DUTCH
SAFETY BOARD

Preliminary report/Safety Alert

Loss of engine power after take-off

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The Hague, December 2021

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The Dutch Safety Board

When accidents or disasters happen, the Dutch Safety Board investigates how it was possible for these to occur, with the aim of learning lessons for the future and, ultimately, improving safety in the Netherlands. The Safety Board is independent and is free to decide which incidents to investigate. In particular, it focuses on situations in which people's personal safety is dependent on third parties, such as the government or companies. In certain cases the Board is under an obligation to carry out an investigation. Its investigations do not address issues of blame or liability.

GENERAL OVERVIEW

Identification number:	2021062
Classification:	Accident
Date, time of occurrence:	25 June 2021, 07:33 UTC
Location of occurrence:	West of Teuge International Airport (EHTE)
Registration:	PH-FST
Aircraft type:	Cessna 208B
Aircraft category:	Fixed wing, single turboprop
Engine type:	Honeywell TPE331-12JR
Type of flight:	Parachute drop
Phase of operation:	Initial climb
Damage to aircraft:	Substantial
Flight crew:	1
Passengers:	17
Injuries:	1 passenger minor
Light conditions:	Daylight

1 INITIAL FINDINGS

1.1 General

This preliminary report presents an update on the accident investigation and initial findings regarding the propeller governor and monopole.

1.2 History of the flight

The aircraft took off from Teuge International Airport (EHTE) with a pilot and 17 parachutists on board. Shortly after take-off, the aircraft lost engine power, after which the pilot made an emergency landing in a field. The aircraft's right wing collided with a billboard, then the aircraft made a ground swing and came to a stop against the crash barrier next to a highway. The aircraft was substantially damaged. One parachutist was slightly injured.

The accident flight was the first flight of the aircraft that day. The aircraft was refuelled the day before. Prior to the accident flight, the maintenance company had replaced the monopole in the propeller governor, following trouble shooting of the engine's Exhaust Gas Temperature (EGT) indication in the cockpit.

1.3 Aircraft and engine information

The Cessna 208B (serial number 208B0823) is a single engine turboprop aeroplane. The aircraft was equipped with a Honeywell TPE331-12JR engine, a Hartzell propeller and associated components, in accordance with Supplemental Type Certificate SA10841SC issued by the US Federal Aviation Administration. The aircraft had a valid Certificate of Airworthiness and Airworthiness Review Certificate.

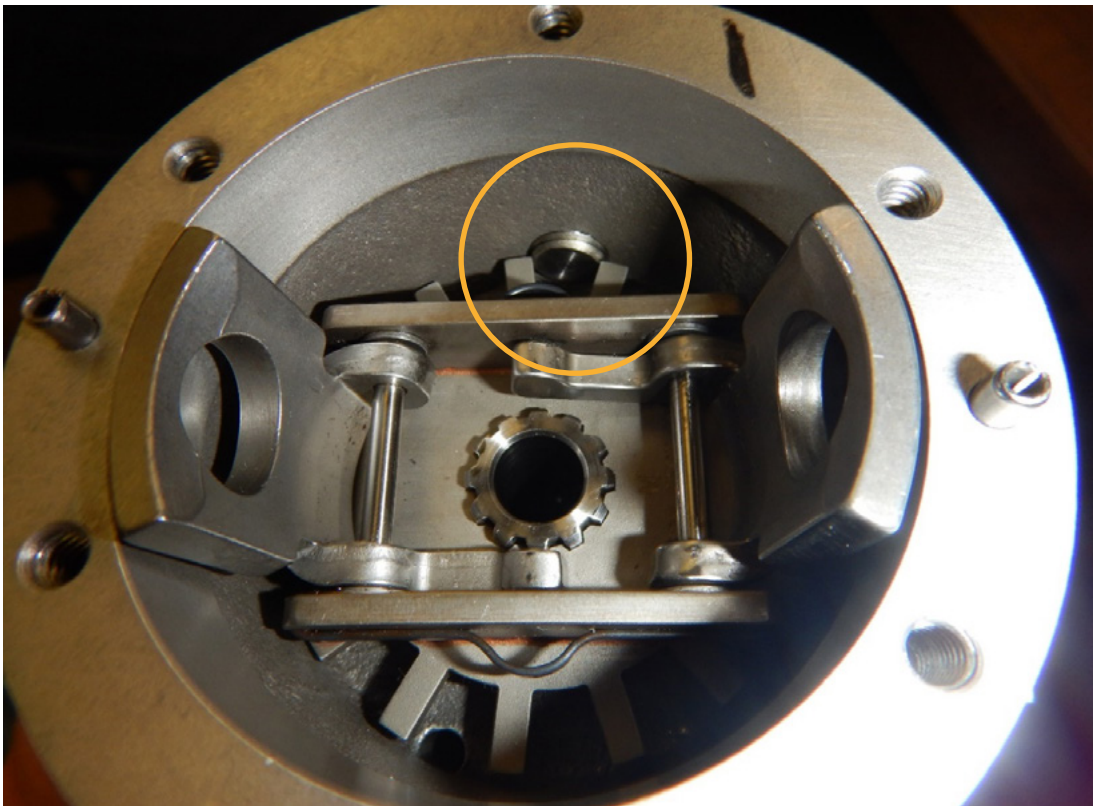
Propeller governor assembly
The propeller governor assembly is mounted at the rear of the engine reduction gearbox. During the propeller-governing mode of operation, which ranges from flight idle to maximum power, the governor controls the blade angle of the propeller. The propeller governor meters the oil pressure to control the pitch angle to maintain the selected engine speed (the TPE331 is a single shaft engine. This means that one shaft contains and drives all components necessary to produce power).
The propeller governor assembly is composed of an integral pump, metering valve, and a flyweight assembly, which includes a toothed gear. A speed sensing magnetic pickup (monopole) in the propeller governor assembly picks up the speed signal from the rotating toothed gear and provides this speed signal to the Single Red Line controller.

1.4 Initial findings

Analysis of the take-off and initial climb profile indicate that the flight profile was normal until the failure of the engine at around 400 feet AMSL. The technical examinations conducted indicate no abnormalities in the fuel supply to the engine. The engine was removed from the aircraft for further investigation. During the subsequent examination and disassembly of the engine, the engine gearcase was noted to be contaminated with metallic debris. Damage was noted to the exterior of the propeller governor housing in the approximate rotational plane of the toothed gear.

The propeller governor was removed from the engine as a possible source of the material. Following the disassembly, it appeared that amongst others the flyweight assembly was damaged and loose metal pieces were found within the governor housing. Almost all teeth had separated from the toothed gear. The monopole was removed from the governor as well and contact damage was noted to the pickup end of the monopole.

The Honeywell Maintenance Manual provides instructions regarding the installation of the monopole (instruction 72-10-03). The instructions state to turn the pickup (monopole) in the propeller governor assembly until it contacts the flyweight head (toothed gear). Next, the pickup is to be loosened ½ turn. This is to ensure that the pickup end of the monopole does not contact the toothed gear during operation.



An undamaged toothed gear with monopole positioned in between teeth (Source: Honeywell)

During the investigation it was demonstrated that it is possible to position the pickup end of the monopole in between the teeth of the toothed gear. In such case, it was determined that loosening it by a half turn is insufficient to ensure free rotation of the toothed gear.

At this stage the Dutch Safety Board does not issue a recommendation, but expects that Honeywell and Woodward inform their customers and take preventive measures where necessary.

1.5 Further work

The investigation continues to further examine all pertinent factors which might have contributed to the engine failure. In particular, work will be undertaken to further examine and assess, amongst others:

- the damage of the propeller governor and monopole;
- the sequence of events following the damage of the propeller governor;
- the maintenance procedures and activities.

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