RNSA

Rannsóknarnefnd samgönguslysa

Final report on aircraft serious incident

Case no.: **19-082F020**

Date: **6. June 2019**

Location: **The farm of Birtingarholt, near Flúðir**

Description: **A loss of engine power, resulting in an emergency landing**

1. FACTUAL INFORMATION

Location and time	
Location:	The farm of Birtingarholt, near Flúðir in Iceland
Date:	6. June 2019
Time[1]:	16:03

Aircraft	
Type:	Cessna 207
Register:	TF-MAJ
Year of manufacture:	1978
Serial number:	0479
CoA:	Valid
Engines:	Continental IO-520F13B of S/N 1012306

Other information	
Type of flight:	Repositioning flight
Persons on board:	One
Injury:	None
Damage:	Catastrophic damage to the engine
Short description:	The engine started running rough, resulting in the pilot making an emergency landing on a nearby farm

Pilot Flying	
Age:	23 years
Certificate:	CPL issued by ICETRA
Ratings:	SEP MEP IR
Medical Certificate:	Class 1
Experience:	Total flight hours: 541.7 Total flight hours on type: 307.4 Last 90 days on type: 0 Last 24 hours on type: 0

[1] All times in the report are Icelandic local times (UTC+0), unless otherwise stated

The airplane was being flown west on a re-positioning flight from Skaftafell (BISL) to Reykjavik (BIRK). During the flight at an altitude of 6000 feet, in CAVOK conditions, close to the farm of Birtingarholt, near Flúðir, the engine started running rough.

The pilot set the mixture to rich, propeller pitch to fine and the throttle to max.

The pilot knew the wind was from a northerly direction and he planned to land into the wind. The pilot searched for a place to land. His first thought was to land on a nearby road, but as he scanned the area he determined that a farm area nearby would be more suitable. The pilot then declared emergency on frequency 118.1 MHz, provided his rough location and stated that he intended to land at a nearby farm.

The airplane vibrated and blue colored smoke exited the engine cowling. The engine oil check hatch blew open and engine oil sprayed from the engine compartment.

The airplane lost altitude at a rate of about 1000 ft/min.

At an altitude of approximately 3000 feet, the pilot had lost most of the forward vision due to oil being sprayed onto the forward windshield. He therefore had to rely on the side windows during the landing.

The pilot made a second emergency call on the radio on frequency 118.1 MHz stating his location and his intent to land on a field near the farm.

As the airplane came downwind to the planned farmland landing site, he took a left turn to base compared to the planned landing site. The pilot extended the flaps to position 30.

When turning to base, the engine lost most of its power. This forced the pilot to make a steeper turn than he originally had intended.

The pilot landed the airplane at an airspeed of 70 - 80 knots, but normal landing is usually performed at 60-70 knots. During the landing roll, the pilot shut down the engine and retracted the flaps.

The landing at the farmland was successful.

Figure 1: Airplane TF-MAJ (rear and side view) at the landing site at Birtingarholt

Figure 2: TF-MAJ at Birtingarholt in Iceland

Figure 3: TF-MAJ oil leak blocked forward window vision

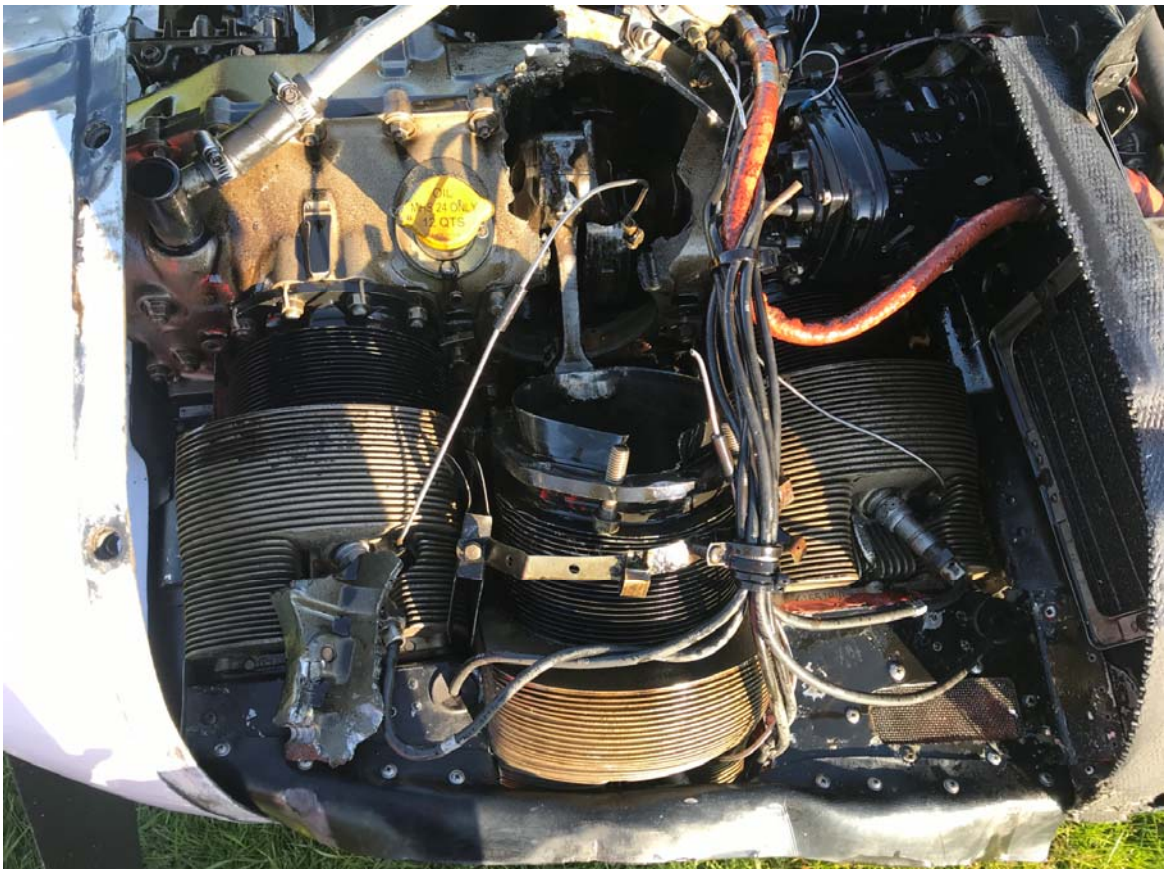

Figure 4: Opening of the engine cowling revealed catastrophic damage to the engine

The on-site inspection of the engine revealed a catastrophic damage to the engine with one cylinder being pushed off its base and a large piece of the crankcase broke off.

The engine had previously been overhauled by the manufacturer (factory overhaul) in June 2015. After the overhaul it was installed on airplane TF-MAJ and since installation, the engine had accumulated 1290.3 hours. The overhaul interval (TBO[2]) of the engine was set at 1900 hours. Therefore, at the time of the incident the engine had accumulated 67.9% of the time between overhauls.

[2] Time Between Overhaul

The last scheduled maintenance on the aircraft was a 50 hours inspection signed out on June 3rd 2019, three days prior to the incident. This was at a TACH time of 11.831. During this 50 hours inspection the following maintenance was performed:

- Vacuum pump P/N RAP215CC was replaced
- Oil filter P/N ch-48109-1 was replaced
- Oil was exchanged, using 8 quarts of the type 20w/50 oil

According to the maintenance provider there were no findings to the oil and the oil filter during that inspection.

The TACH time at the serious incident's site was about 11.837:45 and the next maintenance was scheduled at TACH time of 11.881.

2. ANALYSIS AND CONCLUSION

The engine was sent for a teardown inspection at the manufacturer analytical department. This was done in coordination with the United States ACCREP[3] to the investigation, from the NTSB[4]. Present during the teardown inspection in addition to Continental specialists were both the Investigator-In-Charge from the ITSB[5] as well as an investigator from the FAA[6].

Figure 5: Engine S/N1012306 after the cylinders had been removed

The teardown inspection of the engine revealed the following findings:

- Connecting rod no. 4 (S/N AE15DA612) failed due to complete connecting rod small end bushing migration and piston pin leaving its seat (see Figure 7)
- Connecting rod no. 3 (S/N AE15DA680) had incurred small end bushing migration, small end bushing turning and small end bushing damage (see Figure 8)
- Connecting rod no. 6 (S/N AE15DA666) had incurred small end bushing migration, small bushing turning and small end bushing damage (see Figure 9)

[3] Accredited Representative of a State, as defined by ICAO Annex 13
[4] National Transportation Safety Board
[5] Icelandic Transportation Safety Board
[6] Federal Aviation Administration

Other damage to the engine was suspected to be secondary damage caused by connecting rod no. 4 failure.

All the connecting rods in the engine were manufactured in 2015 and were installed new onto the engine during a factory overhaul. Due to the factory overhaul[7], the overhaul interval for the engine was set at 1900 hours instead of the usual 1700 hours for non-factory overhaul.

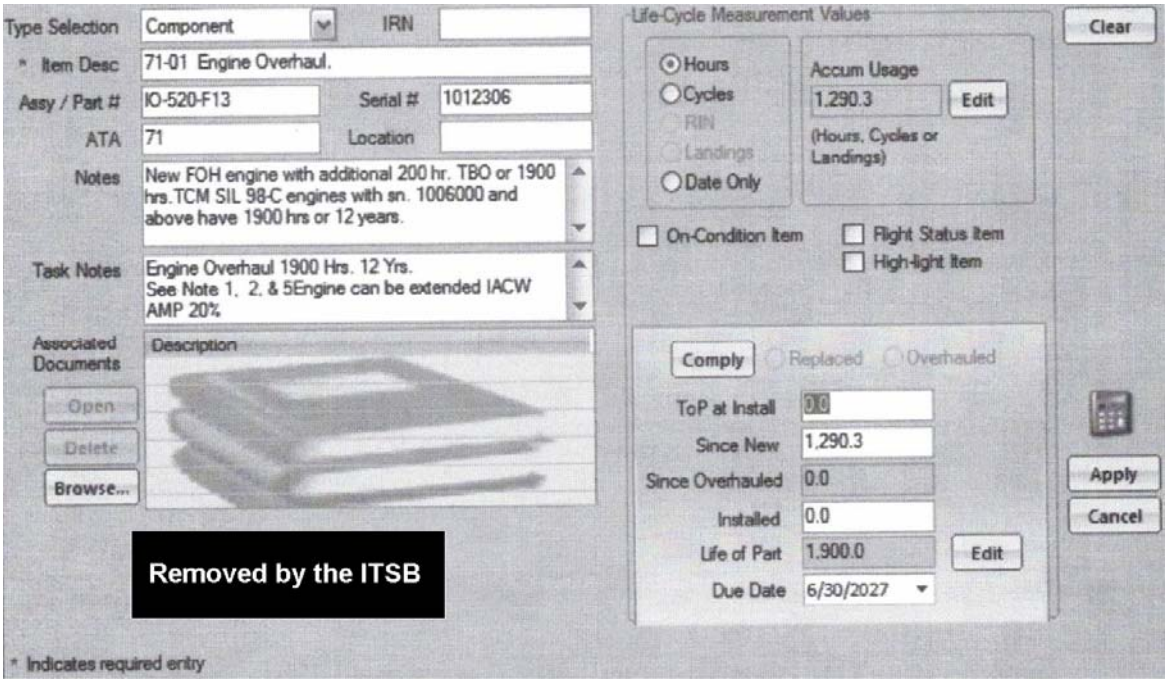

Figure 6: Engine overhaul set at 1900 hr

The engine had accumulated 1290.3 hours since the factory overhaul in 2015.

The manufacturer had only once seen an issue of migrating connecting rod small end bushings on this type of engine and that was for an engine which was on a TBO extension to 2700 hours.

[7] Benefits from many components being replaced with new instead of overhauled

Figure 7: Connecting rod no. 4 (S/N AE15DA612)

– Small end bushing fragments located in oil sump

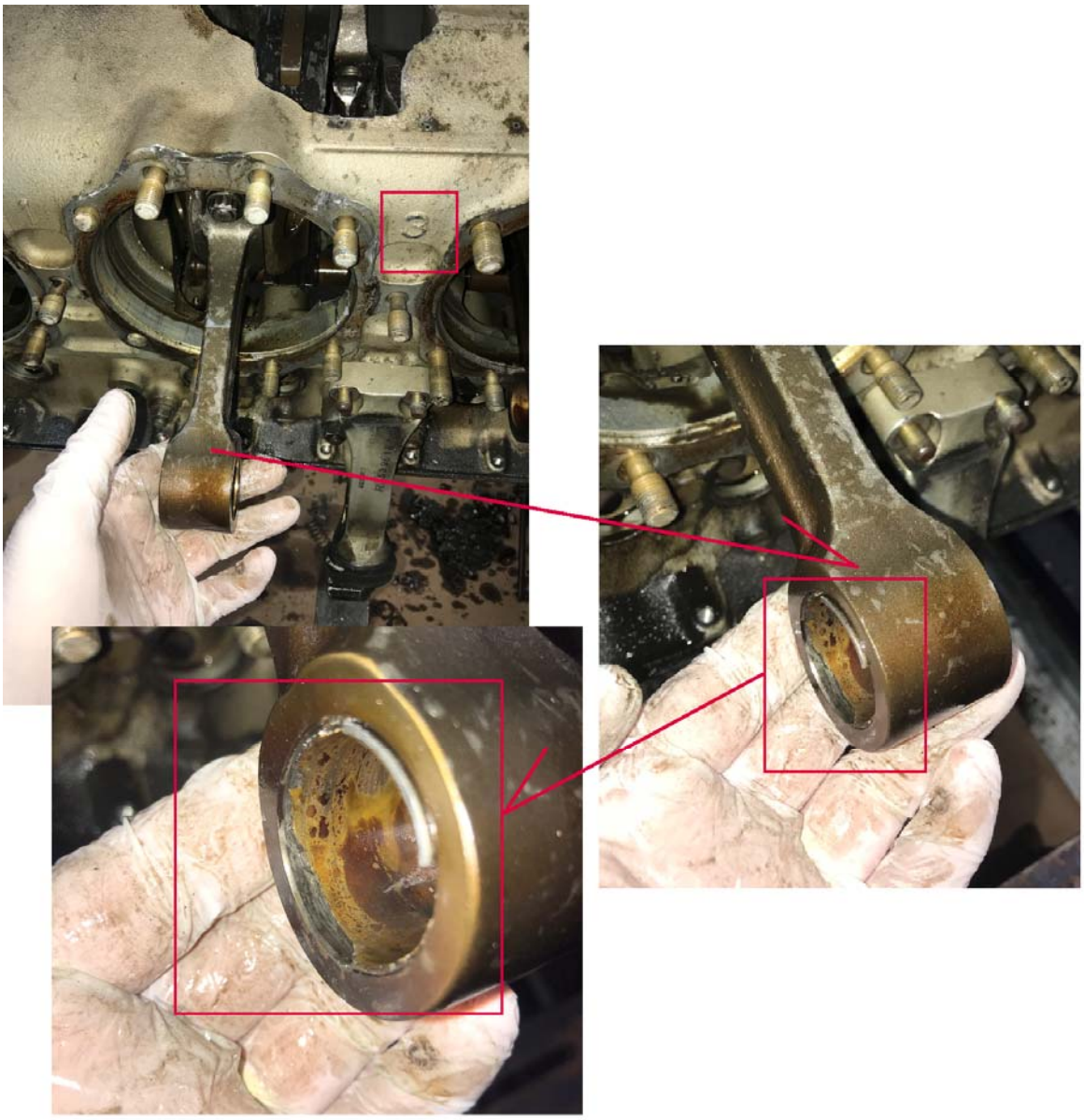

Figure 8: Connecting rod no. 3 (S/N AE15DA680)

– Small end bushing migration and damage

Figure 9: Connecting rod no. 6 (S/N AE15DA666)
– Small end bushing migration and damage

3. SAFETY RECOMMENDATIONS

The ITSB issues the following safety recommendations to Continental:

19-082F020 T01

Take the necessary quality assurance steps to ensure that connecting rod and the small end bushings conform to the required specifications and standards.

The following board members approved the report:

- Geirþrúður Alfreðsdóttir, chairman
- Gestur Gunnarsson, board member
- Hörður Arilíusson, deputy board member
- Tómas Davíð Þorsteinsson, deputy board member

Reykjavík, 15. October 2020

On behalf of the Icelandic Transportation Safety Board

Ragnar Guðmundsson
Investigator-In-Charge