

NATIONAL TRANSPORTATION SAFETY BOARD

Office of Research and Engineering
Materials Laboratory Division
Washington, D.C. 20594



September 4, 2008

MATERIALS LABORATORY FACTUAL REPORT

Report No. 08-098

A. ACCIDENT

Place : St. Louis, Missouri
Date : September 28, 2008
Vehicle : Boeing MD-83, N454AA
Operator : American Airlines, Flight 1400
NTSB No. : DCA07MA310
Investigator : Harald Reichel (AS-40)

B. COMPONENTS EXAMINED

Solenoid Valves s/n P2942C (air interrupt), with push button pin, and s/n P3052C (aborted takeoff) from A/C 4XT (s/n 53611)¹

C. DETAILS OF THE EXAMINATION

The air interrupt solenoid valve, s/n P2942C, was partially disassembled and is shown along with the push button pin in figure 1. The aborted takeoff solenoid valve, s/n P3052C, was assembled, did not have any ancillary parts, and is shown in figure 4.

Visual examinations of the valve balls from both solenoids revealed an oily sheen on both balls along with dark particulate material, as shown in figures 2 and 5. When inverted, the balls from both valves would momentarily stick to the valve seats before moving.

The thin portion of the push button pin on the air interrupt valve was bent as shown in figure 3. In addition, the end of the pin was deformed and spherically dented. The shape and size of the dent was similar to the shape and size of the solenoid valve ball.

Both valves were forwarded to Trace Laboratories Inc. for extraction and FTIR² analysis of the oily material noted on the valve balls. The laboratory report is contained as attachment 1 to this report. The report concludes that the analyzed material was consistent with several aircraft oils.

Joe Epperson
Senior Metallurgist

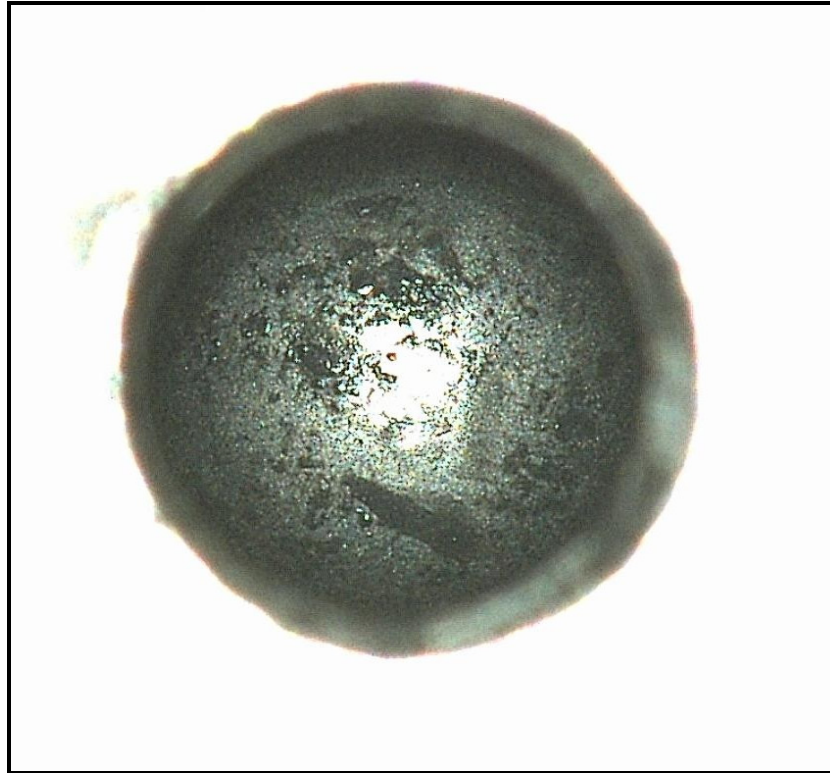
¹ Not the accident aircraft but another MD80 series inspected by American Airlines in the course of the investigation.

² FTIR Fourier Transform Infrared Spectroscopy

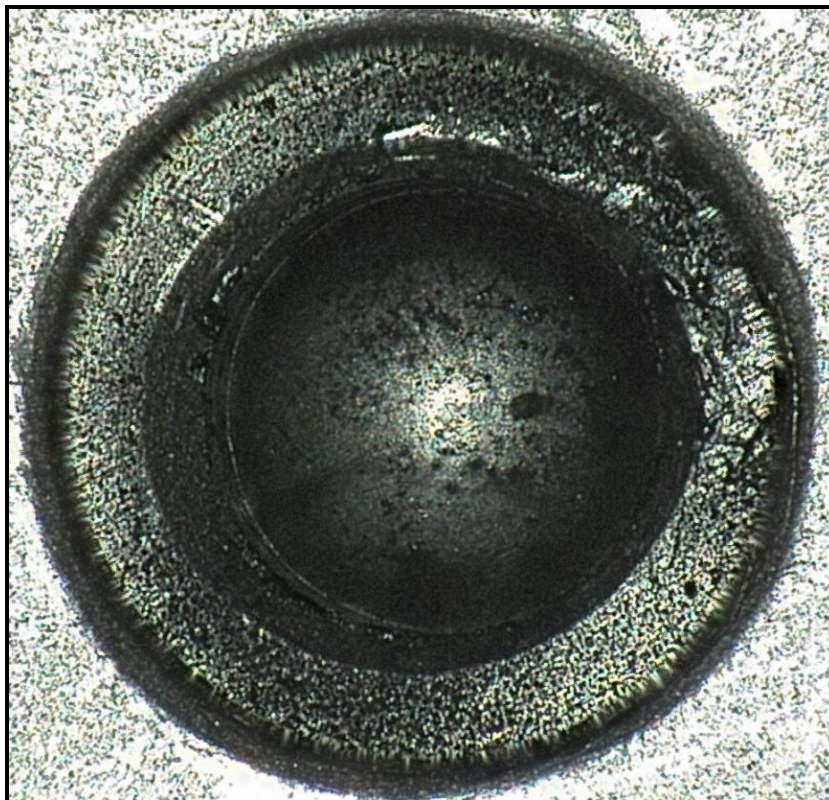


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Figure 1--An overall view of the as-recieved components from the air interrupt solenoid valve, s/n P2942C. The bent push button pin is noted.

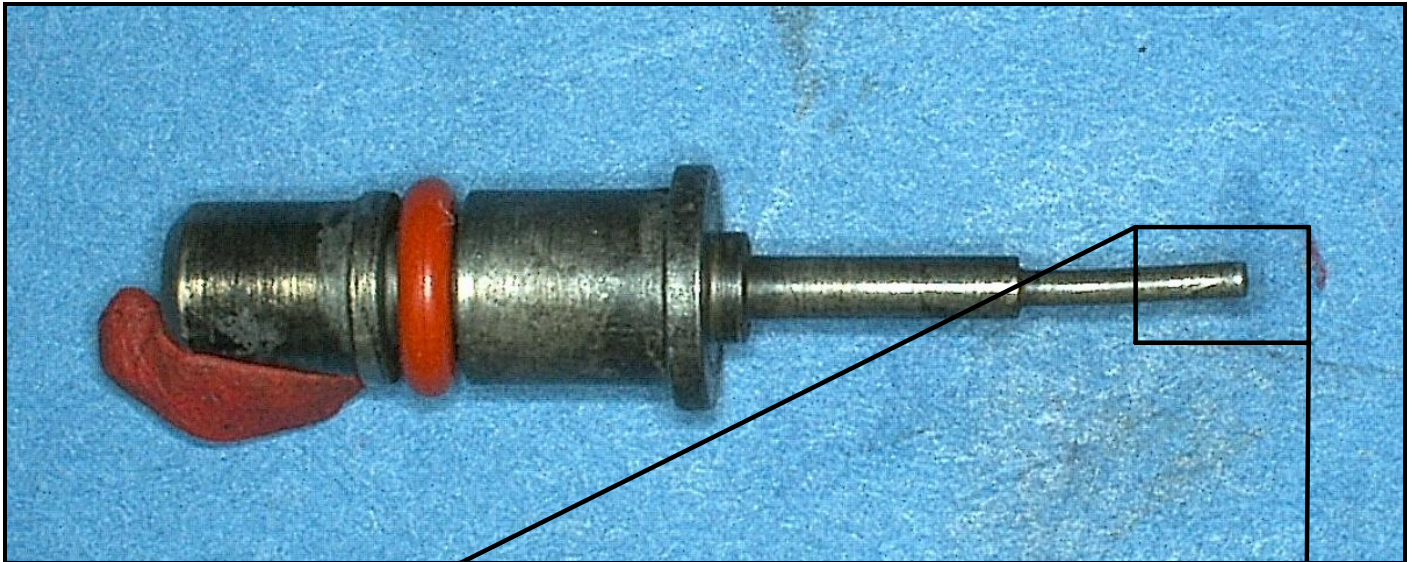


ImageNo:0807A00453, Project No:2008060010 | 50 mils



ImageNo: 0807A00447, Project No:2008060010 | 50 mils

Figure 2--Views of opposite sides of the valve ball showing the black particulate.



ImageNo:0807A00451, Project No:2008060010

500 mils



ImageNo: 0807A00450, Project No:2008060010

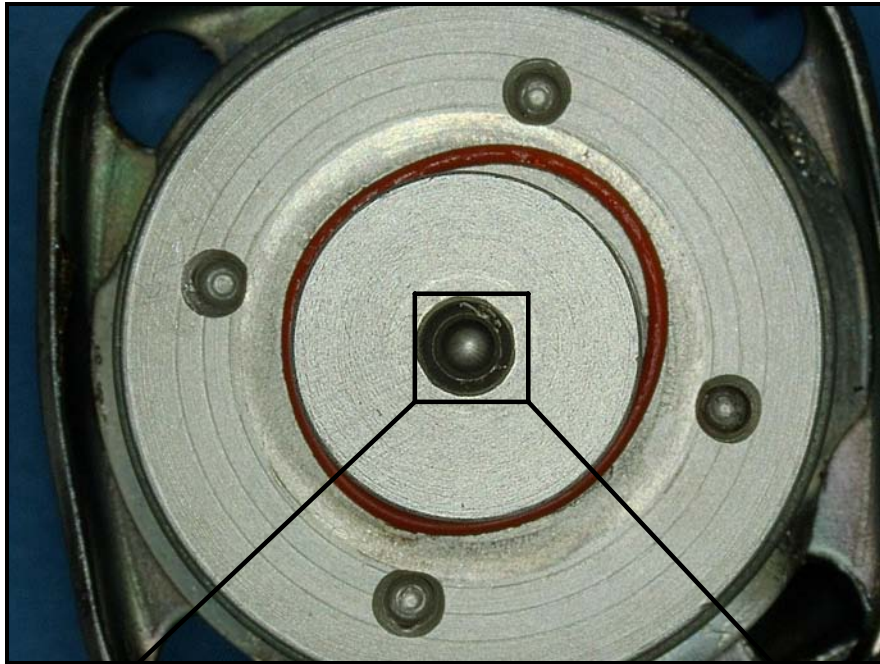
50 mils

Figure 3--The bent push button pin with an enlargement showing the deformed and dented end.



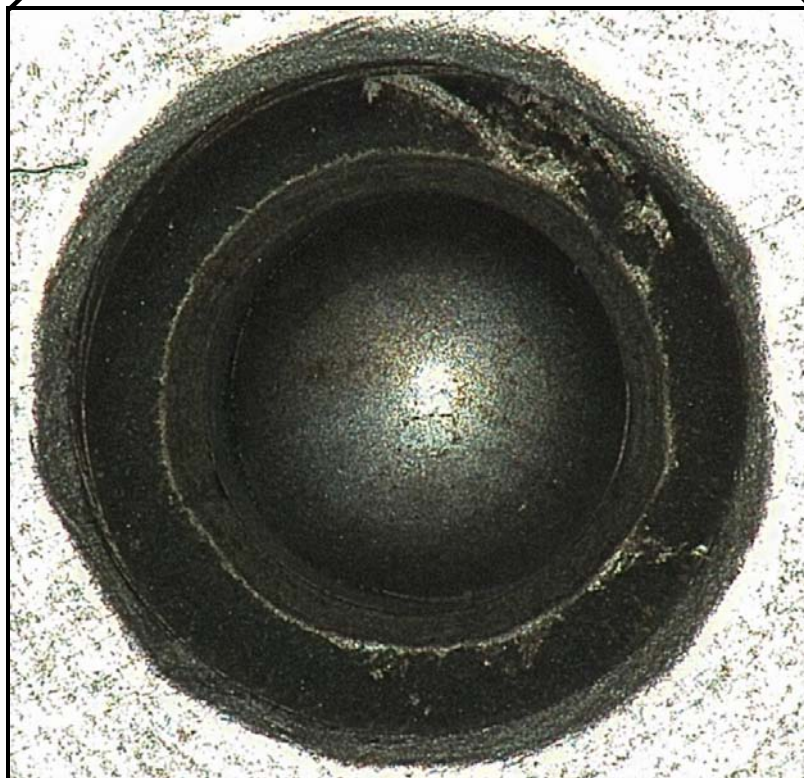
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Figure 4--An overall view of the as-recieved aborted takeoff solenoid valve, s/n P3052C.



ImageNo:0607A00455, Project No:2008060010

200 mils



ImageNo: 0807A00454, Project No:2008060010

50 mils

Figure 5--The valve with an enlargement of valve ball showing particulate material.