



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety

Western Pacific Region

December 6, 2018

Engine Exam Notes

WPR19LA014

This document contains 14 embedded photos.

1 **ACCIDENT:**

2 Location: Agoura Hills, CA

3 Date: 10/23/2018

4 Aircraft: NORTH AMERICAN, SNJ-5, Registration Number: N7969C, Serial #: 43974

5 NTSB IIC: Jack Vanover

6 **EXAMINATION PARTICIPANTS:**

Jackie Vanover

Aviation Accident Investigator

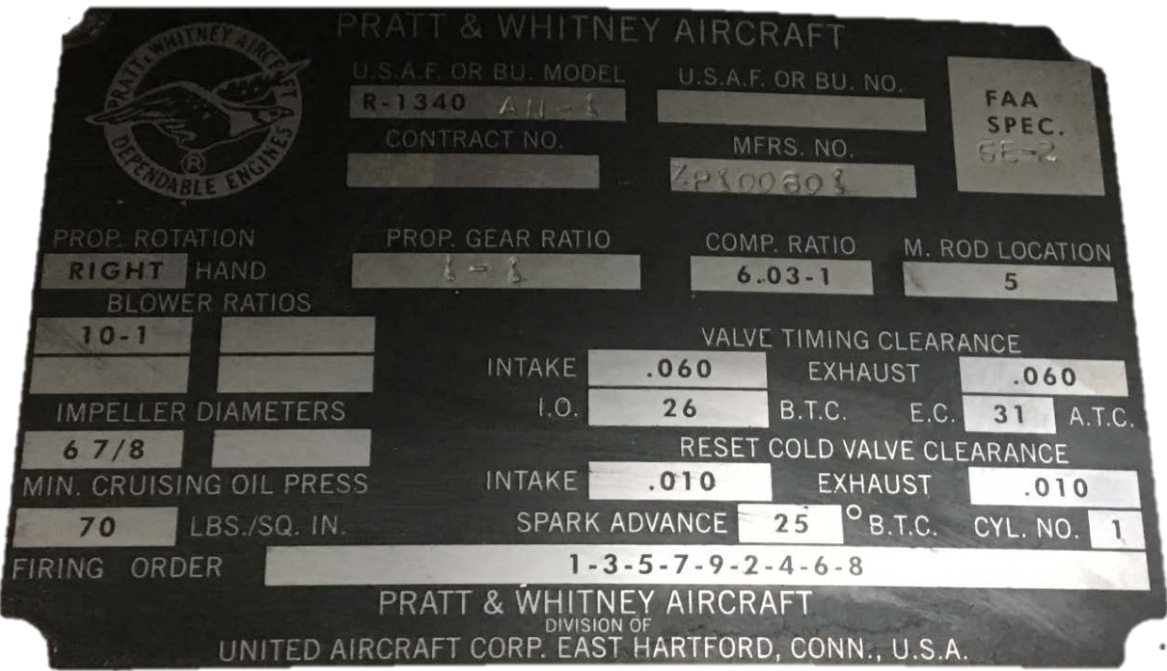
National Transportation Safety Board

Federal Way, WA 98003

7 **Engine Description**

8 The R-1340-AN1 is a single row, nine cylinder, supercharged, radial, air-cooled engine.

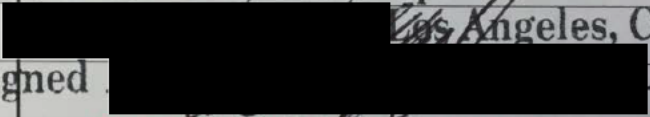
9 Engine data



10

11 **Figure 1: View of data plate. Master Rod Location No.5 cylinder.**

12 According to the maintenance records the last major engine overhaul was completed on April 15,
13 2010 at a total time of 5,034.64 hours. The last annual was completed on July 18, 2018 at a total
14 time of 6,826.4 hours.

Major Overhauled, Test Run and Inspected in accordance with current Regulations of the Federal Aviation Administration and found Airworthy.	
Ground Test Run	<u>4</u> Hrs. <u>59</u> Min. Total Time <u>5034.64</u>
Pertinent details of the repair are on file at this Agency under:	
Repair Order No.	<u>42575</u> Date <u>6-15-2010</u>
AERO-ENGINES, INC., Repair Stations No. VL2R244L	
Los Angeles, Calif. 90039	
Signed	
DUE TO CHANGES IN AUTO FUEL SPECIFICATIONS AERO-ENGINES INC. NO LONGER WARRANTIES ENGINES OPERATED ON AUTO FUEL.	
CAM ^{S/N} <u>14584016</u> ; CRANKSHAFT ^{S/N} <u>20-2302</u>	

15
16 Figure 2: View of last major overhaul.

Engine Maintenance Record
North American SNJ-5

Aircraft Registration N7969C Engine Type: P&W R1340 AN-1 S/N: ZP100601 Date 07/18/2018
Hobbs Hours: 619.4 / Total Time: 6826.4 / Time SMOH: 614.5

Description of Work:

1. I.A.W. 14 CFR Part 43 Appendix D Performed Annual engine inspection. Engine found to be in airworthy condition at this time and is approved to return to service. Next Inspection Due: 08/01/2019
4. Performed pre-inspection run. Compression readings as follows: 79/80, 80/80, 80/80, 77/80, 66/80, 79/80, 75/80, 78/80, 80/80.
2. Drained engine oil tank, both sumps and oil filter screen valve. Inspected oil filter screen and valve. No discrepancies found at this time. Serviced engine oil tank with 9 gallons of Aeroshell W120 oil.
3. Removed and replaced all spark plugs with new. Inspected ignition system for operation, condition of components and timing. No discrepancies found at this time.
5. Inspected engine controls for proper travel and operation. Lubricated pivot points and bearings. No discrepancies found at this time.
6. Removed and inspected fuel filter screen. No contamination found, reinstalled, safetied and leak checked. No leaks found.
7. Inspected exhaust system for general condition and cracks. No discrepancies found at this time.
8. Performed post-maintenance run-up and checks. No leaks or other discrepancies found at this time.
9. Inspected engine baffling, cowl and mounts. Closed and secured.

"I Certify that this Engine has been serviced and inspected in accordance with the requirements of 14CFR43 Appendix D, AC43.13-1B, and AN 01-60F-2 as applicable and was determined to be in an airworthy condition"

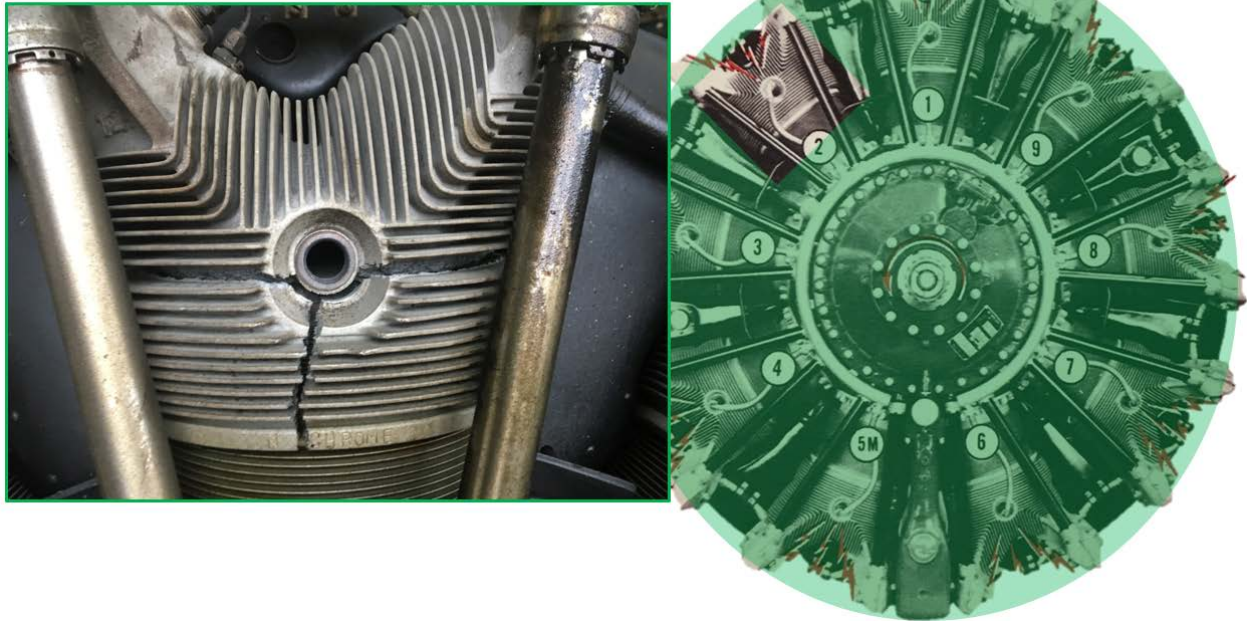
Chris Rushing AP/IA

17

18 **Figure 3: View of last annual.**

19 Cylinder Description

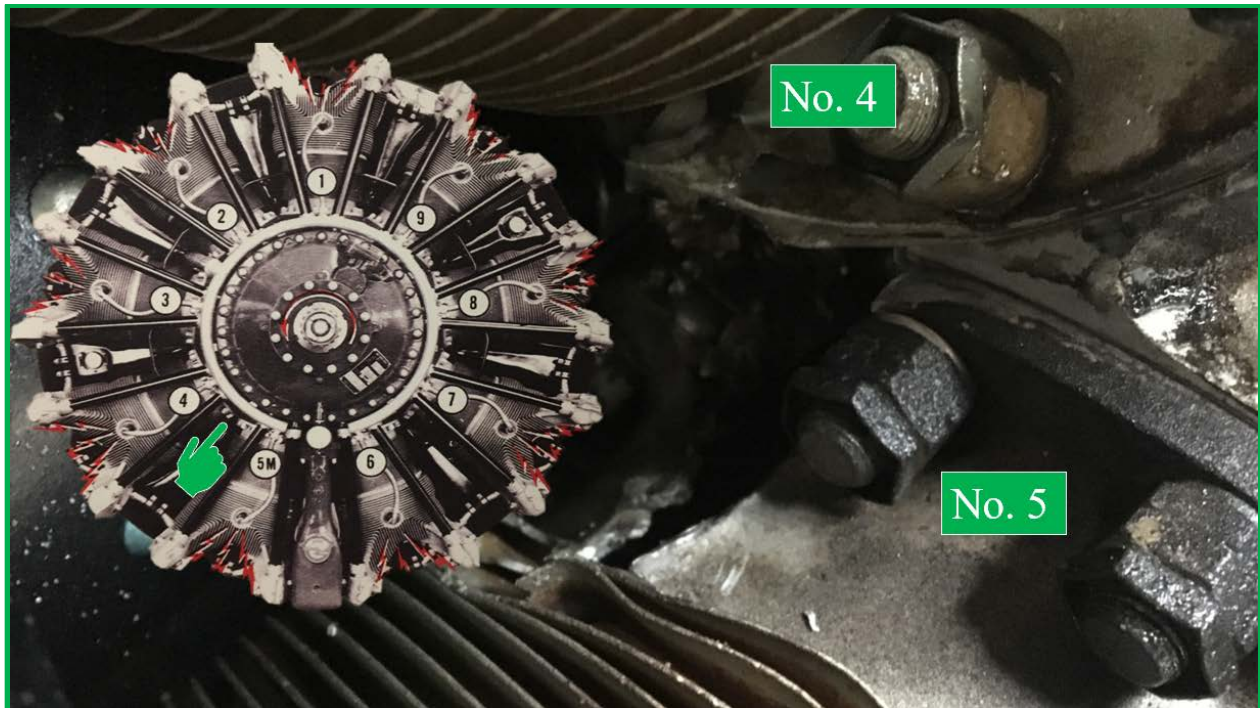
20 The cylinders are constructed of steel and aluminum. Cylinder No. 2 was cracked between the
21 10th and 11th (From Bottom of Head) cylinder head cooling fin. Another crack on No. 2 ran down
22 from the sparkplug to the base of the head.



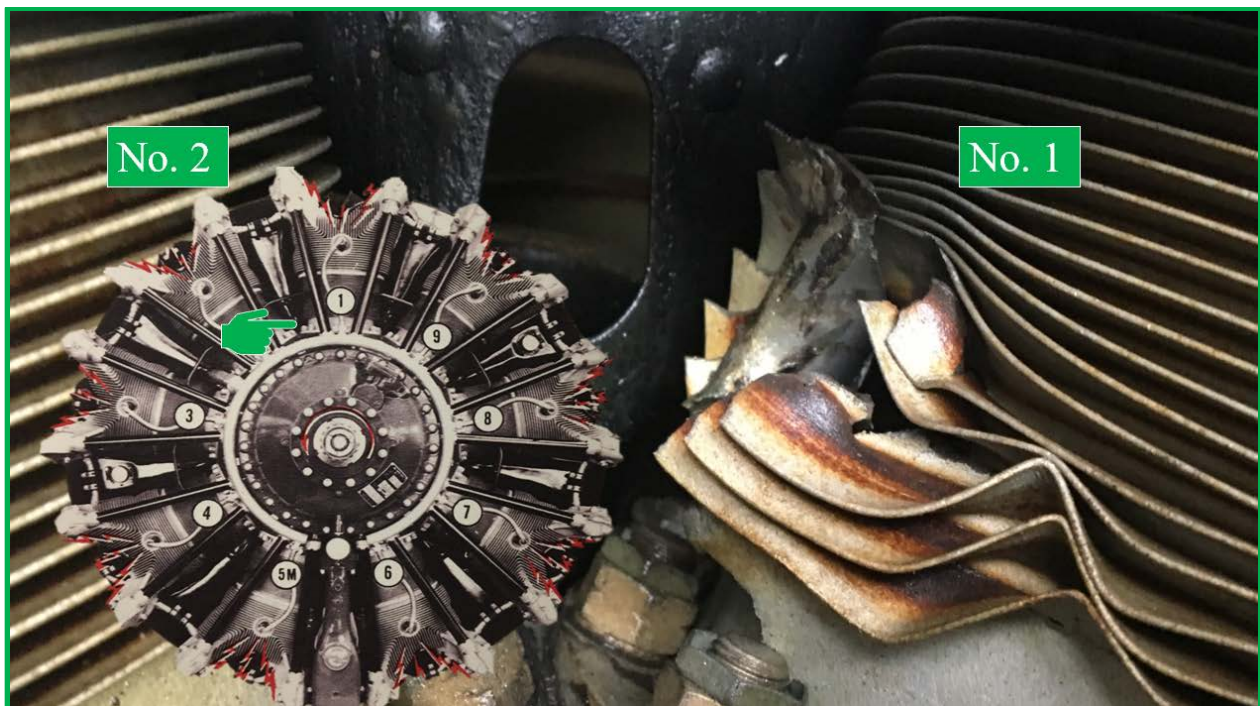
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24 **Figure 4: View of cracked No 2. cylinder head.**

25 Damage at the base was noted between the Nos. 4 and 5 cylinders, and on the No. 1 cylinder.



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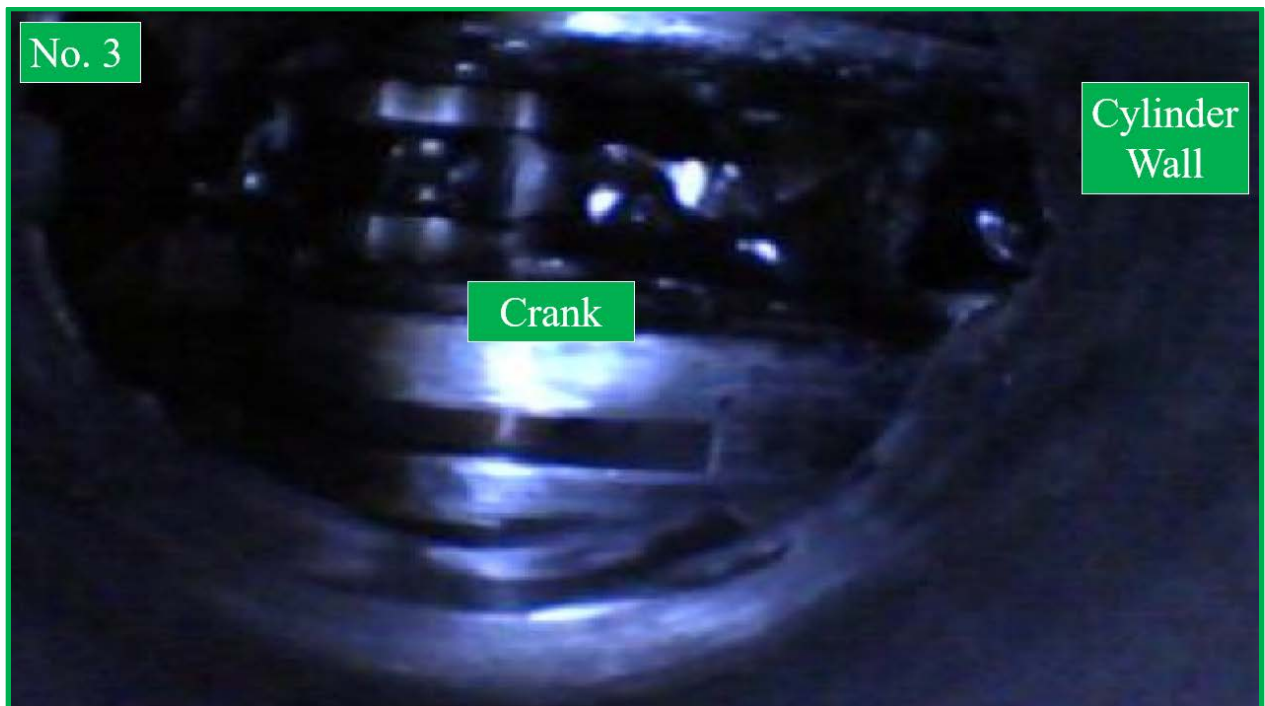
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28 The forward sparkplugs were removed. The make and model of each was Tempest UREM37BY.
29 All of the sparkplugs displayed normal wear. The number nine front sparkplug electrode was
30 bent about 30°.

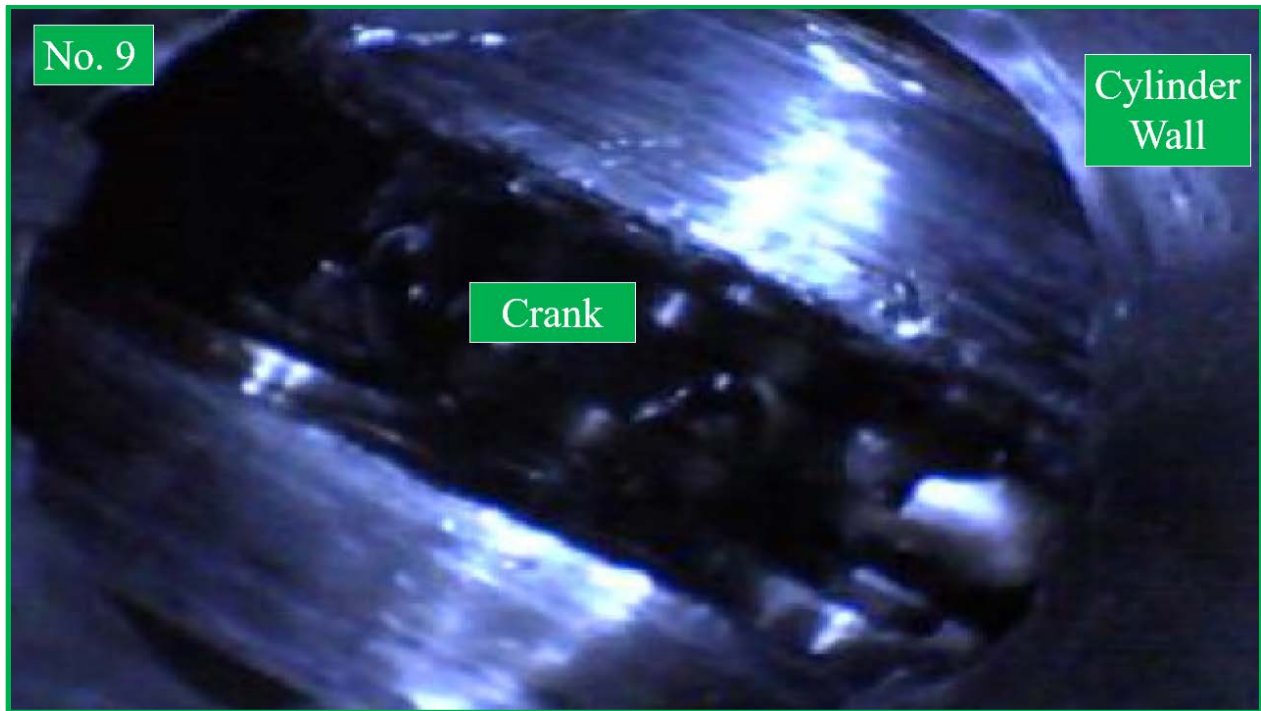


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32 A bore scope (Vividia Able Scope) of the engine revealed that the Nos. 3 and 9 pistons were
33 destroyed.



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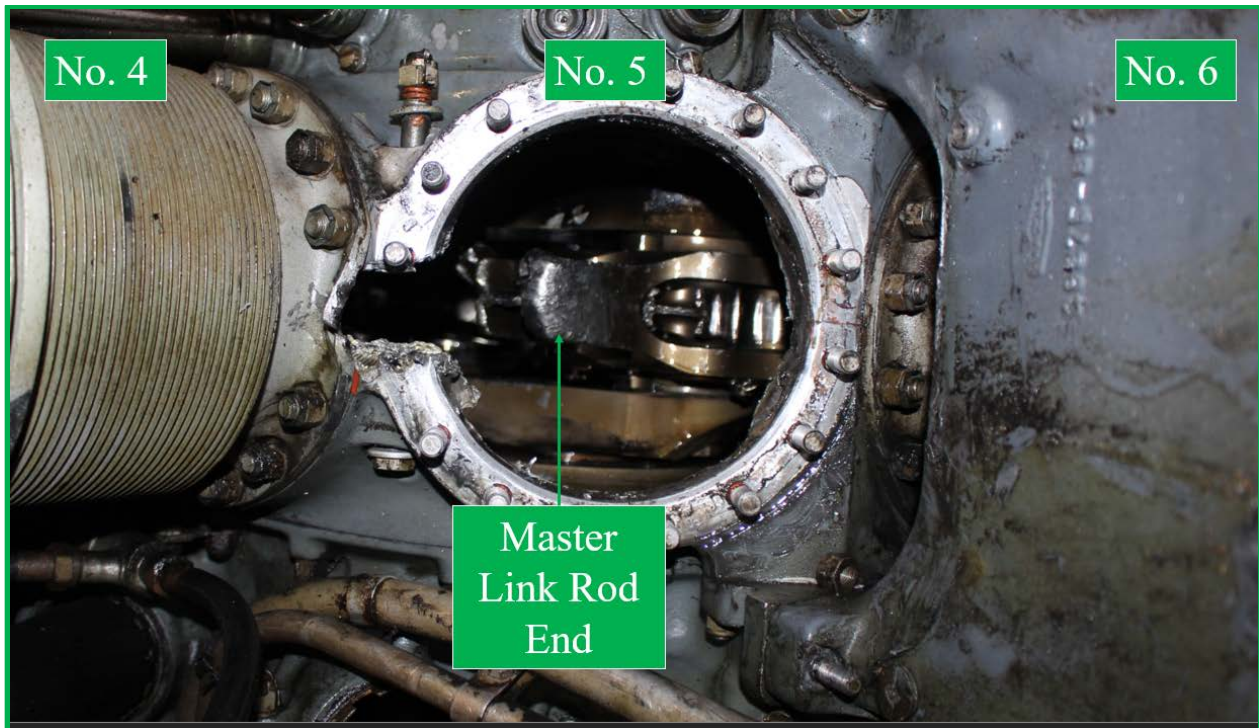


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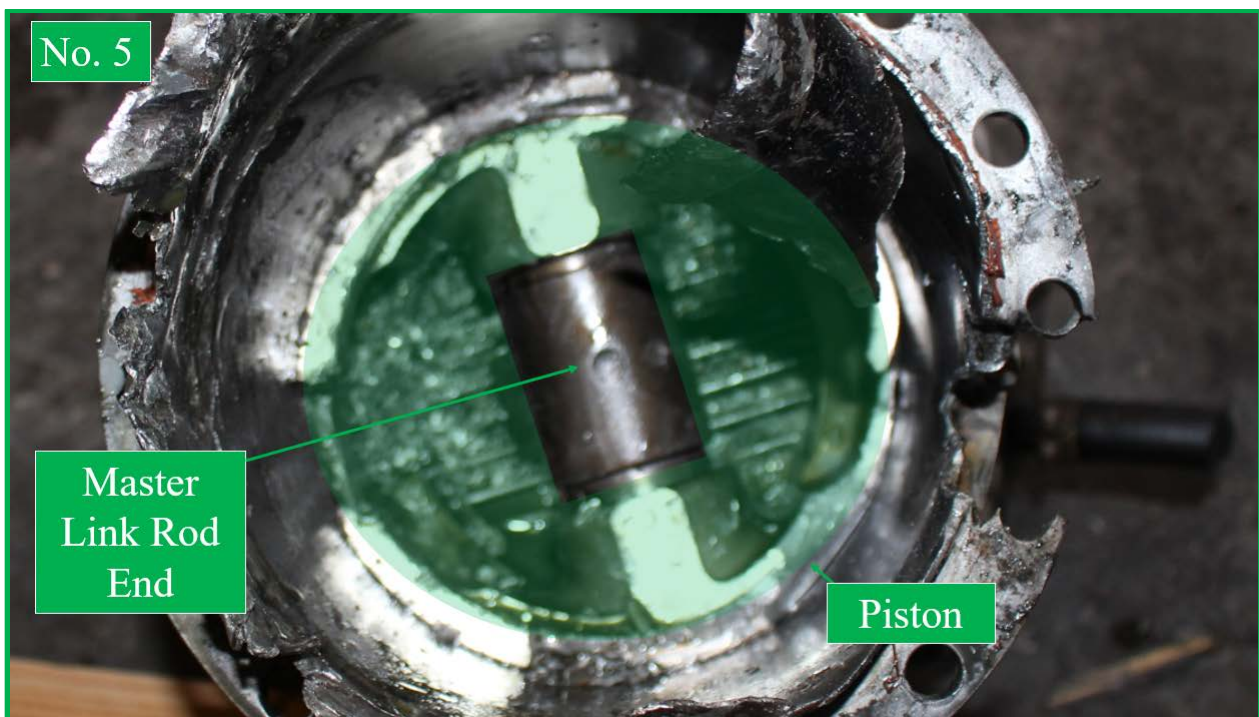
36 The No.5 cylinder was removed.



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40 The cylinder head was cut, and the piston was removed. The piston pin was removed and the
41 master link rod end was removed.



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44 ADDITIONAL INFORMATION

45 In July 1999 the Federal Aviation Administration (FAA) issued an Airworthiness Directive (AD)
46 99-11-02 applicable to Pratt & Whitney R-1340 series engines. The AD required periodic visual
47 inspections for cracks in the cylinder heads at specified intervals of time in service and
48 fluorescent penetration (FP) inspections at cylinder overhaul. Instructions detailing how the
49 inspections for cracks were to be performed was contained within Pratt & Whitney Service
50 Bulletin (SB) 1787 dated September 1983. It stated that maintenance personnel should inspect
51 the cylinder head focusing on the cooling fin roots at the dome area between cooling fins 7 and 8
52 and fins 8 and 9 (fins counted from the intake port).

53

54 According to the AD, visual inspections of the cylinder heads on Pratt & Whitney R-1340
55 engines that are not cowled and baffled, such as on the Air Tractor AT-301, are required at
56 intervals of 100 hours of time in service.