

Grant Robinson

From: McConnell, DAVE P <dave.p.mcconnell@lmco.com>
Sent: Thursday, November 16, 2017 4:25 PM
To: James O'Brien
Cc: Daryl Dixon; Grant Robinson; Nakhon Avionics; Nakhon Supervisor Engineer
Subject: S-76D ENG NO START fault after engine start

Jim

Provided for info and reference.

Dave

Case Number: C0074136
Customer: Thai Aviation Services Limited
Aircraft S/N: 761066
Aircraft Model: S-76D
Aircraft TT: 477
ATA: 24
Case Subject: Spurious ENG NO START WCA Messages

Problem Description:

Following is a representative narrative account from 24 AUG 2017 describing the typical ENG 1/2 NO START WCA messages intermittently seen in the TAS S-76D fleet.

Chief S-76 pilot Jim O'Brien believes ENG NO START faults account for one dispatch delay per week in the TAS S-76 fleet.

Narrative start

761066 was started for its 1st flight of the day with the GPU connected.

Start was normal to stabilized completion, at which point DC GEN 1 caption appeared in WCA.

DC GEN 1 caption extinguished after 5-7 sec. DC status page appeared normal.

Start #2 engine was normal to stabilized completion, at which point DC GEN 2 caption appeared in WCA.

DC GEN 2 caption extinguished after 5-7 sec.

DC status page appeared normal. It was not being monitored DURING the start.

External power was removed as per normal procedures.

APCP daily checks were completed as normal, after which ENG 1 NO START and ENG 2 NO START captions appeared simultaneously in WCA.

See EPAC page as per the attachment.

Avionics/maintenance was called, and the wait for them was used to complete daily DC electrical checks - results normal.

Throttles remained in idle during all this, and were never advanced - never got that far in the NCL.

A/C was shut down and power removed normally. A/C powered up and started up normally.

EEC captions all cleared as expected.

Flight continued as scheduled with no further problems.

As with many faults with recent variants, it is resolved by use of the BATT switch.

Narrative end

TAS request an analysis of this fault – is it an EEC fault or is it airframe related?

Troubleshooting guidance is requested. EoM

This email notification is provided as the case has been reviewed and does not contain technical data in the issue description.

Problem Resolution:

The occurrence of an EEC internal fault will by design set the ENG NO START WCA message. The question is what is causing the EEC internal fault?

The PWC PW210S engine maintenance manual 72.00.02 provides specific troubleshooting for each fault that could appear on the engine EPAC status page. The cross reference table Fig 101 in the PWC manual leads you to subtask 72-00-02-810-850. The fault can be caused by the following Conditions. Only the power interrupts are airframe related. The rest is on PWC side

1. Power interrupt/transients
2. Fault within the EEC detected by EEC self-test
3. Different software Eng 1 vs Eng 2
4. Incorrect DCU setting

Most probably the EEC internal fault is caused by Condition 1 power interrupt/transients related to the associated generator condition, particularly since all the FADEC channels are declaring faults.

The reported condition is intermittent, in the sense that it will clear with power reset. The FADEC does latch the condition fault condition until power reset. Conditions 3-4 would not be intermittent and condition 2 would typically not be intermittent.

Step One of the PWC procedure is to attempt fault clearing by cycling EEC power and that per the PWC manual is sufficient maintenance action to continue normal operation

One clue for electrical is the fact that all 4 EEC channels were affected. Channel A's are powered by essential buss held up by the battery and then all channels held up by the engine alternator above idle. That suggests an overvoltage transient condition rather than an under voltage transient condition on the busses.

This email notification is provided as the case has been reviewed and does not contain technical data in the resolution.

David P. McConnell

Senior Field Service Representative
Sikorsky, a Lockheed Martin company
Email dave.p.mcconnell@lmco.com
Smartphone +1 (203) 873-8552 (US)
Efax +1 (860) 998-8791 (US)
Cell +66 (0)8 7750-7920 (Thailand)



WARNING: THE INFORMATION IN THIS TRANSMISSION IS CONFIDENTIAL AND IS MEANT TO BE READ AND USED ONLY BY THE INTENDED RECIPIENT. ENCLOSED COMMODITIES, TECHNICAL DATA OR SOFTWARE ARE SUBJECT TO THE EXPORT CONTROL OF EITHER THE INTERNATIONAL TRAFFIC IN ARMS REGULATIONS (ITAR) OR THE EXPORT ADMINISTRATION REGULATIONS (EAR) AND CANNOT BE EXPORTED WITHOUT THE AUTHORIZATION OF EITHER THE DEPARTMENT OF STATE OR THE DEPARTMENT OF COMMERCE PRIOR TO EXPORT. EXPORT INCLUDES DISCLOSURE AND OR ACCESS TO COMMODITIES, TECHNICAL DATA OR SOFTWARE BY FOREIGN NATIONALS WHETHER LOCATED IN THE UNITED STATES OR ABROAD. THIS REQUIREMENT APPLIES EQUALLY TO FOREIGN NATIONAL EMPLOYEES OF U.S. COMPANIES AND THEIR FOREIGN SUBSIDIARIES. THIS DOCUMENT, OR AN EMBODIMENT OF IT IN ANY MEDIA, DISCLOSES INFORMATION WHICH IS PROPRIETARY, IS THE PROPERTY OF SIKORSKY AIRCRAFT CORPORATION AND/OR ITS SUBSIDIARIES, IS AN UNPUBLISHED WORK PROTECTED UNDER APPLICABLE COPYRIGHT LAWS, AND IS DELIVERED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED, DISCLOSED, REPRODUCED, IN WHOLE OR IN PART (INCLUDING REPRODUCTION AS A DERIVATIVE WORK), OR USED FOR MANUFACTURE FOR ANYONE OTHER THAN SIKORSKY AIRCRAFT CORPORATION AND/OR ITS SUBSIDIARIES WITHOUT ITS WRITTEN CONSENT, AND THAT NO RIGHT IS GRANTED TO DISCLOSE OR SO USE ANY INFORMATION CONTAINED HEREIN. ALL RIGHTS RESERVED. ANY ACT IN VIOLATION OF APPLICABLE LAW MAY RESULT IN CIVIL AND CRIMINAL PENALTIES. ANY REVIEW, USE, DISSEMINATION, DISTRIBUTION OR COPYING OF THIS TRANSMITTAL BY AN UNINTENDED RECIPIENT IS STRICTLY PROHIBITED, AND MAY BE A VIOLATION OF LAW SUBJECT TO PENALTY.