CEN20FA110

NTSB Airframe and Engine Examination Report

The airplane impacted the southbound lanes of the interchange of I-55 and state routes 10 and 121 in Lincoln, Illinois, on March 3, 2020. The wreckage was located south on I-55, by mile marker 126. A postimpact fire ensued and fire fighters utilized water to extinguish the fire. The airplane was destroyed. The three occupants sustained fatal injuries. There were no injuries to any personnel on the ground.

A Federal Aviation Administration aviation safety inspector responded to the accident site to conduct onsite documentation activities on March 3, 2020. The accident site consisted of asphalt and the airplane came to rest on a heading of about 280° (magnetic). The accident site elevation was about 566 feet above mean sea level. No obstacles in the vicinity of the accident site appeared to be struck from the airplane. The airplane impacted the terrain in a nose-down attitude. All components of the airframe and engine were located at the accident site. Google Earth diagrams of the accident site are attached to this report.

The wreckage was recovered from the accident site and transported to a secure location at the Logan County Airport (AAA), Lincoln, Illinois, for an examination of the airframe and engine. An NTSB air safety investigator, a Federal Aviation Administration aviation safety inspector, and air safety investigators from Textron Aviation and Lycoming Engines traveled to AAA on March 4, 2020 for the airframe and engine examination.

Airframe (N157SF, Cessna 172S, Serial Number 172S11265)

The airplane was consumed by the postimpact fire. The engine and firewall were displaced towards the cockpit, reducing cabin volume. Both wings were observed with hydrostatic deformation and leading-edge crush damage throughout the length of the wings. All four corners of the airplane were identified.

All flight control surfaces were observed. Flight control cable continuity was established from the control surfaces to the cockpit through several cable cuts that were facilitated for the wreckage recovery. The flaps were between 0º and 10º. The flap handle and indicator were both fire damaged, however, the flap actuator was found at 1.75”. The elevator trim was in the 10º tab up position. The elevator surface was fire damaged. The trim cable chain was around the sprocket and continuous. The trim indicator was fire damaged.

The fuel selector handle was fire damaged in the both position. The fuel selector valve was removed, examined, and found to be in the both position. Both fuel tanks were fire damaged. No fuel no samples were obtained. The fuel strainer screen and fuel strainer bowl were both clean. The fuel boost pump was destroyed from the postimpact fire.

Restraint System Information						
Seat	Occupied	Restraint type	Restraint Used	Condition	Manufacturer	
1	Yes	3-Point airbag	Yes	Fire Damage	Cessna	
	Yes	3-Point airbag	Undt	Fire Damage	Cessna	
	Yes	3-Point airbag	Undt	Fire Damage	Cessna	
		3-Point airbag	Undt	Fire Damage	Cessna	

Seat Condition Information					
Seat	Orientation	Feet intact	Back intact	Base intact	Rail intact
1	Forward facing	Partially	No	Partially	Partially
2	Forward facing	Partially	No	Partially	Partially
3	Forward facing	Partially	Partially	Partially	Not applicable
4	Forward facing	Partially	Partially	Partially	Not applicable

No environmental system controls information was recorded due to the postimpact fire damage. The emergency locator transmitter (ACR Artex, ME-406, serial number 197-13882) was destroyed by the postimpact fire.

The positions of the navigation instruments, communication/navigation radios, electrical switch positions, light switch positions, and the ignition switch positions were not determined due to the postimpact fire damage. The airplane recording hour meter was destroyed by the postimpact fire.

The airplane was equipped with a Garmin G1000 all-glass avionics suite and a stall warning system. The airplane was also equipped with a GFC 700 autopilot system.

The engine instruments and engine control positions were not determined due to the postimpact fire damage.

No signs of bird remains or a bird strike were observed in the wreckage.

The airframe hours at the last annual inspection on November 18, 2019, was 1765.1 hours.

No mechanical malfunctions or failures were observed with the airframe.

Engine (Lycoming Engines IO-360-L2A, Serial Number L-35898-51E)

The engine was fire and impact damaged. The exhaust and induction tubing were partially crushed. The oil sump was impact fragmented. The crankshaft (Lycoming serial number V537963449) was fractured at the oil passages about 3 inches aft of the propeller flange. The propeller and crankshaft flange were

separated from the engine and found among the wreckage at the accident site. The upper front portion of the nose of the crankcase was impact fragmented and separated from the engine, leaving the forward portion of the front main bearing shells exposed. All the engine accessories were impact and fire damaged.

The engine was removed from the wreckage, suspended from an overhead lift, and partially disassembled. Impact damage prevented rotation of the engine by hand and it was further disassembled. The accessory case and cylinders were removed, and the crankcase halves separated. The crankshaft was observed bent upward at the #1 and #2 rod journals. The #1 and #2 rods remained attached to the crankshaft but could not be moved due to crankshaft bending. The #3 and #4 rods could be rotated freely on their rod journals, and no damage was noted. The camshaft was removed, and no damage was noted. The interiors of the cylinders were observed, and no damage noted to the pistons or valves.

The fuel injector servo (Precision model RSA-5AD1, serial number 70EF5109) was impact and fire damaged and was found separated from the engine. The throttle and mixture controls were impact damaged and separated. The fuel regulator section rubber diaphragms were burned. No debris was observed inside the fuel injector servo fuel inlet screen. The fuel flow divider (Precision part number 2576564-1) remained attached to the engine and was fire damaged. The rubber diaphragm was burned. The fuel injector nozzles were unobstructed. The engine driven fuel pump (Lycoming part number LW-15173, serial number H3112) was impact fragmented and fire damaged.

Both magnetos (Slick model 4371 – left side part and serial number unreadable, right side part number 66GC20SFNN and serial number unreadable) were impact fragmented and fire damaged.

The #2 top sparkplug was impact damaged. All the sparkplug electrodes exhibited gray coloration and undamaged, worn, normal condition, per the Champion Aviation Check-A-Plug Card, AV-27. All the sparkplugs were Champion REM38E models.

The ignition harness was fire destroyed.

The starter was impact fragmented and separated from the engine.

The vacuum pump remained partially attached to the engine and was impact and fire damaged. The composite drive was intact but was partially melted. The carbon rotor was fractured, and the carbon vanes were intact.

Oil was observed on internal engine parts. The oil sump was impact fragmented. The oil suction screen was fire damaged and laying among the recovered wreckage. The oil filter was crushed. The oil cooler was impact damaged.

The engine hours at the last annual inspection on November 18, 2019, was 1765.1 hours. A review of the engine maintenance records did show any information that the engine was overhauled in its operational history.

No mechanical malfunctions or failures were observed with the engine.

Propeller (McCauley, Part Number 1A170E JHA7660, Serial Number AGK47001)

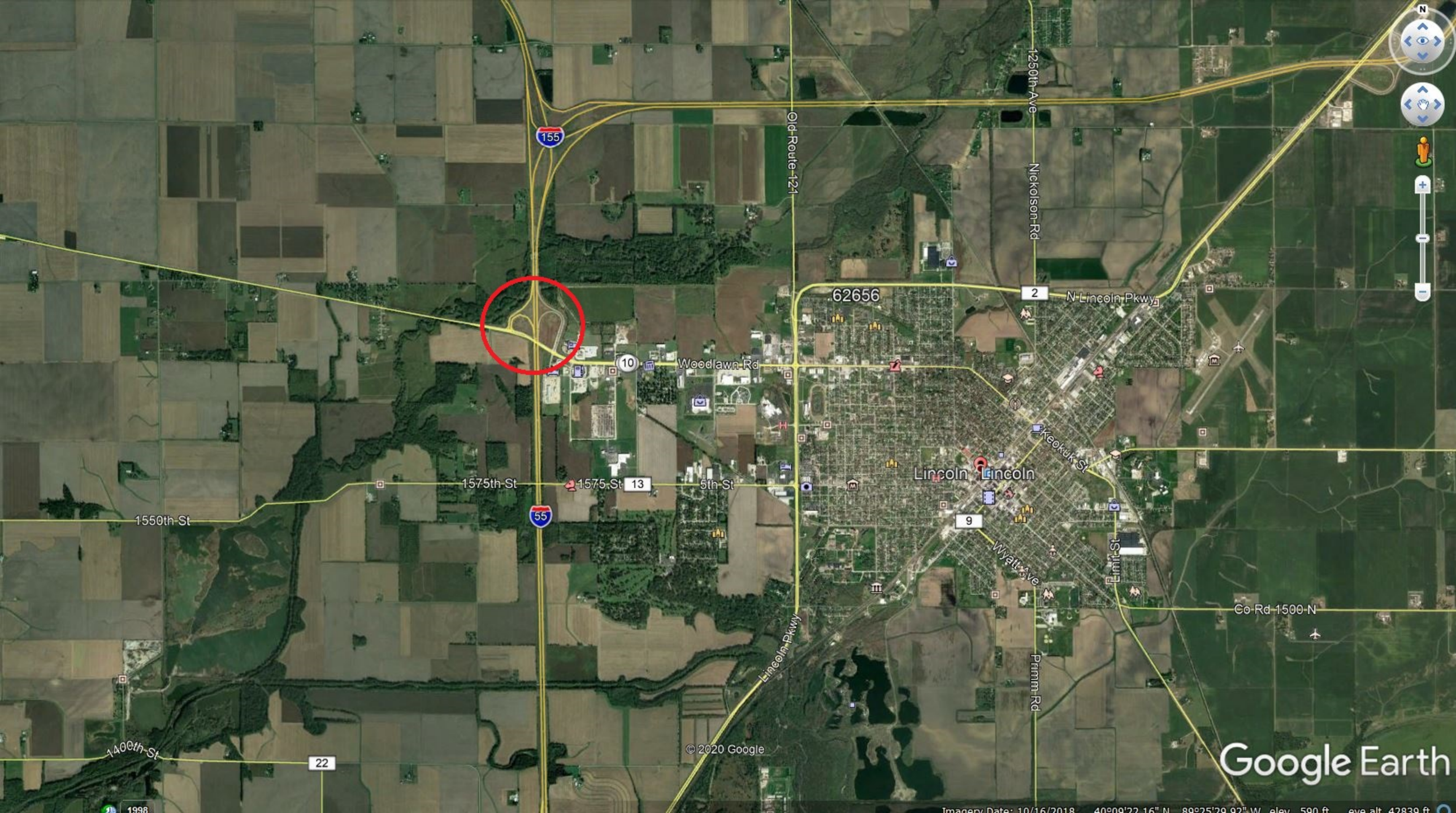
The metal propeller and the front portion of the crankshaft were impact separated from the engine and found among the wreckage at the accident site. The spinner was impact fragmented. One propeller blade exhibited leading edge gouges and longitudinal twisting. The other blade was curved aft slightly. One side of the propeller hub exhibited impact damage.

The propeller hours at the last annual inspection on November 18, 2019, was 1765.1 hours.

No mechanical malfunctions or failures were observed with the propeller.

Maintenance Records

A review of the airplane's maintenance records revealed no evidence of any uncorrected mechanical discrepancies with the airframe and engine.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