



Report 96-017

Jodel D11

ZK-EJP

8 km south of New Plymouth

24 August 1996

Abstract

At about 1040 hours, on Saturday 24 August 1996, at the conclusion of a local flight, Jodel D11 ZK-EJP made an approach and go-around over the farm airstrip where it was based. The aircraft subsequently flew downwind at a lower height than usual and was seen to bank steeply to the left in an apparent attempt to land on the airstrip or in adjacent paddocks. It levelled momentarily then rolled to the right, descended rapidly, and struck the hillside. The pilot sustained fatal injuries on impact. The injured passenger escaped from the burning wreckage and was assisted to safety by farm workers who had observed the accident.

A loss of power due to an undetermined engine malfunction and incapacitation of the pilot may have contributed to the inadvertent stall. Conditions were conducive to carburettor icing. The pilot was probably medically unfit to fly. The pilot had a known medical deficiency, evidenced by severe coronary artery disease, which invalidated his CAA Medical Certificate. Pilot impairment or distraction as a result of the deficiency was a possible contributory factor in the accident.

Transport Accident Investigation Commission

Aircraft Accident Report 96-017

Aircraft type, serial number and registration: Amateur-built Jodel D11, AACCA 323/1, ZK-EJP

Number and type of engines: One Rolls Royce Continental O-200-A

Year of manufacture: 1977

Date and time: 24 August 1996, 1045 hours¹

Location: Mangorei Road, 8 km south of New Plymouth
Latitude: 39° 07.6' S
Longitude: 174° 05.4' E

Type of flight: Private

Persons on board: Crew: 1
Passengers: 1

Injuries: Crew: 1 fatal
Passengers: 1 serious

Nature of damage: Aircraft destroyed

Pilot in Command's licence: Private Pilot Licence (Aeroplane)

Pilot in Command's age: 71

Pilot in Command's total flying experience: 1790 hours
1243 hours on type

Investigator in Charge: D G Graham

¹ All times in this report are NZST (UTC + 12 hours)

1. Factual Information

- 1.1 On the morning of Saturday, 24 August 1996, the pilot of Jodel D11 ZK-EJP, together with his nephew and the latter's wife, arrived at the airstrip adjacent to Mangorei Road where the aircraft was kept in an enclosed hangar. The pilot's nephew and his wife had helped to refuel the aircraft from a 200 litre drum of Avgas 100 also kept at the hangar. They recalled hand pumping about 17 litres of fuel to fill the main fuel tank to capacity, employing a chamois filter and funnel in the process.
- 1.2 The pilot followed his normal practice in preparing the aircraft for flight, carrying out a comprehensive pre-flight inspection, and explaining to his nephew the reasons for each action. He drained a fuel sample from the main filter into a small glass jar, ascertaining that no water, or other contamination was present.
- 1.3 The pilot was accompanied on the first flight by his nephew's wife. Start-up was normal and after taxiing to the slightly elevated southern end of the airstrip he had taken off downslope toward the north as was his custom. At 1000 hours he established RTF contact with the Tower Controller at New Plymouth aerodrome some 8 nm to the north east. The pilot indicated that he would be operating ZK-EJP, with two persons on board, south of Mangorei Road for about one and a half hours. He received clearance to operate as advised at 2500 feet or below, and was requested to call 'operations normal' as appropriate.
- 1.4 The first flight comprised a short cross-country leg toward the west where the pilot circled a property farmed by a family member, and carried out a low level run over an adjacent airstrip. The outward and return route skirted the lower ranges on the northern flank of Mt. Egmont. There were some clouds around but the pilot had no difficulty in avoiding the cloudy areas, and no rain was encountered. There was no indication during the flight of any problem with the aircraft or its engine, and the pilot appeared to be in good health throughout.
- 1.5 After a normal landing toward the south at Mangorei Road the pilot taxied ZK-EJP upslope to where his nephew was waiting on the airstrip. The latter exchanged places with his wife in the right passenger seat. The pilot taxied the remaining short distance to the southern end, completed pre-take off checks, and took off, as before, toward the north.
- 1.6 The nephew, who had flown in ZK-EJP some five or six times previously, noted nothing unusual on the take-off or during the subsequent climb. His uncle gave no hint of any physical discomfort or distress at any time. The nephew had not undertaken formal pilot training but had gained a measure of familiarity with the operation of the aircraft while flying with his uncle on earlier occasions. During this flight the nephew carried out some 180° and 360° turns, and "followed through" during three power-off approaches to the stall, with recovery at stall onset. In each case when power was re-applied the engine responded smoothly, and without hesitation.
- 1.7 The pilot contacted New Plymouth Tower at 1030 hours, reporting 'operations normal'. No further RTF communication took place between ZK-EJP and the Tower Controller, nor were any other transmissions heard from the aircraft after that time.
- 1.8 After about twenty minutes flying, the pilot and his nephew returned to the Mangorei Road airstrip, joining left downwind in the normal manner to make an intentional "dummy" approach and go-around. At this stage the nephew was handling the aircraft under the close supervision of his uncle. The approach was satisfactory and at a height of about 100 feet above the airstrip the pilot, who had resumed full control of ZK-EJP, applied power for the go-around.

- 1.9 At this point the nephew, a qualified mechanic, recalled a distinct ‘miss’ in the engine, giving him the impression that at least two cylinders were not functioning correctly. The instrument panel was vibrating severely due to the uneven running, and although the aircraft seemed to be maintaining height it did not climb in the usual way. His uncle tried various combinations of the carburettor heat control, mixture and throttle in an attempt to alleviate or correct the problem. The application of power had occurred when ZK-EJP was about half way along the airstrip and the nephew recalled that his uncle continued south over the Mangorei Road Golf Links, then turned left to proceed along the downwind leg. Altitude was maintained downwind but he remembered nothing further of events during the flight apart from a momentary glimpse of the ground just prior to impact. His final recollection was of crawling away from the aircraft and looking back once or twice to see it burning fiercely while he was being assisted to safety by the farm workers.
- 1.10 At about 1040 hours farm workers, who knew the pilot and had flown with him as passengers, observed the aircraft flying downwind prior to landing at the farm airstrip. They considered the aircraft to be lower than usual, and also gained the impression that the engine “was not running right”.
- 1.11 The aircraft banked steeply overhead the farm workers, “in a very hard left turn”, as though lining up to land, but levelled momentarily, rolled to the right and lost height rapidly. The right wingtip struck the nearby hillside, pitching the nose and left wing into the slope. Fire broke out immediately and the aircraft began to burn fiercely. Two of the farm workers ran to render assistance while the third rode his farm bike home to alert emergency services.
- 1.12 The pilot’s nephew, in the right seat of ZK-EJP, received injuries to his lower limbs, head, and right arm in the impact sequence but managed to crawl a short distance from the wreckage. His clothes were burning, and the farm workers helped him to extinguish the flames and move to safety. The pilot sustained fatal injuries during the ground impact and subsequent fire.
- 1.13 A neighbour living on the opposite side of Mangorei Road to the airstrip was accustomed to watching the pilot flying ZK-EJP locally. While making a telephone call she looked up to see the aircraft on an apparent approach to land but lower than normal. During her brief observation the right wing “tipped” down and the aircraft dropped out of sight below the level of the hillside. Hearing an impact and seeing black smoke she immediately terminated her conversation and dialled 111 to inform the authorities that an accident had occurred.
- 1.14 Rescue services attended the scene promptly, but the fabric-covered aircraft, of wooden construction, was essentially consumed by the intense fire.
- 1.15 The farm airstrip was located on grassland on the south side of Mangorei Road. It was 380 m long and between 25 m and 30 m wide, oriented 190°/010° M, with an upslope of 4% toward the south. This was the most elevated area of the farm, about 550 feet (170 m) amsl, with the surrounding pastures, comprising small paddocks, scattered trees, and farm tracks lying mostly 100 feet to 150 feet below the level of the airstrip.
- 1.16 The ground fell away steeply at each end of the airstrip. This precluded a successful touchdown if for any reason a landing aircraft was to ‘undershoot’ the threshold. When landing toward the south a series of lower paddocks to the south-east of the airstrip ‘plateau’ offered a confined, but feasible, area for an emergency landing. The pilot had successfully landed ZK-EJP in this area, after experiencing an in-flight engine problem, in 1989. No defect had been identified and carburettor icing was considered a likely cause.

- 1.17 The accident site was on the grass-covered hillside some 300 m north of the northern end of the airstrip, and about 100 feet below its level. Broken windscreen perspex, and other light debris was scattered in a 5 m radius around the site. Fire had destroyed most of the aircraft but the layout of unburnt remains of the wings and tailplane showed that it was complete prior to ground impact, which had occurred on a northerly heading. The wooden main spar had fractured at the wing root on the right side, consistent with the observed initial contact of the right wing. A portion of bulkhead with part of the passenger's safety harness still attached suggested that the weakened right side fuselage structure had broken open during the impact sequence. The passenger was able to make a timely escape from the aircraft before the post-crash fire was fully developed.
- 1.18 Both main undercarriage legs had failed, the engine mount was severely disrupted, and one blade of the two-bladed wooden propeller had broken off in the nose-down major impact. The source of the fire could not be established conclusively but a significant quantity of fuel from the fuselage-mounted main tank was likely to have been showered over the engine, the exhaust system, and the battery and associated electrical wiring installed in the engine bay.
- 1.19 All the flight control cables were located and found to be intact and correctly attached to their respective operating linkages and control surfaces. The elevator trim was in an approximately neutral setting. No information useful to the investigation could be obtained from the burnt-out cockpit instrumentation. The carburettor heat control was found in the 'OFF' position (pushed fully 'IN'). This matched the 'cold air' setting of the inlet air control flap in the carburettor air intake box, but undue reliance could not be placed on these indications due to the impact forces which had been sustained.
- 1.20 A bottle of Nitrolingual anti-anginal spray medicine was found in the area of the cockpit wreckage occupied by the pilot.
- 1.21 Witnesses described the weather conditions at the time as generally calm, with occasional "puffs" of wind, or a briefly sustained light breeze, from a northerly quarter. There was high overcast with cloudy patches below, and some rain in the area. A very light drizzle had begun about the time of the accident.
- 1.22 The Director of the Meteorological Service of New Zealand provided an 'aftercast' of the weather at the time of the accident. Relevant extracts included the following:

Synoptic Situation

During the morning of 24 August 1996 a ridge of high pressure, lying north-east to south-west, moved east across New Zealand and a northerly flow gradually became established over Taranaki. A depression was centred in the mid Tasman Sea with a weak diffuse warm front extending from it to Northern New Zealand.

Weather

The nearest observation sites to the crash site are the tower and AWS at the New Plymouth Airfield about 13 km to the north-east. The surface wind reported by the tower was south-east about 5 knots at first and backed through east during the morning to be northerly at 1000 am. The visibility was 25 km for most of the morning with adjacent showers in sight. At 1035 am the visibility was reported as 6000 metres in light rain but by 1100 am the visibility was up to 12 km. The tower also reported a layer of cloud at about 3500 to 4000 feet during the morning with few to scattered cloud at 2000-2500 feet. During the rain some patches at 1000 feet were also reported. The temperature (rounded to the nearest whole number) was reported as 5 degrees early in the morning and rose to 10 degrees by 1100 am. The relative humidity was 90 percent or greater.

Maximum gusts (in the past hour) were generally 6 to 8 knots, but recorded as 12 knots between 1000 am and 1100 am.

Comment

The weather at the crash site was probably similar to the weather at New Plymouth airfield with due allowance for the fact that the crash site is about 550 feet above sea level. There may have been more light rain than at the airfield as some of the adjacent rain reported by the tower was probably towards Mount Egmont, which is in the direction of the crash site from the tower. The winds at the surface were probably light. Gustiness may have been a little greater than at the airfield because of the undulating nature of ground which rises towards the mountain.

There was evidence of a strong inversion at about 7000 feet. The layer between the surface and the inversion was moist with a relative humidity of about 85 percent. Estimated values of temperature, humidity and wind at various heights are given below:

height	temp	dew point	humidity	wind
1500 ft	5.9	4.8	83	320/13
1000 ft	7.1	6	84	325/11
500 ft	8.3	7.2	85	330/09

1.23 The pilot, aged 71, had joined the RNZAF during World War II and had trained as a fighter pilot, obtaining his 'Wings' in September 1944. He had served overseas with 15 (Fighter) Squadron at Bougainville during 1945, and had flown a variety of aircraft during his war service, including the P-40 and Corsair fighter types.

1.24 On return to civilian life the pilot had maintained his flying qualifications, being issued with a Pilot's 'A' Licence in 1946. He continued to fly light aircraft regularly at New Plymouth, and was issued with a Private Pilot Licence in 1956. After a break from flying of some 12 years, he renewed his PPL in 1970. He had maintained a current PPL since that time.

1.25 The pilot had built the two-seat aircraft himself, commencing its construction in 1975. By November 1977 he had successfully completed the required test and consolidation flying for the issue of a Permit to Fly, and had also received entitlement to carry a passenger.

1.26 Since that time the pilot had flown ZK-EJP regularly, often taking members of his family or friends for flights locally or further afield. He frequently flew at weekends, making several 20 or 30 minute flights during a morning or afternoon.

1.27 Following the completion of Jodel D11 ZK-EJP, the pilot flew this aircraft exclusively. He had accumulated a total of approximately 1790 flying hours at the time of the accident. 1243 hours of this total had been flown in ZK-EJP, over a period of more than 18 years. As far as practicable, the pilot had flown consistently and regularly during each month, averaging some 67 hours flying each year. The major portion of this flying had taken place from the Mangorei Road airstrip. Excluding the flights on the day of the accident the pilot had flown 15 hours 20 minutes within the last 90 days, and 3 hours 30 minutes in the last seven days. He had made a 40 minute local flight on the previous day.

1.28 The pilot had flown ZK-EJP with an instructor every two years in conjunction with the renewal of his PPL. His most recent Biennial Flight Review was carried out on 1 April 1996.

1.29 The pilot, a member of the Amateur Aircraft Constructors Association, had built ZK-EJP from a basic set of plans, and was thus intimately familiar with the aircraft's design, constructional features and modifications. He held Maintenance Approval # 11118, first issued to him early in the aircraft's history, and renewed regularly. This entitled him to carry out minor maintenance of Jodel D11 ZK-EJP and its Rolls-Royce Continental engine. The Maintenance Approval was valid to 5 September 1997.

- 1.30 The Jodel D11, with its two-place side by side seating, neat low-wing layout, and sturdy conventional undercarriage rendering it suitable for strip operations, is a long established and popular 'amateur-built' design of which more than thirty examples are registered in New Zealand. The pilot had installed the 100 HP Rolls Royce Continental O-200-A four-cylinder engine new at the time of construction. He had modified the right side exhaust assembly in an approved manner to provide carburettor heat. This enabled warm air to be admitted to the carburettor, if required, by pulling the cockpit carburettor heat control to the 'ON' position. In common with similar installations in other light aircraft, the effectiveness of the system was dependent on heat transfer from the engine exhaust, in this case from two cylinders only. Potential existed for it to be ineffective in overcoming severe carburettor icing if not selected at an early stage, or if the engine was operated at a low power setting, e.g. during descent, or sustained 'power off' flight.
- 1.31 ZK-EJP was fitted with a 5 imp. gal (22.5 litre) fuel tank in each wing, in addition to the 13 imp. gal (59 litre) main tank in the fuselage. It was understood that, at the time of the accident, neither wing tank contained any significant quantity of fuel.
- 1.32 The aircraft's weight at the time of the accident was estimated to have been approximately 80 lb. (36 kg) below the maximum authorised all-up weight of 1360 lb (617 kg). The position of the CG could not be established accurately but was estimated to have been within the permitted limits.
- 1.33 The aircraft was maintained in accordance with a schedule of Annual, 100 hour, and 50 hour inspections. The most recent Annual inspection had been performed, in combination with a 100 hour inspection, at an approved aircraft maintenance organisation in October 1995. Maintenance Release #AO10741 had been issued following the inspection and was valid to 24 October 1996, or 1301.55 hours total aircraft time in service, whichever occurred earlier. The aircraft and engine had a recorded total time in service of 1250 hours, and the Henry H011 propeller 341 hours, when the accident took place.
- 1.34 The engine and its accessories sustained severe damage as a result of impact and the intense fire. The carburettor, mounted beneath the engine, was broken off at the inlet duct. Soil had been forced through the induction system and filter assembly into the base of the carburettor throat.
- 1.35 The engine was transported to an approved maintenance organisation and a detailed strip examination carried out. There was no evidence of mechanical malfunction, and no significant defects were noted in the cylinders, spark plugs, or magnetos. Fire damage precluded functional testing of the magnetos and the individual spark plug leads. The base of the mechanical fuel pump was cracked due to ground impact but the operating arm was intact. Some fuel was present at the pump inlet. All filters and screens in the fuel and oil system were free from significant contamination.
- 1.36 The carburettor was a Marvel Schebler MA-3 SPA type. Each half of the carburettor body was intact and properly attached. On disassembly it was noted that the float was of composite material. Some pieces of float had peeled off and were lying in the float chamber. A 'soak' test was carried out to determine whether the float would absorb fuel. There was no discernible loss of buoyancy at the end of a 16 hour period. The carburettor jets were all clear.
- 1.37 Two Airworthiness Directives were applicable to the MA-3SPA type carburettor installed in ZK-EJP, but neither had been actioned. DCA/MA/11A required replacement of the composite float with a float of metal construction, and DCA/MA/12A involved replacement of the two-piece venturi with an improved one-piece combination primary and main venturi casting. The compliance dates were 12 February 1993 and 31 August 1993, respectively. No conclusive reason for the non-compliance with the two AD's was established.

- 1.38 There was no evidence to indicate that the composite float or the earlier type venturi within the carburettor contributed to the engine 'miss', or rough running, which occurred during the go-around.
- 1.39 ZK-EJP had been test flown by the pilot following the aircraft's completion. The Flight Test Report indicated that after a slight buffet at 34 knots, the 'POWER OFF level stall' occurred at 32 knots with the aircraft entering a 'wings level squash'. In the 'POWER ON level stall' (full power), buffeting occurred at 26 knots and the stall speed was 25 knots. The pilot noted 'Left wing and nose drop, no violence'. In the 'POWER ON banked stall', buffeting occurred at 36 to 37 knots, stall speed was 35 knots, and the inside wing dropped, but not violently. (The aircraft was stalled, while maintaining 30° bank, by steadily tightening the turn with elevator.)
- 1.40 A pilot who had carried out a significant series of test flights in a Jodel D11 variant reported that the aircraft's stall characteristics were generally docile. He had found, however, that in a steeply banked turn to the left, if the turn was tightened, and not co-ordinated precisely, the aircraft could 'flick', or roll off rapidly, to the right. When this occurred, it happened quickly and without advance warning. Another pilot who had flown over 700 hours in his Jodel D11 reported a very similar experience when the aircraft was pulled 'too hard' in a left turn. He had also found that in a side-slip to the left, at low airspeed with the nose held too high, the aircraft would roll or 'flick' to the right.
- 1.41 The pilot had a routine medical examination for his PPL in December 1995. His Class 2 Medical Certificate, issued as a result, had an expiry date of 13 January 1997. It carried the following restrictions:
002 Bifocal spectacles must be worn, 051 Flexibility: Physical standard²
- 1.42 Notwithstanding the possession of a current Medical Certificate, Civil Aviation Rule Part 61 states that the holder of a flight crew licence shall not exercise the privileges of that licence while the holder has a known medical deficiency or increase of a known medical deficiency that would make the holder unable to meet the medical standards for his or her licence.
- 1.43 The post-mortem examination of the pilot revealed evidence of severe coronary artery disease.
- 1.44 The pilot had been diagnosed as suffering from serious coronary artery disease and gastritis following a hospital admission in February 1996 with atypical chest pain. Similar symptoms had occurred previously on a number of occasions including one episode occurring during a previous flight. Due to the atypical nature of the chest pain, these symptoms may have been caused by either of the confirmed medical conditions.
- 1.45 Medical records, made available with the consent of the family, indicated that chest pain symptoms were continuing following discharge from hospital. The pilot's prescribed medications were not changed following the hospital admission although the pilot had purchased a Nitrolingual spray, used to relieve angina, as an over the counter medication from a pharmacy without prescription.

2. Analysis

- 2.1 The flights carried out by the pilot on Saturday 24 August 1996 had proceeded uneventfully until, at the conclusion of the second flight, the engine failed to respond normally during an intentional 'go-around', and the subsequent accident occurred. The pilot had made many similar flights from the Mangorei Road farm airstrip since completing ZK-EJP in 1977, enabling numerous children, friends, and family members to experience aviation first hand.

² This exercise of flexibility on the physical standard related to satisfactorily treated high blood pressure

- 2.2 The pilot was very familiar with the airstrip and its environs, and well used to the local weather, in addition to his familiarity with the operation of the aircraft itself. He had successfully landed ZK-EJP in one of the nearby paddocks when confronted with an in-flight engine problem on an earlier occasion.
- 2.3 The strip examination carried out after the accident disclosed no evidence of major mechanical malfunction or significant defect in the engine or its accessories. Fire and impact damage, however, limited the extent of the investigation and precluded an engine run, or component bench tests of the magnetos or ignition harness. In the event, no conclusive reason for the apparent ‘missing’, or similar symptoms, recalled by the pilot’s nephew, was determined. The possibility of an electrical or ignition fault could not be discounted.
- 2.4 Réference to a chart showing the probability of icing with a float-type carburettor, as fitted to the engine of ZK-EJP, showed that the meteorological conditions were conclusive to a serious build-up of ice in the carburettor at any power setting. Icing was particularly likely in a ‘power-off’, or low power, situation but in the conditions prevailing could also occur at cruise power.
- 2.5 The pilot could be expected to be well aware of the possibility of carburettor icing, a known hazard in light aircraft operation, and the pilot’s nephew recalled that carburettor heat was selected prior to the approach. However the effectiveness of the carburettor heat installation in ZK-EJP, which was dependent on exhaust heat from only two cylinders, might have been compromised by various factors. These included the severity and rapidity of ice formation, prior operation of the engine at low power settings, or insufficient, or delayed, application of carburettor heat. Whether a build-up of ice in the carburettor intake contributed to the lack of power and/or ‘missing’ of the engine of ZK-EJP, in the final stages of the accident flight, could not be established with certainty but remained a strong possibility.
- 2.6 The witness descriptions of the aircraft’s flight path indicated that although some engine power was available it was insufficient, (for whatever reason) to permit the pilot to climb ZK-EJP to his usual circuit height for a landing on the airstrip toward the south. This situation may have led the pilot, with his experience of the aircraft’s capabilities and generally docile behaviour at low speed, to ‘trade airspeed for altitude’ on the downwind leg and persevere with an attempted landing. If this was the case, normal safety margins in terms of airspeed would have been eroded, and potential would have existed for an inadvertent stall. A steeply banked turn towards the airstrip, or tightening of such a turn to make an approach to the lower paddocks, should this have seemed preferable, would have markedly increased the risk of this occurring.
- 2.7 It is possible that the downwind leg being flown at a lower than normal circuit height led the pilot, through altered visual cues, to unwittingly fly closer to the strip than on a normal circuit. Such a close-in circuit would have provided little room for normal base and final turns, and may have led to the pilot making the reported steep final turn in an attempt to align the approach with the airstrip.
- 2.8 The final events were also consistent with the experience of other Jodel D11 pilots. On occasion, their aircraft while being manoeuvred to the left at airspeeds approaching the stall had, without warning, levelled and rolled, or ‘flicked’, to the right. This tendency would be dependent, among other factors, on the combination of an individual aircraft’s rigging, the bank angle involved, and the co-ordination of controls during the manoeuvre. It was evident, however, that such an unexpected occurrence at a low height would afford little opportunity to recover control of the aircraft before it struck the ground.

Medical considerations

- 2.9 The pilot had been advised of two new medical deficiencies in February 1996, following urgent admission to hospital with chest pain. The pilot did not agree with the diagnosis or medical advice that these were incompatible with using a pilot licence. The admission to hospital and stress ECG evidence of coronary artery disease as a possible cause of the symptoms experienced were both known medical deficiencies that should have been reviewed by the CAA Medical Unit or an Aviation Medical Assessor (AMA) before using a pilot licence. The ECG evidence of severe coronary artery disease and myocardial ischaemia was confirmed by the post mortem findings.
- 2.10 While the pilot did not appear to have any angina-related symptoms in the earlier stages of the flight, it is possible that these may have occurred towards its conclusion. Whether the imposed stress of the engine problem while flying his aircraft induced symptoms which impaired his performance and judgement leading to a loss of control in the final turn, could not be established. This remained a possibility, however, given his familiarity with the local area, and his experience and normal capable handling of the Jodel D11. While the pattern of symptoms was recorded as being unpredictable, the pilot had experienced chest pain in flight previously and would have been aware that this could recur if precipitated by stress and or exertion. It is possible that chest pain or other related symptoms recurred under the stress of the engine malfunction or that the pilot was distracted by concerns that recurring symptoms could cause incapacitation during the emergency procedure. Coronary artery disease was therefore a potential contributory factor in this accident.
- 2.11 The CAA Medical Certificate is invalidated when the holder has a known medical deficiency. The requirement for medical deficiencies to be reviewed once they become known was developed to prevent avoidable pilot incapacitation from any medical conditions that develop between routine CAA medical examinations.
- 2.12 Holders of CAA Medical Certificates are advised that any new known medical deficiency should be notified and clearance requested before again using a pilot licence. Any CAA decision to permit a pilot to resume flying with a known medical deficiency is based on a careful assessment of the risk of sudden incapacitation.
- 2.13 A number of pilots with coronary artery disease are now permitted to resume the use of their pilot licence, if the incapacitation risk is inherently low or reduced by medical/surgical intervention. The exercise of flexibility by the CAA is based on expertise in clinical aviation medicine which enables a comprehensive risk assessment to be undertaken.
- 2.14 As a result of the disputed medical findings, the pilot did not make the required notifications nor did he obtain the appropriate advice that could have clarified whether he was medically fit and safe to fly. Specialist advice either from the CAA or an AMA can help pilots to understand how best to respond to a new medical deficiency and avoid undue hazard to themselves and others. Pilots are strongly recommended to seek the advice of an AMA, or CAA, in the event of any significant known medical deficiency.

3. Findings

- 3.1 The pilot was very familiar with Jodel D11 ZK-EJP, having built the aircraft himself and flown it successfully for more than 18 years.
- 3.2 The pilot's regular flying meant that he was current in handling ZK-EJP under all normal circumstances and well practised in operating the aircraft from the Mangorei Road airstrip.

- 3.3 The pilot had severe coronary artery disease, a known medical deficiency, which invalidated his CAA medical Certificate. Pilot impairment or distraction as a result of the deficiency was a possible contributory factor in this accident.
- 3.4 Severe coronary artery disease was confirmed by the post-mortem.
- 3.5 Angina may have affected the pilot's decision making and/or aircraft handling skills during the final moments of the flight.
- 3.6 ZK-EJP performed satisfactorily throughout the first flight on the day of the accident.
- 3.7 No conclusive cause was determined for the engine problem which was encountered during an intentional 'go-around' at the end of the second flight.
- 3.8 The meteorological conditions prevailing, the limitations of the aircraft's carburettor heat installation, and the type of flying carried out, suggested a strong possibility of carburettor icing.
- 3.9 Non-compliance with two Airworthiness Directives applicable to the aircraft's carburettor, discovered during strip examination following the accident, did not contribute to the engine problem.
- 3.10 Reduced engine performance limited the circuit height and airspeed the pilot was able to maintain while positioning ZK-EJP for a landing on the airstrip toward the south.
- 3.11 The relatively calm weather on the morning of the accident suggested that any light tail wind or brief gust was unlikely to have contributed to its occurrence.
- 3.12 The probable cause of the accident was a steeply banked turn to the left at low airspeed which resulted in an inadvertent stall, right wing drop and descent, with insufficient height available for the pilot to recover the aircraft before it struck the ground.

19 February 1997

M F Dunphy
Chief Commissioner

Glossary of Aviation Abbreviations

AD	Airworthiness Directive
ADF	automatic direction-finding equipment
agl	above ground level
AI	attitude indicator
AIC	Aeronautical Information Circular
AIP	Aeronautical Information Publication
amsl	above mean sea level
AOD	aft of datum
ASI	airspeed indicator
ATA	actual time of arrival
ATC	Air Traffic Control
ATD	actual time of departure
ATPL (A or H)	Airline Transport Pilot Licence (Aeroplane or Helicopter)
AUW	all-up weight
°C	degrees Celsius
CAA	Civil Aviation Authority
CASO	Civil Aviation Safety Order
CDI	course deviation indicator
CFI	Chief Flying Instructor
C of A	Certificate of Airworthiness
C of G (or CG)	centre of gravity
CPL (A or H)	Commercial Pilot Licence (Aeroplane or Helicopter)
DME	distance measuring equipment
E	east
ELT	emergency location transmitter
ERC	Enroute Chart
ETA	estimated time of arrival
ETD	estimated time of departure
°F	degrees Fahrenheit
FAA	Federal Aviation Administration (United States)
FL	flight level
ft	foot/feet
g	acceleration due to gravity
GPS	Global Positioning System
h	hour
HF	high frequency
hPa	hectopascals
hrs	hours
HSI	horizontal situation indicator
IAS	indicated airspeed
IFR	Instrument Flight Rules
IGE	in ground effect
ILS	instrument landing system
IMC	instrument meteorological conditions

in	inch(es)
ins Hg	inches of mercury
kg	kilogram(s)
kHz	kilohertz
KIAS	knots indicated airspeed
km	kilometre(s)
kt	knot(s)
LAME	Licensed Aircraft Maintenance Engineer
lb	pound(s)
LF	low frequency
LLZ	localiser
Ltd	Limited
m	metre(s)
M	Mach number (e.g. M1.2)
°M	degrees Magnetic
MAANZ	Microlight Aircraft Association of New Zealand
MAP	manifold absolute pressure (measured in inches of mercury)
MAUW	maximum all-up weight
METAR	aviation routine weather report (in aeronautical meteorological code)
MF	medium frequency
MHz	megahertz
mm	millimetre(s)
mph	miles per hour
N	north
NDB	non-directional radio beacon
nm	nautical mile
NOTAM	Notice to Airmen
NTSB	National Transportation Safety Board (United States)
NZAACA	New Zealand Amateur Aircraft Constructors Association
NZDT	New Zealand Daylight Time (UTC + 13 hours)
NZGA	New Zealand Gliding Association
NZHGPA	New Zealand Hang Gliding and Paragliding Association
NZMS	New Zealand Mapping Service map series number
NZST	New Zealand Standard Time (UTC + 12 hours)
OGE	out of ground effect
okta	eighths of sky cloud cover (e.g. 4 oktas = 4/8 of cloud cover)
PAR	precision approach radar
PIC	pilot in command
PPL (A or H)	Private Pilot Licence (Aeroplane <i>or</i> Helicopter)
psi	pounds per square inch
QFE	an altimeter subscale setting to obtain height above aerodrome
QNH	an altimeter subscale setting to obtain elevation above mean sea level
RNZAC	Royal New Zealand Aero Club
RNZAF	Royal New Zealand Air Force
rpm	revolutions per minute
RTF	radio telephone or radio telephony

s	second(s)
S	south
SAR	Search and Rescue
SSR	secondary surveillance radar
°T	degrees true
TACAN	Tactical Air Navigation aid
TAF	aerodrome forecast
TAS	true airspeed
UHF	ultra high frequency
UTC	Coordinated Universal Time
VASIS	visual approach slope indicator system
VFG	Visual Flight Guide
VFR	visual flight rules
VHF	very high frequency
VMC	visual meteorological conditions
VOR	VHF omnidirectional radio range
VORTAC	VOR and TACAN combined
VTC	Visual Terminal Chart
W	west