OBSERVATIONAL STUDY FOR AIR METHODS BK117-B2 ACCIDENT, PERRYVILLE, MISSOURI, 7/1/2017

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B. OBJECTIVES

The purpose of the observational study was twofold: (1) to allow the investigative team to familiarize themselves with the BK117-B2 cockpit, instrument displays and start up procedures, and (2) to observe and document the caution/warning panel under various lighting conditions during the BK117A/B startup procedures.

C. OBSERVATIONS

The investigative team convened at the Air Methods base in Joliet, IL, on October 23, 2017, about 1430 CDT, and was assisted by an Air Methods BK117 pilot and mechanic stationed at the Joliet base. The team discussed the investigative plan which included documenting the caution/warning panel under various lighting conditions and the BK117 startup procedures.

When the team arrived, the exemplar BK117-B2 was located in the hangar (see photo 1); the hangar door was closed. The NTSB human performance investigator was seated in the left seat and an Air Methods pilot was seated in the right (pilot's) seat. Additional observers stood in the open doors. The team documented the caution/warning panel in the hangar with the hangar overhead lights on first when the INSTR LIGHTS dials were in the "OFF" position and then when the dials were in the "BR" positions (see photos 2 and 3). This was then repeated with the hangar overhead lights off (see photos 4-6).

The helicopter was moved outside for the next set of tests. The outside conditions were daylight hours with overcast skies. For the first run through, the human performance investigator was seated in the left seat and an Air Methods pilot was seated in the right seat. The pilot performed the Air Methods "Before Starting Engines" and "Starting Engines" sections of the Normal Procedures Checklist (see attachment 2 to the Human Performance Factual Report). The human performance investigator documented the caution/warning panel with the INSTR LIGHTS set to "OFF" and "BR" (see photos 7-13). There were no aural tones/beeps during the testing. The engines were shut down per the checklist and the procedure was repeated using the procedure as performed by the accident pilot according to his post-accident interview (see appendix 1). During normal engine shutdown following each startup procedure, a separate aural tone/beep was heard when each engine N1 decreased below 60%. The startup and shutdown procedures were repeated with the NTSB airworthiness investigator seated in the left seat.

About 15 minutes after sunset, the investigative team returned to the helicopter and documented the caution/warning panel when the INSTR LIGHTS dials were in the "OFF" position and then when the dials were in the "BR" positions (see photos 14 and 15).

The team debriefed before departing the base.

Photo 1. Exemplar BK117-B2.

Photo 2. Caution/warning panel; instrument lights set to “OFF”; transfer pumps “OFF”; taken in hangar with hangar lights on.

Photo 3. Caution/warning panel; instrument lights set to “BR”; transfer pumps “OFF”; taken in hangar with hangar lights on.

Photo 4. Caution/warning panel; instrument lights set to “OFF”; depressing annunciator panel test switch; taken in hangar with hangar lights off.

Photo 5. Caution/warning panel; instrument lights set to “BR”; transfer pumps “OFF”; taken in hangar with hangar lights off.

Photo 6: Fuel gauges; instrument lights set to “BR”; taken in hangar with hangar lights off.

Photo 7: Caution/warning panel; instrument lights set to “Off”; transfer pumps “Off”; taken outside/daylight.

Photo 8: Caution/warning panel; instrument lights set to “BR”; transfer pumps “Off”; taken outside/daylight.

Photo 9: Caution/warning panel; instrument lights set to “BR”; transfer pumps “ON”; taken outside/daylight.

Photo 10: Master warning light; instrument lights set to “OFF”; taken outside/daylight.

Photo 11: Master warning light; instrument lights set to “BR”; taken outside/daylight.

Photo 12. Fuel gauges; instrument lights set to “BR”; taken outside/daylight.

Photo 13: Center console showing location of FUEL PUMP switches and INSTR LIGHTS dials; taken outside/daylight.

Photo 14: Caution/warning panel; instrument lights set to “OFF”; depressing annunciator panel test switch; taken about 15 minutes after sunset.

Photo 15: Caution/warning panel; instrument lights set to “BR”; depressing annunciator panel test switch; taken about 15 minutes after sunset.

APPENDIX 1

Engine Start Sequence used by Accident Pilot

1. Start No. 1 engine
2. Start No. 1 generator
3. Turn on forward xfer pump
4. Perform hydraulics check
5. Start No. 2 engine
6. Turn on No. 2 generator
7. Turn on aft xfer pump
8. Turn off both prime pumps