TRANSPORT ACCIDENT INVESTIGATION COMMISSION

TE KOMIHANA TIROTIRO AITUA WAKA

AIRCRAFT ACCIDENT REPORT

No. 91-002

PIPER PA28-140 ZK-DEG

Near Amberley, Canterbury Province

7 January 1991

Transport Accident Investigation Commission
Wellington · New Zealand

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Transport Accident Investigation Commission
Wellington

Chief Commissioner
Transport Accident Investigation Commission

The attached report summarises the circumstances surrounding the accident involving Piper PA28-140 aircraft ZK-DEG near Amberley on 7 January 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.

26 July 1991

R CHIPPINDALE
Acting Chief Executive

APPROVED FOR RELEASE AS A PUBLIC DOCUMENT

22 August 1991

M F DUNPHY
Chief Commissioner

AIRCRAFT:	Piper PA28-140	**OPERATOR:**	Bellview Flight Centre
REGISTRATION:	ZK-DEG	**PILOT:**	Mr D.B. Palmer
PLACE OF ACCIDENT:	16 nm west of Amberley, Canterbury Province.	**OTHER CREW:**	Nil
DATE AND TIME:	7 January 1991, 1315 hours	**PASSENGERS:**	Nil

SYNOPSIS:
A student on his first solo cross country lost control of the aircraft and it collided with the terrain. The pilot lost his life in the accident. Mr R Chippindale was the Investigator in Charge of the investigation.

1.1 HISTORY OF THE FLIGHT:
See page 4.

1.2 INJURIES TO PERSONS:
Pilot: Fatal

1.3 DAMAGE TO AIRCRAFT:
The aircraft was damaged beyond economical repair.

1.4 OTHER DAMAGE
Nil.

1.5 PERSONNEL INFORMATION:
See page 5.

Flight Times

	Last 90 days	Total
All Types	Nil	36
On Type	Nil	36

1.6 AIRCRAFT INFORMATION:
See page 5.

1.7 METEOROLOGICAL INFORMATION:
See page 6.

1.8 AIDS TO NAVIGATION:
Not applicable.

1.9 COMMUNICATION:
RTF communications with ATC were satisfactory.

1.10 AERODROME INFORMATION:
Not applicable.

1.11 FLIGHT RECORDERS:
Not applicablle

1.12 WRECKAGE AND IMPACT INFORMATION:
See page 8.

1.13 MEDICAL AND PATHOLOGICAL INFORMATION:
There was no evidence of any condition which might have affected the pilot's ability to conduct the flight.

1.14 FIRE:
There was no fire.

1.15 SURVIVAL ASPECTS:
See page 8.

1.16 TESTS AND RESEARCH:
See page 9.

1.17 ADDITIONAL INFORMATION:
See page 9.

1.18 USEFUL OR EFFECTIVE INVESTIGATION TECHNIQUES:
Not applicable.

2. ANALYSIS:
See page 12.

3. FINDINGS:
See page 13.

4. SAFETY RECOMMENDATIONS:
See page 15.

5. REGULATORY:
See page 15.

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

1. FACTUAL INFORMATION

1.1 History of the flight

1.1.1 The student pilot had not flown since 6 October 1990 so the Chief Flying Instructor made a dual flight with him prior to authorising him for his first solo, cross country flight.

1.1.2 The CFI also conducted a comprehensive briefing for the student prior to the cross country flight which included a study of the weather forecasts, the action to be taken in the event of him encountering unsuitable wind or turbulence conditions, the preparation of a flight log, the marking of the map, position reporting to air traffic control and the cockpit management of papers and navigation equipment.

1.1.3 The cross country was to be a visual flight rules (VFR) flight from Christchurch via Eyrewell Reporting Point to Rangiora thence to Culverden, Parnassus, Rangiora and back to Christchurch. The estimated elapsed time to Rangiora was 13 minutes and for the total flight one hour twenty five minutes.

1.1.4 The advice given to the student as to the action to take if he found the wind and turbulence conditions unsatisfactory was to return to Christchurch by initiating a turn to the east and flying reciprocal tracks. The technique for flying reciprocal tracks was discussed. There was no discussion on the technique for flying in severe turbulence as this had been discussed during the course of his earlier dual cross country which was flown in turbulent north-westerly conditions.

1.1.5 The pilot duly taxiied ZK-DEG from the flight school. He made the appropriate radio telephone (RTF) calls correctly and acknowledged the altimeter setting and an instruction to hold "on Drake taxiway short of taxiway Hotel". He did not advise air traffic control (ATC) that he had received the ATIS weather information but he was advised that the ATIS had just been changed to "Golf". No local weather information (other than the QNH) was passed to him when he requested his taxi clearance, nor was he advised of the Sigmet which was still current.

1.1.6 Three minutes later he was called by "Christchurch Ground" but he was not listening out on that frequency. He had not complied with the instruction to hold on the taxiway and according to the controller he "suddenly appeared from nowhere" in front of an aircraft the Controller was endeavouring to clear for take-off. When called by the Tower the student advised he was "lining up". He was instructed to hold clear of the runway to allow the other aircraft to take-off.

1.1.7 Prior to clearing the pilot for take-off the Tower Controller telephoned the CFI and asked him, "Are you still happy for him to go with this sort of westerly (coming) through?" He continued to advise that the wind had been up to 30 knots but had settled around 25 knots and there had been "the odd comment that it's been a bit rough out there this morning".

1.1.8 The CFI replied, "Yes it's a bit strong isn't it. I think I'll let him go and see. I've given him a briefing that if he doesn't like it he comes back"

1.1.9 The student read back correctly his departure instruction to "vacate via Eyrewell not above one thousand five hundred feet". His take-off clearance included an instruction to "report clear of the zone", which he acknowledged.

1.1.10 ZK-DEG was airborne at 1253 hours.

1.1.11 The CFI monitored the RTF calls from ZK-DEG, on the Tower frequency and heard the pilot report, "Approaching Eyrewell fifteen hundred feet" at 1259 hours and subsequently at 1307 hours "Approaching Rangiora - fifteen hundred feet outbound."

1.1.12 In response to his report approaching Rangiora the pilot was advised "Information available on one two four decimal four" to which he responded, "switching Information one two four decimal four."

1.1.13 No further calls were heard from the aircraft on any frequency.

1.1.14 The accident occurred at approximately 1315 hours in daylight; the wreckage of the aircraft was located in a gully on the eastern side of Mt Grey at 1150 feet amsl at 1700 hours that day. National Grid Reference 947077 NZMS1 Sheets 68 and 69 "Amberley and Motunau", latitude 43°06'30"S, longitude 172°34'00"E.

1.5 Personnel information

1.5.1 Daryl Bruce Palmer, aged 20, commenced his flying training on 3 February 1990 in ZK-DEG and completed 28 hours dual instruction and 9 hours solo, prior to the accident. He flew each month until October after which he did no further flying until the day of the accident. On that day he completed a check flight of 50 minutes with the CFI.

1.5.2 On 13 December 1989 he was issued a Student Pilot Licence - Aeroplane (SPL A) and obtained his Flight Radio Telephone Operator Rating on 2 May 1990.

1.5.3 He underwent his medical examination for the issue of his SPL A on 24 November 1989 and was passed as fit to exercise the privileges of this licence for two years.

1.5.4 His SPL A was valid to 10 December 1991

1.5.5 He had completed a 1.3 hour "map reading/cross country" dual flight on 9 September and on 6 October completed a 2.1 hour dual cross country from Christchurch to Rangiora-Parnassus-Culverden and back to Christchurch.

1.6 Aircraft information

1.6.1 Piper PA28-140 (Serial number 28-7125535) was shipped from the United States to New Zealand and first registered as ZK-DEG on 1 November 1971. Its date of construction was 12 August 1971

1.6.2 At the time of the last 50 hour inspection on 20 December 1990 the aircraft had completed 12 808 hours' flying time since new, and the Lycoming O-320 E3D engine serial number L-40236-27A which was manufactured in 1974 had completed 6285 hours since new and 1972 hours since its last overhaul.

1.6.3 A Sensenich 74 DM6-O-58 propeller serial number A 42864 was fitted at the time of the accident.

1.6.4 The aircraft had been maintained in accordance with the Aircraft Maintenance Programme approved by the Civil Aviation Division of the Ministry of Transport on 7 March 1988.

1.6.5 The Maintenance Release serial number A 112816 was valid until 20 June 1991 or 12 857.97 hours total aircraft time in service whichever was the earlier.

1.6.6 A non-terminating Certificate of Airworthiness was issued on 7 March 1988 in the Standard Category.

1.7 Meteorological information

1.7.1 A low pressure area in the Tasman Sea was passing to the south of South Island in the morning with an associated front moving north-eastwards preceded by a strong north-westerly airflow.

1.7.2 Pressures were high to the north-east of New Zealand and a deep depression moved south-east across Otago and Southland during the day. A very strong north-west flow covered the remainder of South Island and a cold front moved quickly across South Island during the morning. The front was probably lying from about Cook Strait to latitude 45° south, longitude 177° east. There was a secondary feature on the West Coast composed mainly of cumuliform cloud.

1.7.3 On this day high winds from the north-west were present over South Island. Winds at Christchurch Airport were north-easterly during the morning but turned north-west just before 1300 NZDT. The north-westerlies were strong and gusty.

1.7.4 A most unusual feature of the winds was the speed recorded at 9000 feet over Christchurch at midday. The speed of 80 knots was only exceeded in 0.1% of wind soundings. These winds were 50% stronger than those recorded upstream at Hokitika at the same altitude. The shears between 5000 and 7000 feet and 7000 and 9000 feet of 7 and 10 knots per 1000 feet indicate the likelihood of severe or extreme turbulence.

1.7.5 From satellite pictures lee waves were present with a wave length of over 20 km. These waves produced well developed cloud formations over and east of the Wairarapa and Kaikouras. The cloud over Canterbury appeared to be either cumuliform cells which were probably evidence of rotors, or incipient wave cloud. The waves could well have been present without producing much cloud. In the presence of these waves downdraughts in the lee of the Southern Alps would have been severe and even if such waves were not pronounced there would have been substantial flow down the mountain slopes from the north-west. The accident site on the north-east side of Mount Grey did not appear to be a place where the downdraughts would have been the most severe, nevertheless they would have been considerable.

1.7.6 In summary, 7 January 1991 was a day of strong north-west winds flowing over the Southern Alps which would have caused strong downdraughts over North Canterbury with severe or even extreme turbulence.

1.7.7 The General Aviation forecast weather for Canterbury was:

> Scattered rain spreading off the ranges with areas of broken cumulus and stratocumulus with a base of 3000 feet and tops of 8000 feet and broken altocumulus and altostratus above 8000 feet becoming scattered during the afternoon.
>
> Visibility: 40 km down to 4000 m in showers and 1500 m in rain.
>
> Turbulence: Frequent moderate and isolated severe turbulence about and east of the ranges, easing from the south.

1.7.8 The 3000 foot wind observed at Christchurch Airport at 0600 hours was 330 degrees true at 16 knots, with a forecast for "winds increasing in the north by 15 knots..."

1.7.9 The METAR for Christchurch Airport at 1100 hours was:

Wind:	050 degrees true/20 knots.
Visibility:	80 km
Rain:	In sight but none at the airport
Cloud:	1 octa of cumulus at 4500 feet
Temperature:	25°C
Dew Point:	10°C
QNH:	983.6 hPa
Significant Weather:	None in the vicinity of the airport.

1.7.10 A Sigmet was published at 1015 hours valid from 1015 to 1415 for the Christchurch Flight Information Region, which was:

> Forecast isolated severe turbulence/downdraughts below flight level 140 about and east of the ranges. Intensity weakening from the south.

1.7.11 Aerodrome forecast:

The TAF for Christchurch Airport, valid to midnight, was:

Surface wind:	350°T/15 gusting to 30 knots Gradually changing between 1200 and 1600 hours to 210° 25 knots
2000 foot wind:	330°T 30 knots gradually changing between 1200 and 1600 hours to 210° 25 knots
Visibility:	60 km
Cloud:	3 octas of cumulus at 3000 feet 6 octas of altocumulus at 10 000 feet

1.7.12 The current ATIS "Golf" at 1246 hours was:

"Runway:	29
Surface wind:	310°/20 to 30 knots
Visibility:	80 km
Cloud:	2/8 at 4500 feet
QNH:	979 hPa
Forecast:	2000 foot wind 310°/30 knots"

1.7.13 A printed copy of the appropriate Metar, TAF, General Aviation Weather and Sigmets for Christchurch was recovered from the aircraft cockpit.

1.12 Wreckage and impact information

1.12.1 The wreckage of ZK-DEG was located at some 1150 feet amsl approximately midway up a steep gully which was oriented approximately north-west/south-east.

1.12.2 The aircraft had impacted on a heading of 215°M with the right wing tip and a propeller blade as the first points of contact on a small flat area on the western side of the gully. The wing's leading edges had symmetrical chordwise compression and the nose undercarriage was bent rearwards to lie parallel with the undersurface of the fuselage.

1.12.3 The forward section of the roof of the cockpit area had jackknifed upwards allowing the leading edge of the roof area behind the door openings to contact the instrument panel. The fuselage had jackknifed to the right with a transverse separation of the fuselage 250 mm to the rear of the wing centre section's trailing edge. The flaps were up and the empennage was undamaged.

1.12.4 The propeller was being driven by the engine at the time of impact.

1.12.5 The chordwise compression of the wings had ruptured the fuel tanks but the fuel tank caps had remained in place.

1.12.6 The pilot's restraint system of a lap strap and diagonal upper torso strap connected to an inertia reel, had remained intact but his seat had separated from its rails.

1.12.7 The metal box containing the first aid kit which had been restrained by a bungee chord and a length of metal angle had carried forwards from its position on the shelf behind the rear seat on the left side.

1.12.8 The axe which was still stowed below the pilot's seat would have been inaccessible to the pilot due to the distortion of the floor beneath the seat.

1.12.9 Numerous pencils and ball point pens were strewn about the cockpit floor area.

1.12.10 The airspeed indicator was indicating 54 knots the engine speed indicator 1450 rpm, the direction indicator 214°, the altimeter subscale was set on 978 hectopascals.

1.12.11 The adjacent trees and the geometry of the aircraft damage indicated an angle of impact approximately 60 degrees in a wings level 60 degree nose down attitude.

1.12.12 An inspection of the control runs indicated they were able to operate the control surfaces normally up to the time of the accident.

1.15 Survival aspects

1.15.1 This accident was unsurviveable due to the reduction of the occupiable space caused by the collapse of the structure which allowed the cockpit roof to contact the glare shield.

1.15.2 The pilot was not wearing a helmet. Had the structural damage been less severe such protection may have materially assisted in his survival particularly in view of the inadequate restraint provided for the first aid kit in a metal box situated on a shelf behind and level with his head.

1.15.3 As with many single engined light aircraft the positioning of the axe beneath the pilot's seat effectively deprived him of its potential assistance in escaping from a damaged aircraft. As this seat was always occupied it was the one most likely to trap the axe in any accident involving an upwards acceleration.

1.15.4 The aircraft's electronic locator transmitter (ELT) was not detected by searching aircraft. The search and rescue satellite aided tracking system (SARSAT) detected its transmission but placed it in the Akaroa region resulting in the initial search efforts relating to the ELT transmissions, concentrating in that area. To the pilots of aircraft searching for the ELT, without a direction finding capability the strongest signal appeared to come from the Banks Peninsula area.

1.15.5 The nearest local user terminal (LUT) for the SARSAT information was located at Alice Springs in Australia. This centralised location could view the satellites anywhere within the Australian continent and, as they rose and until they set, for some distance off shore. New Zealand was at the extremity of the detection range as the satellite had to be visible to both the ELT and the LUT simultaneously for its position to be resolved.

1.15.6 Christchurch Air Traffic Control personnel obtained the assistance of an RNZAF aircraft to check local aerodromes for an unscheduled landing by ZK-DEG when it was overdue. When this established the aircraft had not landed at an aerodrome on route the search was re-oriented towards the intended route of ZK-DEG as there were no obvious craft in distress in the Akaroa area.

1.15.7 The wind and turbulence conditions in the area of the accident were so severe that some of the search aircraft turned back and the helicopter which located the wreckage was unable to land near the site.

1.15.8 The rescue teams reached the site by four-wheel drive vehicle.

1.15.9 The delay in locating the wreckage due to the inaccurate location derived for the ELT and the inability of the helicopter to land nearby, did not jeopardise the pilot's chance of survival.

1.16 Tests and research

1.16.1 A bulk strip of the aircraft's engine indicated that it was in good working order at the time of the accident.

1.17 Additional information

1.17.1 The Owner's Manual for the aircraft stated that the aircraft's speed should be reduced to manoeuvring speed if severe turbulence was encountered. This advice was sound but, apart from in the descent, the aircraft seldom approached manoeuvring speed.

1.17.2 No guidance was given to the pilot, in the aircraft Owner's Manual, on the technique for negotiating turbulence. It was generally accepted that the main requirement was to keep the aircraft on an even keel and to endeavour to fly a constant attitude with moderate, but never extreme, control movements. The aim was for the pilot to allow the aircraft to ride the turbulence rather than

to fight it with the controls as rough handling aggravated the stresses already imposed by the turbulence. Variations in height and speed were normally accepted as unavoidable and the pressure instruments which indicated such variations were themselves likely to indicate incorrectly in such conditions.

1.17.3 The Christchurch Visual Terminal Chart depicted one northern boundary of the Christchurch Terminal Area by an arc 20 nm from Christchurch. On the southern edge of this arc, as with the arcs at 30 and 40 nm was printed the information relating to the vertical limits of the airspace to the south of the arc viz:

"CHRISTCHURCH TMA 1500 feet - 9500 feet 20NM CH"

1.17.4 Unlike the other arcs at 30 and 40 nm from Christchurch this arc also formed the boundary of a second (western) subdivision of the area the limits for which (2500 feet - 9500 feet) were only depicted to the east of the western boundary line. The western portion also had depicted within it, in larger but less bold print, its vertical limits but it was possible for the lower limit to be assumed from reading the information on the northern boundary line.

1.17.5 The pilot's track from Rangiora to Culverden passed beneath this western part of the TMA which had a base of 2500 feet. He had marked "1500" on his VTC against his trackline one mile beyond the 20 nm arc.

1.17.6 The accident occurred four miles west of track after the aircraft had travelled eleven miles from the last turning point, Rangiora. The site was less than 2 miles past the "1500" arc drawn on the student's map.

1.17.7 The Airways Corporation of New Zealand Limited's Manual of Air Traffic Services stated:

"Page 4-14 32 Meteorological Minima: Application

31.2 (sic) Advice on hazardous weather conditions

When hazardous weather conditions, such as turbulence, are known or expected to exist, the pilot shall be advised of the situation and the decision whether or not to take off will rest with the pilot."

"Page MET 5

18 REPORTS FOR DEPARTING AIRCRAFT

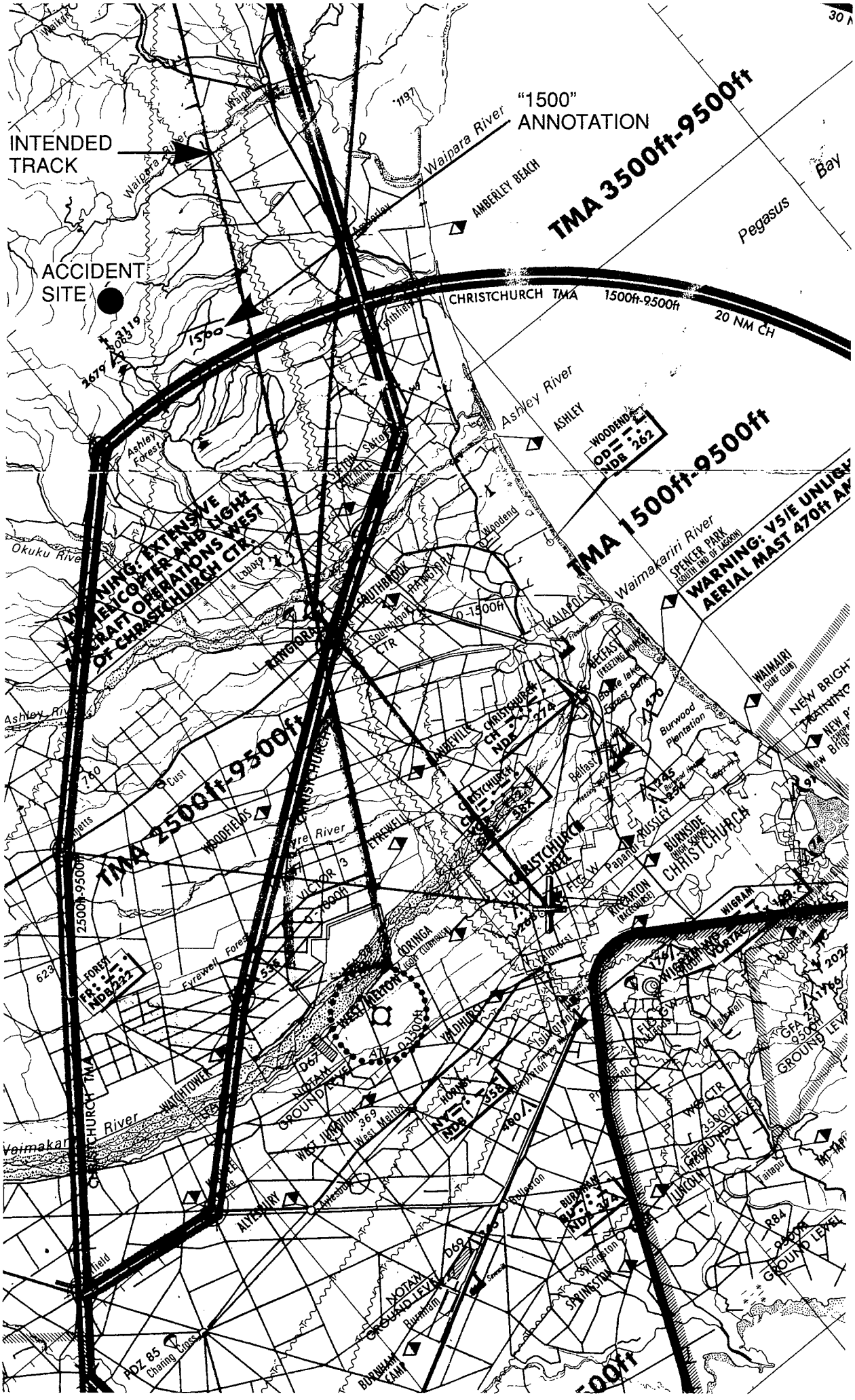
ATS shall pass the following information to aircraft:

Prior to take-off:

Report significant meteorological conditions in the take-off and climb out area including the occurrence of ..., moderate or severe turbulence ..."

1.17.8 The New Zealand Aeronautical Information Publication Planning Manual on page MET 2-3 paragraph 8.1.8 stated:

"Sigmet information is passed by ATS to all known aircraft in flight or about to depart, ..."


INTENDED TRACK
ACCIDENT SITE
"1500" ANNOTATION
TMA 3500ft-9500ft
TMA 1500ft-9500ft
TMA 2500ft-9500ft
CHRISTCHURCH TMA 1500ft-9500ft
20 NM CH
WARNING: EXTENSIVE HELICOPTER AND LIGHT AIRCRAFT OPERATIONS WEST OF CHRISTCHURCH CTR
WARNING: V5/E UNLIGHTED AERIAL MAST 470ft AMSL
Waipara River
Ashley River
Waimakariri River
Okuku River
Eyrewell Forest
AMBERLEY BEACH
ASHLEY
WOODEND
SPENCER PARK
WAIMAIRI
KAIAPOI
RANGIORA
WOODFIELDS
CHRISTCHURCH
BURNSIDE
RICCARTON
WIGRAM
HORNBY
LINCOLN
ROLLESTON
SPRINGSTON
TEMUKA
Pegasus Bay

2. ANALYSIS

2.1 The pilot was checked out by the CFI, as being competent to fly the aircraft, less than two hours before he departed on his first solo cross country. The CFI checked the flight planning and other pertinent information with the pilot immediately before he boarded the aircraft to depart on his first solo cross country flight. These checks should have prepared the pilot adequately for the handling and navigation of the aircraft except that it was almost three months since he had completed the last dual cross country flight.

2.2 The weather forecast, which was valid for the anticipated duration of the cross country flight was discussed with the student but the validity period of the Sigmet advising of forecast isolated severe turbulence/downdraughts below flight level 140 in the Christchurch FIR was translated by the CFI as having expired, nevertheless it was discussed in the context of the anticipated weather for the flight.

2.3 When the pilot called for taxi clearance he did not confirm that he was in receipt of the ATIS. Christchurch "Ground" did not query this but advised that the ATIS had just been changed. Therefore it was not confirmed that the pilot was aware of the latest aerodrome weather specifics other than the QNH which he was given and which he acknowledged. The policy at Christchurch was, in accordance with the Airways Corporation of New Zealand's (ACNZ) current operating practice, not to pass on any hazardous weather reports which had been issued more than 60 minutes before the pilot requested taxi instructions.

2.4 The pilot had called for taxi clearance and confirmed that he understood he was to hold short of taxiway Hotel yet three minutes later without any reference to Air Traffic Control he appeared "out of nowhere" with the intention to line up for take-off in front of an aircraft which the Tower intended to clear for take-off before his aircraft. While this did not cause any hazard it was indicative of the pilot's inexperience.

2.5 The Tower Supervisor consulted the CFI before approving the issue of a take-off clearance to the student. In doing so he commented "there has been the odd comment that it's been a bit rough out there this morning"

2.6 Although the Tower Supervisor referred the weather state to the pilot's CFI he took no steps to ensure this information was passed on to the pilot or that he was aware of the Sigmet itself. Both of these items would have been required by the Manual of Air Traffic Services to be passed to the pilot had there not been an ACNZ policy which modified the requirement. Such information was of value to the pilot in an area well known for its strong and turbulent "north-westerlies". The Controllers in the Tower did not know, personally, whether the student was in possession of this information.

2.7 It was conceivable that the aircraft experienced some 20° of right drift while flying the track from Eyrewell to Rangiora below which there were significant line features for visual track guidance. If the pilot made the appropriate heading change to maintain his intended track to Rangiora that adjustment may have lead to the aircraft drifting to the left of track north of the Ashley River if the wind eased with the aircraft's proximity to the higher ground.

2.8 The pilot had drawn a small arc on his chart and labelled it "1500". This arc was on his intended track one mile north of the northern boundary of the eastern segment of the Christchurch Terminal Area, the base for which was 2500 feet. The aircraft came to rest at some 1100 feet amsl while apparently proceeding up a gully between two small hills which rose to over 1500 feet. As the pilot reported at 1500 when he was approaching Rangiora it is possible that he believed, mistakenly, that he had to remain below 1500 feet until a point two miles prior to the accident site due to misreading the information on the Visual Terminal Chart (VTC).

2.9 A strong north-west wind was flowing directly down the gully in which the accident occurred. Local glider and aerial work pilots attested that the resultant downflow made it unsafe to attempt to cross this area below 5000 feet in such conditions due to the severe downdraughts in such valleys in north-westerly wind conditions. If the pilot approached the gully at or about 1500 feet amsl he may well have encountered a downdraught which was beyond the aircraft's ability to outclimb.

2.10 The aircraft's impact heading and speed taken in conjunction with the local topography suggested that the pilot attempted to turn the aircraft in the widest part of the gully and lost control at low speed, stalled and dived into the ground at a steep angle.

2.11 Although the CFI briefed the pilot that he was to turn back if the weather became unfavourable this assumed that he had the experience to judge when conditions were deteriorating to such an extent that it was necessary to turn back. Such an assessment was too much to expect of a pilot whose total experience of flying was 36 hours.

2.12 The fact that the pilot allowed the aircraft to get 13° off track towards high ground in such a short distance could indicate that the conditions promulgated as likely to produce severe turbulence and downdraughts east of the ranges had materialised and he was unable to devote the required amount of attention to maintaining an accurate heading and navigating the aircraft.

2.13 The aircraft was airworthy, the engine showed no signs of failure and the aircraft carried sufficient fuel for the flight. It was likely therefore that the aircraft was mishandled for some reason and/or flown unintentionally into an inextricable situation.

2.14 Immediately prior to the accident site there were large flat areas available, one of which was used for topdressing operations. Had the pilot been concerned about his position or an aircraft malfunction these areas would have provided ample room for a precautionary or forced landing into wind.

3. FINDINGS

3.1 The pilot was fit for the flight.

3.2 The aircraft was airworthy and carried sufficient fuel for the flight.

3.3 The CFI made an error of judgement in reconfirming his authorisation of the flight when the Tower Controller advised him of adverse weather conditions.

3.4 The CFI misinterpreted the validity period for a Sigmet advice of severe turbulence and downdraughts which was relevant to the authorisation of the pilot's first solo cross country flight in the area.

3.5 The pilot did not have the experience to make a timely judgment on the suitability of the weather during the conduct of the flight.

3.6 The surface movements controller was not required to confirm with the student pilot that the local weather conditions on the ATIS had been received.

3.7 The Manual of Air Traffic Services required the surface movements controller, to confirm that the pilot was aware of the Sigmet before clearing him to taxi.

3.8 The Airways Corporation of New Zealand Limited had modified the policy which related to hazardous weather but had not amended the MATS to reflect this change.

3.9 The NZAIP still advised that ATS would pass Sigmets to "all known aircraft ... about to depart".

3.10 The policy of modifying the requirements of the Manual of Air Traffic Services without amending the written advice in the MATS and NZAIP was inappropriate.

3.11 The weather conditions were unsuitable for the authorisation of a student's first solo cross country.

3.12 The pilot did not adhere to his flight planned track and consequently flew closer to the high ground than his instructor had anticipated.

3.13 The CFI did not notice the "1500" mark on the student's map. Hence the figure might have been placed on the map after the CFI/student briefing.

3.14 The positioning of the "crash" axe and the first aid kit in this aircraft was less than optimum.

3.15 The pilot may have believed, mistakenly, that the upper limit for his flight for 10 miles north of Rangiora was 1000 feet lower than was actually required.

3.16 The pilot did not maintain an adequate margin of height above the terrain for the prevailing conditions.

3.17 The Christchurch Visual Terminal Chart depiction of the vertical limits of the TMA could be improved.

3.18 There were undesirable foreign objects in this aircraft which had the potential to obstruct the free movement of controls.

3.19 There was no evidence of any control obstruction by a foreign object.

CONCLUSION

The probable cause of this accident was the decision by the CFI to authorise an inexperienced student pilot to make his own judgment on the suitability of the adverse weather conditions which had been forecast, during the conduct of his first solo cross country flight. Contributing causes were the pilot's failure to climb to the maximum height allowed by the TMA limits after passing Rangiora,

his decision to fly up a valley, which was in the lee of a strong north-westerly wind, his inaccurate navigation and the Airways Corporation of New Zealand's variation of a stated policy to remind the student pilot of the relevant Sigmet on turbulence.

4. SAFETY RECOMMENDATIONS

4.1 It was recommended to the General Manager of the Air Transport Division of the Ministry of Transport that he:

Review the positioning of "crash" axes in light aircraft,

Review the positioning of first aid kits in light aircraft and the adequacy of restraint systems for these kits,

Promulgate a safety advisory on the necessity to retrieve lost articles from the cockpits of aircraft, particularly those used for training and aerobatics, and

Review the marking on the Christchurch VTC, of the arc delineating the northern boundary of the eastern segment of the Christchurch TMA to make it clear that the one arc formed a boundary of two areas with different lower levels.

4.2 It was recommended to the Airways Corporation that:

They make it clear to ATS staff that the controller with whom the pilot first makes contact should confirm that the pilot was aware of relevant hazardous weather reports, or the Manual of Air Traffic Services should be amended to reflect the current policy in conjunction with a similar amendment to the NZAIP Planning Manual.

5. REGULATORY

5.1 Pursuant to Section 14(5) of the Transport Accident Investigation Commission Act 1990 the representatives of the Airways Corporation of New Zealand, the Chief Flying Instructor of the Bellview Flight Centre and the legal personal representative of the pilot in command were invited to avail themselves of the opportunities afforded to them thereunder.

5.2 As a result of representations received the report was amended and amplified to clarify some of the points raised.

5.3 The representations made to the undersigned are not to be taken as an admission of liability on the part of the parties concerned and their statements are without prejudice to their right to act in any way they may consider fit in any proceedings or action which may be based on the events to which this report refers.

22 August 1991

M F DUNPHY
Chief Commissioner