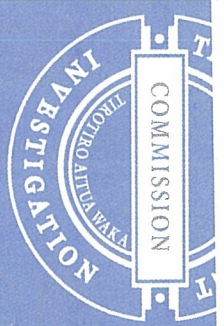


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AIRCRAFT ACCIDENT REPORT

No. 91-015

CESSNA 207 ZK-DXG

Mt Tarawera Airstrip

7 June 1991

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

TRANSPORT ACCIDENT INVESTIGATION COMMISSION

AIRCRAFT ACCIDENT REPORT 91-015

Aircraft Type, Serial Number and Registration: Cessna 207, 207/00267, ZK-DXG

Number and Type of Engines: 1 Continental IO 520F

Year of Manufacture: 1974

Date and Time: 7 June 1991 at 1500 hours NZST

Location: Mt Tarawera Airstrip
Latitude 38°13'40" S
Longitude 176°30'10"E

Type of Flight: Air Transport (Scenic)

Persons on Board: Crew: 1 Passengers: 5

Injuries: Crew: Nil Passengers: Nil

Nature of Damage: Substantial to nose undercarriage, forward fuselage, right wing and propeller

Pilot in Command's Licence: Commercial Pilot Licence - Aeroplane

Pilot in Command's Age: 38

Pilot in Command's Total Flying Experience: 820 hours, of which 110 were on type

Information Sources: Transport Accident Investigation Commission on-site investigation

Investigator in Charge: Mr R Chippindale

Transport Accident Investigation Commission
Wellington

Chief Commissioner
Transport Accident Investigation Commission

The attached report summarises the circumstances surrounding the accident involving Cessna 207 aircraft ZK-DXG at Mt Tarawera Airstrip on 7 June 1991 and includes suggested findings and safety recommendations.

This report is submitted pursuant to Section 8(2) of the Transport Accident Investigation Commission Act 1990 for the Commission to review the facts and endorse or amend the findings and recommendations as to the contributing factors and causes of the accident.

24 September 1991
R CHIPPINDALE
Acting Chief Executive

APPROVED FOR RELEASE AS A PUBLIC DOCUMENT

7 October 1991
M F DUNPHY
Chief Commissioner

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1. FACTUAL INFORMATION

1.1.1 On 7 June the pilot flew a party of five tourists, to land on the airstrip near the summit of Mt Tarawera, to view the evidence of the eruption which took place on 10 June 1886.

1.1.2 The pilot had landed a Cessna 172 on the strip earlier that day and considered from the behaviour of the windsock on this occasion that conditions would be similar for the landing with the C207.

1.1.3 The Mt Tarawera landing area was 3115 feet amsl and consisted of two 50 m wide, level, metalled strips one aligned 01/19 and the other 11/29 degrees magnetic.

1.1.4 The 01/19 strip was disused due to deep washouts in its surface. From the air the strip appeared useable but no warning symbol was displayed to alert pilots to the hazardous surface.

1.1.5 On this flight the pilot approached Mt Tarawera from the west and flew the aircraft along the line of the crater, with the mountain on the aircraft's right, so the passengers on that side could see the chasm caused by the eruption and he could see the windsock at the airstrip.

1.1.6 The windsock was indicating a wind of 10 to 15 knots blowing from 190° parallel to vector 19, the disused cross vector.

1.1.7 In such crosswind conditions, the pilot flew the aircraft to touch down at 80 knots thus having 5 knots "up his sleeve" to help with aileron control to hold the upwind wing down once the aircraft was on the ground.

1.1.8 The company's Operations Manual gave guidance on assessing the surface wind strength from the windsock indications and placed a limit of no more 15 knots from any direction or a 5 knot tail wind (component) for landing. It also required the pilot to check the 2000 foot wind at Rotorua but gave no guidance on the use of that information.

1.1.9 The 1000 hours winds recorded by the Meteorological Service from a pilot balloon ascent at Rotorua were:

2200 feet amsl	139°M/09 knots
2700 feet amsl	126°M/14 knots
3200 feet amsl	130°M/28 knots

The surface wind recorded at Rotorua Aerodrome at 1500 hours was averaging 15 knots with gusts to 24 knots true 130 to 150°M.

1.1.10 For an air transport operation to land at this altitude in a Cessna 207, with no tail wind, Civil Aviation Safety Order number 4 required a minimum landing distance of 745 m to be available. 700 m was required by the Flight Manual for a landing with a 5 knot tailwind component, approach speed 76 knots and 30° of flap.

1.1.11 The 11/29 strip was 700 m long but was scoured at the intersection of the two strips 200 m from the threshold of the 29 vector. While aircraft could land across this area the resultant bouncing of the aircraft was uncomfortable for passengers.

1.1.12 The 11/29 strip was a "one way" strip. Landings were permitted only on the 29 vector which did not have a favourable go around path available, due to the lip of the crater which was 200 feet above and 250m past the end of the 29 vector. The strip surface was compacted scoria. Loose scoria and sparse stunted scrub surrounded the strip.

1.1.13 The approach was normal and the aircraft touched down as the pilot intended, just past the intersection with the other vector.

1.1.14 After touch down the pilot applied the brakes evenly and they responded normally so he released them and allowed the aircraft to run for a short distance before re-applying them.

1.1.15 On the second brake application there was no response from the left brake and the aircraft started to drift to the right. The pilot pushed on the left pedal, both rudder and brake, as hard as he could. The brake pedal "seemed to go to the floor" without result but the rudder and associated nosewheel steering turned the aircraft to the left gradually and prevented the aircraft from running off to the downhill area on the right. The pilot avoided using right brake and continued to guide the aircraft to the left in an attempt to run it off the strip into an upward sloping area.

1.1.16 As a result the aircraft went through some soft ground before running onto a wider area at the end of the runway which was used for aircraft parking. It ran across the parking area and into a boulder strewn, alpine scrub area, where it slewed to the left and stopped some 20 m beyond the end of the strip.

1.1.17 The pilot did not warn the passengers of the impending excursion off the prepared surface and did not include in his safety briefing any information for the passengers on the "brace" position; prior to take-off or at any other time. One passenger was seated beside him and he was wearing the upper torso diagonal restraint as was the pilot. The remainder of the passengers were restrained by a lap strap.

1.1.18 The occupied space of the aircraft remained intact although twisting of the right wing root area forced the inboard edge of the right wing flap which was set at 20 degrees, through a window adjacent to a passenger's seat.

1.1.19 Once the aircraft had stopped the pilot assisted the passengers to leave the aircraft. One lady had a disability which restricted her movements so the seat behind the pilot's seat was removed to facilitate her egress.

1.1.20 The pilot ensured there were no injuries and that the electronic locator transmitter (ELT) had been activated. He was unable to communicate with any station by using the aircraft's radio so he left the ELT on. When a helicopter approached later he switched the ELT off and was able to satisfy the pilot by R/T that no one on board was injured.

1.1.21 All but two of the occupants were wearing warm jackets and the other two had pullovers. However there were no emergency clothing, "Space" blankets or similar readily accessible protection against the cold for the occupants other than the sheepskin covers fitted to each seat.

1.1.22 A check of the brake system after the incident established that there was no loss of hydraulic pressure and normal resistance to brake pedal application was still present.

1.1.23 Four months earlier the same pilot had difficulty with the directional control of ZK-DXG when landing it at Rotorua after a flight from Mt Tarawera. The rectification after that incident revealed that the disc of the aircraft's right hand brake unit had separated from its hub due to erosion of the unit by corrosion. The severity of the corrosion was probably related to an earlier period of operation of the aircraft from a landing strip on a beach.

1.1.24 On this occasion the left hand brake unit failed from the same cause.

1.1.25 Following a similar accident involving a Cessna 185D on November 1988 the Chief Inspector of Air Accidents, of the Office of Air Accidents Investigation, recommended to the General Manager of the Air Transport Division of the Ministry of Transport that a calendar periodic inspection schedule be established for these disc assemblies and after that inspection they be inspected by non-destructive testing, if necessary, irrespective of the hours flown. (See OAAI Aircraft Accident Brief 88-078).

1.1.26 The ATD considered that such an inspection was not warranted and there was no NDT method appropriate to enhance such an inspection. However the Division did accept that corrective action was necessary and highlighted the circumstances in the General Section of their October 1989 Defect Summary as detailed below:

OCT 89

SECTION THREE : GENERAL

CAIC-AIR 4

CLEVELAND DISC BRAKE ASSEMBLIES
Cleveland wheel assemblies P/N 40- series with disc assemblies P/N 164- series installed on, but not limited to, Beech, Bellanca, Cessna, Piper, Maule and Mooney single engined aircraft.

RECOMMENDATION

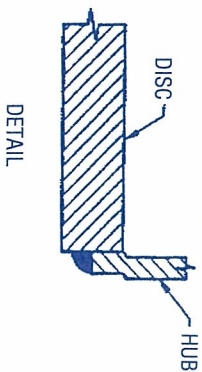
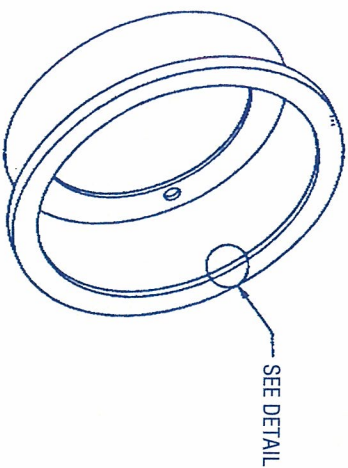
To prevent failure of brake disc assembly and possible loss of aircraft control when landing or ground manoeuvring it is strongly recommended that the following is accomplished at intervals not exceeding twelve months:

Remove wheels from aircraft and thoroughly clean and inspect disc assembly in area of the disc to hub weld. It may be necessary to remove assembly from the wheel to adequately inspect. Remove corroded or defective assemblies from service before further flight.

Please report any defects found.

This recommendation is made as a result of an accident involving a Cessna 185 on 1 November 1988. Defect 88-153 (CAIC-AIR 4, February 1989) and Air Accident Brief 88-089 refer.

88-153



1.1.27 The unit which failed on this occasion was inspected in situ when its opposite number failed four months earlier but it was not replaced by a serviceable unit. The unit was also inspected at every tyre change and routine inspection.

2. FINDINGS

2.1 The pilot was fit and appropriately qualified for the flight.

2.2 The length of the Mt Tarawera airstrip was marginal for air transport operations at an elevation of 3115 feet amsl with a Cessna 207.

2.3 The failure to maintain the airstrip intersection in a satisfactory condition prompted the pilot to land past that area.

2.4 The pilot eroded the safety margin provided for air transport operations by flying the aircraft to touch down 200 m from the threshold.

2.5 Had the full length of the airstrip been utilised it was unlikely that an overrun would have occurred after the brake failure.

2.6 The aircraft's disc brake assembly was operating normally prior to the flight and during the initial landing run.

2.7 The brake unit's disc assembly had been weakened due to corrosion.

2.8 The failure of the disc assembly in the opposite mainwheel four months earlier provided a clear warning of the potential for this failure to occur.

2.9 The operators and their maintenance organisation were not persuaded by the advice promulgated to prevent this type of failure, to reject the subject disc brake assembly when it was inspected after the failure of its opposite number.

2.10 Further emphasis was required on the susceptibility of the Cleveland Disc Brake Assemblies to an unacceptable loss of strength through corrosion.

2.11 Although not a factor in this accident the existence of the apparently serviceable 01/19 strip with substantial hidden hazards, provided an unnecessary potential for an accident to occur if any aircraft pilot elected to use the area in an emergency.

2.12 The cause of the accident was the failure of the aircraft's left hand mainwheel disc brake unit at a critical stage of the landing run. Other causal factors were the failure to recognise the potential for this failure, the ineffectiveness of action taken to eliminate a known cause of accidents, the pilot's decision not to use the full strip length available, insufficient maintenance on the airstrip, the tailwind component during the landing and the pilot's technique of using a higher than normal approach speed and less than normal flap in the crosswind conditions.

3. RECOMMENDATIONS

3.1 As a result of the investigation into the circumstances of this accident it was recommended to the President of the Rotorua Aero Club that:

The disused vector 01/19 on their private strip at Mt Tarawera be marked with a white cross at each end to deter any pilot from attempting a landing on it.

That in marginal wind condition pilots be required to fly over the strip to assess the wind conditions prior to landing,

That Cessna 207 operations to the Mt Tarawera strip be discontinued until the full length of the strip is available and in good repair,

That a blanket be available for each passenger, and

That if the landing procedure required cannot be adhered to in respect of flap settings and approach speeds then no landing be attempted.

3.2 It was also recommended to the General Manager of the Air Transport Division that more stringent criteria be established for the continuance in service of Cleveland disc brake assemblies.

7 October 1991

M F DUNPHY
Chief Commissioner