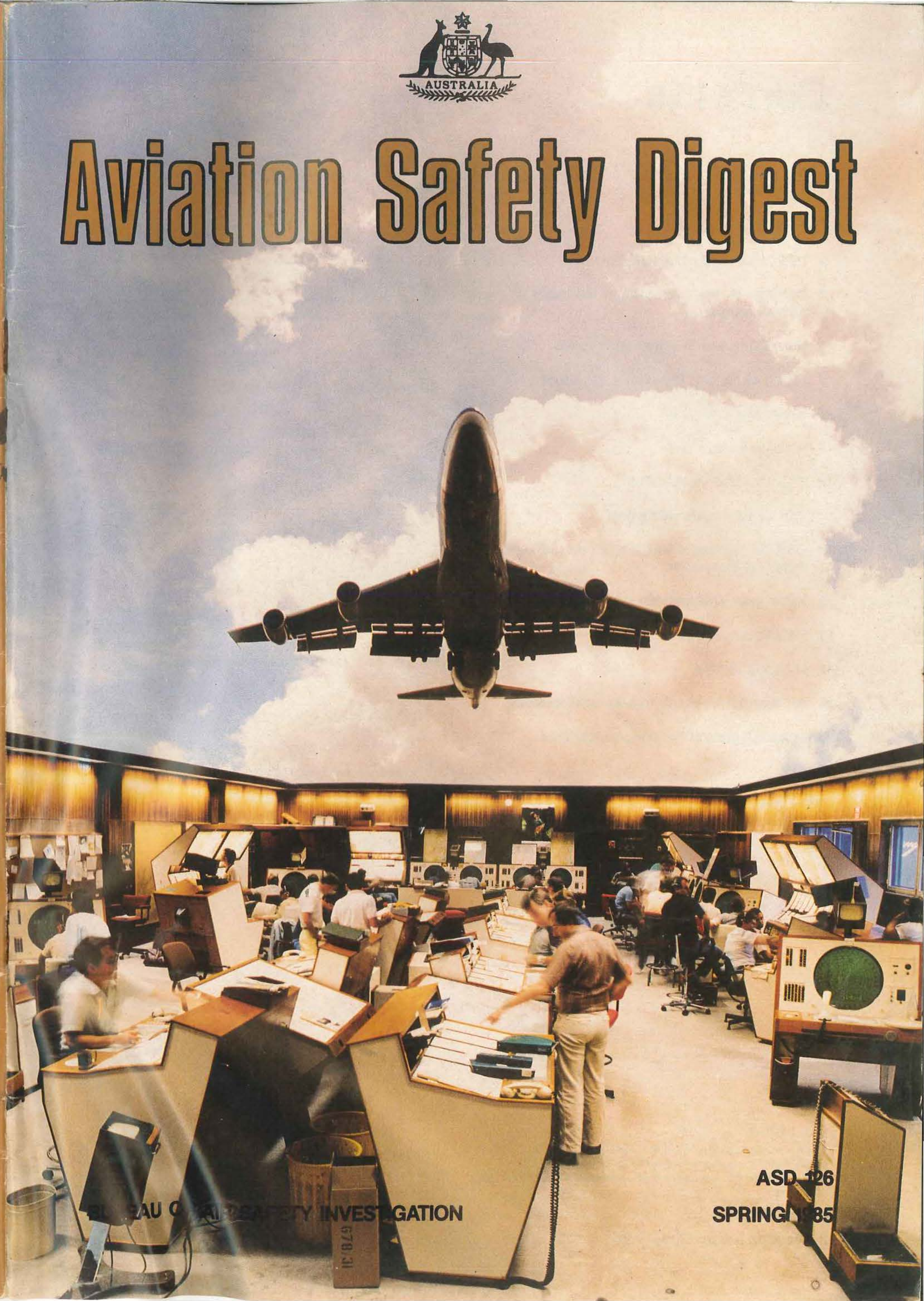
Aviation Safety Digest



BUREAU OF AIR SAFETY INVESTIGATION

ASD 126

SPRING 1985

Contents

Aviation Safety Digest is prepared by the Bureau of Air Safety Investigation in pursuance of Regulation 283 of the Air Navigation Regulations and is published by the Australian Government Publishing Service. It is distributed free of charge to Australian licence holders (except student pilots), registered aircraft owners and certain other persons and organisations having an operational interest in Australian civil aviation.

Unless otherwise noted, articles in the publication are based on Australian accidents or incidents.

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The Publications Distribution Officer
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P.O. Box 1839Q, Melbourne, Vic. 3001

Aviation Safety Digest is also available on subscription from the Australian Government Publishing Service. Inquiries and notifications of change of address should be directed to:

Mail Order Sales
Australian Government Publishing Service
G.P.O. Box 84, Canberra, A.C.T. 2601

Subscriptions may also be lodged at AGPS Bookshops in the capital cities.

Reader contributions and correspondence on articles should be addressed to:

The Director
Bureau of Air Safety Investigation
P.O. Box 367
Canberra City, A.C.T. 2601

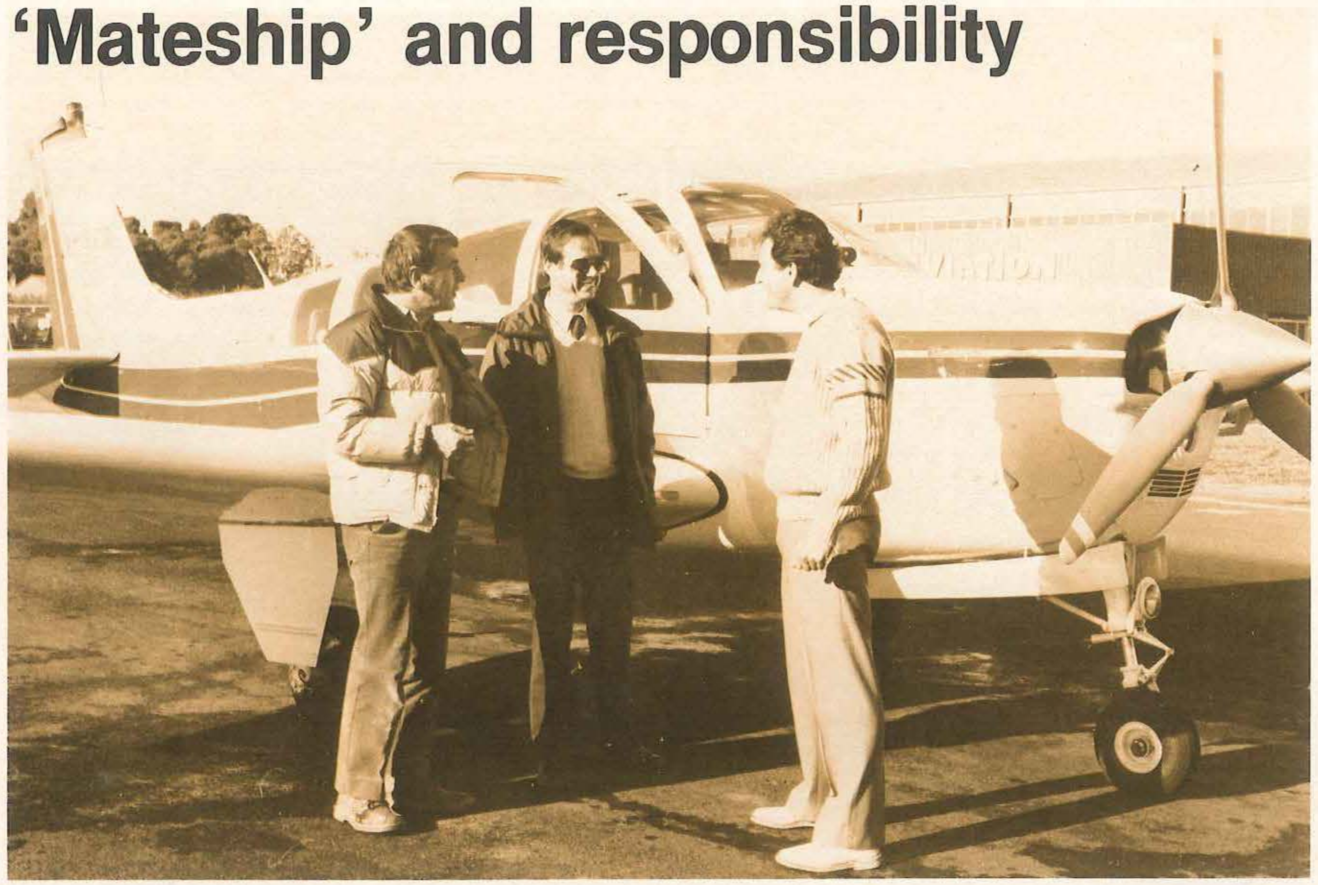
ISSN 0045-1207
R84/403(1) Cat. No. 85 1045 X

Printed by Finepress Offset Printing Pty Ltd
49 Railway St, Yennora, N.S.W. 2161

Front cover

The cover features a highly commended entry in the Digest's recent photographic competition. Submitted by Mr Han van Loon of Canberra, it depicts the relationship between aircrews and air traffic controllers.

'Mateship' and responsibility



One of the best-publicised characteristics of Australian social relationships is that of 'mateship'. Among the elements which seem to make up mateship are admirable qualities such as friendship, loyalty, dependability and so on. Central to this ethos is the notion of 'sticking by your mates'. However, the findings of aircraft accident investigations sometimes indicate that apparently mistaken notions of mateship may place lives and property at risk. Where such mistaken notions exist, the question which must always be answered is: are we really doing a mate a favour by concealing his potentially fatal behaviour, both from him and those in a position to do something about that behaviour? Perhaps nowhere does this question have more relevance than in aviation. Consider the following occurrence.

'Heavy landing'

A Chief Flying Instructor of an aero club was notified that one of his aircraft had been damaged in a heavy landing. At the time of the occurrence it was being flown by a PPL holder, who was training for his CPL; while two other CPL trainees were in the aircraft as passengers.

Following an inspection of the aircraft the CFI held some doubts about the report submitted by the pilot-in-command so he requested an official investigation into the occurrence. He also continued to make enquiries himself.

Inspection of the aircraft showed that damage consisted of slightly bent propeller tips, cracks and sheared rivets in the nose wheel doors, a damaged lower wing-root cover, slight damage to the engine cowling caused by contact with the flywheel, and a number of spinner attachment bolts either loose or missing.

It was considered that most of this damage could have been caused by a heavy landing. This assessment did not, however, apply to the missing or loose spinner bolts, which, it was considered, could only have vibrated loose over a period of time, i.e., it seemed that the aircraft must have been flown for some period after the initial impact which loosened the bolts. Yet according to the pilot this was not the case.

After the inspection it was not at first possible to contact the pilot to check the facts. In the interim, the two passengers were telephoned and they both supported the pilot's original statement.

Later, however, after further discussion, the passengers recounted a different sequence of events.

Water impact

The pilot had arranged to take the two passengers on an area familiarisation flight. After some general flying over land, the aircraft was descended towards a nearby dam. Weather conditions were fine: the surface of the water was glassy, there were no ripples and the surrounding trees could be seen reflected in the water.

The aircraft passed over the dam wall at about 50-100 feet AGL, still descending, and eventually levelled out over the water at about 10 feet. It passed under a set of power lines which were marked with large, coloured discs.

One of the passengers later said that he had the impression that the pilot may have been testing them to see how low he could go before they became scared.

The pilot told the passengers that he had 'trimmed the aircraft nose-up to prevent the nose from dropping should he let the controls go'. One of the passengers asked if the operation was safe, to which the pilot replied that everything was under control and that he had done this sort of flying before.

After about 2 minutes flight at 10 feet above the dam, the aircraft suddenly struck the water. The windscreen was covered with spray and the engine surged.

Fortunately for its occupants the aircraft 'ricocheted' back into the air; the pilot was able to regain control and fly away. A climb to 3000 feet was made and general handling checks carried out.

The pilot then advised his passengers that they would land to inspect the aircraft, not at the aero club's aerodrome, but instead at a nearby ALA. Apparently the landing there was very smooth but, after looking at the damage caused by the water impact, the pilot told the others that he would explain to the aero club that it had been caused by a heavy landing at the ALA. His passengers agreed to support this story.

After the investigation started, the pilot eventually came forward and confirmed that there had been no heavy landing, and that in fact the aircraft had impacted the waters of the dam during illegal low flying.

Discussion

Before addressing the 'mateship' aspects arising from this event, it is first worth noting that the pilot had been briefed previously on the difficulties associated with judging height over calm water, while he had also been counselled by his supervisors in relation to another incidence of illegal low flying in the same area.

Turning to the thrust of this article, it is essential here to get completely away from the misguided — albeit well meaning — notions of 'dobbing in' one's mate.

The plain fact in this occurrence is that it was sheer good fortune that the three occupants of the aircraft were not killed. All of those associated with the accident had an obligation — to themselves, to anyone who might fly in similar circumstances, and to the pilot concerned — to try to prevent a repetition which might not end so fortuitously.

Rather than doing the pilot a favour by initially helping him conceal the truth, his passengers were doing him a great disservice. How would the passengers have felt if, through a repetition of this occurrence, the pilot had killed himself, and perhaps others. Worse still, how would they have felt if the pilot had killed other passengers and survived himself?

Surely the notion of not 'dobbing in one's mate' involves *protecting* your mates. Given the nature of the occurrence described in this article, the best way to protect the pilot and any subsequent passengers would have been to do everything possible to ensure that this pilot never repeated such a stunt again.

There is no question of 'dobbing' or protecting one's mates, but there is unarguably one of safety, defined here in terms of *prevention* and *responsibility* ●

Carriage of liquid nitrogen in the cabin of small aircraft freighters

This photograph of a Lear 35 at Tennant Creek is by courtesy of Mr Brenton Hollitt of Adelaide.

In a recent incident involving a Lear 35 aircraft the cabin filled with fog following venting of nitrogen from a container of liquid nitrogen being carried as cargo. The pilot returned to the departure aerodrome where the container was off-loaded.

The consignment had been properly prepared and handled as dangerous goods in accordance with the requirements of ANO 33.

The release of gas from containers of deeply refrigerated liquefied (non-toxic) gases is normal. The containers are either continuously vented or protected against pressure build-up by a pressure release valve.

The venting of the very cold gas will often form visible condensation in the atmosphere around the container and may impair visibility in the cabin of a small aircraft.

The problem may be rectified by increasing cabin temperature; however, if the pilot cannot positively attribute the cause to the foregoing phenomenon he should take appropriate emergency action.

Wherever possible, deeply refrigerated liquefied gases should be carried in cargo holds where fog formation is of no consequence ●

Ultra-lights and low-level turbulence

Photograph courtesy of Mr David Belton, Thruster Aircraft (Aust.) Pty Ltd, Sydney.

An article entitled 'Ultra-lights aren't easy' which appeared in *Aviation Safety Digest* No. 124 pointed out that the handling characteristics of ultra-light aircraft can vary significantly from those of GA aircraft. Factors mentioned included the following:

- ultra-lights tend to have a narrower performance envelope;
- they have far less power to weight and far more drag;
- because they have less inertia than GA aircraft, when the throttle is closed or the engine stopped, they lose airspeed more quickly; and
- as they fly at much lower speeds, they are far more susceptible to the effects of wind and terrain.

The latter factor appears to have played a part in a fatal accident involving a Pterodactyl.

The accident

A series of demonstration flights had been arranged by the aircraft's owner. The weather was clear and sunny, although, while the wind was generally calm, gusts of 5 knots were blowing from widely varying directions. Thermal activity was also believed to have been affecting the operating area. The pilot had about 200 hours on the Pterodactyl but was unfamiliar with flight in thermalling conditions.

Takeoff was commenced in a north-easterly direction and the ground roll was normal. However, when the aircraft had reached a height of about 10 feet it entered what appeared to be an involuntary turn to the left. The turn continued through about 90 degrees. At the same time the climb angle — which is normally about 20 degrees — became much steeper than normal: one witness said that as the aircraft was flying away from him, he could see the canard above the wing plan form. The engine was reported as sounding normal.

When the aircraft was at an estimated height of 100 feet its left wing dropped, it turned left through about 180 degrees, and its nose fell until it was in a near-vertical dive.

The Pterodactyl struck the ground in a 40 degree nose-down attitude. Witnesses reported that it appeared to be recovering from the dive as it impacted.

There was no evidence of mechanical failure or defect.

Initial investigation suggests that the aircraft encountered a strong thermal after takeoff, which induced the abnormal climb performance. The wing drop and auto-rotation probably occurred when the aircraft exited the thermal. There then was insufficient height for the pilot to recover from the near-vertical, post-stall dive.

Comment

Because ultra-lights operate at such slow speeds, the effects of wind and/or terrain — even a 5 knot gust or a single tree — can produce alarming control problems for the unwary. In this unfortunate accident it seems probable that the attitude and airspeed changes induced by a thermal caught the pilot unawares, eventually resulting in a dire situation from which he was unable to recover in time. *(continued on page 6)*

Flying Vyse, and the pilot's handbook

Aviation Safety Digest 125 contained an article titled 'Safe operation of light twins'. A reader has suggested that, while he found the article generally very informative and useful, it did not go far enough in its discussion on flying Vyse — the airspeed that will give the best single-engine rate-of-climb (or the slowest loss of altitude). His point was that for many light twins, Vyse can vary significantly with All Up Weight (AUW), and that simply to fly the blue radial speed on the airspeed indicator regardless of AUW may not produce the optimum performance. The point is a good one.

A review of a number of representative Pilot's Operating Handbooks (POH) is instructive in illustrating this matter.

Many pilots complete their initial twin endorsement on the Piper PA44 Seminole. The POH for the 180T model stipulates in Section 2 (Limitations) that the 'one engine inoperative best climb speed' is 88 KIAS; no qualifications are given. This is confirmed in Section 5 (Performance) in the one engine inoperative climb performance graph, where 88 KIAS is recommended regardless of AUW. For this aircraft, then, the manufacturer has determined that the operational simplicity of a single 'blue line' speed outweighs any minimal performance increase that varying Vyse might achieve.

Similar operational advice is given in the Beechcraft Baron 58/58A POH. Section 2 nominates a Vyse without any qualifications, and Section 5 advises that the one engine inoperative climb speed is 101 knots for all weights. Again, this represents the manufacturer's best assessment of operational performance, taking all variables into account.

Some aircraft, however, do derive significant performance benefits if the pilot flies a Vyse appropriate to AUW. The Cessna 310 is a good example.

Section 2 of the POH for the 310R defines a Vyse of 106 KIAS '. . . at sea level standard day conditions and 5500 pounds weight'. The POH is perhaps slightly ambiguous here, for while that definition implies that Vyse will vary, Section 2 also links Vyse to the blue radial marked on the airspeed indicator at 106 knots. Reference to Section 5 resolves any doubts. The rate-of-climb one engine inoperative data includes a table which stipulates that at sea level, Vyse should be varied from 98 knots at 4700 pounds AUW to 106 knots at 5500 pounds. This is a significant difference in airspeed, and it can give an important performance gain.

An even more graphic example is provided by the Cessna 402B, in which the Vyse range at sea level can vary 19 knots with AUW.

Summary

Vyse varies with weight for all multi-engine aeroplanes, being highest at the maximum take-off weight (MTOW) and lower for lower weights. For some light twins the range of Vyse is small and manufacturers may publish only the Vyse appropriate to the MTOW. It is this speed which is shown on the airspeed indicator at the blue radial.

The increase in performance which accompanies a reduction in aircraft weight greatly exceeds the penalty which results from flying at the blue radial speed rather than the correct Vyse. When flying at the blue radial speed the performance will never be less than the performance available at the MTOW.

Where the Pilot's Operating Handbook contains performance data on Vyse, your pre-flight planning should include a determination of Vyse appropriate to your take-off weight. In the event of an engine failure, you should maintain this predetermined Vyse rather than the blue radial speed. If only one value of Vyse is published in the POH for your aeroplane, maintain the blue radial speed ●

Ultra-lights and low-level turbulence *(continued).*

Not only do ultra-lights fly at comparatively low indicated airspeeds but, also, in many cases, a narrow band exists between cruise and stall speeds: something in the order of 20 knots is not uncommon. Given that stall speed effectively doubles in a 60-degree-bank level turn, pilots must exercise considerable caution when operating in gusty conditions in which airspeed fluctuations and uncommanded bank inputs are likely. Furthermore, any problems which arise in such conditions are likely to be compounded by the fact that ultra-lights operate at low altitudes.

Conclusion

There are two main causes of low-level turbulence:

- thermal movement of air, and
- mechanical disturbance of airflow.

A detailed article on low-level turbulence appeared in *Aviation Safety Digest* 109.

Regardless of his aircraft type - wide-bodied jet or homebuilt - a pilot needs to understand the causes of low-level turbulence and its possible effects. This knowledge is especially important for ultra-light pilots ●

Assessing a forecast

A Cherokee Six 300 took off from Birdsville in the early afternoon, en route for Alice Springs. The flight plan for the route had been submitted that morning at Broken Hill, using meteorological data issued there.

Initially the aircraft climbed VFR to its planned altitude of 6500 feet and then took up a heading of 282°M. Tracking was verified as accurate when the first reporting point selected by the pilot, Goonamillera Water Hole, was overflown some 36 miles outbound. A standard positon report was made, with the elapsed time to the next position at Geosurvey Hill amounting to 65 minutes.

About 30 minutes after passing Goonamillera Water Hole the pilot decided he would have to descend to maintain VMC. Accordingly the PA32 was descended to 3500 feet, which placed it below the cloud layer. At that altitude the pilot found visibility poor as the sun was creating a diffused glare through the clouds, while the terrain was darkened by the cloud cover. Map reading features on the Simpson Desert became difficult to discern, so the pilot decided to maintain heading on 282°M.

When the ETA for the next position report eventually arrived the pilot was disturbed by the fact that the terrain did not match that depicted on his chart.

Contact was made with Alice Springs Flight Service Unit and, after some discussion, the pilot advised that he was unsure of his position. An Uncertainty Phase was declared and actions taken by the FSU to assist the pilot with his navigation.

Some time later the PA32's ADF gave a steady bearing on Alice Springs NDB and the pilot was able to track to the aerodrome without further difficulty.

* * *

The relevant route Area Meteorological Forecast showed that there was a surface trough situated close to the Birdsville-Alice Springs track. At latitude 25° South — which lies roughly along the planned track — the wind direction was predicted to change through about 120 degrees at the 7000 foot altitude, depending on whether one's position was north or south of the trough.

The Cherokee pilot had completed his flight plan using the forecast 7000 foot wind velocity for south of 25 degrees South, 250/15. The groundspeed from this wind gave a total elapsed time interval to Alice Springs of 188 minutes.

However, once the aircraft was descended to 3500 feet it was affected by a markedly different wind velocity — 140/15 — than that on which the flight plan had been based. The pilot did not allow for this.

With a wind of 140/15 instead of 250/15, the aircraft's groundspeed would have increased from 108 knots to about 138 knots, and the elapsed time interval Birdsville-Alice Springs would have been shortened by about 36 minutes. This explained the navigational error which became apparent at ETA Geosurvey Hill.

Comment

Navigating for long periods over relatively featureless terrain can be a demanding exercise, invariably requiring meticulous preflight preparation. In these circumstances, attention to the weather must be even more thorough than usual. While weather forecasts obviously must be tempered by inflight observations, a sound understanding of the *total* meteorological situation — not just selected items from it — is essential.

Using this particular incident as an illustration, the presence of the trough near the planned route should have been a factor to be considered by the pilot when a change to his flight planned altitude became necessary. Thus, while it may be unrealistic — given his workload at the time — to expect the pilot to have referred back to the forecast while he was descending, an *awareness* of the *overall* weather conditions should have alerted him to the possible consequences for his flight planning of the surface trough.

As it was, during the descent the wind velocity affecting the PA32 changed from a headwind to a tailwind. Although this change had been forecast it was not used by the pilot and, when allied to the difficult visibility, it eventually caused him to become unsure of his position.

Finally, it should be said that the pilot did a good job in resolving his predicament by notifying the FSU of his problem and seeking assistance in time, i.e., while factors such as fuel and daylight remaining were still in his favour ●

23012 ADDNYM
AMD ARFOR 0300 TO 1700 AREA 85
BASED ON SITUATION FOR ADDN FIR AT 222300
MET SITUATION: SFC TROUGH NEAR JVS/WIS MOVING E AT 20 KTS. RIDGING EXTEND INTO S
AMD WIND 3000 14015 5000 N 25S 12020 S 25S 27015 7000 N 25S 13020
S 25S 25015 10000 28020 PS07 14000 28025 MS02 18500 27030 MS10

Reprinted here is a copy of the Amended Area Forecast for Area 85, based on the situation for the Darwin FIR at 222300, and valid from 0300Z to 1700. Note that the wind at 3000 feet is forecast as being 140/15, while at 7000 feet and North of 25° South it is 130/20, but South of 25° S (the wind used by the pilot in planning) it is 250/15.

A circling approach

Effecting the transition from instrument to visual flight can be a demanding exercise, involving as it does a sudden change of one's visual perceptions and the need for rapid re-orientation. These demands are likely to be most pronounced during conditions of reduced visibility and/or marginal weather. Regardless of the circumstances, changing from instrument to visual flight is a procedure which requires concentration, discipline and adherence to the clearly defined criteria.

In preparation for a charter flight planned for the following day, a CPL holder with a Class One Instrument Rating was ferrying a Beechcraft Duchess to the departure aerodrome. The pilot who was to carry out the actual charter flight was on board the Duchess as a passenger, but was assisting the pilot-in-command with radio transmissions.

Before taking off on this ferry flight — which took place at night — the pilot had been given an actual weather report for his destination which indicated that conditions were below minima. This information was confirmed by a report that preceding traffic had been unable to land at the aerodrome following NDB approaches, and had diverted. The cloud base was reported to be 500 feet AGL, about 500 feet below the NDB minimum.

On arrival an NDB letdown was carried out from which, according to the pilot, he became visual right on the minimum altitude of 3100 feet.

Transitioning to visual flight, the pilot joined crosswind for his selected runway and descended to 2700 feet (aerodrome elevation was close to 2100 feet). On downwind he lowered the undercarriage and airspeed decreased to about 100 knots. He then found that he had to turn slightly to his left to avoid some cloud: this in turn put him too close to the runway so he continually had to look over his left shoulder to keep the runway in sight.

A base turn was commenced and 15 degrees of flap selected. It seems that at this stage the pilot was experiencing considerable difficulty in retaining visual contact with the runway, for he later stated that during the base turn he was not sure what the airspeed was or whether the Duchess was descending.

Eventually accepting that his attempted approach was not complying with the criteria — indeed he later stated that he lost sight of the runway completely — the pilot decided to make a missed approach. He applied full power, raised the aircraft's nose and retracted its landing gear and flap.

While the gear was still retracting the aircraft struck power lines and then a roadway, and came to rest upright in a built-up area after a ground slide of 82 metres.

When investigators examined the accident site, it was found that the aircraft was actually *below the level of the aerodrome* when it impacted the power lines — it was little wonder, then, that the pilot had been unable to see the runway lights.

Analysis

Relevant factors identified during the investigation included the following:

- poor weather;
- pilot continued with the circuit in unsuitable weather conditions;
- loss of visual contact with the runway;
- failure to carry out a missed approach when conditions clearly dictated the need to do so;
- descent below a safe height.

Discussion

The standards and procedures for the kind of approach attempted by the Duchess pilot are listed in the Instrument Approach and Landing Charts section of AIP. Obviously instrument-rated pilots must know all of them thoroughly and adhere to their detail. Several of the more salient points are the need to:

- establish visual reference within the prescribed circling area at an altitude not below the minimum altitude and by reference to the specified aid or aids;
- maintain visual reference; and
- achieve an obstacle clearance of at least 400 feet by day and 600 feet by night until the aircraft is aligned with the runway, strip or landing direction in use.

Conclusion

To reiterate, making the transition from instrument to visual flight demands a rapid change of orientation and perception. Strict adherence to established criteria and practices is essential during this procedure.

Perhaps attention should also be drawn to the lack of action, in the form of monitoring progress, from the passenger/pilot, who was more experienced than the pilot-in-command. Accepting that he was just a passenger, it nevertheless does not seem unreasonable to suggest that in view of his relative degree of experience and the difficult conditions, he might have closely monitored the approach, not so that he could interfere — this could be counterproductive and even dangerous — but rather to draw timely attention to any matters of concern. Apparently this was not done ●

Upper left: approximate flight path and power line impact.

Lower left: The runway threshold is 600 metres away in the direction the aircraft is pointing. The aircraft came to rest 15 degrees off the runway heading.

Unauthorised modification

Positive and specific procedures have been established in Australia for the incorporation of modifications into aircraft. On occasions it may seem tempting to bypass those procedures, when a proposed mod. seems relatively straightforward. There can, however, be many factors to consider which are not immediately apparent but which, if ignored, can create hazards. Unauthorised work carried out on a Piper PA 32 provided a case in point.

* * *

A PA32 arrived at a remote locality after a long flight. Several passengers disembarked and the pilot left shortly afterwards for another destination.

After the Cherokee had departed one of the disembarked passengers mentioned to a bystander that, in the course of the flight, a number of the passengers had developed headaches and the pilot had been sick several times. The bystander recognised those symptoms as possibly being attributable to carbon monoxide poisoning, and contacted the Bureau of Air Safety Investigation. An investigation was initiated.

Findings

During a subsequent flight test carrying an airworthiness surveyor with test equipment, excessive carbon monoxide was indeed detected in the aircraft's cabin: in some positions it exceeded the allowable level by a factor of five. The gas was found to be entering the cabin through the overhead duct assembly, which was connected to a louvre scoop — which had been fitted without approval — in the area where the air conditioning condensor unit should have been. This louvre scoop was drawing contaminated air into the aircraft from the fuselage under-surface. The end result of this unauthorised modification was, in the words of the safety investigators, 'a massive carbon monoxide leak into the cockpit of the aircraft'. To make matters worse, the poisonous gas was entering the aircraft through vent outlets located near the crews' and passengers' heads.

Conclusion

This incident graphically illustrates the potential danger of unauthorised modifications. One of the big traps is that seemingly harmless changes to an aircraft's configuration can in fact have insidious and far-reaching consequences. Part of the rationale for the formal modification process is to give specialists the opportunity to consider thoroughly *all* of the possible effects for the safe flight operations of a proposed mod.

Finally, concerning inflight procedures, the action of the pilot in immediately flying another trip after most of those on board had been sick for no apparent reason must be questioned ●

In brief

It has been suggested that pilots working under pressure may misuse some types of navigation plotters. For example, the IPR-13 ICAO Plotter, which is made from clear plastic and is used on both sides, has a scale for measuring 1:250 000, 1:500 000 and 1:1 000 000 navigation charts on one side in nautical miles; and the same provision for measuring distances in kilometres on the other side.

Because the instructions for using the plotter are presented on the 'kilometres' side, the possibility exists that a pilot who was not as familiar with the plotter as he should be, and under a high workload, might refer to those instructions and then forget to turn the plotter over before making a distance measurement: i.e., he would measure in kilometres instead of nautical miles.

Familiarity with your equipment, and a quick mental double-check of all calculations are the best safeguards against such possible pitfalls.

* * *

An item in the *Canada Aviation Safety Letter* illustrated the dangers of inadequate maintenance on pilot's seats:

A Cessna 206 was making its first flight after maintenance. With 20 degrees of flap selected, the pilot rotated at about 50 knots. Just after liftoff his seat slipped backwards, leaving him beyond the reach of the rudder pedals. As he struggled to keep control the aircraft climbed to 100 feet, veered left and, with full power on, struck the ground.

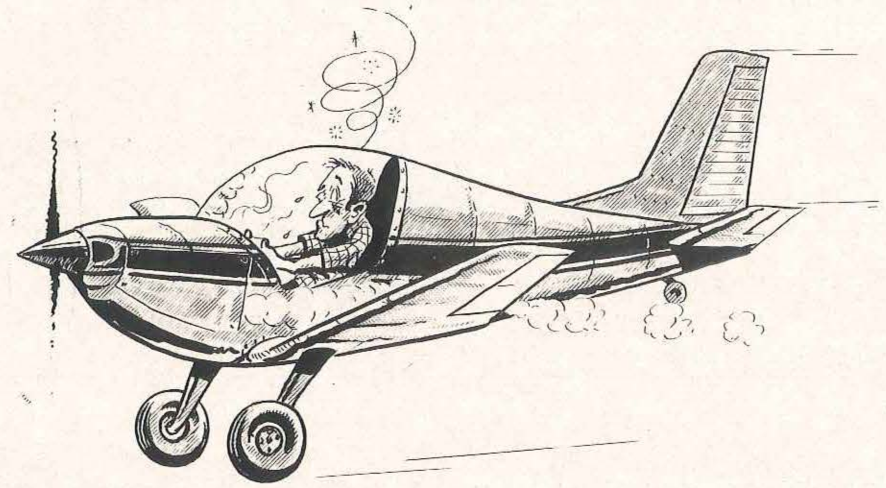
Examination of the seat assembly showed that all four rollers were extremely worn and should have been replaced prior to the accident. The seat rail guides were also worn and slightly expanded. This allowed the seat to move, even though it was locked in by an adjustment pin. (This particular model had only one adjustment pin, while some models have two.) The combination of worn seat rollers with acceleration forces in the nose-up rotation attitude allowed the seat back-top to move rearward, lifted the two front rollers off the seat rail, and pulled the adjustment pin out of the locking hole, allowing the seat to slide rearward.

It is a good idea to have a look at the condition of the seat assembly during your walkaround.

Also, if possible, lock the seat in the desired setting for flight and check the position of the pins visually.

A well-maintained seat assembly and properly locked pins will go a long way towards ensuring that you and your aircraft leave the ground simultaneously ●

Carbon monoxide poisoning



Carbon monoxide is the product of the incomplete combustion of carbonaceous material. It is found in varying amounts in the smoke and fumes from burning aircraft engine fuels and lubricants. The gas itself is colourless, odourless, and tasteless but is usually mixed with other gases and fumes which can be detected by sight or smell. It is lighter than air and so tends to be around the heads of persons in confined spaces such as light aircraft cockpits.

When carbon monoxide is breathed it combines with haemoglobin, the oxygen-carrying agent of the blood. The affinity of haemoglobin for carbon monoxide is over 250 times greater than for oxygen. The product of carbon monoxide and haemoglobin, carboxyhaemoglobin, has a two-fold effect. First, it reduces the oxygen-carrying capacity of the blood and, second, it reduces the process by which oxygen is transferred from the blood to body tissues. Not only is the oxygen carriage diminished but also the reduced amount of oxygen cannot be fully utilised. The first organ to be affected by the shortage of oxygen is, as in hypoxia, the brain. A person's ability to perceive, store and process information and then make decisions is impaired. Exposure to small amounts of carbon monoxide over a period of hours will reduce performance and is as dangerous as a short exposure to a high concentration of carbon monoxide. Carboxyhaemoglobin slowly reverts to haemoglobin on breathing fresh air free of carbon monoxide but it may take 2-5 hours to reduce the carbon haemoglobin level by half (half life).

The effects of carbon monoxide poisoning increase with altitude. As altitude increases, air pressure decreases and the body has difficulty getting enough oxygen; add carbon monoxide which further deprives the body of oxygen, and the situation can become critical. Inhalation of tobacco smoke also introduces carbon monoxide into the body in significant quantities. It has been suggested that the smoking of one cigarette at night at sea level has the same effect on night vision as being at 4000 ft breathing air. There is a noticeable reduction in night visual acuity and the inference is surely obvious.

Many light aircraft cabins are warmed by air that has been circulated around the engine exhaust pipes. A defect in the exhaust pipes or cabin heating system may allow carbon monoxide to enter the cockpit or cabin. The danger is greatest during the winter months when the temperature is such that use of the cabin heating system becomes necessary and windows and vents are closed. But there is danger at other times too, for carbon monoxide may enter the cabin through openings in the firewall and around fairings in the area of the exhaust system.

Symptoms

Early symptoms of carbon monoxide poisoning are feelings of sluggishness, being too warm, and tightness across the forehead. The early symptoms may be followed by more intense feelings such as headache, throbbing or pressure in the temples and ringing in the ears. These in turn may be followed by severe headache, general weakness, dizziness and gradual dimming of vision. Large accumulations of carbon monoxide in the body result in loss of muscular power, vomiting, convulsions and coma. Finally, there is a gradual weakening of the pulse, a slowing of the respiratory rate, and then death.

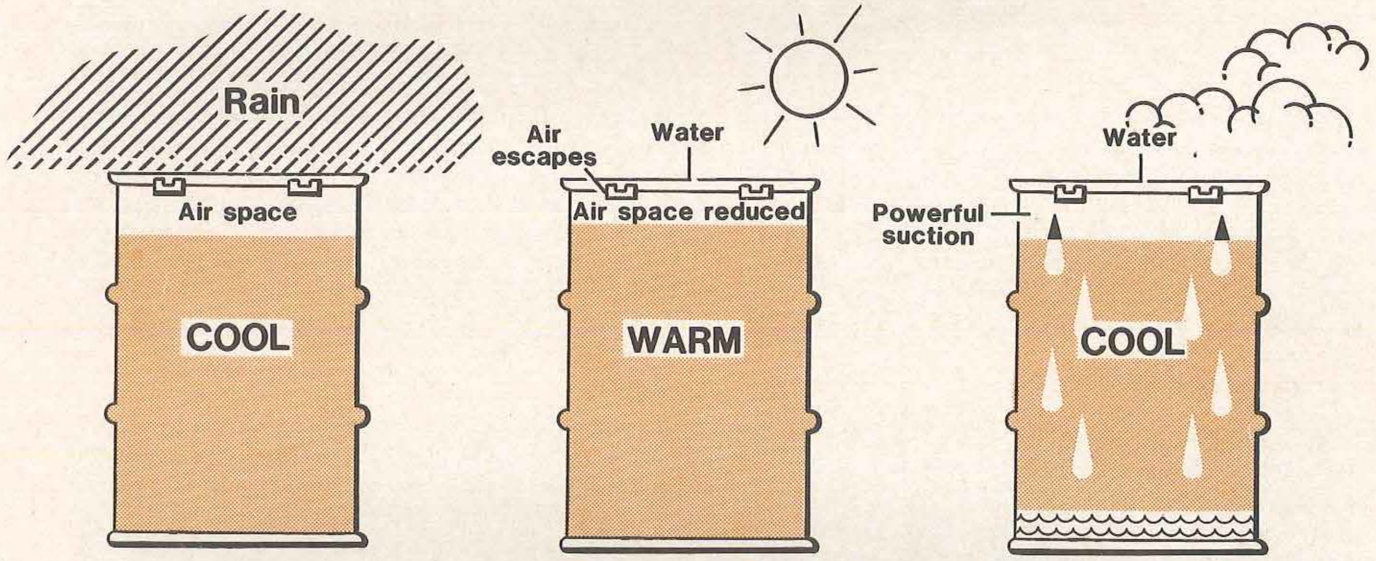
What to do about exhaust odours and symptoms

If you smell exhaust odours or begin to feel any of the symptoms previously mentioned, you should immediately assume carbon monoxide is present and take the following precautions:

- Immediately shut off the cabin air heater and close any other opening that might convey the engine compartment air to the cabin.
- Open a fresh air source immediately.
- Avoid smoking.
- Inhale 100 per cent oxygen if available.
- If you are flying, land at the first opportunity and ensure that any effects from carbon monoxide are gone before further flight.
- Determine that carbon monoxide is not being allowed to enter the cabin because of a defective exhaust, unsealed opening between engine compartment and cabin, or any other factor. It may be wise to consult a LAME on this matter, as the source of any leak may not be evident to a pilot ●

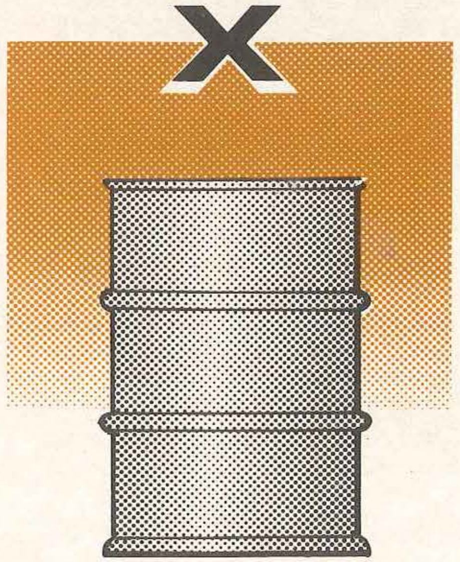
Outside storage of fuel & oil drums-
Stop Water Contamination

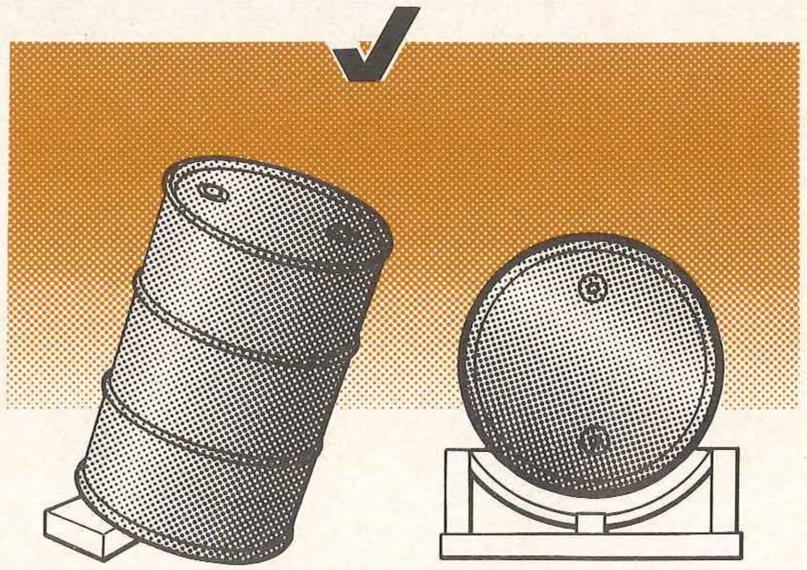
If you must store fuel and oil drums outside, do not store them upright. Even though the bungs are drawn tightly enough to prevent fluid leakage, they still are not airtight. Rainwater that collects inside the rim of drums stored vertically on end can be sucked past the bung into the drum when cooler temperatures cause contraction of the internal air and fluid. This water now contaminates the fluid and also may, in time, form rust under the drum lid which can flake off and add a particulate contamination problem.



When delivered | Heating causes expansion and escape of air | When cooled, water is sucked past bungs

To prevent this situation store drums so that rainwater cannot collect and cover the bungs.





Aircraft accident reports

SECOND QUARTER 1985

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	N = Nil
F = Fatal	S = Serious	M = Minor	

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*

12 Apr 1624 — Piper 31-350 VH-AOX — Pt. Macquarie — Supplementary Airlines — Pt. Macquarie NSW/Coffs Harbour NSW — C1S,P6S,1M,1N — 8521024

Just after lift-off, the pilot reported that the aircraft experienced a loss of power. As there was insufficient runway remaining to land, the pilot raised the gear and flap but the aircraft did not continue to climb. The pilot decided to land the aircraft straight ahead off the end of the runway. During the landing the rear fuselage impacted a dirt bank and the aircraft ran through a fence before coming to rest.

12 Apr 1715 — Piper 25-235 VH-PTX — Mareeba Qld 1E — Aerial Agriculture — Atherton Qld/Atherton Qld — C1N — 8511017

During the pull up at the end of a downwind spray run, the right wing struck a tree. The aircraft was landed without further damage at a nearby aerodrome.

14 Apr 1005 — Cessna 404 VH-LAD — Moomba SA 65NW — Charter – passenger operations — Adelaide SA/Lake Coonamooranie — C1N,P8N — 8541008

During the landing roll the aircraft suddenly veered to the left. The pilot took corrective action but the nose gear collapsed and the nose section of the aircraft struck the strip surface.

16 Apr 1530 — Hughes 269C VH-PHK — Mt Hope Qld — Non commercial – aerial application/survey — Mount Hope Qld/Scartwater Stn. Qld — C1N,P1N — 8511018

The pilot reported that just after lift off the engine seemed to lose power. She manoeuvred the helicopter to a suitable landing area, but during the landing the main rotor blades struck a sapling. The helicopter was then repositioned to another landing site where the engine was shutdown and the damage to the main rotors noticed.

02 May 1430 — Hughes 269C VH-RIK — Balbirini Stn. NT — Commercial – aerial mustering — No. 6 Bore Balbirini Stn./No. 6 Bore Balbirini Stn. — C1N,P1N — 8541010

The pilot was attempting to move a cow back into the mob. He brought the helicopter to a low hover close to the animal. The animal spun around, reared up and caught its horns on the helicopter skids. The helicopter pitched forward and struck the ground.

04 May 1745 — Cessna U206 VH-PQT — Meredith Vic — Sport parachuting (not associated with an airshow) — Meredith Vic/Meredith Vic — C1N — 8531015

The aircraft initially touched down about halfway along the strip, became airborne again, then touched down 50 metres before the end of the strip. The pilot applied power to go-around. However, after reassessing the situation, he closed the throttle and attempted to steer the aircraft through a gate. The nose wheel dug into the ground and the aircraft tilted forward onto the propeller and left wing. The propeller spinner struck the gate and the aircraft stopped.

07 May 1755 — Cessna 310N VH-KOM — Cudal NSW — Charter – cargo operations — Cudal NSW/Bankstown NSW — C1N — 8521028

On the two previous landings the pilot noticed a nose wheel shimmy during the landing roll. As his next stop was at his company's maintenance base, he advised the company of the problem. No nose wheel shimmy was noticed on landing, however, the aircraft was inspected by service personnel. During the subsequent take-off, a violent shimmy developed, the pilot abandoned the take-off as the nose leg strut fractured.

09 May 1605 — Beech D55 VH-KNE — Dalwallinu WA — Charter – passenger operations — Carnamah WA/Dalwallinu WA — C1N,P5N — 8551011

The aircraft was landed at the destination strip with the gear up.

13 May 1700 — Ayres SR2 VH-WBU — Mungindi NSW — Non commercial – aerial application/survey — Mungindi NSW/Mungindi NSW — C1F — 8521029

The flight was intended to provide familiarisation for the pilot on the aircraft type. After loading water into the hopper the pilot took off and carried out a series of turns before positioning for a spray run along one of the flight strips. At the end of the run the aircraft pulled up steeply and began banking to the right. It then appeared to enter a spin to the right and subsequently struck the ground in a steep nose-down attitude with little forward speed.

15 May 1335 — Piper 32-R300 VH-PNB — Babinda Qld 5W — Non commercial – business — Townsville Qld/Cairns Qld — C1F,P3F — 8511019

The pilot received a weather briefing before departing Townsville which indicated that the weather enroute was unsuitable for visual flight. After being issued with a clearance to enter Cairns control zone no further transmissions were received from the aircraft and it failed to arrive at Cairns. The wreckage of the aircraft was located in rain forest on the lower southern slopes of the south peak of the Bellenden Ker Range. The weather in the area at the time was reported as low cloud with heavy rain.

Date / *Time* — *Aircraft type & registration* / *Location* — *Kind of flying* / *Departure point/Destination* — *Injuries* / *Record Number*

18 May — Cessna 172F VH-DNV — Non commercial – pleasure — C1N,P3N
1505 — Curl Curl Beach — Richmond NSW/Richmond NSW — 8521031
The aircraft was cruising at 500 feet above some Sydney area beaches. Following an ATC instruction, the pilot applied full power in order to climb to 2000 feet. Shortly afterwards the engine lost all power and the pilot was committed to a forced landing in shallow water. Touchdown occurred about 5 metres from the shore-line and the aircraft came to rest inverted in the water.

20 May — Robinson R22 VH-ONE — Commercial – aerial mustering — C1N,P1N
1130 — Mt House Stn. 37NW — 33NW Mt House Stn. WA/33NW Mt House Stn. WA — 8551012
After the helicopter had been transitioned to forward flight, the pilot felt a vibration through both the collective and cyclic controls. During his attempts to stop the vibration, the helicopter was allowed to descend. As he then selected a climb attitude the helicopter yawed to the right. The pilot was unable to correct the yaw and the tail struck a tree which slowed the yawing and allowed the pilot to land the helicopter. Initial inspection revealed that the intermediate flexplate in the tail rotor drive system had disintegrated.

22 May — Piper 28-161 VH-IJK — Non commercial – pleasure — C1N
2015 — Goulburn NSW — Bankstown NSW/Goulburn NSW — 8521033
The pilot was conducting a night cross-country exercise to maintain his recent experience requirements. On final approach he realised that the aircraft was undershooting. Engine power was applied but the pilot then saw power lines ahead, too late to take any avoiding action. The aircraft struck the wires and subsequently impacted the ground 211 metres short of the threshold. The wires struck provided power for the airfield lighting, which was extinguished at the time of collision.

27 May — Bell 47-G5 VH-AEO — Commercial – aerial mustering — C1N,P1N
1030 — Normanton 140E — 148E Normanton Qld/148E Normanton Qld — 8511021
While flying at a slow forward speed approximately 15 feet above the trees, the helicopter suddenly yawed to the right. As the pilot was unable to correct the yaw he attempted to manoeuvre the helicopter to a clear area. The helicopter impacted the ground in a level attitude, heading rearward and rotating. Initial investigation has revealed that all the teeth were missing from the rear coupling of the forward short shaft.

29 May — Bell 47-G5 VH-SJY — Commercial – aerial mustering — C1F,C1S
0930 — Ivanhoe WA — Ivanhoe Station WA/Ivanhoe Station WA — 8551013
The helicopter was being flown at about 50 feet agl, when one main rotor blade grip failed. The main rotor blade separated from the helicopter and the resulting imbalance caused the other main rotor blade and transmission to be torn from the helicopter. The fuselage then fell to the ground, landing on its right side.

30 May — Cessna 182H VH-PLF — Instructional – solo (supervised) — C1N
1030 — Roma Qld — Dalby Qld/Roma Qld — 8511022
The pilot reported that he had made a good approach, but had flared high. The aircraft landed heavily on the mainwheels then nosewheel. Buckling of the firewall and undersurface of the fuselage was discovered after the aircraft had been shut down in the parking area.

03 Jun — Conaero LA4-200 VH-AWY — Charter – passenger operations — C1N,P2N
1711 — Shute Harbour Qld — Hayman Island Qld/Shute Harbour Qld — 8511023
During the landing roll the aircraft began to swing to the right. The pilot attempted unsuccessfully to correct the swing by applying left brake and rudder. Because of the likelihood of striking a parked aircraft he then induced a ground loop to the right and the aircraft was brought to a stop. An inspection of the aircraft revealed that the right maingear had unlocked and the aircraft had settled on the right float.

07 Jun — Cessna 210-N VH-RSD — Non commercial – pleasure — C1F,P5F
1031 — Bankstown NSW — Bankstown NSW/Bourke NSW — 8521035
Prior to taxying the pilot had checked the all-up-weight of the aircraft and had performed a thorough pre-flight inspection. The take-off and initial climb appeared to be normal, however when the aircraft had reached a height of about 200 feet there was evidently a loss of performance and no further height was gained. In response to queries from ATC the pilot indicated that he was returning for landing. During the turn towards the aerodrome, control of the aircraft was lost. The left wing dropped sharply and the aircraft entered a near vertical descent, subsequently colliding with a large tree before impacting the ground. A fierce fire broke out and consumed the wreckage.

09 Jun — Grumman 164A VH-CCT — Aerial agriculture — C1N
1300 — Gayndah Qld 30NW — Gurgeena Plateau Qld/Gurgeena Plateau Qld — 8511024
On the pull-up at the end of the first spray run in that particular direction, the aircraft struck a single wire power line. The pilot immediately landed the aircraft in a clear area. During the landing roll the right wheel struck a large rock, which was concealed in long grass, and the right main gear was torn off. The aircraft pitched forward onto the engine and came to rest in a near vertical attitude.

09 Jun — Piper 28-140 VH-MAM — Air show/air racing/air trials — C1N,P1N
1411 — Wedderburn NSW — Wedderburn NSW/Wedderburn NSW — 8521036
As part of a club competition, the pilot was required to carry out a practice forced landing on the strip. On the downwind leg the height of the aircraft was lower than desired and the pilot adjusted his tracking in order to converge with the strip. A continuous turn from downwind to final was attempted, during which the left wing suddenly dropped and the rate of descent increased. The pilot was able to regain partial control but the aircraft struck the ground heavily and ran off the side of the strip, colliding with rocks and scrub.

13 Jun — De Hav DHC2 VH-IME — Aerial agriculture — C1N
1600 — Dorrigo NSW 17W — Deer Vale NSW/Deer Vale NSW — 8521038
The pilot reported that shortly after take-off the elevator control jammed. He then noted that the horn end of the left elevator was hanging about eight centimetres below the horizontal stabiliser. The load was jettisoned as the pilot prepared to land but increasing difficulty was experienced in keeping the aircraft nose up. On short final approach the elevator separated from the aircraft and despite the lack of elevator control the aircraft was landed without further damage.

14 Jun — Piper PA30 VH-UOY — Instructional – dual — C2N
1150 — Armidale NSW — Armidale NSW/Armidale NSW — 8521037
The aircraft entered the circuit in preparation for a practice single engine landing. The gear was selected down, however neither pilot checked that the gear-down light illuminated. The aircraft was landed with the gear retracted and the pilots reported that they then noticed that the gear motor circuit breaker had popped.

19 Jun — Piper 32-300 VH-WSZ — Non commercial – pleasure — C1N,P1M,P6N
1053 — American Rvr. Sth. — Adelaide SA/American Rvr. Sth. — 8541011
The pilot established the aircraft on final approach at 80 knots with full flap selected. She allowed the airspeed to reduce to 70 knots as the aircraft crossed the boundary fence. The aircraft impacted the ground heavily, nosewheel first, from about 15 feet agl. The main landing-gear was dislodged and the nose-gear folded backwards.

19 Jun — Piper 38-112 VH-UAL — Instructional – solo (supervised) — C1N
1130 — Bankstown NSW — Bankstown NSW/Bankstown NSW — 8521039
On return from his third solo flight, the pilot was attempting to complete a 180 degree turn in a confined area between two hangars. He positioned the aircraft on the left extremity of the concrete apron prior to starting the right turn. The left outer wing section struck a vertical support for the hangar located adjacent to the apron.

Date / *Time* — *Aircraft type & registration* / *Location* — *Kind of flying* / *Departure point/Destination* — *Injuries* / *Record Number*

21 Jun — Piper 32-300 VH-MGQ — Charter – passenger operations — C1N,P6N
1422 — Mer Island Qld — Prince of Wales Is/Mer Island Qld — 8511026
When the aircraft became low on approach, the pilot applied power to correct the approach angle. However this resulted in a higher than recommended airspeed and touch down was not effected until 170 metres after the threshold. As insufficient runway remained for the aircraft to be brought to a stop, the pilot attempted to carry out a ground loop. The aircraft skidded sideways off the strip and down a steep incline before coming to rest against a tree.

21 Jun — Piper 38-112 VH-MHO — Instructional – solo (supervised) — C1N
1630 — Parafield SA — Parafield SA/Parafield SA — 8541012
The aircraft landed heavily and bounced. The pilot recovered the situation and made a smooth landing. He then taxied the aircraft to the parking area where the damage to the nosegear assembly, firewall and airframe was found.

22 Jun — Robinson R22 VH-HBL — Non commercial – aerial application/survey — C1S
1057 — St Paul's HS 9S — St Paul's HS Qld/St Paul's HS Qld — 8511027
After helping to herd cattle to a yard, the pilot turned the helicopter and accelerated away along a creek. The helicopter struck a powerline, which crossed the creek at right angles, and impacted the ground on its right side. One of the main rotor blades bounced backwards into the cabin and almost severed the pilot's right foot.

24 Jun — Conaero LA4-200 VH-EJX — Instructional –dual — C2N
0955 — Townsville Qld — Townsville Qld/Townsville Qld — 8511028
The student pilot was receiving instruction for an endorsement on the aircraft type. Following a touch and go landing, the instructor closed the throttle to simulate an engine failure. The subsequent landing was firm and the right wheel broke off. The aircraft ground looped through 180 degrees before coming to rest. Inspection of the gear leg revealed severe corrosion in the internal section of the leg.

27 Jun — Cessna 172N VH-WHK — Non commercial – business — C1N,P3N
0930 — Cape Keer-Weer — Cape Keer-Weer/Musgrave Station Qld — 8511029
The pilot stated that just after the aircraft became airborne it encountered a strong gust of wind. The left wing tip and nosewheel struck the ground and the aircraft overturned.

28 Jun — Smith 600 VH-IGV — Non commercial – business — C1N,P1N
0951 — Bankstown NSW — Cowra NSW/Bankstown NSW — 8521041
The landing gear was selected down during the downwind leg of the circuit, and the gear down lights were illuminated. The aircraft touched down normally, but as soon as the nosewheel contacted the runway, the gear warning horn sounded and the nose-gear retracted. The aircraft slid to a halt on the centre-line of the runway.

28 Jun — Bell 47-G5 VH-SJA — Commercial – aerial mustering — C1S,P1M
0700 — Burketown 100SW — Punjaub Station Qld/Punjaub Station Qld — 8511030
Just after take-off at about 30 feet agl a loud bang was heard and the helicopter started rotating rapidly. The pilot manoeuvred the helicopter clear of fuel drums but it landed heavily while moving rearward. Initial inspection of the helicopter revealed that the tail rotor drive forward short shaft had become disconnected after the failure of the top left longeron.

FINAL REPORTS (The investigation of the following accidents has been completed)

Date / *Time* / *Pilot Licence* — *Aircraft type & registration* / *Location* — *Age* — *Kind of flying* / *Departure point/Destination* / *Hours Total* — *Hours on Type* — *Rating* — *Injuries* / *Record* / *Number*

03 Apr — Stevens AKRO VH-KGZ — Non commercial – pleasure — C1N,O2N
1857 — Darwin NT — Delissaville NT/Darwin NT — 8541006
Private — 40 — 900 — Unknown — None
The aircraft was part of a four aircraft formation taking part in a photography session. On return to Darwin it was intended that the aircraft land one after the other on the same runway. The first aircraft landed and the pilot requested a clearance to turn off the runway onto a cross strip. A clearance was not available due to other traffic on that strip and the pilot was instructed to continue taxying along the runway. As the second aircraft commenced the flare for landing it collided with the aircraft already on the runway.

The flight had been poorly planned and the briefing conducted before departure was inadequate. The pilot flying the second aircraft to land was inexperienced on the aircraft type and had no formation flying experience.

03 Apr — Pitts S2A VH-KIT — Non commercial – pleasure — C1N,P1N,O1N
1857 — Darwin NT — Delissaville NT/Darwin NT — 8541006
Private — 23 — 101 — 5 — None
The aircraft was part of a four aircraft formation taking part in a photography session. On return to Darwin it was intended that the aircraft land one after the other on the same runway. The first aircraft landed and the pilot requested a clearance to turn off the runway onto a cross strip. A clearance was not available due to other traffic on that strip and the pilot was instructed to continue taxying along the runway. As the second aircraft commenced the flare for landing it collided with the aircraft already on the runway.

The flight had been poorly planned and the briefing conducted before departure was inadequate. The pilot flying the second aircraft to land was inexperienced on the aircraft type and had no formation flying experience.

05 Apr — Stod Ham Glasair SH2 VH-MVC — Non commercial – pleasure — C1N,P1N
0645 — Casino NSW — Coolangatta Qld/Dubbo NSW — 8521023
Private — 38 — 200 — 21 — None
The pilot decided to make an unscheduled landing at an aerodrome enroute to check a problem with the aircraft. On touchdown he noticed steel pickets on either side of the runway and reapplied power. During the go-around the left wing tip struck a picket, the aircraft yawed and then collided with other pickets, before the aircraft was brought to a stop.

The aerodrome had been closed for reconstruction work. White crosses were placed on the runway and adjacent to the windsock. The pilot had not advised Flight Service of his intended landing. The aircraft nose attitude on approach reduces forward visibility and the pilot did not see the white crosses on the runway. The aircraft yawed as power was applied for the overshoot.

Date Time Pilot Licence	Aircraft type & registration Location	Age	Kind of flying Departure point/Destination Hours Total	Hours on Type	Rating	Injuries Record Number
06 Apr 0758 Senior commercial	Cessna 172N VH-PVO Kemp NT	25	Aerial mapping/photography/survey Darwin NT/Kemp NT 1731	194	Instrument rating 1st class or class 1	C1M 8541007

The pilot had operated into the strip two weeks prior to the accident flight, and saw a powerline that had apparently been diverted underground, near one end. After checking with his passengers who were familiar with the area, a landing was made. On this flight a flatter approach was made and the nose leg snagged on the powerline causing the aircraft to impact the ground in a steep nose down attitude. The 10 metre high powerline had been diverted to cross the approach area, above ground, 274 metres from the threshold.

07 Apr 1240 Commercial – helicopter	Robinson R22 VH-FHK Pnt Lookout Qld	26	Non commercial – pleasure Pnt Lookout Qld/Pnt Lookout Qld 756	566	None	C1N,P1N 8511016

Because of obstructions around the intended landing area, the pilot carried out a downwind approach. As the pilot reduced the speed of the helicopter for landing it was caught by a sudden gust of wind. The helicopter sank, struck the ground and bounced before landing on the left skid which entered a depression in the ground resulting in the helicopter rolling over.

16 Apr 1300 Private	Cessna 172M VH-MAE Hoxton NSW	31	Non commercial – pleasure Hoxton NSW/Hoxton NSW 120	30	None	C1N,P3N 8521025

On final for runway 16 the pilot noticed another aircraft on departure using runway 34. The climbing aircraft turned right immediately to allow sufficient clearance for the landing aircraft to continue its approach; however, the pilot elected to go around instead. During the go around the aircraft mushed onto the flight strip, broke off its nosewheel, nosed over and came to rest inverted 30 metres from the initial impact point.

The aircraft entered the circuit without making inbound or circuit entry calls and because the wind was still directly across the strip, the pilot decided to use runway 16 which he had used for take-off. Two aircraft already in the circuit, but using runway 34, were not sighted until a head-on condition had developed with one of them. During the go around, with the speed at about 65 knots, the flaps were fully retracted. Prior to this departure, a dual check was completed as the pilot had not flown the Cessna 172 for 8 years.

18 Apr 1100 Senior commercial	Cessna R182 VH-SMV Maitland NSW	26	Non commercial – pleasure Maitland NSW/Maitland NSW 2700	100	Instrument rating 1st class or class 1	C1N 8521030

The pilot decided to carry out a circuit in order to check the performance of the engine. Because of the presence of a gusting 20 knot westerly wind, a higher than normal approach speed was flown. The pilot stated that he closed the throttle at about 50 feet agl and flared the aircraft. The subsequent landing was heavy, the aircraft bounced, the pilot moved the control column forward and the aircraft bounced a second time. On the third touch down the pilot reported that the tail struck the runway causing substantial damage to the tail area of the aircraft.

18 Apr 1500 Commercial	Cessna A188-A1 VH-KQA Seabird WA	43	Aerial agriculture Seabird WA/Seabird WA 5675	4000	Agricultural class 1	C1N 8551009

During the take-off run the left wheel locked. The aircraft ground looped to the left, the right gear leg collapsed and the nose section and right wing struck the ground.

During prior maintenance of the left wheel hub the inboard bearing had not been correctly reinstalled and it subsequently collapsed into the centre of the wheel assembly during the take-off run.

20 Apr 1343 Commercial	Piper 32-300 VH-MAR Darwin NT	19	Non commercial – pleasure Dum In Mirrie NT/Darwin NT 258	100	Instrument rating class 4	C1N,P5N 8541009

After landing, the aircraft was taxiied along a taxiway to the general aviation parking area. In preparation for a 90 degree turn in the taxiway the pilot moved the aircraft to the right of the taxiway. The nose wheel struck a steel gable marker, which was positioned 500 millimetres off to the right of the taxiway. As a result of the collision the nose gear collapsed.

The pilot was not concentrating sufficiently on the taxying of the aircraft, which was being operated at a high speed.

01 May 1720 Private	Beech 95-A55 VH-FDP Busselton WA	52	Non commercial – pleasure Bunbury WA/Busselton WA 2700	1100	None	C1N,P1N 8551010

During the circuit, the pilot and passenger were discussing fires near their property. The aircraft was subsequently landed with the gear up.

The gear and its warning systems were serviceable. The pilot's attention was diverted from the operation of the aircraft by the fires and the pre-landing checks were not correctly completed.

03 May 1640 Senior commercial	Piper 30 VH-TOD Hay NSW 24ENE	28	Charter – passenger operations Hay NSW/Griffith NSW 5500	350	Instrument rating 1st class or class 1	C1N 8521026

The pilot elected to conduct the flight at a very low height above the ground. The aircraft collided with power lines, which severed the top 10 centimetres of the rudder. Control of the aircraft was maintained and a safe landing was made at the intended destination.

06 May 1830 Private	Piper 34-200T VH-AOQ Kempsey NSW	41	Non commercial – business Bankstown NSW/Kempsey NSW 249	151	Instrument rating class 4	C1N,P3N 8521027

The pilot reported that the aircraft was flared normally for the night landing, but it dropped suddenly and struck the runway heavily. Damage was caused to the nose gear strut. The pilot, believing he was losing control of the aircraft, carried out a go-around. During the subsequent landing, the pilot was unable to steer the aircraft which veered to the left and struck a cone marker before being brought to a stop.

The aircraft had been observed to fly a close base leg followed by a steep final approach path. The pilot had misjudged the landing flare and during the subsequent heavy landing the nose gear strut was pushed upward through the aircraft nose, disloding the windscreen and disconnecting the nose wheel steering. Unknown to the pilot, the propellers also contacted the runway and the tips of all blades had been bent.

18 May 1305 Commerial	Beech D55 VH-ILM Brampton Island	42	Non commercial – pleasure Proserpine Qld/Brampton Island 13000	1200	Instrument rating 1st class or class 1 with instrument rating	C1N,P6N 8511020

After the pilot selected the gear down, he observed that the single gear position indicator light indicated that the gear was down. During the landing roll, as the aircraft slowed down, the left wing tip and left propeller contacted the strip. Subsequent inspection of the aircraft revealed that the left main gear was in the up position.

The left gear uplock bracket-block had recently been repaired but the forward hole had been drilled slightly off centre. This caused the bracket to tilt rearward and the block to slip off the uplock roller face and jam against the roller retaining bolt. When the gear was selected down the gear motor drove against the jammed uplock and bent the left retract rod. This allowed the motor to complete its extension cycle and indicate a gear down condition because the indicator switches are located on the activator housing and not at each gear leg.

Date Time Pilot Licence	Aircraft type & registration Location	Age	Kind of flying Departure point/Destination Hours Total	Hours on Type	Rating	Injuries Record Number
09 Jun 1230 Glider	Glasflugel Mosquito VH-GSZ Horsham Vic 36SSE	30	Non commercial – pleasure Dadswells Bridge Vic/Dadswells Bridge Vic 508	250	Glider	C1N 8531017

During ridge soaring operations, areas of sink were encountered and the aircraft descended over forested terrain. The only area suitable for an outlanding was a small deer enclosure. The pilot initially overshot the area and during the turn to re-position the aircraft for landing the right wing struck the fence surrounding the enclosure. The aircraft yawed through 90 degrees before impacting the ground in a level attitude.

Although general soaring conditions were poor, the pilot had elected to leave the ridge-line to conduct a sight seeing flight. During this flight a wind change moved through the area. On return to the ridge-line the pilot, who had not detected the wind change, persisted with efforts to find an area of lift. The proximity of the aircraft to the tops of the trees and the small size of the deer enclosure precluded the pilot sighting the clearing in time to conduct a straight-in approach.

27 Jun 0630 Commercial	De Hav C2 VH-AAY Walcha NSW 3NW	27	Activities associated with aerial agriculture Walcha NSW 3NW/Kanimbla Homestead 1200	300	Agricultural class 2	C1N 8521040

The aircraft had been parked in the open overnight. When the pilot arrived at the strip he noted that shallow fog had settled over the area. The temperature was below freezing point and frost covered the aircraft, except for the windscreen which had been protected by a cloth sheet. A pre-flight inspection was carried out, but did not include the removal of the frost from the aircraft. Because the fog had reduced visibility to about 50 metres, the pilot taxied the aircraft along the strip to check for obstructions. During this time the moisture froze on the windscreen, however by reaching from the cockpit the pilot was able to clear the left side of the screen.

Shortly afterwards the take-off was commenced and the lightly loaded aircraft became airborne after a ground run of about 250 metres. At this point all forward visibility was lost because of frost re-forming on the windscreen. The pilot noticed that the aircraft appeared to be banking to the left and he elected to land immediately. The left wingtip contacted the ground, followed by the main wheels. The aircraft ran off the side of the strip and collided with a fence, before coming to rest about 100 metres from the strip.

The pilot had had no disciplined instrument flying experience and had been unable to maintain effective control of the aircraft during the take-off with severely restricted visibility. The degradation in aircraft performance as a result of the frost covering the wings and tail surfaces could not be established.

FINAL UPDATES (The investigation of the following accidents has been completed. The information is additional to or replaces that previously printed in the preliminary report.)

Date Time	Aircraft type & registration Location	Age	Hours Total	Pilot Licence Hours on Type	Rating	Record Number
01 Apr 83 1430	Beech A36 VH-EUM Nundroo SA	29	198	Private 10	None	8341012

The pilot had previously discussed the strip with the station owner but had not ascertained its length. On overflying, the pilot assessed its length as 600 metres, and after checking the P-chart he calculated that 500 metres was needed for a landing. The pilot stated that he crossed the threshold at 65-70 knots with full flap selected. Ground marks indicated that the aircraft touched down 195 metres past the threshold. It then bounced twice before overrunning the strip, striking an earth mound and running through a depression.

The grass strip was measured as 408 metres long and was slippery from rain which had fallen the previous day.

09 Apr 83 1250	Beech 95-B55 VH-FDG Maitland NSW	30	571	Private 15	Instrument rating class 4	8321036

As the aircraft entered the circuit, the pilot selected the gear down. He stated that during the downwind leg of the circuit he completed the pre-landing checks, which included checking that the gear was down. Ground witnesses observed that the gear was down as the aircraft joined the circuit, but when the aircraft was on late final approach the gear was observed to be up.

Inspection of the aircraft revealed that the extension and electrical indication systems were serviceable, however, the mechanical indication system was unserviceable. It is probable that the pilot inadvertently retracted the gear during the pre-landing checks.

08 Oct 83 0941	Cessna 177RG VH-IRO Kingston (SE)70NW	46	504	Private 350	Instrument rating class 4	8341031

During cruise at about 1000 feet agl the engine began to run roughly and the pilot observed falling oil pressure indications. A severe engine vibration then developed and the pilot, after selecting a suitable forced landing area, shut down the engine. He delayed lowering the landing gear until he was satisfied that the selected area had a firm surface. The gear was selected down on very late final, but only the nose gear had time to become partially extended before touchdown.

Lack of sufficient tension of a nut securing a conrod bolt of Number 1 cylinder allowed the conrod bearing cap to loosen causing loss of oil pressure and subsequent engine failure.

05 Dec 83 1016	Cessna 501 VH-BNK Kalgoorlie WA 10NE	57	11000	Senior commercial 650	Instrument rating 1st class or class 1	8351029

The pilot returned to Essendon at about 1700 hrs ESuT on 4 December after having operated for some time in Tasmania. On his arrival he refuelled the aircraft and completed a flight plan for the flight to Adelaide and Kalgoorlie the following morning.

At about 0430 hours ESuT the next morning the pilot submitted the flight plan to Melbourne Briefing Office prior to obtaining a forecast of the upper winds for the route and terminal area forecasts for Adelaide and Kalgoorlie. To calculate the time intervals for the two legs of the proposed flight the pilot had assumed a headwind component of 50 Knots. However, the forecast given to the pilot indicated that the headwind component for the Essendon to Adelaide leg at the planned level, flight level 310, was about 90 knots, and for the Adelaide to Kalgoorlie leg at planned level, flight level 370, was about 100 knots. The flight plan also gave the fuel endurance of the aircraft as 200 minutes ex Essendon and 300 minutes ex Adelaide.

The aircraft subsequently departed Essendon and arrived in Adelaide after an apparently uneventful flight. The pilot left a note to instruct the aircraft refuellers to refuel the aircraft to full tanks and proceeded to the Adelaide Briefing Office. At the Briefing Office the pilot obtained updated weather forecasts which indicated that Kalgoorlie required an alternate. The pilot then advised the Briefing Officer that he would nominate Perth as the alternate. When he was told that the fuel endurance necessary to plan Perth as an alternate would be 302 minutes, the pilot changed the flight plan to indicate that the fuel endurance of the aircraft ex Adelaide was 320 minutes. At the flight levels planned a fuel endurance of 320 minutes could not be obtained. The pilot also decided to fly the leg at flight level 290 as the head winds at that level were less than at the higher level, although still almost twice the strength of the flight planned headwind.

When the pilot returned to the aircraft he found that it had not been refuelled as requested. He then assisted the refuellers to refuel the aircraft by adding the anti-icing agent to the fuel during the operation. Because of the delay the normal fuelling procedure was not carried out and as a result the fuel tanks were not filled to capacity.

About an hour after departing Adelaide the aircraft entered cloud and encountered icing conditions. The pilot switched on the engine anti-ice and the cruise was continued at flight level 290 for about 30 minutes before climbing to flight level 310, clear of cloud where anti-icing was turned off. Operating with engine anti-ice on increases the fuel consumption by 8 percent.

Date Time	Aircraft type & registration Location	Age	Hours Total	Pilot Licence Hours on Type	Rating	Record Number
05 Dec 83 1016	Cessna 501 VH-BNK Kalgoorlie WA 10NE	57	11000	Senior commercial 650	Instrument rating 1st class or class 1	8351029

Continued

As the aircraft approached the mid-point of the flight the pilot became concerned that he may not have sufficient fuel to continue the flight from Kalgoorlie to the alternate, Perth. He decided to continue the flight towards Kalgoorlie and if the alternate requirement was not lifted when he was at a point along track that was 30 minutes beyond Caiguna, he would return and land at Caiguna. Shortly afterwards the alternate requirement was lifted on Kalgoorlie.

When 185 kilometres east of Kalgoorlie the pilot commenced the descent and at flight level 250 the aircraft entered cloud and the engine anti-ice was again switched on. During the descent the fuel low level warning light illuminated and the left engine surged and flamed out at 10,000 feet. The pilot unsuccessfully attempted to restart the engine. As the aircraft broke clear of cloud at 1000 feet above ground level the right engine also flamed out. The pilot made a distress call and landed the aircraft, gear up, on a fire break. After touchdown the aircraft skidded 400 metres before coming to rest.

The examination of the aircraft found that during the landing the left fuel tank had been breached, however no evidence was found of any significant fuel spillage. Approximately five litres of fuel was recovered from each of the left and right fuel tanks. The engine fuel filters and fuel lines provided only a small amount of residual fuel. The inspection of the remainder of the aircraft did not reveal any defects that could have contributed to the accident.

Significant factors

1. The flight was inadequately planned, the aircraft had insufficient fuel capacity to complete the flight at planned levels.
2. The refuelling of the aircraft at Adelaide was rushed and as a result the tanks were not filled.
3. During the flight insufficient attention was given to fuel management.
4. The engines flamed out due to fuel exhaustion.

Date Time	Aircraft type & registration Location	Age	Hours Total	Pilot Licence Hours on Type	Rating	Record Number
05 Jan 84 1655	Blanik L13 VH-GIX Leeton NSW 6N	34	15	Glider 9	None	8421003

After reaching a height of about 200 feet agl on a winch launch, the glider was observed to enter a shallow dive. The drogue parachute was seen to inflate above the inboard section of the left wing and then trail behind the glider with the tow wire draped over the top of the wing. The glider entered a left turn which developed into a spiral dive. Partial recovery was effected but the aircraft impacted the ground in a nose-down attitude.

The pilot was relatively inexperienced and was performing his fourth solo winch launch. During the launch the aircraft exceeded the climb speed limit and the pilot attempted to signal this fact to the winch operator by the normal method, which involves lowering the nose of the aircraft prior to yawing it from side to side. However, the pitch change used was larger than normal, unloading the tow cable and resulting in a "back release". The length of cable between the attachment ring and the drogue parachute was considerably shorter than that recommended and increased the probability of an uncommanded release of the tow cable.

Date Time	Aircraft type & registration Location	Age	Hours Total	Pilot Licence Hours on Type	Rating	Record Number
24 Mar 84 1930	Piper 28-R201 VH-FSD Dubbo NSW 102SW	30	243	Private 128	Instrument rating class 4	8421015

While cruising at 6000 feet on a night VMC flight the pilot encountered a heavy rain shower. During an attempted 180 degree turn the aircraft entered a spiral dive and in the recovery from this dive the aircraft was evidently overstressed. After diverting to Parkes the pilot flew to his planned destination on the following day. The damage sustained by the wings was not detected until a subsequent daily inspection.

Date Time	Aircraft type & registration Location	Age	Hours Total	Pilot Licence Hours on Type	Rating	Record Number
13 May 84 1509	Beech 36 VH-TYZ Beaudesert 8SW	23	439	Commercial 65	Instrument rating class 4	8411023

Soon after settling in the cruise at 2000 feet, the pilot noticed that the fuel flow was lower than expected. He selected rich mixture but the fuel flow began to fluctuate markedly and the MAP reduced. A short time later the engine began to run roughly, accompanied by a rise in oil pressure and a further reduction in MAP. The pilot elected to return to the departure point. Engine power became inadequate for level flight and the pilot selected an emergency landing area. The aircraft came to rest after running through two barbed wire fences.

The engine failed due to long term lack of lubrication to several bearings caused by the rotation of two main bearing shells which covered oil supply galleries. The damage to the main bearing assemblies was such that the cause of bearing shell rotation could not be established.

Date Time	Aircraft type & registration Location	Age	Hours Total	Pilot Licence Hours on Type	Rating	Record Number
09 Jul 84 1553	Cessna R182 VH-UCN Borroloola NT 33SE	36	3985	Commercial 3	Instrument rating class 4	8441020

As the aircraft was climbing through 8000 feet the engine suffered a complete loss of power. After unsuccessfully attempting to restore engine power, the pilot selected a small clearing in which to land. During the landing attempt, the aircraft floated the 160 metre length of the clearing before colliding with trees.

A substantial amount of foreign matter and corrosion had accumulated in the carburettor float bowl, main strainer bowl and auxiliary fuel pump. Although the fuel filters were clean the corrosion was evidence that water had been held within the system for some considerable time. It is probable that during the climb some of the foreign matter blocked the carburettor main jet.

Date Time	Aircraft type & registration Location	Age	Hours Total	Pilot Licence Hours on Type	Rating	Record Number
17 Jul 84 1705	Mooney M20F VH-CGJ Narrabri NSW	29	2520	Commercial 113	Instrument rating 1st class or class 1 with instrument rating	8421032

The pilot was receiving a check flight as part of a biennial flight review. He was appropriately endorsed for retractable gear and constant speed propeller aircraft, but had not previously flown the Mooney type. After touchdown on the third of a series of touch-and-go landings the pilot inadvertently raised the landing gear instead of the flap. The aircraft slid to a halt on the runway.

Date Time	Aircraft type & registration Location	Age	Hours Total	Pilot Licence Hours on Type	Rating	Record Number
05 Aug 84 1543	Piper 25-235/A1 VH-BSB Woodbury Tas	38	360	Private 239	None	8431021

The student glider pilot had carried out three previous flights during the day. Her instructor had informed her that she was at a suitable stage of training to be introduced to practice emergency procedures. After sighting her training log book, the instructor for the final flight left the glider to speak to the pilot of the tug aircraft. The instructor returned to the glider and preparations for take-off were then continued.

Witnesses observed that the tug and glider became airborne and subsequently carried out normal turns to position the aircraft on a downwind leg at about 500 feet above ground level. The tug aircraft was then seen to waggle its wings sharply three times. Almost immediately this aircraft assumed a steep nose-down attitude, its tail apparently being pulled into a vertical position by the tow rope which was still attached to the glider. The glider then also assumed a steep nose-down attitude and both aircraft spun or spiralled towards the ground. The tow rope was released from both aircraft, but neither pilot regained control before impact with the ground.

The subsequent investigation did not disclose any defect or malfunction with either aircraft that might have contributed to the development of the accident.

During glider towing operations when the pilot of the tug waggles the aircraft wings it is a signal to the glider to immediately release from the tow. This "wave-off" signal would normally be given when the tug pilot detects some malfunction or when the glider is sufficiently far out of position behind the tug to affect the tug pilot's control of his aircraft.

On this occasion it was considered likely that the instructor in the glider had arranged for the tug pilot to simulate an emergency by giving a wave-off signal. However, there was no evidence to suggest that the student pilot had received a formal briefing on the actions and procedures required in the event of the emergency. The wave-off signal was observed to be given in the normal position relative to the strip for such training manoeuvres to be performed. The reason for the subsequent loss of control of both aircraft could not be determined, however it was evident that when the aircraft released the tow rope there was insufficient height remaining to permit recovery to normal flight.

Probable Significant Factors

There was insufficient evidence available to determine the precise cause of the accident. Nevertheless, the following were considered to be probable factors in the development of the occurrence.

1. The gliding instructor and the tug pilot arranged to give the student a practice emergency.
2. The student was inadequately briefed on the actions required for the emergency.
3. When the wave-off signal was given the glider did not immediately release from the tow.
4. Control of both aircraft was lost at too low a height to permit recovery.

Date Time	Aircraft type & registration Location	Age	Hours Total	Pilot Licence Hours on Type	Rating	Record Number
05 Aug 84 1543	Czech Blanik L13 VH-GGF Woodbury Tas	33	232	Glider 19	None	8431021

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Date Time	Aircraft type & registration Location	Age	Hours Total	Pilot Licence Hours on Type	Rating	Record Number
23 Aug 84 1835	Beech H18 VH-PDI Bankstown NSW	26	897	Commercial 23	Instrument rating 1st class or class 1	8421040

The aircraft returned to its departure aerodrome after suffering a complete electrical failure. Emergency extension of the gear was completed, but during the landing roll the nose leg retracted, which resulted in the nose and propellers striking the runway.

A written checklist was not used prior to departure and the generators were evidently not switched on. The electrical panel and the generator warning lights are obscured by the control column. Emergency gear and flap extension is achieved using the same winder which is placarded "Flaps-push handle in, Gear-pull handle out". Investigation revealed that although the flaps were in the fully down position the gear was only part of the way through its extension cycle.

Date Time	Aircraft type & registration Location	Age	Hours Total	Pilot Licence Hours on Type	Rating	Record Number
01 Sep 84 1505	Piper 25-235/A1 VH-MYE Korumburra 4SSE	28	226	Private 25	None	8431026

The pilot had been engaged in glider towing operations for about four months, and had completed 108 towing flights.

During the afternoon the pilot had carried out two aerotow flights without incident. On the accident flight a normal take-off and transit to the north side of Korumburra township was made. The glider was released at a height of 2000 feet above ground level and the tug aircraft then turned and tracked towards a right base leg position for the south west landing strip at Leongatha.

Not all of this flight was observed, but two witnesses noticed the aircraft descending in a spin to the right. It appeared to recover briefly, with the nose being raised above the level flight attitude, however a spin to the left then commenced. This spin continued until the aircraft disappeared from sight, but the wreckage distribution and impact marks indicated that the pilot had been able to stop the rotation in the last moments of flight. It was evident that insufficient height remained to effect a full recovery.

A detailed inspection of the wreckage did not disclose any defect or malfunction with the aircraft, its engine or systems that might have contributed to the development of the accident.

It was considered unlikely that the pilot had deliberately entered a spin on his return to the airfield. The aircraft type was not approved for spinning, and the spin characteristics of this particular two seat conversion are unknown. There was no evidence available to determine how or why the spin situation developed. It was apparent that the pilot had succeeded in partially recovering from the initial spin, however the recovery technique being employed did not prevent a spin in the opposite direction.

Date Time	Aircraft type & registration Location	Age	Hours Total	Pilot Licence Hours on Type	Rating	Record Number
04 Sep 84 1037	Piper PA38-112 VH-HAV Bankstown NSW	44	30	Student 30	None	8421045

Following a period of dual instruction the pilot was authorised to carry out her second solo circuit and landing. During the landing flare the aircraft ballooned and subsequently touched down on the nosewheel. The aircraft bounced and on the next touchdown the nosewheel broke off, the nose gear leg was displaced and the aircraft slid to a halt on the runway.

The pilot's previous training flight had been conducted approximately one month prior to the accident. After misjudging the landing flare, the pilot persisted with the landing attempt instead of going around.

Date Time	Aircraft type & registration Location	Age	Hours Total	Pilot Licence Hours on Type	Rating	Record Number
24 Sep 84 1610	Cessna 172M VH-WYK Burleigh Stn. 17N	21	860	Commercial 745	Instrument rating class 4	8411041

After arriving at the property that morning, the pilot commenced mustering operations. The operations were conducted between 50 feet and 300 feet above ground level throughout the day and all manoeuvres performed appeared normal to ground observers.

Later in the afternoon a witness reported that he observed the aircraft perform a steeper than normal climb before diving towards the ground. The aircraft subsequently impacted the ground in a steep nose down, wings level attitude, bounced, then slid forward for 13 metres before the left wing struck a tree.

Examination of the wreckage did not reveal any defect with the aircraft that could have contributed to the accident. It is probable that the pilot was fatigued after a long day and that he inadvertently allowed the aircraft to stall at the top of the climb. Insufficient height was then available to allow a recovery to be effected.

Date Time	Aircraft type & registration Location	Age	Hours Total	Pilot Licence Hours on Type	Rating	Record Number
24 Sep 84 1040	Wittman W8 VH-MGO Munglinup WA 7E	56	700	Private 450	None	8451026

The aircraft touched down in a three-point attitude and after a short ground roll, became airborne over a small rise. The second touchdown was in a left wing low attitude and the propeller struck the ground. The aircraft swung to the right then the left wing struck the ground turning the aircraft to the left. It slid a short distance before coming to rest with the left gear leg collapsed.

It was ascertained that during production of the aircraft, the welding of the combined engine mount and main undercarriage unit was not to the required standard. The weak welds failed during the landing roll on the unprepared strip.

Date Time	Aircraft type & registration Location	Age	Hours Total	Pilot Licence Hours on Type	Rating	Record Number

29 Sep 84	Cessna 210-N VH-AOI			Private		8451027
1620	Beverley WA 3W	41	250	16	None	

Prior to the first flight on the day the pilot inspected the fuel tanks of the aircraft and estimated they contained 225 litres of fuel. On that basis he planned a flight of 155 minutes duration. Approaching the second last turning point of the flight the engine stopped. The pilot selected the other fuel tank, power was restored and a diversion made to the nearest suitable airfield. On final approach to that airfield the engine stopped again. The aircraft was landed heavily in a paddock and the nose gear leg torn off.

The aircraft had been parked on sloping ground which could account for the over-estimation of fuel contents. As the flight was conducted at 3000 feet, no attempt was made to lean the mixture although fuel consumption was increased 24 per cent by running the engine at full rich mixture. Suitable forced landing areas were overflown enroute to the diversion aerodrome because the pilot thought that the fuel gauge was in error. The aircraft stalled during an attempt to prolong the glide to a more suitable area.

12 Oct 84	Piper 25-235 VH-CCS			Commercial		8421053
1200	Blayney NSW 15SW	36	3000	400	Agricultural class 2 with flight instructor and instrument	

During spraying operations the engine suffered a partial power loss. The pilot initiated dumping of the hopper load but was unable to prevent the aircraft from striking the ground heavily. The landing gear collapsed and the aircraft slid for about 50 metres before coming to rest.

The reported power loss had occurred during a procedure turn, the latter portion of which was downwind. No fault was subsequently found with the engine, however it was considered likely that the aircraft was affected by downdraughts in the lee of a hill. When dumping was initiated, the pilot's left sleeve had probably caught on the throttle lever and pulled it towards the closed position.

30 Oct 84	Beech 58 VH-DTU			Commercial		8421058
1015	McIntyre's Field	22	1800	200	Instrument rating 1st class or class1	

After a normal circuit the aircraft crossed the threshold at 85 knots. The pilot advised that the wheels locked as soon as braking was applied. Intermittent brake application had little effect in slowing the aircraft and as the pilot considered that insufficient strip remained to permit a go-around he attempted to ground loop the aircraft. It slid off the side of the strip and collided with a fence before coming to rest.

The strip surface was very slippery as a result of overnight rain. Misty rain was still falling as the pilot made his approach and touched down about one quarter of the way along the strip. The pilot had not determined the last point at which a go-around could be commenced and persevered with the landing attempt beyond the point where a go-around could have been safely accomplished.

04 Nov 84	Bellanca-8-KCAB VH-UOO			Commercial		8421060
1130	Wallacia NSW	27	265	60	Instrument rating class 4	

After a normal approach in calm wind conditions the aircraft bounced following the initial touchdown. A number of bounces then occurred before the pilot was able to regain control of the aircraft. At this time he assessed that there was insufficient strip remaining to stop the aircraft or to safely go-around. A ground loop was attempted, during which the right landing gear collapsed.

The strip length was about 120 metres longer than that required for a normal landing. The aircraft was being operated in excess of the maximum permitted landing weight. After the initial bounce the pilot persisted with the landing attempt and evidently did not consider carrying out a go-around until the aircraft was too far along the strip for this manoeuvre to be performed with safety.

11 Nov 84	Cessna U206F VH-EKJ			Private		8441025
1156	Broken Hill 80S	51	448	67	None	

The pilot noticed a low oil pressure reading and decided to land at a strip he had just overflown. As he turned the aircraft toward the strip the engine began to vibrate and backfire and it was shut down. The aircraft touched down 150 metres short of the strip boundary fence. After running through this fence the aircraft continued for a further 280 metres before coming to rest on the strip. Initial inspection revealed that the engine crankcase had been punctured by a connecting rod.

Inspection of the engine revealed that the crankcase had been punctured by the connecting rod of the number 4 piston. The connecting rod assembly had been subjected to excessively high temperatures due to a lack of lubrication. The cause of the lack of lubrication to the assembly could not be determined. After the engine had failed, the pilot continued with his attempt to land at the nearby station strip although a closer and more suitable area was available.

17 Nov 84	De Hav DH 84 VH-AQU			Private		8441027
1025	Beachport SA 10E	45	474		None	

After refuelling, the pilot found one of the tanks contaminated with water. The fuel was drained from the tank and clean fuel added. No contamination was found in the subsequent check of the fuel in the tank. The aircraft was then washed using a high pressure water hose. During the following flight, the engines began to run roughly and the pilot decided to carry out a landing in a paddock. The surface of the paddock was rough and the aircraft bounced heavily and groundlooped, collapsing the right gear.

The investigation revealed that water had been present in the fuel system for some time. Because of the design of the fuel system it is not possible to drain the lowest point of the fuel tank while the aircraft is parked. It is probable that the engine rough running was caused by a combination of contaminated fuel and a sticking valve.

01 Dec 84	Amer Air 5A VH-SZV			Private		8411055
0854	Beaudesert 40S	39	229	36	None	

As he approached the Macpherson Range the pilot was forced to fly around some hills in order to stay below the cloud base. After crossing a ridge line where the gap beneath the cloud was about 300 feet, the pilot was confronted by a higher ridge. He subsequently advised that the aircraft could not out-climb the terrain and he carried out a controlled entry into the jungle canopy about 200 feet below the top of the ridge. Both wings were torn off however the cabin area came to rest intact.

02 Dec 84	Pitts S1 VH-IGZ			Private		8441028
0859	Emkaytee NT	44	2195	700	Instrument rating class 4	

At the conclusion of an aerobatic display the pilot performed an inverted circuit, rolling upright as the strip was sighted on final. On short final the aircraft descended below the desired flight path and the pilot applied power. The aircraft responded but the right gear leg caught on a power line 5 metres agl and 330 metres from the threshold. The aircraft struck the ground in a steep nose down attitude and came to rest inverted.

The inverted circuit had been conducted at between 50 and 100 feet above the tops of the trees.

02 Dec 84	Piper 28-140 VH-RVL			Private		8431036
1510	Longwarry Vic	38	290	275	Instrument rating class 4	

The pilot was to conduct two spot landings from practice forced landing approaches commenced at 2000 feet. On the first approach an undershoot developed and power was used to complete the landing. The second approach was high and touchdown was made about half way down the 730 metre strip. A go-around was initiated but the engine failed to develop significant power. The take-off was then abandoned and the aircraft struck a dirt bank and drain beyond the end of the strip.

It is probable that carburettor icing caused the lack of engine response when the go-around was initiated. Braking was inhibited by wet grass covering the remainder of the strip available.

Date Time	Aircraft type & registration Location	Age	Hours Total	Pilot Licence Hours on Type	Rating	Record Number

04 Dec 84	Burkhart ASTIR CS VH-KYN			Glider		8441030
1919	Whitwarta SA	66	750	200	Glider	

After travelling 15 metres during a winch-launch the left wing-tip contacted the ground. The instructor immediately assumed control of the glider and applied right rudder and aileron but the left wing entered an oat crop on the edge of the strip. The tip then dug into soft soil, causing the glider to cartwheel and impact heavily on its nose 120 metres from the take-off position and 35 metres to the left of the centreline.

The crop on the edge of the 15 metre wide strip was about 1 metre high and the glider's wing span was 17.5 metres. The student was experiencing difficulty learning to control the aircraft during take-off and following wing-tip contact with the ground both the instructor and the student stated that they made control inputs. Conditions during the day were hot and the instructor had been on duty for nearly ten and a half hours.

09 Dec 84	Czech Blanik VH-GIK			Glider		8441031
1400	Monarto SA	25	9	4	None	

It was reported that the flight proceeded normally until during the flare. The glider was lined up with the strip, but during the hold-off it drifted to the right and touched down on the edge of the marked, 50 metre wide strip. The landing roll continued off the runway and the starboard wing struck a tree 20 metres from the edge of the strip.

The landing was conducted in 4 to 8 knot crosswind conditions. During the hold-off the student pilot applied excessive rudder when aligning the aircraft with the strip prior to touchdown.

24 Dec 84	Schleicher ASW 19 VH-GWL			Other (Foreign, Military, etc.)		8441032
1900	Waikerie SA 7E	28	310	3	Unknown or not reported	

Following an outlanding the pilot arranged an aerotow. The take-off was commenced into wind and up a rise. The glider became airborne but on breasting the rise, the tug pilot aborted the take-off as trees and a fence appeared closer than expected. The tug aircraft which had just become airborne turned left and the left wing tip struck the ground before the aircraft came to rest. The glider pilot released the tow but the glider's right wing tip contacted the ground then the fence before the glider impacted the ground beyond the fence.

Before commencing the aerotow the pilot of the tug aircraft had estimated that sufficient distance was available for the take-off to be completed. He did not measure the distance available nor consult the aircraft performance chart. The chart indicated that with the prevailing conditions, insufficient distance was available to successfully complete the take-off.

24 Sep 84	Piper 25-235 VH-WGC			Commercial		8441032
1900	Waikerie SA 7E	46	1170	15	Instrument rating 1st class or class 1	

Following an outlanding the pilot arranged an aerotow. The take-off was commenced into wind and up a rise. The glider became airborne but on breasting the rise, the tug pilot aborted the take-off as trees and a fence appeared closer than expected. The tug aircraft which had just become airborne turned left and the left wing tip struck the ground before the aircraft came to rest. The glider pilot released the tow but the glider's right wing tip contacted the ground then the fence before the glider impacted the ground beyond the fence.

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27 Dec 84	Piper PA34-200T VH-STN			Private		8441033
1610	Adelaide SA	19	350	3	None	

The pilot reported that as the aircraft descended through 300 ft on final approach, windshear and an increase in the rate of descent was experienced. He applied power to arrest the rate of descent then reduced the power setting to idle. The aircraft landed heavily and bounced, the pilot attempted to take corrective action but the aircraft again landed heavily. The aircraft was taxied to the parking area where the damage was noted.

The endorsement completed earlier that day, was the pilot's first flight in a civil aircraft and this flight was his first solo in a multi-engined aircraft. Although endorsed on a heavy transport type, the pilot was projected into an environment beyond his level of experience, due to the single pilot workload being higher than that to which he was accustomed. The approach was steeper and 30 knots faster than recommended and a high power setting was used. The approach was made into the sunset and visibility was further impaired by a dirty windscreen.

27 Dec 84	Cessna 310R VH-FFA			Commercial		8421074
1321	Moruya NSW	62	12500	5000	Instrument rating 1st class or class 1 with instrument rating	

Following a normal circuit, the aircraft touched down with the landing gear doors open and the gear partly extended. The gear collapsed as the aircraft slid to a halt on its under-surface.

The pilot had diverted so that a telephone call could be made and he decided to land well down the runway to save time taxying. He forgot to select the gear down until immediately prior to touchdown.

06 Jan 85	Piper 28-R200 VH-WIN			Private		8521002
1245	Bourke NSW	73	1305	610	None	

As the pilot was attempting to locate the airstrip at his destination, he noticed some of the aircraft's electrical equipment had failed. He decided to proceed to Bourke and land. On arrival over Bourke the pilot selected the gear down but did not obtain any indication of the gear position. He then manoeuvred the aircraft in an effort to assist gear extension but did not attempt to use the manual override system. The aircraft was landed with the gear retracted.

The alternator and engine pulleys were out of alignment resulting in the drive belt becoming detached. The handling notes were carried in the rear luggage locker, out of reach of the pilot and because the operation of the emergency gear lowering system could not be remembered a wheels up landing was made.

12 Jan 85	Czech Blanik L13 VH-GBT			Glider		8521004
1655	Tumut NSW	34	12		None	

Following a dual check and a short solo flight, the pilot was authorised to conduct a soaring flight of not more than one hour's duration. The glider was subsequently launched from an aerotow after take-off into a light northerly wind. It was observed soaring in the vicinity of the aerodrome within an estimated height band of 3000 to 6000 feet above ground level. During the flight the wind on the ground changed to become a gusty south-westerly at about 10 to 15 knots. The shade temperature was 36 degrees celsius and localised areas of turbulence were reported by other pilots.

The pilot did not return for a landing for approximately two hours, despite the pre-flight briefing. When he returned, the aircraft was positioned for a landing into the north, apparently without reference to the changed wind conditions. During final approach the glider was seen to pitch down into an almost vertical dive. It struck the ground some 200 metres before the strip threshold and came to rest inverted.

Subsequent examination of the wreckage did not reveal any defect or malfunction that might have affected the pilot's ability to safely control the aircraft. It was apparent that the glider had been in a normal wings level approach configuration immediately before the pitch-down which occurred at a height of about 100 feet above ground level. It was considered possible that the aircraft could have been affected by turbulence, or that the pilot may have suffered from heat stress and fatigue. However, insufficient evidence was available to enable the precise factors in the occurrence to be determined.

Date Time	Aircraft type & registration Location	Age	Hours Total	Pilot Licence Hours on Type	Rating	Record Number

14 Jan 85 0900	Cessna 180K VH-SAA Bundaberg Qld	59	2720	Commercial 24	Flight instructor grade 1 or 2 with instrument rating	8511002

During the landing roll the aircraft started to veer right. The pilot under check applied sufficient rudder to correct the swing but then applied excessive left rudder and considerable power and the aircraft swung sharply left. The left wing and elevator tips contacted the ground whilst the instructor was regaining control. The pilot under check had not flown a tail wheel aircraft for five months.

18 Jan 85 0748	Bell 206B VH-WNB Karratha WA 37N	46	6162	Commercial — helicopter 634	None	8551002

After establishing level flight with an external sling load, the pilot felt a bump from the rear of the helicopter. He corrected the accompanying pitch change and then a second bump was felt. The load was jettisoned and immediately the helicopter began yaw to the right. The pilot was unable to regain control before the helicopter struck the ground.

The pilot had not flown helicopters for two years and although he had recently completed a check flight, slung operations were not covered. On this operation the pilot was substituted for another pilot who was unavailable. The load carried on this run was identical to loads previously carried, but much lighter. The pilot elected to use the same cruise speed as for the heavier loads. The load became unstable and encountered the tail boom. Upon its release the load slid back and was struck by the tail rotor, breaking off one blade and snapping the drive shaft.

24 Jan 85 1450	Beech 58 VH-EZB Halls Creek WA	24	1664	Commercial 220	Instrument rating 1st class or class 1	8551004

During the start sequence for the left engine, a loud bang was heard and the fuel agent noticed a fire under the aircraft. He advised the pilot, who secured the engine and along with the passengers, evacuated the aircraft. The fire was extinguished but the left wing damaged.

During the prior refuelling operation fuel was seen to be leaking onto the ground beneath the left engine from a known leak within the left wing. However the left engine was started in situ. Subsequent investigation revealed cracks due to age decay in the left wing outboard fuel cell vent line joints.

26 Jan 85 1302	Cessna 172N VH-WND Albury NSW	41	386	Commercial 132	Instrument rating class 4	8521006

Following a report of engine rough running a section of an exhaust valve was found to have broken away. A new cylinder assembly including an exhaust valve was fitted but on take-off for a test flight the engine suddenly suffered a substantial loss of power. During the subsequent forced landing the aircraft ran through a fence and came to rest in a ditch. Two cylinder assemblies were found to have suffered internal damage and pieces of the missing section of the previously replaced exhaust valve were found within the induction system.

Although the engine had been ground run by the engineers it had not been tested to full power. As the pilot was asked to limit taxiing and idling times to avoid overheating the new cylinder, engine run-up and pre-flight checks were conducted whilst taxying. Take-off was commenced 230 metres along the 1900 metre runway and this was the first full power demand made on the engine since its repair. At about 250 feet agl a power loss was experienced, full flap was not used for the forced landing attempt and the aircraft struck the ditch which was 274 metres past the end of the runway.

27 Jan 85 1410	Pitts S1 VH-DDS Lake Eppalock Vic	31	784	Commercial 114	Instrument rating class 4 with flight instructor	8531002

A low level aerobatic display was being conducted over the lake. Towards the end of the display the pilot performed four snap rolls followed by a steep climb and stall turn. Although the display was to be conducted not below 500 feet agl the aircraft was recovered from the last snap roll at an estimated 150 feet agl. Despite this low recovery height the pilot persisted with the climb and stall turn manoeuvre. While attempting to recover from the subsequent dive he stalled the aircraft at too low a height to avoid impacting the water.

06 Feb 85 1023	Transav PL12 VH-MLJ Deloraine Tas 8E	45	9900	Commercial 500	Agricultural class 1	8531003

At the conclusion of spraying operations the pilot initiated a climb enroute to his destination. Almost immediately, the engine failed completely and the pilot was committed to a landing in a barley crop. During the landing roll the nosewheel was broken off and the aircraft overturned.

The aircraft was at about 100 feet agl when the engine failed and the most suitable area available required that the landing be made downhill on a soft surface. A skid to the right after touchdown caused the nosegear to fail. The cause of the engine power loss could not be established.

07 Feb 85 1520	De Hav DH82-A VH-BFW Alberton Vic	49	905	Private 820	None	8531004

After a short flight in the local area the pilot made a long low final approach towards the intended landing point. During the approach the pilot temporarily forgot that powerlines crossed the flight path. The aircraft collided with the wires, which were 68 feet agl, and struck the ground in a vertical nose-down attitude about 800 metres from the landing area.

08 Feb 85 1550	Piper 25-235 VH-TOX Wilmot Tas 2S	37	1800	Commercial 1000	Agricultural class 2	8531005

The pilot was conducting the last of his spraying tasks for the day. The paddock had an uphill slope and there were two groups of tall trees at the uphill end. The first run was conducted up the slope but during the subsequent pull up and procedure turn strong turbulence was encountered. The left wing struck branches in one group of trees, control was lost and the aircraft struck the ground heavily. The fuel tank ruptured, a fire broke out and the wreckage was completely gutted.

The spraying was commenced in strong wind conditions and the procedure turn was executed in the lee of the trees. When the turbulence was encountered the pilot chose to fly between the two stands of trees but insufficient clearance existed for the passage of the aircraft. The pilot advised that his workload during the day had been high and that he did not like spraying this particular paddock because of its slope and the adjacent trees.

17 Feb 85 1900	Piper 28-151 VH-RUZ Moorabbin Vic	26	150	Private 150	None	8531011

The pilot was turning into the parking area, intending to taxy between aircraft parked in parallel rows. As the turn was completed the left wing tip struck the spinner of the aircraft at the start of the left hand row. This aircraft was undamaged, however the wing tip of the taxying aircraft was pushed rearwards with consequent damage to the rear spar fuselage carry-through member.

During the turn into the parking area one of the passengers interrupted the pilot's concentration by pointing out that the parking position from whence they had departed, was still vacant. The pilot did not notice that the aircraft had moved almost 2 metres to the left of the taxiway guideline until the collision was imminent.

Date Time	Aircraft type & registration Location	Age	Hours Total	Pilot Licence Hours on Type	Rating	Record Number

17 Feb 85 1440	Bede BD4 VH-ABD Tanunda SA 5SSW	43	370	Private 120	None	8541003

The pilot was attending a fly-in to display his aircraft. Because he was concerned about the length of the strip he was endeavouring to touchdown at the threshold. During the final approach, he became aware that the airspeed was reducing below the optimum and applied some power, however, the aircraft struck the ground heavily about 10 metres before the strip threshold. The pilot applied full power and carried out a go-around. As a result of the ground contact the nosewheel was torn off.

The pilot was advised of the situation by ground observers and elected to divert to Parafield. During the subsequent landing the nosegear leg collapsed.

18 Feb 85 1115	Piper 28-161 VH-UMB Deniliquin 22NE	42	3280	Commercial 1500	Flight instructor grade 1 or 2	8521013

At the conclusion of the dual training segment of the flight the instructor decided to demonstrate a forced landing sequence. Descent was continued to a very low height, and during the go-around the aircraft struck a fence at the approach end of the selected paddock. Control was maintained and a safe landing was subsequently carried out at the destination aerodrome.

20 Feb 85 0845	Piper PA23-250 VH-JEN Palm Island Qld	26	1460	Commercial 90	Instrument rating class 3	8511008

The pilot stated that when braking was applied after touchdown, the aircraft did not decelerate normally. A go around was carried out, and after the aircraft became airborne, the nosewheel struck a fence. As a result the nosewheel became misaligned and the nose gear collapsed during the subsequent landing at Townsville.

Upon arrival the pilot had to orbit for 5 minutes to allow a rain squall to pass. Without overflying the strip he assessed that the wind favoured a landing direction which placed him presently in a wide base position. Due to standing water on the grass strip and a tailwind component, deceleration was minimal. By the time a go around was initiated the aircraft had entered an area of long grass. The flaps were left in the landing position during the go around, this further increased drag and added substantially to the ground run.

21 Feb 85 1800	Cessna A188-A1 VH-KVK Trangie NSW 11SE	47	8112	Commercial 97	Agricultural class 2 with flight instructor	8521014

On commencing the clean up run, the wire deflector on the aircraft struck a single power line. The top section of both the fin and rudder were severed from the aircraft which was subsequently landed at the departure strip without further damage.

The pilot had been briefed on the crop to be sprayed and on the location of power lines in and around the paddock. After cleaning up the other edges, the final run was commenced with the aircraft flying parallel to the main power lines. The pilot temporarily forgot the presence of the single wire running from the main line into the paddock.

24 Sep 85 1807	Beech 76 VH-BGY Moorabbin Vic	36	121	Private 20	None	8531007

Shortly after a normal touchdown directional control problems were experienced and the left wing began to lower. The pilot applied full power and carried out a go around. The pilot advised the tower that the left mainwheel tyre was probably flat, and subsequently positioned the aircraft for another landing. Normal gear down and locked lights were illuminated, however after touchdown the left gear leg began to collapse and the aircraft slewed off the side of the runway.

The left gear retracted due to insufficient overcentre action on the side-brace lock. This was compounded by wear in the side-brace centre-pivot. Both of these potential problem areas had been address by the aircraft manufacturer in relevant Service Instructions. Compliance with these instructions was not mandatory and the aircraft had not been modified.

05 Mar 85 1220	Bell 47-G3B1 VH-ANG Mt Riddock Stn. NT	28	1215	Commercial — helicopter 1085	None	8541004

During mustering operations the pilot landed on two occasions in order to visually check the amount of fuel remaining. Although the second of these checks revealed an estimated endurance of 20 minutes, the pilot elected to carry out a further short mustering task before returning to the refuelling area about 4 kilometres away. While enroute to the refuelling point the engine suddenly stopped. The pilot entered auto-rotation but had to manoeuvre to avoid trees and the aircraft subsequently landed heavily.

The investigation revealed that the aircraft was serviceable but the engine had failed due to fuel exhaustion. The last landing to check the fuel quantity was probably made on sloping ground and could account for the overestimation of fuel remaining, although below required reserves, at that time.

09 Mar 85 1625	Mooney M20J VH-MVO Bankstown NSW 13W	59	820	Private 350	None	8521017

The aircraft was cruising at 1500 feet agl when a large bird was struck. Substantial damage was caused to the right wing of the aircraft, however the pilot subsequently carried out an uneventful landing.

09 Mar 85 1845	Cessna A188B-A1 VH-PLU Gundagai NSW	39	3800	Commercial 1500	Agricultural class 1	8521016

Spray runs were being carried out under a power line when the aircraft cable deflector struck the line. The cable rode up the cable deflector and severed the top of the rudder from the aircraft. The aircraft was landed in a paddock without further damage.

09 Mar 85 1615	Glasflugel Mosquito VH-FQR Jondaryan Qld	66	773	Glider 143	Glider	8511011

Deteriorating soaring conditions resulted in the pilot landing at a strip close to his intended destination. The landing was uneventful and the pilot arranged for an aero-tow launch. During the take-off roll the left wing of the glider dropped slightly and became caught in long grass. The glider veered violently to the left, became airborne for a few metres then swung to the right and left again before the pilot could release the tow. The glider sustained several cracks in the mid-fuselage area.

09 Mar 85 1130	Wittman W8 VH-SLA Mt Beauty Vic	52	604	Private 50	None	8531010

Enroute to his planned destination the pilot flew around the Mt Beauty area for several minutes. He had not previously landed at the strip and had not intended to on this occasion, however after watching other aircraft operating a decision to land was made. A go-around was made from the first approach as the aircraft was high on late final. Touchdown from the subsequent approach was made well into the strip and the aircraft bounced. A go-around was initiated but while turning to avoid trees the left wing struck the ground and the aircraft cartwheeled, coming to rest inverted.

Witnesses reported that during the go-around the aircraft adopted a steep nose high attitude but did not climb. The turn left was initiated whilst the aircraft was in this attitude. No fault was subsequently found with the engine or associated systems. The pilot had probably established the aircraft in a steeper than normal attitude because of the presence of a hill adjacent to the strip.

Date / Time	Aircraft type & registration / Location	Age	Hours Total	Pilot Licence / Hours on Type	Rating	Record Number
13 Mar 85 / 1500	Hiller UH12-E VH-FFT / Charleville 146NE	38	4000	Commercial — helicopter / 2000	Instrument rating 1st class or class 1	8511012

The pilot had landed the helicopter in a clearing in order to refuel from drums carried in the aircraft. During the subsequent take-off into the strong wind prevailing, downdraft was experienced as the aircraft approached a heavily timbered area. A turn was carried out to avoid the trees but the combined effects of the downdraft and the downwind turn resulted in the helicopter touching down heavily. The impact forced the landing skids rearwards, bending the associated vertical support members.

Date / Time	Aircraft type & registration / Location	Age	Hours Total	Pilot Licence / Hours on Type	Rating	Record Number
14 Mar 85 / 1345	Cessna 182F VH-WPC / Bankstown NSW	63	186	Private restricted / 18	None	8521021

The pilot was carrying out a series of practice circuits and landings. On this particular approach the aircraft bounced after touchdown. The pilot applied some power in an attempt to cushion the subsequent touchdown, however the aircraft struck the ground heavily and bounced again. A go-around was conducted and was followed by a normal landing. Post-flight inspection revealed damage to the nose strut, the engine firewall area and the propeller.

Date / Time	Aircraft type & registration / Location	Age	Hours Total	Pilot Licence / Hours on Type	Rating	Record Number
15 Mar 85 / 0830	Grumman 164A VH-SLK / Jondaryan Qld 30N	39	11700	Commercial / 5500	None	8511013

The pilot had sprayed the paddock using a series of runs in an east-west direction, parallel to power lines along the property boundary. He then decided to do a clean-up run in a north-south direction, but forgot about the presence of the power lines. During the pull-up at the end of the run the aircraft flew into the wires and subsequently struck the ground heavily 219 metres further on.

Date / Time	Aircraft type & registration / Location	Age	Hours Total	Pilot Licence / Hours on Type	Rating	Record Number
19 Mar 85 / 1718	Piper 30 VH-RBT / Coffs Harbour NSW	23	2550	Senior commercial / 90	Instrument rating 1st class or class 1 with instrument rating	8521020

When the gear was selected down it did not fully extend and the gear circuit breaker tripped. Initially the circuit breaker could not be reset nor could the gear be lowered using the emergency system. The circuit breaker was subsequently reset and a gear down indication obtained. Shortly after touchdown the aircraft yawed until it was travelling backwards. The tailskid struck the runway and the aircraft came to rest after turning through a further 90 degrees. The right main wheel was found to have turned through 90 degrees because the scissor linkage arms had become disconnected.

A castellated nut and its retaining split pin was found to be missing from the bolt which joins the scissor linkage arms. The reason for the loss of these items could not be positively established.

Date / Time	Aircraft type & registration / Location	Age	Hours Total	Pilot Licence / Hours on Type	Rating	Record Number
19 Mar 85 / 1530	Beech V35 B-MK2 VH-ILO / Robe SA 25SE	40	63	Private restricted / 7	None	8541005

The aircraft was parked about 40 metres from its hangar. After carrying out a normal daily inspection the pilot boarded the aircraft with the intention of conducting some practice circuits and landings. As soon as the engine was started it developed full power, the aircraft accelerated rapidly and collided with a truck which was parked in the hangar.

The pilot had not flown for four months and most of her experience was on a more basic aircraft type. The pre-flight and engine start sequences were attempted without using the checklist. After the engine had started the pilot tried to reduce power but did not depress the throttle-lock of the vernier control. It is possible that the cabin heat control, which was selected on, could have been mistaken for the park brake, which was not set, as they are both situated in the same panel.

Date / Time	Aircraft type & registration / Location	Age	Hours Total	Pilot Licence / Hours on Type	Rating	Record Number
23 Mar 85 / 1600	Piper 28-R180 VH-KIE / Mundijong WA	51	8076	Commercial / 32	Flight instructor grade 1 or 2 with instrument rating	8551007

The student pilot was undergoing a conversion onto the aircraft type. As part of the conversion, the instructor closed the throttle and requested the student to demonstrate a forced landing. At about 600 feet agl, the instructor, being satisfied with the exercise, advised the student to go-around. The throttle was opened but the engine did not respond. The instructor took control but was unsuccessful in his attempts to restart the engine. The aircraft was landed in a paddock and ran through a fence.

The exercise was carried out conforming to the checklist requirements, one of which was to switch the fuel boost pump on. Investigation revealed that the engine would not idle with the pump on. The engine had been out of service, unpreserved, for 17 months and the fuel regulator diaphragm was sticking to its guide and seal assembly causing the engine to run rich at idle and stall. Although the instructor took control at 600 feet, attention was diverted from the forced landing to restarting the engine.

Date / Time	Aircraft type & registration / Location	Age	Hours Total	Pilot Licence / Hours on Type	Rating	Record Number
24 Mar 85 / 1415	Piper 38-112 VH-FLA / Archerfield Qld	17	39	Student / 39	None	8511014

On final approach, the pilot reported that the aircraft encountered a strong headwind. At about 30 feet above the ground the aircraft began to sink and the stall warning sounded. The pilot applied some power and selected a higher nose attitude, but the aircraft landed heavily on the mainwheels, bounced onto the nosewheel and the propeller struck the runway. The aircraft ran off the runway before the pilot was able to regain control.

Date / Time	Aircraft type & registration / Location	Age	Hours Total	Pilot Licence / Hours on Type	Rating	Record Number
26 Mar 85 / 0815	Zenith CH200 VH-MAD / Dixons Creek Vic	66	617	Private / 310	None	8531012

Initial touchdown occurred about one third of the way along the 518 metre strip. A slight bounce followed and as soon as the aircraft had settled on the ground again the brakes were applied. There was no noticeable retardation and the pilot attempted to go around. The nosewheel struck a gable marker just prior to the boundary fence, and the left mainwheel contacted the top strands of the fence. The fuselage was punctured by a fence post and the pilot abandoned the take-off attempt. An inspection of the strip immediately after the occurrence revealed a very heavy dew on the short, thick grass surface.

Date / Time	Aircraft type & registration / Location	Age	Hours Total	Pilot Licence / Hours on Type	Rating	Record Number
30 Mar 85 / 1125	Cessna 152 VH-TNX / Melton Vic	17	12	Student / 12	None	8531013

During the pilot's second solo flight the aircraft bounced twice on landing. The pilot persisted with the landing attempt and applied forward control column pressure after each bounce. Following the second bounce the nose wheel struck the ground heavily and was torn off and the aircraft overturned.

Date / Time	Aircraft type & registration / Location	Age	Hours Total	Pilot Licence / Hours on Type	Rating	Record Number
31 Mar 85 / 1730	Cessna 172M VH-TCB / Moonera WA	64	1491	Private / 326	None	8551008

After encountering navigational difficulties, the pilot became concerned that he may not reach his destination before last light. He decided to land on a road near a homestead. While the aircraft was being taxied after landing, the pilot misjudged the distance from a metal pole and the right wing struck the pole.

Know your systems: the mixture control

Aircraft engine mixture controls are often coloured red to indicate that they should be used with caution. Correct use of the mixture control in flight for adjusting the air-fuel (A-F) ratio is one of the most important items in the operation of engines. Proper leaning of the mixture provides smooth, efficient engine operation, more power for a given power setting, and best range and endurance; on the other hand, misuse of the mixture control can seriously damage or ruin an engine.

The following occurrence is typical of those associated with incorrect operation of the mixture control.

After only a brief flight, the engine of a Piper PA28 suffered a partial loss of power, which was accompanied by severe vibration. The pilot completed a precautionary landing as quickly as possible.

On investigation it was found that the number 2 exhaust valve head had separated from the valve stem. There was evidence of valve 'necking' (which means narrowing and, therefore, weakening of the valve), while there was also excessive clearance between the valve stem and guide. Both of these conditions are generally indicative of excessive, localised 'hot spots' within an engine, which in turn are related to an incorrect A-F ratio. In this instance this was attributed to the use of improper fuel leaning procedures.

As is the case with any aircraft system, pilots will appreciate its purpose better if they understand how it works.

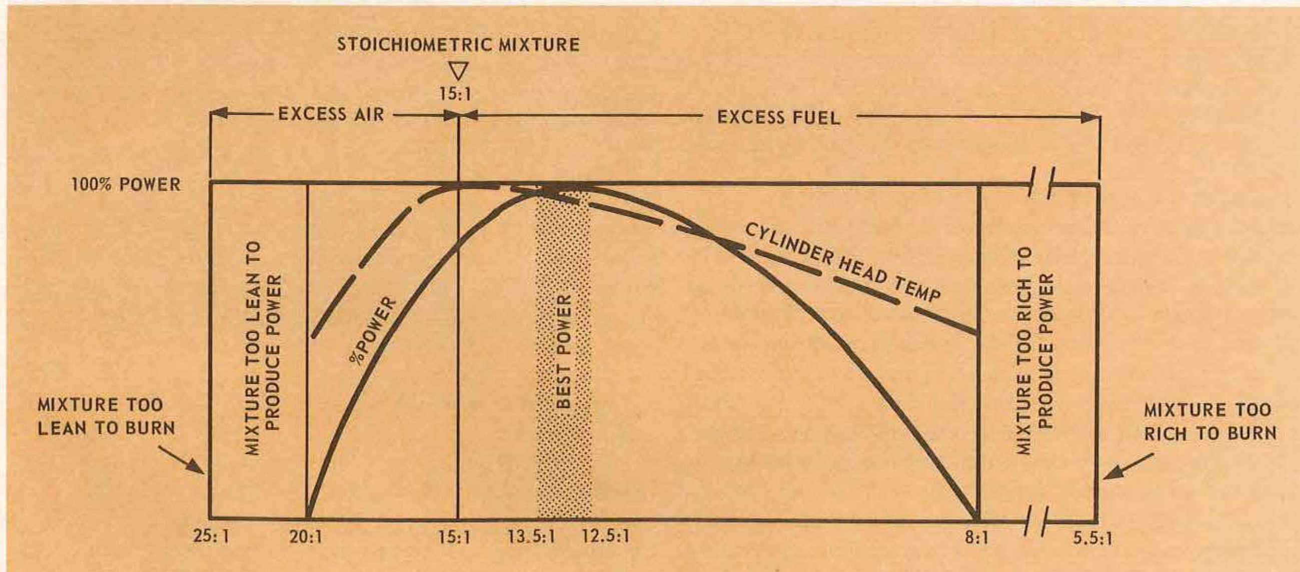
Air-fuel ratio

The air-fuel ratio is the ratio between the weight of air and the weight of fuel that goes into an engine's cylinders. Gasoline will burn in a cylinder if mixed with air in a ratio of between 8 parts air to 1 part fuel and 18 parts air to 1 part fuel, although in very general terms the best power range may be considered to be between 12:1 and 16:1, with 15:1 being the accepted theoretical best chemically correct air to fuel mixture. In many aircraft engines the most practical air to fuel ratios vary between 11.5:1 and 14:1, with the rich mixture used at high power output and lean mixtures customarily used at lower cruising powers.

The key role in controlling the mixture ratio is played by the carburettor or fuel injection system. Because gasoline cannot ignite or burn when in the liquid state, it must first be vaporised and mixed with the correct amount of air. The carburettor or fuel injector measures the approximate quantity of fuel to be supplied to the engine, atomising and mixing the fuel with air in the correct proportion (i.e. A-F ratio) before the mixture enters the cylinders. This proportioning must be done accurately regardless of the speed, power setting and altitude at which the engine is operating.

Unlike car engines, aircraft engines must operate over a wide range of altitudes. Carburettors and fuel injection systems are normally calibrated for sea-level operations, which means that the mixture of air and fuel will be correct for the power selected at sea level with the mixture control in the 'full rich' position.

As an aircraft climbs to higher altitudes the air density decreases, that is, the given volume of air will not weigh as much as it would at a lower altitude. Therefore, the weight of air entering the carburettor/injector will decrease, although the volume



FUEL-AIR RATIOS VS. POWER AND TEMPERATURE remains the same. The amount of fuel metered by the carburettor/injector depends on the volume, not the weight, of air. As altitude increases the amount of fuel entering the carburettor/injector will remain approximately the same for any given throttle setting. Thus, since the same amount (weight) of fuel is metered by the carburettor but there is a lesser amount (weight) of air, the air-fuel mixture becomes richer as altitude increases.

To compensate for this, aircraft engines are equipped with manual and/or automatic mixture controls.

The mixture control

This leads to the central question: what does the mixture control do? The answer is that it compensates for the decreased air density by metering the amount of fuel which passes through the main jet in the carburettor or to the injectors. It is used to reduce the amount of fuel flow and maintain the correct A-F ratio. This in turn reduces fuel consumption and provides smoother engine operation. For the majority of GA aircraft this leaning of the mixture is effected manually.

Engine considerations

Two important factors associated with the A-F ratio are those of engine operating temperature and power output. Temperature, recorded as cylinder head temperature (CHT), is indicative of the 'burning process' taking place within the cylinders, while aircraft performance parameters such as speed, range and endurance are of course directly related to engine power output.

The relationship of the A-F ratio to power and temperature is shown in Figure 1. Note that the A-F ratio of 15:1 is known as the stoichiometric mixture, which is the chemically correct mixture for all of the fuel and all of the air to burn.

This leads to the question of fuel distribution. In a carburettor-equipped engine the intake manifolds and induction pipes are used to distribute the fuel and air charge to the various cylinders. Those cylinders which are the furthest from the carburettor often receive a slightly leaner mixture than those closest to it. Because of this unequal fuel distribution the temperatures within the cylinders will tend to vary. This can be important when the pilot uses the mixture control to lean the mixture.

If a pilot uses extremely lean mixtures without reference to proper instrumentation, localised 'hot spots', coinciding with the areas of leanest mixture, can be created. Depending on where the temperature probe for the CHT gauge is located, cockpit indications in such circumstances may show that the engine is operating at normal temperatures, when in fact an exhaust valve and seat, for example, are overheating.

This apparently was the case with the fractured valve stem which caused the engine failure in the incident described at the start of this article.

Note that while fuel injection provides better fuel distribution than carburettion, fuel injected engines can still be leaned excessively.

Two other aspects of mixture control raised in Figure 1 need elaboration; these are the conditions of excess air or fuel, and 'best power'.

Excess air or fuel

Figure 1 shows that for mixtures less than the stoichiometric, there is more air in the cylinders than is needed for complete combustion, while on the right side there is more fuel than necessary.

For normally aspirated (i.e. unsupercharged) engines, recommended operating range CHTs are always maintained by selecting a mixture richer than the stoichiometric mixture. The same technique is almost invariably used for supercharged engines although, if approved by the manufacturer, some large supercharged engines may be operated in the 'excess air' range, as the amount of excess air in such engines will act as a coolant. For example, if the manual mixture control of a supercharged engine is moved towards the lean position, CHTs will be hottest when the A-F ratio is 15:1, but as the mixture is leaned still further, temperatures will return to cooler, more proper values. To reiterate, this should be done only with the manufacturer's approval, while unsupercharged small aircraft engines should never be leaned to this extent as excessive temperatures will result.

Best power mixture

The 'best power' mixture is that A-F ratio at which the most power can be obtained for a given throttle setting. By definition, 13.5:1 A-F ratio is 'lean best power' and 12.5:1 A-F ratio is 'rich best power', i.e. any mixture between 13.5:1 and 12.5:1 is a 'best power' mixture. This represents an optimum setting at which to operate an engine.

Instructions for adjusting the mixture control to achieve a 'best power' setting are given in Pilots' Operating Handbooks.

Excessively lean mixture

As the occurrence described at the start of this article illustrated, using a mixture that is too lean can seriously damage an engine. In addition to causing rough running, back firing, over-heating or sudden 'cutting out', excessive leaning can also initiate detonation and pre-ignition.

Detonation. Detonation is the spontaneous explosion of the unburned charge in the cylinders after normal ignition. If the temperature and pressure of the unburnt portion of the A-F charge reach critical values, combustion will begin spontaneously. The result is a sudden and violent explosion — i.e. detonation — of the charge rather than the relatively slow burning of normal combustion.

Continued operation when detonation is present can result in dished piston heads, collapsed valve heads, broken rings; or eroded portions of valves, pistons and cylinder heads. Complete and sudden engine failure can result.

Since it is very important to avoid detonation, it is

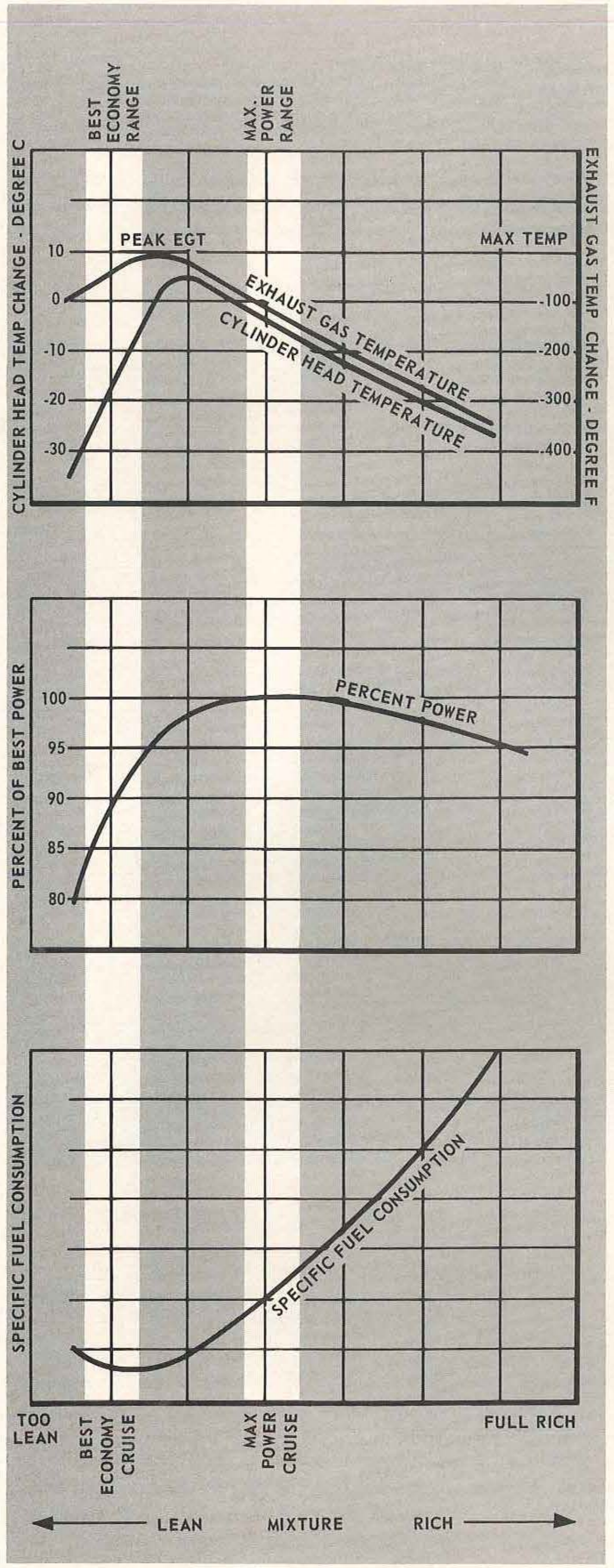


Figure 2

well to consider the principal factors which cause it. As far as the pilot is concerned, those over which he can exercise control are the octane rating of the fuel, mixture and, where applicable, manifold pressure.

Usually detonation cannot be recognised from the cockpit through sound or engine roughness; therefore, protection from its possible occurrence must be provided by:

- engine design; and
- *adherence to correct engine handling procedures by pilots.*

Pre-ignition. Pre-ignition is the uncontrolled firing of the A-F charge in advance of normal spark ignition. It is caused by the presence within the combustion chamber of an area which is incandescent (red hot) and which serves as an ignitor in advance of normal ignition. Pre-ignition may result from a glowing spark plug electrode or exhaust valve, or perhaps a carbon or lead particle heated to incandescence.

As with detonation, such operating factors as high intake air temperatures, lean mixtures, high manifold pressures and improper cooling are likely to set the stage for pre-ignition. Pre-ignition may start detonation and, conversely, detonation may start pre-ignition because of the high temperatures involved.

Pre-ignition can be just as destructive as detonation.

Rich mixture

Before discussing manual leaning techniques, an important point concerning rich mixtures must be made. Operating with the mixture more rich than required is not necessarily 'being kind' to the engine — in fact, the opposite could well be the case. Operating an unsupercharged engine at high altitude with an excessively rich mixture not only wastes fuel, but the power produced will be less than that which is available at that altitude with the mixture correctly leaned. Surplus fuel is rarely required for combustion chamber cooling at high altitudes, and the use of mixtures that are too rich usually only introduces other problems such as spark plug fouling. Spark plugs are designed to operate within certain heat ranges in order to function properly and operate without fouling. An excessively rich mixture will lower the temperature of the spark plug centre electrode below normal which, in turn, will lead to the formation of carbon and lead deposits. These deposits are electrically conductive and when they reach a sufficient depth, the electric current will flow through the deposit rather than 'jumping the gap' in the spark plug to ignite the air and fuel charge. It is essential, therefore, that an A-F ratio is maintained which will provide sufficient heat in the combustion chamber to vaporise any deposits which may form on the ceramic centre of the spark plug.

Manual leaning techniques

Depending on the power settings used and engine handling limitations contained in Pilots' Operating Handbooks/Aircraft Owners' Manuals, engines may be operated at lean mixture settings corresponding to maximum power and, where specifically permitted, best economy. The three basic recommended techniques for manual leaning are the tachometer/airspeed indicator method, the fuel flow or pressure gauge method, and the exhaust gas temperature method.

Tachometer/airspeed indicator method. The tachometer and, in favourable conditions, the airspeed indicator, are useful guides in establishing these mixture settings. For aircraft with fixed pitch propellers, the throttle should be set for the desired cruise RPM as shown in the Owners' Manual, and the mixture then gradually leaned from full rich until either the tachometer or the airspeed indicator gives a maximum reading. At peak indication, the engine is operating in the maximum power range. It should then be enriched, to prevent excessive temperatures, in accordance with the manufacturer's instructions. In the case of constant speed propellers, the mixture should be leaned until the airspeed indicator reading peaks or there is a significant power loss or evidence of rough running. Again, the mixture should then be enriched until the engine runs smoothly and power and airspeed are fully restored, and approved operating CHTs achieved.

Where the use of cruise powers at best economy settings are permitted, the mixture is first leaned from full rich to maximum power, then leaning is slowly continued until the engine begins to run roughly or power and airspeed decrease rapidly. When either occurs, the mixture should be enriched sufficiently to obtain an evenly firing engine or to regain most of the lost airspeed and engine RPM. Some engine power and airspeed must be sacrificed to achieve a best economy mixture setting.

Fuel flow or pressure gauge method. For aircraft with fuel-injected engines, the mixture can be leaned manually by using the fuel flow or pressure gauge. Settings for a given cruise power and altitude may be obtained from tables or other data provided by the aircraft manufacturer, or the indicator may be marked with the correct flow for each power setting. For any given set of conditions, the pilot need only lean the mixture to the specified fuel flow value to obtain the correct mixture.

Exhaust gas temperature method. One of the most accurate methods of establishing correct mixture strengths is to use an exhaust gas temperature gauge. This device measures the temperature of the exhaust gases and in this way indicates the proportions of the air-fuel mixture. To establish the maximum power setting by this means, the mixture is leaned to the point at which the temperature reading reaches a maximum, and is then enriched again, to achieve a fixed temperature drop. Whenever best economy operation is permitted by the aircraft owners' handbook or the engine manual, the mixture may be leaned to peak EGT. The accompanying graphs (Figure 2) show that that peak EGT occurs essentially at the rich edge of the best economy mixture range. They also show that operation at peak EGT not only provides minimum specific fuel consumption but also 95-96 per cent of the engine's maximum power capabilities for a given engine speed and manifold pressure.

Aircraft with turbo-charged engines frequently have an exhaust gas temperature pick-up installed in the turbine inlet to measure turbine inlet (exhaust gas) temperature. The procedures for leaning these engines, using turbine inlet temperature, are slightly different, and the technique and reference temperatures published in the owner's handbook should be strictly observed. For these installations, it is important that the maximum turbine inlet temperature specified by the manufacturer is not exceeded.

General considerations

Many pilots believe they should never lean the mixture for operations below 5000 feet. The theory behind this practice is that, by the time an aircraft with an unsupercharged engine has climbed to 5000 feet, the power output will have dropped to about 75 per cent at the throttle setting normally used for climb, and at this power, there is less likelihood of an engine being damaged through improper leaning techniques, since the cylinders and other engine parts are operating at lower temperatures. The fact of the matter is, however, that unless specifically prohibited in the owner's manual, the mixture may be leaned at any height, provided the power setting is below 75 per cent.

The mixture must always be returned to full rich before increasing power, and then reset. It should also be reset for any change in altitude or the application of carburettor heat. It is good practice always to select full-rich mixture before joining the circuit for a landing. Other distractions near the ground can cause the mixture setting to be overlooked and a pilot could encounter serious difficulties with detonation or overheating if a go-around became necessary.

When setting the mixture by means of an exhaust gas temperature gauge, it is not sufficient merely to adjust the mixture to obtain a given temperature reading based solely on previous experience. Not only are there likely to be characteristic variations in exhaust gas temperature from engine to engine, but changes in calibration of the indicating equipment can also lead to inadvertent over-leaning of the mixture unless the correct 'temperature drop' method is always used.

Similar considerations apply also to setting the mixture using a fuel flow gauge in that, while the specified fuel flows have a built-in margin of safety under normal operating conditions, unless the gauge remains accurate within close limits, the engine could be receiving a mixture that is either too rich or too lean. Thus, while determining the correct mixture by means of a fuel flow or exhaust gas temperature gauge is clearly preferable to setting it 'by ear', the accuracy of settings established by these methods still depends on the cockpit gauges and sensing units remaining close to correct calibration at all times.

Finally, regardless of the leaning technique used, careful consideration must also be given to such factors as any reduction in engine power, actual fuel consumption, engine cooling, smoothness of operation and other relevant engine limitations. As a final check, once the mixture has been set for cruise operation, the cylinder head temperature and oil temperature gauges should be constantly monitored. Although these two instruments have slow response times, the trend of their readings is a useful guide in maintaining correct mixture strengths and preventing engine damage.

Conclusion

For engines equipped with manually operated mixture controls (which means most types of modern light aircraft engines), the pilot has a particular responsibility to understand the fundamentals of engine operation and to use the mixture control safely and intelligently ●

Helicopters and ground fires

One of the most regular — and yet at the same time avoidable — accidents in Australian aviation is that of helicopters 'setting fire to themselves'. As the brief narratives of three such accidents which occurred in a recent 10 month period illustrate, the same causal factors are almost always present.

- A pilot carrying out an aerial survey landed in an area of long, dry grass to 'take a breather'. The engine was left idling and the hot exhaust ignited the grass on the port side, suddenly and intensely. The pilot vacated the helicopter rapidly and watched it burn out from a safe distance. Although he had 2450 hours total flight time, 450 hours on type and a Commercial Helicopter Licence, he had not been aware of this perennial helicopter problem.
- While involved in his first solo mustering flight a young pilot decided to take a short rest and landed in a spinifex-covered clearing. The helicopter's exhaust set fire to the spinifex; in the ensuing conflagration the aircraft was destroyed.
- The helicopter had landed in long grass to drop off a passenger. However, before the passenger could disembark, the aircraft's hot exhaust started a grass fire. Finding himself confronted by a wall of flames the passenger retreated across the cockpit, and in doing so prevented the pilot from taking any action to try to save the machine. With the helicopter alight both men escaped and watched it burn out.

Comment

Fortunately no-one was hurt in any of the three accidents summarised above, although the potential clearly is considerable: for example, the pilot of the helicopter in the accompanying illustration (taken from another 'self-immolation' accident) sustained serious burns.

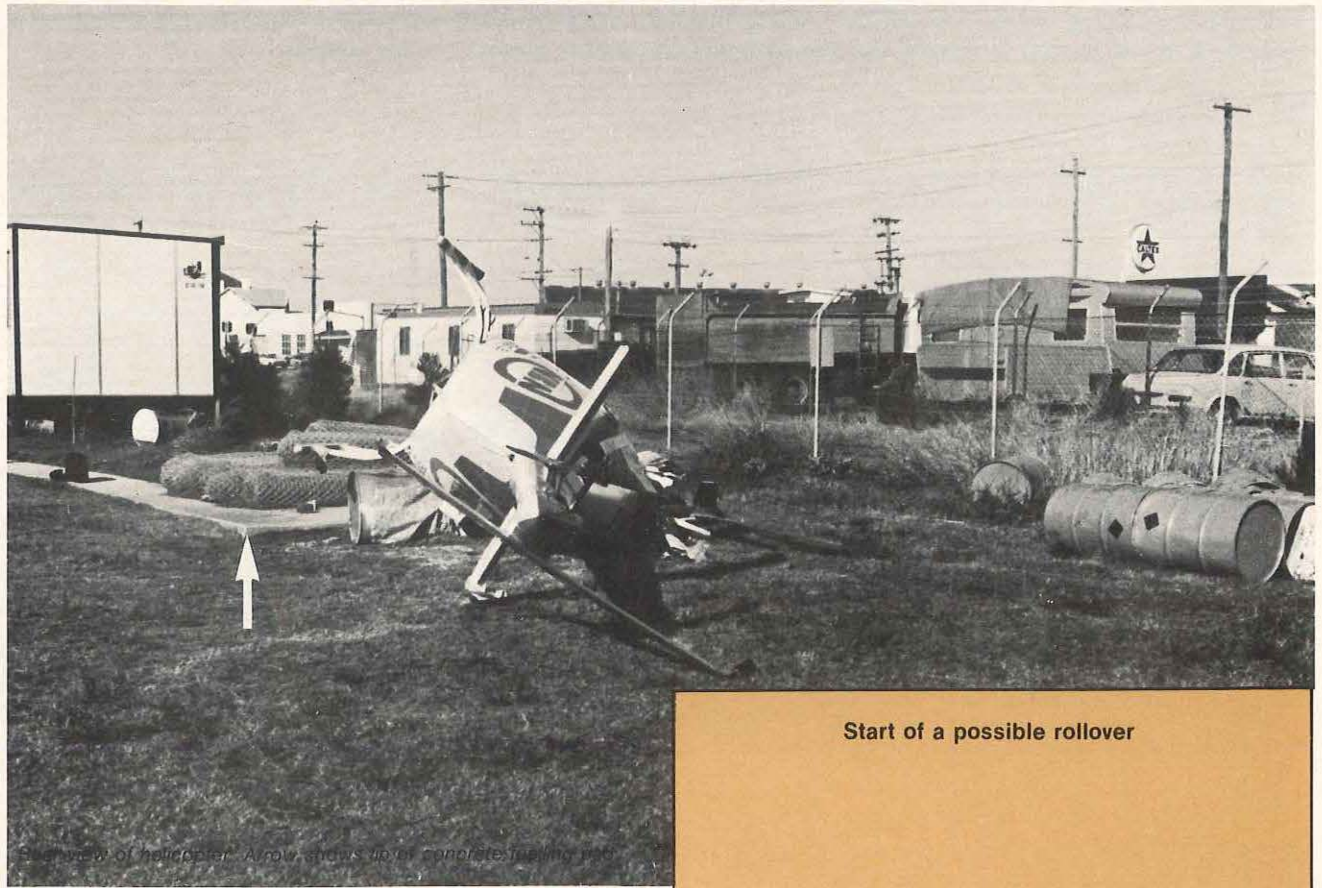
Given the persistent occurrence of this type of accident it seems, to state the case mildly, extraordinary that, either supervisors and senior pilots apparently do not brief all of their employees on this subject, or, some pilots apparently choose to ignore the advice when it is given. That advice is simple — helicopter pilots need to be careful where they land ●

Notable quote

As a postage stamp which lacketh glue, so are the words of caution to a fool; they stick not, going in one ear and out the other, for there is nothing between to stop them.

Courtesy of Flight Safety Bulletin

Dynamic rollover



Rear view of helicopter. Arrow shows lip of concrete fuelling pad

A Bell 206B had been parked adjacent to a refuelling platform 60 millimetres high. As the pilot was bringing the aircraft to the hover prior to takeoff, the right skid contacted the platform. The pilot attempted to correct with cyclic but the helicopter rolled to the right and came to rest on its right side near the platform.

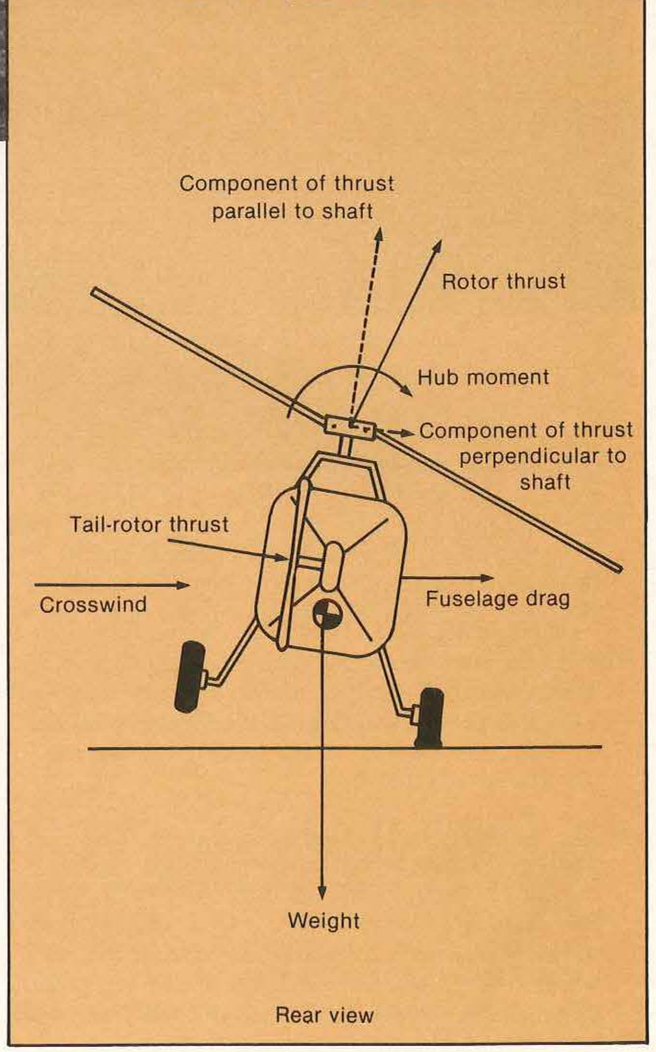
The contact between the skid and the edge of the platform had induced dynamic rollover. Evidently the pilot had not identified the problem in time to take the appropriate corrective action of lowering the collective control in order to place both skids on the ground.

Aerodynamic forces

In flight, high bank angles are generally of no great concern because control around the roll axis is usually where the helicopter is at its best. On the ground, however, even a moderate bank angle can be disastrous if it is enough to tip the machine over.

The primary helicopter upsetting moments are attributable to rotor flapping, with the resultant tilted rotor thrust and hub movements as shown in the diagram. Sometimes tail-rotor thrust and wind on the fuselage also contribute. The moment that keeps the helicopter from tipping over comes from the weight acting between the two wheels or skids. If the helicopter rolls on its landing gear, this stabilising moment diminishes; it goes to zero if the aircraft ever rises on one wheel far enough to put the centre of gravity (CG) right over that wheel. If the helicopter is sitting on a slope, it already has a reduced restoring moment and a lateral CG position (perhaps caused by fuel sloshing). A narrow landing-gear tread or, if on a ship, a rolling deck, compounds the problem.

Start of a possible rollover



A rollover can happen in calm air if the stick is being held off-centre enough during takeoff, but a crosswind can make it even more likely. Even in a strong crosswind, there is little or no main-rotor flapping due to non-symmetrical aerodynamics until the collective is raised for takeoff, then the non-symmetrical aerodynamics produce flapping (sometimes referred to as 'blowback'). In addition, as the shaft is tilted against the springiness of the landing gear, the increased angle of attack generates even more flapping. Thus, if the pilot is not compensating for the disc tilt with cyclic pitch, he will find the upsetting effects increasing at the same time that the restoring effects are decreasing.

Recovery techniques

In a normal takeoff of most single-rotor helicopters, one landing gear comes off the ground first but, since this happens just as the aircraft becomes airborne, this action is not associated with a rollover. If, however, one landing gear comes off the ground with only partial thrust on the rotor, a rollover may be starting. In this situation, the pilot might try to hurry the takeoff by raising the collective. This is usually a mistake since the increased thrust in the same direction results in an increase of the upsetting moment.

Another choice is to apply lateral control to put the gear back on the ground—but this action may be too late, especially if the initial motion came as a surprise. If an appreciable rolling velocity has developed, it will take a second or two to stop the motion and by this time the helicopter may have tilted irrevocably beyond its critical tip-over angle. This is especially true on the deck of a ship rolling in the same direction as the helicopter.

A reduction of collective pitch to get both landing gears firmly on the ground is the accepted cure for a dynamic rollover but this should be done gently. If the helicopter is dropped too fast it might bounce on the gear that was in the air and start rolling in the other direction.

Although pilot distraction or inattention is usually required to set up the conditions for a dynamic rollover, some accidents have occurred when the liftoff was attempted with one landing gear still stuck to the ground by mud, ice or a tiedown.

The possibility that a pilot may cause a helicopter to rollover on the ground is increased by very stiff hingeless rotors, since even at flat pitch a little out-of-trim cyclic pitch can produce a high, upsetting hub moment. In the Lockheed AH-56 Cheyenne, to discourage the pilot from holding the stick off-centre, a device was installed that stiffened up the control centring springs whenever the aircraft had its full weight on the landing gear. The device was deactivated on takeoff as 'squat switches' sensed the partial extension of both landing gear oleos ●

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In brief

During a dual training exercise in a C152 with a student pilot a series of circuits had been satisfactorily completed. At about 450 ft when climbing away the engine note suddenly changed and the rpm fell significantly. The instructor took control and landed without damage on the sterile area beside the runway (contractor plant was working on that end of the runway).

The air filter had disintegrated and a loose piece had become lodged in the carburettor, partially blocking the airflow. A new filter was fitted and engine performance was returned to normal. The filter was very dirty and clogged. The operator's fleet was checked and all were given new filters. The report commented that this was an example of the generally poor standards of maintenance of these particular aircraft. (NB: this was a UK occurrence).

Air filters should be kept clean and uncontaminated, as collapse of this simple item can have very serious consequences. This also makes economic sense since obstruction of the free flow of clean air will result in an inefficient, excessive fuel-burning engine. This can be demonstrated by keeping careful fuel records following fitment of a new filter (on a car or an aeroplane).

* * *

The pilot of a PA31 was on approach to a UK airport behind a Boeing 737. At the outer marker he reduced speed to 110 knots to give a greater separation. The approach was on the centreline and glideslope with only light atmospheric turbulence. At 300 ft he was cleared to land; landing flap was set and speed reduced to 95 knots crossing the threshold. Suddenly at about 25 ft a severe buffet was experienced and the aircraft rolled violently to the left through 25–30 degrees until application of full aileron, rudder and asymmetric power controlled the roll. The aircraft then managed to climb away from the ground, experiencing two more slight buffets with the rolling effect diminishing in strength. A normal landing was made further down the runway.

The pilot felt that had an overshoot been initiated when the buffet was first experienced the aircraft would have climbed above the vortex. His company training highlights the problems of wake turbulence and suggests a high approach path to a non-limiting runway as one solution. In this case it was not possible as ATC had issued a 'land after' clearance with the B737 clearing slowly two-thirds down the runway ●

Reader contribution
An eventful weekend


Photograph courtesy of Mr Robert Mossel of Klemzig, S.A.

It all began one Saturday morning: having recently finished my Unrestricted Private Pilots Licence I had completed several solo flights as well as some reasonably long distance flights with my wife as passenger.

I had been checked on the Cessna 172 and 172RG and was that day completing my load check on the 172RG prior to flying to Dubbo the next day with my wife, cousin and his wife.

The following morning bright and early we departed from Bankstown and had an uneventful run until our reporting point abeam Burrendong Dam (I always prefer to fly FULLSAR/FULL REPORTING). Upon transmitting our position report I was unable to receive any response. It was only when we were within sight of Dubbo airfield that two-way communications were established, and then only on COM 2 — by trial and error I determined that the COM 1 selector switch was inoperative.

On landing at Dubbo we encountered a strong crosswind gust, landing heavily on the right main gear wheel, and on inspection at the tie-down bay it was noticed that the tyre was unserviceable.

We visited the Western Plains Zoo as planned to see our recently sponsored wallaby and on our return to the field were advised that a replacement tyre would not arrive until the following morning. My passengers caught the 3 pm XPT and arrived at Parramatta 7 hours later while I checked into a motel and arranged to attend to some business and see our other major customer in the area the following morning.

The next day, having concluded my business, I filed a flight plan, refuelled the Cessna and, having confirmed that the COM 1 was still unserviceable, opted to return to Bankstown using COM 2 only.

Departure and en route reporting was OK until Bathurst when the weather began to look dirty despite an earlier forecast indicating VMC over Katoomba.

I flew around the 'hill' at Bathurst at approximately 4500 feet with clear visibility to Katoomba, although low cloud appeared to be sitting on the ranges at some distance to either side — it almost appeared that there was an archway cleared over Katoomba for me!

Sucked into the trap I proceeded towards Katoomba when without warning the cloud dropped within what seemed to be about 30 seconds. On turning in cloud to return to Bathurst I noticed that my senses had betrayed me and that instead of completing a level rate 1 turn, I was instead losing height at the rate of 1000 feet per minute in a 60 degree bank to the right! That's when I saw the treetops . . . (still quite some distance below). My immediate response was to curse myself for failing to heed instructions to rely on the *instruments* and *not* my senses.

FULL RICH
FULL PITCH
FULL POWER
LEFT RUDDER
LEFT AILERON
WINGS LEVEL
BACK PRESSURE ON THE CONTROL COLUMN
BEST CLIMB SPEED, POSITIVE RATE OF CLIMB, CONFIRM GEAR AND FLAP UP

I switched the transponder from 'standby' to 'on' and squawked ident.

> Sydney this is Kilo Delta Echo on climb through 5000 feet approximately ten miles west of Katoomba; I have inadvertently entered cloud and am not certified for IMC (by this time I knew I was clear of terrain . . . all I had to do now was maintain control!) require assistance . . . am attempting to level out at 5000 feet and then maintain a heading, will await further instructions.

Sydney then advised me to climb to 8000 feet in an attempt to get above cloud and advised that they would clear the frequency and attempt to radar vector me to an area safe for descent; they also ascertained my endurance as being approximately 180 minutes.

That's when the radio started to play up, and I lost communications with Sydney.

The aircraft was fitted with Autopilot, 2 VORs, DME and ADF. With the radio playing up I elected to forget the VOR/Autopilot and tried instead to monitor the Bankstown NDB. However, I was having enough trouble maintaining level flight and attempting to set a course without also experimenting with instruments I was familiar with only at a theoretical level.

I found that I was receiving several frequencies at once, with Sydney being over-ridden by Bankstown on 118.1 and 121.1.

I turned the whole set off and on again several times and tried to complete the standard inflight emergency radio checks as best I could.

All of a sudden I had Bankstown loud and clear telling me to switch to another frequency . . . and there was Sydney, clear as a bell!

When I re-established contact with Sydney I had settled down and was able to respond readily to their rapid request for another ident. and almost immediately a change of heading (this time I was located as being 25 miles north-west of Sydney — obviously in the RAAF's airspace at Richmond). Unbeknown to me there was a twin on an IFR flight to Wellington which had been instructed to climb to 7500 to allow me clearance, but which could not be contacted after I had been instructed to climb to 8000 feet — about the time my radio played up. The controllers apparently could only stand and watch as our blips converged on their radarscope.

The controller then advised that I was to continue on my heading at 8000 feet and that they would radar vector me to the vicinity of Camden and re-assess the situation . . . Hell, I was ready to fly to Canberra if necessary!

On approaching Camden I came across a 'bubble' in the clouds; it was clear from about 8500 down to ground level within a diameter of approximately 1.5 miles. Immediately I commenced a turn and advised Sydney that it was my intention to commence a steep descending turn into VMC. After some hesitation they agreed. Ignoring my training I commenced a power-on descent and very soon found myself descending at a speed in excess of 150 knots with 60 degrees of bank . . .

WINGS LEVEL
THROTTLE SET
PROP SET
FUEL SELECTOR BOTH
COWL FLAPS CLOSED
CARBY HEAT ON
10 DEGREES OF FLAP AT 130 KIAS
SELECT DESCENT ATTITUDE
CONTROLLED DESCENT . . .

Down again and into VMC at approximately 3500 . . . sighted 2FC tower and Bankstown Field . . . Controller stayed with me through descent on course to 2FC and then very professionally said 'Change frequency now to Bankstown on 118.1'. My automatic response was 'Kilo Delta Echo'.

With a very strong southerly I was directed to land on runway 18 and subsequently directed to report to Operations.

* * *

This series of events underscores the ease with which difficulties can be encountered through a 'She'll be right' attitude.

After flying blind for a total of 25 minutes in Sydney/Richmond Controlled Air Space I must say that in hindsight I should have had the radio thoroughly checked at Dubbo and should have exercised more care in determining the cloud base over Katoomba.

I walked away from this one mostly by staying calm . . . the first minute or two were the most harrowing as I was unsure that I was climbing clear of obstructions; however, once into cloud, concentration on instrument scan was paramount in saving the day.

I plan to start Class 1 training soon ●

Incorrect ground handling procedures

During disassembly of a C172 for transporting, the horizontal stabilizer front spar doubler plate at the fuselage attachment point was found to be cracked in four places. All cracks originated at the lightening hole and varied in length from 12mm to 18mm (see Figure 1). There also was buckling of the stabilizer centre section skin and spar. Airworthiness engineers believed that this damage may have been caused by incorrect ground handling.

Some manufacturers of tricycle undercarriage aircraft approve alternative methods of manoeuvring of the aircraft on the ground when a towbar is unavailable.

One such method involves pressing down at the horizontal stabilizer front spar adjacent to the fuselage to raise the nosewheel off the ground. With the nosewheel clear of the ground the aircraft is then turned by pivoting it about the main wheels. For example, the Cessna Model 172 series service manual details this technique.

It is important to note that if this method is used, downward pressure should be applied at no location other than the junction of the horizontal stabilizer front spar and the fuselage, as the application of force at locations outboard of this point will generate excessive leverage which could result in structural damage.

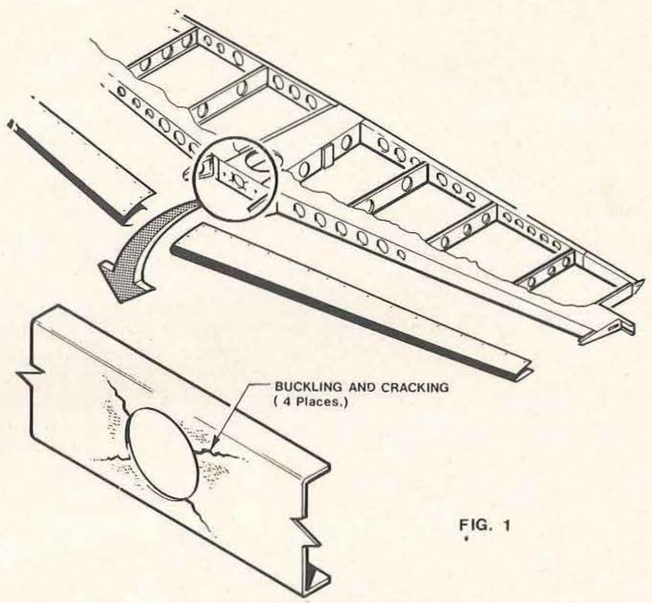

FIG. 1

The preferred method of ground manoeuvring is depicted at Figure 2 ●

Brush up on your aeronautical knowledge *(Courtesy Canberra Aero Club.)*

BECAUSE of the harsh comments made by the CFI in the last club magazine about the technical knowledge of members fronting for biennial flight reviews, he was asked to devise a 'standard quiz'.

Here it is. The pass rate will remain at zero per cent.

BFR QUIZ NO. 1

1. Determine to an accuracy of one litre the holding fuel remaining after a flight from A to B, a distance of three standard isogonals, given the following:
   fuel flow, 15mb per hour
   density latitude, 40 per cent
   QNH, standard constipation rates.
2. Calculate the time you will see sunrise on 4 December in a leap year if you are flying east from J to K with 7 oktas of northerly drift and at right angles to the winter equinox (ignore CLIAS and LSALT factors).
3. If your answer to question 2 was ►95°15'S, intercept nearest VOR radial and convert it to troy ounces of 100LL Avgas.
4. You are flying a TAS course from A to B using Adriatic QFE and a 120v headset. You find a disused flight level at right angles to track.
   a) What action should you take immediately?
   b) Would all POB need 100 per cent oxygen?
5. You are navigating with a Lamberts Incredible Chart. It has a scale of 1:3000 as measured by a Douglas Rectum.
   a) Would the topography have a concise or adverse curve?
   b) Would the curve be constant, given that the earth is a shereblat obroid?
   c) Which standard calisthenic will be east/west and will it be straight or corrugated?
6. Your aircraft has a compass swing at 180°20'W and has since been flown three times. The depreciation card shows an accretion of 6° below ISA on the headings north to west. Given a fixed card DME, what would be the relative bearing to your destination after two nautical yards of ale? Can you complete this flight on a great circle track without an SSB HF on HP?
7. Convert the velocity of triangles into mb^3 and multiply the result by your groubschpeken measured in degrees Cerberos.

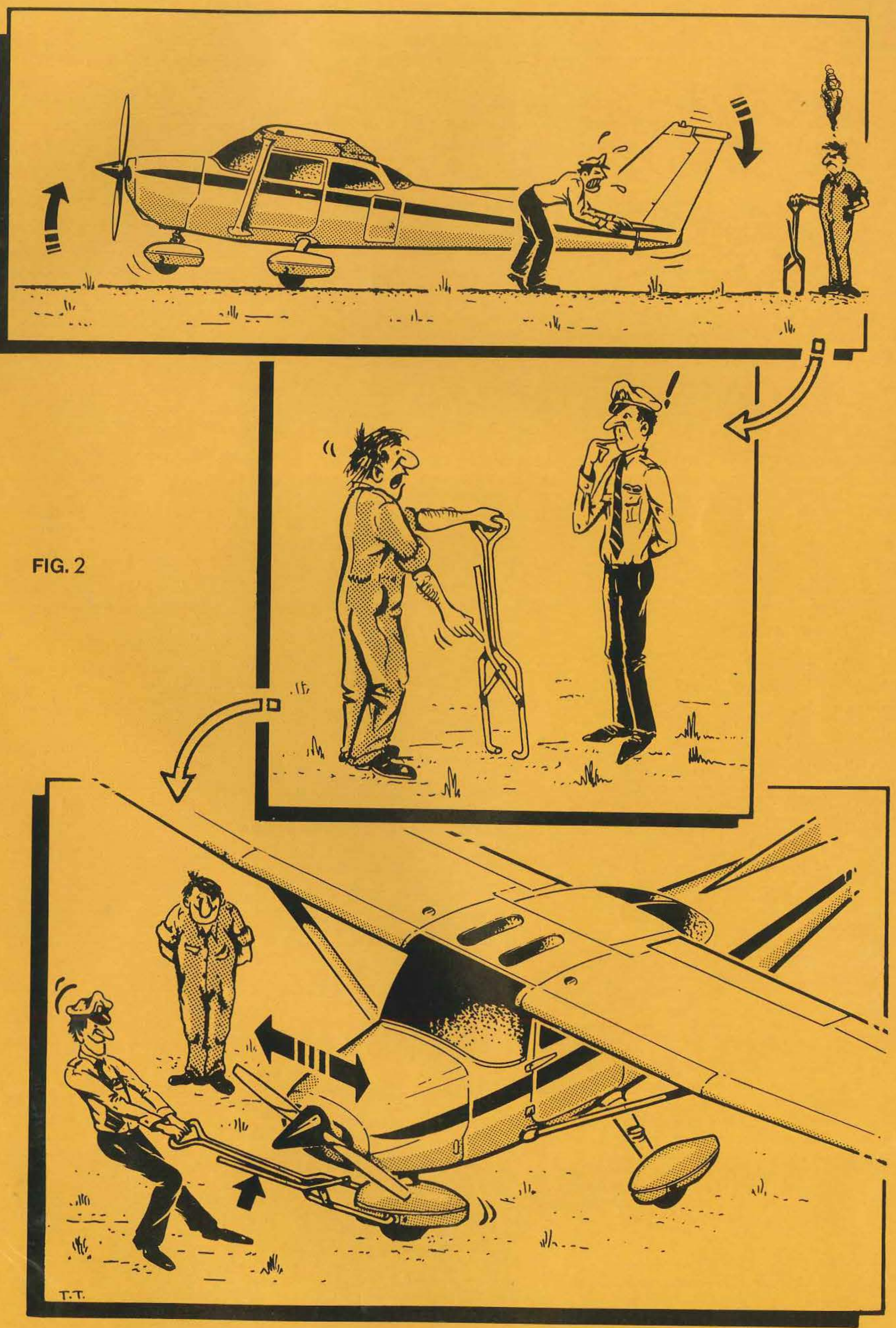

FIG. 2