For Our 'Other' Readers!

Aviation Safety Digest, formerly distributed only to Australian licence holders and industry organisations, is now available to other interested readers at an annual subscription of $2.00, post paid.

Details are shown on the subscription order below.

Single copies, including some past issues, are also obtainable, price 30 cents each over the counter from A.G.P.S. Book Centres at:

Canberra — 113-115 London Circuit.
Melbourne — 347 Swanston Street.
Perth — 4th Floor, Commonwealth Centre, 1-3 St. George's Terrace.
Sydney — 1st Floor, Bank House, 315 George Street.

SUBSCRIPTION ORDER

ASSISTANT DIRECTOR (SALES AND DISTRIBUTION)
AUSTRALIAN GOVERNMENT PUBLISHING SERVICE
P.O. BOX 84
CANBERRA, A.C.T. 2600

Please record one year's subscription (six issues) to Aviation Safety Digest at $2 post paid.

I enclose $2.00 in payment ☐

Please debit my AGPS account number ☐

Name..

Address..

....

Signature..

Date..

(Please use block letters)

Remittances should be made payable to 'Collector of Public Moneys — Australian Government Publishing Service'.

Number 85 June 1973 DEPARTMENT OF CIVIL AVIATION AUSTRALIA

AVIATION SAFETY DIGEST

Number 85 June 1973

DEPARTMENT OF CIVIL AVIATION AUSTRALIA

Cover and above:

STRETCHED – AND STRETCHED AGAIN! – Two views of TAA's new "stretched" Boeing 727-200, caught by the Digest camera as it arrives at Melbourne's Tullamarine Airport after a flight from Adelaide. Taken from this angle with a normal camera, the 200 looks much the same as a normal 727. So in the second picture, the S–T–R–E–T–C–H has been accentuated with the aid of a fish-eye lens!

The 727-200, seating up to 150 passengers, is used extensively by both airlines on the longer hauls between our more distant capital cities. Both TAA and Ansett Airlines of Australia have three more aircraft of the type on order, the first of which is expected in the latter part of this year.

AVIATION SAFETY DIGEST

Contents

Aviation Safety Digest is prepared in the Air Safety Investigation Branch and published by the Department of Civil Aviation at two monthly intervals. It is distributed free of charge to Australian licence holders (except student pilots), registered aircraft owners and certain other persons and organisations having a vested operational interest in Australian civil aviation. Aviation Safety Digest is also available on subscription from the Australian Government Publishing Service as shown on the order form below. Contributions for publication should be addressed to The Editor, Aviation Safety Digest, Box 1839Q, G.P.O. Melbourne, 3001.

Change of address: Readers on the Department's free distribution list should notify their nearest Regional Office. Subscribers should notify the Australian Government Publishing Service.

Editor: G. Macarthur Job. Assistant Editor: R. J. Maclean. Design: N. Wintrip and P. Mooney.

Printed by The Ruskin Press Pty. Ltd., 39 Leveson Street, North Melbourne.

SUBSCRIPTION ORDER

ASSISTANT DIRECTOR (SALES AND DISTRIBUTION), AUSTRALIAN GOVERNMENT PUBLISHING SERVICE, P.O. BOX 84, CANBERRA, A.C.T. 2600, AUSTRALIA.

Please record one year's subscription (six issues) to Aviation Safety Digest at $2 post paid.

I enclose $2.00 in payment [ ]
(Cheque or money order)

Please debit my AGPS account [ ]

Name .... Signature ....

Address .... Date ....

.... (Please use block letters)

Remittances should be made payable to 'Collector of Public Moneys – Australian Government Publishing Service'.

AUSTRALIA

A VICTIM OF CIRCUMSTANCE

At an island holiday resort on the Great Barrier Reef, 45 miles off the coast of Queensland, an arrangement existed for two Bell Jet Ranger helicopters to operate charter services carrying tourists between the island's hotel and an airport on the mainland. The island, only about half a mile long and less than 1,000 feet wide, is thickly timbered, and lies in a generally east-west direction. The hotel, together with some other buildings used by a marine-life research station, are grouped at the western end, where there is a helipad as well as a harbour for small craft.

On a day in the middle of the summer holiday season, one of the two helicopters arrived at the island about noon. The pilot was to make the return flight to the mainland early the next morning but, as he had no further flying commitments that day, he intended to spend the afternoon relaxing at the island with his wife who had accompanied him on the flight from the mainland. On several occasions during the afternoon and evening, the pilot had alcoholic drinks. Before going to lunch he had some drinks in the bar and, returning to the dining room for dinner that evening, the pilot again called in at the bar. Later, during the meal, he shared a bottle of wine with friends and other guests at the table. After the evening meal, the group made their way back to the bar where they remained drinking quietly for an hour or so.

Although the sky was almost completely overcast with high cloud, and there were electrical storms in the direction of the mainland, the night was warm and, late in the evening, several people were still sitting in the garden outside. Suddenly, at about 2330 hours, they were startled to see a red signal flare low to seaward off the western end of the island. A few moments later, there was another, apparently fired on the same trajectory. Some who saw the flares also heard the sound of their discharge.

Believing the flares to be distress signals, two of the hotel guests went at once to tell the manager and after a short discussion, he and the island's head boatman, with several others, hurried down to the beach. There was nothing to indicate where the flares had come from but, looking out to sea in the direction they had been sighted, the group thought they could see a flickering white light low in the water some distance out. Two small ocean-going vessels were lying at anchor in the harbour and, hoping to get help from their crews, the manager and the head boatman rowed out to them. But when they hailed the first they obtained no reply and, after receiving an indifferent response from the other, they returned to the beach.

Meanwhile, in the hotel, the pilot and his wife had decided to retire for the evening and they were returning to their suite when one of the hotel staff told them of the flares. Shortly afterwards, the pilot made his way to the beach where the others were still trying to identify the white light out to sea. After watching for a few minutes, the pilot remarked he was "sure there was somebody out there" and he urged that a boat be taken out to render assistance. He added that "something had to be done" and that, though he was reluctant to do so, he would use the helicopter if necessary to locate and assist the people in trouble. The manager, with the help of the boatman, then fitted an outboard motor to a small boat and the two men, accompanied by the pilot, set out from the beach, hoping the frequent lightning flashes from the storm would provide sufficient light for them to search the area. But a combination of low tide and strong currents frustrated the venture and the boat was unable to cross a coral reef only about 600 feet from the shore. After about half an hour, they returned.

Back on the beach, the three men stood apart from the other onlookers, talking amongst themselves. The manager was reluctant to persist any further with the search, but the pilot seemed convinced there was a boat in distress and, after several more minutes discussion, he left to ready the helicopter for flight. Deciding they would accompany the pilot, the manager and the boatman joined him at the helipad soon afterwards and, donning life jackets, the three men boarded the aircraft. The engine started normally and, at about 0045 hours, the helicopter lifted off and took up a south-easterly heading towards the far end of the island.

In the meantime, shortly before midnight, a marine biologist and several of his assistants from the research station, after spending most of the evening at the hotel, had walked back to the island's eastern beaches to photograph and tag turtles as part of their research programme. They had been at work only a short time when the biologist looked up suddenly to see the red and green navigation lights of the helicopter approaching low and fast over the trees. It passed directly overhead and he stood watching its lights as it continued on out to sea and began a turn to the right as if about to head back towards the hotel buildings. Then abruptly, all its lights disappeared and, seconds later, he heard the sound of impact. Concerned, the biologist and his assistant switched off their torches and looked out to sea for some sign of the aircraft or its crew. But there was none, and after watching and listening intently for a few more minutes, the biologist, now convinced that the helicopter had crashed, ran back to the opposite end of the island to raise the alarm.

Quickly, several small boats put out from the research station. At first, no trace of the aircraft could be found but eventually, at about 0230 hours, the searchers sighted a light on the water near where the helicopter had last been seen. Reaching the spot a few moments later, the searchers found it was coming from the emergency lamp on top of the helicopter's self-inflating dinghy, which was still attached by a rope to the wreckage of the helicopter lying on the bottom in shallow water. It was obvious from the extent of the visible damage that none of the occupants could have survived the impact.

* * *

The main wreckage, surrounded by numerous small components which had been torn from the structure by the force of impact, had come to rest in about six feet of water, half a mile off the eastern end of the island. A detailed examination of the wreckage after it had been raised revealed that the helicopter, apparently under control, had probably struck the water in a slightly nose-down attitude while making a shallow turn to the right. All major components were accounted for and there was nothing to suggest that any failure of the aircraft's structure, engine or control systems could have contributed to the accident.

The pilot was 42 years of age and held a commercial helicopter licence. His total flying experience amounted to 6,000 hours, of which almost 4,500 hours had been gained in helicopters, with slightly over 1,500 hours in the Bell Jet Ranger. He had flown extensively overseas and for a period of about 18 months had piloted helicopters in air-sea rescue operations. He had accumulated some 280 hours night flying on fixed and rotary wing aircraft, and had over 180 hours instrument flying, but his actual night flying experience in the preceding five years amounted to only 35 minutes, gained on a helicopter mercy flight about nine months before the accident. This mercy flight however, had been conducted in clear and cloudless conditions, and in the immediate vicinity of a large town and harbour where there were numerous lights for visual reference. Furthermore, the flight had commenced shortly before the end of daylight, giving the pilot time to become accustomed to the conditions before it became completely dark. The pilot did not hold a current instrument rating of any class and though the helicopter involved in the accident was equipped with the instruments required for instrument flight, it was not approved for night operations or flight in instrument meteorological conditions.

It was clear from the evidence of witnesses that the pilot had consumed alcohol several times during the day of the accident, yet this same evidence did not suggest he had taken a large quantity. Pathological examination however, disclosed that the pilot had a relatively high blood-alcohol level at the time of the accident. This level would not only have prejudiced his capacity to properly assess the need for the flight, but would have impaired his ability to safely conduct the flight in the existing conditions.

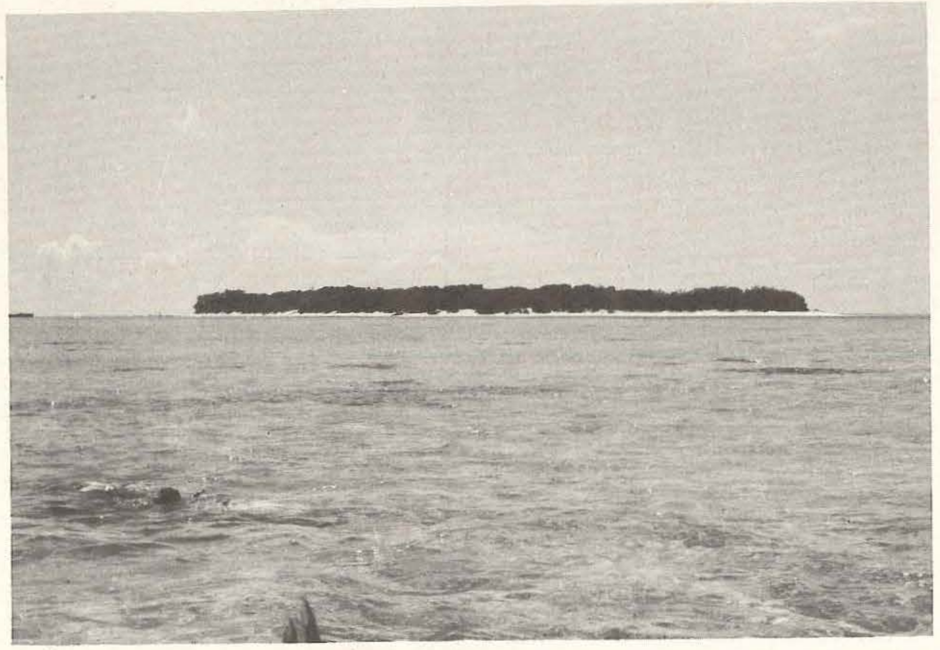
From the helipad to the accident site, the total distance covered by the helicopter had been slightly less than one nautical mile. Closely following the procedure he usually adopted when departing for the mainland, the pilot had at first headed along the island in a south-easterly direction. But then, apparently planning to track back over the hotel on a reciprocal heading, he had begun a turn to the right, probably intending to use the lights of the building to establish a heading out to sea in the direction of the flickering light he intended to investigate.

Although the weather in the immediate vicinity of the island was fine, the conditions under which the flight was attempted were difficult in the extreme. It was completely dark, with only a few stars visible and no moon. There was no discernible horizon and no visual references other than the dark mass of the island and a few domestic lights in the hotel buildings. To operate safely in such conditions would have required the maximum concentration of a pilot currently in practice on night operations.

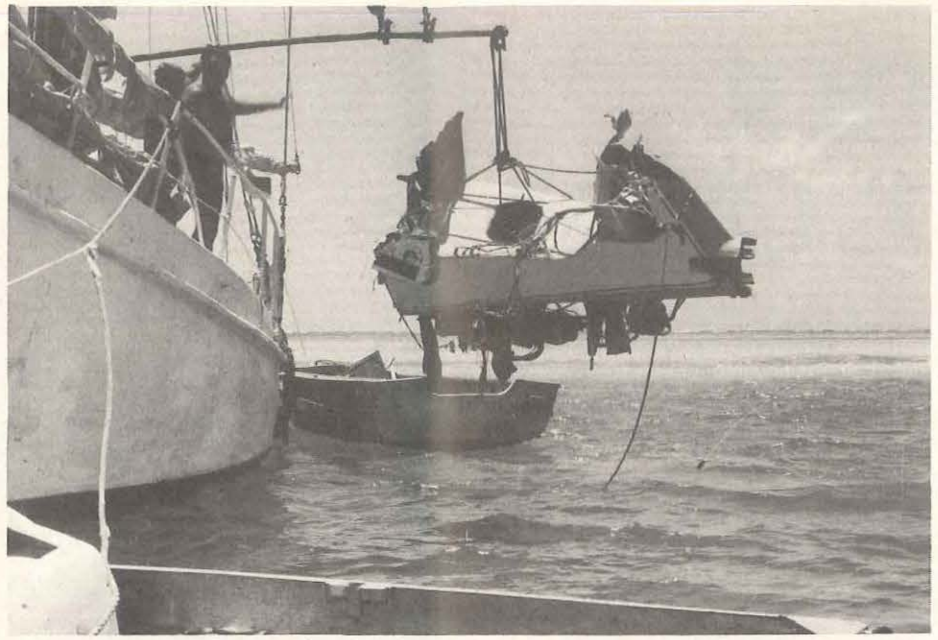
In this instance, however, the pilot lacked recent instrument and night flying experience and, though it is probable that he was able to maintain attitude visually while still over the island, he would have immediately lost whatever guidance he had obtained from the surface features once the helicopter passed beyond the eastern end of the land mass. While on a constant heading away from the island, the pilot probably managed to remain in level flight by reference to his instruments alone, but as he started to turn, it is likely he would have looked outside, watching for the lights of the buildings to line up for his run back over the land. The lights would have come into view after the helicopter had turned about 90 degrees and, as they would have been his primary track guidance, he probably tended to concentrate on them rather than on his instrument indications. With his attention thus diverted, it seems that from a low height, the pilot unwittingly allowed the helicopter to enter a gradual descent which continued unchecked until it struck the water.

In all the circumstances, it is difficult to escape the conclusion that an accident was inevitable from the moment the helicopter left the ground and headed away from the visual references provided by the lights of the buildings and the island mass. Even in more favourable circumstances, the attempted flight would have been a hazardous undertaking but on this occasion, having regard to the pilot's impaired efficiency, the conditions were clearly beyond his ability at the time and there was little hope of the flight ending any differently than it did.

But it would be extremely unjust to conclude that the flight was no more than a foolhardy venture, undertaken by a pilot whose operational judgement and manipulative ability were impaired by alcohol. At a time when he was not fully capable of making an objective decision, the pilot was placed in the unhappy



General view of island from approximate point of impact. The main wreckage, lying in shallow water is just visible at lower left.



The largest intact section of the fuselage being lifted inverted from the water during salvage operations the day after the accident.

position of having to weigh the hazards involved in the flight against the possibility that there was a boat in distress to which he might have been able to render assistance. In deciding to undertake the flight, the pilot was almost certainly influenced by the circumstances of a recent boating accident near the island, in which two fishermen had lost their lives. This tragedy had been discussed at length at the hotel and had been the subject of further conversation at lunch only a few hours before the helicopter crashed. The pilot, in fact, had been heard to remark that the fishermen's boat was probably only a short distance from the island when it foundered and the timely use of a helicopter might have averted the loss of life.

Once all other means of resolving whether or not there were persons in distress had been exhausted, it seems that the pilot, willingly or otherwise, accepted the full weight of further decision. Under normal circumstances, he probably would have critically assessed the situation and decided against any further searching until daylight. But it is not unusual for persons affected by alcohol to form strong convictions based on insubstantial information, nor is it unusual for them to be over-confident of their ability. In this situation, it seems that, despite the obvious hazards of a low-level search over water at night and the pilot's reservations about the flight, he became convinced there were people to be saved, and that he was the only one with the means and capability to render assistance.

The pilot of the helicopter involved in this accident was highly regarded by his associates, not only for his manipulative skill but also for his attention to detail and general attitude to safety. The whole circumstances of the accident provide a tragic example of the extent to which alcohol can cloud the judgement of a person who is normally careful and responsible. Apart from this obvious lesson however, the accident provides a reminder for other pilots who, from time to time, could be called upon to accept the whole responsibility for a decision as to whether or not a particular flight is justified. In these circumstances, rather than base their judgement solely on the apparent necessity for the operation, pilots must consider the risks involved in making the flight and decide whether it can be safely accomplished. On this occasion, three lives were lost on an attempted flight which, from the very outset, had virtually no hope of achieving its objective.

The complete futility of the whole venture became apparent only a short time later when it was learned that the flares had been fired from one of the vessels in the harbour and were not actual signals of distress. Although the pilot seems to have based his decision to make the flight more on the flickering light he believed he saw, the sighting of the two flares was nevertheless the first event in the chain that led to the accident. There can be little doubt that, had all the circumstances of the sighting and hearing of the flares been made known to the pilot and the other persons concerned, the flight would never have been attempted.

You're not on your own

TIME and again when an accident has occurred, that accident has been the culmination of a series of unfortunate events or incidents, any one of which, if eliminated or overcome at the time, could have prevented the accident. And nowhere is this more true than with accidents that have resulted from continuing into deteriorating weather, or those that have been the final link in a chain of navigational misfortunes.

Time and again too, the subsequent investigation of these accidents has shown that, although it must have been obvious to the pilot concerned that he was getting further into difficulties with weather conditions or some other navigational problem, he gave absolutely no indication of his dilemma at the time to the airways operations system. On the contrary, his transmissions were such that his operations could only have been taken to be quite normal. On a number of occasions too, pilots have accepted a clearance, believing they could comply with it but have not requested an alternative when, later on in the flight, they experienced difficulty in doing so without infringing visual flight rules.

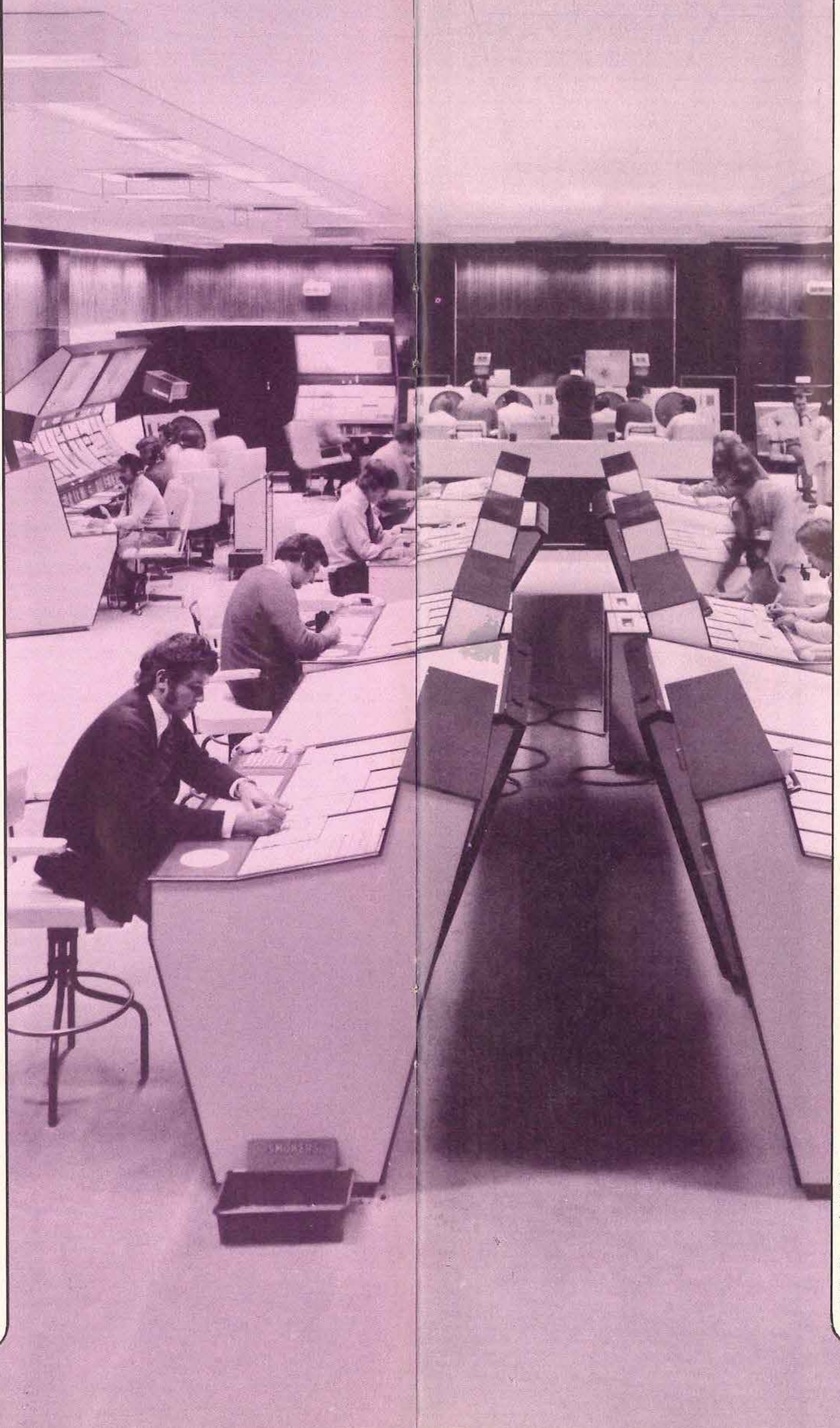
Why this obvious and widespread reluctance to request assistance or an alternative clearance when in need? As the Director-General points out in his letter distributed to all pilots on 16th October, 1972, perhaps one of the principal causes of breakdown in safety communications between pilots and the airways system is the widely held notion that a pilot will be held to account for the circumstances leading to a predicament in which he becomes involved. Indeed, it may well be for this reason that many pilots seem to hold the view that the less information conveyed to airways operations units the better.

It should be obvious that, in these circumstances, the umbrella of safety inherent in the airways operations system cannot be made available to a pilot, let alone exploited to his full advantage. On the other hand, it should be equally apparent that a great deal is to be gained from a readiness and willingness to make full use of the airways facilities that have been provided for the whole purpose of making aircraft operations safer. For this reason pilots should never hesitate to communicate with Air Traffic Control or Flight Service whenever they are in need of assistance.

Whenever a pilot does become involved in an abnormal operation, there is, of course, a need to examine the reasons and circumstances that led to that situation. For instance, the operation might have placed the aircraft and the lives of its occupants in grave danger, and it is necessary that ways and means of avoiding future situations of a similar nature be looked at most carefully. Full and frank information from pilots on the circumstances that led to such situations can thus be invaluable to those charged with the responsibility for accident prevention. Information of this sort, considered in conjunction with that obtained from other occurrences, frequently enables common factors to be isolated and identified and remedial measures developed.

The whole purpose of the Director-General's letter was to encourage pilots to make full use of the services available to them, especially if ever they find themselves in a critical operational situation. To lend weight to this encouragement, the Director-General stated in his letter that pilots who do request assistance from airways operations units in such circumstances would be immune from any resulting disciplinary action.

It has subsequently been very encouraging to find that a number of pilots are taking this advice very much to heart and are not hesitating to call for assistance when they find themselves becoming involved in a difficult operational situation. As the following recent examples show, this assistance has not only been forthcoming promptly but, in each case, has saved the pilot and his passengers from what might well have become a far more embarrassing predicament:



- Four hours after departing from Parafield, for a private flight to the Moomba gas-field, the pilot of a Piper Cherokee reported that he was unsure of his position and that his fuel state was critical with only 30 minutes remaining. The Flight Service Unit at Leigh Creek co-opted the assistance of pilots of two other aircraft flying in the area, who were familiar with the route, and from descriptions of the terrain provided by the pilot of the Cherokee, identified the aircraft's position and directed it to a nearby landing area.
- A Piper Comanche engaged in a private flight from Moorabbin to Canberra reported position at Tumut, but 15 minutes later the pilot requested navigational assistance, saying that he was over the Burrinjuck Dam. The aircraft was identified on radar over Tantangara Reservoir and was then vectored to Canberra Airport.
- A Piper Cherokee reported position over Dubbo, but in the thick dust haze that prevailed at the time he was unable to find the aerodrome. After questioning the pilot, Dubbo Flight Service advised him that he was probably over Wellington and directed the aircraft to Dubbo Airport where it made a safe landing.
- The pilot of a Cessna 150 in the final stages of a private flight from Albury to Moorabbin, reported 10 miles north-east of the field and inbound, but shortly afterwards he requested assistance to determine his position. Melbourne Approach was contacted to identify the aircraft's position on radar and the aerodrome beacon was switched on. Very soon afterwards Moorabbin Tower sighted the aircraft six miles out and directed it on to a base leg for landing.
- Shortly after departing from Moorabbin for a private flight to Hamilton, and while attempting to proceed by the western light aircraft lane, the pilot of a Cessna 182 reported that he was unsure of his position and that he might have drifted out of the lane. The aircraft was identified on radar near Laverton and vectored to Melton, where the pilot resumed his own navigation.
- Seven minutes after the estimated time of arrival at his destination on a private flight from Parkes to Cowra, NSW, the pilot of a Musketeer reported that he was over a town which he was unable to identify. The Flight Service Unit contacted police stations in the area and established that the aircraft was in fact over Grenfell. An ambulance aircraft operating in the vicinity was directed to intercept the Musketeer and to escort it to Cowra where it landed an hour later.
- A Cessna 150 flown by a private pilot was making a flight from Cessnock to Wagga with an ETA of 1317 hours. In the latter stages of the flight, the ETA was amended to 1313 hours but at 1328 the pilot called Wagga and reported that he was unsure of his position. After questioning the pilot, Wagga Flight Service ascertained the aircraft's position, then directed another aircraft to intercept it and escort it to Wagga where it landed safely.
- The pilot of a Cessna 337 attempting a VFR flight from Moorabbin to Moree, NSW, reported position at Yan Yean with an estimate for Kilmore in 10 minutes time. Soon afterwards he reported that he was unsure of his position and climbing in cloud, homing on the Mangalore NDB. The aircraft was identified on radar and vectored to a clear area where the pilot was able to resume VFR flight, and the aircraft returned to Moorabbin.
- The pilot of a Piper Comanche which had departed Moorabbin on a VFR flight to Dubbo requested navigational assistance about half an hour after departing. The aircraft was identified on radar 14 miles south-east of Mangalore and was instructed to climb to 10,500 feet clear of cloud. The aircraft was then vectored to an area which was clear of cloud where it could descend visually and the pilot landed safely at Essendon.

Well then, what do you think? All the help possible is there for the asking when you need it. When trouble looms **you're not on your own.** But it's up to you to take the initiative – ATC and Flight Service staff are not clairvoyant and they cannot know what your situation is unless you tell them.

Will you be like the pilots of the aircraft mentioned and take advantage of what is available when you need it? Or would you prefer to follow the example of others, many of whom are no longer with us, and persist with your own efforts to extricate yourself from your problem – perhaps until it is too late?

It's up to you!

DRUGS AND FLYING

Depressing though the thought may be, one of the few things we can bet on with any certainty is that most of us will be smitten by the cold or 'flu bug' in the next two months or so. Nasal gruntings, spluttering coughs, explosive sneezes, and the rustle of tissues will become (if they are not already) the familiar accompaniment to our daily routine. Again we will be faced by that stoic body of people who steadfastly refuse to acknowledge the onset of winter illness and thumb their noses at the advice of the professionally qualified. Instead they will trust their continued survival to the healing properties of some patent medicine – as advertised on TV. It is for these misguided people that the following article has been written.

Drugs and flying? We know that the permissive society has permeated a lot of places but, 'pot' in the crewroom? A quick 'fix' before take-off? You have to be joking!

Put that way, it does seem a bit fantastic that any aircrew member should be at risk from drugs. But let us take a closer look at the problem. What do we mean by the term 'drug'? . . . . Suppose we define it as a substance which, when taken into the body, alters form, function, perception or judgment. Now we are getting back to reality.

We are not, for the moment anyway, concerned about bodily form. However, we are very much concerned with function, perception and judgment where flying is concerned. "Land as near to the ground as possible" is good advice to any pilot. But what if he cannot judge just where the ground is?

Right, so you still don't take drugs. But what about alcohol, and dear old nicotine? Never had an aspirin? Drinking and smoking have formed the basis of many an article in numerous daily papers and periodicals so we won't dwell on them here. Aspirin? – surely that can't be harmful to anyone unless of course the stated dosage is exceeded. Well you're wrong, and it can. Admittedly it happens only rarely and then only in susceptible persons but it can cause gastro-intestinal haemorrhage, acute renal failure, blood dyscrasias and idiosyncratic reactions such as urticaria and angioneurotic oedema. Grip that lot! . . . . And all from your actual little aspirin tablet! But you took it to get rid of your headache and those other aches and pains of winter illness. Isn't that what aspirin's for? Yes it is, but almost every drug has some 'side-effects' and when doctors prescribe a drug they weigh up the possibility of causing side-effects against its efficacy in treatment.

Some common examples of side-effects from drugs are drowsiness from sedatives and anti-histamines, the unnatural sense of well-being from the amphetamines and the malaise or local pain from some inoculations. The anti-histamines are commonly used to clear blocked noses and sinuses and also to prevent airsickness. The amphetamines have been prescribed to help people control their appetites if they are overweight. They are also used as stimulants. Inoculations are given before travelling overseas. Aircrew in particular would be likely to benefit from the therapeutic effects of any of these drugs but they are clearly contra-indicted for operating aircrew because of their side-effects.

But you know all this – don't you? You don't fly if your nose or sinus is blocked. You just take one of those little coloured pills your wife had from Dr. Smith for her hay fever. They worked like a charm – or did they? What's that? They made you feel absolutely flakers? And those slimming pills you got from your parent's doctor when you were on leave . . . . don't they make you feel a bit "not-with-it"? Didn't you tell him you were a pilot? You're feeling thick in the head today? I'm glad you slept well last night but did you have to take that blue capsule the night before flying? Didn't anyone tell you about the drug's hangover? You should have asked!

What's all this leading to? How can you avoid the danger of side-effects from drugs while flying? Well, first of all, if you know that any drug impairs your function, perception or judgment, don't fly when taking it and don't take it if you are likely to fly.

Second, if you are given any medication by a doctor, remind him that you are flying and ask him whether or not the drug is likely to affect your ability to fly.

Third, a universal rule – never take drugs which have been prescribed for others unless you know their content and are sure that they will not affect you adversely. Remember, the doctor prescribed these, taking into account the possible results of side-effects for his patient – not for you.

Fourth, never raid the drug cupboard haphazardly for something for a minor illness. Incidentally, no unnamed medicines should be left there anyway but should be thrown away when needed no further.

Fifth, beware particularly the proprietary cold cures, airsickness tablets, nerve tonics and slimming pills.

Finally, don't take anything yourself until you are absolutely certain that it will not affect your performance in the air.

Flight safety depends on sharp perception and accurate reaction – don't let yours be dulled by accidental poisoning.

Reproduced with permission from the R.A.F.'s "Air Clues".

DIGEST to the RESCUE?

This pilot "got caught" when he attempted a VFR flight in face of an unfavourable forecast. But he was then wise enough to recognise his limitations and "cut his losses" before it became too late!

* * * *

I had planned to fly from Bankstown to Coolangatta with my wife for a long weekend, departing on the Saturday morning.

On the Friday evening, I telephoned the forecaster at Sydney Airport to ask if conditions were likely to be suitable for a VFR flight early next morning. He told me there would be low cloud with scattered showers, mainly confined to the ranges and the coast, but in his opinion a flight in VMC should be possible, and the day should improve to fine and sultry by mid-morning. Later that night, at about 2330 hours a jet passed overhead, and as it was clearly visible, the cloud base must have been higher than 3,000 feet.

Next morning I rose at 0500 but as there was low overcast cloud I decided to delay our departure. At 0900 I saw there was a high base to the strato-cumulus cloud which was well clear of the terrain to the north, so I telephoned my CFI at Bankstown. He told me the Bankstown weather was satisfactory and that two aircraft had departed northbound at 0700, apparently continuing without difficulty.

We drove to Bankstown and I placed our luggage in the aircraft, then went to the Briefing Office. The Met. Officer on duty advised that conditions to the north were unsuitable for VFR operations, so I put no ETD on my flight plan when I submitted it.

After I had checked the aircraft and completed a daily inspection, I talked to other pilots who had been flying locally, and from their comments I believed that the weather conditions would be satisfactory. So I telephoned the Briefing Office, gave an ETD of 1100 hours, and nominated a SARTIME of 1330 hours to Coffs Harbour.

We departed Bankstown at 1058 hours and the weather conditions were more than adequate with 10 to 25 NM visibility. I tracked, as I normally do, over St. Ives to Pittwater and across it to the coast, maintaining about 1500 feet. The cloud base generally was about 3000 feet, but to the west of Brooklyn Bridge conditions appeared to be less than VMC, with low cloud on the ranges.

Conditions remained much the same as we flew northward up the coast but when about over Terrigal, Sydney Flight Service reported that the weather at Williamtown was no longer VMC. I advised I would land at Aero Pelican and continued, but when we reached the lighthouse at Norah Head I saw that the coast to the north was obscured by heavy rain and showers. Believing this was only a temporary deterioration, I held position at Norah Head and advised Sydney. I then saw that conditions to the south were also non-VMC because of showers.

After holding for half an hour, conditions had not improved to the north or south, so I commenced a search of the area between Norah Head and The Entrance to find a suitable spot to land if this became necessary. I decided that the most suitable area for a precautionary landing was on the beach, just to the north of the entrance to the lake, even though there were people along this section of the beach.

Having found a place to land, I informed Sydney that if conditions did not improve, I would land on the beach. Sydney then suggested other alternatives such as the airstrip at Somerby near Gosford, Cessnock, as well as Aero Pelican. But after considering the weather surrounding the area in which I was holding, together with information from Sydney on conditions to the south and west, I decided that flight into these areas would be very marginal. My thoughts turned to many articles I have read in the Digest and to the pilots who have pressed on into marginal weather, or continued past a position where they could have made a precautionary landing. I informed Sydney that I would continue to hold as conditions were still VMC and I had 20 gallons of fuel left.

Half an hour or so later however, the weather began to close in, and as showers began in my area I decided I would have to land. I could see wheel tracks from four wheel drive vehicles in the sand and could judge the nature of the surface from this. I made a number of practice approaches, turning the landing lights on and off and with my wife waving both arms in an attempt to get people clear of the firm sand – they waved back but they didn't move!

Finally I asked Sydney Flight Service if they could obtain police assistance to clear the beach, continuing meanwhile to fly rectangular circuits. When the people had moved sufficiently I made an approach, lowering full flap in stages and bringing the speed back to 50 knots on short final, and turning off the magneto and master switch just before touchdown. The touchdown was on the main wheels and the aircraft slowed smoothly but I had to apply firm starboard rudder to keep straight and prevent the aircraft from edging closer to the water. When it was almost stopped it tipped forward on its nose and port wing tip, before falling back into a normal attitude. The only damage sustained was a bent propeller and wing tip. The aircraft was flown out from an adjacent road two days later, when conditions had improved.

I had never flown in cloud or heavy rain showers before and did not know what to expect. The dangers in this situation have been strongly expressed in the Digest, a pilot becomes disorientated and a tragic event follows and I feel that these Digest articles counteracted any tendencies I might have had to continue the flight. They helped me to make the right decision!

THRUST NORMAL – ACCELERATION ASSUMED...

Based on Report by National Transportation Safety Board, U.S.A.

While attempting to take-off from Anchorage, Alaska in freezing drizzle, a DC-8 63F failed to become airborne in the distance available, overran the end of the runway and crashed. The aircraft was destroyed by impact and the fire that followed, and 47 of the 229 occupants perished. After the accident, skid marks, together with rubber and pieces of shredded tyre casings, were found over the entire length of the runway.

THRUST NORMAL – ACCELERATION ASSUMED...

THE DC-8, an airline aircraft under charter to the United States Military Airlift Command, was operating a service from Tacoma, Washington to South Vietnam, with refuelling stops at Anchorage, Alaska and Yokota, Japan. The aircraft had departed Tacoma at 1204 hours and had arrived at Anchorage after an uneventful flight lasting three and a half hours. The runway was icy at the time and, after touching down, the captain had used reverse thrust, together with medium to heavy braking, to bring the aircraft to a stop. Braking action was not good on the icy runway, and only light braking was used while taxi-ing to the terminal. After the aircraft had been parked and chocked at the terminal, the parking brakes were released. The aircraft was then refuelled, bringing its gross weight to just over 349,000 lbs. The maximum allowable gross weight for take-off was 350,000 lbs.

Because freezing drizzle was falling, the aircraft was de-iced just before it departed from the terminal for the next stage of the flight. At 1654 hours the aircraft was given a clearance to the holding point for runway 06R, and the take-off check list was carried out while the aircraft was taxi-ing. Just about 1700 hours the aircraft was cleared to line up and the captain taxied slowly on to the runway. The first officer was to make the take-off and the captain briefed the crew that he would handle the brakes, set the engine power and make the required airspeed calls during the take-off. The reference speeds for the take-off were V_1 = 138 knots, V_R = 153 knots and V_2 = 163 knots.

The remaining items of the take-off check list were then completed and, just before 1703 hours, the aircraft was cleared for take-off. The captain advanced the power to 80 percent, took his feet off the brakes, and said to the first officer "Let's go". He then advanced the throttles to take-off power.

The aircraft seemed to accelerate normally at first up to about V_1, then its acceleration appeared to lag, though the speed was still increasing. At 145 knots the acceleration curve seem to flatten even further, but to the crew there appeared to be plenty of runway left to reach V_R, rotate and lift-off before reaching the end.

The aircraft reached V_R still about 1500 feet from the end of the runway and the first officer rotated the aircraft to about nine degrees nose-up. It failed to lift-off. As it left the end of the runway with the tail dragging on the ground, the captain pulled off the power. The aircraft tore its way through a wooden barricade 675 feet beyond the end of the runway, demolished the runway's ILS installation structure, catching fire on the port side as it did so, bounced through a 12 foot deep drainage ditch, and finally came to rest with its back broken 3,400 feet from the end of the runway, where, despite the efforts of the airport fire service, it burnt to destruction.

* * *

Anchorage runway 06R is 10,900 feet long and 150 feet wide and has a paved asphalt surface. The terrain beyond the end of the runway is generally flat, ploughed ground, and a drainage ditch crosses the area at right angles to the runway 2,620 feet beyond its end. Beyond the ditch, the terrain is generally uneven, especially where the aircraft came to rest. An examination of the runway made about 15 minutes after the accident, showed that it was covered with a layer of relatively soft, moist, clear ice.

Evidence found on the runway showed that there had been progressive deterioration and destruction of the aircraft's tyres throughout the take-off run. Normal wheel tracks made by the port main undercarriage truck, progressed from the taxi-way, and on to the runway, to a well-defined static footprint melted through the ice where the aircraft had held awaiting a take-off clearance. There was no evidence of skidding in the wheel tracks leading to this footprint, but from it, skidmarks extended in the direction of take-off. Skid marks made by the starboard undercarriage truck were also found leading from the point at which the take-off was commenced. Evidence of the progressive deterioration of all main undercarriage tyres began at the initiation of the take-off, and continued for the entire length of the runway. The first scrap of reverted rubber was found only 560 feet from the start of the take-off and, by 2,700 feet, the amount of fibre in the rubber scraps indicated that at least some of the tyres had been ground down to their reinforcing cords. Four thousand three hundred feet from the start of the take-off, all the port tyres were flat and by 8,700 feet all of the starboard tyres were flat. Examination of the tyres and wheels not extensively damaged by fire showed that they were all ground down in one place only, with no evidence to show that they had been rotating during the attempt to take-off. The tyre damage and blow-out patterns were typical of that caused by skidding with the wheels locked, and X-ray examination of the tyres showed that none of them had rolled after they had blown out.

Detailed inspection of the brake assemblies of the crashed aircraft indicated that they should have been capable of normal operation and that the damage they had sustained was the result of impact forces. The aircraft's parking brake handle was in the off position and there was no evidence of any failure or malfunction of the parking brake mechanism.

The aircraft was fitted with both a flight data recorder and a cockpit voice recorder, but the tape of the latter had been exposed to excessive heat and no readout could be obtained. The flight data record was recovered relatively free of damage and showed that, after lining up on the runway, the aircraft had remained stationary for a minute and a half. The aircraft then began to move and the airspeed trace oscillated upward to approximately 50 knots as the heading became stabilised at 062 degrees. The maximum speed attained during the take-off was 152 knots, which was reached 72 seconds after it began. From this point, the speed dropped off radically and the altitude and vertical acceleration traces began to show large excursions.

The weather at the time of the accident was overcast with a cloud base of 1600 feet and a visibility of five miles in very light freezing drizzle and fog. The temperature was minus four degrees Celsius and the wind was from 060 degrees at six knots. It was dark at the time of the accident.

Two surviving passengers, both Air Force pilots, said that when the aircraft was two to three thousand feet down the runway during the attempted take-off, they heard a series of loud reports which they believed were the aircraft's tyres blowing out. In their opinion the aircraft lacked the necessary speed for take-off. Soon after rotation they said the ride became extremely rough. At about this point, the first of three impact jolts was felt, the nose of the aircraft came down and the engine noise ceased. Fire broke out on the port side of the aircraft before it came to a stop. Most of the other survivors gave similar accounts of the crash sequence.

Two witnesses on the airport who saw the aircraft crash, said that the initial part of the take-off run seemed normal except that the aircraft was rotated further down the runway than usual. One of the witnesses, who was on a taxi-way adjacent to the runway, heard two or three loud reports shortly after the take-off began which sounded like tyres blowing out. None of the crew on the flight deck heard the sounds or reports described by the passengers or witnesses, nor did they feel any unusual vibrations that they associated with blown tyres.

At the request of the Board, the National Aeronautics and Space Administration participated in the investigation and conducted tests on the rolling and sliding friction forces generated by aircraft tyres at low ground speeds. In view of the fact that skidmarks were left in the parking footprints when the aircraft started to move, indicating that the tyres were sliding under the influence of take-off thrust, consideration was given to whether a tyre that had skidded momentarily on ice, could then develop skidding friction coefficients so low that it would not begin to roll when the brakes were released. Tests were also conducted to determine whether viscous skidding of an unbraked wheel could be sustained on ice, following brake release under skidding conditions on ice. In all cases, it was determined that a tyre would spin up and rotate normally following brake release. The break-away starting friction coefficients on frosted ice and on glazed ice were measured at 0.16 and 0.14 respectively. Thus, as long as the initial aircraft thrust to weight ratio exceeded these values, the aircraft would move forward with the brakes on and the wheels locked. It was also found that, immediately upon sliding, because of water melting in the footprint from friction heating, the average sliding friction coefficient dropped to 0.025, a value which was of the same order as the normal rolling friction of 0.019. It was thus evident that a take-off could be continued under these conditions with little initial effect on the aircraft's acceleration, though with catastrophic effect on the tyres.

During the investigation, enquiries were made of other DC-8 operators to determine what brake system malfunctions and failures had occurred in their DC-8 aircraft. It was found that although the majority of operators had experienced no major brake system problems, there were several cases of either slow or incomplete brake releases that were suspected to have resulted from the malfunction of an anti-skid control valve, or airlocks in the brake system. Some of these instances involved all the brakes, while others involved one main undercarriage only.

* * *

The reason why the crew did not detect that the aircraft was skidding initially becomes easy to comprehend when the

Aerial photograph of runway 06R at Anchorage, looking in opposite direction to that of take-off. The wreckage is visible in the foreground.

runway frictional data is considered. With a total weight of 349,000 pounds on the aircraft's undercarriage, and break-away coefficient of friction of 0.14, only 48,900 pounds of frictional drag would have existed. Thus with the aircraft's total engine thrust of 74,600 pounds, only 65 percent power would have been required to cause the wheels to skid, even with the brakes hard on and the wheels locked. Also, since the sliding coefficient of friction (0.025) is almost a full order of magnitude less than the break-away coefficient of friction (0.14), a surge of acceleration, possibly similar to a normal take-off brake release, would have been felt as the aircraft started to move. Moreover, as the sliding coefficient of friction was found to be only slightly higher than the undercarriage's normal rolling coefficient of friction, the initial acceleration would have differed very little from that of a normal take-off.

As already mentioned however, the effect of the locked wheels on the aircraft's tyres would have been catastrophic and, as the airspeed increased, the sliding coefficient of friction would probably have increased to values nearly double their low speed value. Furthermore, as the tyres blew out, the frictional values would have risen significantly higher, probably to 0.2 or 0.3. Throughout the attempted take-off therefore, the aircraft's acceleration would have deteriorated at an increasing rate, particularly in the latter stages. This deterioration is clearly shown in the following table, comparing the performance of the aircraft in this particular take-off, with normal take-off performance figures supplied by the manufacturer.

Normal Takeoff Performance			Accident Takeoff Performance			Differential	
Speed (KIAS)	Time (Sec)	Distance (Feet)	Speed (KIAS)	Time (Sec)	Distance	Time (Sec)	Distance (Feet)
72.4	18	1000	72.4	22	1250	4	250
98.3	25.7	2000	98.3	33	2650	7.3	650
117.2	31.7	3000	117.2	45	4700	13.3	1700
132.4	36.9	4000	132.4	55	6600	18.1	2600
139 (V_1)	39.2	4500	139 (V_1)	60	7700	20.8	3200
145.4	41.5	5000	145.4	65	8800	23.5	3800
152	44	5584	*152	72	10,400	28	4816
153.5 (V_R)	44.5	5700					

* Max KIAS attained.

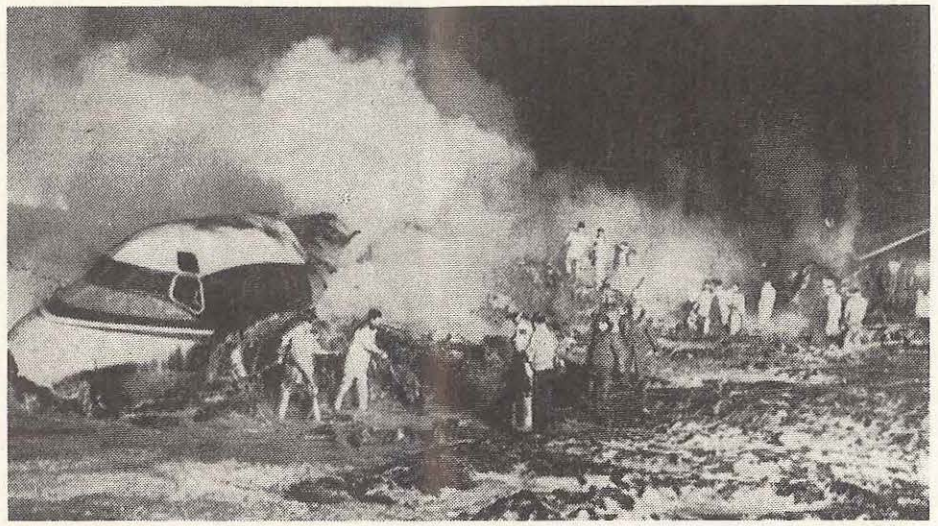
It will be noted that this comparison supports the findings of the friction tests in relation to the initial phase of the take-off, and shows that the aircraft's performance, up to a speed of about 100 knots, was only a little below the performance normally to be expected. For this reason it would have been difficult, if not impossible, for the crew to have detected that the wheels were not rotating and that the aircraft's performance was deteriorating, during the early stages of the take-off. Perhaps their only cue to this condition, might have been an unusual feel of the aircraft at the initial break away but this possibility is negated by the crew's evidence that they experienced a sensation of brake release at the beginning of the take-off run.

The evidence of the investigation clearly indicates that the accident resulted from the main undercarriage wheels failing to rotate during the take-off and there was nothing to indicate that any phenomenon such as aquaplaning could have inhibited their rotation. Rather it was evident that a sustained braking torque was somehow applied to all the main undercarriage wheels after the aircraft had lined up on the runway. The possibility of a malfunction within the hydraulic system resulting in an unwanted brake application was examined but, because most of the hydraulic brake system components were destroyed in the fire, the condition of the system before the crash could not be determined. For this reason no conclusion could be reached concerning any relationship between a hydraulic system malfunction and the locked brakes. All main undercarriage wheel bearings were examined for evidence of high frictional forces but all were found to be in an operational condition with no unusual surface markings or discolourations.

Consideration was given to the possibility that either the captain or the first officer had inadvertently maintained some foot pressure on the brake pedals during the take-off. The captain said that he had held the brakes on with his feet while he was stabilising the engine power then, as he had opened the throttles to take-off power, he had released the brakes, keeping his feet on the rudder pedals. The first officer said that his feet were on the rudder pedals during the take-off with his heels on the floor and that he maintained directional control in this way. He did not feel the brake pedals being depressed at any time during the take-off.

In the existing slippery conditions, only slight braking pressure would have been required to cause the aircraft to skid initially, and keep the wheels locked to the point where the tyres would have been seriously affected. When the aircraft began to slide however, the rise in the coefficient of friction would certainly have been sufficient to overcome any inadvertent braking being applied by one of the crew. In such a case, some indication of wheel rotation would have been produced either on the tyres or on the runway. As well as the fact that no such evidence was found, it is difficult to conceive that braking could have been applied and maintained equally to all main wheels throughout the take-off, without a conscious effort on the part of one of the pilots.

Notwithstanding the fact that both the captain and first officer said that they had not applied the parking brakes at any time after departing from the terminal, the possibility was considered that the crew set the parking brakes while holding on the runway awaiting take-off clearance and subsequently overlooked their release before beginning the take-off. If such a possibility is to be accepted however, the fact that the captain, first officer and flight engineer failed to notice the anti-skid "not armed" warning light must also be accepted. This lamp is illuminated whenever the anti-skid system is not armed, or any time the anti-skid switch is in the armed position and the parking



brake is engaged. The crew said that the warning light was on while they were taxi-ing to the runway, but that when the system was armed, in accordance with the take-off check list, just before turning on to the runway, the light went out. The light did not come on again at any time after this. It is difficult to imagine that this warning light could have been overlooked by all three members of the crew during the take-off, particularly as the take-off was being conducted at night when a bright amber light would be conspicuous indeed in the darkened cockpit.

The investigation found that there was insufficient evidence to support any of these possibilities. Nevertheless, in view of the unusual and coincidental circumstances of an equal braking torque being applied to all eight wheels, together with the fact that this braking torque was apparently not applied until the aircraft was positioned on the runway for take-off, the investigation could not dismiss the possibility that either a hydraulic brake system malfunction had occurred, or that the parking brake was engaged.

Although the combination of circumstances which kept the wheels locked, while permitting the take-off attempt to proceed, was certainly the principal factor contributing to the accident, the investigation could not ignore the crew's response to the situation. As already discussed, the initial portion of the take-off probably seemed quite normal, but there can be little doubt that the lack of acceleration had reached noticeable limits by about 100 knots. By the time the aircraft had reached V_1, the take-off had occupied 60 seconds instead of 39, and the aircraft had travelled 71 percent further down the runway than it should have. Looking at the figures in another way, with the benefit of hindsight, the aircraft, after 39 seconds (the normal time to V_1), had reached only 110 knots instead of the expected 139. If the take-off could have been abandoned at this point, having used only some 3700 feet of runway, and with the speed still 29 knots below V_1, the aircraft could have been brought to a stop with room to spare.

The captain said that the acceleration felt normal up to about 135 knots but that he had noticed some momentary hesitation at about 100 knots. In his mind, this might have masked the extent to which the aircraft's performance was falling off from this point on. Although the captain realised that the acceleration was slower than normal after the aircraft had attained V_1, his decision to continue the take-off is understandable, for except in the case of a catastrophic emergency, the accelerate-stop concept automatically precludes an abandoned take-off after attaining V_1. It is apparent that the insidious nature of the aircraft's decreasing performance made recognition and assessment of the situation very difficult and, once the aircraft had accelerated to V_1, the captain's only reasonable option was to continue the take-off.

In these circumstances, perhaps the only means by which the accident could have been avoided, once the take-off had commenced, would have been by the crew's recognition of the lack of acceleration and their decision to abandon the take-off immediately. But this could have been achieved only if there had been some means of the crew determining that the required acceleration over a given time or distance was being achieved. As a result of this investigation, the National Transportation Safety Board recommended that the F.A.A. should determine and implement take-off procedures that will provide the crew with a time or distance reference by which they can appraise the aircraft's acceleration to V_1 speed.

Probable Cause

The National Transportation Safety Board determined that the probable cause of this accident was the failure of the aircraft to attain the necessary airspeed to effect lift-off during the attempted take-off. The lack of acceleration, undetected by the crew until after the aircraft reached V_1 speed, was the result of a high frictional drag which was caused by a failure of all main landing gear wheels to rotate. Although it was determined that a braking pressure sufficient to lock all of the wheels was imparted to the brake system, the source of this pressure could not be determined. Possible sources of the unwanted braking pressure were either a hydraulic/brake system malfunction or an inadvertently engaged parking brake.

Comment

The icy condition of the runway was of course a principal factor in the development of this accident, and some readers might feel inclined to dismiss it as having no relevance to their operations in Australia. But it is not hard to imagine other situations where an unusual drag increase during take-off leads to a failure to accelerate in spite of normal thrust being available. Increased drag resulting from tyre, wheel or brake malfunctions, slush or water on runways, or inadvertent overloading, are some factors that in the past, have led to undetected deterioration in acceleration during take-off.

WINTER WISDOM

MUCH of the contents of this issue of the Aviation Safety Digest is concerned with the problems of operating light aircraft, both visually and on instruments, in the more difficult conditions that are inevitably brought by the onset of the winter months.

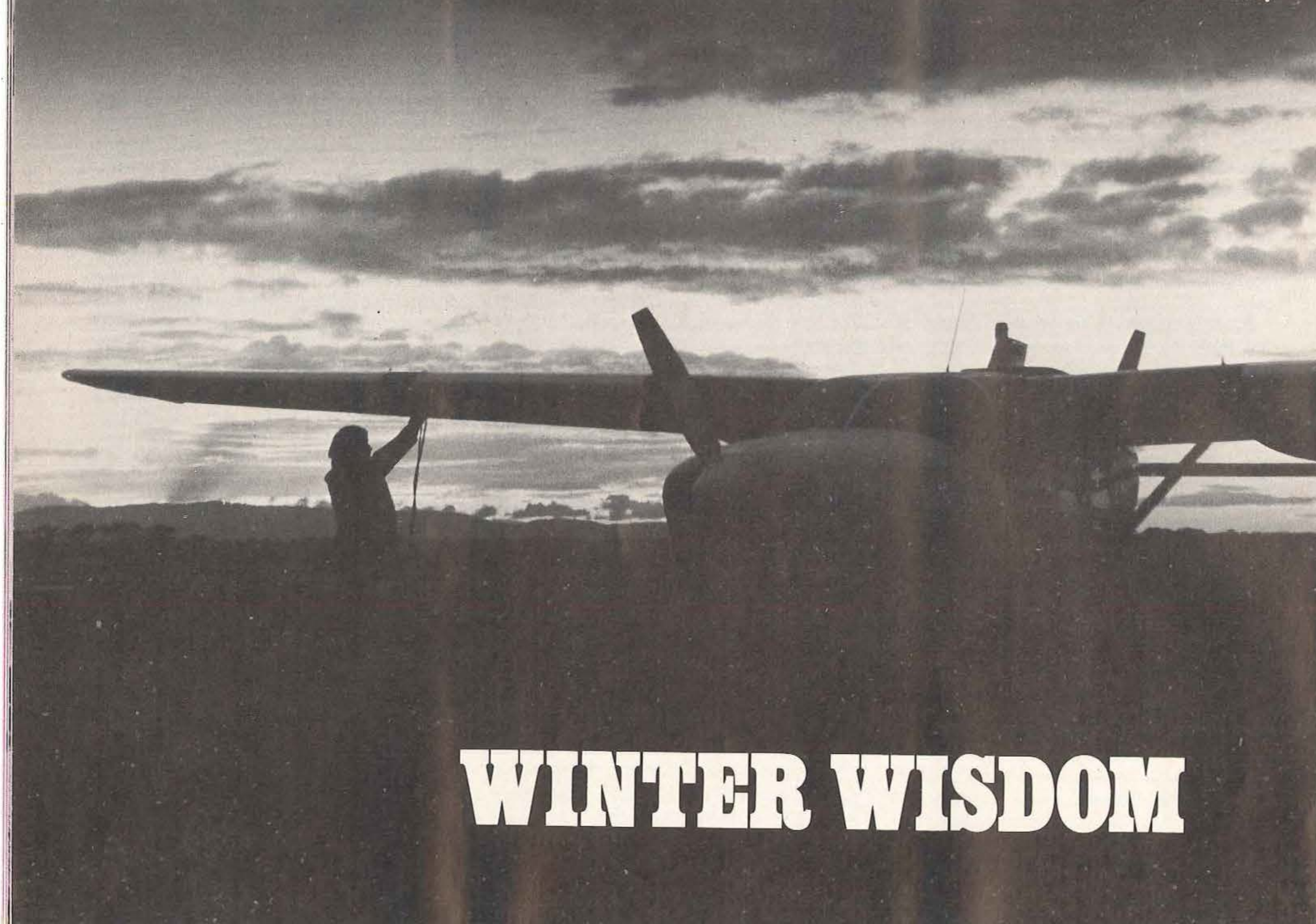
Those of us that have been born and bred in Australia, have grown up with Australian weather, and have done all our flying here, are probably "spoilt" as far as weather flying is concerned. So much of the Australian continent enjoys clear skies and fair weather for such a large percentage of the time, that we tend to take these conditions for granted – to accept them as the norm. And become very impatient when the elements decree otherwise! We might do well to remember sometimes that, for a large proportion of the northern hemisphere where light aircraft are operated, almost the opposite is true, and the same sort of weather that we regard as unfavourable is more nearly the norm, with our frequent "CAVOK" conditions the exception. It is virtually only on the southern coastal fringes and highlands of the Australian continent and in Tasmania, that our day-to-day operational conditions could be likened to those of Europe and North America.

On reflection perhaps, this is the reason so many otherwise competent Australian pilots have come to grief when confronted with weather conditions considerably more adverse than those they have been accustomed to. Perhaps we become so used to conditions that enable us to use a light aeroplane as though it were an aerial motor car, particularly in our inland areas, keeping schedules and appointments without difficulty or problem, that we simply cannot accept the delays and frustrations of having to turn back, or to make a diversion, or wait on the ground, when we encounter weather conditions worse than those we bargain for. As a result, many have succumbed to the temptation "to give it a go" when prudence should have dictated otherwise.

This temptation to press on in "below VMC" conditions, undoubtedly our greatest weather safety problem of all over the past three years, is still very much with us, as will be evident to all who have read Operational Alert Number Two, issued recently by the Department on the subject of weather survival. As most readers know only too well, the message of Operational Alert Number Two is but the last word in a long succession of similar warnings and discussions published in the Digest over the past two and a half years, culminating in the article "What More Can We Say?" in Digest Number 82 in November last year.

As pointed out in "What More Can We Say?", all that needs to be said about the mechanics of these accidents has been repeated ad nauseam in the Digest during this time. We do not intend to repeat it or add to it now, except to recommend again that these earlier utterances in the Digest be re-read and heeded afresh because the problem remains a most vital one – literally one of life and death. Rather in this issue, we have attempted to review some of the measures that pilots can take to avoid placing themselves in like situations, as well as to provide some useful food for thought on other problems associated with operating light aircraft in winter weather.

Altogether it is hoped that this selection of operational experience might motivate readers to give such careful thought to their operations this winter, that many of the problems that have plagued us in past years might remain just this – a thing of the past.



ODD ANGLES

ELUSIVE OBSTRUCTIONS

Five minutes after taking-off from a country airstrip in Queensland, the engine of a Piper Comanche began to surge and run roughly. The pilot turned back and just managed to regain the airstrip, where he made a safe landing.

A maintenance engineer was flown to the site to inspect the engine, but found that it would now run satisfactorily. The aircraft was then ferried to Cairns for further investigation.

After extensive checking and testing in an authorised workshop, two small pieces of thin clear plastic were found in the starboard fuel tank adjacent to the outlet pipe. Under certain conditions the pieces of plastic could restrict the fuel feed from the tank sufficiently to cause the engine to run unevenly and even to cut out altogether.

WAXING TOO ENTHUSIASTIC?

Shortly after taking-off from Bankstown Airport, the pilot of a Cessna 150 saw that the altimeter, airspeed indicator and vertical speed indicator were functioning erratically.

The pilot informed the Tower and returned to land. An aerodrome emergency was declared but the aircraft touched down safely. After it had taxied in, it was found that polishing wax had accumulated in the static vent to such an extent that the hole was obstructed.

TO WHOM IT MAY CONCERN . .

A reader of standing in the community, with the interests of air safety very much at heart, has forwarded us this first-hand account of a recent experience:

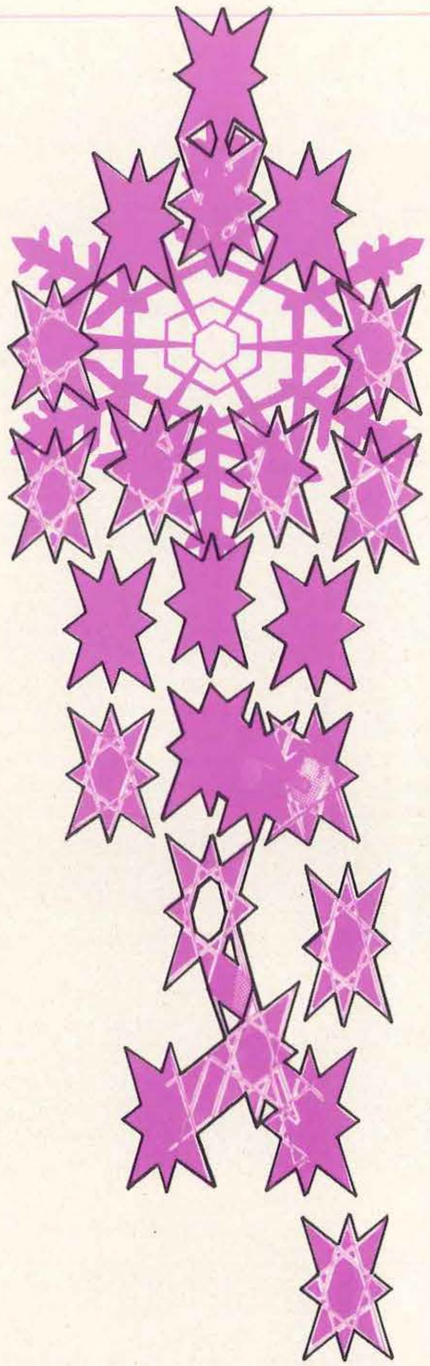
"Recently I arrived at Sydney Airport as a passenger in a Fokker Friendship. The Fokker had stopped short of the terminal building which meant that on leaving the steps down from the aircraft, it was necessary to turn half-right towards the entrance to the terminal building and follow a path which diverged slightly away from the aeroplane.

"Another passenger, who had gone down the steps in front of me, was looking to his left as he did so, and was walking almost exactly parallel to the length of the fuselage towards the still-rotating propeller. Fortunately, he looked to his front in time to see the error of his ways and altered course to his left, so avoiding what would have undoubtedly been a fatal impact with the propeller.

"What interested me particularly about this happening was that the passenger's error was not noticed either by the aircraft crew, or any member of the aerodrome staff.

"Using the retrospectoscope, I cannot ever remember seeing anyone standing guard over the propellers of a Fokker Friendship when the passengers are disembarking, and there is no doubt in my mind that the elements of a fatality are present in this omission. I would respectfully suggest one possible solution to this danger: One of the hostesses could easily be the first person to leave the aeroplane to stand guard in the necessary position and direct the passengers on the correct path to follow. Perhaps they would then be performing a more useful task than murmuring the usual meaningless (if very pleasant!) banalities that are their custom as passengers leave an aircraft."

Airline managements and staff – over to you!



Be alert for Carburettor Ice

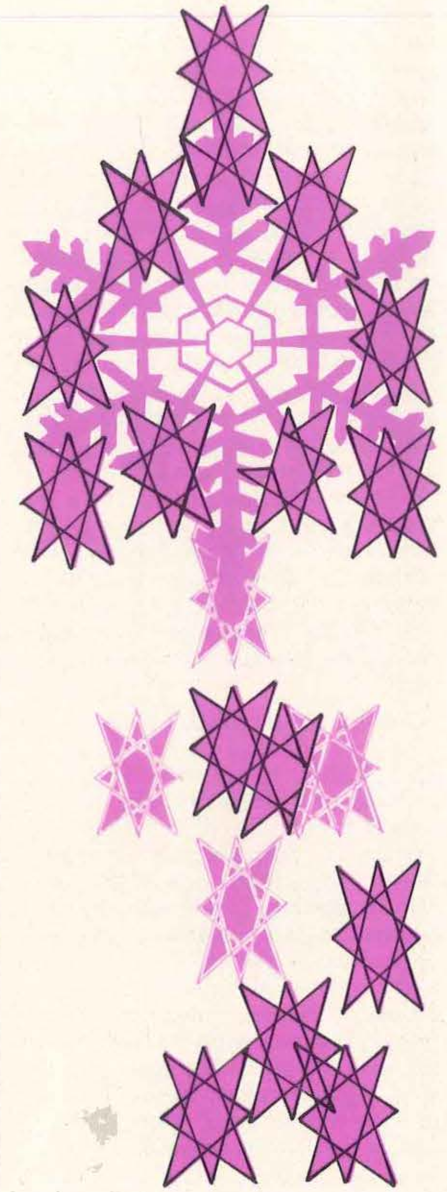
Weather situations guaranteed to quicken the pulse of the most experienced pilot can be encountered at any time of the year. But it is generally the winter months, with their relatively severe conditions, that are the most demanding for general aviation pilots. Some of the problems of winter flying are covered elsewhere in this issue but, now that the season is with us again, it seems opportune to include the hazard of carburettor icing. Although this phenomenon is by no means confined to winter, nearly every year the onset of cold weather is accompanied by numerous incidents, and occasionally accidents, that can be attributed to ice in the carburettor or induction system. The following examples are typical:

THE pilot of the Pawnee shown in the picture had been spreading fertilizer on a rice crop at a property a short distance from a town in northern Queensland. He had commenced operations early in the morning and, using the town's airstrip as a base for reloading, had successfully completed twelve sorties to the property before stopping to refuel. Airborne again after this stop, he returned to the property once more to make two clean-up runs along one boundary of the rice field. Throughout the operation, the owner of the property had been acting as ground marker and, after the pilot had completed his second run, he flew back over the crop towards the owner to indicate that the operation was finished. The owner waved in acknowledgement and the pilot turned back towards the airstrip.

But as he straightened out of the turn at a height of about 200 feet, the pilot saw that the engine was losing power. At first he was not unduly concerned as he thought he had sufficient height to reach the airstrip, but even with the throttle wide open, the engine continued to lose power. He attempted to keep the aircraft in the air by easing back on the control column but eventually the engine failed completely and he was forced to lower the nose.

Now dangerously low, the pilot realised he would have to put the aircraft down and, seeing a gravel road below, turned steeply towards it. But as soon as he lowered flap, the airspeed decreased alarmingly and the aircraft fell on to the road heavily in a steep nose-up attitude. Bouncing back into the air, the aircraft touched down again with the starboard wheel and wing in the long grass growing at the side of the road. Retarded by the drag of the grass and the soft, muddy soil beneath, the aircraft slowed rapidly and, when almost stopped, tipped forward on to its nose and fell on to its back. Quickly releasing his harness, the pilot kicked out the canopy side panel and extricated himself from the cockpit with only minor scratches.

Careful examination of the engine revealed no evidence of any mechanical or system malfunction and later, when the aircraft was lifted back on to its wheels, the engine started and ran normally. Although the weather at the time was fine and very warm, the humidity was high and conditions were especially favourable for carburettor icing. The symptoms accompanying the loss of power were characteristic of the formation of ice in the carburettor and, in the absence of any mechanical defect, it was concluded that ice had built up undetected in the carburettor to the point where the engine had lost all power.



* * *

Shortly before taking off from Moorabbin, Vic., on a dual training flight in a Cherokee 140, an instructor had briefed his student on practice forced landing techniques, including engine handling and the use of carburettor heat. Once airborne, the aircraft was flown to the local training area where, levelling out at 2,500 feet, the student applied partial carburettor heat and closed the throttle to simulate engine failure. Leaving the carburettor heat control in this intermediate position, the student completed his emergency cockpit drills, selected a field and established the aircraft in a forced landing pattern, warming the engine every 500 feet until the aircraft had descended to a height of 1,000 feet. Without warming the engine again, the student continued the descent until, at 300 feet, the instructor was satisfied with his performance and told him to go around. But when the student opened the throttle, the engine did not respond. The instructor immediately took control but, as the aircraft was by now very low, he had no choice but to continue with the forced landing into the selected paddock. Although the ground was wet, the aircraft touched down normally and rolled to a stop undamaged.

The cool and humid conditions existing at the time were conducive to the formation of carburettor ice and when, a short time later, the engine was started and ground run satisfactorily, it was clear that ice had formed in the carburettor during the descent and the small amount of heat selected had been insufficient to prevent it building-up. When no fault could be found with the engine, the aircraft was moved to a dry part of the field and, after taking-off, was flown back to Moorabbin without further incident.

* * *

A student pilot, while on a dual training flight in a Beech Musketeer from a country aerodrome in Victoria, was being instructed on in-flight emergency procedures. The exercise had commenced with the instructor demonstrating action to be taken in the event of fire. Starting at 4,000 feet, he had shut down the engine by closing the throttle and turning off the fuel and ignition switches. At this stage, he selected full carburettor heat. Once the aircraft was established in the descent and he was satisfied that the student was familiar with the procedure, he decided that, with the height still in hand, he would demonstrate re-starting the engine by diving the aircraft.

After stopping the propeller, the instructor set the controls for a restart, and then pushed the nose down until, at 125 knots, the propeller began to windmill. But when he levelled out and opened the throttle, there was no response from the engine. Double checking the various engine controls, he persisted with his starting attempts until, at 2,300 feet, he realised that the engine was not going to fire. Committed now to a forced landing, the instructor established the aircraft in an approach to a field only a short distance from the aerodrome and put the aircraft down without damage.

Shortly afterwards, a licensed engineer examined the aircraft but could find no defect. The engine was started without difficulty and after it had been successfully ground run, the aircraft was flown back to its base by the chief flying instructor. In the absence of any

mechanical malfunction, the failure of the engine to restart was attributed to carburettor ice. With a temperature of five degrees C at 4,000 feet and moderate humidity, conditions were ideal for the formation of ice and although hot air had been selected during the emergency procedures demonstration, the engine would not have been firing at this stage since the fuel and switches had already been turned off. Thus there would have been virtually no residual heat in the engine to disperse the ice which had probably formed while the engine was windmilling with the throttle closed during the recovery from the dive.

* * *

TYPES OF ICE FORMATION

The fact that such accidents and incidents are continuing to occur, is all the more surprising when it is remembered that the problem of carburettor ice has long been recognised, the conditions under which it occurs are known, and the means for precluding it are readily available for the pilot to use at his discretion.

Carburettor ice can form under a wide variety of atmospheric conditions. It is not only a low temperature phenomenon but, as with the Pawnee in the first example, it can occur at air temperatures well above freezing point, and in clear air as well as in cloud and precipitation. Although the susceptibility to carburettor ice varies greatly amongst aircraft types, under certain meteorological conditions, all piston engines are liable to be affected to some degree by icing in the induction system. In engines having a float-type carburettor, in which the fuel is introduced upstream from the throttle butterfly, icing can occur at almost any air temperature if the humidity is high enough. In the case of engines employing fuel injection systems, impact and throttle icing may still be encountered when flying in cloud or in low temperatures. The ice may form in various places and on various parts of the induction system – in the air intake, in curves of the inlet manifold, at the main jet, in the venturi, or on the throttle butterfly valve. Ice formation in the induction system can result in a loss of power, or in power not being available when needed and, in extreme cases, can render movable parts inoperative.

There are three different processes by which ice may form in engine induction systems: fuel-evaporation icing, throttle icing and impact icing.

Fuel-evaporation icing

This is the most common and insidious kind of carburettor ice and forms in the induction system at and downstream from the point at which the fuel is introduced. It is caused primarily by the rapid cooling of the induction air and the adjoining surfaces of the carburettor as the fuel vaporises. The heat required for the evaporation process is taken from the surrounding air, lowering its temperature. If the incoming air is sufficiently humid and the temperature falls below the local dew point, excess moisture is precipitated in the form of condensation. If the temperature is reduced below 0 degrees C, this moisture freezes. Between 0 degrees C and about minus seven degrees C, this freezing process is relatively slow and ice will begin to form on any solid object the moisture may encounter on its way through the carburettor. In fact, at these temperatures, the moisture will even "flow" over a surface for a short distance as it freezes, building up layer upon layer of ice as it does so. If this build-up is allowed to continue unchecked, it will eventually increase to the point where the induction passages become blocked and the engine loses all power.

Visible moisture in the air is not necessary for evaporation icing – only air of high humidity. It can occur in no more than scattered clouds, or even in bright sunshine with no sign of rain. Evaporative icing can normally be expected to occur within a temperature range of five degrees C to 30 degrees C, although the upper limit may extend as high as 40 degrees C. Temperatures around 15 degrees C should be regarded as the most suspect. The minimum relative humidity generally necessary for evaporative icing is 50 per cent, with the possibility of icing increasing at higher humidity levels. Obviously, the icing will be more severe if there is water in liquid form in the outside air, so pilots should be particularly alert for icing during flight in rain or cloud at these temperatures. For a given relative humidity, the severity of this type of icing decreases with a reduction in temperature and it is unlikely to give trouble at temperatures below minus 10 degrees C.

Throttle icing

As the induction air flows past the restriction of a partly closed throttle, its velocity increases. This is accompanied by a decrease in air pressure and a consequent fall in air temperature. As a result of this reduction in temperature, any water vapour in the induction air condenses and ice may form at or near the throttle butterfly. This kind of icing is most likely to occur when the engine is running with the throttle nearly closed, such as during an approach to land or when operating on the ground. Only a small amount of ice is needed to block

the small gap between the butterfly and the wall of the carburettor, and there may be little or no warning that this is happening. Opening the throttle will usually clear the ice, but a heavy accumulation may make the engine slow to respond or, in extreme cases, may prevent it picking up at all.

The temperature drop at the throttle butterfly normally does not exceed two degrees C. Thus, in a fuel injection installation, where the fuel is introduced downstream from the throttle, this type of icing is unlikely to occur at free air temperatures above about five degrees C. With a normal float-type carburettor installation however, any ice formation at the throttle butterfly could be attributed to the effects of both the evaporation ice and throttle ice phenomena, and can occur at temperatures much higher than five degrees C.

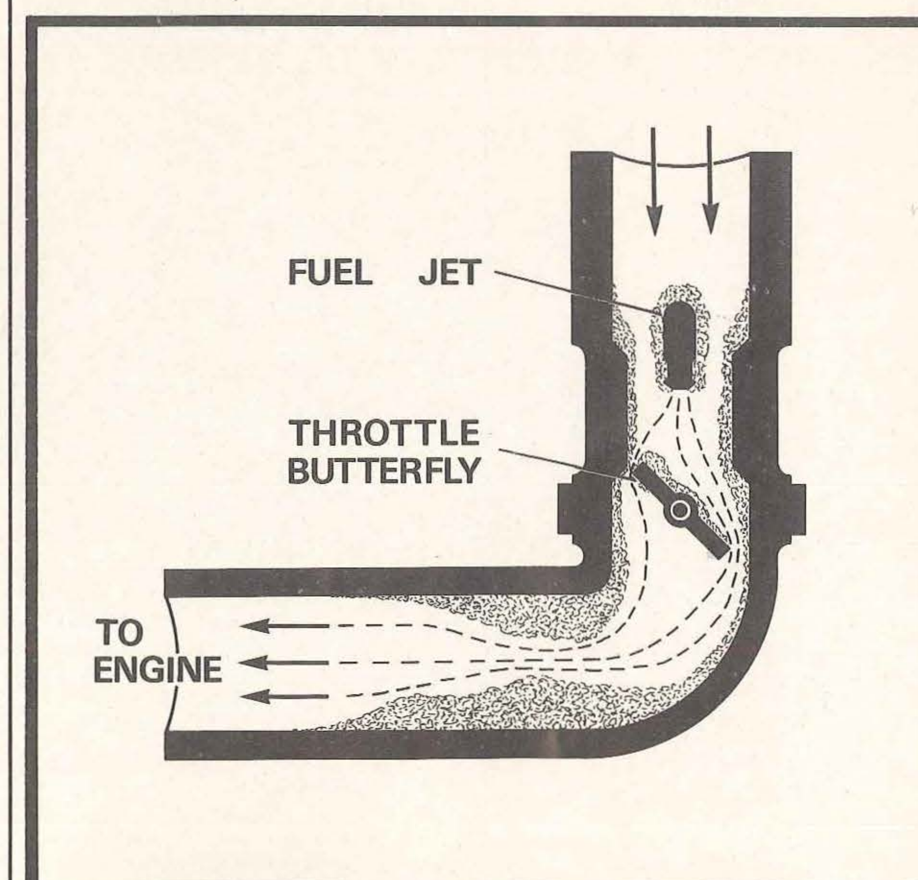
Impact icing

The conditions required for the formation of impact ice in the induction system are similar to those that produce airframe icing. For this reason, it is more easily anticipated than the other two forms of carburettor icing. Impact icing occurs in air temperatures between minus 10 and 0 degrees C, when supercooled water droplets strike parts of the air intake or induction system which are themselves at or below 0 degrees C. In these conditions, the water droplets, at a temperature below freezing but still in liquid form, freeze immediately they come in contact with the components of the induction system.

Supercooled moisture may be encountered in the form of freezing rain, clouds or wet snow. At temperatures above minus 10 degrees C, clouds always contain water droplets and so are prolific sources of impact icing, which can build up on air intakes, heater shutters, duct walls, carburettor screens, throttle butterflies and carburettor metering elements. The most serious form of icing is clear ice which occurs readily at around minus five degrees C, especially at high airspeeds, when there is a high liquid water content in the air, or when the water droplets are large.

RECOGNITION AND PREVENTION

The onset of carburettor icing is not always immediately apparent and its symptoms can easily be confused with other engine troubles. With a fixed pitch propeller, the best indication of icing in the induction system is an otherwise unaccountable drop in RPM which may



or may not be accompanied by rough running. In the case of a constant-speed propeller however, the loss of power could be serious before a reduction in RPM occurs and a more positive indication is a drop in manifold pressure or a reduction in airspeed in level flight.

Carburettor air heaters in light aircraft are usually of the exhaust pipe "muff" type. In this system, the induction air is heated by circulating it through a muff fitted around the exhaust pipe. The exhaust-heated air is then directed through a valve into the carburettor intake or returned to the atmosphere. Under all ordinary circumstances the application of full heat will ensure that the internal temperature of the carburettor is raised above 0 degrees C. Thus hot air can be used in a precautionary way to prevent ice forming in the carburettor, as well as to remove any ice which has already formed.

Icing in the induction system has exactly the same effect as gradually closing the throttle. The airflow through the carburettor is progressively restricted as the ice deposits build up, reducing the power being developed by the engine. If the symptoms of carburettor ice go unrecognised, pilots often try to compensate for the gradually falling RPM or manifold pressure indications by opening the throttle further and further. It is just this set of circumstances that can lead to a complete loss of power. The heat for the hot-air system is provided by the engine and if the application of carburettor heat is delayed too long, the heat available at the reduced power may be insufficient to melt a large accumulation of ice in the induction system.

It is important therefore, that the symptoms of carburettor ice be recognised early enough for the application of hot air to be effective. Immediately icing is suspected of causing a power loss, full carburettor heat should be applied for sufficient time to restore engine power to the original level. In particularly adverse conditions, it may be necessary to apply heat for intervals of up to 30 seconds to ensure that all ice has been removed. If ice has been forming, and the use of hot air disperses it, returning the carburettor air knob to the cold position will produce an increase in RPM or manifold pressure, over the original reading.

If icing conditions are suspected during flight, it is good practice to use carburettor heat at frequent intervals to check for ice formation. If icing is severe, the control should be left in the fully hot position for as long as these conditions persist. When carburettor heat is used continuously in cruising flight, it will also be necessary to lean the engine. Hot air is less dense than cold, and the application of carburettor heat richens the mixture. The engine should therefore be leaned in the normal way to avoid excessive fuel consumption.

A small loss of power and some rough running will always occur when carburettor heat is selected, whether or not ice has formed. This is the result of both the change from ram air to the less direct flow of the hot air system and enrichment of the mixture. If a large build-up has occurred, this normal power loss will be accompanied by an increase in engine roughness and further loss of power as the ice melts and passes into the engine as water. At first these conditions may give the impression that the application of hot air has only made the situation worse, and pilots unfamiliar with the processes involved are sometimes reluctant to apply sufficient heat for long enough to have any effect. This state of affairs is only temporary however, and **it is vital that pilots resist the temptation to return the carburettor heat knob to the cold position before the hot air has had time to clear the ice.** Despite the temporary roughness and moderate power loss, no engine harm can result from the continuous use of full hot air at cruise power settings of 75 percent or less. At higher powers however, such as during climb, carburettor heat must be used with discretion to avoid detonation and possible engine damage. At no time should carburettor heat be used for take-off.

In aircraft equipped with a carburettor air temperature gauge, partial carburettor heat should be used as necessary to maintain safe temperatures and prevent icing. But if no intake temperature gauge is fitted, partial hot air, unless specifically recommended by the aircraft manufacturer, should never be used. The system should be either fully on or off. When operating in temperatures below the critical range for ice formation, the use of partial heat can actually **cause** carburettor icing by raising the intake temperature to the most critical icing range. In this situation, the temperature of the warmed air may be sufficient to melt ice particles which would otherwise harmlessly pass into the engine, but not high enough to prevent a rapid build-up of ice as the resultant moisture freezes again when fuel evaporation takes place.

Carburettors are especially prone to icing during long periods of flight at reduced power settings, such as during a let-down or an approach to land. In order to provide sufficient heat for the hot air system to function effectively the engine should be kept warm by opening the throttle at intervals of approximately 500 feet during prolonged descents. Whenever the possibility of icing exists, hot air should be selected **before,** rather than after, the throttle is closed and before the engine temperature starts to fall as the aircraft descends.

Carburettor icing can also occur on the ground during taxi-ing with small throttle openings or while the engine is idling. During the pre-take-off cockpit checks, full carburettor heat should be selected not only to verify that the hot-air system is working properly, but to remove any ice which might have formed. If the aircraft is kept waiting for any length of time at the holding point, it may be necessary to repeat this procedure to keep the engine clear of ice. Except for these checks however, hot air should not be used during ground operations. With carburettor heat selected, the incoming hot air by-passes the air intake filter and there is a possibility, especially in dusty conditions, of foreign material being drawn into the engine. Before full power is applied for take-off, the carburettor heat control must be returned to the cold position.

* * *

Virtually all accidents and incidents involving carburettor icing can be attributed to mismanagement of the engine controls. Unlike a mechanical failure, over which the pilot may have little or no control, carburettor icing **can be avoided** because the means to preclude it are readily available. It follows that the best defence against icing difficulties is a sound knowledge of the correct method of using carburettor heat, greater awareness and vigilance on the part of pilots in learning to recognise the atmospheric conditions favourable to carburettor icing, and in being alert when operating in such conditions for symptoms that indicate ice is forming.

Because of unique combinations of weather and engine characteristics, recognition of icing conditions is not always easy. Pilots should therefore be constantly alert for the possibility of carburettor icing and take the necessary corrective action before an irretrievable situation arises. It is important to remember that if an engine fails completely because of carburettor icing, it may not restart. Even if it does, the delay could well be critical.

AIR SAFETY ADVICE — ILLUSTRATED

" Pre-flight information is available . . ."

(Graham Carey's Flight Office, Fisherman's Bend, Victoria, 1925. Can anyone help identify the pilots?)

WE WON THE RACE —BUT ONLY JUST!

My Cessna 310 had been chartered to fly four passengers from Canberra to Tyabb, Victoria, and then back to Canberra, departing on the return flight late on an August afternoon. It was to be an IFR flight of course, and from Tyabb, on the Mornington Peninsula 40 miles south-east of Melbourne, I telephoned Moorabbin Airport for the area forecast. There was a moderate to strong westerly stream with two eighths of cumulus cloud from 4,000 to 9,000 feet, and three eighths of strato-cumulus from 4,000 to 7,000 over the mountain regions. There were also areas of drizzle on the windward side of the Southern Highlands, where I could expect three eighths of stratus from 2,000 to 3,000 feet. The freezing level was quoted as 5,000 to 7,000 feet and, with the exception of a little icing to be expected in the tops of the cumulus cloud, the weather seemed to be quite reasonable for an IFR flight. For this reason I had no hesitation in selecting the most direct route — Moorabbin, Eildon Weir, Albury, then via the RNC route to Canberra, and I planned to cruise at 9,000 feet near, if not above, the cloud tops.

It was 1757 hours and quite dark, when we at last set course from Tyabb and began climbing to cruising level. The sky around Tyabb was almost clear with only isolated patches of strato cumulus cloud, and soon we climbed through it. When we reached cruising level we were at least 2,000 feet above the cloud. The flight continued uneventfully with the weather very much as forecast but, about 30 miles south-west of Eildon Weir, the cloud began to thicken. There was one towering cumulus on track which I altered course to avoid, and by the time we reached Eildon Weir we were on top of about six eighths of cumulus about 1,000 feet below our level. But 20 miles further on, the cloud tops were reaching to our cruising altitude and we began flying in and out of cloud.

As expected, we then began to pick up a little rime ice on the leading edges of the wings and tail surfaces. I thought this was quite normal for this area at the time of year, but as the accumulation continued and would possibly become a nuisance, I informed Melbourne Flight Service that I was descending to cruise at 7,000 feet. We then continued through broken cloud with no further appreciable build-up of ice.

Reporting to Wagga Flight Service at the Murray River position, I requested an airways clearance. I was passed back a clearance to Canberra via Talbingo, on the 246 radial at 7,000 feet. This was the route I preferred because of the acceptable forecast weather and the fact that we would obviously have an excellent tail wind on that track. Over Talbingo I changed frequency and called Canberra Approach. Canberra confirmed the clearance they had given and requested me to call 30 miles out in the normal way. With the tailwind we were encountering we now had a ground speed in excess of 200 knots and our estimated time interval for this 48 nautical mile segment was only 14 minutes.

At 7,000 feet, we had been flying through four to five eighths of cumulus cloud, with the stars visible above us most of the time, indicating that the cloud tops were not particularly high. But now I became aware of patches of strato-form cloud above and below us and, only a few minutes past our Talbingo position, we found ourselves in eight eighths of cumulus, with turbulence and continuous moderate rain. The airframe ice began to accumulate again, though not enough to cause concern, and I turned on the propeller de-icing equipment. But within five minutes we were flying in heavy cloud and were running into areas of quite sharp turbulence. At this stage, we were about 30 miles from Canberra and we began picking up ice at an alarming rate. I called Canberra and requested a descent as soon as possible but on our track the controller was unable to clear us below the lowest safe altitude of 6,790 feet. By this stage we were too far into the high country to turn back – in fact with the velocity of the wind, I considered that to do so could only have a detrimental effect on our situation.

The load of ice on the aircraft had now built up to the stage where I was having difficulty maintaining height. I raised the nose and brought the speed back as far as I dared, but at around 110 knots it felt as

though I was near the stall. The aircraft was buffeting and, in the turbulence the airspeed was fluctuating quite violently between 105 and 120 knots. As well as this, I was forced to keep the elevator controls moving to prevent them from freezing solid. The trim control was already rigid and quite immovable.

Canberra Approach then identified us on radar 28 miles south-west of Canberra, and five minutes after my earlier request, I again asked about a descent. The communications went something like this:

Aircraft: How are we for descent now?
Canberra: Report flight conditions.
Aircraft: Very cloudy – still picking up ice.
Canberra: Roger. In another five miles you'll be able to descend to 6,000.
Aircraft: We're having trouble maintaining altitude.
Canberra: Further descent in two miles – confirm you are able to maintain altitude now?
Aircraft: Negative – we're down to 6,000 now.
Aircraft: We've left 6,000 – I just can't maintain altitude. Could you vector us over lower terrain?
Canberra: Terrain clearance advises 7,000 is the lowest in this area.
Aircraft: We're down to 5,700!
Canberra: Position 21 south-west of Canberra.
Aircraft: Roger, 5,600 feet.
Canberra: Have lost your ident on radar – confirm operations still normal?
Aircraft: 5,600 feet – 5,500 – I'll have to declare an emergency – we can't make that altitude.
Canberra: I have an ident now at 18 miles south-west on the 246 radial – you are now in the 6,000 terrain clearance area. Report altitude.
Aircraft: 5,200.
Canberra: Are you able to maintain 5,200?
Aircraft: We're down to 100 knots – and we're just on the stall!
Canberra: Position 16 miles south-west of Canberra and you are coming into the 5,500 terrain clearance – that gives you 1,000 feet above the highest terrain in that area.
Canberra: Position 12 miles south-west – you have another two miles to the 4,000 clearance.
Aircraft: Roger, 5,100 – we're holding 5,000 now . . .

All this took place within the space of about 20 odd miles and demonstrated how rapidly a situation like this can develop. Finally, after several terrifying minutes, we had won the race and the controller was able to clear us for descent to 4,000 feet. At 4,500 feet we broke out of cloud and sighted the lights of Canberra – and it is impossible to express the feeling that the sight of those lights gave me! Incidentally, apart from the man in the right hand seat, the passengers were blissfully unaware of my cold sweat!

Although the windscreen was now clear, the ice was still on the aircraft and, as we had been buffeting to quite a marked degree during the last minutes before we became visual, the stalling speed was obviously still very high, so I made the final approach at 105 knots. We touched down safely.

Later, reconstructing those dramatic few minutes of flight from our times, distances and altitudes, it seems that we must have scraped over the Brindabella Range with only a couple of hundred feet to spare. This would have been just about the time Canberra lost us on radar. Then in the darkness and cloud, we must have edged past the northern face of Tidbinbilla Peak, about 100 feet below its top. If we'd been even slightly south of track, we might not have made it!

* * *

Looking at the events in retrospect, what is there to be learnt from this experience?

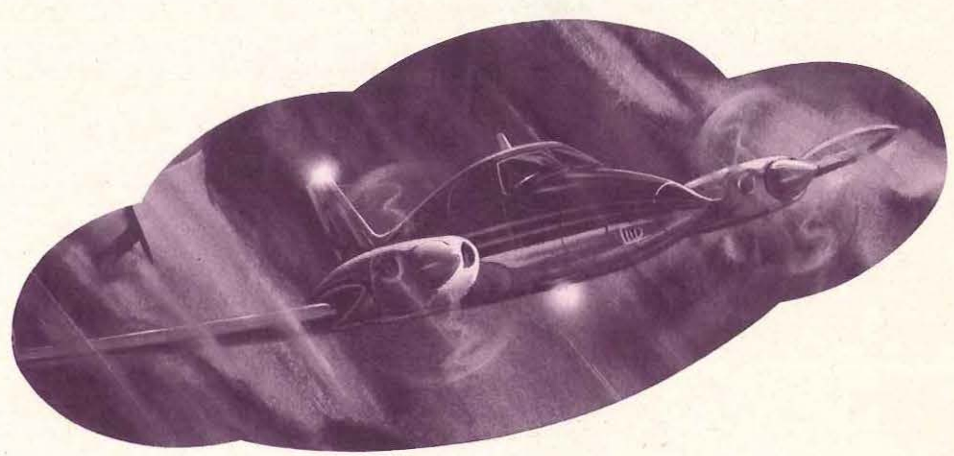
The weather had certainly deteriorated unexpectedly in this area – in fact it was found that a minor trough had formed, but as no other aircraft had flown the same route for some hours before I did, no Sigmets had been passed.

Should the accumulation of ice earlier on the flight have given some warning of the impending problem? No doubt some will say yes. But pilots with knowledge and experience of these routes in winter, know that some ice accumulation is normal at that time of the year.

Perhaps the real lesson to be learned concerns the route to be taken in such conditions – for the time lost by taking a more westerly route to Canberra, over areas of lower terrain, would have been no more than what was lost at the lower airspeed resulting from icing!

We in the charter field probably tend to be too time conscious – though of course we have to be to a certain degree. But we have to face the fact that our living depends on our completing a job safely – as well as in the shortest possible time – so we must never let the pressures of business affect our judgement to the extent that we compromise safety.

There is at least one pilot now who has a healthier respect for airframe icing, and unless the weather ahead is known to be reasonably free of icing he takes steps to avoid the danger area! Having diverted several times from the Talbingo-Canberra route since this memorable episode for exactly the same reasons, I have found that the maximum time lost has never been more than 10 minutes. Admittedly this still represents a small amount of lost income – but it has more than offset by the fact that I have not accumulated any more grey hairs.



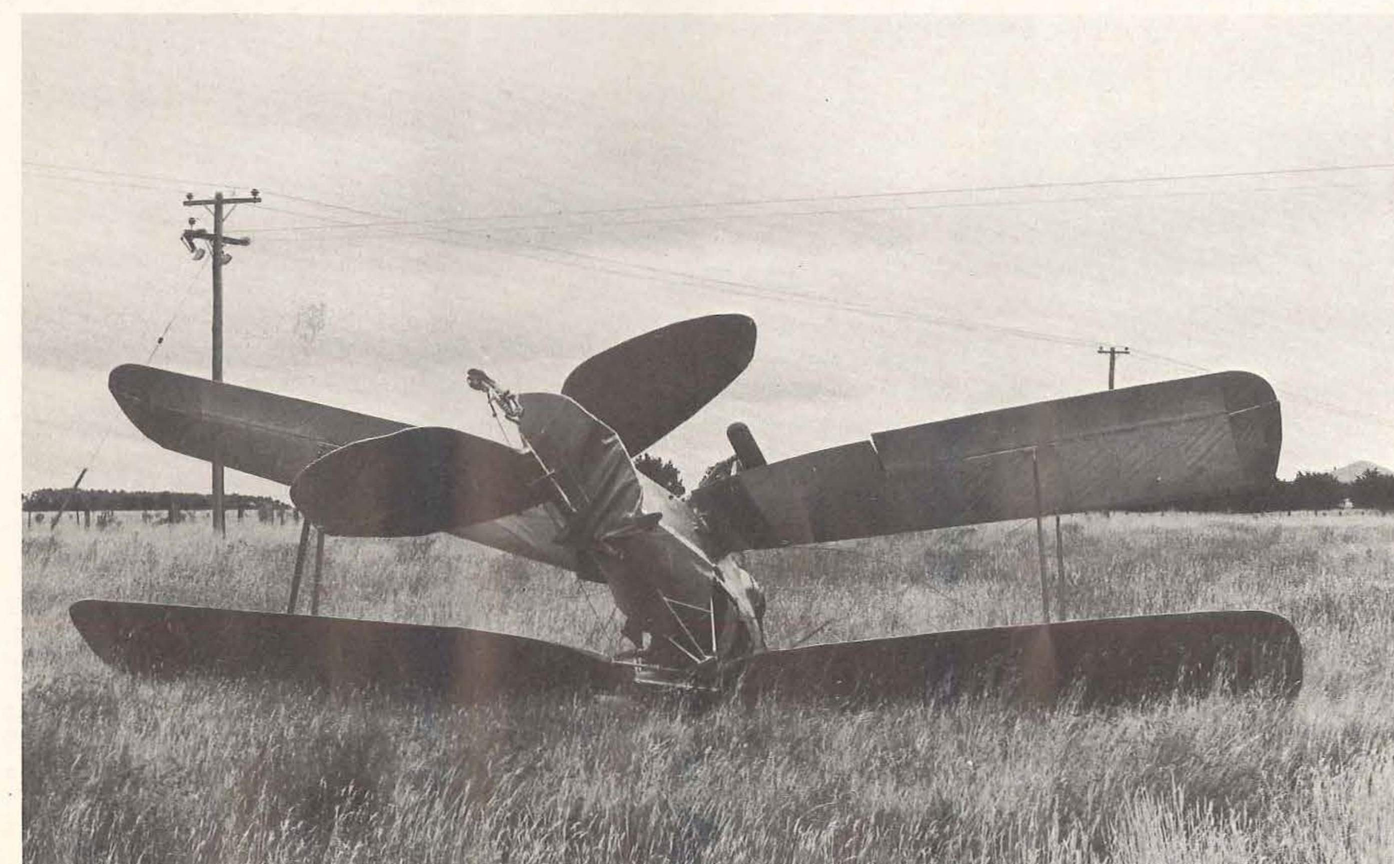
History has a habit of repeating itself . . .

This picture was first published in Digest No. 56 . . .

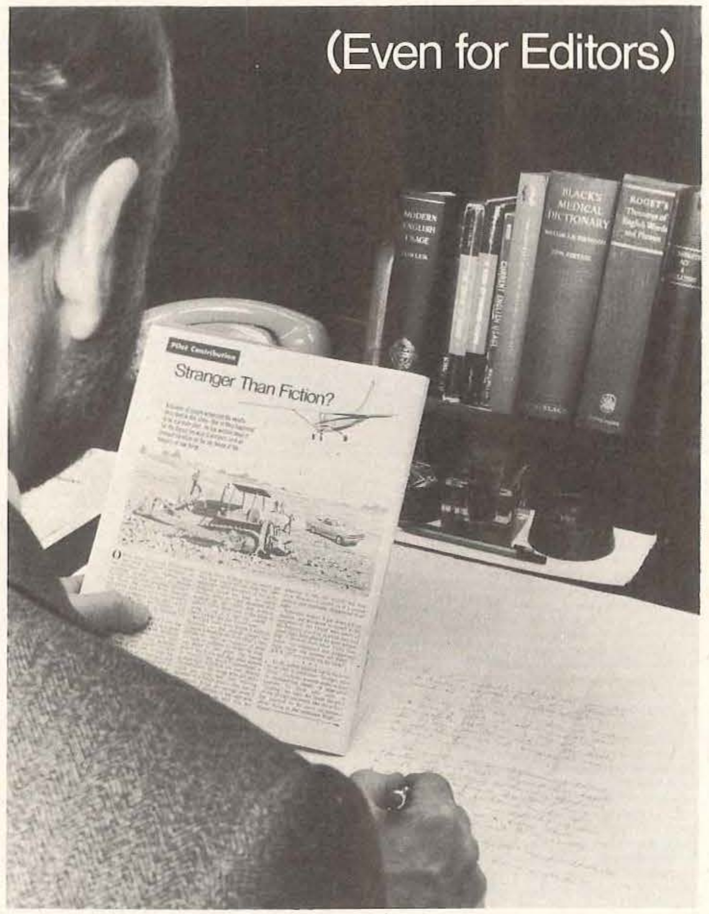
("There's Danger Down Low", Page 19)

This one is taken from a recently completed accident report!

NEED WE SAY MORE?



A Little Knowledge is a Dangerous Thing



You could say that the title of this article is one of the maxims of the Aviation Safety Digest. But in a recent letter, pointing out the error of our ways, a reader has given us (very deservedly), a taste of our own medicine!

HE writes:

In the Pilot Contribution "Stranger Than Fiction" on page 28 of your September issue, (I missed my copy when it was distributed and have only just obtained one to read), we have a story, seemingly appropriately illustrated, which tells of blatant disregard for regulations, and gives some interesting details of how lucky a few people were. These are the sort of stories we all like to read, because we have a concern for safety in aviation. When we do, we mentally chastise the offender and perhaps shake our heads in disapproval.

The irony of the situation in this case however, is that the story's illustration appearing in a magazine so dedicated to safety as the Digest, would do duty as a classic example of "what not to do" when handling heavy earth moving equipment!

For example, examining the illustration, which depicts a bulldozer parked by the roadside with its driver standing on top of the machine waving to the aircraft, we see:-

- *The bulldozer is parked on a slope — never park a bulldozer on a slope!*
- *The blade is not on the ground — never leave the operator's seat before lowering the blade to the ground!*
- *The single tyne ripper is raised — never leave the operator's seat before lowering the ripper!*

As well as this, to judge from the position of the cover on top of the exhaust, the engine is running at about a third to a half throttle! It doesn't take much imagination to see what would happen if the transmission lever happened to vibrate its way into reverse in the torque converter powershift transmission fitted to this type of machine. Also, it is never good practice to stand on top of one's machine, especially when it is on a slope — oil and mud on boot soles can result in broken legs!

Perhaps if we look deeper into the picture, we might find that the brakes were not locked on, and the safety lock was not engaged to prevent the transmission lever moving into a gear position — in other words, that the stage is all set for an accident, even in the short time it would take for the aeroplane to flash overhead!

To my mind the whole illustration is an excellent example of the fact that, in all industries, there are safety regulations and they are there for a purpose. Those not "in the know", do not always see these dangers.

I might mention that before turning "airframe operator", I was an experienced plant operator with some 8,000 hours logged on all types of heavy earthmoving equipment. I have personally witnessed quite a number of accidents of the type "set-up" in your Pilot Contribution illustration, and spent many hours training "student" operators not to do exactly those things!

Comment: We feel suitably chastised! We have always taken pride in the attention to detail we give to our illustration of aircraft. In view of our concern for accuracy and authenticity, it is perhaps poetic justice that on the rare occasion that we presumed to depict a piece of equipment from another operational discipline, we did not stop to consider that this too, might have its own code of "airmanship"! Our contributor's point that there are safety regulations in all industries, that they are there for a purpose, and that the "uninitiated" do not always see the dangers involved, is only too true.

The editorial staff have all learnt afresh, from a new and quite unexpected angle, the very sort of thing that we have been trying to inculcate in some of our readers for so long!