Civil Aviation Safety Investigation

FINAL REPORT

CLASSIFICATION: Serious Incident

Owner: RAF Avia, Latvia
Operator: RAF Avia, Latvia
Manufacturer: Antonov
Aircraft: AN-26B
Registration country: Latvia
Registration: YL - RAC
Location: "Traian Vuia" Timișoara International Airport, Southern part of runway
Date and time: 17.07.2017 / 20:30 LT (17:30 UTC)

No. : I 17 -13
Date: 13.12.2017
ENGINE FAILURE DURING TAKE-OFF RUN

<table>
<thead>
<tr>
<th>Aircraft</th>
<th>AN 26B / YL - RAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date and time</td>
<td>17.07.2017 / 20:30 LT (17:30 UTC)</td>
</tr>
<tr>
<td>Operator</td>
<td>RAF Avia, Latvia</td>
</tr>
<tr>
<td>Flight type</td>
<td>Cargo</td>
</tr>
<tr>
<td>Persons onboard</td>
<td>Pilot, Co-pilot, Flight mechanic</td>
</tr>
<tr>
<td>Injuries</td>
<td>-</td>
</tr>
<tr>
<td>Pilot</td>
<td>PL.FCL.7493.ATPL(A) / 28.02.2018</td>
</tr>
<tr>
<td>Co-pilot</td>
<td>PL.FCL.16462.CPL(A) / 31.03.2018</td>
</tr>
<tr>
<td>Board mechanic</td>
<td>PL.2430.FEL / 16.03.2019</td>
</tr>
<tr>
<td>Damage</td>
<td>-</td>
</tr>
<tr>
<td>Location</td>
<td>Timișoara “Traian Vuia” International Airport</td>
</tr>
<tr>
<td></td>
<td>Southern part of the runway</td>
</tr>
<tr>
<td></td>
<td>Coordinates: Latitude: 45° 48´ 51.2” N</td>
</tr>
<tr>
<td></td>
<td>Longitude: 21° 19´ 09.3” E</td>
</tr>
</tbody>
</table>

1. HISTORY OF OCCURRENCE

On 17.07.2017, the aircraft AN-26B, registered YL-RAC, was scheduled to perform a cargo flight with take-off from Timișoara International Airport, Romania (LRTR) having as destination Budapest International Airport, Hungary (LHBP).

At 20:32 LT (17:32 UTC), the aircraft started taxiing from parking position to waiting position for the runway 11 in service, and at 20:35 LT (17:35 UTC), Timișoara TWR cleared the aircraft to take-off. Shortly after the aircraft started the take-off run, engine no. 2 stopped off, without any other indication of abnormal operation. The crew Captain performed maneuvers to keep the aircraft on direction, but after taxiing around 200 m from the runway 11 threshold, it turned right and exited almost 30 m on the grass surface in the runway safety lane.

Being in radio connection with Timișoara TWR and following the instructions received, the Captain confirmed that the aircraft could return to the runway using its own means, and after returning to the runway he continued taxiing to the parking platform, parking at position 13. Subsequently, the aircraft was repositioned at position 9 to perform some functional engine tests.

After this serious incident, the aircraft crew did not suffer bodily injury and no damage has occurred to the aircraft.

Take-off/landing runway excursion location:
Coordinates: Latitude: 45° 48´ 51.2” N
Longitude: 21° 19´ 09.3” E
2. ADDITIONAL INFORMATION

2.1 Meteorological information

The METAR information issued for Timișoara International Airport (LRTR) valid on the date of the occurrence for 17:30 UTC (20:30 LT) was as follows:

METAR LRTR 171730Z 36006KT CAVOK 27/07 Q1019=

- wind direction N with the speed of 6 knots (3 m/s), visibility over 10 km, temperature 27° C, atmospheric pressure 1019 hPa.

2.2 Airport information

Timișoara - Traian Vuia International Airport (IATA code: TSR, ICAO code: LRTR) is the third airport in Romania, in terms of the registered passenger traffic.

The airport meets all the aeronautical safety conditions according to international standards. There are no operating restrictions for airline aircraft that have regular flights at Timișoara Airport, and it is open to irregular operation of any aircraft type.

2.3 Aircraft information

The aircraft involved in this occurrence is Antonov AN-26B, an aircraft used for cargo commercial air transport, which is equipped with two 2 turbo propulsion engines, also having a turbo-reactive auxiliary engine RU19. The wingspan is 29.2 m, and the orientation angle of the nose landing gear wheels is maximum 45° on each side (left-right).
The aircraft engines are AI-24VT type, manufactured by Ivchenko Progress. Engine no. 2, with serial number H4811BT061, was installed on YL-RAC aircraft on 24.05.2016, and on 17.07.2017 it had 2199 operating hours and 1973 cycles.

Last maintenance performed on aircraft and its engines was the check F-15 and is certified by CRS (Certificate of Release to Service) no. 349, dated 03.05.2017. Works were performed i.a.w. MP AN-26, issue 3, Revision nr.10, dated 06.01.2017, approved by CAA of Latvia by Part 145 approved maintenance organization RAF Avia (approval no. LV.145.0007).

Fuel flow regulator ND-24T, no. 02449365 was installed on engine no.2 (serial number H4811BT061) on May 25, 2016. During F-15 check, works on this component consisted in replacement of filters, as registered and certified on WO (Work Order) No 349 of 3 May, 2017, article 10.1.

The aircraft has a flight recorder (DFDR - Digital Flight Data Recorder) "БУР-4-1" type installed, which, after decoding, revealed the following data:

<table>
<thead>
<tr>
<th>Marks</th>
<th>00.08.09</th>
<th>00.08.11</th>
<th>00.08.16</th>
<th>00.08.22</th>
<th>00.08.30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Lever 1&amp;2 Settings (Degrees УПРТ)</td>
<td>100</td>
<td>100</td>
<td>74</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Torque Engine 1 (Kg/sq.cm)</td>
<td>94</td>
<td>94</td>
<td>94</td>
<td>40</td>
<td>0</td>
</tr>
<tr>
<td>Torque Engine 2 (Kg/sq.cm)</td>
<td>15</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>ACFT Heading (Degrees)</td>
<td>106</td>
<td>106</td>
<td>112</td>
<td>128</td>
<td>170</td>
</tr>
<tr>
<td>Event</td>
<td>TO Power set up Pitch stop engaged</td>
<td>Automatic Eng.2 propeller feathering</td>
<td>Power Levers was set 74 deg.</td>
<td>Power Levers was set 0 deg., Pitch stop disengaged, ACFT veered from RWY 11</td>
<td>ACFT stopped at heading 170</td>
</tr>
</tbody>
</table>

After returning to the airport platform and parking the aircraft in a position which fulfilled the necessary conditions to make engine testing, the crew inspected the aircraft. After the inspection no damages were found.

After finishing the aircraft inspection, the crew made the engine testing. Engine no. 2 started and worked normally at idle, but it stopped without control when a higher power was required.

To detect the malfunction that caused the uncontrolled engine shutdown it was inspected and checked the operation of systems involved in the engine automation:

1. The control system of Exhaust Gas Temperature – EGT, that limits the maximum temperature of exhaust gas at take-off. Main components: PRT Block, thermocouples.
(2) The propeller control system – maintains the engine speed constant when the control lever is in a position over the Flight Idle point, ensures positions of the propeller blades in accordance with the engine control levers position, locks/unlocks the propeller pitch and ensures the automatic or manual putting in feather position of the propeller in case of engine failure. Main components: governor R-68D-24, automatic sensor of propeller putting in feather position depending on its torque.

(3) The control system of the engine fuel supply. Main components: fuel pump regulator ND-24T, automatic fuel regulator ADT-24T.

The following components have been replaced one by one:
- PRT Block (from exhaust gas temperature control system);
- URT Block (from speed control system);
- governor R-68D-24 (from propeller control system);
- automatic fuel regulator ADT-24T;
- fuel pump regulator ND-24T.

After replacing each component there were performed engine tests to confirm or deny the malfunction removal.

The engine no longer presented the initial defect and worked in normal parameters after replacing the fuel pump regulator (ND-24T, No 02449365).

3 CONCLUSIONS
3.1 Findings

The crew members had valid licenses and medical certificates.

The aircraft had a valid airworthiness certificate, maintenance being performed according to the approved maintenance schedule.

During take-off run, engine no. 2 stopped without control, and the propeller was automatically put in feather position. There were no other indications of abnormal operation.

The aircraft crew did not report any external incident that could have caused the failure of engine no. 2 (birdstrike, FOD, etc.).

In order to find the malfunction that caused the engine uncontrolled shutdown more components of the systems that are part of the engine automatics were replaced one by one.
The engine operated in normal parameters after replacing the fuel pump regulator (ND-24T, No 02449365). Between the installation time and incident date, no faults in operation for this component were noted in aircraft maintenance files.

3.2 Cause of the occurrence

The cause of this serious incident is the engine uncontrolled shutdown, as a consequence of the fuel pump regulator (ND-24T) technical failure.

3.3 Safety recommendations

The investigation commission issued no safety recommendations after this serious incident.

Note: The documents and analysis objects used for the issuance of the flight safety investigation Report are confidential and are archived at the Civil Aviation Safety Investigation and Analysis Center, according to legal provisions.