inspectors and a technician from the repair station conducted hydraulic systems examination and testing of the airplane. The airplane had not been operated or powered up since the accident, and the results of the examination and testing were as follows:

The hydraulic reservoir was found to be full and properly serviced. In the cockpit, the battery switches were both "OFF," the guarded hydraulic pump switch was in the "AUTO" position, and the auxiliary hydraulic pump switch was in the "OFF" position. The hydraulic pressure gauges for the "Normal" and "Aux" systems indicated approximately "0" and "2,800" psi, respectively. According to the technician, these readouts were indicative of the system pressures at the time of the accident. The emergency brake handle was pulled up, and had been rotated so that its long axis was parallel to the airplane longitudinal axis.

Electrical power was then applied via the batteries, and an operational check of the hydraulic power system was performed in accordance with steps B (1) through B (4) of the Sabreliner MM NA 69-420, Section 29-10-4. System functionality, including proper hydraulic pressure and pump performance, were satisfactory, with the exception of the warning horn/clacker. The horn/clacker was designed to provide an alert by sounding when the hydraulic switch is in the "OFF" position and the engine master switches are in the "ON" positions. The horn/clacker did not sound during the test. The "Hydraulic Power Off" and the "Master Caution" annunciator lights, designed to illuminate and provide visual warnings of the hydraulic system problems, did function properly.

The nose wheel steering (NWS) system was tested in accordance with MM NA 69-420, Section 32-50-03. The NWS system test results were satisfactory.

The brake system was tested in accordance with MM NA 69-420, Section 34-40-02. The brake system test results were satisfactory. In addition, the brake wear values were determined in accordance with the Goodyear Component Maintenance Manual (CMM) Section 32-43-24, and were found to be within acceptable limits.

History of Flight

Taxi-to runway	Sys/Comp malf/fail (non-power) Ground collision (Defining event)
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Pilot Information

Certificate:	Airline Transport	Age:	34, Male
Airplane Rating(s):	Multi-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 Without Waivers/Limitations	Last Medical Exam:	10/01/2007
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	08/01/2007
Flight Time:	8500 hours (Total, all aircraft), 350 hours (Total, this make and model), 7500 hours (Pilot In Command, all aircraft), 50 hours (Last 90 days, all aircraft), 15 hours (Last 30 days, all aircraft)		

Co-Pilot Information

Certificate:	Airline Transport	Age:	34, 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):	None	Toxicology Performed:	No
Medical Certification:	Class 2 With Waivers/Limitations	Last Medical Exam:	08/01/2007
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	09/01/2007
Flight Time:	14400 hours (Total, all aircraft), 360 hours (Total, this make and model), 13651 hours (Pilot In Command, all aircraft), 2 hours (Last 90 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Manufacturer:	North American Rockwell Corp.	Registration:	N3RP
Model/Series:	NA-265-80	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Normal	Serial Number:	38042
Landing Gear Type:	Tricycle	Seats:	10
Date/Type of Last Inspection:	01/31/2008, Continuous Airworthiness	Certified Max Gross Wt.:	23000 lbs
Time Since Last Inspection:		Engines:	2 Turbo Fan
Airframe Total Time:	5825 Hours	Engine Manufacturer:	General Electric
ELT:	Installed, not activated	Engine Model/Series:	CF700
Registered Owner:	Qualint LLC	Rated Power:	4500 lbs
Operator:	Qualint LLC	Air Carrier Operating Certificate:	None

Meteorological Information and Flight Plan

Observation Facility, Elevation:	FXE, 13 ft msl	Observation Time:	1553 EST
Distance from Accident Site:		Condition of Light:	Day
Direction from Accident Site:		Conditions at Accident Site:	Visual Conditions
Lowest Cloud Condition:	Scattered / 6900 ft agl	Temperature/Dew Point:	27° C / 15° C
Lowest Ceiling:	None	Visibility	10 Miles
Wind Speed/Gusts, Direction:	10 knots, 130°	Visibility (RVR):	
Altimeter Setting:	30.12 inches Hg	Visibility (RVV):	
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Ft. Lauderdale, FL (FXE)	Type of Flight Plan Filed:	IFR
Destination:	Brookesville, FL (BKV)	Type of Clearance:	Unknown
Departure Time:		Type of Airspace:	

Airport Information

Airport:	Fort Lauderdale Executive (FXE)	Runway Surface Type:	
Airport Elevation:	13 ft	Runway Surface Condition:	
Runway Used:	N/A	IFR Approach:	None
Runway Length/Width:		VFR Approach/Landing:	None

Wreckage and Impact Information

Crew Injuries:	2 None	Aircraft Damage:	Substantial
Passenger Injuries:	N/A	Aircraft Fire:	None
Ground Injuries:	1 Minor	Aircraft Explosion:	None
Total Injuries:	1 Minor, 2 None		

Administrative Information

Investigator In Charge (IIC):	Michael C Huhn	Adopted Date:	03/23/2010
Additional Participating Persons:	Michael Spencer; FAA/FSDO; Fort Lauderdale, FL		
Publish Date:	03/25/2010		
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.ntsbt.gov/pubdms/ .		

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