AIRPLANE EXAMINATION

NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety

Western Pacific Region

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This document contains 13 embedded photos.

(13 Pages)

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Apple Valley, California

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Aero Vodochody – N39AY

National Transportation Safety Board

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Tail Section

The airplane was equipped with flap trim located on the left elevator and an elevator trim tab on the right elevator. According to the manufacturer, the flap trim deflects with the flaps to compensate for aerodynamic ballooning during landing. The flap trim will not display a deflection when the flaps move between the neutral and 25° positions. The elevators were cut one inch outboard of the flap trip and elevator trim tabs in preparation for recovery. Both the elevator and flap trim were in the neutral position (see *photograph 1*); however, the manufacturer reported that a takeoff can be accomplished with elevator trim in either the neutral or takeoff "2 tick mark down" position. The flap and elevator trim surfaces could not be manipulated by hand.

The elevator bearings appeared to be lubricated and the hinges did not display any signs of deformation.

Continuity of the elevator and flap trim linkages were confirmed from their respective tail section control tubes to both trim tabs. A 24 volt battery was connected to the pins of the cannon plug near wire bundle V50 to test the elevator trim motor; however, a suspected short in the wiring between the cannon plug and the elevator trim motor precluded a successful test of the elevator trim tab. The flap trim motor was not tested.

The tailpipe mounting ring displayed deformation and had separated from the tail.

Empennage

Two control tubes from the elevator and rudder assembly were recovered from the wreckage. The steel control tube normally suspended over the engine was thermally damaged, but remained intact with a slight bend (see *photograph 2*). The aluminum control tube separated from the elevator/rudder bellcrank and fractured into 5 pieces that displayed signatures consistent with overload separation (see *photograph 3*).

Center Fuselage

The air conditioning unit and most of its assembly, hydraulic bay, low pressure fuel boost pump, and several steel tube bleed lines were recovered from the accident site. The hydraulic tank was breached and the hydraulic bay was melted; some of which was fused to the center fuselage airframe skin. The low pressure fuel boost pump, normally attached to the main tank, was thermally damaged and the screen was partially separated, but did not contain any debris (see *photograph 4*). Examination of the smoke oil tank used to distribute white smoke during aerobatic flights revealed no evidence of a tank breach; however, the unit was void of any oil. Several bleed air tubes exhibited thermal damage and exposure to high temperatures as evidenced by pieces of molten aluminum that were attached to the threaded ends of many of the tubes. Several components of the air conditioning assembly including the condenser, filter, turbo cooler, overpressure relief valve, and assembly tubes were damaged by fire, but did not display any evidence of deformation.

Wings

The bottom half the left aileron with its corresponding trim tab and the bottom half of the right aileron were damaged by fire. The left aileron trim tab separated at the rod end from the aileron hinge, but remained connected to a push pull tube. The left aileron turn buckles were intact; however, the control tubes had separated (see *photograph 5*). The left wing tip tank exhibited significant vertical crush damage indicated by its accordion-like appearance and the containment tank was breached. The left aileron steel and lead balances remained attached to the airfoil. The

main aileron bell crank was intact, but also separated from its control tubes. The inboard and outboard right wing flap tracks had separated from the wing, but portions of the flaps remained attached to their respective tracks, which indicated a 25° deployed (takeoff) position (see *photograph 6*). The right aileron turnbuckle was attached to a portion of the wing through a bearing (see *photograph 7*). The right aileron leading edge steel balance bar was thermally damaged, but remained connected to a portion of airframe skin. The right main landing gear uplock assembly was intact, but thermally damaged. The left landing gear door bell-crank was intact. The right wing pitot tube was intact, but the hoses were impacted separated at the tube root.

Cockpit

The front seat occupant throttle lever was located in the full forward position beyond the detent and fixed (see *photograph 8*). The rear seat occupant throttle had broken free of the fuselage structure and could be manipulated by hand, which precluded an evaluation of the lever position (see *photograph 9*). The front seat occupant's rudder pedal assembly remained intact and had been adjusted to the forward position; however, the left rudder pedal was bent approximately 50° forward and the right rudder pedal was bent about 25° forward (see *photograph 10*). Both control tubes separated from the pedals and bell crank mounts. The rear seat occupant's rudder assembly was also intact; the control tubes remained attached and the rudder pedal mounting tubes were straight (see *photograph 11*). The rudder assembly was in the aft position.

The front seat passenger fuel cutoff remained attached to the left side cockpit fuselage. The fuel lever was in the full aft position (closed) and bent about 10° (see *photograph 12*). The fuel lever was in the full aft position (closed) and the protective gate that prevents inadvertent manipulation of the fuel cutoff remained attached to the fuel lever assembly. Both the lever and the gate were bent to the side about 10° by impact forces (see *photograph 12*).

Instruments

Fuel quantity: 725 kg
EGT: below 0° C
Vibration indicator: 20-25 mm/sec.
Pitch trim indicator: thermally damaged/needle broken
Fuel flow indicator: Unreadable
Oil pressure: Unreadable
Oil temperature: Unreadable
N_1/N_2 rpm gauge: N_1 38%, N_2 34%

Accident Flight Photo

A photograph taken by an observer revealed that the flaps were deployed during takeoff (see *photograph 13*).

Photograph 1: Flap and pitch trim tabs

Photograph 2: Elevator/rudder steel control tube

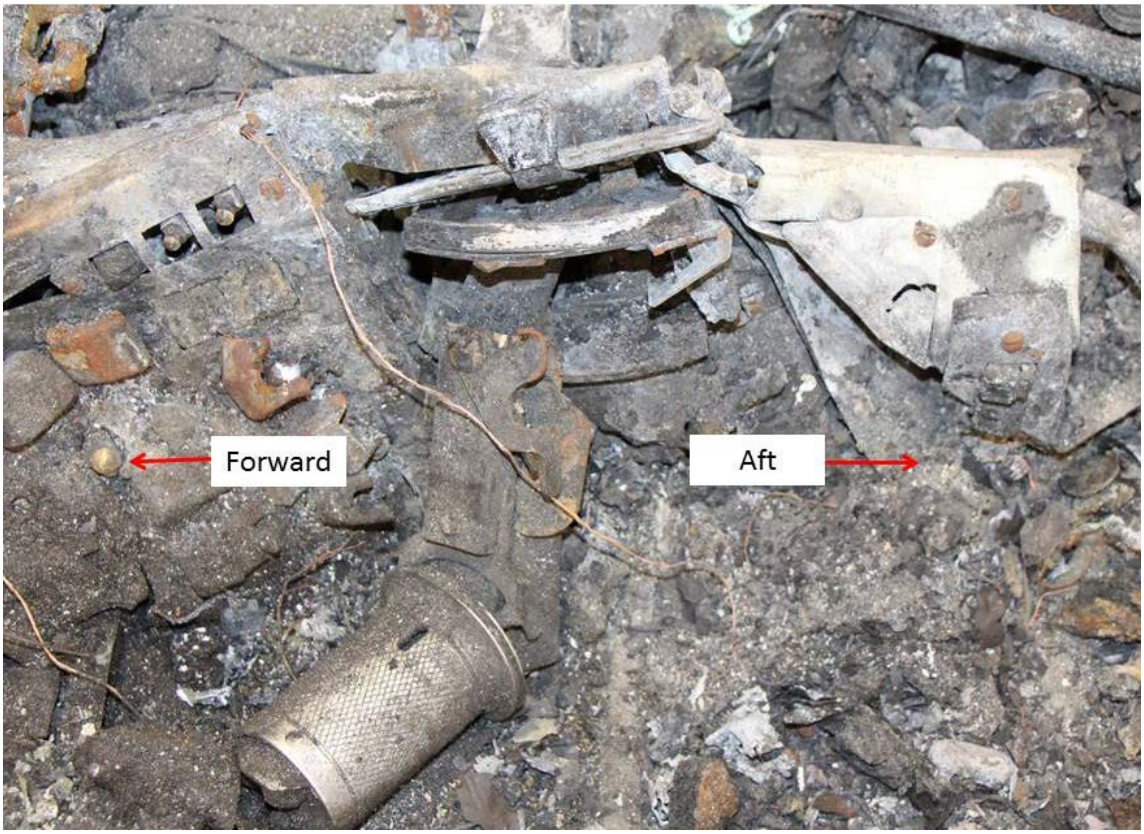
Photograph 3: Elevator/rudder aluminum control tube

Photograph 4: Low pressure fuel boost pump

Photograph 5: Left aileron turnbuckle

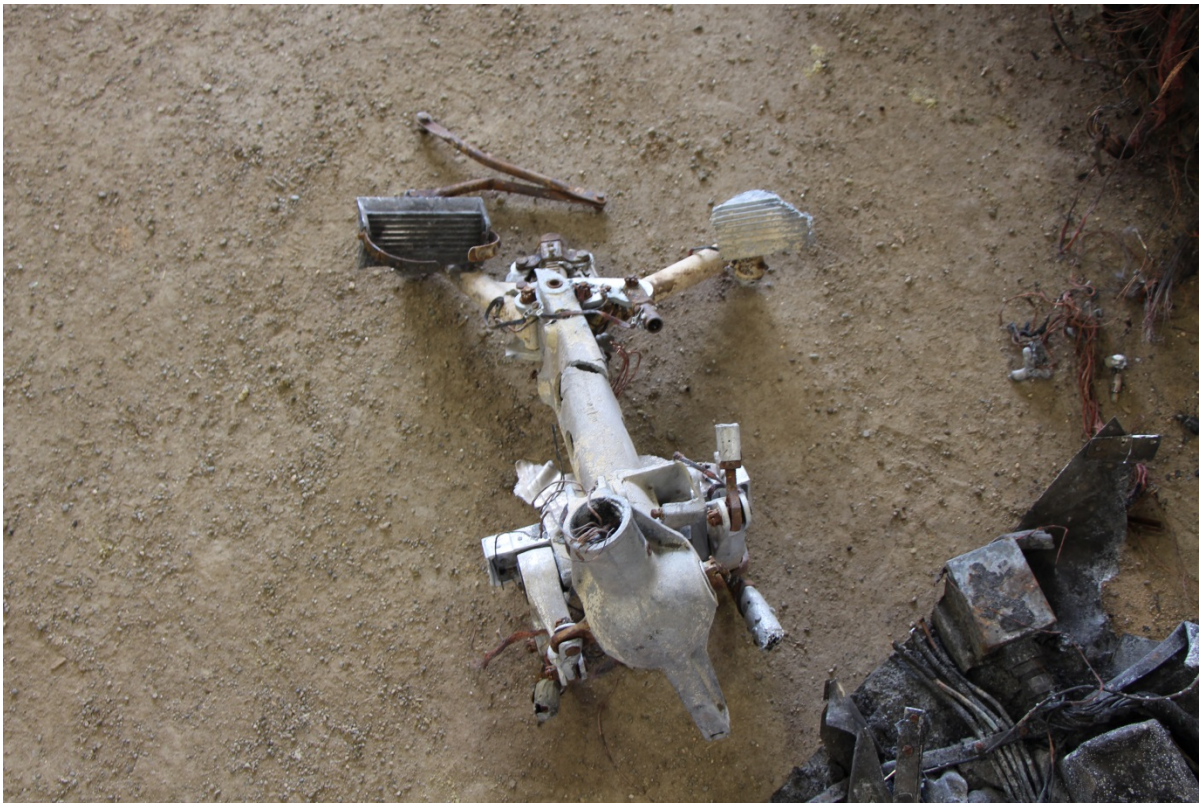
Photograph 6: Right wing flap track

Photograph 7: Right aileron turnbuckle

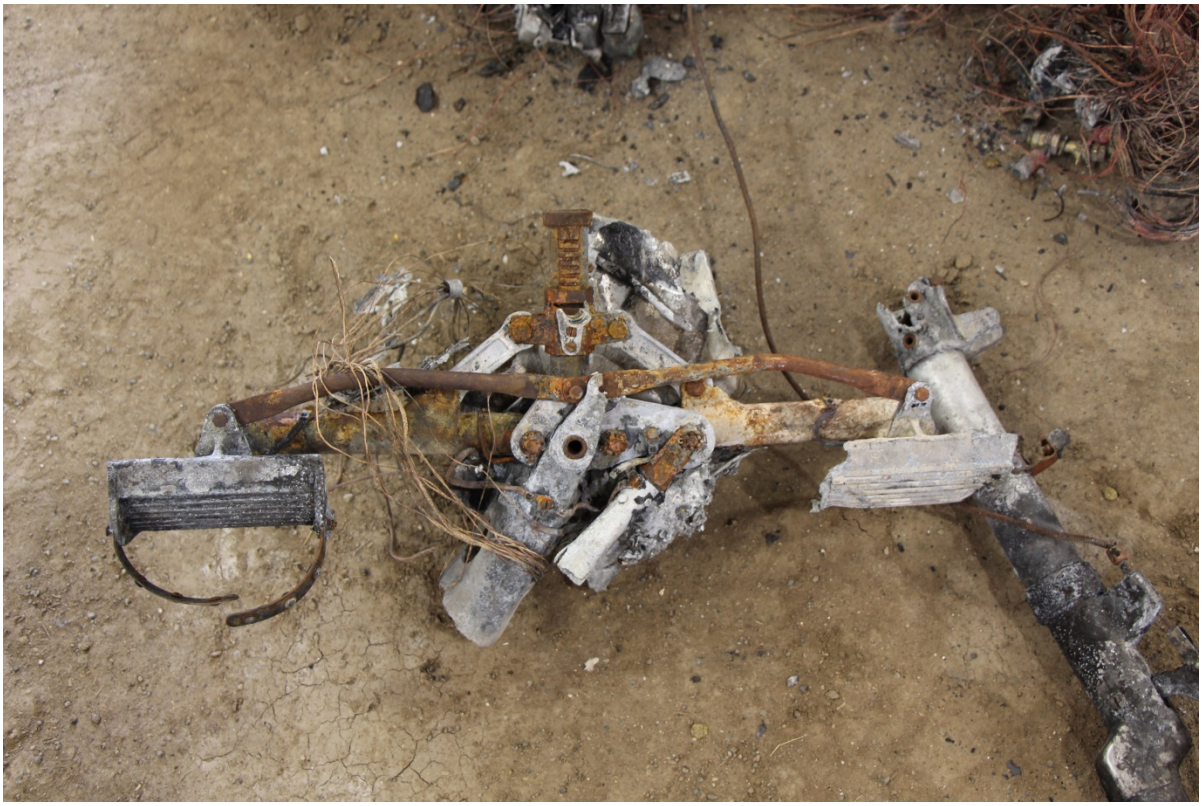


Photograph 8: Front seat occupant throttle

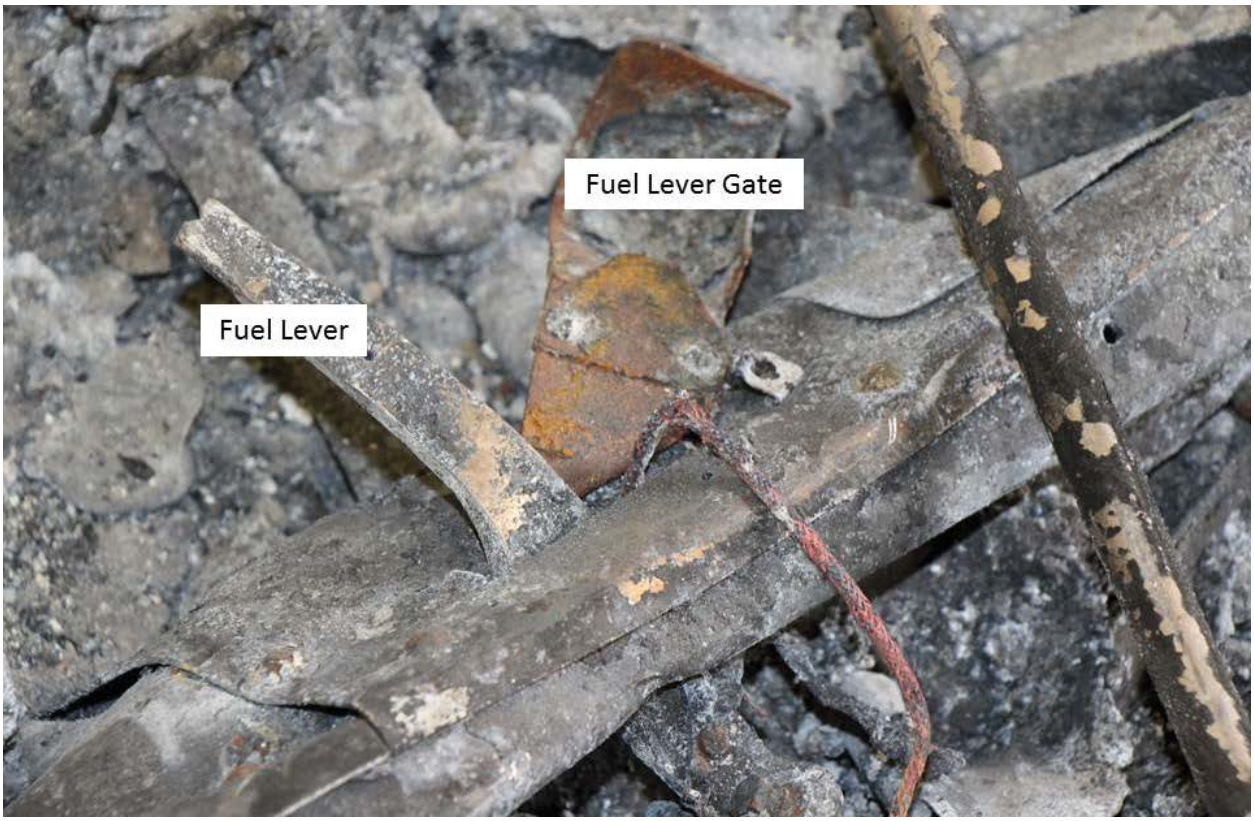

Photograph 9: Rear seat occupant throttle



Photograph 10: Front seat occupant rudder assembly



Photograph 11: Rear seat occupant rudder assembly



Photograph 12: Fuel cutoff lever and protective gate

Photograph 13: Airplane during takeoff