TRANSPORT ACCIDENT INVESTIGATION COMMISSION
TE KOMIHANA TIROTIRO AITUA WAKA

AIRCRAFT ACCIDENT REPORT

No. 91-013

Piper PA23-150 Apache

C-FDTG

Marua, near Hikurangi

27 April 1991

Transport Accident Investigation Commission
Wellington · New Zealand

Price $11.95 (including G.S.T.)

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ADDENDUM

AIRCRAFT ACCIDENT REPORT No. 91-013

Page 6 Section 1.5.9 please amend the date of licence validity to read 12 May 1991.

Transport Accident Investigation Commission
Wellington

Chief Commissioner
Transport Accident Investigation Commission

The attached report summarises the circumstances surrounding the accident involving Piper PA23-150 Apache aircraft C-FDTG at Marua, near Hikurangi on 27 April 1991 and includes suggested findings.

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 as to the contributing factors and causes of the accident.

27 February 1992

R CHIPPINDALE
Acting Chief Executive

APPROVED FOR RELEASE AS A PUBLIC DOCUMENT

12 March 1992

M F DUNPHY
Chief Commissioner

AIRCRAFT:	Piper PA23-150 Apache	**OPERATOR:**	Mr V.J. Prouting
REGISTRATION:	C-FDTG	**PILOT:**	Mr V.J. Prouting
PLACE OF ACCIDENT:	Marua, Near Hikurangi	**OTHER CREW:**	Nil
DATE AND TIME:	27 April 1991, 1600 hours	**PASSENGERS:**	Nil

SYNOPSIS:

The Duty Inspector of Air Accidents was notified of the accident at 1740 hours on 27 April 1991. Mr D.G. Graham was appointed Investigator in Charge and commenced an on-site investigation next morning. The aircraft collided with trees immediately after taking off from a farm airstrip. The aircraft descended into a bush clad gully and caught fire. The pilot succeeded in vacating the cockpit but received extensive burns. He died in hospital 14 days after the accident.

1.1 HISTORY OF THE FLIGHT:	1.2 INJURIES TO PERSONS:	1.3 DAMAGE TO AIRCRAFT:	1.4 OTHER DAMAGE
See page 4.	**Pilot:** 1 Fatal	The aircraft was destroyed.	Nil.

1.5 PERSONNEL INFORMATION:

See page 6.

Flight Times

	Last 90 days	Total
All Types	30 (Approximate times only)	3140
On Type	Not known	600 approx

1.6 AIRCRAFT INFORMATION:

See page 7.

1.7 METEOROLOGICAL INFORMATION:	1.8 AIDS TO NAVIGATION:	1.9 COMMUNICATIONS:
See page 8.	Not Applicable.	Not Applicable.

1.10 AERODROME:	1.11 FLIGHT RECORDERS:	1.12 WRECKAGE AND IMPACT INFORMATION:
See page 8.	Not Applicable.	See page 9.

1.13 MEDICAL AND PATHOLOGICAL INFORMATION:	1.14 FIRE:	1.15 SURVIVAL ASPECTS:
See page 10.	See Page 10.	See page 10.

1.16 TESTS AND RESEARCH:	1.17 ADDITIONAL INFORMATION:	1.18 USEFUL OR EFFECTIVE INVESTIGATION TECHNIQUES:
See Page 10.	See page 11.	Nil

2. ANALYSIS:	3. FINDINGS:	
See page 12.	See page 13.	

4. SAFETY RECOMMENDATIONS:	5. APPENDICES:

* All times in this report are NZST (UTC + 12 hours)

1. FACTUAL INFORMATION

1.1 History of the flight

1.1.1 The aircraft's owner/pilot was a Canadian citizen who was born in New Zealand, but had lived and worked in Canada for many years, latterly based in Prince George, British Columbia where he was employed as a Greyhound bus driver.

1.1.2 He had owned Piper Apache C-FDTG for more than fourteen years and had flown it extensively in both Canada and the United States. During 1985, however, the aircraft had been dismantled and shipped to New Zealand to be later re-assembled. The pilot had returned to his parent's farm property in Northland at that time. Some three years later the pilot returned to Canada. The aircraft remained at the farm.

1.1.3 About two weeks before the accident, the pilot had arrived back in New Zealand with the intention of flying C-FDTG back to Canada. He intended to depart from Kerikeri Aerodrome and the proposed route included Norfolk Island, Fiji, Samoa, Christmas Island, Honolulu and San Francisco. A large ferry tank of welded aluminium construction, positioned behind the pilot's seat, had been installed in the aircraft during his previous stay in New Zealand. It was estimated to have had a capacity of more than 200 litres. The aircraft's main and auxiliary fuel tanks, located in the wings outboard of each engine, had a combined capacity of approximately 408 litres.

1.1.4 Family members reported that preparations for the flight included the installation of additional navigation and "oceanic" radio equipment which the pilot had brought with him specifically for the long overwater sectors. The aircraft had been cleaned and inspected, the undercarriage function had been checked and the battery had been changed. The pilot had also spent some time working on at least one of the magnetos on one engine, in which he had identified and corrected a defect. He had carried out a number of engine runs during the preparation period.

1.1.5 In the late afternoon of 26 April 1991 (the day before the accident) the pilot had taken off from the property in C-FDTG, completed a circuit and landed. One of his brothers, who had assisted him in preparing the aircraft, observed the take-off which was made towards the west. He reported that the aircraft had "clipped" trees at the western boundary shortly after becoming airborne. The landing had been difficult due to the glare of the sun and was somewhat "heavy". In a later discussion with his brother regarding the take-off, the pilot had commented that he would use "more flap and rotate it sooner" on the next occasion. There was no indication however that he was dissatisfied with the overall performance of the aircraft or its engines. The airspeed indicator had not given any reading on this brief flight and prior to the flight the next day, the pitot head and lines were cleared to the pilot's satisfaction.

1.1.6 The aircraft had been refuelled by the pilot from two of four drums of BP Racing Fuel No. 1 which had been purchased from the BP Depot in Whangarei and transported to the farm airstrip. The position of two unsealed drums indicated that they had been used to refuel the left and right wing tanks respectively. A quantity of about 155 litres had been uplifted to refuel the left

tanks and 160 litres to refuel the right tanks. Whether any significant quantity of fuel had been placed in the "ferry" tank was not established, but it was likely that the pilot had added at least some fuel to this tank in order to check its operation.

1.1.7 On the day of the accident the pilot planned to fly C-FDTG to Kerikeri to position the aircraft for final preparation and formalities prior to the proposed departure across the Pacific. He had arranged to return by road from Kerikeri and accordingly had left his personal luggage at the farm. Family members recalled, however, that he took with him in the aircraft a briefcase containing all his navigation data and personal and aircraft documentation. Other items on board included a nosewheel chock, a small toolbox and a 10 litre container of oil to replenish the engine's oil supply. The co-pilot's seat and spare control yoke from the aircraft were left at the farm.

1.1.8 Before commencing the take-off, the pilot taxiied C-FDTG up and down the airstrip three times. He had earlier walked over the strip and discussed with his brother, who was to drive to Kerikeri, whether an easterly or westerly take-off direction would be most suitable in the prevailing conditions. There was little wind at the time, but occasional light gusts were from a north to north-easterly direction. In the event, having made the decision to attempt the take-off, despite his recognition that it might be marginal, the pilot chose to take-off to the east.

1.1.9 After taxiing into position just to the west of the last of three fence lines which had been taken down to increase the available length, he held C-FDTG on the brakes, opened both throttles and commenced the take-off. Several family members in various locations on the property watched the aircraft gather speed and eventually become airborne. It lifted off at a late stage and shortly afterwards the observers saw and heard it strike the upper portion of trees growing down the slope beyond the eastern end of the airstrip. The engines sounded normal throughout the take-off and initial climb. The pilot's brother, who was at the airstrip with his family, reported that the aircraft had a high nose attitude and may have stalled into the trees. Immediately after contacting the trees the aircraft rolled to the right and disappeared from sight as it descended down the bush covered slope. Within a few seconds of impact the observers saw a plume of smoke rising from the bush.

1.1.10 The pilot's brother and family ran to the scene but found the aircraft burning fiercely amidst the trees in which it had come to rest. Others who had observed the accident alerted police and medical authorities. The pilot had extricated himself from the cockpit and had managed to walk some distance from the vicinity of the burning aircraft but had sustained very severe burns. Immediate first aid was rendered by his brother and family. The rescue helicopter from Whangarei arrived at the airstrip within 30 minutes of the accident and the pilot was transferred to Northland Base Hospital. Local farmers and the Hikurangi Fire Brigade endeavoured to extinguish the fire but it was of such intensity that the aircraft was consumed. The fire was confined however and little damage occurred to the surrounding bush.

1.1.11 The pilot made no comment regarding the accident other than expressing his concern that, as the take-off progressed, the aircraft "just wouldn't pull up" (i.e. lift off and climb sufficiently to clear the trees).

1.1.14 The accident occurred in daylight at about 1600 hours. The accident site was in a bush clad gully, near Marua, 11 km east-north-east of Hikurangi, at an elevation of approximately 400 feet amsl. National Grid Reference 375262 NZMS 260 Sheet Q06 Pt R06 "Hukerunui". Latitude 35°33'07"S, longitude 174°23'08"E.

1.5 Personnel information

1.5.1 The pilot in command, Vernon Joseph Prouting, 48, had learned to fly in New Zealand and had obtained a New Zealand Private Pilot Licence in 1964 which had been kept valid until 1967. This licence included ratings on PA18 and PA28 aircraft types.

1.5.2 Information from the Transportation Safety Board of Canada indicated that in 1966 Mr Prouting had been issued with a Canadian Private Pilot Licence and in 1967 had obtained a Canadian Commercial Pilots Licence. A seaplane endorsement was later added to this licence. In 1973 he was issued with a multi-engine endorsement. The flight test for this endorsement was flown in Piper PA23-150 Apache C-FDTG.

1.5.3 Mr Prouting had obtained a Canadian Class II Group I Instrument Rating in 1980 in C-FDTG and in 1984 had been issued with a Class I Group I Instrument Rating. This had lapsed in 1985. Subsequently he had undertaken the necessary examinations and had commenced flight training in Canada to regain his instrument flight qualifications.

1.5.4 After his return to New Zealand in 1985, Mr Prouting's Canadian Commercial Pilot Licence had been validated, enabling him to exercise the privileges of a New Zealand Private Pilot Licence. The certificate was endorsed for Group E aircraft which covered operation of the Piper PA23 Apache.

1.5.5 In 1986 while still in New Zealand, he had undertaken a flight check as a qualification assessment for the issue of a New Zealand Private Pilot Licence. The form completed for this purpose indicated his total flight experience as 3067 hours which included 2393 hours as pilot in command, 85 hours dual, 122 hours night and approximately 200 hours instrument flight time.

1.5.6 He had subsequently been issued New Zealand Private Pilot Licence number 10127 which had remained valid until October 1987. This licence had not been renewed.

1.5.7 His most recent Canadian aviation medical examination was carried out in November 1990. At this time he was assessed fit, A1 Category, with no restrictions.

1.5.8 Mr Prouting's Canadian Commerical Pilot Licence was valid until 12 May 1991. At the time of his last Canadian medical examination he indicated a total flight experience of 3140 hours, of which 60 hours was obtained in the last 12 months and 30 hours within the last 90 days. No record was available of his total flight time on multi-engined aircraft, or the hours flown on Piper Apache C-FDTG, but information recorded in 1985 indicated that he had accumulated 586 hours of multi-engine experience, almost all on C-FDTG, by that time.

1.5.9 Mr Prouting did not hold a Canadian or New Zealand Aircraft Maintenance Engineer Licence.

1.6 Aircraft information

1.6.1 Piper PA23-150 Apache C-FDTG serial number 23-1467 was manufactured in the United States in 1958. It had been imported to Canada in the same year.

1.6.2 The two engines were Avco Lycoming O320-A3B. The left engine was serial number L7131-27 and the right engine serial number L7130-27. The propellers were Hartzell type HC82VL-2C. The left propeller was serial number K3357N. The right propeller was serial number 327R.

1.6.3 Information from the Department of Transport, Transport Canada Aviation Group, indicated that the most recent Canadian Department of Transportation inspection was carried out on the aircraft in September 1983. The aircraft had last been weighed in October 1983. The aircraft's latest Canadian Certificate of Airworthiness was recorded as issued in September 1985.

1.6.4 The pilot had applied to the Civil Aviation Division of the New Zealand Ministry of Transport in August 1986 for registration of the aircraft on the New Zealand Register as ZK-VJP and had indicated that it would be made available shortly thereafter for survey for the issue of a New Zealand Certificate of Airworthiness (C of A). During 1987 the pilot arranged for an approved maintenance facility in Whangarei to carry out the necessary inspections and work on the aircraft to obtain a New Zealand C of A. A portion of the work was carried out but the financial arrangements became the subject of dispute to the extent that, although the matter was eventually resolved, early in 1988 the pilot flew the aircraft back to the farm property without the remainder of the work for the New Zealand C of A, or its documentation, being completed.

1.6.5 In the interim, the Civil Aviation Division had discontinued further action to place the aircraft on the New Zealand Register after receiving information from the Canadian authorities that C-FDTG could not be removed from the Canadian Register at that time as the aircraft was involved in a matter before the courts.

1.6.6 A Certificate of Registration for C-FDTG indicating Mr Prouting as owner of the aircraft, was issued in Vancouver by the Transport Canada Aviation Group, on 7 February 1991.

1.6.7 Towards the end of 1988 Mr Prouting had applied to the Transport Canada Aviation Authority to allow him to fly C-FDTG from New Zealand to British Columbia. The required Flight Permit, valid from October 1988 to December 1988 had been issued and forwarded to Mr Prouting who was still in New Zealand at that time.

1.6.8 A similar Flight Permit had been issued to Mr Prouting in Canada, on 2 April 1991, authorising a ferry flight of C-FDTG from New Zealand to British Columbia. This Flight Permit was valid until 2 June 1991.

1.6.9 Special compulsory conditions included the following:

"...(3) the aircraft shall be certified as serviceable for the proposed flight, by an appropriate endorsed aircraft maintenance engineer, or other authorised person, or holder of an appropriate ICAO type licence issued by the state in which the aircraft is located, in the aircraft journey logbook prior to commencement of the flight,

...(6) Any modification to the aircraft shall be approved by Transport Canada."

1.6.10 The airframe, engine and propeller logbooks for C-FDTG were believed to have been destroyed by fire at the time of the accident. At the time of his application to the Canadian Department of Transport for a Ferry Permit in September 1988, Mr Prouting indicated that both engines had accumulated 1990 hours, but "checked out 100 percent" on a leakdown test. (The manufacturer's recommended time between overhauls for the engine type was 2000 hours). No indication was given as to the total airframe time.

1.6.11 The mass of C-FDTG at the time of the accident could not be determined with accuracy, but was estimated as 1455 kg (approximately 3200 pounds). Maximum authorised take-off mass was 3800 pounds. The C of G was estimated to be within limits.

1.7 Meteorological information

1.7.1 A ridge of high pressure, lying north-east to south-west moved steadily east across New Zealand during the day as a small depression and associated frontal system moved towards North Island. The frontal band moved onto northern North Island and Taranaki late in the evening. The General Aviation forecast for the Northland/Auckland/Taranaki area valid from 1300 to 2400 hours indicated lower cloud levels and rain developing in the late afternoon and evening. No significant turbulence was forecast. The 3000 foot wind at Kaitaia at 1200 hours was 030°/13 knots.

1.7.2 The 1600 hour recording from the Whangarei Automatic Weather Station provided the following information:

Average Wind:	030°/8 knots (maximum 3 second wind gust in previous hour 14 knots)
Past Weather:	No rainfall in last hour
Temperature:	18°C
Dew Point:	12°C
QNH:	1013.9 Hpa

1.7.3 Witnesses to the accident reported that it was clouding over at the airstrip, but there was no rain. Conditions were almost calm with occasional light wind gusts from the north or north-east. After the accident the smoke from the burning aircraft was observed to drift slowly to the west.

1.10 Aerodrome information

1.10.1 The farm was situated in coastal hill country, partly bush covered and partly grazing land. The airstrip was located on an undulating plateau of small open paddocks at an elevation of 400 feet amsl. The airstrip was aligned 240°/060°M and fences had been taken down to provide an average width of some 30 m. At the eastern end it was bordered to the north and south by stands of totara and manuka. The temporary removal of the three fence lines within four small paddocks through which the strip passed provided a total available length of some 350 m. However the surface of the western-most paddock which was 80 m wide, was covered with small hillocks and had an upslope to the east of 4°.

1.10.2 The pilot had not utilised this paddock, probably due to its roughness and the upslope, but had commenced the take-off in C-FDTG close to the paddock's eastern boundary. From this point an available length of 270 m remained before the ground began to fall away over a further 40 m to the line of trees with which the aircraft collided. The surface was dry, short cropped grass, and was relatively smooth. From the take-off position the airstrip sloped upwards at 2° for 90 m, then levelled for 70 m before descending some 75 m to a depression and rising again, resulting in an overall down slope over the final 110 m of about 1.5°. The airstrip had a transverse slope of 1° to 1.5°, downwards towards the north.

1.12 Wreckage and impact information

1.12.1 The burned out remains of C-FDTG were lying amongst the trees and undergrowth of a gully which sloped down from the eastern end of the farm airstrip at an angle of some 45°. The wreckage was about 150 m beyond the end of the strip and some 30 m below it. The aircraft had cut a narrow swathe through the trees as it descended and was probably steeply banked to the right and in a nose down attitude at the time of ground impact, after which it had rebounded and slid further down the slope before being arrested by trees and local levelling of the ground contour.

1.12.2 The fuselage lay on a heading of 060°M. The tail assembly had "jack-knifed" to the right. Fire had consumed virtually the whole aircraft except for the propeller assemblies and forward sections of the engine and cowlings. No useful information was available from the remains of the cockpit or instrument panel.

1.12.3 Neither propeller was feathered. The relative lack of damage to the propeller blades suggested that the pilot may have reduced power on both engines following initial impact with the trees. The position of the flaps was not established. Damage to the main and nose undercarriage assemblies suggested that retraction had probably commenced shortly before ground impact occurred.

1.12.4 It was not practicable to determine whether all primary control systems were intact and capable of correct function prior to the accident. The control cables, however, had survived the fire and the relative positions in which the cables and the attachments for the elevator, rudder and aileron circuits were found, appeared normal.

1.12.5 The tip section of the right wing (750 mm in width and extending across the full chord of the wing), had been torn from the aircraft when it collided with the trees after lifting off from the airstrip, and had remained lodged in the upper branches of the trees. Examination of the detached tip and broken foliage in the area indicated that the right wing had struck several totara and tanekaha saplings about 10 m tall, which were growing at the edge of the bush. The aircraft had struck the trees 2.5 m to 3 m below their tops. The trunks were some 50 mm to 60 mm in diameter at the point of collision. Impact marks on the wingtip showed that the aircraft was laterally level and in a climbing attitude when the collision occurred.

1.12.6 The ground fell away at the eastern extremity of the airstrip and the line of trees struck by the aircraft lay 40 m beyond the final usable portion of the strip and at right angles to the take-off path. The trees were approximately 310 m from the point at which the take-off had commenced.

1.12.7 Measurements at the accident scene showed that, if lift-off and rotation to the climb had occurred as the witness reports suggested, close to the end of the available take-off distance of 270 m, the aircraft had achieved a climb angle of about 5° (9%), to the point of collision with the trees.

1.12.8 To have avoided the tops of the trees with the same climb angle it would have been necessary for the aircraft to have lifted off and rotated to the climb attitude after a ground run of approximately 230 m.

1.13 Medical and pathological information

1.13.1 The pilot was in good health at the time of the accident. There was no evidence of any medical factor which may have affected the pilot's ability to conduct the flight.

1.14 Fire

1.14.1 Fire had broken out immediately after ground impact. The extent to which most components had been reduced to molten metal indicated the intensity of the post-impact fire. No precise source of ignition was established but it was evident that rupture of the aircraft's wing tanks would have dispersed fuel over the engines and parts of the exhaust systems. Whether the ferry tank contributed to the initiation and sustaining of a fire in the cockpit area was not clear but the cockpit and its contents had been reduced to ashes.

1.15 Survival aspects

1.15.1 The impact forces were survivable, although the pilot sustained a dislocated right shoulder and a minor head injury in the accident. However the rapid onset and intensity of the fire which enveloped the aircraft immediately after impact resulted in extensive burns (over some 60% of the body) to his skin and trachea. Despite intensive medical care, the pilot succumbed to complications, largely arising from his burns and died in hospital fourteen days after the accident.

1.16 Tests and research

1.16.1 Samples of BP Racing Fuel Number 1 were taken from the drums which had been used to refuel the aircraft. Although this fuel was not subject to the strict quality control accorded to aviation products, analysis of the samples showed that in all respects the fuel met the specification of Avgas 100 aviation fuel which was an approved fuel for the engine type.

1.17 Additional information

1.17.1 The Piper Apache Owner's Handbook issued in 1958 and revised in January 1978, which Mr Prouting had held in his possession, but had left at the farm, contained a performance chart for the PA23-150 showing "Take-off distance versus altitude" for the flaps "UP" configuration and a temperature at sea level of 60°F. Using this chart, the "take-off distance" for C-FDTG at a weight of 3200 pounds and at 400 feet amsl was approximately 760 feet (234 m).

1.17.2 The meaning of the term "take-off distance" was not defined in the handbook, but in the era in which this document was first published it was generally understood to refer to the ground run required. The information presented in the handbook was also likely to have been developed from data obtained under the most favourable conditions, including the use of a new or low-time test aircraft, flown by an experienced pilot from a paved runway.

1.17.3 It was therefore important that such data, while serving as basic reference information, should be treated with considerable caution and suitably factored to take into account any increase in distance resulting from the runway or airstrip surface, adverse slope, density altitude, deterioration of engine performance over a period of time and any tailwind component.

1.17.4 The handbook contained the warning "if there is any inconsistency between this handbook and the Airplane Flight Manual approved by the FAA, the Airplane Flight Manual shall govern". It was not known whether Mr Prouting had calculated a take-off distance for C-FDTG from the aircraft's flight manual prior to the accident flight, or from any other source.

1.17.5 Civil Aviation Safety Order (CASO) Number 4 defined Performance Limitations and Standards for various categories of aeroplanes operating in New Zealand, including the Piper PA23 Apache series. Using appropriate data for C-FDTG in the conditions prevailing on the day of the accident, calculations based on the information in CASO 4 indicated a minimum "operational grass field length" of 530 m for the private flight being undertaken.

1.17.6 This was clearly much greater than the "take-off (ground run) distance" of 234 m obtained using the information in the Piper Apache Owners Handbook. However, the "operational field length" was based on the distance required for take-off:

> "from a standing start to a point on the take-off surface vertically below the point at which the aeroplane reaches a height of 50 feet with all engines operating and a speed of at least 1.2 Vs".
>
> (Vs, in this case was defined as the stalling speed or minimum steady flight speed in the take-off configuration).

In addition, the calculated field length included allowance for airstrip surface, slope, elevation and temperature.

1.17.7 Obstacle Clearance Limitations promulgated in CASO 4, also required, and were intended to ensure, that the aircraft's flight path after take-off would continue to clear all obstacles by a margin of more than 50 feet (the margin increasing with distance flown beyond the end of the "take-off distance available").

1.17.8 The CASO contained the following "General Performance Limitation":

> "Each aeroplane shall be operated at all times in compliance with the conditions and limitations contained in its Certificate of Airworthiness and its associated Aeroplane Flight Manual.
>
> A flight shall not be commenced unless the performance information provided in the Aeroplane Flight Manual indicates that the relevant requirements of this Safety Order can be complied with for the flight to be undertaken."

2. ANALYSIS

2.1 The pilot had returned to New Zealand for a brief period with the intention of ferrying C-FDTG back to Canada. He held a valid Canadian Commercial Pilot Licence and had obtained a Flight Permit from the Canadian authorities in respect of the proposed flight. He had also arranged recently an up-to-date Certificate of Registration for the aircraft. The pilot's flying qualifications and the aircraft documentation he had obtained met the Canadian requirements for the flight provided that there was compliance with the special compulsory conditions specified in the ferry Flight Permit.

2.2 The pilot had intended to ferry C-FDTG to Canada at the end of 1988 or early in 1989 but had not found it practicable to do so at that time. The aircraft had thus remained inactive at the farm property for a period of more than two years until the pilot's return to New Zealand some two weeks before the accident.

2.3 Prior to the accident flight the pilot had spent a considerable time cleaning and inspecting the aircraft and checking the function of its various systems in preparation for the ferry. While the pilot had worked on the aircraft and engines and had endeavoured to satisfy himself that C-FDTG was serviceable for the proposed flight, there was no record that the aircraft had been inspected by an appropriately endorsed aircraft maintenance engineer or other suitably qualified and authorised person and certified as serviceable in accordance with the requirement laid down in the Flight Permit. In addition there was no record to suggest that the installation of the aluminium ferry tank in the aircraft's cabin had been approved by Transport Canada.

2.4 The aircraft's logbooks and associated documents were consumed by the post-accident fire and thus detailed information concerning the total hours on the airframe, engines and propellers of C-FDTG and other information relating to the technical serviceability of the aircraft was not recovered. The available evidence indicated that the engines had already run 1990 hours and had therefore almost reached the manufacturer's recommended time between overhaul at the time of the accident. The destruction of the aircraft by fire precluded engine tests following the accident and the possibility could not be eliminated that, for undetermined reasons, the power output of one or both engines was reduced thus affecting the aircraft's take-off performance. However, while it was likely that the high time on the engines would contribute to some overall performance loss, witness reports suggested that both engines were functioning normally during the final take-off.

2.5 The pilot had owned C-FDTG for many years and could be expected to be familiar with the general operation of the aircraft. His total flying time on the aircraft could not be determined but was approximately 600 hours. The most recent flying, however, that the pilot had carried out on C-FDTG was limited to flying the aircraft at the farm property more than two years earlier and the single trial circuit flown the day before the accident.

2.6 The latter flight had involved a take-off to the west and the aircraft had "clipped" trees at the airstrip boundary shortly after lift-off, but apparently sustained no damage. The pilot's response to this event, indicating solely that he would modify his take-off procedure, suggested that he did not recognise limitations in the airstrip, as to available length or obstructions, or other factors such as less than favourable prevailing wind conditions, to be sufficient deterrents to prevent a further take-off attempt. Alternatively the actual, or perceived, pressures upon him to commence the ferry flight may have swayed his judgement in respect of these issues.

2.7 The pilot evidently considered the aircraft itself and its engines to have performed satisfactorily, apart from the lack of airspeed indication. After the flight he had taken steps to correct the latter problem. Despite this action the possibility could not be completely excluded that during the accident take-off an absence of airspeed information, or erroneous indication, prevented the pilot from achieving optimum performance from the aircraft.

2.8 The minor collision with the trees may have influenced his eventual decision next day to take off in the opposite direction, to the east. It was more likely, however, that the occasional light "gusts" and general wind drift which favoured a take-off in this direction and the descending contours of the valley leading to the coast were the deciding factors. While he had evidently flown successfully from the airstrip on past occasions, the growth of the trees in the intervening period was likely to have diminished or even negated the clearance margin which may have been achieved previously. In addition, any deterioration in engine performance and/or reduced handling skill, due to lack of recent experience on the aircraft type, held potential to reduce the likelihood of a successful take-off and climb.

2.9 The pilot took some time to decide upon the final take-off direction and may have had some misgiving regarding the attempt. In the event however, he elected to proceed. Investigation showed that under the existing conditions the airstrip length available was marginal to enable the pilot to accelerate the aircraft to flying speed, lift-off and clear the trees safely. Subsequent loss of the outboard section of the right wing as a result of colliding with the trees, ensuing yaw and retardation of the aircraft (already at low speed in a climbing attitude) rendered the accident inevitable.

3. FINDINGS

3.1 The pilot held a valid Canadian Commercial Pilot Licence and was rated on the Piper PA23 Apache aircraft type.

3.2 The pilot was the registered owner of Piper PA23 Apache C-FDTG and was familiar with the operation of this aircraft.

3.3 The pilot intended to fly C-FDTG from New Zealand to Canada and had obtained the required Flight Permit from the Canadian Authorities.

3.4 No record was available to indicate that the aircraft had been certified as serviceable for the proposed flight in accordance with the requirement of the Flight Permit.

3.5 The available evidence suggested that the aircraft's mass and centre of gravity were within the authorised limits.

3.6 Shortly after take-off the aircraft collided with trees at the eastern boundary of the farm airstrip.

3.7 The collision resulted in the loss of an outboard section of the right wing, the aircraft descended into bush and caught fire.

3.8 The pilot survived the impact but was severely burned. He succumbed to his injuries fourteen days after the accident.

3.9 The collision probably occurred because the pilot did not ensure sufficient airstrip length was available to enable the aircraft, in the existing conditions, to become airborne and climb safely above trees which lay beyond the end of the airstrip.

12 March 1992

M F DUNPHY
Chief Commissioner