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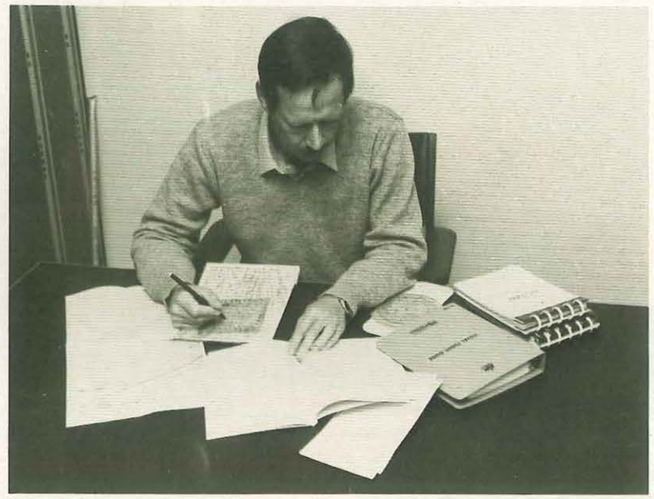
The covers this quarter illustrate the winning entries from the Digest's photographic competition. On the front is the winner in the Best Photograph Category, a De Havilland Float Beaver off Pittwater, N.S.W. This entry was submitted by Mr R. Israel of Sydney, who used a Pentax 6 x 7 cm, 150 mm lens, Fujicolour.

The back cover is the winner in the Best Safety Theme Category, submitted by Mr C. Atkins of Melbourne, using a Pentax 6 x 7 cm with a Takumar 35 mm fisheye lens, Fujicolour. Mr Atkins' photograph depicts, through the use of streaks of light originating from lamps attached to the pilots' hands, a visual representation of the control ergonomics involved during an approach flown in TAA's B727 simulator.

BASI would like to thank both the many hundreds of aviation enthusiasts who submitted entries and the competition's sponsors, Maxwell Optical Industries Pty Ltd, the Australian distributors of Nikon cameras and photographic equipment.

Preflight preparation



A few seconds after his Beechcraft M35 Bonanza became airborne the pilot selected the undercarriage UP. Unbeknown to the pilot, the emergency landing gear extension handle, which is located behind the front seats, was engaged. Thus, as the undercarriage retraction cycle started, the emergency extension handle began to rotate rapidly.

The front right seat was not occupied and its safety belt harness had not been secured. The buckle of the lap section was hanging down loose and the rotating emergency extension handle began to strike it, causing a sudden and rather startling noise.

According to the pilot, 'This unexpected noise completely drew my attention from the task at hand' (namely, to take off safely).

On identifying the source of the noise the pilot became concerned that the seat belt might foul the handle, thereby causing the landing gear to jam. With that in mind he leant over to try to secure the belt.

While doing this he sensed a change in the Bonanza's vertical speed. A quick look outside the aircraft confirmed this: it was sinking, and was almost back on the runway. The pilot immediately raised the aircraft's nose to try to re-establish a climb. However, before the 'sink' was arrested a noise was heard. This was interpreted by the pilot as the mainwheels just touching the bitumen, as the noise was similar to that which accompanies a smooth landing.

The Bonanza then climbed away and, as both the undercarriage UP light and mechanical UP indicator appeared normal, the pilot felt reassured in his assessment that it was the mainwheels which had inadvertently touched the runway, and that everything was all right. He therefore decided to continue the flight as planned.

It was only after a ground inspection was completed following the arrival at the destination that it was realised that it had been the inner mainwheel doors and not the wheels which had scraped the runway during the takeoff.

Discussion

One of the perennial topics of the *Aviation Safety Digest* is that of preflight preparation and aircraft knowledge. There is a very good reason for this: the investigation of accidents and incidents continues to show deficiencies on the part of many pilots in those areas.

The M35's Pilot's Operating Handbook does not include any reference to the undercarriage emergency extension handle in the preflight checklist. In the Emergency Procedures Section it does, however, state that the handle should be kept in the disengaged position when not in use. From the available evidence, it seems that the pilot did not check this before flight. It is also apparent that he did not observe the sound practice of securing all unused seat belts during his preflight inspection.

Comment

Many GA pilots fly infrequently. If you fall into this category, or have not flown a particular type recently, one of the most important safety-related actions you can take is to read thoroughly the Pilot's Operating Handbook before a flight. Safe operations simply cannot be expected if you are not familiar with your aircraft's limitations, normal procedures, emergency procedures and so on.

It always bears repeating that preflight preparation is the basis of aviation safety. Before every flight, could you tell yourself with confidence that you are familiar with and feel comfortable about all of the operational information relevant to your intended activities? If the answer is not a positive 'yes', then you need to re-examine your approach to piloting ●

Fatigue on the midnight express

A light twin was cruising at 10 000 feet on a 'midnight express' freight run. The pilot's first takeoff on the period of duty had been made at 0055 hours local time and he had departed on this, the final leg, at 0445. At 0511 he gave a position report to Sydney Flight Service Unit (FSU) which included an estimate of 0544 for entering controlled airspace approaching Melbourne. In the following 33 minutes the pilot did not, however, contact Melbourne FSU to receive his airways clearance, nor did he respond to calls transmitted by the FSU.

At 0536 the probable radar return of the aircraft was observed at a distance of 80nm from Melbourne and 6nm off track. Shortly afterwards Melbourne Control commenced communication checks, but again there was no response.

Finally, at 0555, Melbourne FSU received a call from the pilot: his aircraft was still at 10 000 feet and was (as confirmed by the continuous radar surveillance) 26nm from Melbourne—well inside controlled airspace. The pilot was transferred to Melbourne Control and given an airways clearance; the flight was then concluded uneventfully.

Post-flight discussion with the pilot elicited the following information:

- The flight had been single-pilot with no passengers.
- On the previous day he had flown between 0830 hours local and 1100 and then had been off duty; however, he only managed to sleep between 1900 and 2230.
- He was self-medicating in an attempt to counter the early stages of a cold.
- Oxygen was available in the aircraft but had not been used as the flight did not go above 10 000 feet.
- The pilot believed that he was not actually asleep, but rather in a low arousal state because when he became fully aroused again, he noticed that during the period Melbourne had been unable to contact him he had tuned navaids and made a heading adjustment. He had also retuned his VHF radio to 118.62 MHz instead of 118.6 MHz: he believed that if he had been on the correct frequency he would have been aroused by Melbourne FSU calling him as he approached controlled airspace.

Analysis

In reviewing the incident, an aviation medicine specialist commented that even though the pilot had been given a rest period before the flight, his 3½ hours of sleep were inadequate. Further, the anti-cold capsules he was taking might have caused some drowsiness, thus exacerbating any existing fatigue. It was also possible that the onset of the cold could have raised the pilot's temperature, which in turn could have increased his metabolism and need for oxygen. Given that he was flying at 10 000 feet, the oxygen saturation of his blood would already have been reduced: under normal circumstances this would have been acceptable, but here, in concert with the other physiological factors, his susceptibility to drowsiness was increased.

Findings

Summing up, the Avmed Doctor suggested that the following factors were relevant to this incident:

- The pilot was tired because of lack of sleep.
- He was probably subject to reduced oxygen tension, exacerbated by increased metabolism due to infection.
- The low workload in a low information environment (night flying) was conducive to boredom.
- The pilot was self-medicating with drugs which could have caused drowsiness.

The sum total of these factors was a state of low arousal/torpor in the pilot which could have had a far more serious outcome.

* * *

This leads to the question: what can we, as pilots, learn from this potentially disastrous incident?

Fatigue is an almost inevitable consequence of the type of operation described in the article, and one reaction might be:

> Well, that's all very interesting, but things like fatigue and common colds are unavoidable, everyday operational problems. All I can do is hang in there, keep flying, keep my job and hope that something like going to sleep on the job doesn't happen to me. It's all just a matter of luck.

If that is your reaction, here is the good news. It is not just a matter of luck—there are steps you can take to minimise the effects of fatigue on your performance as a pilot.

Fatigue

Fatigue is a condition which generally must be 'self-recognised', i.e. it is difficult to quantify: it depends not so much on the amount of work performed but, rather, how the individual feels. Further, the effects of fatigue can vary between individuals and may not be readily apparent to either those affected or their supervisors. On the positive side of the ledger, we know what kinds of conditions are most likely to produce a fatigued pilot, we know what the effects are on performance, and we know the remedial actions required.

There are two types of fatigue—acute and chronic.

Acute fatigue is the more common. Caused by excessive physical and/or mental activity, it is a temporary condition associated with short-term stress. While its effects can be serious, recovery usually requires only a good night's sleep. The symptoms of acute fatigue are listed in Table 1.

Chronic fatigue is a function of prolonged exposure to stress, normally over a period of weeks or months. Chronic fatigue may not always be as severe as acute fatigue, but it cannot be so readily relieved. Its development may be so gradual that an individual may be unaware that it is happening; while its cure can be complex, usually requiring an extended period of recuperation.

Stresses commonly leading to chronic fatigue include problems most of us experience at some time or another: physical illness, career insecurity, family difficulties, and so on. Chronic fatigue can be manifest through the symptoms detailed in Table 1, plus those in Table 2.

TABLE 1. Acute and chronic fatigue

Symptoms	*Signs*
Sleepiness	Tired, bored, slow frequent yawning or sighing
Lowered standards	Increased rates of errors, sloppy, careless
Increased reaction time	Slow to respond, missing radio calls, rough on the controls
Physical exhaustion	Slow movement, increased effort to carry out work, complaints of cramps or stiff muscles
Irritability	Fault-finding, impatience, temper flareups, grouchy
Unable to concentrate	Instrument scan breaking down, indecisive, slow in solving simple problems

TABLE 2. Chronic fatigue

Symptoms	*Signs*
Forgetfulness	Forgetfulness, unusual preoccupation
Increased reliance on caffeine, alcohol	Chain smoking, hangovers, coffee addiction
Insomnia	Change of sleep habits, nightmares
Loss of appetite	Not eating well, loss of weight
Depression	Withdrawal, anxiety, fearfulness, confusion, sense of failure
Tenseness	Unable to relax, restless
Psychosomatic illnesses	Headaches, heartburn, constipation, diarrhea, vague chest pains, shortness of breath

Curing fatigue

As mentioned above, acute fatigue can usually be remedied with a good night's sleep. Also, looking after yourself with good nutrition and a sensible exercise program will help the body to recover more quickly.

Chronic fatigue can be a complex matter, often as much psychological as physical. It may incorporate a vicious cycle—you are tired but have insomnia, or undernourished but have no appetite, or need exercise but have no energy, etc. The cycle must be broken, but this can be a lengthy process.

The key factor is that of learning to leave the problems causing the stress behind, or at least learning to cope with them. A change of environment (location, job) or a good holiday can help. Often, it is best to seek professional advice. Psychologists have developed a range of stress management and relaxation techniques which are very effective and readily available. Remember, the consequences of not doing anything could be disastrous.

Preventing fatigue

As usual, prevention is better than cure. The following factors should be taken into account by operations supervisors and their crews alike:

- **Work-rest schedules.** A regular schedule will assist greatly.
- **Physical condition.** 'Norm' has a point—a sensible exercise program should be a must.
- **Good nutrition.** We give our aircraft's components the best of attention, yet sometimes treat our personal airframe and engine like a garbage bin. Healthy eating is essential. Apply a bit of quality control.
- **Moderation in consumption of alcohol, and smoking.** If addicted to smoking, at least abstain during the period from one hour before a flight through to its completion.
- **Moderate consumption of coffee and tea**—no more than one cup every three or four hours. Caffeine induces dehydration, which in turn will degrade performance.
- **Drink sufficient water.** Flying necessitates a greater fluid intake than that required on the ground. About one glass of water an hour is recommended.
- **Exercise while flying**—stretch and flex limbs, relax the neck and back muscles etc. periodically to improve blood circulation and reduce fatigue.

Sleep

Special attention must be given to the subject of sleep, for researchers have found that, when all things are considered, the most common single cause of fatigue among pilots is that of inadequate or insufficient sleep, regardless of the type of flying operations concerned. Most of the stress factors which cause chronic fatigue do so because their effect is to disrupt or prevent proper sleep. (Refer also to *Aviation Safety Digest* Nos 119, 120, 121 and 122). Here there are two vital elements. Sleep must be of:

- sufficient duration; and
- good quality.

Try to ensure that you have a quiet, dark environment for sleeping.

Work–rest patterns can severely affect your ability to sleep if they are constantly changed. For example, it takes some time for the body to adapt to work–rest patterns associated with night work. The situation often arises in which, just after your body has adapted to a night schedule, you are re-scheduled for day operations. This again requires time for the body to re-adapt.

During both of these periods of adaptation normal sleep is disrupted; thus, if you are constantly changing from day to night work, a sleep deficit will gradually accumulate. The result can be chronic fatigue, with its concomitant probability of potentially disastrous lapses in performance.

Conclusion

The idea, then, is to try to get plenty of regular, good quality sleep. One way of achieving this is by stabilising work–rest schedules as far as possible, thereby enabling you to adapt to a particular pattern. Another important and readily achievable preventative measure is that of regulating your life style; and here, matters such as exercise and nutrition are important.

The processes discussed in this article may require some discussion with your company or clients, but if implemented they are likely to result in better and safer operations ●

Hung up

Having reached 8000 feet during parachuting operations, the pilot of a Cessna 206 completed the run-in and then closed the throttle in preparation for the drop. One parachutist stood on the right main wheel while five others assembled at the right hand rear doorway, from which both doors had been removed. The pilot was looking forwards, maintaining a steady flight path. He was wearing headphones, with the right earpiece displaced to hear heading instructions, and a Slimpack parachute.

On the jumpmaster's command 'Go!', all six parachutists appeared to leave the Cessna, which produced the normal aircraft response of an upward 'jerk' and a roll left. The pilot set the aircraft up for descent while immediately turning left to watch the free fall manoeuvres. After completing one or two orbits he saw the parachutists separate and the canopies open. There were only five.

Thinking that one parachute may have malfunctioned or separated some distance from the others the pilot started a visual search, levelling the Cessna's wings to improve his downward visibility. At about the same time he heard a cry from the rear of the aircraft. Turning around he saw a leg, with the foot uppermost, lying vertically against the rear doorpost. Then a face came into view about a metre below the floor level, outside the aircraft.

The pilot increased engine power slightly, left the flaps and trims set as they were, and moved back to the doorway, still wearing his parachute. The aircraft remained in a reasonably steady attitude.

He found that the parachutist was suspended by a leg strap of her harness, which had hooked over a triangular seat belt anchorage at the outer edge of the floor next to the rear door post; the other leg was under the aircraft somewhere, not visible. The parachutist was trying to reach the door sill with her right hand but was unable to do so.

Grabbing her arm, the pilot pulled her upwards until the leg strap became free of the seat belt anchorage: her legs then fell free, leaving her suspended outside the aircraft by one arm which the pilot was holding (with some difficulty, as her jump suit was slippery).

As he assessed that it would be a difficult task to lift the parachutist back into the aircraft because of the slipstream, the pilot asked her if she was able to continue with the drop. She nodded, saying that she was 'OK', so he let go. He saw her fall for about a thousand feet and then her canopy opened normally. The pilot resumed his place at the controls, with the Cessna at an altitude of around 5000 feet, and returned to the landing strip.

It transpired that when the jump command 'Go' was given, the parachutist followed her normal practice of diving headlong through the open door. However, on this occasion the right leg strap of her harness caught on the triangular seat belt attach point on the floor of the aircraft and she found herself suspended upside down under the aircraft. She said that she had become completely disoriented and found it impossible to get back into the aircraft: she had been shouting and banging the underside of the fuselage, but it was only after the pilot levelled the Cessna's wings that she had been able to get one leg back into the doorway and raise her head sufficiently to be able to shout directly into the cabin. She was full of praise for the pilot's actions in extricating her.

The parachute descent after she had been freed was uneventful.

* * *

In accordance with regulations, the C206 had single point restraints in the floor for the parachutists. Additionally, a loose carpet had been placed on the floor to guard against the possibility of equipment getting caught up. Despite these apparently reasonable precautions, a mishap still occurred. The triangular seat attach point was subsequently removed.

The incident highlighted the potential dangers which protuberances inside parachuting aircraft can pose ●

Fatigue on the midnight express *(Continued)*

Safe operation of light twins

Accidents involving light twin-engine aircraft in Australia continue to indicate that not all pilots understand as well as they should all of the basic factors involved in operating a twin.

This photograph by Mr Brenton Hollitt was a highly commended entry in the BASI Photographic Competition. Mr Hollitt used a Pentax SP 1000 with Kodak C135 100 ASA film.

The major demand in flying a twin as opposed to a single is knowing how to manage the flight if one engine loses power for any reason. This may sound obvious, but experience unfortunately indicates that it is not. Safe flight with one engine-out requires proficiency in two areas:

- an understanding of the factors affecting aircraft performance during asymmetric flight; and
- piloting competence in inflight engine-out procedures.

These key factors are discussed below in relation to climb performance and controllability.

Climb performance

Climb performance depends on an excess of power over that required for level flight. Loss of power from one engine obviously represents a 50 per cent loss of power, but *in virtually all light twins, climb performance is reduced by at least 80 per cent* (see Figure 1).

The amount of power required for level flight depends on how much drag must be 'overcome' to sustain level flight. It is obvious that, if drag is increased because the gear and flaps are down and the propeller is windmilling, more power will be required. Not so obvious, however, is the fact that drag also increases as the square of the airspeed, while power required to maintain that speed increases as the cube of the airspeed (see Figure 2).

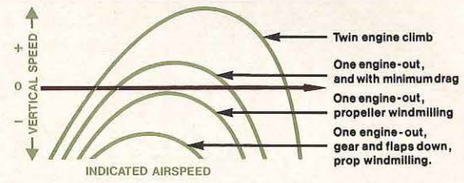


Figure 1. Effect of one engine-out and aircraft configuration on vertical speed.

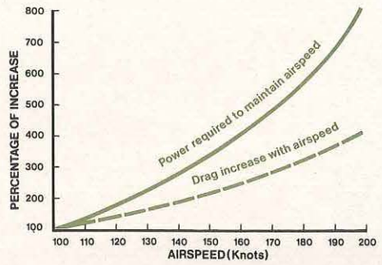


Figure 2. Effect of airspeed on drag - and power required to maintain that airspeed while in level flight.

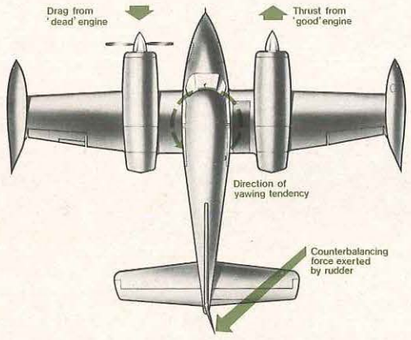


Figure 3. Yaw

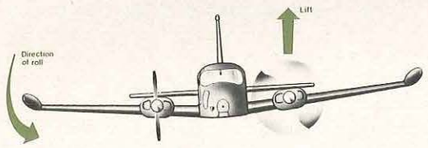


Figure 4. Roll

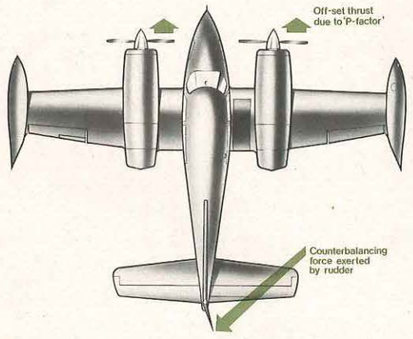


Figure 5. Engine thrust line shifts to right at low airspeeds and at high angles of attack

Thus, climb performance depends on four factors:

- **Airspeed**—too little or too much will decrease climb performance.
- **Drag**—gear, flaps, cowl flaps, propeller, speed and slip angle.
- **Power**—amount available in excess of that needed for level flight.
- **Weight**—passengers, baggage and fuel load greatly affect climb performance.

Controllability

Aerodynamic controllability can be considered initially in terms of yaw and roll.

Yaw. Loss of power on one engine creates yaw towards the failed engine. Yaw forces must be balanced with the rudder (see Figure 3).

Roll. Loss of power on one engine reduces propeller wash over that wing. Yaw also affects the lift distribution over that wing: in combination, these factors cause a roll towards the 'dead' engine (see Figure 4). The roll forces may be balanced with use of opposite aileron. It is also most important to note that total aircraft drag, and rudder force, are decreased by banking the aircraft towards the 'live' engine. This will, for a steady heading, result in an unbalanced skid ball, but this, and the minor disadvantage of slightly increased aileron forces, greatly outweigh higher rudder forces and extra airframe drag caused by the greater sideslip which occurs with the wings level attitude.

Note that airspeed control and the power set on the live engine are also critical as far as controllability is concerned; these factors are discussed later in this article.

Critical engine

The critical engine is that engine which, if it fails, will most adversely affect the performance or handling qualities of the aircraft. The critical engine on most U.S.-built light twins—i.e., the majority of those flying in Australia—is the left engine, as its failure requires the most rudder force to overcome yaw. The reason for this is as follows. At cruise speeds and power settings, the thrust line of each engine acts through the propeller hub; thus, neither engine is particularly critical. However, at low airspeeds and high angles of attack, the effective thrust centreline shifts to the right on each engine because the descending propeller blades produce more thrust than the ascending blades (this is known as the P-factor). Thus, the right engine produces a greater mechanical yawing moment than does the left, and so requires a greater rudder force to counteract that yaw (see Figure 5).

Airspeed control

Airspeed control is the key to safe single-engine operations. Certain speeds must be known and understood by twin pilots. This article discusses those speeds in two sections:

- Immediately below, the practical implications of those speeds are defined.
- In the subsequent section, a more detailed discussion is provided, first, of the conditions under which the speeds are determined and, second, of significant operating considerations related to critical speeds.

Key airspeeds

- **Vmca**—the airspeed below which control of the aircraft will probably be lost.
- **Vsse**—the intentional one-engine inoperative speed is a minimum speed selected by the manufacturer for intentionally rendering one engine inoperative in flight for training purposes.
- **Vyse**—the airspeed that will give the best single-engine rate-of-climb (or the slowest loss of altitude).
- **Vxse**—the airspeed that will give the steepest angle-of-climb with one engine-out.

These key airspeeds are depicted graphically at Figure 6.

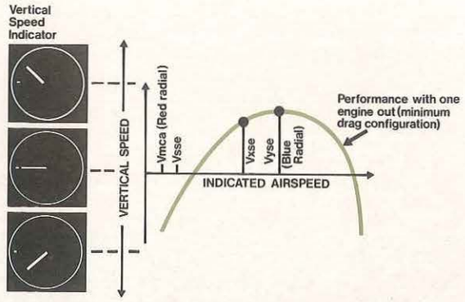


Figure 6. Key single engine airspeeds

Minimum control airspeed

Vmca is designated by the red radial on the airspeed indicator and defines minimum control speed, airborne, at sea level. It is determined by the manufacturer as the minimum airspeed at which it is possible to recover control of the aircraft within 20 degrees of heading change, and thereafter maintain straight flight with not more than 5 degrees of bank if one engine fails *suddenly* with:

- takeoff power set on both engines;
- the rearmost allowable centre of gravity;
- flaps in the takeoff position;
- landing gear retracted; and
- the propeller of the failed engine in the takeoff pitch position (or feathered if fitted with auto-feather).

Sudden engine failures rarely occur with all of the factors listed above, so the actual Vmca in a particular situation may be a little lower than that indicated on the ASI. On the other hand, most light twins will not maintain level flight at an airspeed at or near Vmca; consequently, it is not advisable to fly at speeds approaching Vmca except during training or test flights.

It should be remembered that to minimise the difficulties which occur on *sudden* failure under the critical circumstance (e.g. just after takeoff), the pilot should accelerate quickly to recommended single engine and then all-engines operating climb speeds. It is important also to remember that whilst some manufacturers provide a speed margin between Vmca and recommended lift-off speed, others do not, and there may be very little or no speed margin provided in the data, for either reasons of ground control or merely the desire of the manufacturer to show minimal takeoff distance figures.

Vsse and Vmca demonstrations

Vsse *may* be specified by the aeroplane manufacturer in Pilot's Operating Handbooks, and is the minimum speed at which an engine should be deliberately shut-down for training or demonstration purposes. The use of Vsse is intended to reduce the accident potential from loss of control after an engine shut-down at or near minimum control speed. Vmca demonstrations are necessary in training but must not be practised with a propeller feathered or an engine shut down. In addition, the pilot-in-command must ensure that:

- the aircraft is at a safe altitude above the terrain, and
- Vmca for the particular aircraft type is greater than the stall speed for the configuration and weight.

To demonstrate this sequence, power reduction should be made on one engine at or above Vsse or, where Vsse is not specified, at a safe margin above Vmca. Power on the operating (good) engine should be set at the position for maximum continuous operation. Airspeed is then reduced slowly (one knot per second) until control of the aircraft can no longer be maintained (e.g. heading cannot be maintained through loss of directional control, or lateral control cannot be maintained; the limits may be dictated by control forces or control stops). Note that at higher altitudes, with normally aspirated engines, the first symptoms of a stall may appear before Vmca is reached (see Figure 7). Recovery is necessary so that spin conditions are avoided. This exercise, which in fact is the determination of *static* Vmca at the particular altitude under the given conditions, should precede *dynamic* Vmca exercises, where simulated *sudden* engine failures (as opposed to the preset reduced power settings used for static Vmca demonstrations as described above) are made in the appropriate configuration at decreasing airspeeds.

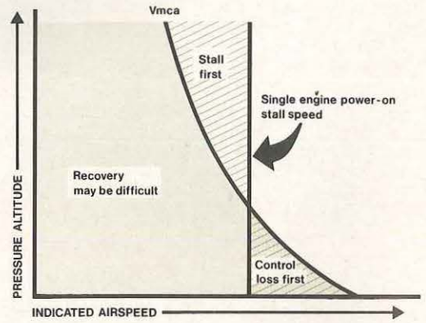


Figure 7. Relationship between stall speed and Vmca for aircraft with normally aspirated engines.

Recovery from flight below Vmca is made by reducing power on the operating (good) engine, decreasing the angle of attack by lowering the nose, accelerating through Vmca, and then restoring required power to the operating engine and accelerating to Vyse, the blue radial speed.

Best single-engine rate-of-climb speed

Vyse is designated by the blue radial on the airspeed indicator. Vyse delivers the greatest gain in altitude in the shortest possible time, and is based on the following criteria:

- critical engine inoperative, and its propeller in the minimum drag position;
- operating engine set at not more than maximum continuous power;
- landing gear retracted;
- wing flaps in the most favourable (i.e., best lift/drag ratio) position;
- cowl flaps as required for engine cooling; and
- aircraft flown at the recommended bank angle.

Drag caused by a windmilling propeller, extended landing gear, or flaps in the landing position, will severely degrade or destroy single-engine climb performance. Single-engine climb performance varies widely with the type of aircraft, weight, temperature, altitude and aircraft configuration. The climb gradient (altitude gain or loss per mile) may be marginal or even negative under some conditions. Study the Pilot's Operating Handbook for your specific aircraft and know what performance to expect with one engine out.

Best single-engine angle-of-climb airspeed

Vxse is used only to clear obstructions during an initial climb-out as it gives the greatest altitude gain per unit of horizontal distance. It provides less engine cooling and requires more rudder deflection than Vyse.

General considerations

Having discussed the main aspects of key single-engine performance speeds, attention must now be drawn to some important general operational considerations.

Single-engine service ceiling

The single-engine service ceiling is the maximum altitude at which an aircraft will climb, at a rate of at least 50 feet per minute in smooth air, with one propeller feathered.

The single-engine service ceiling chart should be used during flight planning to determine whether the aircraft, as loaded, can maintain the en route lowest safe altitude if IFR, or terrain clearance if VFR, following an engine failure.

Basic single-engine procedures

Know and follow the single-engine emergency procedures specified in your Pilot's Operating Handbook for your specific make and model of aircraft. The following procedures apply generally:

- Maintain aircraft control and airspeed at all times. This is cardinal rule no. 1.
- Usually, apply maximum power to the operating engine. However, if the engine failure occurs during cruise or in a steep turn, you may elect to use only enough power to maintain a safe speed and altitude. If the failure occurs on final approach, use power only as necessary to complete the landing.
- Reduce drag to an absolute minimum.
- Secure the failed engine and related sub-systems.

The first three steps should be done promptly and from memory. The check list should then be consulted to be sure that the inoperative engine is secured properly and that the appropriate switches are placed in the correct position.

CAUTION: Be sure to identify the dead engine *positively* before feathering its propeller. Many pilots—both students and veterans alike—have feathered the wrong propeller. Do not let it happen to you. Remember, first identify the suspect engine ('dead leg, dead engine'); second, verify your identification by cross-reference to engine instruments and, on some piston engine aircraft, by cautious throttle movement; *then* feather. But be certain that the engine is dead and not just sick.

Engine failure on takeoff

If an engine fails before liftoff speed is attained, the only proper action is to discontinue the takeoff. If the engine fails after liftoff with the landing gear still down, the takeoff should still be discontinued if touch down and roll-out on the remaining runway is still possible.

If you do find yourself in a position of not being able to climb, it is much better to pull the power on the good engine and land straight ahead than to try to force a climb and lose control.

Pilot's Operating Handbooks for a number of light twins contain guidance concerning engine failure during takeoff, specifically in relation to:

- **Accelerate–stop distance:** this is the distance required to accelerate to liftoff speed and, assuming an engine failure at the instant that liftoff speed is attained, to bring the aircraft to a full stop.
- **Accelerate–go distance:** this is the distance required to accelerate to liftoff speed and, assuming an engine failure at the instant liftoff speed is attained, to continue the takeoff on the remaining engine to a height of 50 feet.

When considering such guidance, pilots should make allowance, not only for the prevailing conditions, but also for the fact that the manufacturer's data may have been determined under favourable test conditions.

Study your accelerate–go charts carefully. Most aircraft are not capable of climbing out on one engine under all weight, pressure altitude and temperature conditions. Know, before you taxi, whether you can maintain control and climb-out if you lose an engine while the gear is still down. It may be necessary to off-load some weight, or wait for more favourable temperature or wind conditions.

It is important to realise that there is no regulatory requirement for continued takeoff capability in light twin aircraft, *nor the requirement for any positive climb at all* in certain small light twins. There is much truth in the somewhat cynical statement that 'many light twin-engine aircraft are merely single-engine aircraft with their power divided into two individual packages'. The capability of en route continuation of flight and safe landing after an engine failure is usually there; however, the capability of some light twins for climbing away from the ground after sudden engine failure, even if the optimum configuration is quickly achieved and faultless pilot performance exhibited, is often just not available.

When to fly Vx, Vy, Vxse and Vyse

During normal two-engine operations, always fly Vy (or Vx if necessary for obstacle clearance) on initial climb-

out. Then, accelerate to your cruise climb airspeed, which may be Vy plus 10–15 knots after you have obtained a safe altitude. Use of cruise climb airspeed will give you better engine cooling, increased inflight visibility and better fuel economy. However, at the first indication of an engine failure during climb-out, or while on approach, establish Vyse or Vxse, whichever is appropriate. (Consult your Handbook or Flight Manual for specifics.)

Remember, too, that single-engine go-arounds in light twins are virtually impossible unless they are commenced several hundred feet above the ground and with adequate airspeed in hand. Plan any single-engine approach well ahead, use final flap with extreme caution and only when committed and keep that airspeed up, again until committed.

Summary

Know the key airspeeds for your aircraft and when to use them:

Vmca (Red radial)—never fly at or near this airspeed except in training or during flight tests.

Vsse—never intentionally shut down an engine below this airspeed.

Vyse (Blue radial)—always fly this airspeed during a single-engine emergency during climb-out (except when necessary to clear an obstacle after takeoff) and on final approach until committed for landing.

Vxse–fly Vxse to clear obstacles, then accelerate to Vyse.

Know the performance limitations of your aircraft, including its:

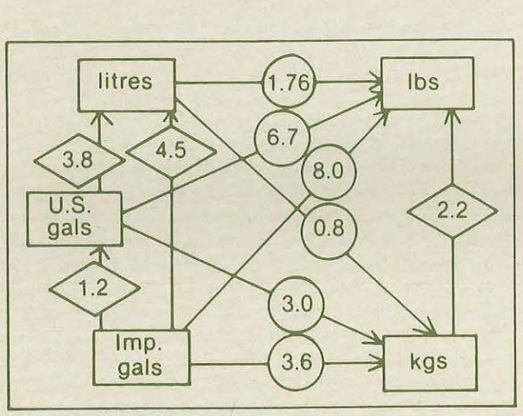
- accelerate–stop distances;
- accelerate–go distances;
- single-engine service ceiling; and
- maximum weight at which a single-engine climb is possible.

Know the basic single-engine emergency procedures:

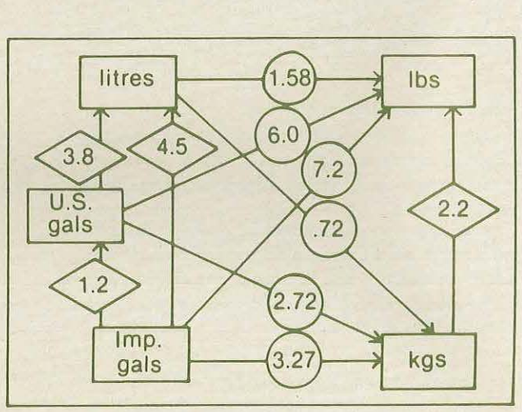
- Maintain control of the aircraft by flying at the proper airspeed.
- Apply maximum power, if appropriate.
- Reduce drag (includes feathering).
- Complete engine-out checklist.

And finally, put your knowledge into practice with a qualified instructor observing and assisting you. Engine failure can be handled competently and safely by proficient pilots. Proficiency is related to currency, and both are fundamental to safety ●

Quick conversions



For jet A calculations turbine SG 0.8
- follow the arrow and multiply
- backtrack the arrow and divide



For AVGAS calculations piston SG 0.72
- follow the arrow and multiply
- backtrack the arrow and divide

These small charts need only a hand held calculator to use. They enable you to convert fuel figures from any volume units to any weight units, and vice versa.

All the figures in the diamond-shaped boxes are precise while all the figures in the circles are 'about' right. The qualification 'about' right is necessary because those circled figures depend on the specific gravity of the fluid in question, which in turn depends on its temperature. An average SG of 0.8 has been used for jet fuel and 0.72 for AVGAS.

These figures are not intended for use in precise flight planning; rather, they are for quick reference and are sufficiently accurate to eliminate gross errors and keep you out of trouble. ●

Aircraft accident reports

FIRST 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*
06 Jan 1245	Piper 28—R200 VH-WIN Bourke NSW	Non commercial — pleasure Deniliquin NSW/Bullaroon Stn. NSW	C1N, P2N 8521002

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.

06 Jan 1103	Bell 206B VH-BHC Hoskinstown NSW	Activities associated with fire control Hoskinstown NSW/Captains Flat NSW	C1S, P1S, P1M 8521001

Just after lift off, the pilot initiated a climbing left turn and the helicopter struck a powerline about 120 metres from the take-off point. Control of the helicopter was lost, it impacted the ground and rolled inverted. The occupants were able to evacuate the wreckage before it was destroyed by fire.

11 Jan 1133	Cessna 172K VH-RGT Mittagong NSW	Non commercial — pleasure Mittagong NSW/Coffs Harbour NSW	C1M, P2N 8521003

The pilot reported that the aircraft became airborne after a ground roll of about 760 metres and initial climb was commenced at an indicated airspeed of 65 knots. Soon after lift off the climb performance of the aircraft decayed and the airspeed reduced to 50 knots. Several gradual turns were made to avoid trees but the aircraft struck trees on rising terrain and impacted the ground.

11 Jan 0917	Hughes 269-C VH-KLQ Scartwater 28 W	Non commercial — pleasure Jumba Qld/Scartwater Qld	C1N 8511001

The pilot reported that the engine stopped without warning during cruise at 3000 feet. Restart attempts during an autorotation were unsuccessful. The helicopter was landed in a small clearing and the tail boom was severed.

12 Jan 1655	Czech Blanik L 13 VH-GBT Tumut NSW	Instructional — solo (supervised) Tumut NSW/Tumut NSW	C1F 8521004

The student pilot was briefed to conduct a soaring flight of not greater than 1 hour duration. The aircraft departed strip 35 via aerotow into a light northerly wind. During the flight the wind changed to a gusty south-westerly. The pilot did not return for 2 hours and then rejoined the circuit for strip 35. At approximately 100 feet on final approach the aircraft abruptly entered a steep dive and impacted the ground in a steep nose down attitude.

14 Jan 0900	Cessna 180K VH-SAA Bundaberg Qld	Training Bundaberg Qld/Bundaberg Qld	C2N 8511002

Towards the end of the landing roll the aircraft started to veer left. The pilot under check applied right rudder and considerable power and the aircraft swung sharply right. The left wing and elevator tips contacted the ground before the instructor could take over and regain control of the aircraft.

15 Jan 0635	Piper 34 — 200T VH-KGR Clermont Qld	Charter — passenger operations Emerald Qld/'Wondabah' Qld	C1N 8511003

After arriving in the area the pilot was unable to locate the destination strip. He decided to land on a gravel road near a house to seek directions. Shortly after a normal touchdown the nosegear collapsed and the aircraft came to rest in a drain beside the road. The pilot reported that there had been nosewheel shimmy during the previous take-off and just prior to the nose leg collapsing.

17 Jan 0900	Cessna A185E VH-SWE Clermont Qld 32N	Charter — passenger operations Emerald Qld/Bendemeer Station	C1N, P2N 8511004

After a normal touchdown a swing to the right developed. The swing was controlled initially with rudder but, as brake became necessary the pilot lost directional control. After the aircraft had swung through about 120 deg the left wheel was dislodged. Initial investigation indicates that the failure of a bolt in the left brake assembly caused the brake to become ineffective.

Date *Time*	*Aircraft type & registration* *Location*	*Kind of flying* *Departure point/Destination*	*Injuries* *Record number*
18 Jan 0748	Bell 206B VH-WNB Karratha WA 20N	Charter — cargo operations Legrendre Island WA/MV 'Western Odyssey'	C1M 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.

22 Jan 1555	Cessna 172N VH-KGA Esperance WA 34SW	Non commercial — pleasure Esperance WA/Esperance WA	C1N 8551003

As part of his pre-flight inspection, the pilot completed a water check on each of the wing tanks and operated the fuel strainer knob, although a sample was not drawn from this point. During the flight the pilot noticed a strong smell of fuel. As he turned back towards the departure aerodrome the engine lost power. The pilot carried out a forced landing into an area of dense light timber, during which the aircraft struck several trees.

24 Jan 1450	Beech 58 VH-EZB Halls Creek WA	Charter — passenger operations Halls Creek WA/Fitzroy Crossing WA	C1N, P2N 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 was damaged.

24 Jan 0946	Socata 880B VH-UQG Wellington NSW	Non commercial — business Wellington NSW/Mudgee NSW	C1N P2N 8521005

The pilot had diverted to Wellington because of thick bushfire smoke on his intended track. Take-off was initiated after the smoke had cleared, however shortly after becoming airborne the aircraft sank towards the ground. The pilot subsequently advised that although the engine was developing full power he was unable to prevent the sink from continuing until the aircraft struck the ground heavily, 210 metres beyond the boundary fence of the strip.

26 Jan 1302	Cessna 172N VH-WND Albury NSW	Test Albury NSW/Albury NSW	C1S 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.

27 Jan 1410	Pitts S1 VH-DDS Lake Eppalock Vic	Air show/air racing/air trials Moorabbin Vic/Moorabbin Vic	C1M 8531002

A low level aerobatics display was being conducted over the lake. Towards the end of the display the pilot intended performing a hesitation roll at 500 ft agl, followed by a 45 deg climb and stall turn, with the dive recovery to be flown in the opposite direction. Buffeting was experienced during the stall turn recovery and the pilot was unable to regain full control before the aircraft struck the water.

31 Jan 0626	Piper 23-250 VH-AVE Bankstown NSW	Charter — passenger operations Bankstown NSW/Widdin NSW	C1N, P2N 8521007

The pilot reported that the landing gear selector was in the neutral position and the three gear indicator lights were green as he commenced the take-off roll. At about 40 knots the gear commenced to retract and the aircraft slid to a halt with the gear indicating up and locked.

03 Feb 1500	Britnor 2-A20 VH-IGT Wilton NSW	Sport parachuting (not associated with an airshow) Wilton NSW/Wilton NSW	C1N, P11N 8521009

During the take-off roll the aircraft did not achieve flying speed by the point where it was normally expected to become airborne. The pilot abandoned the take-off and applied maximum braking, but was unable to prevent the aircraft over-running the strip. The aircraft broke through the boundary fence and came to rest in a small ditch.

06 Feb 1023	Transav PL12 VH-MLJ Deloraine Tas 8E	Aerial agriculture Deloraine Tas/Deloraine Tas	C1N 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.

07 Feb 1520	De Hav DH82-A VH-BFW Yarram Vic 8S	Non commercial — pleasure Alberton Vic/Alberton Vic	C1M, P1S 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 1600	Piper 25-235 VH-TOX Wilmot Tas 2SE	Aerial agriculture Sprent Tas/Meander Tas	C1S 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.

10 Feb 1415	Brasov IS-28B2 VH-CQF Lightning Ridge	Instructional — dual Lightning Ridge/Lightning Ridge	C1N 8521010

When the aircraft had reached a height of about 300 feet agl the winch motor lost power. The pilot released the launch cable and attempted to land straight ahead but the aircraft overshot the end of the landing area and collided with trees.

Date *Time*	*Aircraft type & registration* *Location*	*Kind of flying* *Departure point/Destination*	*Injuries* *Record number*
11 Feb 1628	Cessna 210-N VH-HOC Georges River NSW	Instructional — dual Hoxton Park NSW/Bankstown NSW	C2N 8521011

The aircraft was flown to Hoxton Park and a number of circuits and landings were carried out as part of an endorsement exercise. The pilot in command then elected to return to Bankstown in order to refuel the aircraft. During the approach the engine lost power and attempts to restart it were unsuccessful. A ditching was carried out in the Georges River and the pilots swam to the shore.

16 Feb 1520	Cessna 172-B VH-CRB Rylstone NSW	Charter — passenger operations Rylstone NSW/Rylstone NSW	C1F, P2F, P1S 8521012

Witnesses reported that after take-off in hot and gusty crosswind conditions the aircraft did not climb away normally. It passed over the boundary fence at a low height and then remained at about tree-top height for about one kilometre. The aircraft was then seen to turn sharply to the left before disappearing from view. It was subsequently discovered to have struck the ground while in a steep nose-down attitude, and been completely destroyed by a post impact fire.

17 Feb 1900	Piper 28-151 VH-RUZ Moorabbin Vic	Non commercial — pleasure Ballarat Vic/Moorabbin Vic	C1N, P2N 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.

17 Feb 1440	Bede BD4 VH-ABD Tanunda SA 5SSW	Air show/air racing/air trials Woodside SA/Rowland Flat SA	C1N, P2N 8541003

During the approach, 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 and the nose gear leg subsequently collapsed on landing at Parafield.

18 Feb 1155	Piper 28-161 VH-UBM Deniliquin 22NE	Instructional — dual Deniliquin, NSW/Deniliquin, NSW	C2N 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 0840	Piper PA23-250 VH-JEN Palm Island, Qld.	Charter — passenger operations Townsville, Qld/Palm Island, Qld	C1N, P2N 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.

21 Feb 1800	Cessna A188-A1 VH-KVK Trangie, NSW 11E	Aerial agriculture Burratipi, NSW/Burratipi, NSW	C1N 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.

24 Feb 1087	Beech 76 VH-BGY Moorabbin, Vic.	Non commercial — pleasure Launceston, Tas./Moorabbin, Vic.	C1N, P3N 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.

03 Mar 0830	Cessna 172N VH-TSQ Falmouth, Tas	Non commercial — practice Falmouth, Tas/Falmouth Tas	C1N, P1N 8531009

The pilot intended to conduct practice circuits and landings in preparation for competitions later in the day. On the first landing the aircraft bounced slightly and then veered into soft earth at the edge of the newly constructed strip. The nose gear leg collapsed and the left wing tip struck rocks adjacent to the strip.

04 Mar 1327	Robinson R22 VH-UXT Camden, NSW	Instructional — check Camden, NSW/Camden, NSW	C2N 8521015

As the final sequence of a licence test flight the examiner requested the pilot to carry out a normal autorotative landing from circuit height. The aircraft was flared slightly high, recovered but subsequently contacted the ground in a tail low attitude. It then bounced forward and the tail boom was severed by the main rotor.

05 Mar 1220	Bell 47-G3B1 VH-ANG Mt Riddock Stn, NT	Commercial — aerial mustering Mt Riddock Stn, NT/Mt Riddock Stn, NT	C1M, P1M 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.

05 Mar 1900	Cessna 172A VH-DZA Nullagine, WA	Non commercial — pleasure Limestone Stn. WA/Nullagine, WA	C1N 8551005

The pilot planned to arrive at his destination 10 minutes before last light. However, deviating around rain showers and conducting an aerial inspection of a prospecting site, the pilot's arrival was delayed until 10 minutes after last light. An approach was made to the unlit strip using the aircraft landing light for guidance. After flaring at about 15 feet agl the pilot waited for touchdown but the aircraft stalled and struck the ground nosewheel first, collapsing the nose gear.

Date *Time*	*Aircraft type & registration* *Location*	*Kind of flying* *Departure point/Destination*	*Injuries* *Record number*
05 Mar 1500	Cessna 172G VH-PLX Windorah 80SSW	Commercial — aerial mustering Keeroongooloo Stn. Qld/Windorah 80SSW	C1N, P1N 8511010

The pilot was attempting to move cattle away from the intended landing strip when he noticed a shorter strip which was free of stock. He elected to use the shorter strip but did not notice that it was crossed by a washout. During the landing roll the aircraft entered the washout, which was about 40 centimetres deep and 1.5 metres wide. The nose gear fork was broken and damage was sustained by the propeller, engine cowling and right wing.

09 Mar 1615	Glasflugel Mosquito VH-FQR Jondaryan Qld	Non commercial — pleasure Jondaryan Qld/Jondaryan Qld	C1N 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 1130	Wittman-W8 VH-SLA Mt Beauty Vic	Non commercial — pleasure Moorabbin Vic/Mitta Mitta Vic	C1M, P1M 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.

09 Mar 0845	Cessna A188B-A1 VH-PLU Tumut NSW	Aerial agriculture Tumut NSW/ Tumut NSW	C1N 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.

13 Mar 1500	Hiller UH12-E VH-FFT Charleville 146NE	Activities associated with aerial agriculture Charleville 146NE/Boxland Qld	C1N 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.

14 Mar 1345	Cessna 182F VH-WPC Bankstown NSW	Non commercial — practice Bankstown NSW/Bankstown NSW	C1N 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.

15 Mar 0845	Grumman 164A VH-SLK Jondaryan Qld 30N	Aerial agriculture Toowoomba Qld/Toowoomba Qld	C1M 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.

15 Mar 1000	Cessna 172M VH-RXN Pt Macquarie 75W	Non commercial — pleasure Cooranbong NSW/Armidale NSW	C1M, P1S, P1M 8521018

Prior to departure the pilot checked the fuel quantity using a graduated dipstick and noted that each tank apparently held 18.5 gallons. About 75 minutes after take-off and while cruising at 4500 feet amsl the engine lost all power. The pilot was committed to a forced landing in a rugged, heavily timbered area. The landing gear was sheared off on touchdown and deceleration forces were severe. Subsequent investigation revealed that the engine failed from fuel exhaustion. The dipstick used by the pilot had been graduated in litres.

18 Mar 1756	Cessna 404 VH-TMP Canberra ACT	Scheduled passenger service — commuter Canberra ACT/Williamtown NSW	C1N, P6N 8521019

In order to avoid thunderstorms in the immediate vicinity, the pilot requested take-off from a runway direction giving a slight downwind component. The initial stage of take-off roll was normal, but the aircraft then failed to accelerate. The take-off was abandoned at about 65 knots Indicated Air Speed, however braking effectiveness was reduced because of the wet runway conditions. A ground loop was attempted, the nosegear subsequently became detached and the aircraft slid sideways into the aerodrome boundary fence.

19 Mar 1718	Piper 30 VH-RBT Coffs Harbour NSW	Charter — passenger operations Tyagaran NSW/Coffs Harbour NSW	C1N, P3N 8521020

When the gear was selected down it did not fully extend. The pilot found that the gear circuit breaker had tripped and after it had been reset the gear was raised then lowered and a gear down indication obtained. During the subsequent landing roll the aircraft yawed to the the right and ran off the runway. An inspection of the aircraft revealed that the right main wheel had turned through 90 degrees due to the scissor linkage becoming disconnected.

19 Mar 1530	Beech V35 B-MK2 VH-ILO Robe SA 25SE	Non commercial — practice 'Bray Homestead' SA/'Bray H/stead' SA	C1N 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.

Date *Time*	*Aircraft type & registration* *Location*	*Kind of flying* *Departure point/Destination*	*Injuries* *Record number*
20 Mar 1233	Cessna 404 VH-UOP Lismore NSW	Scheduled passenger service — commuter Grafton NSW/Lismore NSW	C1N, P6N 8521022

On initial touchdown the pilot detected an abnormality with the landing gear. An immediate go around was carried out and the pilot of another aircraft reported that the left main gear was sloping rearwards of its normal alignment. The pilot was committed to a landing with the gear in this position and the gear leg subsequently collapsed at about 60 knots. Initial investigation indicated that the failure of a slotted pin allowed the trunnion forward pivot pin to work itself free, with consequent misalignment of the gear leg.

23 Mar 1220	Bell 206-B VH-KXV Karratha WA	Construction work Cape Preston WA/Karratha WA	C1M 8551006

After depositing the sling carried load on the ground, the pilot moved the helicopter to the right to release the cargo net and shackle from the hook. He operated the release mechanism and as he checked to ascertain if the release had been successful, the helicopter commenced to roll to the right. The pilot attempted unsuccessfully to correct the roll and during the subsequent landing a main rotor blade struck the ground.

23 Mar 1600	Piper 28 - R180 VH-KIE Mundijong WA	Training Jandakot WA/Jandakot WA	C2N, P1N 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.

24 Mar 1415	Piper 38-112 VH-FLA Archerfield Qld	Instructional — solo (supervised) Archerfield Qld/Archerfield Qld	C1N 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, bounded onto the nosewheel and the propeller struck the runway. The aircraft ran off the runway before the pilot was able to regain control.

26 Mar 0815	Zenith CH200 VH-MAD Dixons Creek Vic	Dept of Aviation survey and inspection Moorabbin Vic/Dixons Creek Vic	C1N 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.

27 Mar 1430	Bell 47-G5 VH-DUS Boomarra Qld	Scheduled passenger service — commuter Boomarra Qld/Boomarra Qld	C1N 8511015

While hovering at about 20 feet agl, the pilot attempted to apply power. The engine did not respond and the helicopter was landed heavily as the pilot was manoeuvering it to more suitable terrain.

31 Mar 1240	Champion 7 - KCAB VH-DAY Apollo Bay Vic	Non commercial — pleasure /Moorabbin Vic/Apollo Bay Vic	C1N, P1N 8531014

The pilot decided to carry out a low fly past along the strip to check the effect of the prevailing strong wind. After having flown along about a third of the strip he landed the aircraft. During the landing roll the wind lifted the left wing and the aircraft began to move off the right of the strip. The right wheel struck a low dirt mound and was twisted rearward. The aircraft then ran through a fence before coming to rest.

31 Mar 1730	Cessna 172M VH-TCB Moonera WA	Non commercial — pleasure Kalgoorlie WA/Caiguna WA	C1N, P1N 8551008

When the pilot encountered navigational difficulties he decided to land on a road near a homestead and check his location. During the latter part of the subsequent landing roll the pilot misjudged the clearance of the aircraft from a post and the left wing struck the post.

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*
05 Jan 1057 Private Restricted	Piper 22-160 VH-AMX Northam WA 2E	32	Glider towing Northam WA/Northam WA 771	7	None	C1N 8551001

The aircraft was on climb towing a glider when the pilot saw smoke and flames around the left rudder pedal area. The glider was released and the pilot landed the aircraft in a paddock. He abandoned the aircraft before it was destroyed by fire.

Because of the severity of damage the cause of the fire could not be determined. It was established that the fire melted fuel lines beneath the left side of the cockpit floor. The fuel released then fed the fire which completely gutted the aircraft.

Date / Time / Pilot Licence	Aircraft type & registration / Location	Age	Kind of flying / Departure point/Destination	Hours Total	Hours on Type	Rating	Injuries / Record Number
18 Jan	Piper 31 350 VH-WJK		Charter — passenger operations				C1N,P9N
0992	Saibai Island Qld		Horn Island Qld/Saibai Island Qld				8511005
Commercial		30		2548	506	Instrument rating class 3	

The pilot reported that, during approach to the 765 metre wet grass strip, the wind appeared to change to a tailwind. The mainwheels struck a concrete sea wall which marks the threshold, both tyres burst and the landing gear legs were damaged. Directional control problems were experienced during the landing and a go-around was carried out, with the aircraft becoming airborne just before the far end of the strip. The pilot was not aware that any damage had occurred until the gear would not retract. A diversion to an alternate aerodrome was conducted and the left main gear leg collapsed on landing.

The strip at the original destination was too short for the normal operation of the heavily laden aircraft. Because of this, and the wet surface, the pilot had approached at a lower than recommended airspeed, aiming to land close to the threshold. He had been unable to arrest the sink rate which developed in the final stages of the approach.

22 Jan	Cessna 182N VH-EKH		Non commercial — aerial application/survey				C1M
0600	Bullamon Plains		Bullamon Plains ALA/Bullamon Plains ALA				8511006
Private		35		106	9	None	

The aircraft was being flown between 500 and 1000 feet agl at 60 knots with 20 degrees of flap. A mob of sheep was spotted and the pilot turned right to keep them in sight. The stall warning sounded and the pilot noticed a lack of elevator control but did not associate this with a stall. Descent continued while the pilot was engrossed in the elevator problem until the aircraft struck trees in its path. A major portion of the right wing was severed and the aircraft came to rest on its side.

26 Jan	Cessna A188B-A1 VH-IEQ		Aerial agriculture				C1N
1000	Jimbour Qld 10N		Dalby Qld/Dalby Qld				8511007
Commercial		39		4500	2000	Agricultural class 1	

The pilot commenced spraying operations before the ground markers had taken up their positions. As he approached the starting point for the first run he glanced towards the markers to check their progress towards their assigned places. The pilot then looked forward and suddenly realised he had temporarily forgotten the presence of a power line which crossed the paddock. Evasive action was taken, however the top of the rudder struck the wire and was severed. Control of the aircraft was maintained and a safe landing was subsequently made.

26 Jan	Cessna 180A VH-EYA		Ferry				C1N
1050	Mansfield 9ENE		Moorabbin Vic/Mansfield 9ENE				8531001
Commercial		20		1316	150	Instrument rating class 4	

Whilst applying brake after landing the pilot's foot slipped off the left rudder pedal and the aircraft veered to the right. The pilot replaced his foot on the pedal and applied corrective rudder and brake but the aircraft subsequently ground looped to the left and the right main gear leg collapsed.

The rudder pedal surfaces were found to be worn, the pedal design was such that foot restraining capabilities were reduced as the surface became smoother from normal wear and tear. It was also determined that the brake pads on the right gear were excessively worn and this probably aggravated the pilot's problem with directional control.

26 Jan	Schneider ES-60		Non commercial — pleasure				C1M
1505	Boomerang VH-GTL		Whitwarta SA/Whitwarta SA				8541001
Glider	Red Hill SA 5S	25		93	6	Glider	

During the cross country flight the glider encountered an area of sink. The pilot was unable to find any updraughts and selected a paddock in which to land. As the glider was on short final, it suddenly lost height and collided with the boundary fence of the paddock. The glider then landed heavily in the paddock.

The pilot was inexperienced on type and also lacked recent experience of outlandings. The paddock selected gave a shorter landing distance than desirable and the pilot aimed for a lower than normal height to cross the boundary fence. When sudden sink was encountered in the hot, turbulent conditions the pilot was unable to prevent colliding with the fence.

03 Feb	Beech C23 VH-UMM		Non commercial — practice				C1N
1005	Hoxton Park NSW		Hoxton Park NSW/Hoxton Park NSW				8521008
Private Restricted		36		58	39	None	

The pilot, who was inexperienced in total hours and hours on the aircraft type, landed the aircraft firmly. A bounce occurred but the pilot persevered with the landing. After the aircraft had bounced a further three times the nose wheel collapsed and the aircraft slid to rest on its nose.

19 Feb	Cessna 152 VH-SPG		Instructional — solo (supervised)				C1N
1140	Moorabbin Vic		Moorabbin Vic/Moorabbin Vic				8531006
Student		41		66	66	None	

Following a period of dual instruction the student was authorised to practice glide approaches. During the first of these approaches the aircraft bounced after touchdown. Several more bounces occurred and the nose gear leg collapsed. The aircraft slid to a halt 3 metres off the side of the runway.

The aircraft was high on approach and touched down nosewheel first. The pilot stated that the rapid succession of bounces surprised her and no bounced landing recovery was attempted.

25 Feb	Airparts 24-A4 VH-EOF		Aerial agriculture				C1N
1600	St Arnaud Vic 25S		Stuart Mill Vic/Stuart Mill Vic				8531008
Commercial		45		9500	5000	Agricultural class 1	

Shortly after take-off for a spreading operation the engine suddenly lost power. The pilot dumped the load and operated the fuel boost pump, however after a short burst of power the engine failed completely. The pilot was committed to a downwind landing and towards the end of the landing roll the aircraft ran into a gully and collided with tree stumps.

The engine had failed from fuel exhaustion. The pilot was not aware of the amount of fuel added to the tanks at the previous refuelling and he had subsequently relied on the fuel gauge readings to assess the remaining endurance.

Date / Time / Pilot Licence	Aircraft type & registration / Location	Age	Kind of flying / Departure point/Destination	Hours Total	Hours on Type	Rating	Injuries / Record Number
02 Mar	Cessna 182H VH-PLF		Non commercial — practice				C1N,P1N
1100	Dalby Qld		Dalby Qld/Dalby Qld				8511009
Private restricted		48		83	29	None	

After returning from the local training area, the pilot joined the circuit for a landing. He stated that he flared high, added some power whilst allowing the aircraft to descend, then reduced power again. The aircraft contacted the runway heavily in a slightly nose down attitude. The firewall, lower fuselage skin and control tunnel were all deformed, causing control difficulties during the subsequent taxying.

Following the high flare, the pilot failed to adequately arrest the sink-rate. Skid marks on the runway in the vicinity of the touchdown, and a substantial single bald patch on the right tyre indicated that the right brake was probably applied at touchdown.

09 Mar	Mooney M20J VH-MVO		Non commercial — pleasure				C1N,P1N
1625	Bankstown NSW 13W		Cowra NSW/Bankstown NSW				8521017
Private		59		820	350	None	

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.

30 Mar	Cessna 152 VH-TNX		Instructional — solo (supervised)				C1N
1125	Melton Vic		Melton Vic/Melton Vic				8531013
Student						None	

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.

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	Pilot Licence: Hours Total	Hours on Type	Rating	Record number
01 Apr 83	Piper 32-R300 VH-EMD			Private		8321034
1405	Lismore NSW 4N	20	124	8	None	

The pilot decided to divert to a nearby aerodrome because the fuel gauges indicated a low fuel quantity remaining. Shortly after commencing the diversion the engine failed. During the ensuing forced landing the aircraft struck a fence post, overturned, and slid inverted for 120 metres.

The engine had failed from fuel exhaustion. During the flight, which involved 3 landings, one refuelling and about 6 hours flight time, the pilot had not conducted a check of the aircraft fuel consumption. Although the fuel gauges indicated a higher than normal rate of consumption, the pilot did not land at suitable enroute aerodromes and the diversion was not made until a critical situation had developed. Subsequent examination of the engine and fuel system did not establish the cause of the excessive fuel consumption.

25 Dec 83	Piper 32-R300 VH-UAM			Private		8311083	
1744	Brampton Island	24	197	120	None		

The pilot misjudged the height of the aircraft above the ground when he initiated the landing flare. Touchdown occurred at a high rate of descent and the left gear collapsed.

The pilot was inexperienced. During the day he had flown for almost 8 hours in Northern Australian summer conditions. Metal fatigue in the left gear oleo casting had reduced its capacity to withstand side load stress.

18 Jan 84	Robinson R22 VH-CIA			Commercial — helicopter		8451002	
1500	Albany Whaling St	23	382	382	None		

After take-off, the pilot flew the helicopter low along a beach, over a moored ship and turned toward rising terrain. He then climbed the helicopter to follow the slope of the rising terrain. About half way up the slope the pilot carried out a turn through 180 degrees. He reported that the helicopter experienced a loss of engine and rotor rpm. He attempted to recover the situation but the helicopter touched down and rolled over.

Examination of the engine revealed that one of the magnetos was contaminated with oil. The magneto was tested on another engine and no power loss was evident. Also, flight testing in a similar helicopter confirmed that with one magneto inoperative the power loss was only 3 to 4 percent of the engine rpm. It is therefore probable that during the turn the pilot overpitched the rotors when insufficient height was available for recovery.

03 Feb 84	Amer Air 5 VH-ESC			Private		8421043	
1040	Jaspers Brush NSW	55	250	64	None		

Just prior to lift-off from the private airstrip the pilot stated that the engine misfired. He elected to abandon the take-off and veered the aircraft to the left to avoid a stand of trees just beyond the upwind end of the strip. The aircraft could not be stopped before colliding with the side boundary fence.

Investigation revealed that the probable cause of the engine misfiring was lead fouling of one or more of the spark plugs.

Date / Time	Aircraft type & registration / Location	Age	Hours Total	Pilot Licence / Hours on Type	Rating	Record number
03 Feb 84	Piper 31 VH-KFD			Senior comercial		8431002
1137	Moorabbin Vic 6SSE	54	14600	4500	Instrument rating 1st class or class 1	

The right engine had been replaced as part of a routine maintenance program. During two subsequent flights the engine lost all power. Extensive ground checks failed to reproduce the symptoms and an air test was then carried out. During the test the right engine failed and while various techniques were being employed by the pilot to restore power, the left engine also failed. The pilot was committed to a gear up landing in a paddock and damage was sustained during the ground slide when a mound of dirt was struck.

Faulty seals in the right engine fuel shut off valve allowed air to be drawn into the fuel lines causing the power losses experienced. The left engine failed from fuel exhaustion and when the pilot selected crossfeed from the right tank, air was drawn through the defective valve, preventing further running of the left engine.

05 Feb 84	Hiller UH12-E VH-XRG			Commercial — helicopter		8411003
0930	Beaudesert 8SE	44	4000	1500	Agricultural class 1	

At the end of a 180 deg turn the pilot attempted to level out but there was no cyclic response. The helicopter continued in the turn and the application of back cyclic could not prevent the nose dropping. The helicopter struck the bank of a creek shearing off the tail boom, main rotor and gearbox and came to rest in the water. The pilot escaped unhurt and unaided from the partially submerged cockpit.

Investigation revealed that a bolt which secured a foot of the cyclic control wobble plate pylon to the transmission gearbox had become detached. Subsequent movement of the pylon deprived the pilot of effective cyclic control. The reason for the loss of the bolt could not be established.

12 May 84	Cessna 402 VH-CJA			Commercial		8411022
1247	Archerfield Qld	50	11500	1000	Instrument rating 1st class or class 1	

After landing, a 180 degree turn to the right to backtrack along the runway was planned. As the aircraft was being slowed to taxi speed a gentle left turn to position the aircraft near the left side of the runway was commenced, but the right main gear collapsed. A gear down indication remained on after the aircraft came to a halt.

The right main gear retraction push-pull tube bellcrank had developed a fatigue crack in the area of the bushing hole. The bellcrank failed in overload at this crack causing insufficient downlock tension to be maintained on the extended main landing gear. The aircraft had flown 9336 hours at the time of the failure and the left bellcrank had previously been strengthened.

15 May 84	Cessna 340A VH-BYB			Private		8421022
2344	Goulburn NSW	25	700	143	Instrument rating 1st class or class 1	

Prior to departure the pilot had received a weather forecast which indicated that fog could be expected at the destination. Adequate fuel was carried in the aircraft tanks to allow for a considerable period of holding and/or a diversion to another aerodrome if required.

After an apparently normal flight of 35 minutes the aircraft arrived in the Goulburn area and the pilot reported his intention to carry out a standard instrument approach. The manoeuvres associated with this procedure do not involve flight over the city of Goulburn, however witnesses observed the aircraft as it circled over the city several times at a relatively low height. It was then seen to roll and descend steeply before striking two houses. A fierce fire broke out which engulfed the aircraft and both residences. The three persons on board the aircraft and a person in one of the houses received fatal injuries.

A detailed inspection of the wreckage revealed that the camshaft of the left engine had failed in flight and the pilot had apparently feathered the propeller. The engine was not operating at the time of impact. No other defect or malfunction was discovered which might have contributed to the development of the accident. It was determined that the particular camshaft had failed from fatigue cracking, resulting from defective manufacture.

It was considered likely that when the aircraft arrived over Goulburn, shallow fog obscured all or part of the aerodrome. The lights of the city would have been clearly visible and the pilot probably decided to use the city, rather than the nearby radio navigation aid, as a convenient holding point while waiting for conditions at the aerodrome to improve. During a series of left hand orbits, and after advising his intention to conduct an instrument approach, the pilot experienced a complete failure of the left engine.

In order to realise the available single-engine performance of the aircraft the pilot had to perform a series of checks and actions which would result in the applicable propeller being feathered; any unnecessary aerodynamic drag being reduced; and an appropriate airspeed being established. It was determined that although the propeller had probably been feathered, the landing gear, which had evidently been lowered previously, had not been raised to reduce drag. In addition, an analysis of radar returns from the aircraft, recorded at Canberra, indicated that the airspeed at which the aircraft was flying shortly before radar contact was lost, was less than the optimum figure. The final manoeuvre described by witnesses was consistent with that which follows a loss of control in twin engine aircraft when power is being supplied by only one engine and the speed is below the minimum required for full control.

10 Jun 84	Fuji 200-180 VH-FJI			Private		8441018
1439	Strathalbyn SA	53	620	105	None	

An inter-club fly-in had been organised at the private airstrip. Due to a long-time interest in aerobatics, the club secretary who had organised the meeting and was anxious for it to be a success, arranged to accompany the pilot on an aerobatic demonstration flight. A series of aerobatic manoeuvres, judged by the witnesses to be of a relatively poor standard, were completed between 1500-3000 feet. The aircraft was then observed to overfly the aerodrome at about 300 feet agl and enter what appeared to be a roll. When the aircraft reached the inverted attitude, its nose was well below the horizon and the roll was not continued. The nose then lowered further and the aircraft impacted the ground at high speed.

Subsequent investigation indicated that the aircraft and its control systems had been serviceable prior to impact with the ground. The pilot was neither approved nor sufficiently experienced to perform aerobatics at a low level and it is probable that on this occasion his actions were influenced by the presence of the group assembled on the ground.

04 Jul 84	Robinson R22 VH-UXM			Commercial — helicopter		8431019
1220	Mildura Vic 11ESE	36	6250	150	Unknown or not reported	

The aircraft departed Camden on the previous afternoon for a ferry flight to the Kununurra area, with an overnight stop near Eildon, Victoria. About 35 kilometres from Mildura the pilot reported that he was landing due to a vibration. After inspecting the aircraft he continued with the flight but later made a brief Mayday call. Witnesses reported that the engine was running intermittently before the helicopter landed heavily, tail-down, in a vineyard. A contaminant, sufficient in quantity to restrict the flow of fuel, was found in the fuel system filter.

The source of the contaminant could not be identified, however an identical polyester material was found in the fuel filter of another new helicopter of the same type. It is probable that the material was present prior to the import of the helicopters. The fuel filters were not inspected prior to the first flight. The helicopter was being operated on super motor spirit at the time but it is considered unlikely, in this instance, to have been a major factor in the engine failure. Due to the pilot's incorrect diagnosis that the power surges were associated with a main rotor problem, he progressively opened the throttle in an attempt to maintain rotor rpm. This action combined with the momentary power surges, exacerbated control difficulties being experienced and resulted in a belated autorotative landing.

Date / Time	Aircraft type & registration / Location	Age	Hours Total	Pilot Licence / Hours on Type	Rating	Record number
12 Aug 84	Robinson R22 VH-UXL			Commercial — helicopter		8421039
1528	Castle Hill NSW	24	1718	280	Flight instructor grade 1 or 2 with instrument rating	

At the conclusion of the student's first training exercise the instructor positioned the helicopter in a hover at about 3 feet agl and allowed the student to use the controls. The aircraft was headed into the 25 knot gusty wind when sudden sink was experienced. The student instinctively applied full aft cyclic control and the heel of the right skid dug into the ground as the helicopter moved backwards. The aircraft rolled onto its right side, destroying the main rotor blades and distorting the cabin area.

The instructor had allowed the student to attempt an operation beyond the level of his current ability and had been unable to recover control when the sink was experienced.

23 Aug 84	Cessna A188B-A1 VH-EVV			Commercial		8421049
1400	Spicers Creek NSW	40	7440	600	Agricultural class 1	

During a spray run which involved a flight beneath a power line, the pilot lost sight of the supporting poles and assumed he had passed the cable. A pull up was initiated but the fin and rudder struck the cable, which tore about 15 cm from both surfaces. The aircraft remained controllable and a safe landing was subsequently carried out.

06 Sep 84	Cessna A188B-A1 VH-UJR			Commercial		8421046
1515	Illabo NSW 5E	30	3500	700	Agricultural class 1	

The particular spraying run crossed a group of trees at the top of a rise. As the pilot pulled up to overfly the trees the right wing of the aircraft struck some branches. The pilot noticed fluid escaping from the tears in the wing and elected to carry out an immediate landing on the downslope beyond the trees. Shortly after touchdown the aircraft yawed, the left wheel dug in and the aircraft rolled over twice before coming to rest inverted.

07 Sep 84	Robinson R22 VH-UXK			Private — helicopter		8451023
1800	Mt Farquhar 12NNW	28	2500	2450	None	

The pilot was flying the helicopter along a ridge line checking a gully for cattle, when the engine suffered a substantial loss of power. The pilot initiated an autorotational descent as the engine failed completely. The helicopter landed heavily in the base of the gully.

The pilot was aware that there was little fuel remaining in the tank. However he elected to continue and ensure the security of the mob before last light, so that additional herding would not be necessary the next day. The helicopter was being operated at a low height and airspeed, over unsuitable terrain at the time the fuel was exhausted.

12 Sep 84	Cessna 172-N VH-POS			Private		8441021
1536	Gove NT	30	135	100	None	

The pilot commenced an approach to land after a preceding Fokker F28 had cleared the runway. During the landing flare the pilot reported that severe buffeting was encountered and the aircraft subsequently landed heavily, with resultant damage to both wings, the forward fuselage, landing gear and the propeller.

Because of the prevailing conditions it is considered that the disturbance reported by the pilot was unlikely to have been caused by wake turbulence, however the probable cause of this disturbance could not be determined. When the aircraft suffered the disturbance, the pilot applied full power to carry out a go around but the aircraft struck the ground.

12 Sep 84	Bell 47-J2A VH-THH			Commercial — helicopter		8441022
1650	Mataranka HS NT	24	335	235	None	

A ten minute flight in the local area had been completed without incident. After departure for a second flight the helicopter was climbed to 150 feet agl to allow the passengers to view the campsite and a herd of animals. The pilot and passengers then heard a loud bang which was followed by a severe airframe vibration. The noise and vibration continued and the pilot elected to carry out an autorotational descent and land in a small clearing. The clearing was overshot and the helicopter struck several trees.

Investigation indicates that the engine cooling fan drive belt, which rotates at high rpm, failed. The flailing belt then tore a section of the canvas cooling fan shroud. Vibration was produced when the broken belt and section of shroud were ingested into the cooling fan.

16 Sep 84	Cessna U206F VH-WTJ			Commercial		8451025
0725	Halls Creek 115NE	21	650	300	Instrument rating class 4	

When the pilot applied climb power a loud bang was heard followed by a severe vibration and a loss of power. The pilot selected the most suitable area of the rough terrain to attempt a landing. During the landing the aircraft struck several trees, the nosewheel was torn off and the aircraft nosed over. Inspection of the aircraft revealed that one of the propeller blades had separated in flight.

The propeller blade separated due to overload failure, initiated by a fatigue crack commencing at the blade retention thread root, in the propeller hub. An airworthiness directive had been issued requiring that the propeller hub be dye penetrant tested for cracks every 100 hourly inspection. This was not done. The certifying maintenance engineer believed that the A/D was not applicable to this model hub. The aircraft had flown 30 hours since its last 100 hourly inspection.

18 Sep 84	Piper 25-235 VH-KLZ			Commercial		8411039
1010	Goondiwindi 50NE	31	680	190	Agricultural class 2	

After conducting a routine strip inspection the pilot was concerned about the height of the wheat on each side and commenced another inspection from about 10 feet agl. During the inspection the aircraft descended almost to ground level, with its right wing low, as a result of the strong, gusting wind. The right spray boom contacted the wheat and the aircraft yawed right. As ground contact was inevitable the pilot closed the throttle and attempted to correct the yaw but the main wheels and left wing contacted the ground, causing the aircraft to slew through 180 degrees before coming to rest.

28 Sep 84	Cessna 182-A VH-CJC			Private		8411042
0922	Nangwee Qld	33	484	80	None	

After releasing a group of parachutists from 10 000 feet the pilot commenced descent. Carburettor heat was applied until the aircraft was positioned on a long left downwind for the selected strip. Shortly after engine power was further reduced and carburettor heat was selected to off, the pilot realised that the engine had failed. He turned onto a right base leg and manoeuvred the aircraft in order to land downwind on the strip. The aircraft stalled just prior to touchdown and came to rest inverted.

Subsequent examination of the engine did not reveal any reason for the reported loss of power. While manoeuvring the aircraft for a landing the pilot evidently did not pay sufficient attention to the indicated airspeed.

Date / Time	Aircraft type & registration / Location	Age	Hours Total	Pilot Licence / Hours on Type	Rating	Record number
12 Oct 84	Beech E33 VH-ENU			Private	8411044	
1135	Emerald Qld	38	385	24	Instrument rating class 4	

After take-off the pilot noticed that the airspeed indicator was fluctuating between 55 and 60 knots irrespective of the aircraft's actual speed. He elected to land again but, with his attention directed towards the faulty airspeed indicator, he forgot to lower the landing gear prior to touchdown.
Although no fault was subsequently found with the airspeed indicating system, it was probable that a partial blockage of the pitot tube had occurred. The pilot was relatively inexperienced on the aircraft type and had not previously flown this particular aircraft.

20 Oct 84	Piper 28-181 VH-SVQ			Private		8421055
1652	Glen Innes 6NE	48	332	220	None	

The aircraft departed with a planned fuel endurance of 170 minutes, and an expected flight time of 116 minutes. About 110 minutes after take-off the engine lost power and the pilot was forced to land on unsuitable terrain. The aircraft sustained damage to the wings, landing gear and rear fuselage as it ran through two fences and came to rest after striking several trees. Initial inspection revealed that the spring loaded fuel drain cock for the right tank was in the open position.

The aircraft was parked on wet grass when the pilot conducted the fuel drain check and he evidently did not visually check to ensure that the right wing drain cock had resealed. When the engine lost power the pilot switched the electric fuel pump on before changing tanks. This sequence is the reverse of that recommended by the manufacturer and increases the time taken to effectively restore power. Adequate fuel had remained in the other tank to allow completion of the flight, had engine power been regained.

23 Oct 84	Bell 47-G5A VH-BHQ			Commercial—helicopter		8411046
0900	Miranda Downs Qld	32	5640	5310	None	

The helicopter was hovering at about 100 feet agl when the engine stopped. A heavy landing followed. The pilot reported that he knew the aircraft normally had an endurance of 220 minutes. On this flight he had been operating for 210 minutes, the task was almost completed and the refuelling point was a short distance away. He continued for a short time with the fuel gauges indicating empty in order to complete the task.
The engine failed over an area of trees and the subsequent manoeuvring and flight to the closest open area resulted in insufficient rotor rpm being available to complete an autorotative landing.

28 Oct 84	Piper 32-300 VH-ISB			Private		8441024
1806	Darwin NT	27	120	13	None	

The approach was made with full flap extended at an indicated airspeed of between 75 and 80 knots. As the pilot closed the throttle in preparation for landing, the handle of the throttle lever came off in her hand. The aircraft struck the runway heavily and bounced several times, collapsing the nose gear leg.

The pilot had been distracted when the throttle lever handle separated during the landing flare. The handle had been attached by an unsuitable retaining bolt.

28 Oct 84	Piper PA36-300 VH-FEQ			Commercial		8421057
1130	Deniliquin NSW 25E	39	12000	2000	Agricultural class 1	

The aircraft was being flown at about 180 feet agl en route to a rice paddy. The pilot reported that as he overflew an irrigated paddock strong sink was encountered. Full power was applied and dumping of the hopper load was commenced, but the aircraft touched down briefly. With full power still applied the aircraft became airborne again, however another touchdown occurred some 250 metres further on and the pilot closed the throttle. The left wing struck a fence post before the aircraft came to rest.

03 Nov 84	Cessna 182-N VH-LMG	Private				8421059
1320	Capertee NSW	56	200	80	None	

The aircraft was turned onto the base leg of the circuit earlier than normal because of cloud in the area. The pilot selected an approach speed 5 knots higher than usual as the aircraft was being operated at a greater than normal weight and because of the turbulence. The aircraft touched down on all three wheels simultaneously and bounced. The second touchdown, 100 metres further along the strip, was on the nosewheel, which collapsed.

The aircraft was not correctly flared before the touchdown, nor was the correct action taken after the bounced landing. After the second touchdown the nosewheel dug into a soft patch on the strip.

05 Nov 84	Cessna T303 VH-OBH			Senior commercial		8451031
1345	Perron Place WA	37	3700	23	Instrument rating class 4	

The pilot, who was relatively inexperienced on the aircraft type, elected to conduct a short field approach into a gusting 25 to 30 knot wind. When he flared the aircraft he was unable to reduce the rate of descent and the aircraft landed heavily. Sufficient strip length was available to conduct a normal approach using a threshold speed suitable for landing in the prevailing wind conditions.

10 Nov 84	De Hav C2 VH-IDH			Commercial		8421062
0930	Barham NSW 21N	44	14100	10000	Agricultural class 1	

At a height of approximately 50 feet after take-off the engine suddenly lost all power. The pilot was able to glide the aircraft over several drainage banks, two fences and an irrigation canal but a high rate of descent developed and the aircraft landed heavily and overturned. Fire broke out and the central section of the fuselage was burnt out.

The investigation was hampered by the extent of fire damage and the cause of the loss of engine power was not positively established.

14 Nov 84	Transav PL12 VH-IVH			Airline transport		8441026
1445	Andamooka SA 16E	32	8000	20	Instrument rating 1st class or class 1	

The aircraft was being flown in company with a helicopter. While en route the pilots had been requested to check the surface of Lake Torrens for suitability for future operations. The helicopter was landed on a section of the lake which was assessed as suitable for the fixed wing aircraft. The pilot of that aircraft also assessed the area as suitable and a landing was made at a touchdown speed of 40 knots. Shortly after the nose wheel contacted the surface it began to sink in the soft ground and the aircraft overturned.

15 Nov 84	Rockwell S2R VH-WBW			Commercial		8421064
0805	Moree NSW 63NE	36	8000	600	Agricultural class 1	

During spraying operations the engine began to run very roughly and lost a considerable amount of power. The pilot considered that insufficient power remained to permit him to divert to a suitable landing area and he attempted to land straight ahead. Towards the end of the landing roll the aircraft struck a contour bank and the right landing gear collapsed.

The cause of the power loss could not be positively identified, but was probably related to excessive spark plug fouling.

18 Nov 84	Cessna 150M VH-WWU			Commercial		8451032
1130	Nyang Stn WA 19E	32	479	350	Instrument rating class 4	

Whilst sheep spotting the passenger became visibly agitated and the pilot elected to land. During the landing roll the aircraft entered scrub but was not damaged. After the passenger disembarked the pilot attempted a flapless take-off using a clearing approximately 140 metres in length. The aircraft failed to become airborne and hit several trees before coming to a halt in soft sand.

Prior to the attempted take-off the pilot did not measure the available length or refer to the flight manual 'p' charts. He subsequently indicated that his judgement was affected by perceived commercial pressure to continue the sheep spotting operation without undue delay.

18 Nov 84	Piper PA25-236 VH-KKQ			Private		8411052
1500	Spring Creek Qld	31	315	255	None	

The pilot advised that he was taxying towards the take-off threshold of the ALA, using the grassed area alongside the gravel strip. He noticed an anthill about 30 centimetres high in front of the aircraft, but while turning to avoid the obstruction the left mainwheel struck the anthill. The gear leg broke at its attachment point to the wing, resulting in substantial damage to the wing and the left flap.

20 Nov 84	De Hav 82A VH-PFL			Commercial		8421065
1430	Bankstown NSW	45	6000	1000	Instrument rating 1st class or class 1	

The aircraft is fitted with a tail skid and has no brakes. The pilot was taxying on the grass beside the taxyway in order to increase the rolling resistance of the wheels. His attention was directed to the right, when the left lower wing struck a sign which was 6 metres from the edge of the taxyway.

30 Nov 84	Hiller UH12E VH-FBH			Commercial—helicopter		8411054
1330	Wyena Stn Qld	28	2300	1970	Unknown or not reported	

The pilot reported that, shortly after commencing to cruise at about 750 feet agl, the helicopter encountered a willy willy and was thrown almost upside down. During the recovery actions, right pedal was applied rapidly and the operating cable broke. An auto-rotational landing was initiated but, just prior to touchdown, another willy willy struck the helicopter and it landed while spinning under the influence of this disturbance.

01 Dec 84	Stits SA6B VH-ULB			Private		8441029
1845	Aldinga SA	43	900	50	None	

After installing his passenger in the aircraft, the pilot hand swung the propeller, the normal means of starting the engine. When the engine fired it ran up to high power and the aircraft jumped the chocks. The pilot attempted to stop the aircraft but it continued forward and collided with the side of a hangar. The nose gear collapsed and the wooden propeller shattered as the aircraft came to rest on its nose.

During the pre-start checks the pilot believes he set the throttle almost fully open by mistake. The aircraft handbrake was unserviceable.

01 Dec 84	Aerocdr 500A VH-AGA			Private		8421069
1110	Goulburn NSW	38	1328	139	Instrument rating class 4	

The aircraft was being used to transport equipment for members of an Aero Club, who were to carry out training at Goulburn. As the pilot was undergoing formation flying training, it was decided that he would lead a formation of two aircraft for the flight. A briefing on the procedures to be followed was carried out. During the flight the pilot of the second aircraft began to suspect the accuracy of his aircraft's airspeed indicator and requested that it be checked against that of the lead aircraft as the aircraft joined the circuit. The pilot of the lead aircraft extended the landing gear and flew the initial leg of the circuit at an indicated airspeed of 96 knots. At the end of this leg the pilot turned the aircraft steeply to the left, the nose dropped slightly and the aircraft flicked into a steep right turn. The aircraft then assumed a steep nose down attitude, however, the pilot was able to level the wings and raise the nose to the level attitude before impact. The impact occurred at a very high rate of sink.

The pilot had not previously practised steep turns at relatively slow airspeed and was not aware of the stalling speed in the given configuration and attitude. The pilot was subsequently unable to recall the reason for attempting a steeper than normal turn. When the aircraft stalled the pilot was unable to effect a full recovery in the height available before impact with the ground.

14 Dec 84	Cessna A188B-A1 VH-FZD			Commercial		8411056
1620	Kingaroy Qld 4SSE	22	228	10	None	

As part of the final phase of the rating test, the pilot was required to spray a paddock. An inspection of the area to be treated was carried out. During the procedure turn at the end of the second spray run, the nose dropped and the aircraft struck the ground in a near vertical attitude.

The pilot had incorrectly assessed the wind direction and had carried out the procedure turns at the end of the spray runs in the wrong direction. In an effort to align the aircraft for the next run, the pilot tightened the turn and the aircraft stalled.

14 Dec 84	Airparts 24-950 VH-MXD			Commercial		8431037
1020	Scottsdale 20NE	45	19900	2000	Agricultural class 1	

While en route to the treatment area the pilot noted a loss of engine power. After the load of superphosphate was dumped, he realised he would be unable to return to the departure strip and selected a track as the most suitable landing area. During the landing roll the aircraft ran over a hump which caused it to slew off the track into the surrounding bush.

Engine examination revealed that the fuel injector system was out of adjustment, producing a lean mixture at high power settings. The resulting high combustion temperatures produced abnormal engine wear and led to spark plug failure.

Date / Time	Aircraft type & registration / Location	Age	Hours Total	Pilot Licence / Hours on Type	Rating	Record number
15 Dec 84	Glasflugel Libelle VH-GGQ			Glider		8431038
1419	Woodbury Tas	60	219	58	Glider	

The pilot reported that an aerotow to 2700 feet agl seemed to be accomplished quickly. When the glider had descended to 1400 feet the pilot rejoined the circuit but then considered that the altimeter was defective. She believed that sufficient height remained to permit a landing at the strip and carried out a low, tight circuit. However, as the turn onto final was completed an immediate landing flare was required. A heavy touchdown occurred and the aircraft came to rest 175 metres after the strip boundary.

Faulty alignment of the 'thousands' needle in the altimeter had led to the pilot mis-setting the height of the strip prior to take-off. The indications she read from the instrument were therefore 1000 feet in error.

17 Dec 84	Cessna 182-A VH-KLJ			Commercial		8431039
1511	Interview River	22	1100	60	Instrument rating class 4	

The pilot decided to land at the strip to check on the welfare of two mining company employees working in the area. During the latter stages of the landing roll the nosewheel entered a soft area and dug in, causing the aircraft to overturn.

As the mining company's base radio was unserviceable and the ground personnel were not expecting the aircraft, the pilot was not able to establish the condition of the strip. Although it appeared serviceable from the air, the strip contained a section where water from recent rain had accumulated and resulted in the surface in that area being soft and wet.

18 Dec 84	Beech 77 VH-HBI			Commercial		8411058
1511	Archerfield Qld	39	800	387	Flight instructor grade 1 or 2 with instrument rating	

The aircraft was being taxied across another runway towards a taxiway. Approaching the edge of the flight strip, the instructor noticed a 20 centimetre deep spoon drain in the path of the aircraft. He took control and attempted to avoid the drain but the nosewheel entered the drain and broke off. The presence of the drain was indicated on a diagram of hazardous taxying areas available to pilots but the area was not marked by cones.

The aerodrome was being used for taxying purposes, as an all-over field, contrary to approved procedures. The pilot saw the drain obstruction, which was situated just outside the flight strip, too late to take effective avoiding action.

22 Dec 84	Piper 25-235 VH-SPE			Private		8431040
1951	Dooen Vic	33	1915	290	Instrument rating class 3	

Prior to the flight the pilot was given details of the paddock in which the glider was located, by the glider pilot. This information included reference to power lines on the western side. An inspection run into the west was performed at 300 feet agl and as a run at a low height towards the east was commenced the landing gear struck a power line suspended 9 metres above the ground. The aircraft struck the ground in a vertical nose down attitude and came to rest inverted.

The power line ran obliquely across the paddock from a line of poles paralleling a railway track. There were no supporting poles in the paddock to alert the pilot as to the whereabouts of a power line and he assumed that those running next to the railway were the ones mentioned in the briefing.

22 Dec 84	Reims 172H VH-EDZ			None		8411060
1447	Quilpie Qld 3W	50			None	

The aircraft was parked, with controls locked and doors unlocked, by the owner who retained the ignition key. Later, another person entered the aircraft and operated a number of controls before experimenting with a car key in the ignition switch. The engine started and the aircraft took off from the position at which it was parked. The occupant attempted a landing but this was unsuccessful as full power was still selected. Some time later the engine stopped due to fuel exhaustion and the aircraft glided into scrub near the town. The occupant was later apprehended by local Police.

The thief had received no pilot training and was not capable of adequately controlling the aircraft.

26 Dec 84	Piper 28-151 VH-PZC			Private		8411061
1335	Miles Qld 32NW	43	334	180	None	

The pilot reported that, after commencing the take-off with flaps up, he selected 10 degrees of flap and rotated at 60 knots. Although the aircraft became airborne it did not climb normally. The aircraft struck a telephone line near the end of the strip and then landed in a paddock before passing under a power line. With full power still applied, the pilot attempted to clear a fence but the wing leading edges struck fenceposts. The aircraft landed heavily and came to rest 478 metres from the strip end.

The take-off performance had been degraded by a loss of engine power resulting from unserviceable piston rings in two cylinders. The aircraft was being operated at some 120 kg in excess of the weight extracted from the performance charts as being the maximum allowable for the strip length.

26 Dec 84	Glasflugel 210B VH-GGY			Glider		8451034
1245	Narrikup WA	48	645	218	Glider	

The glider was launched by being towed behind a motor vehicle. After the glider became airborne, the pilot signalled to the vehicle driver to slow down. The vehicle driver slowed the vehicle too quickly, the tow rope slackened and the rope drogue deployed. The tow rope then released from the glider. Because of the position of the tow rope, below the glider, the pilot did not immediately lower the nose, the glider stalled at about 15 feet agl and landed heavily.

30 Dec 84	Cessna 182L VH-EFN			Private		8431041
1545	Willaura Vic	59	193	114	None	

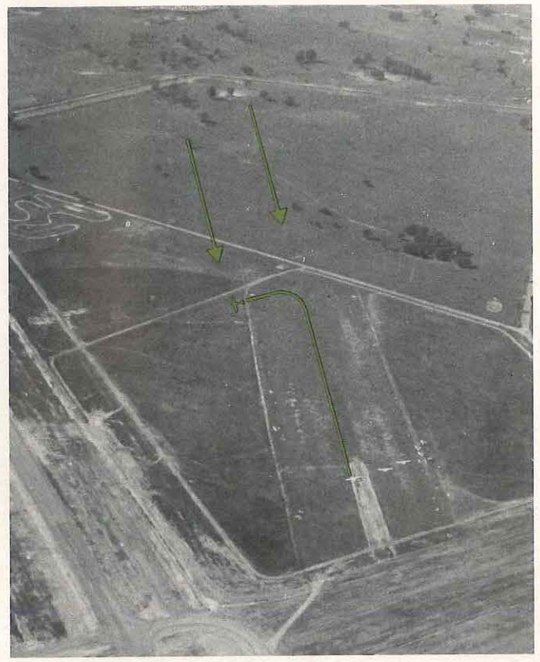
After flying in the local area for a time, the pilot entered a long straight-in final approach for the easterly strip he had used for take-off. From a distance he observed that the wind was a light southerly. Following a slight bounce on touchdown, braking was initiated but the aircraft seemed to be travelling faster than normal. The pilot, believing that he had landed with a tail-wind, turned the aircraft to the north-east to increase the landing roll available. The aircraft overran the area into a fence and firebreak.

The approach speed used was 12 knots faster than that recommended in the landing chart. The bounced landing, slippery grass surface and use of other than maximum braking increased the stopping distance required. The direction of turn chosen by the pilot to increase his stopping distance was downhill and with a tailwind component. The presence of telephone lines at the end of the strip precluded a go-around.

Pin that airspeed

Launching a glider is a critical phase of flight, for if it becomes necessary to abandon the launch the glider pilot is likely to find himself at a low altitude and with little time to select an outlanding area. It is of course standard practice to consider during preflight preparation alternative courses of action should launch problems arise; additionally, the flat, open terrain characteristic of many gliding centres often presents numerous outlanding options.

Notwithstanding the latter factor, emergencies such as rope or wire breaks, or winch failures, continue to result in unnecessary or excessively severe accidents. In many of these accidents, investigation indicates that the central problem is that most basic and important aspect of piloting, airspeed control. An accident involving an IS28 glider was a case in point.



Aerial view showing takeoff flight path and areas (arrowed) suitable for forced landing.

The accident

Prior to launch normal procedures were followed for the attachment of the tow rope to the glider's aero-tow release mechanism. The takeoff proceeded uneventfully and after lift off the glider went to the 'low tow' position (i.e. below the tow aircraft). At about the same time the tow rope suddenly released from the glider.

The glider pilot subsequently reported that he pushed forward on the control column and checked his airspeed, although he had no recollection of what the airspeed was. He started a left turn towards a clear area near the departure end of the strip but found he was unable to control the aircraft as 'the right wing kept going up' and he was 'unable to stop it'.

Initial contact with the ground was made by the left wingtip; the aircraft then cartwheeled and the nose impacted heavily.

Both the pilot and his passenger were certain that the tow rope release control had not been activated. Investigation confirmed that the aero-tow release unit was faulty and had released by itself.

Comment

The sequence of events leading up to this accident thus started when the tow rope separated from the glider at an altitude of about 50 feet AGL. Had this not happened an accident would not have occurred. On the other hand, because it did happen, it did not have to result in an accident: there were several suitable outlanding areas within easy gliding range.

Witness reports stated that the left turn had been very steep, while some also mentioned that the aircraft's nose was abnormally high. In combination with the impact evidence (e.g. wreckage distribution), this was consistent with a loss of control prior to impact; specifically, a stall and incipient spin.

The critical action after a sudden inadvertent release in circumstances such as these is to 'pin' the correct speed for:

- best glide performance; and
- continued safe flight.

Clearly, if the first point is satisfied then so is the second; nevertheless, given the number of occurrences in which pilots fail to maintain adequate airspeed, it bears emphasis.

In this case the glider should have been able to cover a distance of 1500 feet from an altitude of 45 feet AGL at an airspeed of 55 knots. As it was, it covered nothing like that. The pilot not only failed to 'pin' the best glide speed, but he also allowed the speed to drop below that necessary for safe flight. His attempt to 'pick up' the left wing with aileron when he became alarmed by the steepness of the left turn would only have increased the glider's susceptibility to spinning given the low airspeed.

Conclusion

No aspect of piloting is more fundamental than that of airspeed control, yet accidents of this type continue to occur. The message is as valid for pilots of powered aircraft as it is for glider pilots, not only if they experience a power loss, but also for a whole range of operations which involve manoeuvring close to the stall.

To summarise, if you are faced with an outlanding or forced landing, maintenance of adequate airspeed is of paramount importance. In the worst case where a clear area is not available, a controlled, wings-level crash is far preferable to an out-of-control crash.

The investigation of a large number of accidents continues to prove that, regardless of obstructions and terrain, if the aircraft is under control at impact you have a fair chance of 'walking away from it', but if it is not you are very lucky if you do ●

Drum refuelling

A Hiller 12E pilot landed alongside a homestead for refuelling after about one and a half hours of cattle mustering. He intended carrying out the job with a portable electric fuel pump inserted in the top of a drum of AVGAS.

Because the electric pump did not have a standpipe, the drum had to be placed on its side to enable fuel to reach the bung hole into which the pump had been placed. To power the electric pump, the pilot disconnected the main leads from the aircraft battery and connected the leads from the pump to the battery terminals with alligator clips.

As the pilot was about to put the fuel nozzle into the helicopter's tank, the delivery hose came off the electric pump, and fuel started to gush out all over him. (The pilot later commented that while the delivery hose fitted tightly onto the pump, it was not clamped.)

In order to stop the pump from running and thus stop the fuel from pouring out, the pilot grabbed the leads from the pump and pulled them off the battery. However, it seems that, as the alligator clips came off the battery terminals, they touched, and caused electrical arcing.

The fuel ignited.

Inside the homestead the property owner heard a loud 'whoomph' and then a scream. He ran outside and saw that both the pilot and the helicopter were on fire. He managed to grab hold of the pilot and extinguish the fire in his clothing by rolling him on the ground.

The pilot, who had been wearing long trousers and a long-sleeve shirt, sustained burns to about 20 per cent of his body, primarily to his hands and from the waist down. The helicopter was destroyed.

* * *

Refuelling from drums is almost invariably done as an 'in-the-field' operation. Many of those who use drums do so often and as a matter of routine; thus, the practice of completing the refuelling quickly and cutting corners tends to arise.

In fact, there are a number of regulations, orders and time-proven procedures applicable to drum refuelling. Like most standard procedures these are intended or have been developed, not to make life difficult for those to whom they apply, but rather to serve safety and preserve life and property. Before reading the rest of this article, it may be a worthwhile exercise to review the accident described above and make a note of the number of deficiencies in refuelling technique which you can identify; the two basic areas you should consider are fuel quality control and fire prevention. Having done that, compare your knowledge to the information presented below.

Fuel quality control

The drum to be used should be checked before commencing refuelling to ensure that—

(a) its markings and the contents are consistent, and appropriate for the use intended;
(b) it is not aged;
(c) there has been no obvious contamination during storage; and
(d) it contains no free water. A positive method, such as the use of water detecting paste or paper, is a necessity.

Before pumping, the drum should be stood on its end and tilted by placing a piece of wood 50mm thick under one side, so that the large bung is on the high side. If the drum is left lying on its side, the suction standpipe, designed so that fuel cannot be drawn from

Photograph shows proximity of fuel drum, battery and helicopter. Arrow indicates remains of fuel nozzle and hose.

Figure 1

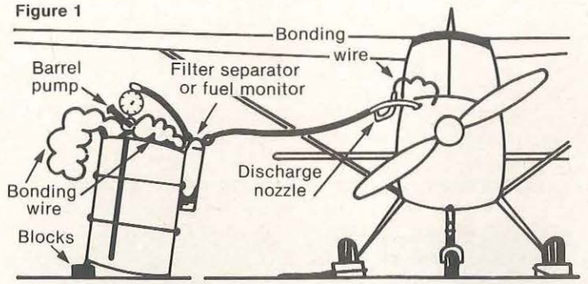
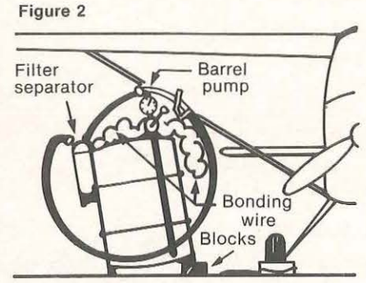


Figure 2



Fuelling from drums

- Mount filter/separator or fuel monitor on side of drum, and bond correctly (Fig. 1).
- Open large bung and insert pump suction to bottom. Large bung should be on high side of drum.
- Bond discharge nozzle to aircraft before opening aircraft fuel tank.
- Fuelling nozzle or hose should be inserted as far as possible into the aircraft fuel tank to minimize splash filling.
- Commence delivery.

When switching to a fresh drum (Fig. 2)

- Remove nozzle from aircraft fuel tank.
- Cap aircraft fuel tank.
- Remove bonding and nozzle from aircraft vicinity.
- Remove pump from empty drum.
- Reseal empty drum.
- Remove filter/separator or fuel monitor.
- Remove bonding.

within 80mm of the drum bottom, cannot do its job—water or other contaminants could be drawn from the drum. Further, as the accident detailed above showed, leaving the drum on its side can increase the possibility of fire.

Having been tilted, the drum should then be allowed to stand for as long as possible, preferably one hour, but not less than 15 minutes, to let water or sediment settle to the lowest point.

If refuelling from jerry cans etc., the fuel should be filtered through a mesh strainer, aviation-type, water-trap funnel.

If refuelling with a pump fitted with a filter, check the filter before and after refuelling for signs of water and other contaminants.

Also note that, if possible, drums should be taken to the aircraft on the tray of a vehicle, not rolled along the ground. If it is necessary to roll the drums, they must be given the longest settling period possible before refuelling is commenced.

Fire prevention

Getting the correct grade of clean fuel into your aircraft's tanks is half the battle—the other half consists of doing it safely:

- The aircraft and the fuelling equipment should not be closer than
  —5 metres to any sealed building;
  —6 metres to any other stationary aircraft;
  —15 metres to any exposed public area; and
  —9 metres to any unsealed building for an aircraft with a MTOW not exceeding 5700 kg, or 15 metres for an aircraft with a MTOW in excess of 5700 kg.
- Static leads should be connected to ensure bonding between the drum, the pump and the identified aircraft earthing point. If there is a ground earthing point available, the refuelling equipment and the aircraft should be earthed.
- The aircraft should be positioned so that it can be quickly moved to safety in an emergency.
- The area in which refuelling operations are being conducted is a 'No Smoking' area. Persons operating fuelling equipment should not carry matches, cigarette lighters or objects which could constitute an ignition hazard and no person should smoke or use a naked flame within 15 metres of the aircraft and the ground fuelling equipment.
- Fire extinguishers should be positioned in the vicinity of the aircraft and the fuelling equipment.
- Particular attention should be given to possible sources of ignition such as arcing between metallic parts of electrical circuits and components.
- Fuelling plant (ie the fuelling system) must be fitted with an isolation switch between the battery and electrical services.
- Exposed electrical terminals should be protected by insulating boots or covers.
- All batteries should be suitably covered to prevent accidental shorting of the cells and should be provided with adequate means of natural ventilation.
- All connections should be secured with spring or lock washers to prevent accidental loosening of connections while in use.

Conclusion

All of those individuals involved in drum refuelling are urged to familiarise themselves thoroughly with the advice contained here and, for safety's sake, to put it into practice ●

Wasted resources

A Piper PA28 was on a VFR flight in Central Australia. The pilot, who held a Class 4 instrument rating, had nominated a SARTIME of 1030 hours GMT. His flight plan estimate for his destination was 0950, which coincided with last light. No arrangements had been made for runway lighting at the destination.

At about 0950 the Flight Service Unit (FSU) for the area received a phone call from a person waiting for the Piper, advising that it had not arrived as expected. Even though the nominated SARTIME had not expired an uncertainty SAR phase was declared because:

- daylight had expired;
- runway lighting was not immediately available; and
- it was not known at that stage whether the pilot held an instrument rating.

At 1037 hours the SAR phase was upgraded to that of Alert.

En route airfields were checked, while runway lights at those airfields, and at possible diversion strips, were turned on where available. The aircraft's owner was contacted and was able to give SAR co-ordinators information on the pilot's qualifications and experience.

No contact was made with the PA28, so at 1145 a Distress phase was declared and a full scale search planned, starting with a high-level Emergency Locator Transmitter (ELT) sweep during the night by a Department of Aviation Merlin. In all, a total of nine aircraft was involved, including a RAAF Orion which took off at first light the next morning.

At 2143 hours on that morning, the missing PA28 arrived at its destination.

It transpired that the pilot had experienced navigational difficulties and, when he found himself rapidly running out of daylight, had carried out a precautionary landing some 10 or so miles from his destination. He had made R/T calls on the area VHF frequency, but had not been able to contact anyone. No consideration had been given to activating the ELT 'because he had not crashed and was in no immediate difficulty'. An uneventful night was spent on the ground.

The next morning the brief flight to the destination was completed, and the pilot learnt that he had been the subject of an extensive aerial search.

Discussion

Before addressing the SAR aspects of this incident, some observations about the pilot's flight planning are warranted.

The plan submitted by the pilot contained no details of true airspeed, wind velocity, magnetic heading or ground speed. It was obvious that he had not allowed for wind velocity in calculating headings and ground speeds. As it was, the relevant forecast wind amounted to about a 15 knot headwind component. There is little doubt that the pilot's failure to allow for this contributed to his navigational problems.

A considerable number of GA pilots submit flight plans in which the effects of wind velocity have not been included. Given that thorough preflight preparation is the basis of flight safety, this is a poor practice. In this particular instance accurate planning was even more essential because of the relatively featureless terrain en route.

As a second point on planning, the pilot's failure to arrange for runway lighting at his destination also was inconsistent with good airmanship and regulations.

Turning to the search and rescue activities, we Australian pilots enjoy one of the best air traffic systems in the world. One aspect of this is that, if we nominate a SARTIME and do not cancel it as intended, we can rest assured that SAR action will rapidly commence.

Here, the pilot was doubtless well-meaning in thinking that as he had not crashed, he should not turn on his ELT. However, the fact was that he had not arrived at his destination and had not cancelled SAR. Accordingly, the 'system' sprang into action, eventually involving nine aircraft and costing, by one estimate, $40000, in what turned out to be a waste of resources. Activation by the pilot of his ELT would have quickly been detected by the Departmental aircraft, and resolved the issue.

The needless expense incurred was important, but the needless use of resources was even more so. Had a genuine emergency arisen, valuable resources may not have been available because they were already involved in this pointless exercise ●

In brief

Some sympathy can be felt for the holder of a Student Pilot Licence who lost directional control of his Cessna 180 while practising solo circuits. He had about 40 hours total flight experience, nine hours of which had been on the type.

After two successful touch-and-go landings he brought the aircraft in for a 'full stop'. At about 20 knots during the latter stage of the landing roll, the aircraft groundlooped to the left resulting in the right wing and elevator striking the ground. The wind was calm at the time.

The old adage 'A landing is not completed until the aircraft has stopped' applies particularly to types such as the Cessna 180 series. Even pilots with considerable experience on type have been caught out. Rudder, ailerons and, most importantly, differential braking, must be applied to maintain directional control during the landing roll out.

It is far cheaper and considerably more convenient to replace worn brake pads than to rebuild the whole aircraft! ●

Reader contribution

Airborne direction finding

This article describing an actual airborne Direction Finding (D/F) intercept and escort was prepared by Air Traffic Control officers from Townsville. It illustrates both the value of this rescue technique and the important safety contribution alert and concerned observers can play by quickly reporting, and trying to aid, a pilot apparently in trouble.

(Photograph courtesy of NSCA)

South-east stream weather frequently produces poor flying conditions along the North Queensland coast and ranges. It was in such conditions that the pilot of a Cessna 182 bound for Cooktown, and thirty minutes south of Cairns, began to encounter navigational difficulties. While the pilot was reporting north of Cardwell, in VMC, a number of telephone calls were being received by Townsville Operational Control Centre personnel advising that a light aircraft had been sighted in the Herbert River valley, circling and flying up and down the river in extremely poor conditions. One of the callers had been a private pilot and he was exceedingly apprehensive, knowing that the valley basin narrows rapidly to form the Herbert River Gorge with the Blencoe Falls at its head, and that heavy rain was falling.

Despite reassurances that the pilot had reported that she was diverting back to Townsville in VMC and was within ten miles of the coast line, a cropspraying pilot at Ingham, in heavy rain, pushed his aircraft out clear of its hangar and selected appropriate frequencies to contact the pilot and assist her with local knowledge. In Townsville at the Rescue Co-ordination Centre, telephone pager numbers were being rung at 9.32 a.m. to alert the stand-by crew of the National Safety Council of Australia (SAR, Townsville Section). At 9.43 a.m. as the pilot of the NSCA Bell 212 helicopter was being briefed, other crew members were towing the large yellow helicopter on its trolley from the hangar. At 9.52 a.m. the helicopter was airborne to commence a D/F routine which had been discussed in theory but had yet to be tried in practice.

In the meantime, the pilot of the Cessna, unsure of her position but believing she was still close to the coast, had found a gap in the clouds and had scrambled through it at the end of the valley, and was heading westwards with 110 minutes of fuel remaining. This heading was taking her away from the cloud

Attention to detail

The incident discussed in this article highlights a number of the factors often associated with the wrong grade of fuel being pumped into an aircraft's tanks. It also illustrates the value of that much-maligned commodity, paperwork, and attention to detail.

A light twin had made a scheduled landing at an uncontrolled airfield. It was the early evening, and fuel and lights had been arranged by the operating Company. When placing this order by telephone the Company operations officer had not, however, stipulated the grade of fuel required.

After landing, the pilot taxied to the refuelling area where the refueller was waiting for him. Lighting in the area was poor.

Three hundred litres of fuel were added. Shortly afterwards, the pilot noticed on the documentation that his aircraft had been topped up with Jet A1 instead of AVGAS 100/130.

The aircraft was moved to a clear grassed area, the fuel drains opened, and syphon hoses used to drain the fuel tanks. Fuel was drained and the system flushed for 1½ hours, during which time numerous checks of the fuel in the system were completed against a known pure sample of AVGAS 100/130. Only after this process had been completed and the pilot was certain that all Jet A1 had been purged from the light twin's system was the aircraft fuelled again, this time with 800 litres of AVGAS 100/130.

Moving the aircraft to an area clear of that in which the fuel draining had been done, the pilot then started the engines and ground-ran them for 15 minutes, carefully monitoring all engine instrument indications. Deciding that the fuel system was now uncontaminated, the pilot continued with the flight, which was concluded without incident.

Factors identified as being relevant to this occurrence were as follows:

- The required fuel type was not specified when the order was placed by telephone.
- The refueller thought the aircraft had gas turbine engines.
- The refueller did not notice the AVGAS decal near the fuel caps.
- Lighting in the fuelling area was poor.
- The pilot did not monitor the fuel grade on the bowser in use, nor did he personally confirm the type of fuel coming out of the pump.

As stated above, most of the factors appear regularly in this type of occurrence.

Perhaps in conclusion several observations could be made. First, in the final analysis, just what gets pumped into an aircraft fuel tanks is the responsibility of the pilot-in-command. On the credit side of the ledger, by checking the documentation carefully, this pilot discovered the error in time to take remedial action. Despite some pilots' beliefs to the contrary, most of the paperwork associated with aviation serves a valuable safety purpose, and the temptation most of us occasionally experience to sign without reading, or ignore the paperwork completely, can be an unhealthy practice. Finally, the thoroughness with which the contaminated fuel system was purged and the safety measures which were taken are worthy of attention ●

Airborne direction finding *(Continued)*

enshrouded, rain drenched mountains of the Great Divide.

The NSCA Bell 212 is fitted with an Ocean Applied Research ADF 320 'Searchmeter' and at 9.57 a.m. the operator got an initial bearing. A firm bearing was obtained at 10.03 a.m., and as the helicopter took up a track divergence to obtain a second bearing the Cessna was turned onto a reciprocal heading, on reduced power to conserve fuel. As the Cessna continued towards a rendezvous with the helicopter, staff in the Rescue Co-ordination Centre plotted the bearings given by the helicopter crew, determined that the weather at Charters Towers and other aerodromes nearby precluded an en route diversion, and checked to ensure that the Cessna and helicopter would be clear of an area in which unexploded bombs were due to be detonated.

At 10.30 a.m. visual contact was made, 56 nm WSW of Townsville, and the Bell 212 positioned astern to escort the Cessna to Townsville. The accompanying photograph was taken at that time.

By 11.20 a.m. both aircraft had landed and the Cessna pilot gratefully accepted the offer of a cup of tea from RCC staff.

Following this rescue the D/F procedure was further refined, and in a training exercise three weeks later the pilot of a Cessna 310 simulated the classic situation of a pilot unsure of position, in indifferent weather with limited fuel and daylight remaining, and flying low level in rough country. The Cessna was 60 miles north-west of Townsville. The NSCA Bell 212 was 'scrambled', established communication with the 'lost' aircraft, and a bearing and heading to take up were determined within 5 minutes of lift-off. Further bearings quickly followed and an intercept point was calculated by RCC staff. The Cessna's position was established only 15 minutes after the liftoff of the Bell 212.

Airborne D/F does work! ●

ELTs and false alarms

Considerable concern has been expressed within some sections of the aviation industry over the large number of inadvertent activations of Emergency Locator Transmitters (ELTs). There are two main consequences of these 'false alarms':

- a high commitment of finance and resources which ends up as a complete waste; and
- the possible diversion of search and rescue services away from genuine emergencies.

For example, during the last three years in Australia, there has been an average of about 140 false alarms each year, that is, about three a week. It should be fairly obvious that this quickly develops into a significant and wasteful drain on valuable resources.

Research conducted in the United States found that the inadvertent activation of ELTs could be divided into four broad categories, and determined the rate of each category as follows:

1. Mishandling of ELT	28%
2. Hard landings	21%
3. Other G-switch activations	16%
4. Unknown	35%

Mishandling

This category refers primarily to the handling of portable units during transportation and/or storage. It is the category which could be most easily eliminated by pilots and LAMEs simply by the removal of the batteries or battery pack before transporting the instrument. In most cases this is a relatively straightforward procedure. Terminals may be taped over to prevent short circuiting. (When re-installing a portable ELT in an aircraft, always turn it on to check it for normal operation. However, ensure that you have notified the Department of Aviation *before* conducting this test.)

Simply switching an ELT to the 'disarmed' mode during storage or transit is no guarantee that it will not be accidentally activated by a bump, an inquisitive child, electrical shorting or other causes. *No* batteries means *no* signal—it's as simple as that. This practice also safeguards against the danger of a flat battery in the event that one day you become a downed pilot in need of help.

Mention should also be made here of the inadvertent activation of ELTs by owners, LAMEs or pilots working on aircraft. A typical occurrence of this was reported from Darwin some months ago when a person working on the tail section of an aircraft disconnected the ELT's external antenna but did not switch the unit off and subsequently activated the transmitter, probably by a knock which activated the G-switch. This incident gave rise for further concern when investigators found on inspection that the ELT had been incorrectly installed, such that its radiated power would have been reduced. Like any piece of aircraft equipment, ELTs should be installed only by qualified persons and in accordance with the approved procedures; while the same advice applies for any maintenance being completed which might affect an ELT.

Hard landings

For aircraft with permanent ELT installations, hard landing activations can be detected by listening on 121.5 on the aircraft's radio after engine shutdown.

Miscellaneous

The third category, 'Other G-switch activations', refers generally to false alarms set off during shipment of the transmitter, either by the manufacturer to an outlet or by an owner or LAME for purposes of repair. Here again, the answer is to ensure that any ELT shipped to you or by you has its batteries removed and transported separately.

On occasions suggestions have been raised that ELT signals should be made audible to the unaided ear or to the crew in the cockpit, thus eliminating the problem. Unfortunately this presents considerable technical problems and would be prohibitively expensive.

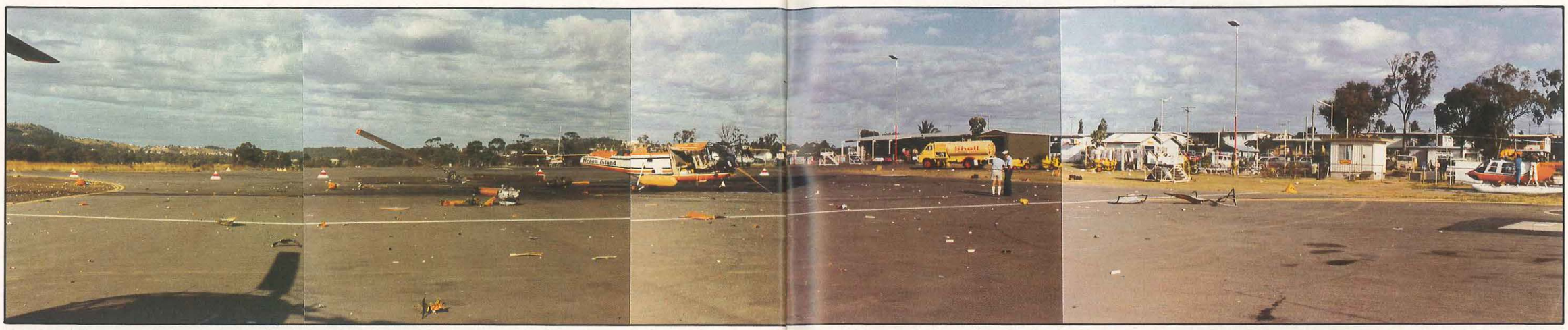
VSBs

The generic term ELT applies to transmitters which are carried in a fixed aircraft mounting. Some pilots also carry portable transmitters, known as VSBs (VHF survival beacons). This practice is encouraged, but it should be noted that as a result of inadvertent activations, transmitters with G-switches are no longer approved for use as VSBs.

Conclusion

Currently some of the design emphasis in new-generation ELTs is being placed on providing a foolproof warning of inadvertent activation which will not overburden owners' wallets. In the meantime, observation of the simple precautions detailed above should ensure that the safety of airmen genuinely in need and the availability of valuable resources are not compromised by false alarms ●

Helicopter ground resonance



Helicopter ground resonance is a phenomenon which can begin without warning, develop with alarming rapidity and culminate in disastrous consequences.

The rapidity with which ground resonance can develop is one of the most significant factors which emerges from accident investigations. The two following summaries are typical of this type of accident.

The accidents

A student helicopter pilot was undergoing an instructional sortie in a Hughes 269C. The flight was to consist of operations from pinnacles, slopes and confined areas; and autorotations. The first three circuits flown were into a pad on a large ridge where a go-around was initiated from a low hover. A landing was effected off the fourth approach, and the throttle was closed to flight idle while the instructor and student discussed the circuits.

After this brief interval the student opened the throttle from the flight idle setting (2000 RPM) to 2500 RPM and then started to raise the collective lever to increase the RPM to the takeoff setting of 3200. However, before that figure was reached a lateral vibration commenced, so he lowered the collective. The instructor, quickly assessing the vibration as the probable onset of ground resonance, took control and increased collective and attempted to lift off, although at that stage full takeoff RPM had not been achieved. The vibration increased and the helicopter's nose pitched up. Even when the normal takeoff collective/power setting was reached the helicopter did not lift off, so the instructor bottomed the collective and closed the throttle.

Notwithstanding this, the vibration continued, to such an extent that the two pilots found it difficult to see inside the cabin and were continually thrown against each other. The helicopter began to break up.

Engine noise increased so the instructor attempted to close the engine down with the mixture control. This did not seem to work, so the student turned off the magneto switches. Shortly afterwards the helicopter caught fire. When the movement of the rotating blades ceased the pilots evacuated the machine and watched it burn out from a safe distance.

The Accident Investigation did not determine the cause of the onset of ground resonance, but concluded that, once it had started, it was developed and increased by wrongly set pressures in the oleos. The instructor correctly identified the condition, but by the time he attempted to lift off the resonance was so severe that the helicopter's efficiency had been compromised to the extent that the takeoff could not be effected.

In the second accident, an Aerospatiale SA 319B (Alouette) was ground taxiing for takeoff when the ground resonance occurred. The pilot lifted the helicopter off the ground and the resonance ceased. However, the main rotor then started to vibrate severely so the pilot landed his aircraft. Ground resonance recommenced, with such force that one main rotor blade struck the cabin roof and severed the tail boom. The aircraft turned through 180 degrees as it sustained further damage.

Inflight main rotor imbalance had been caused by the failure of a blade damper, which in turn resulted from the seat displacement of a one-way valve by a portion of perforated plate. Blade imbalance then induced the failure of a main rotor spacer cable. As the Bureau of Air Safety Investigation report concluded, the ensuing loss of control necessitated a landing, as a consequence of which severe ground resonance, induced by the blade imbalance, occurred.

Ground resonance

Ground resonance can be defined as a vibration of large amplitude resulting from a forced or self-induced vibration of a helicopter in contact with or resting upon the ground. The pilot will recognise ground resonance from a rocking motion or oscillation of the fuselage and, if early corrective action is not taken, the amplitude can increase to the point where it will be uncontrollable and the helicopter will begin to break up. The forces involved are so great that the helicopter can be thrown onto its side or even inverted. Pieces detached from the helicopter during the break up process, e.g., rotor blades, possess considerable energy and can be thrown some distance, with the obvious danger of injury to bystanders or damage to other aircraft.

Causes

The initial vibration which causes ground resonance can already be present in the rotor head before the helicopter comes into contact with the ground. Ideally the disc should have its centre of gravity over the centre of rotation, but, if for any reason its position is displaced, a wobble will develop, the effect being similar to an unbalanced flywheel rotating at high speed. Ground resonance can also be induced by the undercarriage being in light contact with the ground, particularly if the frequency of oscillation of the oleos and/or tyres is in sympathy with the rotor head vibration.

(a) **Rotor head vibration.** Rotor head vibration can be caused by:

- *Blades of unequal weight or balance.* Blades should be correctly weighted and balanced during manufacture, but flight in icing conditions can cause imbalance due to the uneven accumulation of ice on the rotor blades. Moisture absorption or blade damage can also be a cause of imbalance.
- *Faulty drag dampers.* With a three-bladed rotor system the blades should be equally spaced 120 degrees apart. If a damper is sticking or is allowing uneven spacing of the blades, the centre of gravity of the rotor will be displaced away from the axis of rotation (Fig. 1).

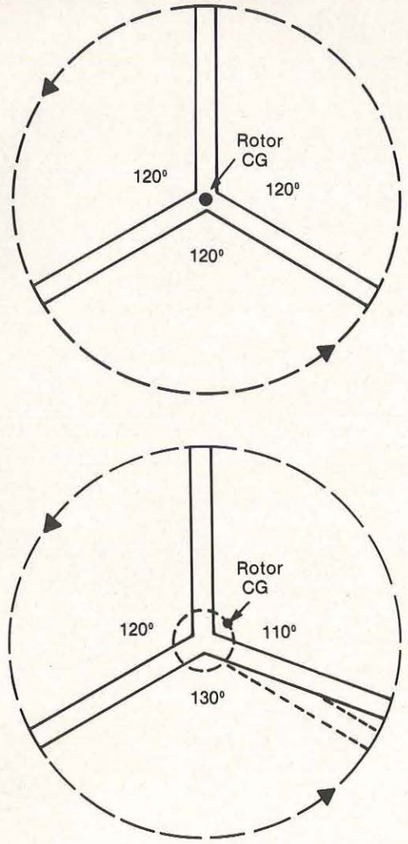


Fig. 1. Effect of faulty drag dampers.

- *Faulty tracking.* A rotor which is greatly out of track may set up an unbalanced condition which will be transmitted through the helicopter. This type of imbalance usually results in nothing more than a rough helicopter and a beat in the cyclic stick. However, if enough track imbalance exists, it is possible that a combination of factors may be encountered which would result in ground resonance being induced (Fig. 2).

(b) **Fuselage vibration.** Fuselage vibration can be caused by:

- *Mislanding,* aggravated by continuous lateral movement of the cyclic stick.
- A *taxiing takeoff,* or *run-on landing,* over rough or uneven ground.
- Incorrect or unequal *tyre pressures;* incorrect or unequal *oleo pressures.* Incorrect tyre and/or oleo pressures can markedly alter the resonance response of the undercarriage system of a helicopter. If the resonant response of the degraded undercarriage system is in sympathy with a rotor head vibration, however induced, ground resonance will occur.

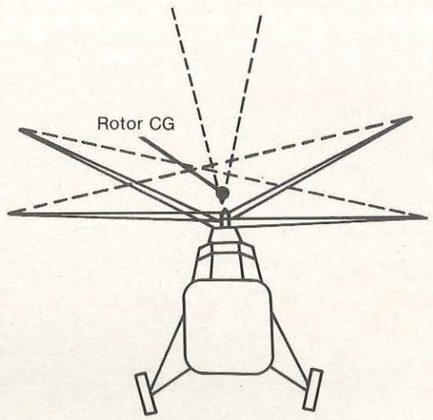


Fig. 2. Effect of faulty tracking.

Recovery action

The more appropriate of the following actions must be taken:

- Take off immediately if rotor RPM are available. Rotor RPM should always be maintained in the operating range until the final landing has been completed.
- Shut down immediately if takeoff RPM are not available or if takeoff is not practicable; i.e., lower the collective, reduce power and apply the rotor brake and wheel brakes (where applicable).

The emphasis must be on decisive action, based on a prompt analysis of the circumstances.

Note that with the advent of rigid rotor systems, helicopters fitted with such systems are far less likely to be affected by ground resonance than those types using a fully articulated rotor system and an articulated undercarriage ●

In brief

The pilot of a Hughes 300 helicopter was making a prelanding circuit after a 40 minute training flight when the fuel low pressure warning light appeared to flicker 'on'. As a consequence he shortened the circuit and carried out a faster than normal approach, but when slowing the machine to a hover at about 30ft AGL the main rotor RPM decayed rapidly and the helicopter began rotating to the right.

After several revolutions the pilot almost succeeded in regaining control but the right skid struck the ground and collapsed, causing the helicopter to roll on to its side. The pilot was fully restrained with a shoulder harness and lap strap which effectively prevented injury during the impact sequence.

Subsequent investigation showed there was still some 18 litres of fuel remaining in the tank, even after some loss through the tank vent following the accident.

It had been observed by the operator on previous occasions that the sun's rays striking various glass domed warning lights at a specific angle could give the impression of illumination. On this occasion the sun was to the left rear of the helicopter as the pilot turned downwind in the circuit. It was thus probable that the sun's rays striking the fuel low pressure warning light had caused a momentary illuminating effect ●

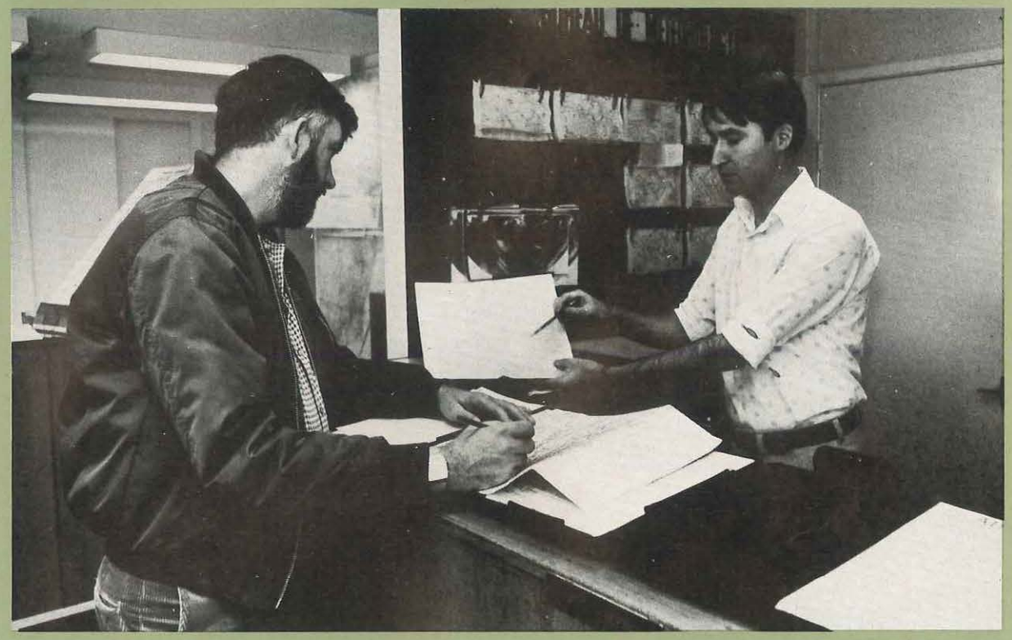
A PPL holder who had flown only two hours during the previous three months was taking six children for a local private flight in his Cessna 206.

The airstrip was a paddock 317 metres long with a 5 degree slope and was covered in 4 inch high grass. On final approach the pilot selected full flap and reduced airspeed to 60 knots prior to the flare. Despite this, the aircraft floated and failed to touch down until more than half way up the strip. It then bounced back into the air and the pilot, concerned at the limited length of strip remaining, decided to go around.

The aircraft struck a gorse bush located at the airstrip boundary where the ground sloped abruptly upward for about 10 ft. The pilot raised the nose and managed to retain sufficient control to keep the aircraft tracking straight up a ridge. It then stalled and 'mushed' into some fern and bracken, coming to rest 40 metres from the end of the strip. The pilot and his young passengers fortunately were uninjured and vacated the aircraft safely.

The topography of the airstrip and the high terrain near one end dictated that the pilot was committed to land after passing the threshold. Locally based agricultural pilots commented that the area was bad for gusts and subject to changeable wind conditions due to mountainous terrain to the west. ●

Its YOUR decision!



Make your weather decision while you still have a choice.

BEFORE TAKE-OFF

- Get, read and assess all meteorological information.
- Prepare a flight plan on the basis of that assessment, not on what you hope the weather will be.
- Pre-plan alternative courses of action.
- Leave a margin for error, or the unexpected — carry ample fuel reserves.

WHILE AIRBORNE

- Keep an eye on the sky.
- Monitor weather broadcasts and ask for updates.
- Don't push your limits.
- Make your turnback/land decision early.

REMEMBER: Preflight preparation is the basis of air safety