

**No:** 6/92      **Ref:** EW/G92/03/10      **Category:** 1c

**Aircraft Type and Registration:** Rans S10 Sakota, G-RANS

**No & Type of Engines:** 1 Rotax 532 piston engine

**Year of Manufacture:** 1991

**Date & Time (UTC):** 22 March 1992 at 1405 hrs

**Location:** Near Stoke Badole, Nottinghamshire

**Type of Flight:** Private

**Persons on Board:** Crew - 1                      Passengers - None

**Injuries:** Crew - None                      Passengers - N/A

**Nature of Damage:** Propeller broken, landing gear collapsed with damage to the fuselage and the left leading edge strut bent

**Commander's Licence:** Private Pilot's Licence

**Commander's Age:** 28 years

**Commander's Flying Experience:** 100 hours (of which one was on type)

**Information Source:** Aircraft Accident Report Form submitted by the pilot and gearbox components examined by AAIB

This was the pilot's second flight in the newly built aircraft and some general handling and circuit work was planned. After take-off the pilot levelled at 1,500 feet altitude and checked the instruments. He carried out some gentle turns to the left and right and again an instrument check showed all parameters within limits. The aircraft was level at 1,500 feet at 85 kt and 5,500 rpm (normal cruise setting) when the engine suddenly oversped, exceeding the maximum tacho indication of 8,000 rpm. The engine was throttled back and the aircraft turned downwind. The pilot made an emergency call to his departure airfield but this was not successful as the transmission coincided with engine shut-down and the radio was powered directly from the engine driven generator.

A forced landing was made in a crop field; the ground was soft and the landing gear dug into the ground and collapsed but the aircraft did not turn over and the pilot exited unhurt.

It was apparent that there had been a disconnection within the single stage reduction gearbox and when the gearbox was examined it was found that it did not contain any oil. The teeth on the input pinion had been destroyed where they had been in contact with the larger diameter driven gear. The input

pinion teeth were wider than the driven teeth and both ends of each tooth were still present on the wheel but the centre of the span of each tooth had been removed. All the teeth on the driven gear were present and almost intact but they were covered with debris from the pinion gear which had melted and resolidified. The loaded faces of the driven gear also showed signs of heavy wear and overheating. The other components from the gearbox, seen by AAIB, showed no signs of distress.

The gearbox, whether supplied mounted on an engine or separate, is delivered without oil and, due to an oversight, none had been added before flight. Within the engine installation instructions there are two relevant paragraphs. Instruction No 8, the final assembly instruction which is marked with a Safety Warning Symbol, requires the addition of oil to the gearbox. No 9, the engine preflight instructions which are separate from any aircraft preflight instructions but which also have a Safety Warning Symbol, repeats the information that the gearbox is delivered without oil and must be filled.