



NATIONAL TRANSPORTATION SAFETY BOARD

**Office of Aviation Safety
Western Pacific Region**

SITE and ON-SCENE INFORMATION

**NTSB Accident: WPR18FA035
Accident Date: November 19, 2017**

Examination Dates: November 20-21, 2017

This document contains 53 embedded images

A. ACCIDENT

Location: Tehachapi, California
Date: November 19, 2017
Aircraft: Cessna 152, N24987, Serial # 15280496
NTSB IIC: Michael Huhn

B. EXAMINATION PARTICIPANTS:

Michael Huhn
Air Safety Investigator
National Transportation Safety Board
Western Pacific Region

Frank L. Motter
Airworthiness Inspector
Federal Aviation Administration
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Air Safety Investigator
Textron Aviation
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Avionics Inspector
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C. SUMMARY

On November 19, 2017, about 1756 Pacific standard time, a Cessna 152, N24987, was destroyed when it impacted terrain shortly after takeoff from Tehachapi Municipal Airport (TSP), Tehachapi, California. The private pilot received fatal injuries. The personal flight was conducted under the provisions of Title 14 Code of Federal Regulations Part 91. Night visual meteorological conditions prevailed.

All components were accounted for at the accident site. No evidence consistent with in-flight fire or in-flight structural failure was observed.

D. RESPONSE and SITE LOCATION INFORMATION

1.0 Response

- The accident occurred about 1758 PST 11/19/17
- First responders arrived on scene very shortly thereafter
- The pilot was removed from the scene the evening of 11/19/17
- FAA representatives arrived about 0930 11/20/17
- NTSB representative arrived about 1030 11/20/17
- Textron Aviation representative arrived about 0800 11/21/17

2.0 Wreckage Location & General Description

- The wreckage was situated in a ranch pasture just north Hwy 58, which was just north of TSP
- The terrain was very hard-packed dry earth, flat and level, with mostly dried grass and about 15% low dried shrubs
- The initial impact point was located about 350 feet west-northwest of, and offset about 2,050 feet north-northwest of, the runway 11 threshold.
- The main wreckage came to rest about 250 feet, on a bearing of 138° true, from the initial impact point.
- The main wreckage consisted of the engine, wings, empennage, and most of the fuselage
- Several items, including the propeller, some engine accessories, and some fuselage fragments, formed a debris field between the initial impact point and the main wreckage
- Several high-density items such as the battery and the alternator core came to rest several hundred feet beyond the main wreckage.
- There was no fire

3.0 Ground Scar & Debris Field Information

- Ground scars were consistent with the airplane striking the ground in a nose and right wing low attitude
- The right wingtip strike was beginning of the ground scars
 - The earliest identifiable piece of wreckage was an outboard fragment of the right aileron
- A ground scar consistent with the RMLG was located about 20 feet beyond the right wingtip strike
- The nose impact (NLG and/or propeller) was situated about 10 feet beyond the RMLG strike
- The ground scars and airplane damage were consistent with the wreckage tumbling and sliding
- About 26 key components in the debris field were mapped to enable development of a wreckage/debris field diagram (documented separately)



Figure 1 - Outboard Fragment of Right Aileron



Figure 2 - View Towards Wreckage from Initial Impact Point



Figure 3 - Gouge Near Initial Impact Point



Figure 4 - Initial Ground Scars (reverse view)



Figure 5 - Ground Scars and Main Wreckage

E. WRECKAGE INFORMATION

1.0 General, Aero Surfaces, and Flight Controls

- The aft fuselage was inverted, with the aft direction of the longitudinal axis oriented on a magnetic heading of about 150°
- The vertical and horizontal stabilizers remained attached to the aft fuselage
 - All 3 stabilizers retained their aerodynamic control surfaces
 - The pitch trim tab remained attached to the R horizontal stabilizer
 - All 4 control surfaces were relatively undamaged
- The two wings remained in their approximate relative location and orientation with respect to one another,

- The wings came to rest approximately leading edge (LE) down, with the lateral axis oriented along a magnetic line of about 120°/300°
- Both wings exhibited full-span, aft-direction crush damage along their LEs; the damage was more significant outboard of each wing's lift strut attach point
- Both lift struts remained attached to their respective wings, but separated from the fuselage
- Both wings retained their respective fuel tank caps
 - The left tank cap gasket was in good condition and flexible
 - The right tank cap gasket was in fair condition with slight brittleness and some minor cracking
- Flaps
 - Both flaps remained fully attached to their respective wings; the flaps were relatively undamaged, and appeared to be in the fully retracted position
 - Examination of the flap actuator indicated that the flaps were in the retracted position at impact
- Ailerons
 - Both ailerons remained attached to their respective wings. The left aileron was relatively undamaged, while the right one was missing about a 1-foot spanwise section at the outboard end. That section was the first identifiable item in the debris field



Figure 6 - Main Wreckage from Left Wingtip



Figure 7 - Left Wing



Figure 8 - Left Wing



Figure 9 - Main Wreckage



Figure 10 - Main Wreckage



Figure 11 - Main Wreckage



Figure 12 - Right Wing



Figure 13 - Right Wing



Figure 14 - Main Wreckage

- All wing and empennage control surfaces retained their respective balance weights
- Control continuity was established from both elevators, the pitch trim tab, and the rudder to the fuselage break in the cockpit
- Control continuity was established from both ailerons to the fuselage break in the cockpit
- Aileron Cables
 - All aileron cables were still attached to their respective aileron bellcranks in the wings, and were continuous to the door post and cockpit area
- Flap Cables
 - All flap cables were separated in tensile overload



Figure 15 - Empennage



Figure 16 - Empennage



Figure 17 - Elevator Control Linkage

2.0 Fuselage/Cockpit/Cabin

- The cockpit/cabin was torn open early, as evidenced by the structural parts and cabin interior items early in the debris field
 - These items included the windshield and window fragments, the left door post, cockpit instruments and instrument panel section, and airplane manuals
- The windshield was reduced to numerous small fragments, mostly 2-5" in size
- Both doors were completely fracture-separated from the airplane
- The cabin ceiling was deformed and partially fracture-separated from the two wings
- The firewall remained partially attached to the cockpit floor
 - The engine mount remained partially attached to the forward side of the firewall
 - Portions of the center pedestal and instrument sub-panel remained partially attached to the aft side of the firewall
 - Portions of the flight control system, including the rudder pedal assembly and the aileron/elevator rods, gears and chain remained partially attached to the aft side of the firewall
- Both yokes were fracture-separated from the control system at the forward end of the yoke
 - The left horn was fracture-separated from one yoke (Yoke item #20 in debris field database)
 - The other yoke retained both horns (yoke found under main wreckage)
 - The yokes were not matched to seat/cockpit sides
- The following control or switch positions were observed:
 - Ignition key: OFF, with key installed and bent over in same direction (CCW, airplane right to left) to shut off ignition
 - Primer: Full forward
 - Throttle: Full forward (cable continuous to carburetor)
 - Mixture: Full forward (cable continuous to carburetor)
 - Carburetor heat: Not identified/located
 - Flap Handle: Full Up/Retract
 - Pitch Trim: The elevator trim indicator and trim wheel were impact damaged. The trim actuator was measured and it indicated a 5° tab trailing edge up position
 - Control/Gust Lock: Stowed in back pocket of right seat
 - Fuel Selector: "ON" position
 - Master Switch: absent
 - Circuit Breakers: All absent from their receptacles
- The following instrument readings were observed
 - Airspeed: In fracture-separated panel segment, 0 kts
 - Artificial Horizon: Fracture-separated from panel, crushed, no display information
 - The gyro rotor case was opened for examination
 - No internal scoring or other damage was observed
 - Altimeter: Fracture-separated from panel, indicator mechanism damaged & one hand missing, indication unreliable, Kollsman 30.08"
 - DG: Fracture-separated from panel, indication not determined
 - VSI: Fracture-separated from panel, 1400fpm down (but needle loose/swings)
 - Tachometer: Fracture-separated from panel, needle absent, hours 1716.6
 - Vacuum: In fracture-separated panel segment, off-scale low or high

- o L Fuel Qty: Off scale low (impact-damaged)
 - o R Fuel Qty: Off scale low (impact-damaged)
 - o Oil pressure: Undetermined due to impact damage
- The cockpit floor and attached seat rails were buckled
- The left seat was found fully detached from the cockpit floor, several feet from the main wreckage
- The right seat remained partially attached to the cockpit floor
- The airplane was equipped with 3-point (lap and single shoulder) occupant restraint harnesses
 - o The left harness lap and shoulder harness were buckled; the inboard lap belt stitching failed at its floor bracket attach wrap, which liberated the pilot
 - o The right seat harness components were all intact and remained attached to the fuselage
- The following cockpit/cabin items were recovered from the wreckage

ITEM	ESTIMATED WEIGHT (lbs)
Pilot's personal bag	10
Towbar	2



Figure 18 – Left Doorpost/Frame



Figure 19 - Left Door



Figure 20 - Right Door and Door Post



Figure 19 - Rudder Pedal Assembly



Figure 20 - Instrument Subpanel Segment

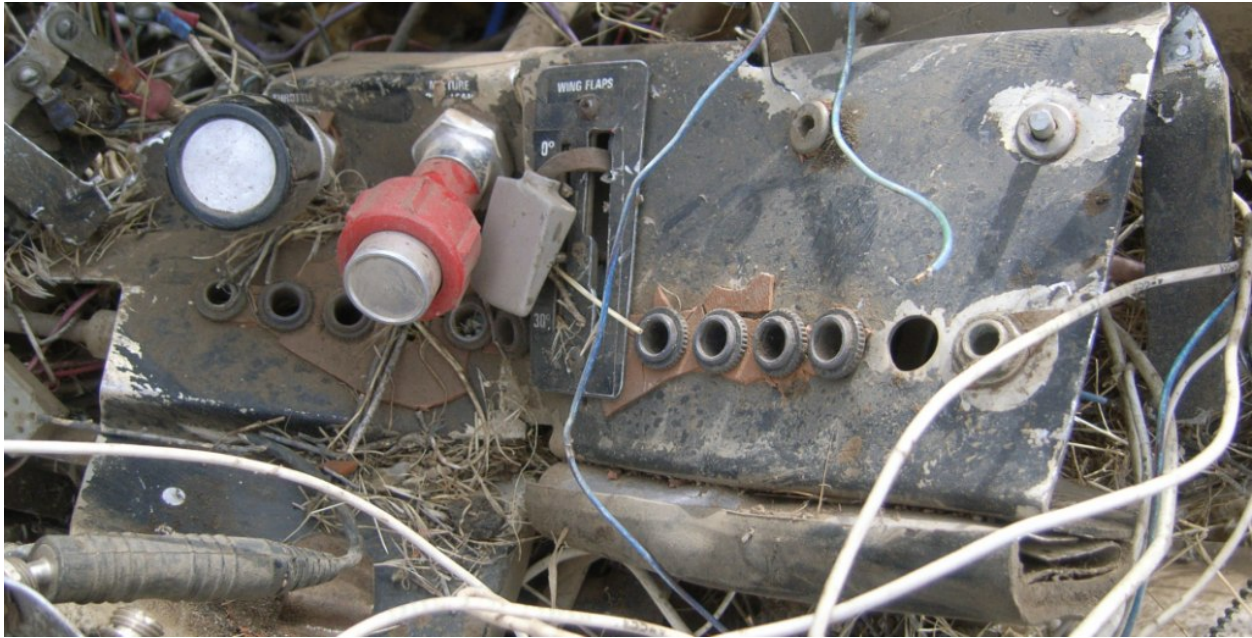


Figure 21 - Instrument Subpanel Segment



Figure 22 - Instrument Panel Fragment



Figure 23 - Vertical Speed Indicator



Figure 24 - Directional Gyro



Figure 25 - Altimeter



Figure 26 - Tachometer



Figure 27 - Artificial Horizon



Figure 28 - Artificial Horizon Gyro Rotor Case

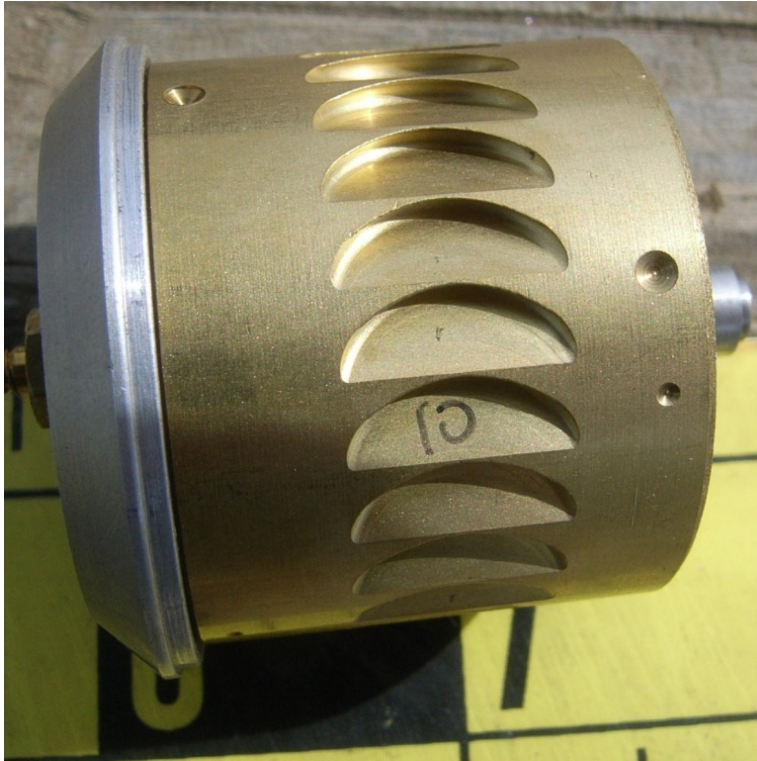


Figure 29 - Artificial Horizon Gyro Rotor



Figure 30 – Underside of Left Seat



Figure 31 – Left Shoulder Harness Assembly



Figure 32 - Failed Stitching on Left Lap Belt

3.0 LANDING GEAR

- The landing gear was fixed, tricycle style
- The LMLG strut remained attached to the fuselage, and the wheel and tire assembly remained attached to the strut
- The RMLG strut remained attached to the fuselage,
 - The wheel and tire assembly was fracture-separated from the strut
 - The wheel and tire assembly was found about 505 feet beyond the main wreckage, on a bearing of approximately 137° true
 - The lower 10" of the sheet metal strut fairing was fracture-separated from the fairing
- The NLG strut assembly was fracture-separated from the fuselage structure
 - The NLG strut assembly was found about 85 feet beyond the main wreckage, on a bearing of approximately 208° true
- The NLG fork and wheel/tire assembly was fracture-separated from the NLG strut
 - The NLG fork and wheel/tire assembly was found about 473 feet beyond the main wreckage, on a bearing of approximately 093° true

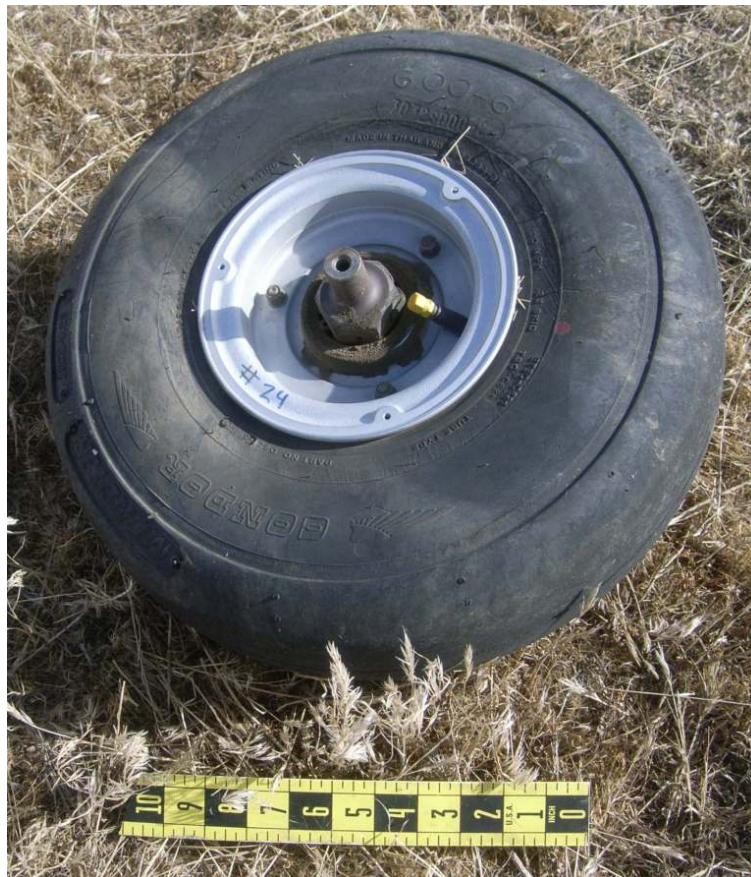


Figure 33 - RMLG Tire and Wheel



Figure 34 - Fractured End of RMLG Strut



Figure 35 - NLG Assembly

4.0 Engine and Propeller

- The engine remained partially attached to the engine mount and forward fuselage
- The engine was essentially intact, but had sustained crush/impact damage in the aft and up directions
 - No evidence of any pre-impact catastrophic failures were observed
 - All four cylinders remained attached
 - The crankcase was not fractured
 - The carburetor remained attached and nearly intact
 - 7 spark plugs remained installed
- Several engine accessories or external components were fracture-separated from the engine
 - Starter
 - Right magneto
 - Alternator
 - No. 1 bottom (front right) spark plug
 - Muffler

- The muffler exhibited significant crush damage, but was otherwise in good condition.
 - Visible internal components evidenced minimal/normal corrosion
 - The exhaust stack inner surface was of normal appearance (grayish-tan)
 - Vigorous shaking of the muffler did not result in any rattling indicative of loose internal parts
- The fuel strainer (gascolator) was fracture-separated from the firewall
 - The metal bowl was fractured and empty
 - The filter/screen remained attached, and appeared clean except for impact site dirt/dust
- The vacuum pump remained securely attached to its mounting pad on the engine accessory face
 - The pump was removed and disassembled
 - The shear coupling was intact
 - The rotor and vanes were all intact
 - The rotor rotated freely by hand, and all vanes moved freely in their slots
- The metal upper engine cowling and composite upper nose bowl were found early in the debris field
 - Neither exhibited any evidence of engine distress such as oil spray, thermal damage, or component liberation
- No evidence of abnormal or heavy external oil streaking observed on airplane skins
- The propeller was fracture-separated from the engine
 - The starter ring gear was separated from its attach flange
 - That flange was fracture separated from the engine and propeller, and fractured into multiple fragments
- Both propeller blades exhibited moderate bending/twisting deformation, and scoring



Figure 36 - Engine in Main Wreckage



Figure 37 - Engine



Figure 38 – Engine and Propeller Flange



Figure 39 - Muffler



Figure 40 - Fuel Strainer Assembly



Figure 41 - Vacuum Pump

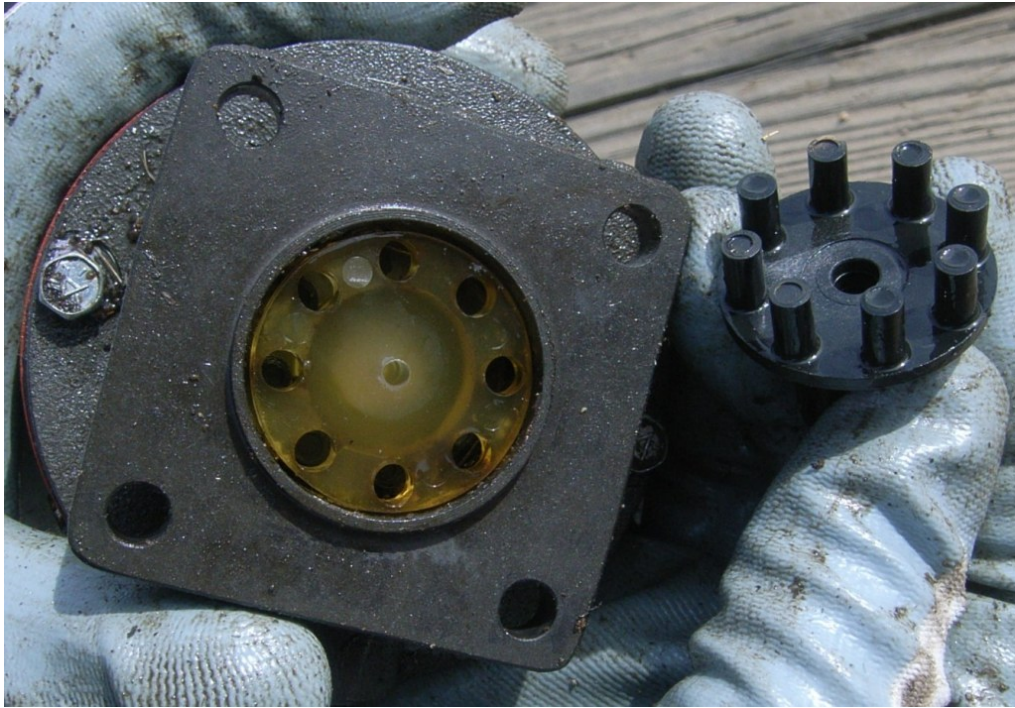


Figure 42 - Vacuum Pump Shear Coupling



Figure 43 - Vacuum Pump Rotor and Vanes

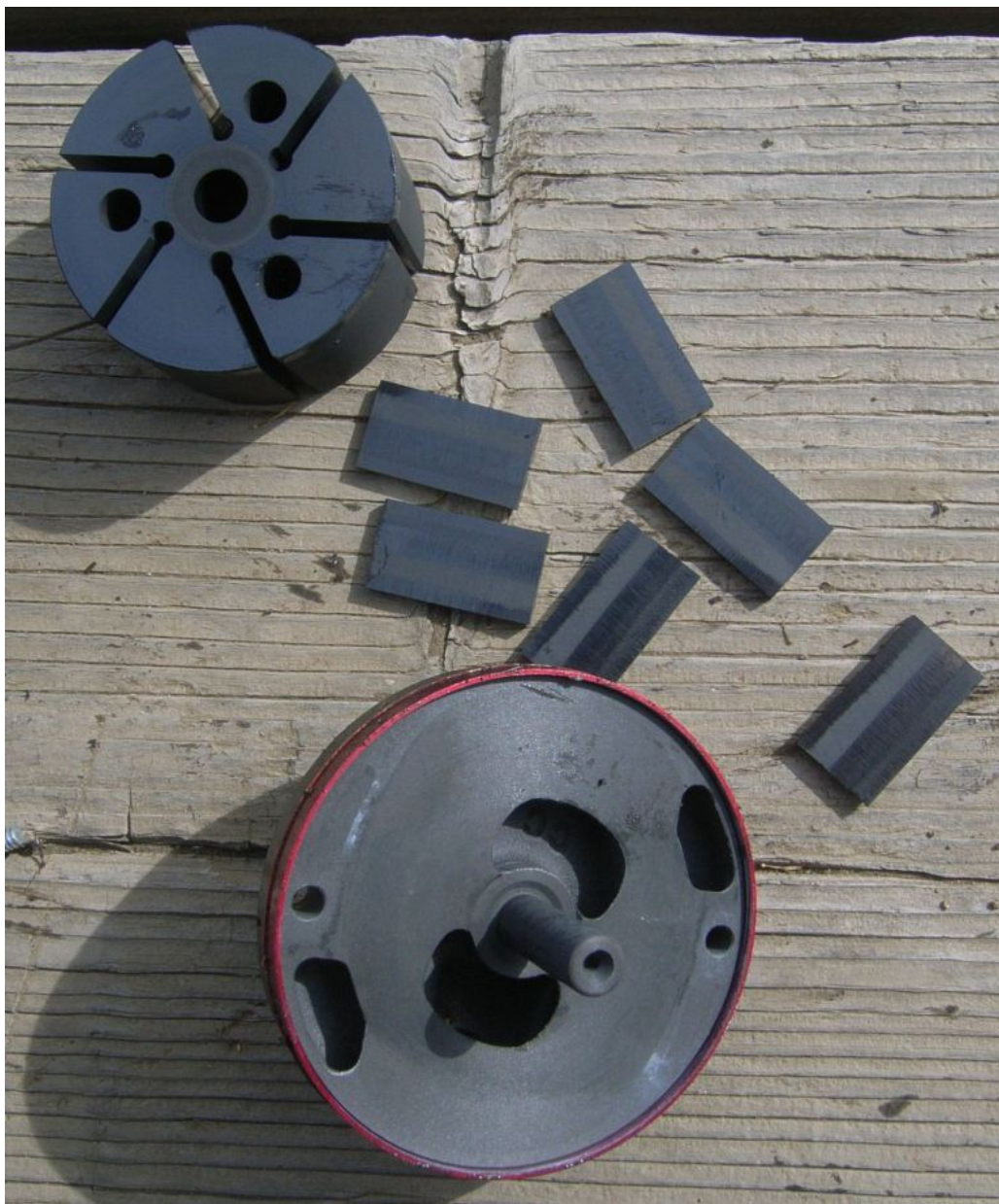


Figure 44 - Vacuum Pump Rotor and Vanes



Figure 45 - Cowling



Figure 46 - Cowling Underside



Figure 47 - Propeller Flange Assembly Fragment



Figure 48 - Propeller



Figure 49 - Propeller



Figure 50 - Propeller Tip



Figure 51 - Propeller Tip