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AIRCRAFT ACCIDENT REPORT

No. 92-009

**Harvard Ila
ZK-MJN**

Ardmore Aerodrome

25 March 1992

**Transport Accident Investigation Commission
Wellington - New Zealand**

TRANSPORT ACCIDENT INVESTIGATION COMMISSION

1. NARRATIVE

AIRCRAFT ACCIDENT REPORT NO. 92-009

Aircraft Type, Serial Number and Registration:	North American Harvard IIa NZ1052 ZK-MJN
Number and Type of Engines:	One Pratt and Whitney Wasp R-1340-AN-1
Year of Manufacture:	1943
Date and Time:	25 March 1992, 1334 hours NZST
Location:	Ardmore Aerodrome Latitude: 37°02'S Longitude: 174°58'E
Type of Flight:	Private – Training
Persons on Board:	Crew: 2
Injuries:	Crew: 2 Nil
Nature of Damage:	Substantial to left wing and main undercarriage
Pilot in Command's Licence:	Air Transport Pilot Licence — Aeroplane, with B and D Category Instructor Ratings
Pilot in Command's Age:	37
Pilot in Command's Total Flying Experience:	5200 hours 300 hours on type
Information Sources:	Transport Accident Investigation Commission field investigation
Investigator in Charge:	Mr D V Zotov

1.1 The two pilots had intended to make a series of take-offs and landings at Ardmore Aerodrome for the purpose of familiarising the experienced pilot under instruction on the handling of an aircraft with a tailwheel undercarriage configuration. The instructor had flown this type of aircraft while in the RNZAF, but not as an instructor.

1.2 Runway 21 was in use. The Aerodrome Superintendent had banned grass vector operations by aircraft over 1100 kg maximum all-up weight because it had been found that, in dry conditions, the grass took too long to recover from such operations.

1.3 The wind was light, but while its general direction favoured runway 21, fluctuations in direction had been producing perceptible drift during final approach.

1.4 On the first landing, the pilot under instruction had some difficulty with directional control. The intercom in the rear cockpit had a push-to-talk switch on the righthand cockpit wall, so if the instructor had his hands on the controls he had no means of communication with the student. He found this unsatisfactory, and decided to terminate the exercise after the second landing.

1.5 One the second landing, the pilot under instruction flared too high. The touchdown was a tailwheel first, and the aircraft "skipped" onto the mainwheels which set up a small bounce oscillation between tailwheel and mainwheels. The aircraft had drifted to the left of the centreline and the student advised that he corrected instinctively towards the centreline with rudder. This occurred during the first bounce, and when the mainwheels touched again the resulting swing to the right was overcorrected. The ensuing yaw to the left was again overcorrected.

1.6 The aircraft then started to swing to the right, and progressively increasing left rudder deflection did not check the swing. The left undercarriage leg collapsed and the left wingtip struck the ground. The aircraft came to a halt at the right edge of the runway, heading at right angles to the runway direction.

1.7 Tyre marks on the runway showed that the mainwheels were firmly on the ground while the aircraft was skidding parallel to the centreline but to the left of it, and the left mainwheel at least remained in contact throughout the accident sequence. About sixty metres after the initiation of the swing to the right, there was a gouge some 50 mm deep in the runway surface. Asphalt particles trapped between the tyre and the outboard rim of the left wheel confirmed that the wheel rim had "biten" into the runway surface at this point, the resulting shock loading causing the undercarriage oleo tube to fail in overload.

1.8 The instructor advised that he had not tried to use differential braking to stop the swing because, with the aircraft "skipping" after touchdown, he was concerned that the brake might be applied while the wheel was off the ground. By the time he considered applying power to counter the swing the aircraft was already at an angle to the runway; application of power may have taken it across the parallel grass vector, which was in use.

1.9 The factor which initiated the swing was the student's attempt to maintain the aircraft on the runway centreline. This resulted in the aircraft touching down with some drift. Had the aircraft been operating from a grass vector the absence of centreline marking would have removed this cause factor.

1.10 If a swing began during the ground roll, the tendency for the aircraft to move sideways was opposed by the friction between the mainwheels and the runway. A tailwheel aircraft was prone to groundloop: with the mainwheels ahead of the centre of gravity, the force distribution gave rise to a yawing couple which tended to exacerbate the swing.

1.11 The side forces on the mainwheels were greater on a sealed runway than on grass, due to the higher coefficient of friction, so any swing was likely to be more abrupt. The Ardmore runway was chip-sealed, giving a high coefficient of friction.

2. FINDINGS

2.1 The crew were appropriately licensed to conduct the flight.

2.2 The prevailing wind was generally along the sealed runway in use, but was variable in direction.

2.3 The aircraft groundlooped to the right during the landing roll.

2.4 Side forces caused the left oleo leg to fail in overload.

2.5 The aircraft's intercom system was unsuitable for an instructor to give dual instruction.

2.6 The probable cause of this accident was a swing due to touching down with drift, which was not adequately countered by the pilot and subsequent overcontrolling.

2.7 Contributory factors were insufficient recovery action by the instructor, the inability of the instructor to communicate readily with the student during the landing sequence, the instructor's decision to allow the student to make a further landing after he had decided he had an inadequate intercom system for instructional purposes, training in tailwheel technique on a sealed runway, and the soft asphalt surface on the runway.

12 June 1992

M F DUNPHY
Chief Commissioner