



Aviation Investigation Final Report

Location:	Pittsburgh, Pennsylvania	Accident Number:	ERA22LA150
Date & Time:	March 9, 2022, 08:27 Local	Registration:	N903JT
Aircraft:	Honda Jet HA-420	Aircraft Damage:	Substantial
Defining Event:	Runway excursion	Injuries:	3 None
Flight Conducted Under:	Part 135: Air taxi & commuter - Non-scheduled		

Analysis

At the time of the approach and landing, a Braking Action Advisory was in effect and a field condition NOTAM reported slush on the landing runway. The airplane was flying 11 knots faster than the prescribed approach speed as it descended through 1,000 ft with the engines at idle. The pilots continued the instrument approach and visually acquired the runway environment about 100 ft above ground level. The airplane crossed the runway threshold 9 knots faster than VREF (landing reference speed), and touched down 893 ft past the touchdown zone at a speed that was 3 knots faster than the speed assumed by the airplane flight manual (AFM) landing distances. The airplane began to decelerate; however, the captain called for maximum braking when he detected the deceleration to be insufficient to stop the airplane on the remaining runway. He applied the emergency brake and steered to the left to try to stay on the airport property. The airplane skidded sideways, departed the end of the runway, and travelled tail-first over the edge of a steep incline, which resulted in substantial damage to the wings and fuselage.

When the airplane descended below 1,000 ft on the final approach segment of the flight, the thrust levers were at idle, contrary to the operator’s stabilized approach requirement. The operator’s standard operating procedures required that if an approach became unstabilized below 1,000 ft, the flight crew was to initiate a go-around and missed approach procedure. The crew did not initiate a go-around, but instead continued the approach, which resulted in a fast and long landing. This increased the runway length required to stop from that predicated on a nominal touchdown location.

Further exacerbating the long and fast landing was the captain’s decision during the landing roll to fully engage the emergency brake. Per the AFM, this action would result in the anti-skid feature not operating and would increase the wet runway landing distance by 100%.

Postaccident examination of both main landing gear tires revealed evidence of reverted rubber hydroplaning, consistent with a locked wheel skid. It is likely that the full application of the emergency brake put the airplane into a locked-wheel skid and reduced the braking performance of the tires.

Postaccident examination of the braking system revealed no evidence of any preimpact anomalies or malfunctions that would have precluded normal operation. Performance calculations revealed that the wheel braking friction coefficient achieved during the landing was lower than that implied in the wet runway landing distances recommended by the AFM and specified in the FAA Runway Condition Assessment Matrix (RCAM) guidance for wet runways, consistent with the findings in other wet runway landing overruns investigated by the NTSB. Performance calculations and postaccident simulations of the airplane's stopping performance indicated that even with the longer-than-nominal touchdown point and 3-knot fast airspeed at touchdown, the airplane might have stopped before the end runway had it achieved the wet runway wheel braking friction coefficient implied by the AFM wet runway landing distance recommendation, and would have stopped about 850 ft before the end of the runway had it achieved the wheel braking friction coefficient specified by the RCAM. Conversely, even with the 3-knot fast airspeed at touchdown and the lower friction coefficient actually achieved during the landing roll, the airplane would still have stopped on the runway had it touched down at the nominal touchdown point.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

The flight crew's continuation of an unstable approach, which resulted in a long landing on a contaminated runway. Contributing to the outcome was the captain's full application of the emergency brake, which resulted in hydroplaning and a runway excursion.

Findings

Personnel issues	Decision making/judgment - Flight crew
Aircraft	Airspeed - Not attained/maintained
Aircraft	Powerplant parameters - Not attained/maintained
Aircraft	Surface speed/braking - Capability exceeded
Environmental issues	Snow/slush/ice covered surface - Effect on operation

Factual Information

History of Flight

Landing	Runway excursion (Defining event)
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On March 9, 2022, about 0827 eastern daylight time, a Honda Jet HA-420, N903JT, was substantially damaged when it was involved in an accident near Pittsburgh, Pennsylvania. The two pilots and one passenger were not injured. The airplane was operated by Jet It, LLC as a Title 14 *Code of Federal Regulations* Part 135 air taxi flight.

According to the flight crew, they checked the weather prior to departure from Teterboro Airport (TEB), Teterboro, New Jersey, which included an advisory for potential winter weather conditions upon landing at Allegheny County Airport (AGC), Pittsburgh, Pennsylvania. They discussed weather conditions and alternates, loaded the maximum amount of fuel permitted by the landing requirements of the operator's Eligible-On-Demand operations specifications, and subsequently departed around 0720.

The captain stated that he monitored ATIS once in range of AGC and did not recall hearing any remarks pertaining to runway braking action or surface contamination reports, although he noted remarks about contamination on taxiways and ramp areas. Subsequently, he checked in with the approach controller and was advised that snowplows were on the runway. The captain reported that he believed that the airport was "taking care of the runway in the light snow" and "never anticipated runway contamination." The flight crew conducted their landing distance calculations with a wet runway factor. The first officer flew the ILS approach to runway 28 with the autopilot engaged, noting that the thrust levers were near idle during the final approach segment. The captain visually acquired the runway environment upon reaching decision altitude and the first officer continued the approach. The captain acquired the runway about 100 ft above ground level, noticing the runway shoulders were obscured by snow, and the center line was visible.

The first officer disconnected the autopilot and continued the landing. The captain recalled feeling "faster than normal." The airplane began to decelerate; however, the captain called for maximum braking when he detected the deceleration to be insufficient to stop the airplane on the remaining runway. He applied the emergency brake and steered to the left to try to stay on the airport property. The airplane skidded sideways, departed the end of the runway, and travelled tail-first over the edge of a steep incline.

The airplane came to rest in trees about 143 ft past the runway end, and 91 ft to the left of the runway centerline. The pilots and passenger evacuated out the main cabin door.

Review of flight data recorder data revealed that the airplane crossed the runway threshold at a true airspeed of about 131 kts and touched down 2,300 ft from the threshold of the 6,501 ft runway.

Check pilot Information

Certificate:	Airline transport; Commercial	Age:	32, Male
Airplane Rating(s):	Single-engine land; Multi-engine land	Seat Occupied:	Right
Other Aircraft Rating(s):	None	Restraint Used:	4-point
Instrument Rating(s):	Airplane	Second Pilot Present:	Yes
Instructor Rating(s):	None	Toxicology Performed:	
Medical Certification:	Class 1 With waivers/limitations	Last FAA Medical Exam:	November 1, 2021
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	January 29, 2022
Flight Time:	2023 hours (Total, all aircraft), 1437 hours (Total, this make and model), 1088 hours (Pilot In Command, all aircraft), 237 hours (Last 90 days, all aircraft), 116 hours (Last 30 days, all aircraft), 6 hours (Last 24 hours, all aircraft)		

Pilot Information

Certificate:	Airline transport; Private	Age:	30, Male
Airplane Rating(s):	Single-engine land; Multi-engine land	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	4-point
Instrument Rating(s):	Airplane	Second Pilot Present:	Yes
Instructor Rating(s):	None	Toxicology Performed:	
Medical Certification:	Class 1 With waivers/limitations	Last FAA Medical Exam:	November 23, 2021
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	February 10, 2022
Flight Time:	7959 hours (Total, all aircraft), 40 hours (Total, this make and model), 5522 hours (Pilot In Command, all aircraft), 40 hours (Last 90 days, all aircraft), 40 hours (Last 30 days, all aircraft), 5 hours (Last 24 hours, all aircraft)		

Passenger Information

Certificate:	Age:	Male
Airplane Rating(s):	Seat Occupied:	Rear
Other Aircraft Rating(s):	Restraint Used:	
Instrument Rating(s):	Second Pilot Present:	Yes
Instructor Rating(s):	Toxicology Performed:	
Medical Certification:	Last FAA Medical Exam:	
Occupational Pilot:	Last Flight Review or Equivalent:	
Flight Time:		

Captain

The captain, who was qualified to act as a training captain, was flying with the first officer on day 6 of the first officer's Initial Operating Experience, during which the first officer was the pilot-flying.

He stated that the preflight and flight were normal, with no malfunctions or anomalies noted that would have precluded normal operation.

He further reported that on approach into AGC, he listened to ATIS and recalled hearing that there was slush on taxiway and ramp and that a previous landing pilot reported landing condition good, and that they flew the approach "assuming the runway was only wet since there were no other reports other than light snow."

First Officer

The first officer received his type certificate on the airplane on February 10, 2022, and had accrued 34 hours in the airplane at the time of the accident.

During the preflight planning, he added as much fuel as the performance calculations allowed given the forecasted weather and determined that they required 5,800 ft runway length for landing in AGC.

Aircraft and Owner/Operator Information

Aircraft Make:	Honda Jet	Registration:	N903JT
Model/Series:	HA-420	Aircraft Category:	Airplane
Year of Manufacture:	2021	Amateur Built:	
Airworthiness Certificate:	Normal	Serial Number:	42000224
Landing Gear Type:	Retractable - Tricycle	Seats:	8
Date/Type of Last Inspection:	Unknown	Certified Max Gross Wt.:	10900 lbs
Time Since Last Inspection:		Engines:	2 Turbo fan
Airframe Total Time:	110.9 Hrs at time of accident	Engine Manufacturer:	GE Honda
ELT:	C126 installed, not activated	Engine Model/Series:	HF-120
Registered Owner:	Jet It LLC	Rated Power:	2050 Lbs thrust
Operator:	Jet It LLC	Operating Certificate(s) Held:	On-demand air taxi (135)

The HondaJet HA-420 was a light business jet manufactured by the Honda Aircraft Company. The accident airplane was configured for 2 pilots and 5 passengers, and had a maximum takeoff weight of 10,900 lbs. The airplane was equipped with tailcone-mounted speed brakes.

According to the HondaJet HA-420 AFM, the prescribed landing configuration required using "Flaps TO/APPR for landing whenever the aircraft cannot be confirmed clear of ice or if icing conditions may be encountered during approach and landing."

Landing Distance

The HA-420 AFM did not include, nor was it required to include, landing distance tables on other than dry runways, but it did include the following note: "The landing field length provided is based on a dry runway. If landing on a wet runway, it is recommended to increase the predicted landing field length by 30%."

The landing distances published in the AFM were based on several assumptions about touchdown speed and location. Among these factors were that the touchdown airspeed would be about 95% of VREF, and that the touchdown would occur within about 1,400 ft of the runway threshold.

Emergency Brake

The HA-420 AFM emergency checklist for a failure of the airplane's normal braking system cautioned that when utilizing the emergency brake, the anti-skid system would not operate. It also noted that landing distances would increase by 50% on a dry runway and 100% on a wet runway.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument (IMC)	Condition of Light:	Day
Observation Facility, Elevation:	KAGC, 1273 ft msl	Distance from Accident Site:	1 Nautical Miles
Observation Time:	08:15 Local	Direction from Accident Site:	87°
Lowest Cloud Condition:		Visibility	0.5 miles
Lowest Ceiling:	Overcast / 400 ft AGL	Visibility (RVR):	
Wind Speed/Gusts:	3 knots / None	Turbulence Type Forecast/Actual:	Unknown / Unknown
Wind Direction:	340°	Turbulence Severity Forecast/Actual:	Unknown / Unknown
Altimeter Setting:	29.88 inches Hg	Temperature/Dew Point:	1°C / -1°C
Precipitation and Obscuration:	Moderate - None - Fog		
Departure Point:	Teterboro, NJ (TEB)	Type of Flight Plan Filed:	IFR
Destination:	Pittsburgh, PA	Type of Clearance:	IFR
Departure Time:	07:13 Local	Type of Airspace:	Class D

Weather conditions at the time of the accident included ½ statute mile visibility, light snow, and an overcast ceiling at 400 ft. The current airport ATIS included a Braking Action Advisory with a braking action report of “good” by a Pilatus at 0755 and a field condition NOTAM reporting 10% runway coverage with 1/8-inch slush on the landing runway.

An airport surveillance video showed the airplane during its landing roll in weather conditions that were consistent with those reported in Meteorological Terminal Air Reports and field condition reports.

Airport Information

Airport:	ALLEGHENY COUNTY AGC	Runway Surface Type:	Concrete
Airport Elevation:	1251 ft msl	Runway Surface Condition:	Slush covered; Wet
Runway Used:	28	IFR Approach:	ILS
Runway Length/Width:	6501 ft / 150 ft	VFR Approach/Landing:	None

The Chart Supplement listed AGC runway 28 as grooved concrete, 6,501 ft long and 150 ft wide, at an elevation of 1,250 ft and with no gradient noted.

The runway was situated on a flat plateau, and the terrain dropped off steeply about 100 ft past the west end of runway 28.

Wreckage and Impact Information

Crew Injuries:	2 None	Aircraft Damage:	Substantial
Passenger Injuries:	1 None	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	3 None	Latitude, Longitude:	40.354284,-79.941631

Upon recovery, the airplane was examined by representatives of the airframe and engine manufacturers under the supervision of a Federal Aviation Administration (FAA) inspector. Examination of the airplane revealed substantial damage to the fuselage and wings. The center fuel tank was ruptured. The right inboard flap mount had torn through the wing skin. The right aileron sustained damage on both the leading and trailing edges. Both main landing gear tires were shredded, consistent with reverted rubber hydroplaning, and the emergency brake was in the ON position.

Postaccident examination and functional testing of the brake system bleed, the parking brake, the power brake, hydraulic pressure at the brakes, the anti-skid valve and the anti-skid brake system revealed no failures or anomalies.

Additional Information

Aircraft Performance Study

The planned landing weight for the flight was 9,632 lbs, and the corresponding flaps TO/APP VREF was 122 knots.

The operator's Standard Operating Procedures stated that, "For windshear avoidance and safety, crews should calculate and fly a VAPP [prescribed approach speed] speed to fly on final

approach. This will be calculated as: $VAPP = VREF + \frac{1}{2} \text{ Headwind factor} + \text{ Gust factor}$, not to exceed a total correction of 20 knots.”

For the accident flight, the winds were relatively calm, and VAPP was computed as $VREF + 5$ knots, or $122 \text{ knots} + 5 \text{ kts} = 127 \text{ knots}$, which coincided with the “selected airspeed” recorded by the airplane’s flight data recorder.

The airplane was flying about 11 knots faster than VAPP as it descended through 1,000 ft above the touchdown zone (ATZ) in instrument meteorological conditions. This speed was within the operator’s stabilized approach criterion that below 1,000 ft ATZ the speed should not exceed $VAPP + 10/-5$ knots “momentary deviations excepted.” However, as the airplane descended below 1,000 ft ATZ, the thrust levers and engine N1 speeds were at idle, contrary to the operator’s stabilized approach requirement that below 1,000 ft TDZ, the “power setting is appropriate for the aircraft configuration and is not at idle power.” The operator’s Standard Operating Procedures stated that, “if an approach becomes unstabilized ... the crew will initiate a go-around and missed approach.”

The airplane crossed the runway threshold at a true airspeed of about 131 knots, 9 knots faster than VREF, and touched down 2,300 ft from the threshold, or 893 ft past the touchdown zone assumed in the AFM landing distances. The airplane used the additional air distance to bleed off this excessive speed, which resulted in the touchdown speed 3 knots above the assumptions in the AFM performance calculations.

Performance calculations demonstrated that the braking performance achieved during the landing, as indicated by the achieved wheel braking friction coefficient, was lower than that underlying the recommendation in the AFM to increase the dry runway landing distance by 30% on wet runways. The achieved wheel braking friction coefficient was also lower than that specified for wet runways in the RCAM guidance contained within FAA AC 25-32. The finding that the achieved friction coefficient was lower than that implied in the AFM and in the RCAM is consistent with similar findings in other NTSB wet runway overrun investigations including DCA08MA085, DCA11IA047, CEN14FA505, CEN15LA057, and DCA19MA143.

The performance calculations also indicated that even with the longer-than-nominal touchdown point and 3-knot fast touchdown airspeed, the accident airplane might have stopped before the end of the runway had it achieved the wet runway wheel braking friction coefficient implied by the airframe manufacturer’s AFM recommendation to increase dry runway landing distance by 30%. Postaccident simulations of the accident airplane’s stopping performance indicated that the airplane would have stopped about 850 ft before the end of the runway had it achieved the wheel braking friction coefficient specified by the RCAM. Conversely, even with the 3-knot fast airspeed at touchdown and the lower friction coefficient actually achieved during the landing roll, the airplane would still have stopped on the runway had it touched down at the nominal touchdown point.

Contaminated Runway and Dynamic Hydroplaning

According to the Aeronautical Information Manual Pilot/Controller Glossary, a contaminated runway, "is considered contaminated whenever standing water, ice, snow, slush, frost in any form, heavy rubber or other substances are present."

Administrative Information

Investigator In Charge (IIC):	Spencer, Lynn
Additional Participating Persons:	Gerald Labuskes; FAA/FSDO; Pittsburgh, PA Thomas Sully; Honda Aircraft Company; Greensboro, NC Neil Rose; Jet It, LLC; Greensboro, NC Jeremy Sturdy; Crane Aerospace & Electronics; Burbank, CA
Original Publish Date:	March 20, 2024
Last Revision Date:	
Investigation Class:	Class 3
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.nts.gov/Docket?ProjectID=104756

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