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AUSTRALIA

Aviation Safety Digest

BUREAU OF AIR SAFETY INVESTIGATION

117/1983

Contents

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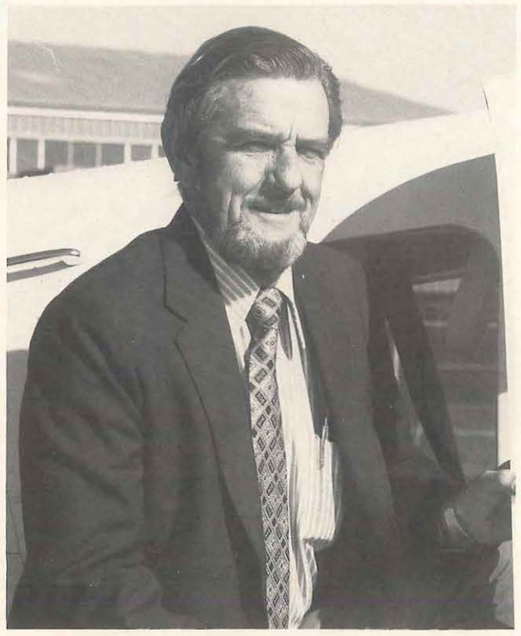
Front cover
Air Whitsunday, which operates from Airlie Beach in Queensland, has recently taken delivery of two Grumman G-73 Mallards. The cover shows the turbine-engine variant overflying the piston-engine variant, which is moored near part of the Great Barrier Reef.

Editorial



The Bureau of Air Safety Investigation (BASI) is responsible for the investigation of all aircraft accidents and incidents involving civil aircraft operating within Australian Flight Information Regions. The fundamental objective of the investigation of an aircraft accident or air safety incident is the prevention of accidents and incidents. It is not the purpose of this activity to apportion blame or liability. It is important to note that the Bureau does not exercise a regulatory function, and that investigators have no powers to suspend licences.

Based on current figures, there has been a continuing decrease in the accident rate in Australian civil aviation for some years. General aviation activity has increased at a rate of about six per cent a year, while the total accident rate has decreased at about five per cent a year. Obviously some of the effort that is directed towards improving aviation safety in Australia is effective.

BASI officers investigate about 250 accidents annually. Many of the investigations are relatively routine, but nevertheless they continue to provide important safety information which contributes to the compilation of a computer-based data bank, which in turn can be analysed in a variety of ways to generate or substantiate safety-related recommendations.

For some time now there has been criticism of the Bureau for not making publicly available more of the information held on aircraft accidents. It has been our policy to use selected accidents with accident prevention potential as the basis of articles in *Aviation Safety Digest*, and to analyse all accidents and provide statistical data in the annual *Survey of Accidents to Australian Civil Aircraft*. However, in response to this demand for more information, this issue of the *Digest* contains a Summary of Aircraft Accident Information Reports for the first quarter of 1983.

It is intended that subsequent issues of the *Digest* will contain the appropriate quarterly summaries and, where applicable, update previous reports which have been finalised in the current quarter. Readers should note that some reports indicate that the accident is still under investigation. The information contained in these reports must be considered as preliminary in nature and possibly subject to amendment when the investigation is finalised.

The inclusion of the Summary in the *Digest* was considered to be the most effective and economical means of conveying the information to the widest possible audience. You will note that it has been designed to be removed without affecting the pages of the *Digest*.

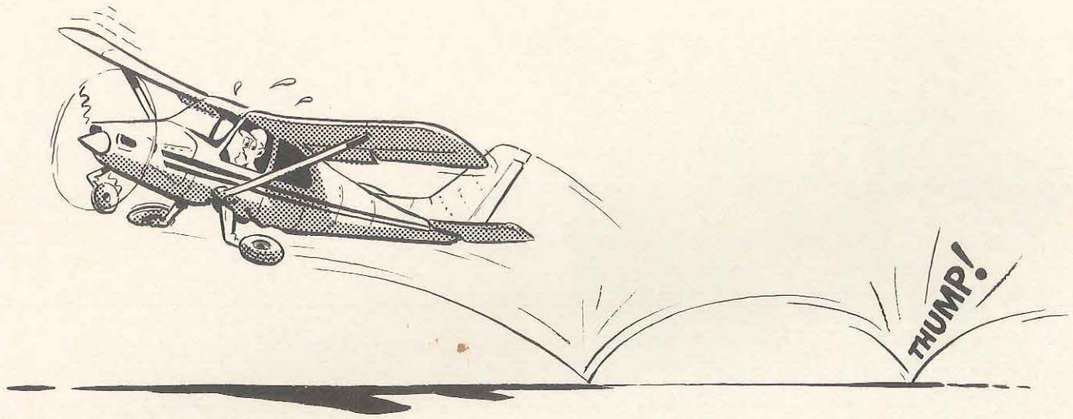
The Summary will be included on a trial basis in this and the following issue of the *Digest*. Its continuation beyond that will be largely dependent on positive reader reaction, so you are invited to comment on the usefulness or otherwise of the Summary.

You will appreciate that in nearly all cases the published information will be the best and most current available. I would like to ask therefore that, where possible, requests for further information be withheld until at least the final summary for the particular accident has been published, as the Bureau's capacity for response could easily be exceeded if a mass of requests eventuated.

Finally, I should like to mention that this issue marks the thirtieth anniversary of the publication of the *Aviation Safety Digest*. The Bureau of Air Safety Investigation believes that the *Digest* has made an important contribution to safety education during that period. You will have noticed that the *Digest* is now being issued regularly at its planned quarterly rate, and it is our firm intention that this will be maintained in the future.

(Paul E. Choquenot)
Director,
Bureau of Air Safety Investigation

Bouncing to an accident



Landing a light aircraft can demand quite some skill. Lacking the higher approach speed and inertia of most RPT machines, light aircraft tend to be more affected by such factors as wind gusts and turbulence. The Bureau of Air Safety Investigation's files contain many reports of aircraft damage arising from improper recovery from a bounced landing; over the past eight years there has been an average of one such occurrence every fortnight. This article discusses bounced landings in tricycle undercarriage light aircraft, which constitute the majority of the reported cases. Typical recent occurrences include the following:

- The aircraft bounced on touchdown following a full flap approach. The pilot eased off back pressure on the control column, causing the aircraft to pitch down onto its nose landing gear, which then collapsed.
- Directional control of the aircraft was lost due to improper recovery from a slightly bounced landing. In the ensuing ground loop the right-hand wingtip struck the ground.
- During a cross-wind landing a wind gust caused the aircraft to bounce. Improper recovery by the pilot caused the propeller to hit the ground.
- An ex-ATPL holder lacking recent experience on light aircraft overshot his intended landing point and bounced several times while trying to get the aircraft to stay on the ground. A propeller ground-strike resulted.

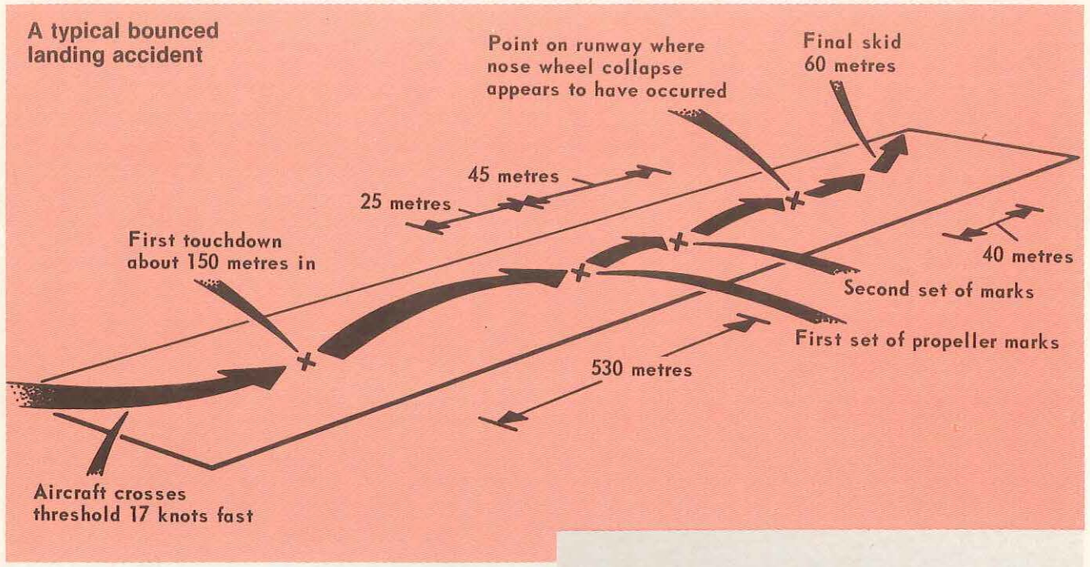
Ideally, when the correct landing technique is applied to a light aircraft with a tricycle undercarriage, the hold-off is sustained to the point where the aircraft is in a slight tail-down attitude. It is then permitted to settle gently on the ground so that touchdown is made on the mainwheels first — as intended by the manufacturer. Because the centre of gravity is forward of the mainwheels the aircraft will pitch slightly forward at touchdown, thereby reducing the angle of incidence (and the lift) of the mainplane, and the aircraft stays on the ground. It is when the correct technique is not observed that problems can arise.

Before discussing the problems of bounced landings in detail it is worth stating at this point that the best way to avoid occurrences of this sort is to maintain your flying skill at a safe level by frequent and properly conducted practice. Otherwise, the best insurance is to take a check flight with your instructor and ensure your flying skill is still at a safe level. If you have not been subject to any official flight tests in the previous 24 months you will also be due for a flight review, and this can be used to brush up your technique, so helping you to prevent accidents rather than cure them.

Mislandings: cause and effect

There are four basic causes of mislandings and each is likely to have predictable consequences:

- No roundout or insufficient roundout. The aircraft will either touch down on the nosewheel or on all three wheels simultaneously. Since the speed will be high the aircraft will bounce, becoming airborne again. Unless corrective action is taken by the pilot the nose will begin to drop as the airspeed decays at the top of the bounce, causing the aircraft to pitch down heavily onto the nosewheel. If excess flying speed still exists this motion may be repeated several times with each oscillation becoming shorter, steeper and less controllable. This motion is called 'porpoising' and can cause serious damage to the undercarriage, propeller and airframe, not to mention the hapless pilot and passengers. Worse, this oscillatory motion can be aggravated by the pilot if his reactions are slow or ill-timed. The instinctive reaction to a bounced landing is to relax back pressure or move the control column forward to reduce the height of the bounce. However, if the control input is delayed it may not take effect until the aircraft has already begun to descend, thereby increasing the rate of descent and steepening the angle of the already downpitching nose. The result is an even heavier impact on the nosewheel and perhaps propeller.
- Roundout too large. The aircraft will balloon, lose airspeed rapidly and then possibly sink at a high rate causing a heavy landing and damage to the undercarriage and airframe.
- Insufficient hold-off or landing before the correct attitude has been reached. This can lead to 'porpoising' if the nosewheel touches first, or a series of skips if all three wheels touch together. The undamped 'porpoise' can cause severe damage. Further, a ground loop may also occur if there is a loss of directional control.
- Holding off too long and landing with little or no control over the aircraft attitude or rate of descent. If a hold-off is continued for too long, so that the airspeed is at or near the stalling speed and the aircraft is then allowed to balloon or is lifted by an unexpected gust, the consequent high sink rate and/or stall may be impossible to control because of the lack of airspeed. Once again, undercarriage and propeller damage are likely, while the consequences of a wing drop during the stall need no elaboration.



Corrective actions

In most cases the best cure is to 'go round' as soon as a mislanding is recognised. If the landing has initiated a 'porpoise', hold the control column slightly aft of neutral and apply full power. This will dampen the 'porpoise' and the aircraft will eventually climb away. Opposing the 'porpoise' pitching action by use of elevator almost invariably accentuates the problem.

If circumstances militate against a go-around, e.g. a damaged aircraft, bad weather, etc., then a mislanding can be recovered by skilful use of power to reduce the descent rate and to fly the aircraft into a second flare and 'hold-off'. However, this technique requires practice and skill. If not familiar with it you should ask your instructor to teach you during your next check flight.

The following pointers, applicable to any landing, are all indicative of a sound flying technique and should be borne in mind when thinking about this article:

- A gentle flare started early is better than a violent flare at the last moment.
- Know the landing attitude of your aircraft
  - — do not let the aircraft touch down until you achieve the landing attitude
  - — do not attempt to hold-off by raising the nose above the landing attitude
  - — if you have reached the landing attitude during the 'hold-off', maintain that attitude with the elevators and, if necessary, control the sink rate with power until the aircraft touches down.
- Pick a point on the runway at which you will 'go round' if the aircraft has not touched down.

An old definition of a good pilot is one who has an equal number of takeoffs and landings . . . think about it! Think about this article too, especially in relation to your flying technique right throughout the approach and landing phases; perhaps there may be some points which would lead to a worthwhile discussion with your local flying instructors on this fundamental aspect of flying. If out of practice or still inexperienced, have your instructor give you a lesson on recovering from mislandings, perhaps during your next check flight ●

Aerobatics and pilot limitations

'The pilot conducted aerobatics at an altitude which was too low to ensure safe recovery.'

Aerobatic flight is very popular throughout Australia. Properly executed aerobatics are exhilarating and also serve as an excellent medium for improving flying skills and learning to appreciate the capabilities of aircraft. They are demanding and many manoeuvres leave the pilot with little scope for error. It is for this reason that stringent rules are prescribed. The display at an air show which draws approving comments from knowledgeable spectators is the end result, not only of a skilled and enthusiastic attitude towards flying, but also of a professional and mature understanding of the nature and demands of aerobatic flight, and of the safety rules pertaining to it. A local accident demonstrated — tragically — that to ignore those rules is to invite disaster.

The pilot had been checked and approved to perform aerobatics down to 1000 feet above ground level (AGL). A condition of the approval was that passengers were not to be carried. He had sought, and received, permission to carry out an aerobatic display at a 'fly-in' held at a country town. This display was carried out in accordance with the pilot's low-level aerobatic approval.

Towards the end of the day's activity a television news team arranged with the pilot to take some air-to-air film of the aircraft performing aerobatics. It was arranged for the television team's helicopter to fly at 500 feet AGL while filming the sequence. This took about 10 minutes. During the sequence a passenger was occupying the front seat of the display aircraft. Recovery from some of the manoeuvres was observed to be below the level of the helicopter, which was maintaining its planned altitude of 500 feet AGL.

When the filming was completed the helicopter departed; the display aircraft flew to a point about one kilometre from the aerodrome and continued performing aerobatics at about 500 feet AGL. Witnesses observed the aircraft begin a looping manoeuvre from which it entered a spin to the left. Recovery was initiated but the aircraft then began to spin to the right. Rotation then stopped with the aircraft pointing vertically downwards. During the recovery from the dive the aircraft struck the ground, still over 30 degrees nose down, with the wings level.

Comment

It will never be possible to determine all the contributory factors in this fatal accident. For example, the unauthorised passenger was also an endorsed aerobatic pilot — were there competitive peer pressures acting, directly or indirectly? The immediate cause, however, was spelt out in the Investigation Report in one brief clear sentence: 'The pilot conducted aerobatics at an altitute which was too low to ensure safe recovery.' An article in *Aviation Safety Digest 102* addressed the topic of 'Aerobatics and structural limitations'. That article, which is commended to all practising or would-be aerobatic pilots, includes the comment that 'No sensible pilot knowingly operates an aircraft beyond its structural design limits'. The same standard must also apply to the individual's piloting limits: limits which are unequivocably spelt out in relevant authorisations ●

'The pilot continued flight into weather conditions . . .'

Readers of the *Aviation Safety Digest* will be, unhappily, all too familiar with the type of accident addressed in this article. Just why VFR pilots continue flight into weather conditions in which they are unable to maintain the visual references necessary to ensure adequate terrain clearance remains unclear, for most pilots involved in such accidents do not survive to explain their reasoning.

It appears that the 'it-can't-happen-to-me' syndrome affects many individuals. Anyone who believes it cannot happen to him is advised to consult the index in *Aviation Safety Digest 113* and review some of the occurrences referenced under the heading of 'Weather'. The urge to get to a destination — to 'get through' or 'get-home-itis' — also seems a likely influence on pilots when making operational decisions. Yet we are rarely, if ever, in as much of a hurry as we think we are — certainly not at the expense of our lives.

Whatever the reasons, this topic is essential reading for all pilots, for investigations have shown that a high experience level, an extensive aviation background and a conscientious attitude towards flying are no guarantee against weather-related accidents. It takes only one hasty or ill-considered decision, regardless of one's experience, to give the elements a potentially dangerous edge over your machine, your passengers and you.

For almost all weather-related accidents it is possible to identify a point, or points, at which the flight should have been diverted or abandoned. This may come, for example, in the form of a preflight weather forecast, an amended inflight forecast or report, or by actually encountering conditions approaching VMC minima. Readers are invited to assess the following account of a weather-related accident with the objective of identifying those points and deciding what actions they would have taken. If they subsequently ever find themselves faced with a decision of that type, then perhaps the careful thought that an analysis of this accident warrants will help them reach the right decision in time.

★ ★ ★

A flight by an experienced pilot was planned from Alice Springs to Adelaide via Leigh Creek. The pilot was familiar with the route, having flown it often. He held a Class Four instrument rating but was not qualified to fly in instrument meteorological conditions. He attended the Alice Springs briefing office and was issued with meteorological forecasts which indicated that weather conditions were expected to deteriorate south of Leigh Creek. In particular, low stratus was likely over the Flinders Ranges. Copies of the forecasts issued at Alice Springs for the section of the flight from Leigh Creek to Adelaide are reprinted below: Area 51 covers the first half of that section and Area 50 the second half.

Area 51 forecast issued at Alice Springs

ARFOR 2300 TO 1100 AREA 51
WIND 2000 24020 5000 24025 7000 24025 10000 25030 ZERO 14000 25035
MS05 18500 25040 MS15
CLD SCT ST 1200/1800FT MON TIL 0200 BUT BKN IN DZ. SCT CU 2500/7000FT
SCT SC 3000/7000FT TEND BKN MON AND IN DZ VIS 40KM DTRT 4000M DZ 400M FG
WX ISOL FG PATCHES TIL 0100. ISOL DZ TIL 0200 CHIEFLY MON
FZL 10000FT
TURB MOD IN CU. MOD BLW 6000FT ON AND TO LEE MON

Area 50 forecast issued at Alice Springs

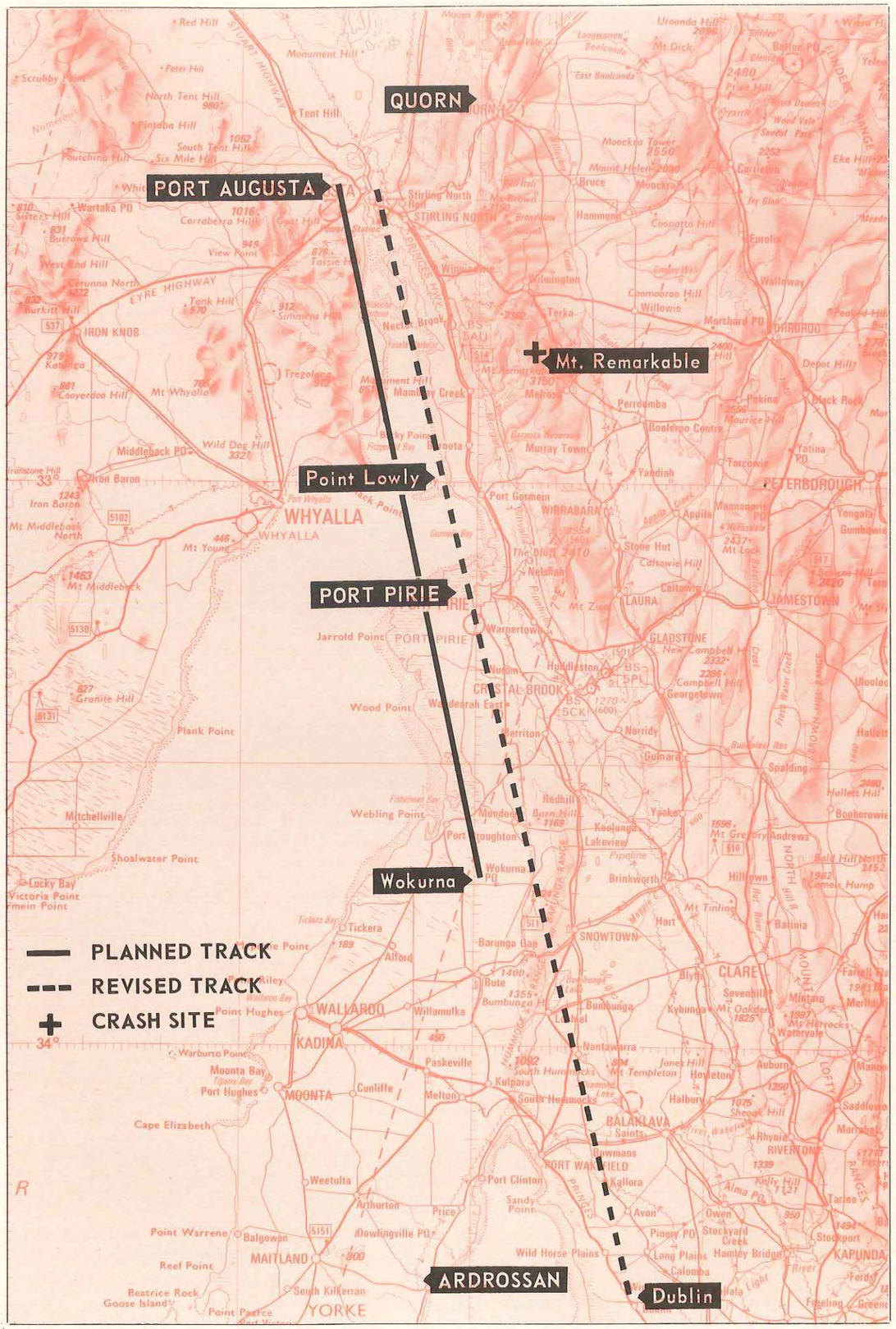
AMD ARFOR 2300 TO 1100 AREA 50
WIND 2000 25030 5000 25030 7000 25035 10000 25040 MS05 14000 25045
MS08 18500 25050 MS18
CLD BKN ST 800/2000FT IN RASH/DZ. BKN ST 800/2000FT WINDWARD COT/MON BEC SCT AFTER 0100 AND REDEVELOPING AFTER 0900. SCT CU 2500/8000FT WITH ISOL TOPS 12000FT S OF 34S. SCT SC 3000/6000FT BKN SC 2000/6000FT IN DZ AND COT/MON
AMD VIS 40KM DTRT 6KM RASH 1500M XXSH 3000M DZ 400M FG
AMD WX ISOL FG PATCHES TIL 0100. ISOL RASH TEND SCT COT/MON S 34S.
ISOL XXSH S 35S. ISOL DZ COT/MON
FZL 5000FT IN S RISING TO 8500FT IN W ICE OCNL MOD INC ABV FZL
TURB OCNL MOD IN CUF. OCNL MOD BLW 6000FT ON AND TO LEE MON

Adelaide TAFOR issued at Alice Springs

COR TAF AMD
AAAD 2304 31018 9999 80RASH 2ST012 4CU020 4SC030 RAPID 0203 23020/41
0414 23020/30 9999 80RASH 4CU020 3SC030 INTER 2305 3000 81XXSH 5ST008
11 12 13 11 1012 1010 1009 1009

A VFR flight plan was submitted and the pilot indicated that if he encountered adverse weather south of Port Augusta, he would divert to Port Augusta or Port Pirie. With his two passengers the pilot departed Alice Springs mid-morning in his Piper Seneca and completed an uneventful flight to Leigh Creek, although the weather at Leigh Creek was marginal for VFR operations.

At Leigh Creek the aircraft was refuelled to capacity and the pilot obtained amended forecasts for Areas 51 and 50. These were as follows:



Area 51 forecast issued at Leigh Creek

ARFOR 0500 TO 1400 AREA 51
WIND 2000 25020 5000 24025 7000 24030 10000 23035 MS01
14000 25040 MS07 18500 26045 MS19
CLD SCT ST 1500/3000FT ABOUT MON AND IN PRECIPITATION
SCT CU 2500/7000FT SCT SC 3500/6000FT DTRT
BKN SC 2500/6000FT IN DZ AND ABOUT MON
VIS 40KM DTRT 4000M DZ/RASH
WX ISOL DZ MON. ISOL RASH MON S HAW
FZL 9000FT
TURB MOD CUF AND BLW 6000FT ON AND LEE MON

Area 50 forecast issued at Leigh Creek

AMD ARFOR 0400 TO 1400 AREA 50
WIND E OF FRONT
2000 28030 5000 28035 7000 28035 10000 27040 MS06
14000 24040 MS11 18500 24045 MS21
W OF FRONT
2000 25025 5000 25030 7000 25030 10000 24035 MS04
14000 24040 MS11 18500 24045 MS21
AMD CLD SCT COT ST 1000/2000FT DTRT BKN ST 1000/2000FT WINDWARD MON. BKN ST 800/2000FT IN RASH/DZ. SCT CU 2500/8000FT ISOL TOPS 14000FT S 34S. SCT SC 3000/6000FT DTRT BKN SC 2000/6000FT IN DZ AND COT/MON VIS 40KM DTRT 6KM RASH, 1500 XXSH, 3000M DZ WX SCT RASH. ISOL XXSH S 35S, ISOL DZ COT/MON FZL 7000FT ICE MOD OCNL INC ABV FZL TURB MOD OCNL CUF AND TO LEE MON

Adelaide TAFOR issued at Leigh Creek

TAF
AAAD 0208 31018 9999 80RASH 2ST012 4CU020 4SC030 RAPID 0203 23020/41
INTER 0205 3000 81XXSH 5ST008 0820 23015 9999 80 RASH 2ST012 4CU020 3SC030 13 12 11 9 1012 1010 1011 1011

While there were still some 45 minutes before the area 51 forecast became valid, it gave the pilot an indication of the expected trend. A comparison of the two sets of forecasts would also have enabled the pilot to make an assessment of the changes, if any, in the general weather pattern, thus giving him a better appreciation of en route conditions.

In addition to receiving the amended forecasts at Leigh Creek, the pilot was also informed that both Adelaide and Parafield were currently closed to VFR traffic because of adverse weather.

As the pilot taxied for departure at 0419 hours GMT, there were six oktas of cloud, base 1500 to 2000 feet, over Leigh Creek. The pilot advised that he intended cruising below 5000 feet instead of 7500 feet as originally planned. He departed at 0424 hours and at 0429 hours acknowledged receipt of an amended Adelaide terminal forecast giving visibility of 10 km or greater, rain showers, one okta of cloud at 1000 feet and six oktas at 2000 feet with visibility intermittently reduced to 3000 metres with three oktas of cloud at 800 feet.

The flight plan submitted by the pilot at Alice Springs indicated his intention to track via Quorn, Wokurna and Ardrossan, but at 0449 hours he advised that he would be proceeding direct to Port Augusta and then to Wokurna. He subsequently reported to Adelaide Flight Service Unit (FSU) passing abeam of Port Augusta at 0515 hours, below 5000 feet, and advised that he would be tracking to Dublin. No reason was given for this change of route, but clearly adverse weather was the cause. Adelaide FSU informed him that restricted area R252, which is situated south-west of Port Augusta, was active and he confirmed that he would be remaining clear of that area. The pilot of another aircraft in the area then reported there was a storm in the Gulf north of Port Pirie, the weather was clear to the west, and suggested that if the Seneca were to track via Point Lowly it would have no problems. This was acknowledged by the Seneca pilot who responded: 'Thank you very much. I shall do.' He was then instructed by Adelaide to call Whyalla FSU. Contact was established at 0523 hours. The pilot did not, however, reply to any subsequent calls directed to him.

Following unsuccessful attempts to re-establish communications with the aircraft, search and rescue action was commenced. Search action was hampered by areas of low cloud and reduced visibility associated with rain and strong winds. The wreckage of the aircraft was located at 0435 hours on the following day. It was situated on the eastern side of Mount Remarkable some 300 feet below the 3150 feet summit. At impact the aircraft had been in essentially level flight on a south-westerly heading. All three persons on board had been killed.

Detailed examination of the wreckage did not reveal any defect or malfunction which might have contributed to the accident.

It was established that at about the time of the accident, extensive low cloud and rain areas obscured the ranges in the vicinity of Mount Remarkable.

Comment

The forecasts obtained by the pilot at Alice Springs indicated that he would be heading towards an area of deteriorating weather. This was confirmed by those received at Leigh Creek, but the pilot did not express concern at any stage on receiving this information; nor did he express any anxiety en route despite the tracking changes he had to make. Perhaps his familiarity with the area led him to believe he could find his way despite the poor conditions. In fact it would appear that he was not able to navigate adequately by reference to the ground and eventually tracked to the east of Mount Remarkable. When he turned south-west — presumably to track to Point Lowly following the advice that the weather was clear there — he obviously was unaware of the dangerous proximity of Mount Remarkable. Uncertain of his position and operating in adverse weather conditions, the pilot turned towards and flew into the highest ground in the immediate vicinity ●

A casual approach

Two different kinds of approach were features of this accident to a Beech Bonanza. The first was a very experienced pilot's rather casual approach to his preflight preparation. The second was an unorthodox final approach into a difficult landing area. The result was substantial damage to the aircraft with, fortunately, no injuries to its occupants.

The purpose of the flight was for the pilot and two passengers to visit a cotton farm on which there were several landing strips. Seven weeks previously the pilot had operated into the strip he intended using this day. The three men drove to the aerodrome where the Bonanza was parked and, while the pilot completed his preflight inspection, one of the passengers telephoned the manager of the cotton farm to check the weather, ensure that everything was right for the aircraft's arrival and to advise their ETA.

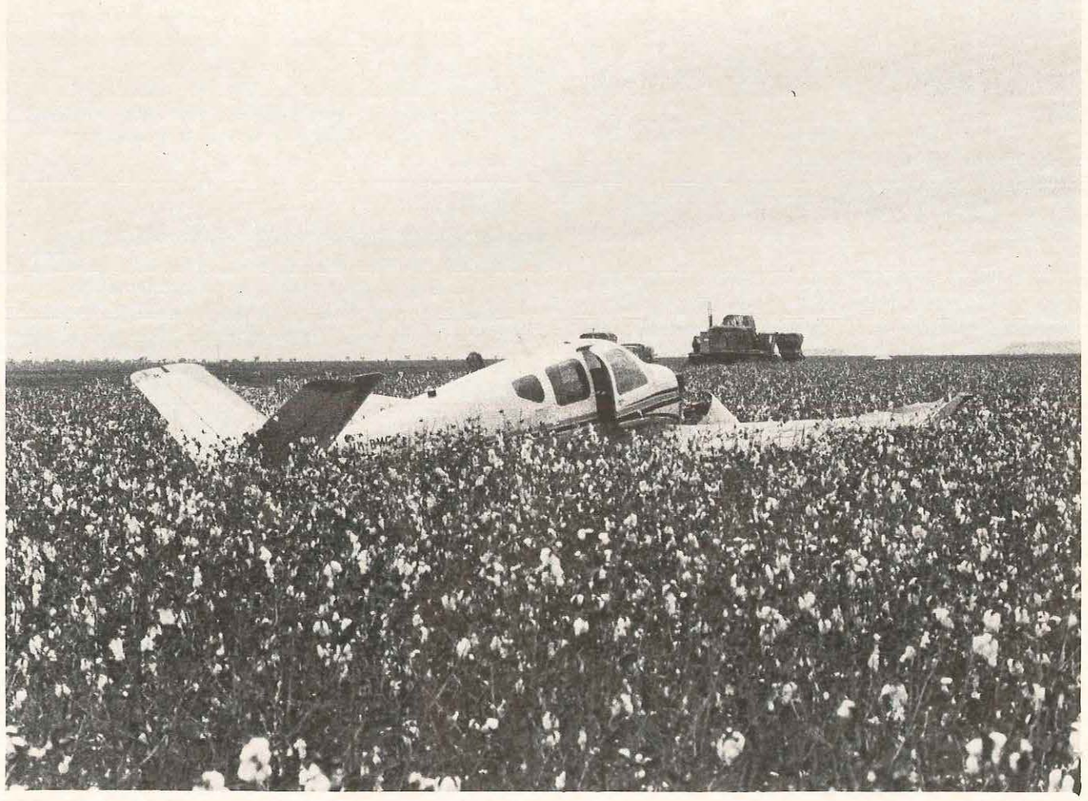
A flight plan was not submitted because of difficulties with the local (manual) telephone exchange and because in the past the pilot had occasionally experienced problems with the aircraft's radios. Further, the farm manager was aware of their plans.

On arrival at the farm the pilot overflew the manager's house at about 1000 feet AGL to alert him to their arrival. He then flew to the airstrip, which is aligned 085/265 degrees and is approximately 1050 metres long, to carry out a visual inspection at 500 feet AGL.

As the wind was only 2-3 knots from the east, the decision was made to land on the 265 strip to avoid looking into the morning sun. The threshold area of this strip was obstructed by a seven-metre-high cotton module maker (a machine for making large cotton bales) to the south, and by four or five cotton pickers, each about five metres high, to the north. All of these obstructions were within the strip boundary but outside the central 15-metre section.

At the end of the inspection run the pilot turned south to give room for a left base. After carrying out the pre-landing checks and selecting gear down and full flap in stages, he approached over the top of the obstacles near the eastern threshold. Realising that he was too fast (100 knots) he went around. He climbed to about 700 feet AGL, retracted the flap but left the gear down and flew a downwind leg.

On the second approach he decided to fly to the north of the obstacles and make an S-turn to line up on the strip after passing them. Full flap was again used. After passing the obstacles and turning left to intercept



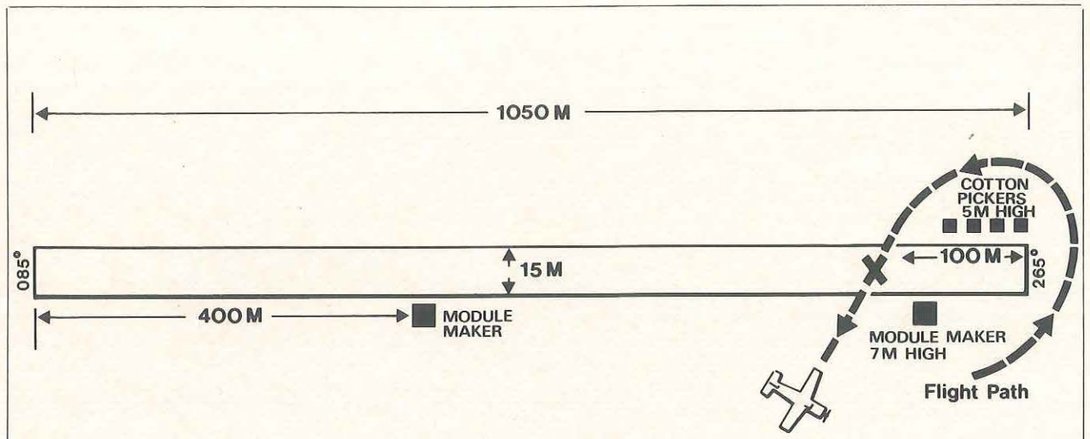


Diagram of Flight Path. (not to scale)

the centreline, the pilot started the turn right to align the aircraft with the strip but at that stage realised he did not have enough height to turn. He rolled to the left to level the wings, at the same time applying full power. This decision, however, had been left too late.

The aircraft sank on to the ground, touching initially about 50 metres in front of the module maker and about 15 degrees off runway heading. The aircraft ground looped and skidded backwards, finally coming to rest about 45 metres south of the strip centre line, on a heading of 115 degrees and with the engine dislodged from its mountings.

The subsequent investigation revealed significant deficiencies in the planning and conduct of this flight.

- Because of the obstacles parked within its boundaries the strip did not meet the requirements for a private category Authorised Landing Area. The landing distance available, allowing for the obstacles, was 310 metres. From the aircraft's flight manual performance charts, the landing distance required from a height of 50 feet in nil wind was calculated to be 500 metres.
- The decision to fly an S-turn on short finals to avoid the obstacles was contrary to the requirement that the last 500 metres of an approach for landing must be made in a straight line.
- Insufficient attention was paid to airspeed, probably because of the demands involved in attempting to line up the aircraft. The pilot advised that he did not notice the speed on the final approach, but that the aircraft attitude felt normal. He stated that he normally approached at about 80 knots, but used the aircraft flight manual to calculate speeds for 'really short' strips. It seems likely that during the turn close to the ground, with the pilot applying considerable back pressure on the control column, the angle of attack increased and the airspeed decayed to the stage where the late application of power was insufficient to arrest the sink rate.

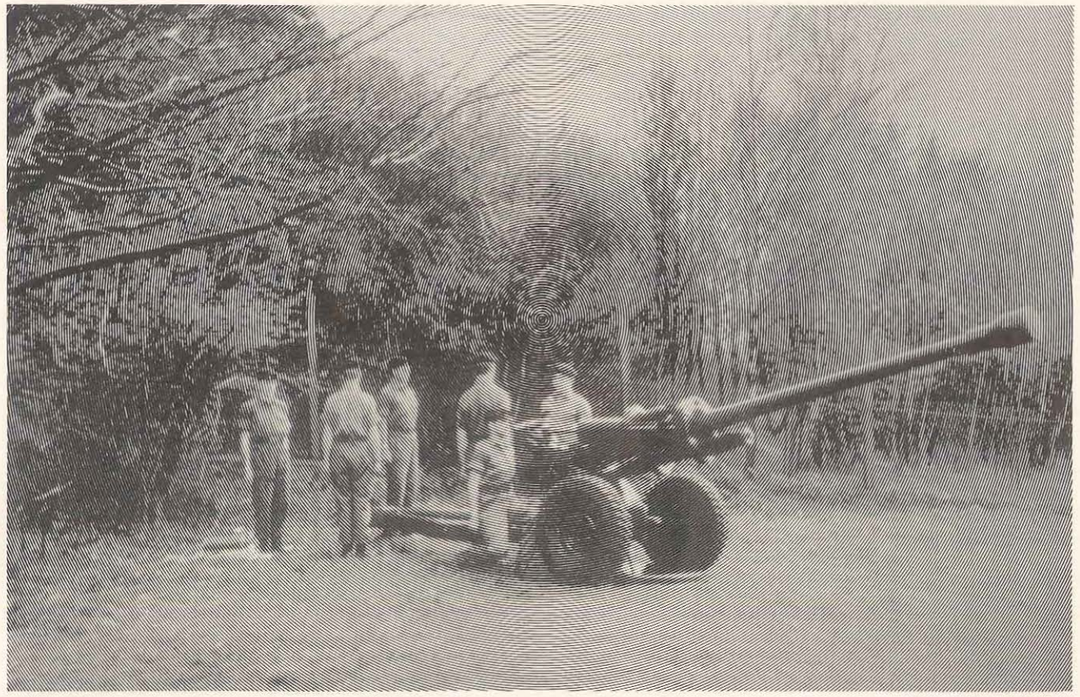
There is no shortage of lessons in this accident, and hopefully the experiences of this pilot can be used as a teaching medium for all of us who fly aeroplanes.

From the outset, the wisdom of leaving one of the passengers — who had no piloting experience — to make contact with the manager at the destination must be questioned. Operations into any ALA should be conducted with caution, especially if you are unfamiliar with the area or have not been there for some time. If someone is available at the area — as they were in this case — then the pilot should contact them himself to confirm such variables as the condition of the surface, obstructions, and alterations to the ALA dimensions. That conditions can change is amply illustrated by this accident. In this case, the passenger who did the telephoning apparently did not raise the question of the state of the ALA.

Just as the pilot's approach to preflight preparation was casual, so too was his attitude to landing when he arrived, found that he was faced with a demanding approach, but decided to press on without properly reassessing the situation. Clearly it would have been impractical for him to calculate the ALA dimensions airborne, but a check of his aircraft's landing data performance figures, allied to his visual observation of the obvious encroachment of the machinery on the available landing length, would have alerted him to the danger. Had the pilot done this — or indeed ascertained the conditions at the ALA himself prior to departure — then he doubtless would have abandoned any attempt to land at that particular airstrip.

A final word. This pilot was offhand in his attitude towards several types of fundamental safety material, particularly the aircraft performance data and certain operational rules. The temptation to bend the rules is familiar to all of us. It is, however, a luxury pilots cannot afford. The rules have been framed, not to frustrate us, but because they are the basis of safe, sound airmanship. Know those applicable to your operations, and abide by them ●

Military firing ranges



The danger of flight through active military restricted areas was highlighted in *Aviation Safety Digests 87* and *111. Digest 111* paid particular attention to the ways in which pilots could avoid this potentially serious breach of regulations, discussing such aspects as preflight planning, the currency of en route charts and documents, and navigational techniques.

Notwithstanding this good advice, breaches are still occurring and there remains a small group of pilots in Australia who, probably without realising it, owe a vote of thanks to the vigilant range safety officer who commanded a 'Cease Fire' on sighting an unwitting and unwanted intruder. Are you one of these recent transgressors?

- An unidentified aircraft flew through R352 near Puckapunyal at 1000-1500 feet while firing was in progress.
- A cream-coloured single-engined Cessna penetrated R329 near Westernport while the range was active.
- An unidentified single-engined, silver-coloured aircraft flew through R353 at Greytown from east to west at 2000 feet when line firing of mortar shells was in progress.
- A single-engined, high-wing aircraft with orange and yellow stripes on the fuselage flew through an active range R524 near Parkes at about 1000 feet.

While these incidents relate to penetration of Army land-based firing ranges, transgressions have also taken place through Navy over-water ranges.

Some data on the prime weapons fired by the Army will be of interest to any pilot planning a flight adjacent to a military range:

- 81 mm mortar — vertical extremity of rounds 5800 feet, maximum rate of fire 10 to 15 rounds per minute.
- 105 mm howitzer — vertical extremity of rounds 18 000 feet, maximum rate of fire six rounds per minute.
- 155 mm howitzer (to come into service in 1983/84) — vertical extremity of rounds 63 000 feet, maximum rate of fire four rounds per minute.

The point here is that, while firing ranges are circumscribed by vertical as well as horizontal boundaries, normal light aircraft operating altitudes are unlikely to provide any safety 'buffer' if transitting below the upper limit of a restricted area. Further, the rate of fire can be rapid, increasing the possibility of a target being hit — so don't think it can't happen to you.

The only certain way to ensure the safety of your aircraft, yourself and your passengers near active firing ranges is to avoid them; and this comes back, again, to thorough and thoughtful preflight planning and adherence to correct inflight procedures ●

Aircraft accident information reports

FIRST QUARTER 1983

Prepared by The Bureau of Air Safety Investigation

The following information has been extracted from accident data files maintained by the Bureau of Air Safety Investigation. The intent of publishing these reports is to make available information on Australian aircraft accidents from which the reader can gain an awareness of the circumstances and conditions which led to the occurrence.

At the time of publication many of the accidents are still under investigation and the information contained in those reports must be considered as preliminary in nature and possibly subject to amendment when the investigation is finalised.

Readers should note that the information is provided to promote aviation safety — in no case is it intended to imply blame or liability.

Note 1: All dates and times are local

Note 2: Injury classification abbreviations

C = Crew	P = Passengers	O = Others
F = Fatal	S = Serious	M = Minor
N = Nil		

e.g. C1S, P2M means 1 crew member received serious injury and 2 passengers received minor injuries.

PRELIMINARY REPORTS (The following accidents are still under investigation)

Date *Time*	*Aircraft type & registration* *Location*	*Kind of flying* *Departure point/Destination*	*Injuries* *Record number*
02 Jan 1430	Cessna 310 L VH-EOZ Berwick Stn., NSW	Non-commercial—pleasure Noondoo Stn., Qld./Berwick Stn., NSW	C1N, P1N 210023

The pilot was landing uphill in heavy rain with a moderate right crosswind. After touchdown on the narrow strip the aircraft drifted to the left into soft ground. The pilot used right brake, rudder and nosewheel steering to correct the drift but the aircraft began to slide and collided with a rock.

02 Jan 1400	Piper 28 140 VH-TVH Hoxton Park, NSW	Non-commercial—pleasure Bankstown, NSW/Bankstown, NSW	C1N, P2N 210013

In calm conditions, the pilot made an approach that was steeper and faster than normal. After floating for some distance the aircraft touched down nosewheel first and commenced to porpoise. The bounces increased in magnitude until the nosewheel tyre burst and the propeller struck the runway.

03 Jan 1345	Piper 25 235 VH-PIK Gatton, Qld.	Commercial—aerial agriculture/baiting Gatton, Qld./Gatton, Qld.	C1F 110013

The aircraft had been spraying corn crops on a property adjacent to the pilot's own property. After adding more spray to the aircraft it returned to spray crops on the pilot's property. It was seen to fly under a power line, bank right then hit another power line which had been recently installed. The aircraft then struck the ground inverted.

03 Jan 1015	Beech 35 C33 VH-DDC Lismore, NSW	Non-commercial—pleasure Lismore, NSW/Coffs Harbour, NSW	C1N, P1N 210033

The pilot elected to return to his departure aerodrome because of deteriorating weather. While manoeuvring to avoid low cloud and rain in the circuit area, the pilot did not complete his pre-landing checks and landed with the gear up.

03 Jan 1205	Cessna 180 VH-RBE Wagga Wagga, NSW	Non-commercial—practice Wagga Wagga, NSW/Wagga Wagga, NSW	C1N 210043

During the landing roll the port wingtip scraped the runway and the aircraft came to rest balanced on its right wingtip, right wheel and spinner.

03 Jan 1336	Cessna 172 E VH-DKK Warrnambool, Vic.	Non-commercial—pleasure Merton, Vic./Warrnambool, Vic.	C1N, P2N 310013

The approach to land was made on Runway 22 in strong gusty westerly wind conditions. During the hold-off the aircraft began to drift to the left. The left main wheel brushed the runway and the right wing lifted. As the aircraft turned left the nose dropped and the aircraft struck the ground nose first, breaking away the nosewheel and right main wheel.

PRELIMINARY REPORTS (The following accidents are still under investigation)

Date / Time	Aircraft type & registration / Location	Kind of flying / Departure point/Destination	Injuries / Record number
04 Jan 1505	Cessna 210 L VH-SMP Lindeman Is., Qld.	Non-commercial—pleasure Cairns, Qld./Lindeman Is., Qld.	C1N, P5N 110023

After checking the wind direction the pilot elected to make an approach towards the south. Severe turbulence on the approach caused the pilot to go around. After rechecking the windsock the pilot decided to accept a slight tailwind and land towards the north. The aircraft touched down with 700 m remaining and the pilot applied moderate braking. About 155 m from the runway end harsh braking became necessary. The aircraft did not stop in time and overran the strip.

06 Jan 1240	Cessna 172 N VH-WCW Northcliffe, WA	Non-commercial—pleasure Jandakot, WA/Albany, WA	C1N, P1M, P2N 510013

The pilot was unable to locate his desired landing point but found another strip about 30 km away. He inspected the strip from about 200 ft agl and carried out a landing. Shortly after touchdown the nosewheel sank and the aircraft overturned. The strip was under construction and had been recently ploughed.

07 Jan 1917	Rolladen LS 4 VH-IIY Renmark, SA	Non-commercial—pleasure Waikerie, SA/Waikerie, SA	C1N 410013

The pilot was making a 300 km triangular cross-country flight when he became unsure of his position. After prolonged attempts to recognise ground features without success, and with evening approaching, he decided to out-land in a paddock. There was a line of trees at the threshold boundary. On final approach the glider struck the top of a tree and dropped heavily to the ground.

07 Jan 1005	Hughes 269 C VH-PHN Strathmay Stn., Qld.	Commericial—aerial mustering Strathmay, Qld./Strathmay, Qld.	C1M, P1M 110033

The engine of the helicopter lost power during cattle mustering. The pilot reduced collective pitch and the engine rpm increased but application of collective caused a loss of engine rpm again. While crossing trees during an attempted forced landing the main rotor rpm decayed. The helicopter entered a rapid descent and made a heavy landing.

07 Jan 1300	Bellanca 8 GCBC VH-ADP Tocumwal, NSW	Towing gliders Tocumwal, NSW/Tocumwal, NSW	C1N 210053

During the landing roll the pilot was unable to prevent the tail of the aircraft from rising. A small thermal was seen passing at the same time, and almost immediately afterwards the aircraft overturned.

12 Jan 1115	Cessna R182 VH-SDG Bankstown, NSW	Non-commercial—practice Bankstown, NSW/Bankstown, NSW	C1N 210063

The pilot was conducting a refamiliarisation flight on the aircraft. On his first approach the aircraft landed heavily on the nosewheel while also drifting to the left.

13 Jan 1213	Piper 28 140 VH-RSM Bankstown, NSW	Non-commercial—pleasure Medlow Bath, NSW/Bankstown, NSW	C1N, P4N 210073

Having misjudged his approach the pilot was still 100 ft. high and on the verge of stalling when one-third along the runway. The pilot said he then lowered the nose and applied some power but was unable to arrest the ensuing high rate of descent before the aircraft impacted the ground.

13 Jan 1600	Glasflugel Club Libelle VH-GVI Rankin Springs, NSW	Trial/race/show Leeton, NSW/Leeton, NSW	C1S 210083

Because of low thermal activity the pilot decided to make an out-landing. Shortly after touchdown the aircraft encountered a strong willy-willy which lifted it into the air and moved it violently to the left. The aircraft collided with a tree and fence before impact with the ground.

17 Jan 1730	Schneider ES60 VH-GPM Beverley, WA	Non-commercial—practice Beverley, WA/Beverley, WA	C1S 510023

As he approached the aerodrome from the east, the pilot gained the impression that the wind was light and variable and he planned to land into the south. Having arrived over the aerodrome at about 450 ft. he noted that the wind was a strong westerly. He then decided to land downwind but, shortly afterwards, realised this was not possible. While turning to attempt to land into wind, the aircraft stalled and entered a spin from which it did not recover.

19 Jan 1450	Glasflugel Libelle VH-GJG Leeton, NSW	Non-commercial—pleasure Leeton, NSW/Leeton, NSW	C1N 210093

Several gliders were approaching the start gate during a championship event. One was overtaking another from below at about 3400 ft when the two collided. One, though damaged, was able to land safely. The pilot of the second parachuted onto the airfield, landing about 150 m from the wreckage of his aircaft.

19 Jan 1450	Szybowcowy Foka-5 VH-GZW Leeton, NSW	Non-commercial—pleasure Leeton, NSW/Leeton, NSW	C1N 210093

Several gliders were approaching the start gate during a championship event. One was overtaking another from below at about 3400 ft when the two collided. One, though damaged, was able to land safely. The pilot of the second parachuted onto the airfield, landing about 150 m from the wreckage of his aircraft.

20 Jan 0626	Cessna 172 N VH-INH Thylungra Stn., Qld.	Non-commercial—aerial mustering Thylungra, Qld./Thylungra, Qld.	C1F 110043

On the evening preceding the accident the pilot indicated his intention to commence mustering early the next morning. The pilot arose at about 0530 hours and it is believed that the aircraft took off at about 0600. The aircraft was seen at about 0620 by two stockmen. It was flying at about 100 ft agl and, when the engine noise ceased and the aircraft was not seen again, one stockman rode to a nearby bore and found the inverted aircraft wreckage.

PRELIMINARY REPORTS (The following accidents are still under investigation)

Date / Time	Aircraft type & registration / Location	Kind of flying / Departure point/Destination	Injuries / Record number
20 Jan 1556	Schemp Cirrus-75 VH-CQQ Tocumwal, NSW	Instructional—solo-supervised Tocumwal, NSW/Tocumwal, NSW	C1S 210103

The pilot was carrying out his first flight in this type of glider. The aircraft was observed to enter a spin, at a low height, at the start of the downwind leg. The aircraft struck the ground, spinning to the right.

21 Jan 1200	Cessna 182 H VH-PLA Dunk Island, Qld.	Non-commercial—pleasure Townsville, Qld./Dunk Island, Qld.	C1N, P3N 110053

The pilot assessed the wind as south-easterly, 15-20 knots and joined downwind for Runway 14. As the aircraft was turning onto final approach one of the passengers took ill. The pilot found a sick bag and passed it to the passenger. By this time the aircraft was on short final and the pilot noticed that the airspeed was 10 knots high. Full flap had been selected so the pilot closed the throttle. The aircraft sank rapidly and hit the ground nosewheel first.

22 Jan 1605	Glaser Dirk DG 200/17 VH-CQJ Tocumwal, NSW	Non-commercial—pleasure Tocumwal, NSW/Tocumwal, NSW	C1N 210113

Following a spin entered at 6000 ft the pilot was unable to effect recovery. He decided to bail out but excessive "g" loading prevented him from doing so until the wings separated from the fuselage at about 1700 ft agl. He was then thrown from the cockpit and parachuted safely to the ground.

23 Jan 1730	Piper PA34-200 VH-FSO Mansfield, Vic.	Non-commercial—pleasure Sydney, NSW/Mansfield, Vic.	C1N, P5N 310023

Before commencing his landing approach, the pilot made a low pass to clear sheep from the strip. The sheep ran to one end of the field in which the strip was located. On the landing flare the pilot saw four sheep stand up out of grass at the opposite end of the field. During the landing roll the four sheep ran across the strip and one was struck by the aircraft's right propeller and main gear.

25 Jan 1410	Cessna 150 G VH-KPQ Canberra, ACT	Instructional—solo-supervised Canberra, ACT/Canberra, ACT	C1N 210123

The student pilot reported that the landing was normal. However, the nosewheel axle bolt failed. The nose strut then collapsed and the aircraft skidded on its nose for 47 m.

26 Jan 0935	Cessna 152 VH-BUE Redcliffe, Qld.	Instructional—solo-supervised Redcliffe, Qld./Redcliffe, Qld.	C1N 110063

Following a dual flight of five circuits the student pilot was authorised for his first solo. The circuit and final approach were normal. On touchdown the aircraft bounced. The pilot did not take the correct recovery action and following several bounces, each becoming progressively worse, the nosegear collapsed and the aircraft slid to a stop.

26 Jan 1105	De Hav 82 A VH-BIN Serpentine, Vic.	Non-commercial—pleasure Kyneton, Vic./Serpentine, Vic.	C1N, P1N 310033

The landing was made into a strong westerly wind. The touchdown was normal but towards the end of the landing roll a gust of wind tipped the aircraft onto its nose and left wingtip.

28 Jan 1615	Piper 32 300 VH-STV Noorong, NSW	Non-commercial—pleasure Adelaide, SA/Canberra, ACT	C1N, P3N 210153

While cruising at 8000 ft the engine failed abruptly. Attempts to restart the engine were unsuccessful so the pilot carried out a forced landing onto an agricultural strip. The nosegear collapsed after the aircraft overran the strip and struck a mound of dirt.

29 Jan 1145	Piper 36 375 VH-TKZ Carrathool, NSW	Commercial—assoc. agriculture/baiting "Boree" prop., NSW/"Boorambi" prop., NSW	C1F 210133

While tracking between the next area to be fertilised and the destination, the aircraft was seen to collide with a tower about 44 m high, apparently without avoiding action being initiated.

29 Jan 2030	De Hav C1 TMKIO VH-UPD Point Gawler, SA	Non-commercial—pleasure Two Wells, SA/Two Wells, SA	C1N, P1N 410023

After takeoff, at approximately 300 ft, the aircraft developed a rough-running engine. As the area ahead was unsuitable for a landing the pilot elected to make a 180 deg turn before attempting a precautionary landing. During the turn an excessive sink rate developed and the aircraft hit the ground heavily during the landing flare.

31 Jan 1930	Rockwell 114 VH-SCM Wanaaring, NSW	Non-commercial—pleasure Griffith, NSW/Wanaaring, NSW	C1N, P1N 210143

While flaring to land on a roadway used as a strip the aircraft suddenly drifted sideways. Full power and some bank were applied in an attempt to go-around but the propeller struck a small tree. The aircraft struck the ground, collapsing the gear, and hit several more trees before coming to rest.

01 Feb 0800	Cessna A188B A1 VH-EVQ Weimbi Downs Stn.	Commercial—aerial agriculture/baiting Weimbi Downs Stn./Weimbi Downs Stn.	C1N 110073

The pilot was conducting spraying operations from a landing area with two strips. He had been briefed about a power line across the western end of the short cross strip. During the fourth approach for landing on that strip the landing gear struck the power line, the aircraft decelerated rapidly and landed heavily on the main wheels. The right mainwheel broke free and the aircraft slid to a halt.

PRELIMINARY REPORTS (The following accidents are still under investigation)

Date / Time	Aircraft type & registration / Location	Kind of flying / Departure point/Destination	Injuries / Record number
02 Feb 0815	Piper 25 235 VH-BMF Donnybrook, WA	Commercial—aerial agriculture/baiting Bunbury, WA/Donnybrook, WA	C1N 510033

After a low pass to clear cattle, the pilot landed on an airstrip situated on the side of a hill. As the aircraft rolled onto a flat portion of the strip the pilot was alarmed to see that cattle were again on the airstrip. He applied heavy braking and the aircraft nosed over onto its back.

02 Feb 2000	Cessna A188B A1 VH-UWH Goondiwindi	Commercial—aerial agriculture/baiting Goondiwindi, Qld./Bogabilla, NSW	C1N 210163

During the takeoff roll, at about 40 kt, a propeller blade detached from the hub. The aircraft slewed uncontrollably, collapsing the left-hand undercarriage.

03 Feb 1259	Enstrom F28 C VH-IYP Castle Hill, NSW	Instructional—solo Hoxton Park, NSW/Castle Hill, NSW	C1N 210173

The helicopter was approaching the hover over the helipad at about 20 ft. It suddenly yawed to the right and continued through several level 360 deg turns. The pilot was unable to stop this turning motion and the helicopter landed heavily, still rotating to the right.

04 Feb 0900	Piper 28 151 VH-PZM Wagin, WA	Instructional—solo-supervised Wagin, WA/Wagin, WA	C1N 510043

The pilot was practising circuits and landings in strong cross-wind conditions. Shortly after touchdown on the first solo circuit of the period directional control was lost and the aircraft ran off the side of the strip. The nosegear collapsed when the aircraft struck an embankment.

05 Feb 1308	Romainian IS-28B2 VH-CQE Camden, NSW	Instructional—Dual Camden, NSW/Camden, NSW	C2S 210183

Shortly after takeoff, at a height of approximately 300 ft, the glider was seen to release from the tow line. An immediate right turn was initiated accompanied by a nose-up pitch change. The glider then stalled, entered a spin and struck the ground at a high rate of descent.

05 Feb Z	Cessna 150 M VH-WWM Urawa, WA	Non-commercial—aerial mustering Urawa Homestead, WA/Urawa Hmstd, WA	C1F, P1F 510053

After completing an aerial spotting task the aircraft was observed to climb above 1000 ft and depart on what was thought to be a windmill inspection flight. When the aircraft failed to return search procedures were instituted. The wreckage was located by a searching aircraft shortly after first light on the following day.

06 Feb 1710	Blanik L13 VH-GIK Lake Keepit, NSW	Instructional—solo-supervised Lake Keepit, NSW/Lake Keepit, NSW	C1N 210193

At about 50 ft, after takeoff on aero-tow, the tug and glider encountered a thermal. The glider was thrown upwards and to the side and the pilot released. The subsequent forced landing was off the edge of the strip.

09 Feb 1030	Cessna 172 G VH-SHV Maryborough, Qld.	Charter—passenger Maryborough, Qld./Happy Valley, Qld.	C1N, P3N 110083

The pilot abandoned the takeoff shortly after becoming airborne. The aircraft was landed back on the runway but failed to stop before colliding with the aerodrome boundary fence.

10 Feb 0700	Cessna 172 N VH-TDH Fraser Island, Qld.	Non-commercial—pleasure Maryborough, Qld./Fraser Island, Qld.	C1N, P1N 110093

Following a low pass along the intended landing area, full throttle was applied to commence an overshoot. The pilot stated that the engine failed to respond and the aircraft collided with trees 100 m beyond the end of the strip.

12 Feb 0830	Cessna 182 Q VH-AIV Ardlethan, NSW	Non-commercial—pleasure Moorabbin, Vic./Ardlethan, NSW	C1N, P3N 210213

The pilot flew several passes to clear sheep from the strip. When no sheep were visible an approach and landing were carried out. As the aircraft touched down a sheep ran across the strip from the right. The pilot steered the aircraft to the left and it ran off the strip into rough ground.

12 Feb 0900	Piper 36-285 VH-BRV Tully, Qld.	Commercial—aerial agriculture/baiting Tully, Qld./Tully, Qld.	C1M 110103

After refuelling his aircraft from drum stocks, the pilot started the engine and taxied to the end of the strip. Takeoff was commenced and at about 100 ft agl the engine ran roughly and then stopped. Attempts to restart the engine were unsuccessful and the aircraft collided with trees.

14 Feb 1107	Beech C23 VH-UML Archerfield, Qld.	Instructional—solo-supervised Archerfield, Qld./Archerfield, Qld.	C1N 110113

On the third bounce of the landing attempt the propeller struck the ground and the undercarriage noseleg collapsed. The aircraft slid along the runway for 270 m from the first point of touchdown before coming to rest.

14 Feb 1514	Cessna 180 D VH-GCW Bankstown, NSW	Non-commercial—pleasure Bankstown, NSW/Gulgong, NSW	C1N 210203

During the takeoff run the pilot's seat-back collapsed. The pilot fell backwards, losing control of the aircraft, which subsequently ground-looped sharply to the left.

PRELIMINARY REPORTS (The following accidents are still under investigation)

Date / Time	Aircraft type & registration / Location	Kind of flying / Departure point/Destination	Injuries / Record number
14 Feb 1430	Cessna 180 VH-BDN Goulburn, NSW	Instructional—training Goulburn, NSW/Goulburn, NSW	C2N 210223

The pilots were engaged on the second of two periods of circuit and landing practice. Towards the end of the twelfth landing, the aircraft ground-looped to the left and the starboard wingtip and tailplane contacted the ground.

18 Feb 0900	Beech 58 VH-FIV Nth. Stradbroke Is., Qld.	Demonstration Archerfield, Qld./Archerfield, Qld.	C1N, P2N 110133

In order to illustrate the high cruising speed of the aircraft to a potential customer, the pilot elected to fly along a beach at a low level. The aircraft flew into a flock of birds which rose from the beach as the aircraft approached.

21 Feb 1003	Piper 28 R200 VH-CJV Buckingham Downs, Qld.	Non-commercial—pleasure Gunpowder, Qld./Buckingham Downs, Qld.	C1N, P1N 110143

During the landing roll on a disused strip, the right main wheel struck a ridge of dirt located on the side of a road that crosses the strip. The resultant damage was not discovered until completion of the subsequent flight.

21 Feb 1520	Conaero LA4 200 VH-BDK Renmark, SA	Charter—passenger Renmark, SA/Goolwa, SA	C1N, P3N 410043

At 50 ft after takeoff the aircraft failed to continue to climb, the airspeed decayed and the aircraft began to lose height. To avoid trees ahead the pilot turned the aircraft. The right float struck the water, the aircraft yawed to the right and skipped sideways to the left across the water before coming to rest.

21 Feb 1204	Burkhart Twin Astir VH-IKB Waikerie, SA	Instructional—check Waikerie, SA/Waikerie, SA	C2S 410033

After lift-off on an aero tow the glider entered an uncontrolled climb, efforts to correct the climb with elevator were unsuccessful. The glider pilot released the tow rope and the glider continued to climb until it stalled. The glider turned left, entered a dive and struck the ground.

22 Feb 0736	Cessna 150 G VH-RNJ Canberra, ACT	Instructional—Dual Canberra, ACT/Canberra, ACT	C2S 210233

During the pre-takeoff checks the student found the carburettor heat control could be pulled out further than usual and that there was no rpm drop associated with the application of hot air. On takeoff the aircraft was slow to accelerate. It became airborne and was observed to enter a gentle right turn. A wing dropped and the aircraft impacted the ground.

22 Feb 0430	Cessna 402 VH-DIL Nagoorin, Qld.	Charter—Cargo Brisbane, Qld./Gladstone, Qld.	C1F 110153

After making a position report no further communications were received from the aircraft. The wreckage was located after two days' search. The aircraft had struck the ground in hilly country in a near vertical attitude.

24 Feb 1130	Piper 28 R200 VH-SWB Pamatta Stn., SA	Non-commercial—business Panatta, SA/Orroroo, SA	C1N, P3N 410053

The takeoff was made from a 650 m long strip. Early in the takeoff run the pilot tried to lift the nosewheel off the strip but reduced back pressure when the stall warning light flashed on. Approaching the end of the strip the aircraft became airborne and to facilitate acceleration, the pilot retracted the landing gear. The aircraft then settled back onto the strip and came to rest after a 100 m slide.

25 Feb 0830	Bell 47-G381 VH-CSI Glen Hills Yard, WA	Charter—aerial ambulance Glenn Hills Yard, WA/Camp Nicholas, WA	C1S, P2S 510063

While established in cruising flight the pilot felt something strike the airframe, and noticed that a pillow supporting an external litter patient had been dislodged. About one minute later the helicopter began to yaw to the right with increasing speed. The pilot entered auto-rotation, aiming for a run-on landing in a small clearing. However, as collective pitch was reintroduced control was lost, the aircraft struck the ground heavily and was destroyed.

26 Feb 1800	Cessna 172 N VH-DDV Bourke, NSW	Non-commercial—practice Bourke, NSW/Bourke, NSW	C1N 210243

The pilot was carrying out the fourth landing in a series of practice circuits. Following a reportedly normal flare and touchdown the aircraft bounced several times before coming to rest on the runway. The damage to the aircraft was discovered after the pilot had taxied to the terminal area.

27 Feb 1346	Boeing 727 276 VH-TBI Adelaide, SA	Scheduled Domestic Passenger Service Adelaide, SA/Melbourne, Vic.	C3N, P123N 410061

The aircraft was using a taxiway which had a row of cones positioned about 11.5 m from the centre-line to indicate a step in the sealed surface. The pilot saw a fuel tanker parked some distance away from the cones. Assuming that the cones were taxiway clearance markers, he continued to taxi along the centre-line. The port wing struck the top of the tanker about 15 m from the aircraft centre-line and about two metres from the wingtip.

27 Feb 2055	Cessna 172 F VH-DOX Witchellina, SA	Non-commercial—aerial mustering Witchellina, SA/Witchellina, SA	C1N, P2N 410073

The pilot flared the aircraft for landing but then decided he was undershooting and applied full power to go around. The aircraft climbed to about 7 ft when the left wing dropped and struck the ground. The aircraft yawed sharply to the left and the nose struck the ground heavily.

PRELIMINARY REPORTS (The following accidents are still under investigation)

Date / Time	Aircraft type & registration / Location	Kind of flying / Departure point/Destination	Injuries / Record number
02 Mar 1139	Cessna 421 VH-MQZ Daralingie, SA	Charter—passenger Adelaide, SA/Daralingie, SA	C1N, P7N 410083

After touchdown the pilot veered the aircraft to the right side of the strip to avoid another aircraft parked near the left side. The right main gear encountered soft soil and the aircraft began to swing further right. The pilot corrected with left brake and rudder but the nosewheel dug into the soft surface and the nosegear supports were broken.

02 Mar 1450	Victa 115 VH-CAP Mundijong, WA	Non-commercial—practice Jandakot, WA/Jandakot, WA	C1M, P1S 510073

On completion of a practice forced landing the pilot opened the throttle to go-around. The engine produced only partial power and the aircraft touched down in a paddock. After selecting carburettor heat to cold the engine developed full power but because of the extremely rough surface of the paddock the aircraft did not accelerate beyond 60 kt. The aircraft became airborne but collided with trees on the paddock boundary and crashed to the ground.

03 Mar 1424	Beech C23 VH-UMF Goulburn, NSW	Instructional—solo-supervised Bankstown, NSW/Goulburn, NSW	C1N 210263

The pilot, on his first solo navigation exercise, was landing with a moderate right crosswind. During the landing the pilot thought that he had made a very smooth touchdown and released control column back pressure. The aircraft then landed heavily on the nosewheel which collapsed.

03 Mar 1010	Cessna P206 B VH-DVT Portland, NSW	Non-commercial—business Camden, NSW/Portland, NSW	C1N 210253

On final approach to the 780 m long strip the pilot observed sheep on the strip near the threshold. He decided to land beyond that area but the aircraft did not touch down until only 320 m remained. The pilot continued with the landing and attempted to ground-loop the aircraft. It did not respond and ran through a fence at low speed.

04 Mar 1658	Pilatus B-4 VH-GID Cuballing, WA	Non-commercial—pleasure Cuballing, WA/Cuballing, WA	C1N, O1N 510083

During an aero-tow launch, the engine of the tug aircraft failed before it became airborne. The pilot of the glider released the tow, attempted to stop the glider but was unable to avoid a collision with the tug.

04 Mar 1658	Piper 25 235/A6 VH-TUG Cuballing, WA	Towing gliders Cuballing, WA/Cuballing, WA	C1N, O1N 510083

During an aero-tow launch, the engine of the tug aircraft failed before it became airborne. The pilot of the glider released the tow, attempted to stop the glider but was unable to avoid a collision with the tug.

05 Mar 1645	De Hav 82 VH-ADW Maitland, NSW	Trial/race/show Maitland, NSW/Maitland, NSW	C1N 210273

Three DH82 aircraft competing in a formation flying competition were making a V formation landing with a moderate left crosswind. After touchdown the aircraft on the left side of the leader was affected by a gust, it swerved to the right and collided with the aircraft in No. 2 position.

05 Mar 1645	De Hav 82 VH-RNI Maitland, NSW	Trial/race/show Maitland, NSW/Maitland, NSW	C1N 210273

Three DH82 aircraft competing in a formation flying competition were making a V formation landing with a moderate left crosswind. After touchdown the aircraft on the left side of the leader was affected by a gust, it swerved to the right and collided with the aircraft in No. 2 position.

06 Mar 1230	Piper 18 150 VH-SBQ Galway Downs, Qld.	Commercial—aerial mustering Galway D. Stn., Qld./Galway D. Stn., Qld.	C1N 110163

The pilot misjudged his approach to a claypan landing area and decided to go around. The throttle was advanced but the engine failed to respond and the pilot was forced to land. As an over-run seemed probable the pilot ground-looped the aircraft.

06 Mar 1045	Cessna 185 A VH-UPI Meredith, Vic.	Sport parachute jump Meredith, Vic./Meredith, Vic.	C1N, P5N 310053

The strip was aligned 140 deg and the wind was about 5 kt from 045 deg. On takeoff the aircraft yawed left then right and ran off the side of the strip. It became airborne just short of the boundary but the tail struck the fence and the tail wheel broke off. After despatching four parachutists at the planned height the fifth parachutist who was the aircraft owner landed the aircraft, holding the tail off the ground. Just before it stopped the aircraft tipped forward onto its nose.

07 Mar 0900	Cessna 182 K VH-KRI Couta Rocks, Tas.	Non-commercial—pleasure Smithton, Tas./Couta Rocks, Tas.	C1N, P1N 310063

After landing the pilot taxied the aircraft along a track leading to a parking area. Nearing the parking area the nosewheel entered a wombat hole, pushing back the nose strut and buckling the firewall.

09 Mar 0945	Cessna T188C VH-MQT Tansey, Qld.	Commercial—aerial agriculture-baiting Tansey, Qld./Tansey, Qld.	C1N 110173

The pilot was engaged in spraying two paddocks, separated by a third. While flying over the intervening paddock the pilot's attention was diverted by looking at the next area to be sprayed. The aircraft struck and broke a three-strand power line. A precautionary landing was made straight ahead in a flat paddock but the aircraft overran it and collided with two fences and a ditch.

PRELIMINARY REPORTS (The following accidents are still under investigation)

Date / Time	Aircraft type & registration / Location	Kind of flying / Departure point/Destination	Injuries / Record number
10 Mar 0850	Beech A36 VH-BKM Archerfield, Qld.	Non-commercial—pleasure Caloundra, Qld./Archerfield, Qld.	C1N 110183

Following a normal touchdown the landing gear partially retracted when the pilot inadvertently selected gear up instead of flaps up.

10 Mar 1800	Transav PL12 VH-SUO Brunswick Jun	Commercial—aerial agriculture-baiting Agricultural strip/Agricultural strip	C1M 510093

The pilot decided to change fuel tank selection during the pre-takeoff checks. While the aircraft was being reloaded, the pilot was distracted by an unserviceability on a second aircraft and omitted to alter the fuel tank selection. Shortly after the aircraft became airborne, there was a complete loss of engine power and the pilot was required to carry out a forced landing on unsuitable terrain.

12 Mar 1200	Schleicher KA-6 VH-GNA Gin Gin, Qld.	Trial/race/show Bundaberg, Qld./Mundubbera, Qld.	C1N 110193

The pilot was attempting a Gold Distance cross-country exercise. Although the cloud base at the start was lower than optimum the pilot elected to proceed as planned. While searching for thermals and waiting for the cloud base to rise, height was lost. An outlanding on a golf course was necessary. During the landing roll the left wing struck a small bush which was growing around a tree stump.

12 Mar 0528	Beech 58 VH-CTU Hampshire, Tas.	Non-commercial—aerial ambulance Devonport, Tas./Wynyard, Tas.	C1F 310073

The pilot was called out at about 0400 hours local time for an urgent medical flight from Wynyard to Melbourne. This required positioning the aircraft from its base at Devonport to Wynyard. The takeoff from Devonport was made in darkness with an overcast sky and light drizzle. The aircraft then apparently continued on the takeoff heading at high power and low level until it struck the ground at high speed in a forest area 25 km south of Wynyard and 56 km from Devonport.

12 Mar 1720	Piper 32 300 VH-PWI Walpole, WA	Non-commercial—pleasure Wagin, WA/Walpole, WA	C1N, P2N 510103

Following a heavy landing the aircraft bounced several times, with the bounces increasing in magnitude. The pilot made a go-around and noticed a wheel spat on the runway during the second approach. A smooth touch-down was made and the nose held up as long as possible. When the nose was lowered the nosegear folded and the propeller struck the ground.

16 Mar 1922	Cessna 172 N VH-MNW Nullarbor, SA	Non-commercial—pleasure Esperance, WA/Nullarbor, SA	C1N, P1N 410093

Concerned about the fuel remaining the pilot hurriedly joined the circuit area. When he found the approach obstructed he tightened the turn to land on the cross strip. During the turn the engine stopped. Unable to glide to the strip the pilot attempted to turn the aircraft into wind. The right mainwheel struck the ground followed by the nosewheel which collapsed, and the aircraft overturned before coming to rest.

18 Mar 1820	Grumman GA 7 VH-JSK Nambucca Rvr., NSW	Non-commercial—pleasure Nambucca Rvr., NSW/Port Macquarie, NSW	C1M, P3N 210283

The aircraft failed to accelerate normally during takeoff from a wet and boggy strip. Although the aircraft became airborne near the end of the strip, flying speed could not be maintained and the aircraft ditched into a nearby river.

19 Mar 0515	Beech A60 VH-DUK Port Macquarie, NSW	Charter—passenger Port Macquarie, NSW/Sydney, NSW	C1N 210293

During the takeoff roll the pilot noticed some kangaroos bounding towards the aircraft. During the attempted avoiding manoeuvres the aircraft ran off the side of the strip and struck a drain.

19 Mar 0832	Piper 23 160 VH-DBF Schofields, NSW	Non-commercial—pleasure Camden, NSW/Schofields, NSW	C1N 210303

The aircraft was crossing the threshold, about 300 m behind an Iroquois helicopter, when the right wing dropped. The nose also dropped and the nosewheel contacted the runway heavily and was broken off. The aircraft slid along the runway for some 200 m on its nose before coming to rest.

19 Mar 1112	Rutan Vari EZE VH-EZI Schofields, NSW	Trial/race/show Schofields, NSW/Schofields, NSW	C1N 210313

Just before touchdown the aircraft encountered wake turbulence from a preceding landing aircraft. The pilot applied full power and attempted a go-around, but the aircraft contacted the runway heavily and the nosegear collapsed.

20 Mar 1145	Cessna 210 L VH-FOC Goolwa, SA	Non-commercial—pleasure Mt. Gambier, SA/Goolwa, SA	C1N, P2M, P3N 410103

After crossing some trees on the approach path the pilot reduced power to land. The aircraft landed heavily and bounced several times. The pilot increased power to go around but the aircraft, which had lost its nosewheel, slid to a halt.

24 Mar 1545	Cessna 182 P VH-MIG Portland, Vic.	Non-commercial—pleasure Portland, Vic./Portland, Vic.	C1N, P1N 310083

The aircraft had been parked in the open for several days during which 10 cm of rain fell. The pilot drained water from the wing tank and main filter drains but twice on start-up and taxi the engine ran roughly and further water was drained from the fuel system. On the third start the engine ran up satisfactorily. The pilot made a normal takeoff but the engine failed at about 300 ft. In the ensuing forced landing the aircraft touched down heavily and the nosegear collapsed.

PRELIMINARY REPORTS (The following accidents are still under investigation)

Date *Time*	*Aircraft type & registration* *Location*	*Kind of flying* *Departure point/Destination*	*Injuries* *Record number*
24 Mar 1000	Cessna 150 L VH-PQX Warambie, WA	Non-commercial—aerial mustering Warambie, WA/Warambie, WA	C1S 510113

After locating some cattle for a mustering party the pilot flew along a creek line at about 400 ft agl and 60 kt with 10 degree of flap. To keep the ground party in sight the pilot commenced a left turn and the aircraft stalled. The pilot was unable to regain control of the aircraft before it hit the ground.

26 Mar 1722	Cessna 210 B VH-DBU Canberra, ACT	Non-commercial—pleasure Bathurst, NSW/Canberra, ACT	C1N, P1N 210323

On takeoff a loud bang was heard when the landing gear was selected up. On arrival at his destination the pilot attempted to lower the landing gear using both the normal and emergency systems. However, his efforts were in vain. As the aircraft touched down the main wheels collapsed and the aircraft came to a stop after sliding 140 m.

26 Mar 1045	Bell 206 B VH-BLP Lake Eildon, Vic.	Commercial—mapping/photo/survey Eildon, Vic./Eildon, Vic.	C1N, P1M, P2N 310093

During a low-level photographic flight, the pilot made a shallow left turn at about 400 ft agl and a low forward speed. When he increased the rate of turn, the helicopter began a rapid turn to the right and the nose pitched up. The rotation continued for 3 to 4 turns during which the nose pitched up and down. The pilot had almost regained control when the helicopter struck the ground heavily on its skids and rolled onto its right side.

27 Mar 1510	Pitts S2 A VH-WEB Wallacia, NSW	Non-commercial—pleasure Wallacia, NSW/Wallacia, NSW	C1M 210333

After initial touchdown the aircraft bounced several times and the pilot initiated a go-around. During a very shallow climb away the aircraft struck a power cable and cartwheeled to the ground.

29 Mar 1442	Cessna 180 VH-BDN Moorabbin, Vic.	Non-commercial—pleasure Goulburn, NSW/Moorabbin, Vic.	C1N 310103

The landing was made on Runway 31C with a light surface wind from about 280 deg. The pilot corrected for right drift on the approach and the aircraft touched down on the main wheels. As the tail settled during the landing roll there was a sudden wind change to 200 deg, gusting from 5 to 11 kt and the aircraft swung sharply to the left. The right wing contacted the runway and the aircraft nosed over onto its back.

FINAL UPDATES

Date Pilot licence	Record number Age	Hours total	Hours on type	Rating
02 Jan Private restricted	210013 21	64	11	None

The pilot had been required to divert due to a thunderstorm over his destination. He did not initiate a go-around when circumstances indicated that this was the correct course of action.

03 Jan Private	210033 42	410	215	Instrument rating Class 4

The gear warning horn was serviceable, however, during the landing approach and flare the pilot had not reduced his throttle setting to the point where the horn would be activated.

21 Feb Private	110143 35	650	Not known	None

Pilot contribution

Reflections on an accident

Recently a light twin-engine aircraft crashed while commencing a charter flight. Although the accident seemed fairly simple, many factors were involved. To help identify the causes of the accident and thus draw lessons affecting Company policy, the Chief Pilot wrote a report which was also submitted to the Bureau of Air Safety Investigation. This report — slightly amended by the author for publication — is printed below.

During the takeoff roll at a remote bush airstrip, the pilot lost control of a light twin operated by my Company. The aircraft took off prematurely, stalled, entered an incipient spin to the right and crashed. Damage to the aircraft was extensive, although luckily neither the pilot nor the passengers suffered injury. Many factors were involved in the accident and are noted below.

The airstrip and conditions

The airstrip is located on a slight rise; although there are a few hills nearby, the approaches are good and most of the surrounding terrain is low-lying and level. The nearest occupied settlement is about ten miles away by a very rough track.

Under most conditions the length and width of this particular airstrip are more than adequate for the Company's aircraft. The main problem is the surface drainage — when wet the grass becomes slippery and in places the ground becomes boggy.

As there is normally no one at the airstrip to report on condition, this information is usually obtained through aerial inspection, combined with the pilot's (and the Company's) knowledge of the strip and recent weather. If the pilot decides to land, he/she can then carry out a further inspection to determine whether a takeoff would be safe, and if so what technique should be used. This is generally done while taxiing after landing. If any doubt remains an inspection on foot is made. Apparently this did not happen; the choice not to takeoff probably was not considered, while takeoff technique also suffered a similar fate.

At the time of the accident there were people working near the airstrip who could have been contacted prior to the flight, but a strip condition report was neither requested nor given.

Weather conditions were an unstable airmass with unsteady and generally light winds. There had been considerable rain in the preceding period. Although strong wind gusts were later cited by some unofficial sources, this is unlikely. In my opinion wind was not a determining factor in the accident; rather it was brought up afterwards as a plausible 'cause'.

I also doubt that the boggy surface was the determining factor — although it certainly was important both in making directional control a little trickier and in retarding acceleration. A takeoff from a surface such as muddy grass or loose sand which is soft and has poor traction is not easy — but nor need it be dangerous.

It would seem to me that conditions were such on the day of the accident that for an experienced and careful pilot using the correct techniques the operation could have been safely carried out.

The aircraft

The aircraft used was a fully serviceable IFR twin. This aircraft was not as suitable for bush work as, for example, a Cessna 206 or a BN-2 Islander.

However, when a customer is prepared to pay for one's most expensive aircraft and one has financial problems, one is not inclined to argue, much less pass the job on to a competitor. As Chief Pilot, I considered that the operation of that aircraft to the airstrip concerned was not unsafe — if it had been, the ALA Register kept by the Company would have noted restrictions on operations.

I must state that in this Company the importance of operational requirements is recognised. Safety is of course far more important than a few dollars; it is better to go broke safely than to lose the plane, pilot and passengers in one easy crash.

The point is that the use of that particular aircraft for that work and in those conditions was not unsafe in and of itself. But again, it did dictate careful handling and a high level of pilotage skill.

The pilot

The request for the charter concerned came when the aircraft was on the return leg of another flight. Thus the pilot had already been flying for most of the day in an IFR environment from large sealed aerodromes with full condition information available, when without warning he was asked to proceed to the bush strip.

The pilot had substantial experience flying twin-engine aircraft in the general region. However, at the time of the accident he did not have a lot of recent experience operating into that strip. This, combined with the strip condition and pressure from the passengers (who were in a hurry to depart), probably induced a certain amount of anxiety in the pilot.

The factors of lack of recent experience at that strip, fatigue, unpreparedness and anxiety cannot be discounted in this accident. These are all valid reasons

for a pilot to refuse a flight; they should all — to the greatest extent possible — be monitored by the Company as well.

It is also possible that the pilot suffered from a certain over-confidence, and considered that he could handle (almost) anything. If you do not recognise your limitations, you tend not to be as careful as the situation dictates. Such an outlook means that one is reluctant to admit that a situation is getting outside one's control. Pride is often hard to swallow, so one tends to press on — outside one's capabilities.

The other side of the same coin is the 'I never make silly mistakes' or 'I always make it' mentality. It is this same attitude which often makes pilots continue a lousy approach, land at an unsafe airstrip, fly VFR in ghastly weather, not take ice seriously when IFR, take off without checking fuel quantity and quality, and so on.

Why did the aircraft lose directional control?

The first factor involved in losing control of the aircraft's direction was that the pilot forgot to release the park brake when commencing to taxi. That this was not a part of the pre-take-off checks indicates a certain weakness in the checklist — understandably caused because usually a set park brake becomes clearly obvious when taxiing. In this instance it did not because of the slippery surface conditions.

But there are other major controls at the pilot's disposal to maintain directional control: the nosewheel steering, the rudder, asymmetric power.

In this case the nosewheel was consciously lifted from the airstrip early to lighten the load on the main wheels and to prevent it from becoming bogged in a soft patch. The idea is to reduce total drag, increase acceleration and reduce the takeoff roll — the well-known soft-field takeoff technique. Of course when the nosewheel left the ground it became useless as an aid to maintaining directional control.

In single-engine aircraft the propeller slipstream flows over the tail surfaces, providing increased rudder effectiveness at low airspeeds. But on twins the slipstream generally does not go anywhere near the rudder — consequently the rudder is not much help until the airspeed has built up.

Especially when one is operating in marginal conditions, there is a certain and justifiable reluctance to compromise performance by using asymmetric power. But this is a control which may be used when necessary — and was not used in this case.

The correct takeoff technique for a light twin on a soft and slippery surface is to maintain just sufficient pressure on the nosewheel to provide positive steering — but not so much that it can sink into soft patches. When airspeed is such that directional control can be maintained with rudder alone, the nose should be lifted such that the nosewheel is no longer on the strip.

If the aircraft begins to wander, the nosewheel should be placed back on the strip, careful use made of brake and if necessary asymmetric power, and the takeoff abandoned if considered advisable. Of course the technique outlined will not necessarily result in a very short takeoff roll; it will simply be as short as safety and the conditions dictate. This must be taken into account when determining load or strip length requirements.

In the air . . . briefly

When the pilot saw his aircraft careering off to one side of the strip, toward the bush, a hut and a small hill, he decided that rather than go through he would try to go over those obstacles. So the aircraft took off at an extremely low airspeed — it was flying in ground effect, on the back side of the power curve, and according to the passengers with a horn (presumably stall warning) sounding. It is significant that the pilot did not hear any stall warning, nor did he recognise the situation that the aircraft was in.

The aircraft 'crawled' up the side of the hill, and there at a height of probably about 100 feet things changed for the worse.

Up to this point, it would appear that the aircraft could have been flown out of its predicament, using the high power-weight ratio, trading height for speed, and flying downhill towards a low clear area. But when the ground is near and all you want to do is gain altitude and irrationally leave the problem behind, there is a certain reluctance to lower the nose even though this is necessary.

The pilot kept the nose high, the aircraft stalled and dropped the right wing. His reaction was to apply full left aileron which was retained until the aircraft hit the ground. But this incorrect reaction probably did not make a lot of difference for from that height it is not possible to recover from an incipient spin.

Miscellaneous factors

Two other factors should be mentioned. The first is that the passengers' equipment was not tied down. Luckily all the impact forces were downward and the equipment stayed on the floor. Had accelerations been in other directions, serious injury could have resulted.

Secondly, although equipped with a serviceable and reliable HF radio, and despite possible VHF communication with overflying aircraft, the pilot did not report to Flight Service when taxiing. There was, therefore, no SARWATCH on the aircraft — indeed, no one outside the aircraft even knew that it was taxiing to take off. Again luckily there were no injuries: for had the pilot and/or radio been disabled no one would have known of the accident and help would not have been forthcoming until the next day.

Conclusions

Technically one could simply call it all 'pilot error', and leave it at that — certainly up to the point of the stall the pilot could have prevented the accident.

But the way a pilot flies and the decisions he/she makes are very largely the result of training and Company policy. With respect to the former, it would appear that the pilot had not been adequately taught several items — most importantly in relation to operations from bush airstrips and also stall/incipient spin recognition, prevention and recovery.

Perhaps the most crucial lesson which had not been taught was the importance of recognising reality and acting accordingly. Flying safely means critically noting what is *really* happening even if it seems unlikely — and not believing what one would merely *like* to see. Flying safely also means realising that conditions are always changing, as is the pilot's view of what is happening. Decisive corrective action should be taken *immediately* unless there is clearly no urgency — and modified as soon as one even suspects that the correction was not enough/was too much/was incorrect. This principle, which is so important and which has its application through all phases of flight, is rarely consciously taught.

With respect to Company policy, several points should be mentioned. First, there was inadequate preparation for the flight — strip condition should have been checked, the pilot questioned about whether he was completely happy to make the flight, consideration given to cargo, and so on.

Secondly, pilot check flights were too lax — although they were carried out, there was too much emphasis on normal manoeuvres and not enough on 'bush' techniques, low-speed work and the like. A large section of the check would often be the Chief Pilot riding as check pilot on a charter flight, when of course emergency manoeuvres could not be practised. Also there was a tendency to regard the Departmental instrument rating renewal test as an adequate pilot check.

Thirdly, long-term Company records of pilot recency (e.g. in bush operations), strip condition, and so on, would appear to have been both inadequate and inadequately used.

Fourthly, Company procedures should have insisted on a full SARWATCH from before takeoff until after touch-down whenever practicable. Use could also be made of the ETD for SAR procedures. In some ways the circuit operations at the beginning and end of a flight are the most critical phases of that flight — thus it is important that a SARWATCH be maintained over these operations. The time between an accident and rescue action can be critical; without a SARWATCH it can be fatally long.

Some of these Company policy factors were affected by financial considerations — how much money can be spent checking and working on a pilot's possible weak points on the off-chance that one day he/she will encounter a certain condition? (Clearly the scope of the checks in my Company was inadequate — but how far do you go?) Other factors were affected by pilots' well-known dislike of paperwork, and still others by simple lack of organisation. The key to all this is professionalism. We need to educate ourselves to be always professional in our approach.

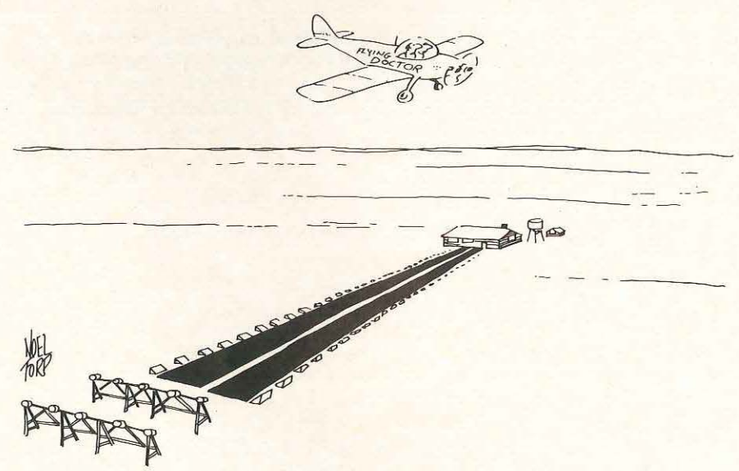
As always, many were the factors involved in the making of the accident. We can consider ourselves lucky that this time lessons can be learnt at the cost of only the aircraft, not human lives.

* * *

Aviation Safety Digest would like to thank this pilot for his comments on this accident. The sole aim of the *Digest* is to promote flight safety, and one of the best ways of doing so is by recounting the experiences of others.

Clearly the message derived from aircraft incidents or accidents can fall between two extremes, depending on whether the occurrence was self-induced and handled poorly, or beyond the pilot's control and handled well, or a combination of these factors.

It is most important to note that an incident does not have to have been handled perfectly to convey a safety message; indeed, the reverse is often the case. This is why the *Digest* on occasions presents articles in which individuals' actions may be questionable. Articles are *never* presented with any intention of denigrating anyone, but rather only in the hope that we can all learn from the experiences of others ●



"That's the Mackenzie spread - bloody hypochondriacs!"

(*Courtesy of* The Bulletin)

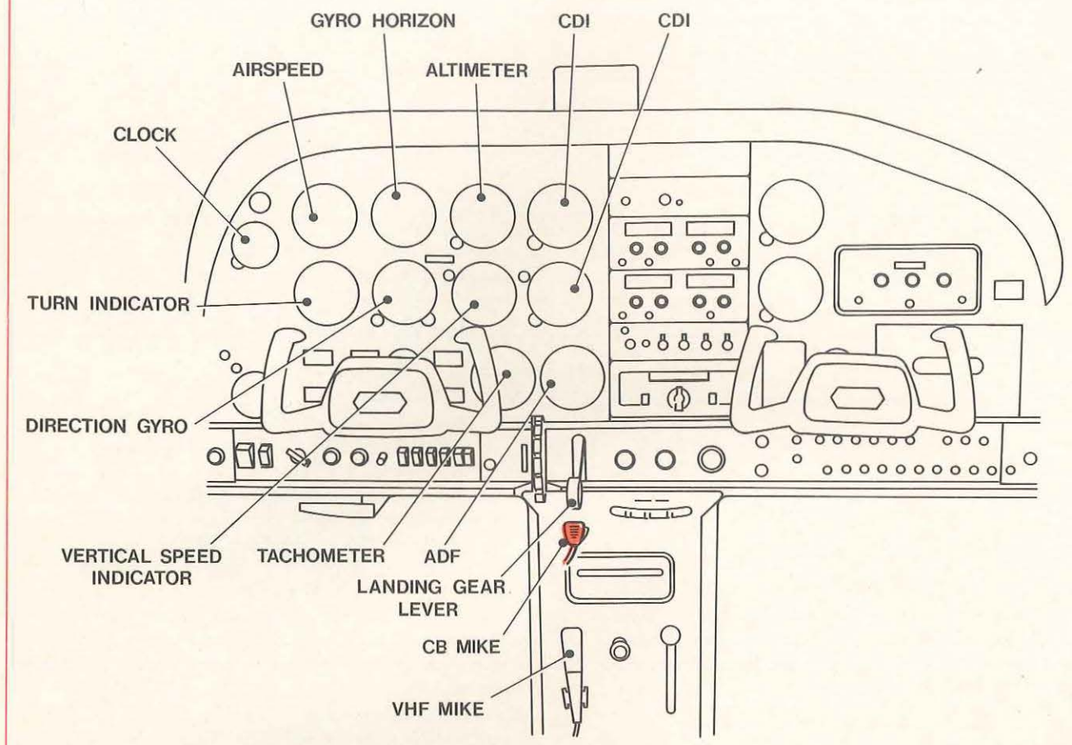
Modifications and cockpit ergonomics

Modifications to aircraft can be approved by either Department of Aviation officers or Departmentally authorised persons. While the great majority of approved modifications enhance the overall operational effectiveness of the aircraft to which they are fitted, the odd exception does sneak through the system. A case in point was highlighted by an incident involving a Cessna 177RG.

The pilot had carried out his prestart, afterstart and taxi checks using a card check list carried in the aeroplane. After obtaining takeoff clearance he lined up and commenced the takeoff roll. At about 60 knots the aircraft's nose dipped perceptibly and this was accompanied by a slight noise. The pilot rotated the aircraft and shortly after establishing it in the climb he noticed that the landing gear selector was in the UP position, although he had not at that stage completed the after-takeoff checks. He selected the landing gear down and obtained the correct indication; then selected it up and obtained a normal up and locked indication. The pilot had intended carrying out a touch-and-go landing but, because of the abnormal occurrence during the takeoff, wisely opted for a full stop landing which was uneventful. Postflight inspection revealed that the propeller was abraded on its tips.

A technical examination of the aircraft, and the landing gear in particular, showed all systems to be functioning normally. The LAME carrying out the inspection did, however, notice that a non-standard (not a factory fit) CB radio microphone had been installed immediately below the landing gear selector. Furthermore, the selector knob was loose and could rotate through 90 degrees, in which position the knob presented a larger than usual area in the horizontal plane; the significance of this was that it made the selector knob more susceptible to an inadvertent knock from someone reaching for the CB microphone.

A word is necessary here on the C177RG landing gear system. The C177RG incorporates a nose gear squat switch, which is actuated by the nose oleo extension, and which electrically prevents inadvertent gear retraction whenever the nose gear strut is



compressed by the weight of the aircraft.

Given these circumstances, investigators postulated the following sequence of events:

- The pilot, in reaching for the microphone after startup, had accidentally bumped the undercarriage selector knob to the UP position.
- Because the aircraft's weight was acting on the landing gear, the nose gear squat switch prevented the gear from retracting.
- As lift developed during the takeoff roll, the aircraft's weight started to come off the nose gear and so the squat switch opened and allowed the landing gear to retract.
- Hence, the nose dipped and the propeller struck the ground. At this stage, however, the aircraft became airborne, preventing further damage, and the pilot found himself in the climb with the gear up and locked, without consciously having moved the selector knob to the up position.

Subsequent discussion with the pilot confirmed that this was indeed the probable sequence of events. The pilot discounted any possibility of his having initiated a premature retraction. He did, however, recall that he had inadvertently picked up the CB microphone when he went to give his first R/T call of the sortie. Because he was unfamiliar with the aircraft, and because the CB microphone was mounted between the VHF microphone and the landing gear selector, he had initially mistaken it for the VHF microphone. In picking up the CB microphone he probably knocked the gear selector knob to the UP position.

This incident should provide food for thought for all those in the modification development and approval chain, Departmental or otherwise. While the pilot's unfamiliarity with the particular aircraft undoubtedly contributed to the incident, the positioning of a microphone immediately adjacent to a critical systems control switch was unwise. There can be few General Aviation pilots who have not at some stage fumbled, without looking, for a hand-operated microphone while primarily engaged in another more pressing aspect of flight. It is most important that such contingencies are taken into account when cockpit modifications are proposed. Consideration must be given, not just to finding a space for an item, but to the whole question of cockpit ergonomics — the 'scientific study of efficiency in a working environment'. An appreciation of this need must be manifested, first, by the engineers who implement modifications and, second, by any pilot whose opinion regarding a proposed modification is sought. As this incident showed, modifications which are not planned in the context of cockpit ergonomics can be a flight safety hazard ●

Reader contribution

Fuel tank water drain checks

'After conducting an investigation for a Major Defect Report following the discovery of water in the fuel tank of a sophisticated General Aviation twin I thought an article on the importance of conducting water checks might be appropriate for Aviation Safety Digest.'

The aircraft was undergoing a 100-hourly inspection when a large amount of water and fungus-like contamination was found in the right-hand main and nacelle fuel tanks. All endeavours to trace the source of the contaminated fuel were unsuccessful. The investigation similarly failed to determine when the last fuel tank water drain check was carried out. It could well be that the aircraft had been carrying the water for over two weeks. It had reached the engine firewall and fuel filter, and the conditions were ripe for an engine failure. While a single engine failure in itself may not have been too dramatic, the scene was set for the left engine to fail also: the pilot needed only to select fuel cross feed from the right tanks and the left engine would have drawn water from the contaminated right nacelle tank as well.

Discussions generated by the investigation of this discovery brought to light extreme cases of fuel quality control neglect: pilots admitted that they had not carried out a fuel tank water drain check in years of operating turbine-powered aircraft.

Fuel quality control in Australia is of a high standard and it is possible that this is the very reason for the neglect of procedures once the fuel is in the aircraft tanks. But remember that water can come from several sources, for example: incorrectly stored drum stock; contaminated hoses and pumping equipment; rainwater (through poorly fitted tank caps or defective cap seals); condensation from partially filled tanks; and dissolved water released from the fuel by a lowering of the fuel temperature — such as will occur in flight.

The problems of the presence of water in jet fuel are not confined to those created by the engine's preference for hydrocarbons. At very low temperatures severe fuel system icing can occur, and at any temperature below zero degrees Celsius, water droplets can freeze and clog filters. Furthermore, water in jet fuel creates an environment favourable to the growth of a corrosive, microbiological sludge. The microbes live and multiply in the environment between the fuel and water separation level. In addition to its corrosive action the sludge produced by the microbes sticks to capacitance-type fuel quantity indicator probes, causing gauge errors.

A further reminder that all those involved with fuel quality control must always be thorough was provided by the instance of a DC10 which uplifted a tanker load of water. The error was not discovered until the aircraft was taxiing for takeoff, when numbers one and three engines became erratic and then stopped.

These are some of the reasons why regular checking of fuel tank water drains is so important. Pilots and engineers alike should be familiar with the drain points on their aircraft and ensure that all points are checked ●

Cattle-mustering aircraft — inspection requirements

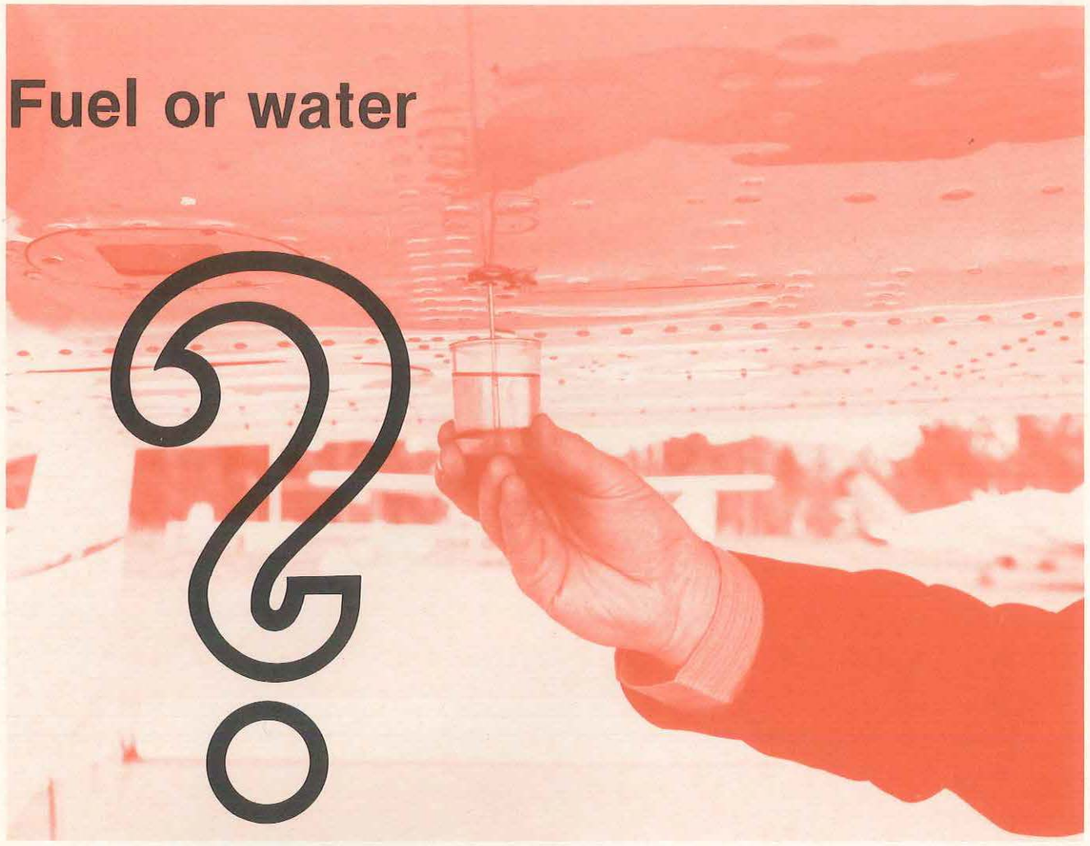
During the investigation of a major defect involving a Cessna 180A, the left inboard flap bracket was found to be loose and damaged. Further investigation revealed cracks in the associated wing spar. A similar investigation involving a Cessna 172 disclosed buckling of the rear spars of both mainplanes.

Both of these aircraft had been used extensively for cattle mustering, which involved operations at low altitudes with the wing flaps partially extended. The damage sustained by the aircraft was directly attributed to this type of use.

Pilots and LAMEs should realise that aircraft manufacturers base their inspection schedules on average utilisation in standard operations. When an aircraft is used in specialised operations or in a particularly harsh environment, these schedules need to be adjusted to account for the different operating conditions.

In the case of aircraft used for mustering cattle, there is a greater than usual proportion of manoeuvring flight at low altitude, more exposure to low-level turbulence and more flight time with flaps partially deflected. While the former condition makes the overall load spectrum worse than for normal operations, the latter applies critical loads to specific structural components — namely, the flaps, their mechanism and the rear spar — much more often than foreseen by the manufacturer.

A wing failure or a flap bracket failure causing asymmetry would, of course, be catastrophic. Consequently, all individuals associated with the operation and maintenance of aircraft used for cattle mustering and similar purposes are urged to increase the frequency of the inspection schedules required under the provisions of ANO 100.5.1 paragraphs 3.2 and 3.3. This extra vigilance is likely to pay for itself in forestalling more costly maintenance, and may even prevent an accident ●



To highlight the message contained in our reader contribution 'Fuel tank water drain checks', the following Air Safety Incident Report was extracted from the computer records:

The pilot completed the daily inspection and preflight checks on his Cessna 182 and everything appeared normal. However, just as the aircraft became airborne the engine stopped. Fortunately for the pilot he was able to land the aircraft straight ahead on the remaining runway, without further mishap.

Initially the pilot was adamant that there had been no sign of water in the fuel during his preflight drain check. He also confirmed that there had been fuel in both tanks and that the fuel selector had been turned on.

The pilot subsequently checked thoroughly the fuel remaining in his aircraft's tanks and found that in fact it was heavily contaminated with water. Indeed, the sample he had taken from the tank water drains during his daily inspection had been all water! Because the liquid he had drained seemed the same colour as the fuel the aircraft used and there were no signs of contamination, he had assumed that the liquid was uncontaminated fuel. About 135 litres of liquid were drained before all evidence of water was removed.

There are two important aspects of this incident, namely, how the water got into the fuel and why the pilot failed to identify the problem during the daily inspection. While the question of how the water got in the fuel is most serious, it is the latter issue with which this article is concerned.

The report from the Bureau of Air Safety Investigation confirmed that the original sample taken by the pilot was all water. The report continued: 'Pilots should become thoroughly familiar with the characteristics of aviation fuels and if a sample is of uniform consistency (as in this case), the fact that it is fuel can and must be verified'.

One method of doing this is to drain the sample into a vessel which already contains a sample of known fuel. If the sample from the aircraft is all water, it will be readily visible. Another 'ad hoc' method is to pour a little of the sample into the palm of one hand: if it is fuel it should vaporise and leave the skin dry; it will also feel cool as it evaporates. Water will remain on the skin. The sense of smell should also be used to help with the identification.

The size of the fuel sample taken is important as it must be sufficient to be conclusive. It will vary depending on the fuel capacity of the particular aircraft. Check on the amount you need to take from each drain on your aircraft, either in the aircraft operating manual or from an appropriately qualified engineer, to ensure a positive result.

Finally, the point needs to be made that the fuel/water checks discussed above should be used only when more positive tests cannot be made. If a visual check is inconclusive, then the best and only certain way to ensure your fuel is free from the danger of water contamination is to test a sample with water-sensitive paste or capsules ●

Dress for crash survival

Each year a number of pilots are killed in survivable accidents. One reason some die so tragically and unnecessarily is their omission to wear suitable protective clothing. The use of protective clothing is an integral part of military flying, but unfortunately the practice has not become widespread in those civil operations — for example, crop dusting, cattle mustering and oil rig support — which also are relatively high-risk activities. The possible consequences of this omission are unhappily illustrated in the following summaries of two Australian accidents.

- A cropduster crashed while carrying out a procedure turn between spraying runs. Rescuers found the pilot about 10 metres away from the aircraft, which had burnt fiercely. Although the pilot suffered no impact injuries, he subsequently died as the result of extensive burns. He had not been wearing adequate protective clothing; indeed, the material of his clothes tended to absorb flammable liquid rather than resist it.
- During an approach to a property airstrip, an aircraft struck power lines and crashed. The post mortem indicated that the pilot had survived the impact but died while attempting to get clear of the ensuing fire. His clothing had not provided protection.

A recent study of accidents during agricultural operations showed that fire after impact was the main factor affecting survivability. Fire occurred in only 14 per cent of the accidents, but these accounted for over 80 per cent of the fatalities. Over two-thirds of these fatal accidents were survivable but the pilots were overcome by heat and smoke. In addition, serious and minor burn injuries were sometimes sustained unnecessarily.

Some of the fatalities and most of the burns could have been avoided by the use of the protective clothing which is described in detail below.

Helmet. The primary function of the helmet is to protect the head, eyes and ears, keeping the wearer conscious so that he can escape from the wreckage. It should be light and shock absorbent with a smooth hard surface to deflect blows and resist penetration. An inner air layer between the shell and the skull is an intrinsic part of the helmet's protective function. The air layer is created and maintained by the use of straps over the head on which the helmet is suspended. These straps must be properly adjusted otherwise protection efficiency will be lost if the helmet is loose and shifts on the head.

Flying overalls. Overalls protect the body from burns as well as chemicals. For hot climates they are normally made from lightweight cellular cotton. Heavier man-made materials are used in more temperate climates. Nylon should never be used. Any material used ideally

(continued on page 21)

Playing with fire

During start-up the right engine on a Piper PA-23 Aztec caught fire. The fire reportedly burnt for about 45 seconds before it was extinguished by the pilot and an aircraft refueller.

The pilot inspected the engine and discovered that the fuel line from the fuel control unit to the injectors on the top of the engine had a loose connection. This was tightened and the engine ground run with all systems appearing normal. A test flight without passengers was then carried out and once again all systems appeared normal. After this, passengers were embarked and the aircraft resumed its schedule. At no stage before these passengers were carried was the aircraft inspected by a LAME, nor was a properly recorded endorsement of the occurrence entered in the maintenance release.

Inspection of the engine by a LAME on the return of the aircraft to its home base revealed fire or heat damage to the following items:

- Alternator wiring
- Starter motor wiring
- The fuel control unit
- The mixture control stop
- The outboard rocker drain tubes
- No. 1 cylinder induction tube rubber

The extent of the damage to some of these components was sufficient to indicate that this pilot and his passengers may have been very lucky to have arrived safely at their destination.

Breakdown of the insulation on both the starter cable and the alternator wiring was of sufficient magnitude for either to have been a source of arcing. Various fuel and oil seals had also been damaged, to a degree which only a LAME could have determined. Of particular concern were seals which were damaged in the fuel control unit and which could well have allowed a massive fuel leak under pressure into the engine compartment. In combination with the badly insulated wiring, ignition would have been highly likely. As the investigation report concluded, fires resulting from similar circumstances in the past have led to catastrophes.

Comment

The test flight conducted after the inspection by the pilot proved nothing — damaged components may last one year or one minute. There is only one course of action to follow after an occurrence such as this: write it up in the maintenance release and leave the aircraft on the ground until the damage is assessed and the entry cleared by a qualified engineer ●

Dress for crash survival *(continued)*

should have a fire-retardant treatment. Nomex provides better fire protection than most fabrics but tends to be hot and uncomfortable.

Like all protective clothing, overalls should be kept as clean as possible, especially from oil and fuel contamination.

Underclothing. Undergarments should be made from natural fibre. String-type garments are preferable as they increase thermal protection and help keep the wearer cool. Nylon should never be worn against the skin.

Gloves. Gloves are essential to protect the hands, particularly when hot buckles, handles, etc., need to be opened.

Scarves. A scarf can be used to provide extra neck protection.

Immersion suits. Maritime operations can pose a different survival hazard, namely, hypothermia. Many military forces require immersion suits to be worn for transits over water which is at 15 degrees Celsius or less. Survival time in water of that temperature averages only about 20 minutes. At 10 °C survival time can be as little as 10 minutes. Wind-chill effects reduce these times even further.

The average sea temperature in Bass Strait is 15-20 °C during summer and 10-15 °C in winter.

Survival can be significantly prolonged by the use of immersion suits. Both aircrew and passengers in North Sea operations now wear such suits. Unfortunately it took a ditching, in which the people involved were unable to get into life rafts, to emphasise the need for protection against low water temperatures.

Conclusion

When a flight either does or could involve abnormal risks, aircrew should wear suitable protective flying clothing. Experience has shown that the failure to do so can mean the difference between life and death ●

Propeller blade damage and maintenance

An aircraft's propeller is the end of the energy chain which provides the aircraft with its motive force. It does the job of converting the brake horsepower of the engine into thrust. During normal operation there are at least four separate stresses imposed on the propeller: thrust, torque, centrifugal force and aerodynamic force. Additional stresses may be imposed by vibration caused by fluttering or uneven tracking of the blades. Because of the forces to which they are subject, meticulous maintenance of propeller blades is essential. Summaries of several Australian accidents highlight this.

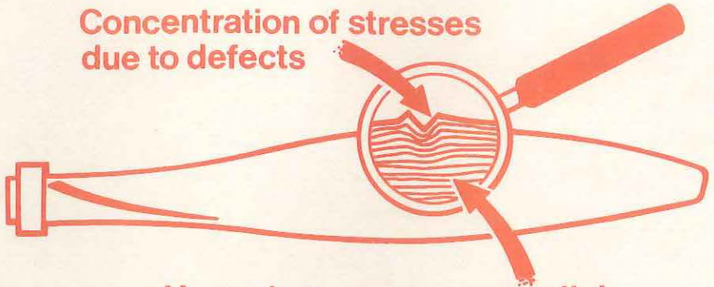
- During an enroute cruise the outer 20 centimetres of one blade of the port propeller of a Piper PA39 detached in flight. The aircraft diverted to the nearest suitable aerodrome and landed safely. Investigation revealed that the blade failure was caused by fatigue which originated from a nick on the lower leading edge radius of the blade.
- A Cessna 150 began to vibrate excessively during flight. One blade of the propeller had shed 14 centimetres as a result of fatigue failure initiated by stone damage. The aircraft was substantially damaged during landing.
- Improper blending-out of a dent in the leading edge of a propeller blade of a Cessna 188 caused a fatigue crack which eventually resulted in 15 centimetres of the blade separating in flight. A successful forced landing was completed.

Causes of blade failure

An investigation conducted in the USA of a representative number of propeller blade failures disclosed that the failures occurred because of fatigue cracks which started at mechanically formed dents, cuts, scars, scratches, nicks, or leading edge pits. In most cases blade material samples did not reveal evidence of failure caused by material defects or surface discontinuities existing before the blades were placed in service.

Some fatigue failures occurred at a point where previous damage had been repaired. This may be due to the failure actually having started before the repair was effected, or by the repair itself being carried out incorrectly. For example, too many blade-straightening or repitching operations can overstress the metal, causing it to fail. *Blades should be repaired only in accordance with the manufacturer's instructions.*

Many propeller blade failures may also occur due to flutter. This vibration causes the ends of the blade to twist back and forth at a high frequency around an axis perpendicular to the crankshaft. At certain engine speeds this vibration becomes critical and, if the propeller is allowed to operate in this range, propeller blade failure may occur. For this reason tachometer accuracy is most important. Periodic tachometer accuracy checks should be accomplished using reliable testing instruments.



How blades fail

The stresses which normally occur in a propeller blade may be envisaged as parallel lines of force that run within the blade approximately parallel to the surface. Closely spaced lines will indicate regions of high stress whereas widely spaced lines will indicate low stresses. When a defect occurs it tends to squeeze together the lines of force in the defect area, thereby concentrating the stress. This increase in stress may be sufficient to cause a crack to start. Even a small defect, such as a nick or dent, may develop into a crack. The crack in turn results in a greater stress concentration and accelerated crack growth. The resulting growth of the crack will almost inevitably result in blade failure. This condition is so common, and the results are so serious, that great emphasis must be placed on the daily and preflight inspection of propeller blades for defects.

Where blades fail

While fatigue failures usually occur within a few inches of the blade tip, failures are possible in any portion of the blade if dents, cuts, scratches or nicks are ignored. No area or damage should be overlooked or allowed to go without repair.

During propeller blade overhaul all items which might obscure damage or defects (such as leading edge boots and propeller blade decals) should be removed and those areas — as well as the rest of the blade — checked for corrosion, pitting and evidence of fatigue cracks.

'Blade tips'

- Keep blades clean — cracks and other defects cannot be seen if they are covered with dirt, oil or other foreign matter.
- Avoid engine run-up areas containing loose sand, stones, gravel, etc.
- Do not move an aircraft by pushing or pulling on the propeller blades — they were not designed to be used as handles (there is, of course, also the potential of injury should the engine start if the switches have been inadvertently left on).
- Engine tachometers must be accurate to ensure that propellers are not operated in any restricted RPM range.

Conscientious observation of the advice offered in this article will greatly reduce the possibility of propeller blade failures ●

In brief

The performance of radio navigation equipment can be affected by certain aircraft colour schemes.

In the U.K. the cause of weak signals on both ADF systems on a Cessna Citation was traced to reflective metallic tapes — part of the 'customised' colour scheme of the operator — on the aft fuselage and dorsal fin near the flush-mounted ADF sense antenna. Removal of the tape cured the problem and the ADF system functioned normally.

With the increased use of flush-mounted antennae, any change to aircraft configuration or paint schemes should be certified by all trades, particularly the radio/nav specialists. Also, when areas of skin are covered by adhesive film, the skin beneath the film should be checked periodically for corrosion ●

A Cessna 402 landed during a rainstorm with a quartering tailwind of 12 knots gusting to 22 knots. Touchdown was made about 100 feet from the threshold in an area of standing water. As the aircraft touched down it swerved to the right, and the right main wheel dropped off the runway.

Power was applied to the right engine and the aircraft was guided back onto the runway, where it swerved again and the pilot lost control. The aircraft skidded off the runway once more and the nosewheel struck a VASI light ●

A Beech Bonanza was on finals when the cabin door popped open. The distracted pilot allowed the airspeed to decay and landed short of the runway. The aircraft's nose gear, propeller and left wing sustained extensive damage ●