

NATIONAL TRANSPORTATION SAFETY BOARD

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



February 3, 2012

MATERIALS LABORATORY FACTUAL REPORT

Report No. 12-007

A. ACCIDENT INFORMATION

Place : Nashville, Pennsylvania
Date : December 22, 2011
Vehicle : Cessna 441
NTSB No. : ERA12FA120
Investigator : Paul Cox

B. COMPONENTS EXAMINED

1) Right and left annunciator panels and 2) right and left fuel quantity gauges.

C. DETAILS OF THE EXAMINATION

Annunciator panels and fuel quantity gauges were submitted to the Materials Laboratory for examination. The layouts for both panels are shown below in Figures 1 and 2.

L FUEL COMP OFF 1	L GEN OFF 2	L FUEL SHUTOFF 3	L FUEL PRESS LOW 4	L AUX BOOST ON 5	L NTS CHECK 6
HYD PRESS ON 7	L HYD FLOW LOW 8	L ENGINE ANTI-ICE 9	L X-FER PUMP FAIL 10	L FUEL LEVEL LOW 11	L BETA 12
DOOR NOT LOCKED 13	AIR DUCT O'HEAT 14	W/S AIR O'HEAT 15	L WING O'HEAT 16	BATT 1 O'HEAT 17	L OIL PRESS 18

Figure 1. Left annunciator panel layout.

R NTS CHECK 23	R AUX BOOST ON 24	R FUEL PRESS LOW 25	R FUEL SHUTOFF 26	R GEN OFF 27	R FUEL COMP OFF 28
R BETA 29	R FUEL LEVEL LOW 30	R X-FER PUMP FAIL 31	R ENGINE ANTI-ICE 32	R HYD FLOW LOW 33	BLEED NH GROUND 34
R OIL PRESS 35	BATT 2 O'HEAT 36	R WING O'HEAT 37	CABIN ALTITUDE 38	EMER PRESS ON 39	SURFACE DEICE 40

Figure 2. Right annunciator panel layout.

On the panels from the accident aircraft, the left and right BATT O'HEAT indicators had been replaced with PITOT HEAT. The face plates for the L FUEL PRESS LOW and the L AUX BOOST ON annunciator lights were missing and the L FUEL PRESS LOW annunciator was missing one bulb. The as-received panels are shown in Figure 3 and 4.

The investigator requested that the following annunciator lights be examined: on the left panel-L FUEL COMP OFF, HYD PRESS ON, L GEN OFF, L HYD FLOW LOW, L FUEL SHUTOFF, L FUEL PRESS LOW, L X-FER PUMP FAIL, L AUX BOOST ON, L FUEL LEVEL LOW, L BETA; and L OIL PRESS and on the right annunciator panel- R BETA, R OIL PRESS, R AUX BOOST ON, R FUEL LEVEL LOW, R FUEL PRESS LOW, R X-FER PUMP FAIL, R FUEL SHUTOFF, R GEN OFF, R HYD FLOW LOW, and R FUEL COMP OFF. The bulbs were examined with a 5X to 50X zoom stereomicroscope. On both panels, each annunciator light had two bulbs installed per light. The examination revealed some evidence of filament sagging on several of the bulbs, consistent with aging. Broken filaments were found in L GEN OFF, L HYD FLOW LOW, L X-FER PUMP FAIL and R HYD FLOW LOW annunciator lights. However, there was no evidence of hot filament stretching found on any of the filaments of the examined bulbs from both panels including those with broken filaments.

The as-received fuel quantity gauges are shown in Figure 5. The faces of the left and right fuel gauges were examined for the presence of witness marks left by the gauge needles. The gauges faces were examined with a 5X to 50X zoom stereomicroscope. No witness marks were found on either gauge face.

Nancy B. McAtee
Chemist

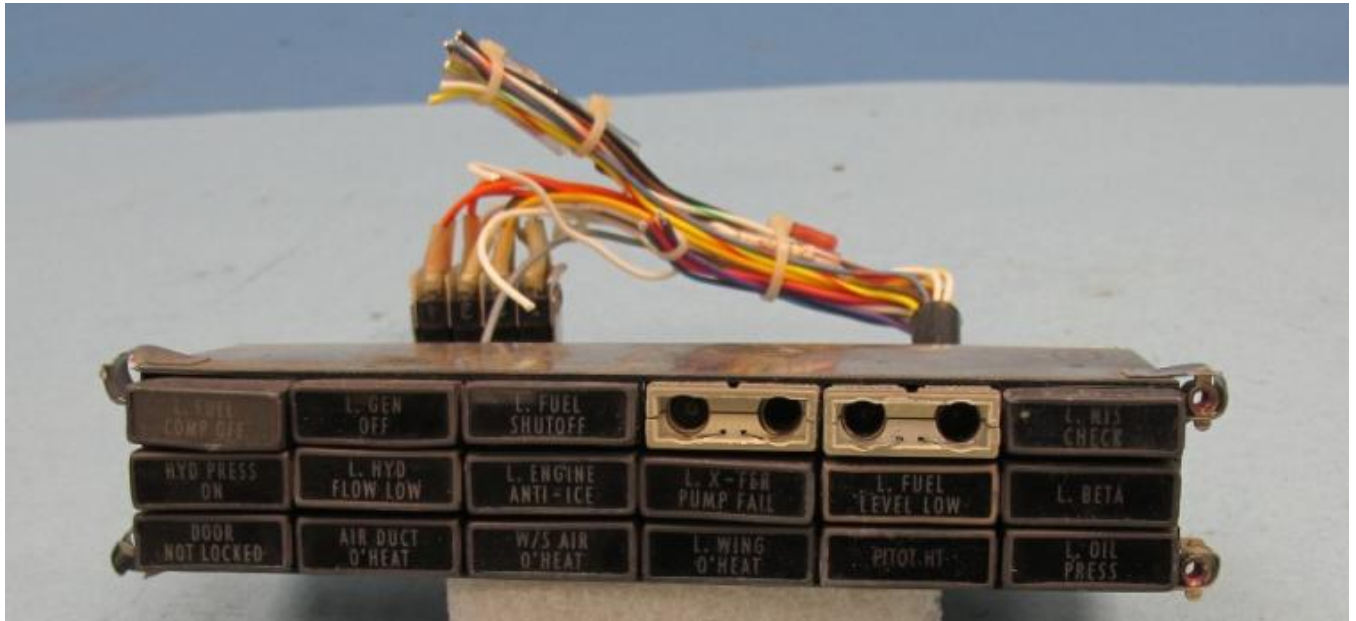


Figure 3. Left annunciator panel.



Figure 4. Right annunciator panel.

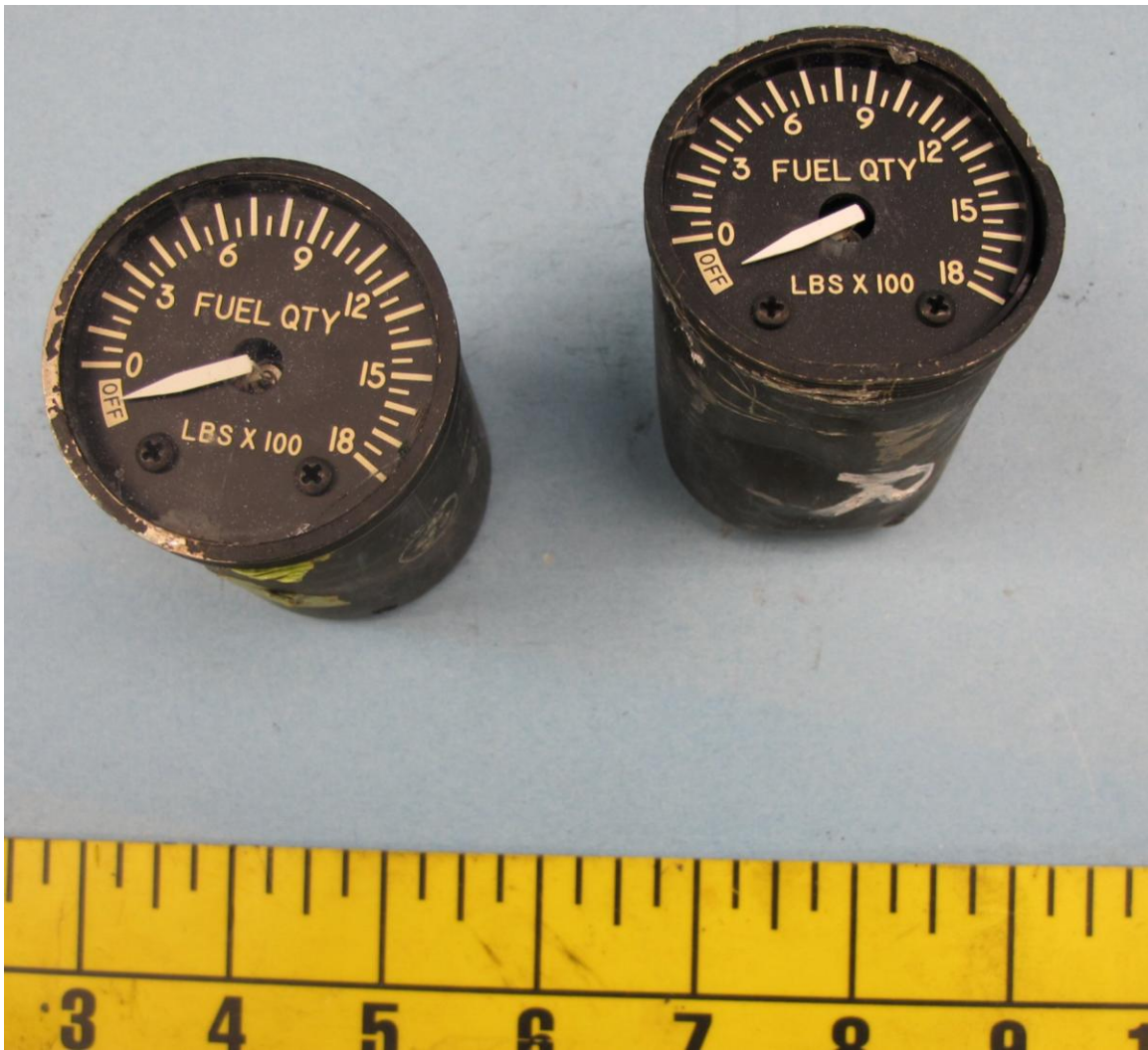


Figure 5. Left fuel quantity gauge (left) and right fuel quantity gauge (right).