



NO. 93-004

NORTH AMERICAN HARVARD III★, NZ1066

ZK-ENE

HAMILTON AERODROME

27 FEBRUARY 1993

A B S T R A C T

During a stream landing at Hamilton Aerodrome the pilot of one aircraft initiated a swerve to increase the separation of his aircraft from the one in front. The swerve developed into a ground loop in which the aircraft sustained substantial damage.

TRANSPORT ACCIDENT INVESTIGATION COMMISSION

A I R C R A F T A C C I D E N T R E P O R T N O . 9 3 - 0 0 4

Aircraft Type, Serial Number and Registration:	North American Harvard III★, NZ1066 ZK-ENE
Number and Type of Engines:	One Pratt and Whitney R1340-AN1
Year of Manufacture:	1941
Date and Time:	27 February 1993, 1436 hours *
Location:	Hamilton Aerodrome Latitude: 37°52' S Longitude: 175°20' E
Type of Flight:	Display
Persons on Board:	Crew: 1
Injuries:	Crew: 1 Nil
Nature of Damage:	Substantial left undercarriage, wing
Pilot in Command's Licence:	Private Pilot Licence (Aeroplane)
Pilot in Command's Age:	46
Pilot in Command's Total Flying experience:	800 hours total 400 hours on type
Information Sources:	Transport Accident Investigation Commission field investigation
Investigator in Charge:	Mr D V Zotov

* All times in this Report are NZDT (UTC + 13 hours)

1. NARRATIVE

1.1 ZK-ENE was one of five Harvard aircraft which gave a formation aerobatic display at Hamilton Aerodrome. The display concluded with a run-in and break, after which the aircraft were to land in stream on sealed runway 18. The aircraft were to land on alternate sides of the runway, the number one aircraft landing on the left.

1.2 From the left side of runway 18, about 700 m from the threshold a sealed taxiway led to the apron in front of the terminal building.

1.3 The first two aircraft landed well into the runway, to leave room for those behind. They slowed to a halt by the taxiway and the number one aircraft turned off. Number two had landed on the right hand side of the runway and therefore had to cross it to reach the taxiway. The pilot turned left and looked to his left to ensure that he could cross safely. He saw number three on the runway sufficiently far away for him to cross, so he did so.

1.4 The pilot of the number three aircraft was aware that he had landed the aircraft "hot" (ie. with more than normal airspeed). The aircraft was still running on its mainwheels, the tailwheel not yet having settled. He looked up and saw number two crossing in front of him, and felt that there was a risk of collision. He therefore applied the brakes, and swerved to the right to pass behind the number two. He considered there was insufficient time to apply power and take off again.

1.5 The swerve to the right developed into a groundloop. Friction with the dry porous tarmac surface was sufficient to roll the tyre back so that the outer rim of the left wheel bit into the tarmac. The force thus generated was sufficient to bend the wheel fork and the oleo cylinder, and to cause the left wingtip to strike the ground with some force. The aircraft came to a halt at the intersection of runway 18 and grass runway 26, a distance of some 230 m short of the taxiway intersection.

1.6 Marks on the runway indicated that the upset was initiated, at latest, 250 m from the runway/taxiway intersection. Braking marks were sought, but could not be distinguished among the general tyre marks in the vicinity of the 1000-foot markers.

1.7 A witness was standing by the intersection

of the taxiway with the runway. She stated that the number two aircraft was entering the taxiway at the time that number three groundlooped. She had not noticed any abnormality about the spacing of the aircraft.

1.8 Number four was on short final at about 100 feet at the time of the groundloop. Numbers four and five made missed approaches and landed safely on grass runway 18, which commenced at the southern side of grass runway 26. Its length was 790 metres.

1.9 The weather was fine, with a wind from 230° magnetic at five to eight knots. It was noted as eight knots immediately after the groundloop. The crosswind limit for this aircraft type was 12 knots.

1.10 The pilot of the number three aircraft believed there was a risk of his aircraft colliding with number two, because his landing airspeed was "exceedingly high". Having decided that there appeared to be a hazard, it was natural for him to try to pass behind. Initiating a swerve into the crosswind would have increased the potential for a groundloop.

1.11 The Harvard's propensity for groundlooping when operating from a sealed runway and the greater potential for damage when operating from a sealed surface indicated that it would be preferable to operate these aircraft from grass surfaces wherever this was practicable.

1.12 At Hamilton, grass runway 18 was of sufficient length for the Harvards to operate on comfortably. The decision to use the sealed runway had been based primarily on convenience for the airshow organisers as it would have taken the Harvards longer to taxi back from the end of the grass runway, than to turn off at the centre of the sealed runway. In the event, the disabled aircraft had to be cleared from the runway, and the last two Harvards had to land on the grass runway, so the operational convenience was not achieved.

1.13 The stream landing saved little time but had a greater appeal for spectators in an airshow environment. However given the increased risk of a ground loop when Harvard aircraft land on a sealed runway it would be prudent for the preflight briefing to stress the procedures to be observed to maintain safe separation after touchdown, particularly if a sealed runway has to be used.

2. FINDINGS

2.1 The aircraft was airworthy prior to the landing.

2.2 The pilot initiated a swerve to avoid a perceived risk of a collision.

2.3 A deliberate swerve after the aircraft touched down developed into a groundloop.

2.4 The choice of a stream landing on a sealed runway increased the potential for this type of mishap.

2.5 The extent of the damage resulting from the groundloop would have been less had the landing been on a grass surface.

2.6 Stream landings as a display procedure can be executed safely in the Harvard aircraft.

3. SAFETY RECOMMENDATIONS

3.1 It was recommended to the association of which the pilot was a member that:

They consider reviewing their procedures for stream landing with Harvard aircraft so that such events are carried out on grass vectors wherever practicable (033/93), and

When stream landings are planned individual pilots are briefed to ensure that a safe distance is maintained between successive aircraft after touch down (034/93).



9 August 1993

M F Dunphy
Chief Commissioner