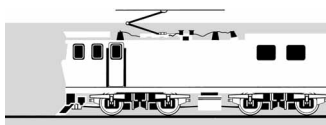
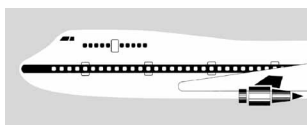


## AVIATION OCCURRENCE REPORT

04-008

Cessna 172N, ZK-JES, ditching, Cable Bay, Northland

15 December 2004



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**Report 04-008**

**Cessna 172N**

**ZK-JES**

**ditching**

**Cable Bay, Northland**

**15 December 2004**

### **Abstract**

On Wednesday 15 December 2004 at about 1450, ZK-JES, a Cessna 172, on a flight from Kerikeri to Waitiki Airstrip ditched in Cable Bay when the pilot could no longer continue flying visually, because of the weather conditions. One of the 2 passengers drowned, and the other passenger and the pilot were seriously injured.

The pilot was inadvertently caught in rapidly deteriorating weather conditions with low cloud, mist and poor visibility. The deterioration was brought about by a fast-moving frontal system, which quickly lowered the ambient air temperature to that of the unusually high dew point temperature. The rapid deterioration removed the pilot's options of diverting to his alternate aerodrome or returning to his departure aerodrome. Because he could not land on a nearby beach the pilot had no option but to ditch.

A safety recommendation was made to the operator about making full use of all available meteorological information.



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## Abbreviations

amsl	above mean sea level
C	degrees Celsius
cm	centimetre(s)
kg	kilogramme(s)
km	kilometre(s)
kts	knots
m	metre(s)
METAR	aerodrome meteorological report
nm	nautical mile(s)
UTC	coordinated universal time
VFR	visual flight rules
VHF	very high frequency

## Data Summary

<b>Aircraft registration:</b>	ZK-JES
<b>Type and serial number:</b>	Cessna 172N, 172-70292
<b>Number and type of engines:</b>	one Lycoming O-360-A3A
<b>Year of manufacture:</b>	1978
<b>Operator:</b>	Salt Air Limited
<b>Date and time:</b>	15 December 2004, about 1450 <sup>1</sup>
<b>Location:</b>	Cable Bay, Northland latitude: 34° 59.5' south longitude: 173° 29' east
<b>Type of flight:</b>	air transport, scenic
<b>Persons on board:</b>	crew: 1 passengers: 2
<b>Injuries:</b>	Crew: 1 serious Passengers: 1 fatal 1 serious
<b>Nature of damage:</b>	aircraft destroyed
<b>Pilot's licence:</b>	Commercial Pilot Licence (Aeroplane)
<b>Pilot's age:</b>	21
<b>Pilot's total flying experience:</b>	650 hours (240 on type)
<b>Investigator-in-charge:</b>	K A Mathews

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<sup>1</sup> Times in this report are New Zealand Daylight Time (UTC + 13 hours) and are expressed in the 24-hour mode.





## Factual Information

### 1.1 History of the flight

- 1.1.1 On Wednesday 15 December 2004 at about 1345, ZK-JES, a Cessna 172, took off from Kerikeri Aerodrome on a visual flight rules (VFR) flight to Waitiki Airstrip 18 km south east of Cape Reinga (see Figure 1). Two passengers and the pilot were on board.
- 1.1.2 The pilot had carried out a pre-flight inspection of ZK-JES and found no defects. The aeroplane had 155 litres of fuel on board, giving it a total endurance of about 3.9 hours. The planned flight time to Waitiki was about 45 minutes.
- 1.1.3 The aeroplane departed normally in fine weather and climbed to a cruising altitude of 1400 feet above mean sea level (amsl). Shortly after take off, the pilot contacted the operator's Chief Executive Officer (the operator) at Paihia and advised that he had departed and that the weather was fine. The flight proceeded without incident along its usual route to abeam Mangonui and north of Kaitaia Aerodrome between 1200 feet and 1400 feet amsl, and then northwest along Ninety Mile Beach on the west coast. As the flight proceeded up Ninety Mile Beach, the pilot saw a band of poor weather lying about 10 km ahead, so he descended to about 700 feet amsl as he got closer to the weather.
- 1.1.4 As the pilot neared the weather he decided it was unsuitable to continue in that direction, so he flew toward the east coast north of Rangaunu Harbour to see if the weather conditions were better from that direction. He contacted a police helicopter pilot operating at low level further north along the east coast and asked him about the weather conditions. The helicopter pilot said he thought the weather was probably unsuitable for ZK-JES to continue.
- 1.1.5 Shortly before 1400, about 15 minutes after ZK-JES, an instructor and student had taken off from Kerikeri Aerodrome in a Cessna 152 for a cross-country flight to Kaitaia. As they proceeded they decided that the weather inland was not suitable to fly direct to Kaitaia as planned, so they flew an easterly coastal route. When they passed Whangaroa harbour at about 1413 enroute to Mangonui the instructor contacted the pilot of ZK-JES and discussed the weather. The pilot described the weather he had encountered and mentioned what the helicopter pilot had said.
- 1.1.6 Several minutes later, the pilot broadcast his intention to turn around because of the weather. He had planned to use Kaitaia Aerodrome as an alternate if he could not continue to Waitiki. However, when he turned back he noticed that the weather had deteriorated quickly behind him and was moving in from the west, with the reduced visibility making flying to Kaitaia unsuitable. He decided to return to Kerikeri, and broadcast that he was west of Rangaunu Harbour. He contacted the operator as he was crossing Rangaunu harbour, and advised him about the weather and said that he had planned to return to Kerikeri. The operator advised that the weather at Kerikeri was fine and suitable for him to return.
- 1.1.7 At about 1430, the instructor advised the pilot he was over Lake Ohia south of the Karikari peninsula in Doubtless Bay. The instructor said that he was returning to Kerikeri via Mangonui because of the poor weather in the Kaitaia area. At Mangonui the instructor advised the pilot that he would attempt to fly direct to Whangaroa Harbour and would give him an update on his progress. The cloud base at Mangonui was about 1000 feet amsl with reasonable visibility. When the instructor reached Akatere he saw that the weather inland was worsening so he continued to the east coast near Taupo Bay to follow the coast south to Kerikeri.
- 1.1.8 Because of the weather and the reports, the pilot also decided to fly along the east coast to return to Kerikeri Aerodrome. The pilot was about 4 minutes behind the instructor, but when he reached Mangonui he found that the cloud base had lowered to about 300 feet amsl and that the

visibility was quickly deteriorating. He could not fly across the land to Taupo Bay as the instructor had done, so he flew around the coast to Bergham Point.

- 1.1.9 As he passed Bergham Point the pilot encountered fog-like conditions with poor visibility and low cloud and rain, so he turned back to attempt to fly to Kaitaia Aerodrome. He configured ZK-JES for bad weather flying and slowed the aeroplane down to about 70 kts. At about 1440 he contacted the instructor, who had just reached the coast by Taupo Bay, and told the instructor that he was diverting to Kaitaia. The instructor told the pilot the weather was clear in his position by Taupo Bay and expressed surprise that the pilot had encountered such poor weather. The weather improved quickly as the instructor continued along the coast past Whangaroa Bay, and he found the visibility in the Kerikeri area to be over 20 km.
- 1.1.10 The pilot flew back past Mangonui and Coopers Beach at low level but found that the visibility was poor to the west toward Kaitaia and to the north toward Tokerau Beach, making it unsuitable for him to continue in either direction. He called the operator and advised him about the situation. The operator told him there was an airstrip on the Karikari peninsula he could land on, but the pilot decided that was not an option because of the low cloud and poor visibility to the north. He advised the operator that he was turning around and would land on Coopers Beach, which he had just passed and thought was long enough for a safe landing.
- 1.1.11 As he passed Cable Bay at low level, he turned left toward the coast to return to Coopers Beach and land, but as he rolled the aeroplane out of the turn he could no longer see Coopers Beach less than one km ahead. Because he could not see the hill between him and Coopers Beach in the poor conditions and worsening visibility, he elected to immediately land straight ahead in the sea rather than fly into a worse situation.
- 1.1.12 The pilot said he had considered that Cable Bay was too short for a safe landing, and some rocks on the end of the beach made it hazardous for an emergency landing. The pilot had an instrument rating and said he had earlier considered climbing the aeroplane into the cloud and flying on instruments to get out of his predicament. The aeroplane was only equipped for VFR flight, but it did have some basic instruments for limited flight in cloud. After considering the option the pilot dismissed it because he thought it would put him in a worse situation.
- 1.1.13 Because the pilot planned to land on the beach he had not briefed the passengers about donning the life jackets that were on board, and once the ditching became inevitable he did not have enough time to direct the passengers to do so.
- 1.1.14 The pilot ditched ZK-JES in Cable Bay about 100 m offshore. The aeroplane broke up into several sections after the ditching. A number of people witnessed the ditching, and some local residents raced to the scene and assisted the pilot and one passenger to shore. The second passenger was trapped in the aeroplane fuselage and drowned.
- 1.1.15 The witnesses spoken to said they did not notice anything unusual with the aeroplane, except that it was flying at low level in poor weather conditions. They said the engine noise sounded normal to them and that the aeroplane landed in the sea just after it had completed a turn. Several witnesses said they had earlier seen the aeroplane pass to the east before returning at low level.
- 1.1.16 Rescue services arrived a short time later, and the surviving passenger and pilot were flown to hospital by helicopter about one hour after the accident.



## **1.2 Injuries to persons**

- 1.2.1 The pilot and one passenger received serious injuries and were admitted to hospital. The second passenger received serious injuries and drowned.

## **1.3 Personnel information**

- 1.3.1 The pilot was 21 years of age. He held a Commercial Pilot Licence (Aeroplane), and a Class 1 Medical Certificate valid until 20 November 2005. He held a C category flying instructor rating and an instrument rating.
- 1.3.2 The operator employed the pilot on 12 July 2004. On 27 July, an independent flight examiner, who had carried out checks for the operator during the past 10 years, completed a route and aeroplane competency check of the pilot for Part 135 operations. The examiner had a reputation for passing fewer pilots than other examiners when conducting pilot competency checks. He thought that the pilot was competent and considered that he had flown to a high standard during the check. He consequently had no concerns about the pilot's flying ability or his performance.
- 1.3.3 The operator had checked the pilot on the route between Kerikeri and Cape Reinga and authorised him for the operation. His training initially included some familiarisation flights where he flew as an observer with other company pilots. This was followed by a number of training flights and supervised flights, including being checked and authorised to land on Waitiki Airstrip. At the time of the accident the pilot had flown the route 51 times. He said he was comfortable flying the route and believed he knew the area very well.
- 1.3.4 At the time of the ditching the pilot had flown 650 hours, including about 240 hours in the Cessna 172 aeroplane type. In the 90-day period before the ditching he had flown almost 128 hours in the Cessna 172 and about 3 hours in a Cessna 207. In the 30-day period before the ditching he had flown 51 hours, and in the 7-day period he had flown 11 hours.
- 1.3.5 The pilot said he did not feel fatigued or unwell before the accident flight. He had reported for duty about 0800. The day before the accident he had flown 3 hours and was on duty for 9 hours. Prior to that he had 2 days off duty. In the preceding 6-day period he had been on duty for 32 hours.
- 1.3.6 The pilot said that he had never before encountered such rapidly changing weather conditions as he did on the day of the accident. He was surprised at how quickly the weather changed and cut off his options.
- 1.3.7 The pilot said he enjoyed his work and that the operator had never pressured him to fly in unsuitable weather conditions or to take risks. He felt that he was thoroughly trained for the flights he undertook and believed the operator set high standards. He recalled turning back once before from a flight to Cape Reinga and that the operator supported his decision.

## **1.4 Aircraft information**

- 1.4.1 ZK-JES was a Cessna 172N single engine 4-place aeroplane, serial number 172-70292, constructed in the United States in 1978. The aeroplane was fitted with a 180 horsepower Lycoming O-360-A3A engine, serial number L-10190-36A.
- 1.4.2 The aeroplane had a non-terminating Airworthiness Certificate in the standard category. The aeroplane maintenance records showed it was maintained in accordance with the operator's approved maintenance manual. At the time of the accident ZK-JES had accrued 8427.4 airframe hours, and 1163.7 engine hours since it was overhauled. The last inspection was a 50-hour check on 1 December 2004 at 8403.1 airframe hours. On the day of the accident the aeroplane had 29.6 hours to run until its next inspection.

- 1.4.3 The maximum approved gross weight of the aeroplane was 2550 pounds (1157 kg), and its operating weight<sup>2</sup> was 1540 pounds (694 kg). The aeroplane weighed 2352 pounds (1067 kg) when it took off, and was estimated to weigh 2288 pounds (1038 kg) at the time of the ditching. The centre of gravity was determined to be within its approved range for the weight of the aeroplane.
- 1.4.4 The pilot said that the aeroplane had performed normally throughout the flight and he was not aware of any defects.

## 1.5 Meteorological information

- 1.5.1 MetService New Zealand Limited provided an aftercast of the weather conditions that prevailed on the day of the accident, and is summarised below, in part.

A trough of low pressure filling the Tasman Sea was moving slowly closer to New Zealand. A warm front was analysed lying east to west across the Auckland area at midday, moving southeast about 10 kt. This front was preceded by a moist northerly air stream and [was] followed by a moist northwesterly flow. Dew point temperatures both ahead of and behind the front were high (of the order of 18 – 20C).

Radar images during the morning indicated the presence of scattered showers over the Northland and Auckland area associated with the warm front. However, from early afternoon a band of more organised precipitation appeared in the very far north and tracked southward. The band was oriented northeast – southwest, and at 2.45 pm lay close to Cable Bay.

Early afternoon visible satellite imagery showed extensive layered cloud over all of Northland. There appeared to be thicker and higher topped cloud covering the southern parts of Northland, probably associated with the warm front.

Surface observations from Kaitaia, Kerikeri, Kaitaia Hospital automatic weather station, Cape Reinga automatic weather station and Purerua automatic [were] included. There was precipitation detected at some of these sites during the morning but the precipitation stopped late morning or around midday. Amounts measured were small i.e. of the order of a millimetre or less and at 2100Z [1000 local] the observer at Kaitaia reported “clear sky to W/NW”.

Kaitaia Hospital automatic weather station reported a slight improvement in cloud conditions during the morning. However, during the afternoon the cloud base lowered progressively with OVC [overcast] 400 feet reported at 0300Z [1600 local].

Later in the day a burst of precipitation was reported at Kerikeri at 0500UTC [1800 local] with light rain, visibility 800 metres and cloud base 700 feet. There were no observations from Kerikeri earlier in the afternoon.

Forecasts issued on the morning of 15 December indicated poor conditions to continue throughout the day. The forecast issued for flight planning purposes for VFR flights (GA WX NI) [general aviation weather North Island] and available from MetService or from Airways Corporation indicated for Northland ... “rain showers with towering cumulus cloud above 1880 feet and areas of broken stratus cloud at 1000 feet. Also, areas of broken layers of cumulus and stratocumulus cloud above 2000 feet. Visibility reducing to 4000 M in rain showers”. This forecast was issued at 12.58 PM.

Weather conditions over Northland on 15 December 2004 were dominated by very high dew point air both ahead of and behind of a feature depicted as a warm front on the MSL analysis chart. There was an “improvement” in the weather conditions during the morning, however, a second small-scale band of rain with associated low cloud and low visibility moved southward to lie near the accident area around 3 pm.

- 1.5.2 The operator had contacts near Waitiki Airstrip and at Houhora, situated about half way (20 nm) between Kaitaia and Waitiki, who would give him basic weather reports for their respective

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<sup>2</sup> The aircraft weight less the weight of the fuel, the crew and passengers and any cargo.

areas and Waitiki. A contact at Mangonui could also be reached for a basic report if necessary. A basic report was a verbal comment describing the observed conditions such as wind strength and direction, mean sea level air pressure, air temperature, the weather conditions and cloud cover.

- 1.5.3 At about 0715 on the morning of the accident Airways Corporation sent the operator the MetService North Island General Aviation weather, and NOTAM<sup>3</sup> information by Internet as a standard arrangement. The weather information was valid from 0600 to 1800 and is summarised below:

Situation. A warm front will sweep southwards over the North Island today. This afternoon a weak cold front will cross the upper North Island from the west.

Forecast weather for Northland. Broken Cumulus and Stratocumulus layers 1500 feet with tops at 7000 feet. Broken Altostratus above 7000 feet giving occasional rain. Embedded towering Cumulus tops above 10 000 feet with a few rain showers. Some isolated Cumulonimbus with rain and thunderstorms. Stratus lowering to 500 feet in heavier PCPN.

Visibility 30 km lowering to 10 km in rain, 6000 m in rain showers, 4000 m in rain, 3000 m in rain and thunderstorms, and 600 m in fog.

The Kaitaia 3000 foot wind was forecast to be northwesterly at 39 kts.

No Kaitaia METAR (aerodrome meteorological report) was available.

- 1.5.4 When the operator spoke to his contact near the Waitiki Airstrip by Cape Reinga, the weather report he gave was unsuitable for flying. The local weather in the Paihia and Kerikeri areas was also poor. At about 0730 the local weather and the weather near Cape Reinga had not improved, so he cancelled the planned morning Cape Reinga scenic flight that the pilot was scheduled to take.
- 1.5.5 At about 0900, the poor weather in the Kerikeri area cleared. Around 1130 the operator spoke to his contact near Waitiki, who said that the weather there had cleared to a high cloud base and good visibility, with the wind westerly at 17 kts.
- 1.5.6 The operator did not speak to his contacts at Houhora or Mangonui because he did not have a concern about the weather, or think it was necessary to do so, after having talked to his contact at Waitiki. He also did not think it was necessary to check for any later weather forecasts or a Kaitaia METAR.
- 1.5.7 The operator said that the winds were not as strong as those forecast and that it was a “warm front sort of morning.” He said that the MetService General Aviation weather forecasts were not always reliable for Northland, so local knowledge and actual weather observations played an important part in his decisions regarding flights.
- 1.5.8 At about 1230 the operator decided the conditions were suitable for an afternoon flight to Cape Reinga so he contacted the 2 passengers who had been booked for the morning flight.
- 1.5.9 The MetService issued another area forecast valid from 1100 to midnight. The forecast winds were from the northwest, blowing 25 kts at 1000 feet, and 35 kts at 3000 feet. Visibility was forecast to be 30 km reducing to 3000 m in rain and drizzle and 5000 m in showers. There were areas of broken stratus cloud forecast at 500 feet, areas of broken layers of cumulus and stratocumulus above 2000 feet and isolated towering cumulus above 1800 feet. The low stratus

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<sup>3</sup> A notice containing information concerning the establishment, condition or change in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to personnel concerned with flight operations.

was forecast to lift to 1100 feet by midday. The drizzle and rain was forecast to change to rain showers after midday. Occasional moderate turbulence was forecast with the possibility of some severe turbulence.

- 1.5.10 A Kaitaia Aerodrome forecast issued at 1031 and valid from 1000 to midnight, indicated northwesterly winds at 10 kts, 20 km visibility in rain, scattered cloud at 800 feet and broken cloud at 1500 feet. Temporary weather deteriorations were forecast between 1000 to 1100, indicating visibility of 4000 m in drizzle with broken cloud at 500 feet. Further temporary deteriorations were forecast between 1100 to midnight, indicating visibility of 6000 m in rain showers with broken cloud at 1200 feet. The 2000-foot wind was forecast to be northwest at 35 kts. The QNH<sup>4</sup> minimum was 999 and the maximum was 1008.
- 1.5.11 A Kaitaia 1100 METAR reported the wind at 5 kts, 40 km visibility, few clouds at 700 feet, scattered cloud at 1400 feet and broken cloud at 5000 feet. The temperature was 22 degrees Celsius and the dew point 20 degrees. The QNH was 1005.
- 1.5.12 Two residents who lived on a hill overlooking Cable Bay saw the ditching. They said the weather was good in the morning but that it began to deteriorate after about 1300. They said the weather deteriorated rapidly about 10 minutes before the accident, closing in very quickly from the northwest and extending over the sea. They described the conditions at the time of the ditching as “terrible” and said it was like a squall coming in. They said the visibility dropped rapidly and was “pea soup” weather, and that it rained heavily after the ditching. They saw the aeroplane pass off the coast at low level, about the height of their house, in the poor visibility before it turned and ditched in Cable Bay. They said there was not much wind and the poor conditions remained for most of the afternoon.
- 1.5.13 Two other residents who also lived on a nearby hill witnessed the ditching. They also described similar weather conditions to those described by the other 2 residents. They saw the aeroplane fly past at about the height of their house. They said it was very foggy at the time but described the weather as initially being bright, but that it was changing. One of the witnesses went to get his telescope to look, but by the time he got it the weather had deteriorated. They said the weather was changing very quickly every few minutes and that very heavy rain fell just after the ditching.
- 1.5.14 The operator advised that his contact at Houhora drove to Cable Bay a short time after the ditching. He reported good weather in the Houhora area and that he only encountered rain and bad weather about 15 km from the site.

## **1.6 Aids to navigation**

- 1.6.1 The aeroplane was equipped for VFR flight only.

## **1.7 Communication**

- 1.7.1 All communications were by very high frequency (VHF) transceivers, the pilot’s cellular telephone or telephone.

## **1.8 Flight recorders**

- 1.8.1 The aeroplane was not equipped with any flight recorders, nor was it required to be.

## **1.9 Wreckage and impact information**

- 1.9.1 The aeroplane ditched in the sea in level controlled flight, but broke up and was destroyed because of the ditching and the action of the waves.

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<sup>4</sup> An altimeter sub-scale setting to obtain elevation when on the ground.

1.9.2 The wreckage washed up onto the beach and was recovered to a secure location for examination. No evidence of any aeroplane malfunction before the ditching was found. No fuel remained in the tanks, but a strong fuel smell was evident during the recovery. An independent overhaul facility disassembled the engine and examined it, but found no evidence of an engine failure or performance loss.

1.9.3 Most of the cockpit indications were unreliable, but the following was noted:

the mixture was rich  
the electric fuel pump was off  
the magnetos were both on  
the altimeter QNH was set to 1005  
the flaps were selected to full down.

## **1.10 Survival aspects**

1.10.1 The ditching was survivable. The passenger who died was trapped and unable to free himself from the aeroplane because of his injuries, and drowned before he could be assisted.

## **1.11 Organisational and management information**

1.11.1 The operator's office was located at Paihia. A hangar at Kerikeri Aerodrome housed the aeroplanes. The operator carried out tourist and scenic flights around the Bay of Islands and Northland, using 3 aeroplanes and a helicopter. A specialty was a half-day aeroplane trip from Kerikeri to Cape Reinga, which included a 3-hour overland 4-wheel-drive tour from Waitiki Airstrip. The accident flight was planned as such a half-day Cape Reinga trip.

1.11.2 On the half-day Cape Reinga trip pilots were off duty during the passengers' land tour, but their duty time was reduced by one hour only. The pilots were provided with accommodation and refreshments near Waitiki. The normal maximum duty time for one day was 11 hours, and 8 hours of flying. The maximum duty hours every 28 days was 200 hours. A computer programme kept a running total of pilots' duty and flight times and gave a warning if any limitations were being approached or had been exceeded.

1.11.3 The operator had a Quality Assurance system in place and used computer programmes to track various items. A programme was used to calculate aircraft centre of gravity and weight limitations, and included take-off and landing parameters.

1.11.4 The operator provided his own flight following system using VHF transceivers and telephones. The contact at the Waitiki Airstrip near Cape Reinga would advise the operator by telephone whenever a flight had arrived or departed, and pilots would give 30-minute in-flight progress reports.

1.11.5 Each morning Airways Corporation sent the operator the MetService General Aviation weather by Internet. Routine observations of the local Kerikeri and Paihia weather by the operator were reported to the pilots. The contact near Waitiki gave regular basic weather reports on the conditions in the Cape Reinga area. No flights to the Cape commenced until the contact had given a recent favourable weather report. The operator would give pilots an update on the local weather conditions in the Bay of Islands before they left Waitiki on the return leg. If during the overland segment of the passengers' trip the weather changed, which prevented the aeroplane leaving or flying to the Bay of Islands, then the passengers would return by road.

1.11.6 The operator relied upon good flying conditions for his scenic flights. Passengers would be told what the weather conditions were expected to be like over the route, and if there was any chance that the conditions may prevent the flight being completed. In these situations the operator's policy was to reimburse the passengers on a pro-rata basis if the flight could not be completed as planned. This was to ensure that pilots were not unduly pressured to complete flights in unsuitable weather conditions, and to ensure passengers were treated fairly.



- 1.11.7 The operator applied the Civil Aviation Rules weather minima and terrain clearance for his flights. For flights at or below 1000 feet above the surface, pilots had to remain clear of cloud and in sight of the surface, and have a minimum visibility of 5 km. Above 1000 feet above the surface, up to 10 000 feet amsl, pilots had to stay 1000 feet clear of cloud vertically, and have at least 5 km visibility. Pilots could fly no lower than 500 feet above the surface, except during take off or landing or during emergencies. Although 5 km visibility was a minimum requirement, except for emergencies, the operator said he would not commence a flight unless the visibility was significantly better so that the objectives of a scenic flight could be achieved.
- 1.11.8 The operator's most recent Civil Aviation Authority Safety Audit was carried out on 18 October 2004, and covered flight operations and maintenance. The audit report summary said:

The Company has a good safety culture and commitment to compliance with Civil Aviation legislation. The Inspectors considered that there are no areas that compromise the operational safety of the Company.

All personnel contacted were found to be fully aware of their responsibilities. They were helpful throughout the audit, acted in a very professional manner and showed willingness to correct the deficiencies identified.

No operational safety or maintenance concerns were evident during the audit.

ZK-JES was inspected during the audit. The audit report stated that the aeroplane was found in a very neat and tidy condition, and that it had been recently repainted. No deficiencies with the aeroplane were found.

- 1.11.9 After the accident, a person who claimed to have worked as a pilot for the operator about 2 years earlier but wished to remain anonymous, complained about the operator. The person asserted, amongst other things, improper document control and recording of duty and flight times and aircraft hours. No evidence was found to support the assertions. On the contrary, evidence was found showing that the operator maintained proper safety standards.

## **2 Analysis**

- 2.1 The pilot was familiar with the aeroplane and the operation and was appropriately qualified and authorised for the flight. He was also familiar with the half-day scenic flight to Cape Reinga, which he had routinely flown many times in the past 5 months. The aeroplane was serviceable, correctly loaded and had more fuel than that required for the round trip, including reserves.
- 2.2 The operator applied appropriate caution in cancelling the morning flight because of the weather conditions, and the decision to attempt the afternoon flight was reasonable for the known conditions. Once the flight was underway the pilot needed to continually assess the weather along the route to ensure that the flight could continue safely. The pilot had the responsibility to turn back or to divert as soon as it became evident that the planned flight should not proceed.
- 2.3 The pilot took off in good weather and flew in weather conditions that both the operator and he considered to be suitable for the flight. He was familiar with the winter and spring weather patterns, but he had not experienced the regional late spring and summer weather conditions. He had not previously encountered such rapidly changing conditions as he did on the afternoon of the accident.
- 2.4 Although the pilot was relatively inexperienced, the scenic flights that he undertook were not challenging and needed to be conducted in good weather conditions for the passengers' benefit. Because of the nature of the operation, the pilot was not subject to undue pressure to meet schedules or other deadlines. The operator also had procedures in place to ensure that pilots were not pressured to complete flights in unsuitable weather.

- 2.5 The operator had a weather checking system that had served him well over the years, and he depended upon actual weather reports more than forecasts to plan and to decide if flights should proceed. Once a flight was underway it was a pilot responsibility to continually assess the weather conditions ahead to ensure they were suitable for the flight. This was a standard requirement for all pilots, and it was not uncommon for VFR pilots to turn back or divert because of weather.
- 2.6 The flight progressed normally until the pilot saw a band of poor weather ahead, to the northwest of Kaitaia. As he approached the weather he decided that he could not continue along his planned track, so he changed heading to fly around the weather and up the east coast. He quickly saw that the weather probably would not allow him to fly up the east coast either, and after talking to a helicopter pilot decided to turn around and divert to Kaitaia Aerodrome, which he had passed about 10 minutes earlier.
- 2.7 After he turned back he was surprised to see how quickly the weather had changed behind him, which made diverting to Kaitaia marginal. After speaking to the instructor flying in the same area and the operator, he decided his best option was to return to Kerikeri along the east coast. In the circumstances his decision was understandable, and other pilots faced with the same circumstances would probably have made the same decision.
- 2.8 Although the pilot was only a few minutes flying time behind the instructor, this was sufficient time for the weather conditions and visibility to deteriorate to such a degree that the pilot was forced to turn back and attempt to return to Kaitaia Aerodrome, his only alternative landing site.
- 2.9 The pilot got caught in the middle of a fast moving frontal weather system, which was dominated by very high dew point air and high humidity both ahead of and behind the front. He had not encountered such conditions before and was taken by surprise. The unusual conditions were such that the moist air only had to cool a little to reach the dew point temperature in order for cloud to form. In the circumstances, low cloud, mist and rain formed rapidly ahead of and behind the pilot, reducing the visibility to a few hundred metres or less. Some local residents described the weather conditions as squall-like and noted they had deteriorated very quickly.
- 2.10 The pilot had correctly elected to configure the aeroplane for bad weather flying and to fly the aeroplane at the slowest safe speed and as low as necessary to negotiate the bad weather. This was a technique that all pilots were trained to apply in the event they were caught in bad weather on VFR flights.
- 2.11 As the pilot flew back past Coopers Beach he considered that it was long enough for an emergency landing if he could not continue to Kaitaia, but he flew about one km past it to Cable Bay before realising that he could not continue. At that point the option of landing on Coopers Beach was gone because of the rapidly worsening visibility. He then had no choice but to ditch the aeroplane immediately, because he had almost no forward visibility and Cable Bay beach was unsuitable for a landing.
- 2.12 Having earlier decided that Kaitaia Aerodrome was unsuitable to divert to, the pilot possibly should have elected to land on Coopers Beach when he returned to it the second time rather than continuing on to check the weather to the west. The pilot though was faced with a difficult situation, and was hoping the weather would allow him to reach Kaitaia Aerodrome situated only about 10 nm to the southwest. His decision not to climb into the cloud and fly on instruments was probably appropriate, given the workload that he was under and his limited experience. The aeroplane was also only equipped for VFR flight, although it did have basic instruments for flight through cloud. Had the pilot elected to climb ZK-JES into the cloud he could have used the operator as a resource for a heading to steer and a safe altitude to climb to, knowing that the weather was clear around Kerikeri some 25 nm to the southeast.
- 2.13 The pilot made a correct decision when he first turned back rather than attempting to carry on to Waitiki through the poor weather ahead. Had he made his decision earlier it would have increased the likelihood of him reaching an alternate aerodrome safely. Timely

decision-making is crucial when encountering poor weather conditions on VFR flights. A number of accidents over the years have occurred because pilots had pushed on into adverse conditions until all their options were exhausted. In this case there was no indication that the pilot had pushed on deliberately into adverse conditions, but by delaying his decision to turn around even by a few minutes, his option of diverting to Kaitaia Aerodrome was gone. Had he been aware of how quickly the weather was deteriorating around him he probably would have made a decision earlier to land at Kaitaia, or return to Kerikeri.

- 2.14 The operator and pilot could have better interpreted the synoptic situation and got the latest reported and forecast conditions, which should have warned them of the potential for a sudden weather deterioration during the afternoon. In particular they could have obtained the latest Kaitaia METAR, and noted the small spread between the ambient air temperature and the dew point temperature and the fact that the air temperature had only to drop about 2 degrees for cloud formation to occur. This should have been a warning that substantial low cloud could form quickly if the temperature dropped.
- 2.15 The operator could have enhanced his and the pilot's overall knowledge of the weather situation by using all the resources available to him, which might have improved the pilot's ability to make an earlier decision to divert. Had he spoken to his contacts at Houhora and Mangonui they might have reported something to suggest that the weather was going to deteriorate.

### **3 Findings**

Findings are listed in order of development and not in order of priority.

- 3.1 The pilot was appropriately licensed, authorised and fit to conduct the flight.
- 3.2 The aeroplane was suitable for the flight and its records showed that it was properly maintained.
- 3.3 The weather reports and meteorological information that the operator and pilot received showed the conditions were suitable for the flight to depart for Waitiki Airstrip.
- 3.4 The pilot's decision to return to his departure aerodrome along the east coast was appropriate based on the in-flight weather reports that he had received.
- 3.5 The pilot was inadvertently caught in rapidly deteriorating weather conditions that prevented him from diverting to his alternate aerodrome or returning to his departure aerodrome.
- 3.6 The pilot probably could have flown safely to either his alternate or departure aerodrome had he made an earlier decision to turn back.
- 3.7 Low cloud and mist formed quickly, severely restricting the pilot's visibility, when the ambient air cooled only a few degrees to match the unusually high dew point temperature.
- 3.8 The pilot was left with no option but to ditch the aeroplane because he could no longer continue flying visually.
- 3.9 The operator did not make full use of all the meteorological information that was available to him.
- 3.10 The pilot's ability to make a timely decision to divert or return to Kerikeri could have been enhanced if he had been forewarned that a sudden weather deterioration was possible.

## **4 Safety Recommendation**

4.1 On 27 May 2005 the Commission recommended to the Salt Air Chief Executive Officer that he:

4.1.1 Make full use of all available meteorological information to identify those elements, such as the spread between the ambient air and dew point temperatures, that may cause the flight conditions to become marginal or unsuitable. (039/05)

4.2 On 2 June 2005 the Chief Executive Officer of Salt Air Ltd replied in part:

4.2.1 Salt Air Ltd have in the past 2 – 3 weeks contracted to the Metservice to provide full weather information as per the recommendation.

Approved for Publication 26 May 2005

Hon WP Jeffries  
Chief Commissioner







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