



DEPARTMENT OF CIVIL AVIATION AUSTRALIA Number 83 February 1973

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Cover and above: The Fish Spotters

Aerial spotting for Australia's fisheries has grown from nothing over the past 15 years into what is almost an industry in its own right. And nowhere is this more true than with the "big business" of deep sea fishing – the tuna industry.

The original "spotters" were of course the hardy look-outs, manning the vessels cramped "crow's nests" for hours at a time. But their task was an onerous one, and with their limited range of vision, it was all too easy to miss a valuable school of fish. Sooner or later it was inevitable that the light aeroplane should be seen as the answer. Low powered, economical single-engine types at first, their pilots somehow inoculated against the "automatic rough" symptoms of operating anything up to 50 miles from the coast, the aircraft quickly vindicated themselves, increasing the total catch as nothing else could have.

But as the fortunes of tuna fishing have improved, so has the equipment – and a breed of pilots steeped in the lore and the profits of the industry have grown up. Today, most of the deep sea survey and spotting operations is done with twin-engined aeroplanes – usually Cessna 337's and Aero Commanders for the downward vision provided by their high wing configuration. Some, fitted with complex electronic water temperature measuring equipment developed by the CSIRO, carry a crew of three and, in addition to spotting duties, undertake research into the movement patterns of the fish colonies.

Our illustrations for this issue depict some typical scenes of the industry at work off the coast of southern New South Wales and eastern Victoria.

Readers noticing the February date on this issue need not fear they have missed their January copy. The change in publication date has been made merely to allow for the stand-down that takes place in the printing industry over the Christmas-New Year period, and should in future avoid the delays that have affected the distribution of our January issue in the past.

Subsequent issues will follow at two monthly intervals, with the last Digest for the year being distributed in December instead of November as before.

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

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..... (Please use block letters)



A Moment's Thoughtlessness ...

Late in the afternoon, after completing a visit to a natural gas pipeline station in outback South Australia, a party of three engineers, together with the pilot, boarded their Bonanza to return to Adelaide. After taxi-ing to the northern end of the single strip, the aircraft took off into the south. But instead of continuing in the direction of Adelaide, those watching saw that it was turning left at low level. The turn continued until the aircraft was flying downwind, parallel to the airstrip, at a height of about 200 feet. As it passed the northern end of the strip it began another, gradually descending, left turn back in the direction of take-off. Shallow at first, the turn tightened to about 60 degrees of bank, then the aircraft straightened out and, travelling at high speed, descended towards the small group of men who had come out to the strip to farewell the party. The occupants waved as they flew by only a 100 feet up but the men on the ground, now fearful for the aircraft's safety, watched apprehensively as it passed close to a 300 foot radio mast positioned only a short distance to the west of the strip. A moment later, they were horrified to see its port wing slice into one of the mast's guy wires, and the aircraft pitch violently nose down

THE airstrip from which the aircraft A number of radio masts, varying in **L** had just taken off was one of several height between 260 and 300 feet, are associated with the operation and mainsituated along the pipe-line at intervals of about 30 miles, and pilots engaged in the tenance of the natural gas pipe-line pipe-line inspections had been briefed on connecting the Moomba Gas Field in the north-east of South Australia with the the positions of these obstructions. The city of Adelaide. The strip, together with pilot flying the Bonanza on the day of the accident had not taken part in these the pipe-line station it serves, is situated pipe-line patrols, but he had flown into only a few miles to the south-east of Lake this particular station previously and been Frome, 200 miles north of Adelaide. At warned of the 300 foot radio mast the time of the accident, the operator of situated only a short distance to the west the aircraft held a contract for the of the strip. This briefing had stressed the conveyance of staff and materials to the fact that any strip inspection must be gas field and its pipe-line stations, as well carried out on its eastern side because of as for aerial inspections of the pipe-line the radio mast. itself





On the day of the accident, the pilot

longer. With two other members of the

pipe-line station staff, he accompanied

checks. The aircraft then began its

movie camera.

The pipe-line station as seen from the air, looking north-west. The airstrip, with the wreckage alongside it, is in the foreground. Note the proximity of the radio mast to the strip.

The leading edge section of the outer port wing. sliced from the aircraft when it struck the cable.



one exclaimed spontaneously "Mind our mast!". Moments later the Bonanza's port wing collided with the mast's easternmost guy wire.

The aircraft struck the ground with tremendous force less than 600 feet south of the radio mast and almost on the western side of the airstrip. Immediately, those who had heard or seen the accident ran to the scene. As the dust subsided. they saw that, with the exception of the tail section and starboard wing, the aircraft had been reduced to a mass of crumpled fragments. The rescuers included the pilot and ambulance officer of an ambulance aircraft that was on standby at the pipe-line station, but the four occupants had been fatally injured. * * *

A detailed examination of the wreckage had departed from Adelaide airport with of the aircraft and its systems, including a four passengers at about 1100 hours. The strip examination of the engine, revealed day was fine and hot, and after a normal, no evidence that the aircraft was other if rather turbulent flight, the party than completely airworthy at the time of arrived at the pipeline station at 1300 the accident. The aircraft had struck the hours. After having lunch, the party ground in a very steep nose-down attitude attended to the work for which they had while banked to port, with the engine come, which was associated with main- running at high power. It was clear that tenance to the pipe-line, while the pilot this sudden deviation from its horizontal, rested in one of the station's air- low level flight path, had resulted from conditioned buildings. By 1630 hours the port wing's collision with the that afternoon, three of the engineers easternmost guy wire of the radio mast at who had flown from Adelaide that a point 118 feet above the ground. The morning were ready to return, but the wire, which had been torn from the mast, fourth member of the party still had had cut the outer eight feet of the leading some urgent work to complete and edge, together with the tip, cleanly away decided he would remain for a day or two from the port wing.

It was found that the amateur photographer filming the aircraft's departure, the pilot and the three passengers back to though not conscious of doing so at the the aircraft and saw them aboard. time, had captured the entire accident Meanwhile, seeing the party returning to sequence on film. The film, when the aircraft, another member of the screened and examined frame by frame, pipe-line station staff, who was a keen conveyed in a most dramatic way, the amateur photographer, decided to film circumstances in which the accident the take-off with his eight millimetre occurred as well as the violence of the aircraft's plunge into the ground. The After starting the engine, the pilot film showed beyond doubt that the pilot taxied to the northern end of the strip had taken no evasive action of any sort where the aircraft halted, apparently before the aircraft's port wing collided while the pilot carried out his pre-take-off with the guy wire.

Enquiries made in the course of the take-off run into the south, raising a large investigation established that there had cloud of dust. The afternoon was hot and been no suggestion, before the cabin door still and the aircraft seemed to take a was closed for departure, of the pilot longer run than usual to become airborne, making a low level run over any part of and by the time it had reappeared to view the pipe-line station or the airstrip. The above the dust cloud, it was already last persons to see the occupants of the banking and turning. Thinking the air- aircraft were the three men who had craft had departed for Adelaide, the men farewelled them at the strip, and after the who had farewelled it began walking back aircraft had taken off, they had begun to the station buildings. They were walking back to the station buildings, not almost half-way from the airstrip when expecting to see the Bonanza again that they saw the aircraft turning and day. It was also evident that the descending from the north towards them. photographer had filmed the aircraft's As it flashed over their heads only about departure only on the spur of the 100 feet up they ducked instinctively and moment when he saw it was leaving. He

was in his room at the station at the time, and the first portion of his film had been taken through a window that faced the airstrip. It was not until he had filmed the take-off and saw that the aircraft was turning for a flight over the station that he went out to the airstrip with his camera.

In the whole circumstances of the accident, taking into account the obvious operational serviceability of the aircraft, and the fact that the engine was operating at high power until it struck the ground, the only plausible explanation for the events that led to this disaster is that, some time after the cabin door was closed. the pilot, for reasons that can only be guessed at, decided to make a low level run over some part of the pipe-line station. His initial shallow turn to port from the northerly "downwind" heading, suggests that at this stage, he intended merely to fly across the station from north-west to south-east before resuming a southerly heading for the flight to Adelaide. Indeed, this is the impression which the pilot of the ambulance aircraft, watching from outside one of the station buildings, had formed. Apparently however, in the latter stages of this turn, the pilot of the Bonanza changed his mind, perhaps remembering that the station's engineering staff were still working against time to complete some important maintenance to the pipe-line, and decided he should avoid disturbing them. Whatever his reason for doing so, the pilot steepened the turn at this stage and entered the shallow descent parallel with the strip, towards the three men who were walking back to the station buildings.

It seems certain that, at this stage of the flight, the pilot had momentarily forgotten the radio mast's guy wires. There can be no question of his not knowing that they were there. Apart from having been briefed on their



location before undertaking his earlier flight to the station, he had walked past some of the anchorage points on his way out to the aircraft only a few minutes before the accident. Nevertheless, as is clear from the film, the pilot took no action to avoid the cables, and as the passengers in the aircraft were seen to be waving to those on the ground only seconds before the aircraft struck the wire, it is quite evident that they too, in the excitement of the moment, had forgotten the hazard of the mast's anchorage points.

The accident is yet another tragic illustration of the dangers of unauthorised low flying and spur-of-the-moment decisions, taken without regard to the careful planning that is so vitally necessary to safe flying. Nearly always in accidents involving "beat ups" these two factors are present. Again and again this deadly combination can be seen to nullify and destroy in moments all the advantages and "in-built" experience inherent in long established safety philosophies and operational procedures. From this and other accidents that have been discussed in the Digest from time to time, it is perfectly clear that no pilot, no matter how competent or experienced he is, can be expected to operate an aircraft with any assurance of safety if he chooses to act less than responsibly by disregarding or departing from the very standards and procedures that many years of hard won aviation experience have shown to be necessary.

Cause

The cause of the accident was that the pilot operated the aircraft at an unsafe height .-

THE FINAL LINK in the CHAIN

AT a country centre in Western Australia, an air display was being held at the opening ceremony of a newly constructed aerodrome. The aerodrome's single strip is aligned north-west, southeast, and is almost 3,500 feet long. From its south-eastern end, approximately 2,750 feet of the central part of the strip is oil sealed to form a runway. A sealed taxiway runs parallel to the runway for its entire length, giving access to the runway at each end as well as at three intermediate points.

The weather on the morning of the display was fine, with a predominantly southerly breeze of about 10 knots. General flying, mainly aircraft arriving for the display and joy flights, began early in the day and, to take advantage of a small headwind component on the runway, all take-offs and landings were made into the south-cast, with a right-hand circuit pattern. Later in the morning, the wind began to swing towards the south-west, blowing virtually at right angles to the runway and gusting occasionally to 15 knots, but operations into the south-east were continued as the wind still tended to favour this direction.

The flying display itself was scheduled Moth had used and, after completing her to commence at 1200 hours and, at 1130 a general briefing was held for the pilots ready. She was advised by the tower taking part. One of the items on the programme was to be a fly-past by women pilots, but because two of the women pilots had not arrived at the time. a further briefing was arranged for them a little later.

As originally planned, seven aircraft cross wind. The aircraft cleared the were to take part in the women's fly-past. telephone wires and tall trees lining the banks of a creek just outside the The leader, in a Cherokee 140, was to gain height over the aerodrome for a aerodrome boundary, beyond the far end simulated "on a spot" forced landing, of the runway, by what she believed was while the other aircraft, following each a comfortable margin. other at close intervals, were to fly two But the woman pilot in the right hand seat, who held a commercial licence, right-hand circuits at 500 feet. However, when the pilots gathered again for the considered the aircraft had taken an second briefing, another woman pilot abnormally long distance to leave the told the organisers that she had obtained ground and, once in the air, she noticed it the use of a Tiger Moth, and would also was climbing sluggishly with the stall be able to take part. The Tiger was not warning light flashing. equipped with radio, so it was decided that it would take-off first ahead of the One by one, all the other aircraft taking part in the event followed the Cherokee Cherokee, with the other aircraft followinto the same access taxiway. The next in line, a Chipmunk, was also advised of the ing in their original order. It was also downwind component on the runway agreed that, to avoid having to taxi the but, though it swung slightly at the Tiger too far in the cross wind, it would be in order for it to enter the runway beginning of its take-off roll under the from one of the access taxiways close to effect of the cross wind, it climbed away normally and, like the Tiger Moth where it was parked.

was started and taxied on to the runway by way of an access taxiway 1,000 feet However the pilot of the following aircraft, a Beech Musketeer, though also from the north-western end. From this informed of the prevailing wind conpoint, a distance of 1,750 feet was ditions, became concerned that her available to the marked end of the aircraft was taking longer than she runway. Meanwhile, the pilot of the Cherokee that was to carry out the selected the first stage of flap for take-off "forced landing" had found that her and, as soon as the aircraft was ready to aircraft's battery had been flattened by leave the ground, she pulled it abruptly prolonged operation of the radio on the into the air. Holding the Musketeer down ground and she was unable to start the until it had accelerated to its normal engine. A set of "jumper" leads was soon located but, by the time the Cherokee's beyond the end of the runway by only engine had been started, the engines of about 20 feet. the other participating aircraft had been running for several minutes. Finally, all was ready and, as the Tige Moth began its take-off, the Cherokee moved off along the sealed taxiway followed by the remaining aircraft i their appointed sequence. The Cheroke entered the same access taxiway the Tige

pre-take-off checks, the pilot reported controller that the crosswind had now increased to 10 knots, with a slight downwind component and was cleared for take-off. She had already selected one notch of flap and experienced no difficulty in controlling the aircraft in the

At the nominated time, the Tiger Moth before it, easily cleared the obstructions. expected to become airborne. She had

> The fifth aircraft in the event, another Cherokee 140, then lined up and reported ready. Warning the pilot that she could xnect a "five to eight knot down-wind omponent", the tower controller cleared the aircraft for take-off and watched as it began its take-off roll. Onlookers heard the engine run up to full power but, though its initial acceleration seemed normal, the Cherokee appeared to take much longer to leave the ground than any of the preceding aircraft. Others watching the take-off noticed that the flaps were in the up position throughout. Eventually, becoming airborne just before reaching the end of the sealed runway, the aircraft climbed slowly in a nose-high attitude, barely clearing the telephone wires. Maintaining its shallow climb, the Cherokee continued towards the row of trees and, without taking any wa



The fatal take-off: The Cherokee, just after lift-off, photographed by a bystander at the end of the strip. Note the wind sock in the background indicating a down-wind component.

This series of photographs, taken by a professional photographer from a position alongside the strip, shows the Cherokee's last seconds of flight. In the first picture, the aircraft can be seen slicing through the uppermost branches. With obvious damage to the leading edge of the starboard wing, the aircraft continues to climb before commencing to turn. The turn steepens and, in the last picture, the aircraft, partly hidden by the trees, plummets steeply nosedown towards the ground.

the tallest tree. Several small branches fell to the ground but, though its nose dropped slightly, the Cherokee seemed to recover, and continued straight ahead in level flight, apparently under control. A few seconds later it began a shallow turn to the right, but suddenly the angle of bank increased until it was almost vertical, the nose dropped violently and the aircraft plunged from sight behind the row of trees. Moments later, a thick column of black smoke arose from where the aircraft had disappeared. Rushing to the accident site, the fire and ambulance services that were on duty at the aerodrome found the wreckage burning led the less experienced pilots into fiercely and that the aircraft's three following each other out to the position occupants had been killed. * * *

Impact marks at the accident site confirmed that the aircraft had struck the ground in a steep nose-down attitude while rotating to the right. Examination damaged by impact and fire, an internal examination revealed no sign of any unserviceability and it was considered capable of producing normal power up until the moment of impact.

The pilot, who was only 18, held a restricted private licence and had accumulated about 53 flying hours. Of this, 48 hours had been in Cherokee aircraft. Her training and private flying had all been conducted from another country aerodrome in Western Australia and, before the flight on which the accident occurred, she had never flown from any other aerodrome. This flight was also her first experience of a controlled aerodrome, the first on which she had operated in a right-hand circuit pattern and the first time she had taken part in any form of display flying. Also, because the length of the runway where she had trained was more than adequate for Cherokee aircraft, she was not accustomed to using flap for take-off.

From enquiries made during the investigation, it was clear that the flying experience of the pilots taking part in the fly-past was not fully known to the organisers of the event. It was also found that the women pilots themselves had little idea of the abilities of their fellow participants and each was in fact, under the impression that the others had far more flying experience than was actually the case. This impression could well have from which the Tiger had begun its take-off, instead of querying in their own minds the adequacy of the runway distance available.

The pilot of the first Cherokee in the of the wreckage was hindered by the event had previously operated from this almost total destruction of the cabin area aerodrome and she believed the distance and starboard wing but, so far as could be available from the take-off point being determined, there had been no engine or used on this occasion was in the order of airframe malfunction before the accident. 2,500 feet. In fact, though the distance to Although the engine was extensively the runway end markers was only 1,750

clearance standards than required, and the runway length that could have been downwind component on the runway. used for take-off was 2,220 feet. She was later unable to recall why she had chosen this particular access taxiway, other than that she considered it provided an adequate length for take-off. It seems to eight knots. For an eight knot however, that her decision could have component, the take-off weight chart been influenced to some extent by the contained in the aircraft's flight manual fact that this taxiway provided the quickest access to the runway from where her aircraft was parked. During the delay she experienced in starting, she would no doubt have been very conscious that the event was being held before a crowd of 5,000 people, and that the Tiger Moth was holding on the runway waiting to take-off as soon as she was in position to follow. In the circumstances, it would have been a natural reaction for her to select the same take-off point as the Tiger Moth, without giving further thought to the take-off distance involved. None of the pilots following the Cherokee were familiar with the aerodrome and no doubt entered the same taxiway in the belief that the Cherokee pilot, with her local knowledge, considered the available take-off distance was sufficient in the circumstances. The following aircraft were all of comparable or better performance and the other participating pilots probably felt they should take-off from the same point for the sake of con-

The wind strength and direction had varied considerably during the day and the wind socks, positioned near each end of the runway, quite frequently differed in their indications. From the evidence of the pilots who took part in the fly-past, it was clear that the wind, which had been blowing lightly across the runway when the Tiger Moth departed, had strengthened to about 10 knots by the a low level over the paddocks in order to time the first Cherokee and the increase the speed to a safe figure. But in

feet, the markers had been placed to begun to swing towards the south-west any extent and the aircraft continued to provide a greater margin over the obstacle and the next aircraft, the Beech Musketeer, obviously encountered a slight

Before she began her take-off, the pilot of the Cherokee involved in the accident was warned by the tower controller that she had a down-wind component of five indicates that a take-off distance of about 2,700 feet would have been required in the existing conditions. Even taking into account the fact that obstacle clearance requirements would have permitted the use of an additional 470 feet of runway beyond the end markers, the total distance of 2,220 feet was still nearly 500 feet less than the performance chart requirement.

A series of photographs of the Cherokee's flight path after take-off were aircraft and, tragically, the lives of all on taken by a professional photographer board. On this occasion, the circumfrom a position near the runway. These stances in which the fly-past was held, the Cherokee pilot's limited flying pictures, reproduced in this article, as well as other evidence from witnesses on experience, and her unfamiliarity with the ground, indicated that the leading the aerodrome and display procedures, edge of the starboard wing had been combined to produce a situation which deformed for about one third of its developed to the point where it was length when the aircraft collided with the beyond the scope of her ability and tree. Because the wing was almost totally judgement. destroyed by the aircraft's impact with The accident, like that to a Mustang the ground and the intense fire which aircraft in Victoria two years ago,* followed, it was not possible to determine demonstrates once again how the pressures, real or imagined, of operating the extent of this damage. It is unlikely however, that it was severe enough in an aircraft in front of a large crowd and itself to have caused the pilot to lose numbers of other pilots, can over-ride the control of the aircraft, especially if she tenets of good airmanship. The responshad maintained an adequate airspeed. ibility for selecting an adequate take-off Open grazing land lay immediately distance rests solely with the pilot-inbeyond the row of trees and, had she command, yet it is significant that no chosen to, the pilot could have mainpilot taking part in the fly-past requested tained airspeed by lowering the nose and a clearance to back-track on the runway, either landed straight ahead with reasonand none of the pilots who took-off able safety, or let the aircraft descend to before the ill-fated Cherokee gave any * See Aviation Safety Digest No. 75, July, Chipmunk had taken off. It had then the event, the nose was not lowered to 1971.







sistency.



climb after it had passed the trees. The aircraft's attitude immediately before it struck the tree was such that its speed was probably already less than the normal climbing speed, and this would certainly have been further reduced by the impact with the upper branches. Thus by the time the aircraft began its slow, shallow turn to starboard, its speed would have been very close to the stall and in this situation, the damage to the leading edge of the wing was probably all that was needed to precipitate an entry into a spin from which the pilot had no chance of recovery in the height available.

This accident provides yet another example of how a series of separate events and circumstances, many in themselves seemingly insignificant, can form a chain culminating in the loss of an

* * *





indication to the tower controller that all contribute to short cuts and errors. follow one another, rather than exercise their individual judgement and risk being "shown-up" by electing to use a greater well as those of their aircraft. length of the available distance.

The lessons of this accident of course, apply not only to such specific areas as the selection of adequate take-off distances but are concerned with all aspects of display flying. The demands of

they considered the cross-wind and Pilots taking part in air displays must down-wind components were becoming discipline themselves to maintain a proper excessive or hazardous. It seems the pilots sense of priorities and ensure that all in the fly-past were content simply to flying associated with the display programme is based on sound airmanship and is well within their own capabilities as

* * *

Accidents like this one are discussed in the Digest for the sole purpose of orders relating to the conduct and enabling pilots, as well as others involved supervision of air pageants are being keeping a flying programme running to in aviation, to learn from the experience reviewed. This review has been underschedule and the emotional tensions so gained. In this way it is hoped that taken with the aim of providing more engendered in pilots, especially those they might avoid similar pitfalls in their effective control of such operations to with little experience of operating in own operations. For this reason the scope minimise the possibility of further front of large crowds of spectators, can of such articles is normally limited to accidents of this type.

Close-up view of the burnt-out wreckage as it came to rest in the paddock.

patch of burnt grass, can be seen in the lower

left. The trees struck by the aircraft are in the

centre of the picture.

those aspects of the investigation that have a message for our readers.

In the course of some investigations however, other circumstances come to light to show that an improved level of safety could be achieved by the revision of existing Departmental standards or procedures. When this occurs, the necessary action is taken and appropriate instructions are issued.

As a result of the investigations into this and other accidents that have occurred at air pageants, the existing

It Really CAN Start!

Readers of the Digest have oft-times been urged, by precept as well as by example, to "treat as alive" any propeller they might have cause to turn by hand. perhaps one of our passengers or some other bystander, with little concept of the dangers involved, might be tempted to "fiddle" with the propeller while our back is turned? The reality of this possibility and its potential consequences is made very plain by a recent incident:



AIR SAFETY PUBLICATIONS AVAILABLE

Since the announcement, in Digest No. 80, of the availability of Accident Investigation Report 70-6, on the mid-air collision between a Beech Twin Bonanza and a Bell 47 helicopter, the following additional Special Investigation Reports have been published:

- 71-2 Incident Investigation Report Boeing 747 N652PA at Sydney Airport,
- 72-1 Accident Investigation Report Piper PA23-250 VH-SIL at Nadzab Aerodrome P.N.G., 7.4.71
- Accident Investigation Report 72-2 Beech 65-80 Queenair VH-CMI at Alice Springs 20.1.72

Price 35 cents

Also just released for distribution is the air safety publication, "A Survey of Accidents to Australian Aircraft, 1969, Price 80 cents, This is a statistical document containing a detailed analysis of accident data and rates for the year under review. together with comparisons with data from previous years. A similar Survey for 1970 is expected to be available within three months.

Readers interested in these publications may obtain them from the Australian Government Publishing Service, P.O. Box 84, Canberra ACT. 2600, or from A.G.P.S. Book Centres in capital cities.

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Price 45 cents

Price 75 cents

A N Airtruk had been hangared at its base overnight and, early in the morning, the pilot and a loader driver arrived at the aerodrome and pulled the aircraft out on to the tarmac ready to depart for an agricultural airstrip. The loader driver took his seat in the rear of the fuselage, and the pilot climbed into the cockpit ready to start. But the morning was cold and, after priming the engine, he found the starter would not turn it over compression. Assuming the battery was flat, the pilot got out again and went into the hangar to get another one. Meanwhile, the loader driver also clambered out and went around to the front of the aircraft to make his own investigation of the trouble. Grabbing hold of the propeller, he pulled it through one compression and called out to the pilot that the impulse start was "not clicking" As he pulled the propeller through the second time, the engine coughed, then roared into life and the aircraft began to move forward. Aghast at this sudden and unexpected turn of events, the loader driver saw to his horror that the Airtruk was heading directly towards a line of parked aircraft, and caught hold of the starboard wingtip to divert it back towards the hangar. Inside the hangar, the pilot had heard the engine start, and came running out. He tried to board the aircraft, but before he could do so, it collided with the hangar. Sparks flew as the whirling propeller chopped into the hangar door and finally ground itself to a stop. Both the aircraft and the hangar door were severely damaged.

Although the pilot had switched off the generator and master switches before leaving the cockpit, he had omitted to turn off the magnetos. Also, not thinking anyone would interfere with the aircraft in the short time he needed to get a replacement battery, he had not set the parking brake. The well-intentioned but misguided loader driver had been in the aviation industry only a short time, having previously been a plant operator with the local council. He had no training or instruction in hand-starting aircraft and vehemently denied any suggestion that he was attempting to start the engine in the pilot's absence. In fact he said, he "wouldn't have been game enough to try", even if the pilot had been in the cockpit. He "just thought that the starter was jammed" .-

MINOR DISTRACTION-MAJOR CATASTROPHE

Distractions from the job in hand are an occupational hazard in nearly every field of human endeavour. But probably in no other everyday occupation, have their consequences the potential for greater harm than in the operation of aircraft. This remains as true for maintenance engineers as it does for pilots, and the tragic story that follows is a grim illustration of the level of self-discipline needed to effectively counteract this subtle source of danger.

Guinea, almost as soon as his aircraft had been released from a 100 hourly inspection, he had flown a load of passengers down to Port Moresby. After Lae, to pick up another party of day.

The afternoon was fine and calm when, after 40 minutes on the ground at Lae, and with the six Aiyura-bound passengers the stricken Aztec almost directly below,

T had been a busy afternoon for the clearance direct to Aiyura at 6,500 feet, north. The aircraft was trailing smoke and pilot of the turbo-charged Aztec. it was cleared for take-off on runway 32 a even as he watched, flashes of orange Departing at 1300 hours from his base at minute behind a Cessna 206 bound for flame burst from the starboard engine Aiyura in the central highlands of New Goroka at 8,500 feet. Both aircraft then nacelle and streamed rearward. As the Aztec neared the single east-west runway, reported their departures normally and were instructed to call Lae Flight Service it turned eastward and flew what at first at 1735 hours. seemed to be a close-in downwind leg, parallel to the runway, for a landing into Aboard the Cessna 206 seven minutes having the aircraft refuelled there he had later, the pilot was about to change the west. But though it was descending, returned north over the ranges again to frequency and call Lae Flight Service the aircraft was clearly still much too high and, instead of making a tight 180 when he was startled to hear a Distress passengers who were accompanying him back to Aiyura on his final leg for the Mayday. I have a fire in my starboard degree turn for a landing into the west, it began a shallow left turn to position itself engine and I am now feathering the on a downwind leg for a landing into the engine - stand by". east. Then its pilot called again; "... Mayday - I am landing at Nadzab. The Banking to starboard, the pilot sighted right engine is completely on fire. At the on board, the Aztec taxied out again just heading towards Nadzab aerodrome moment there is a lot of flame - out the before 1725 hours. With an airways which lay only a little over a mile to the back and - we are going into Nadzab".

still at 6,500 feet, he could see smoke within the lower section of the engine through and the light alloy turbo-charger streaming from the inboard side of the cowling itself, and in the wheel bay oil tank, mounted low down on the Aztec's starboard engine and flames were behind the firewall. bursting out of the nacelle itself. With smoke and flame coming from the engine the accident, the undercarriage was nacelle, the Aztec continued on its lowered, the starboard propeller was downwind leg. but just after the aircraft had passed abeam the western end of the runway, there was a fiery explosion. The Aztec seemed to falter for a moment then, minus its starboard wing, rolled rapidly to the right and crashed.

Descending quickly, the pilot of the 206 made two low runs over the wreckage. A fierce fire was burning where crash. the separated starboard wing and engine had struck the ground but the main wreckage, which had come to rest further on, had not caught fire. Even so, it was evident that no one on board the Aztec could have survived the crash. * * *

The Aztec had crashed in flat, grass the Nadzab runway. From the initial the aircraft's impact with the ground. impact marks made by the starboard engine and wing, the wreckage trail wing and engine nacelle, carried out at same time. extended in a westerly direction for Lae airport, allowed the path of the fire

Even though the pilot of the 206 was in the starboard engine nacelle, both of the firewall had also been burnt

feathered and the starboard fuel cock had been turned off. It was evident that the lines in the nacelle. It was clear that the flaps had been up for most of the time fire had originated on the forward side of the fire was burning, but it was not the firewall and had subsequently burnt possible to determine their position when through the side of the engine cowling, the starboard wing failed. It was also probably entering the rear nacelle evident that the port propeller was through the opening provided by the rotating at high speed at the time of the extended undercarriage. A further means

engine revealed that the coupling nut that would have been uncovered when connecting the fuel line from the the turbo-charger oil tank was consumed. engine-driven fuel pump to the fuel At this stage, both the inboard and injector was loose about a third of a turn. outboard fuel tank lines were breached Further examination of the wreckage by the fire upstream from the fuel cocks, disclosed no other defect which could have contributed to the accident and, intensify the fire. As a result, the main with the exception of the structural spar had been subjected to intense heat, covered terrain about three quarters of a failures within the starboard engine reducing its load-carrying capacity until it mile nor'-nor'-west of the western end of nacelle, all damage was consistent with failed in upward bending close to the

forward face of the firewall, had been It was established that at the time of almost completely consumed. Aft of the firewall, there was extensive fire damage to the airframe structure, the undercarriage, and to the fuel and hydraulic of entry for the fire would have been Close examination of the starboard through two cut-outs in the lower firewall providing a further source of fuel to centreline of the nacelle. The starboard A "reconstruction" of the starboard engine had separated from the wing at the

To determine to what extent the loose nearly 400 feet. A trail of small fragments to be determined with a high degree of fuel line coupling would have allowed of burnt metal, fibreglass and paint was certainty. Ahead of the firewall, there fuel to escape into the starboard engine also found extending for some distance was fire damage to all components cowling, bench tests were conducted. It eastwards back along the flight path. The contained in the lower engine cowl from was found that, with the coupling nut unburnt main wreckage had struck the the fuel injector rearwards. The fibreglass finger tight, and the flow through the fuel ground 90 feet beyond where the cowl in the underside of the engine injector adjusted to that for normal starboard wing and engine had done so compartment had been severely burnt climbing power, there was a barely and had skidded for another 200 feet and, on its inboard side, the fire had detectable weep of fuel. But when the before coming to rest. It was clearly breached a hole two feet long and three nut was loosened a sixth of a turn, fuel evident that there had been a severe fire inches deep. A number of oil lines ahead sprayed out of the union at the rate of



The still-burning wreckage trail of the Aztec, photographed from the Cessna 206, shortly after the crash. The initial impact point is at the left of the picture.



nut was further loosened to a third of a turn, as found during the wreckage examination, the leakage rate increased to 15 gallons an hour. *

The turbo-charged Aztec was six years old and had been owned and maintained by the operator since new. Its total operating hours were less than 4,000 and its last 100 hourly inspection, carried out completion of the 100 hourly inspection, at the operator's base at Aiyura, had been completed earlier on the day of the accident. The licensed aircraft mainten- the engine run-up, the L.A.M.E. had ance engineer responsible for the work on examined the starboard engine through the starboard engine said that while the open panel and all had appeared working on the engine the day before the accident, he had undone the fuel line coupling nut to inspect the fuel screen on the fuel injector unit. He had checked the screen and replaced it and was just reconnecting the fuel line when an unlicensed maintenance engineer, assistencountered some difficulty in refitting the starboard magneto. Leaving the fuel line coupling finger tight, the L.A.M.E. had got up from where he was working and gone to the other side of the engine to advise his assistant, staying to watch him complete the re-installation of the magneto. Soon afterwards the aircraft began.

more than 10 gallons an hour. When the refitted when he arrived. To use his own shut down the starboard engine straight words, this "startled" him momentarily away and the flow of fuel from the loose because it was his habit to make a general coupling would have ceased almost inspection of the completed engine work, immediately, but by this time, the fire before the cowling was replaced. After had probably already spread into the rear thinking about it for a few moments nacelle. however, he concluded that all was in * * * order. In any case, the upper outboard panels of each engine cowl were being left Any pilot who finds himself caught off until after the run-up at the with an uncontrollable engine fire in flight is in an onerous predicament so that each engine could be given a visual indeed, and there is not the slightest check for any leaks. At the conclusion of doubt that the pilot of the Aztec did all he possibly could to try and place his aircraft on the ground in the shortest possible time consistent with safety. But with the advantage of hindsight and the normal. knowledge that has been gained from this and other investigations, it is worth examining the sequence of events to see if there is anything to be learnt from them which in the future could perhaps make the difference between a result like this one, and one which ends with healthy, if very frightened, passengers arriving safely on the ground.

From the results of the bench tests carried out during the investigation, it is understandable that while the coupling nut remained finger tight, no detectable leakage of fuel would have occurred. It seems likely therefore, that either during ing him with the engine inspection, or shortly after the take-off from Lae, the fuel line coupling nut worked loose, allowing fuel to spray out and collect in It is probable that the aircraft was at the bottom of the engine cowling. The about 5,000 feet when the fire became exhaust-driven turbo-charger installation evident to the pilot and, in these below the engine, operating at red heat. circumstances, his decision to land at would have provided a ready source of Nadzab which would have been at most ignition for this fuel and its vapour. Once only about four miles away to the north, the fire had started, the contents of the was jacked and the airframe inspection light alloy turbo-charger oil tank and its was entirely proper. While it is obvious associated lines, which were directly in that the aircraft could have been on the Next morning, the L.A.M.E. was a little the path of the fire, would have provided ground sooner had it been possible to late in getting to the hangar, and found a further source of fuel. It is evident that land into the west, as the pilot of the 206 that the engine cowls were already being on becoming aware of the fire, the pilot at first thought the Aztec was going to



TURBOCHARGER INSTALLATION

a landing into the west could have been occupants were exposed. achieved much earlier than the one into the east.

do, it is quite evident that the aircraft was undercarriage, either to increase the rate much too high at this stage. It thus seems of descent or to limit the aircraft's speed probable that the pilot had already during the descent. It is possible however, planned to land into the east, and that his that by leaving the undercarriage retrack over the eastern end of the tracted, the propagation of the fire into aerodrome was only to position the the rear nacelle might had been slowed, aircraft properly for a landing in this or even prevented. In the circumstances, a direction. Considering the height the wheels-up landing would not have added aircraft had to lose, it seems unlikely that greatly to the danger to which the

Calculations based on the various points of impact of the wreckage The nature of the damage to the indicated that the aircraft was at the starboard landing wheel tyre, indicated height of only about 100 feet when the that the undercarriage was extended for wing failed. Obviously, to be flying at this some time while the fire was burning and height at the end of the downwind leg is it seems likely that the pilot extended the not consistent with an approach to land

on the runway, and it seems probable that on the downwind leg, the severity of the fire increased to such an extent that the pilot decided to carry out an immediate landing on the flat, grasscovered terrain below the aircraft. There is no reason to doubt that if the main spar had remained intact for only a short time longer, probably in the order of 10 to 15 seconds, an emergency landing could have been accomplished.

But none of these comments are intended as criticisms of the pilot's actions in any way, and are offered only for what they might be worth in any future emergency. Clearly from this experience, the only course of action with an uncontrollable engine fire is to try and put the aircraft on the ground in the shortest possible time, and to take whatever measures are possible to prevent it spreading behind the firewall. The investigation of this accident, and that of a similar in-flight fire involving a Beech Queenair,* indicates that the main spar of a typical light twin-engined aircraft, subjected to the effects of an intense fire in the rear of the engine nacelle, is likely to fail within two minutes.

What of the licensed aircraft maintenance engineer who had the responsibility for the work on the starboard engine? The engineer concerned is extremely well qualified and has been on the operator's maintenance staff for a considerable time. He is held in high regard by his employers and his record was previously unblemished. He was completely frank in all his dealings with the investigation team and, when describing the part he played in the 100 hourly inspection, he unhesitatingly admitted that, although he distinctly recalled tightening the fuel screen on the injector unit and refitting the fuel line union finger tight, he had no recollection of putting a wrench on the union after he was distracted from his work. The remorse he has experienced as a result of this tragedy, has no doubt left an impression on him that nothing else could have.

It might be some consolation for him know that other maintenance to engineers have the opportunity to learn from his bitter experience, and can resolve never to allow the quality of their workmanship to be jeopardised in any way by distractions or interruptions.

* Official reports of both the Aztec and Queenair accident investigations are available from the Australian Government Publishing Service. See page 11.



OH, HOW COULD YOU! Remember 'TAMING THE TIGER' IN DIGEST No. 81?

DIDN'T HE READ IT?



ron, together with careful app. rudder, should be used to keep u aeroplane straight.

Although the location of an aircraft's centre of gravity close behind the main wheels is advantageous in reducing the chances of a ground loop, it has the rather obvious disadvantage in that, the closer the C.G. is to the main wheels, the k greater is the aircraft's tendency to nose o over. The fact that Tiger Moths have been o involved recently in an unusually high proportion of nose-over accidents indicates that more than usual care is also needed for this aspect of ground handling. Nose-over accidents commonly result from mis-handling such as excessive forward movement of the control column during the early part of the take-off roll or at the point of touchdown, loss of control during a bounce or when porpoising, or even by simply taxi-ing too fast for the prevailing conditions. Aerodynamic forces and the effect of controls vary with the square of the airspeed, and this can lead to a sudden and, perhaps, unexpected response to controls operated in- as correctly. For these reasons, particular care is necessary when applying forward elevator control, with engine power, to go around from a touch-and-go landing.

OliCin

Any tendency to nose-over will of course be greatly aggravated by soft, wet. ground or long grass and, although it may not always be possible to avoid operating off such surfaces, extreme caution must be used in applying forward elevator control in these circumstances.

ng and Spinning

The High Price of **Distraction**

Arriving in the circuit area of Cooma the pilot of a Piper Comanche carried out his pre-landing checks and, after selecting the undercarriage down, ensured that he had a safe undercarriage indication. On base leg he noticed that a Musketeer aircraft was back-tracking on the runway but, expecting the aircraft would vacate it, he continued the approach descent.

After turning on to final approach, the pilot saw the Musketeer was still on the runway and thought he would have to go around. But just then the Musketeer taxied off the runway to hold position on the grass, so the Comanche pilot decided to continue with his landing,

A few seconds later the Comanche touched down on its belly in a taildown attitude, skipped for about 500 feet and landed again with the undercarrige in the process of extending. The undercarriage collapsed and the aircraft slid to a stop.

The pilot had no clear recollection of the sequence of events that led to the accident but it is evident that, when he decided to go around, he had retracted the undercarriage without realising it. As a result, when he continued with the landing after all, the aircraft touched down initially with the undercarriage retracted. Apparently during the subsequent lengthy skip, either the pilot or his passenger had attempted to save the situation by extending the undercarriage.

* * *

The danger that lies dormant in distractions is all too well adduced by the extremely costly object lesson of the Aztec accident reported elsewhere in this issue. But although in that case it was a maintenance engineer who was distracted at a critical time, the lesson is one that pilots would also do well to note. Three recent examples show why:

> Moment of truth No. 1 - "... he continued with the landing ...





The pilot of a Cessna 185 amphibious float plane was concluding a very busy day's flying, during which he had been under a good deal of pressure to complete the schedule demanded of him. His last flight for the day was from an island 50 miles off the coast, carrying a load of passengers booked on a Fokker Friendship that was due to make a brief stop at the destination airport at almost the same time as the float plane's ETA. In the pilot's own words, it was "touch and go" as to whether they would "make it".

The float plane arrived in the circuit area ahead of the F27 but immediately behind a Mitsubishi MU2 aircraft. The airport was uncontrolled and, throughout their respective circuits, there was considerable radio discussion between the pilots concerning their relative positions. To add to the distraction, the pilot of the float, plane had difficulty reading the MU2's radio transmissions.

In his anxiety to fit in his approach between that of the MU2 and the Friendship, the pilot completely overlooked his normal downwind checks. Also, after he had turned on to final approach close behind the MU2, he was watching the other aircraft carefully to assess whether or not it would be clear of the runway in time for him to continue for a landing. As a result, he missed carrying out his usual final check of the undercarriage and landed the aircraft on retracted.

* * *

• As the pilot of this Piper Comanche entered the circuit area of a private

airstrip in northern Queensland, he Cessna. The Comanche pilot therefore overheard transmissions between Mackay went round, raising the undercarriage as Tower and a Cessna 150, indicating that he did so almost as a reflex action. His it was unsure of its position. The pilot of attempts to contact the Cessna were the Comanche offered assistance and unsuccessful, so he cancelled his Sarwatch relayed transmissions between the Cessna and continued his circuit to land, still and Mackay Tower for nearly 10 minutes. thinking about the whereabouts of the Finally, when the Cessna reported that it Cessna. was landing at an unidentified aerodrome, His powered final approach seemed its floats on the runway with the wheels the pilot of the Comanche lowered his perfectly normal, and it was not until the undercarriage and completed his checks, pilot felt the fuselage scraping the ready to land at the airstrip he had been ground, that he realised the undercarriage circling. On base leg however, Mackay selector was still "up". Tower called again to ask him to try and re-establish communication with the * * *

Moment of truth No. 2 - "... the final approach seemed perfectly normal ...

Moment of truth No. 3 - "... he missed carrying out his usual final check . .



The High Price...

It is obvious in each of these cases, the omissions that led to the accident would potential for this sort of danger is probably greatest during that most vital action to be missed - with been removed. Reason rebels at the most cases it has been flying satisfactorily to safe flight can go entirely unnoticed reason to suppose it will not keep flying during starting, taxi-ing and run-up, but until it is placed safely back on the facts speak for themselves. Could we but know it, it seems safe to say that in the locked controls because he was every occasion. distracted at a critical moment.

aviation has learnt from these many disasters that have resulted from ina de quately performed pre-take-off checks. Written check lists have been introduced, even for elementary aeroplanes, where the checks are often placarded on the instrument panel, and for large complex aircraft, elaborate crew co-ordination procedures have been evolved. As well, pilots on the whole have been well schooled on the dangers of interruptions while carrying out these checks. Many too have learnt the value of beginning again whenever a distraction has occurred, instead of continuing from where they left off, with the attendant risk of over-looking some vital action. The net result of all this effort and determination is that accidents arising from the omission of a vital pre-take-off action are now comparatively rare - an encouraging illustration of the fact that experience gained from accident investi- to good account in developing accident gations, if diligently and consistently applied, can effect a real gain in aviation safety.

Unfortunately as we have seen, the same standard of pilot self-discipline is not have occurred, or would have been not yet evident in regard to pre-landing detected in time, if the pre-landing checks checks in single pilot aeroplanes. This of required for the aircraft had been course is perfectly understandable from a systematically adhered to. For pilots, the psychological point of view. In the first place, unlike the circumstances in which a maintain at times. Yet the only way we pilot does his pre-take-off checks, he is critical of pilot procedures, the pre-take- already very busy. As well as actually off check. Here an unexpected inter- flying the aircraft, he has to position it in ruption, regardless of how legitimate the circuit, look out for other traffic, and might be its reason, can easily cause a perhaps think about the condition of the aerodrome and the crosswind he will have manner despite the circumstances. irreversible and disastrous results. One to cope with. The pre-landing checks have can only guess at the number of somehow to be fitted in with all this. aeroplanes that have crashed after take- Then too, the stakes are obviously not as off, nearly always with fatal results, high as in the case of the pre-take-off simply because the control locks had not check. The aeroplane is already flying; in thought that so obvious an impediment for some time; and there is usually no ground. There is thus not the same motivation for the pilot to perform a nearly every case, the pilot did not detect really conscientious pre-landing check on

The inevitable result is that pilots leave Happily over the years, the world of themselves vulnerable to two particular types of accidents during approaches to land; fuel exhaustion when too low to take remedial action, and touching down with the undercarriage retracted. On the law of averages of course, the fuel tank in use is not likely to be depleted to the point of engine failure on more than a small percentage of occasions that the downwind fuel check is overlooked. The absence of this check thus becomes manifest only rarely in comparison to the number of times it is forgotten - though when it does the outcome is likely to be serious indeed. But undercarriages have to be remembered each time if the landing is not to be an expensive one. Inadvertent wheels-up landings therefore provide a very useful pointer to the incidence and degree of distraction which pilots can encounter during an approach to land information which, as we have seen with take-off accident statistics can be turned prevention procedures.

The frequency with which wheels-up landings are continuing to occur, (involving more than 20 general aviation aircraft in one year), shows clearly that many light aircraft pilots need to re-examine their attitude to pre-landing checks. This, of course, is not to say that there are not mitigating circumstances in many cases particularly those quoted above and that the pilots are only human in falling victim to distractions. But this is the whole point of the argument because we are human - because we are inherently fallible, we need the discipline of uninterrupted, systematic checks, to counteract these frailties in our make-up. The fact that in two of the cases cited in this article, experienced pilots, were involved, only strengthens this argument.

We all know that circumstances may make this self-discipline difficult to can be certain of avoiding accidents of the type discussed is to accept that discipline is necessary and to school ourselves to carry out the drills this discipline entails, in a calm and unhurried

AS OTHERS SEE US...!!

"Let's face it-

the best pilots are the ones behind a desk. The rest of us make mistakes."

- a recent comment by an experienced agricultural pilot.



As an old bush pilot we once knew always used to say, "You never stop learning about flying". Certainly, as many of us know, it is an occupation full of nasty surprises for the unwary. Some of the stories that appear in the Digest attest to this truth only too well of course, yet it is comforting to find that not all end in disaster. Just the same, they can still serve to remind us that in aviation, it's very unwise to take anything for granted.

For instance, reports of rough running engines are by no means unusual, and we thought we had heard of almost everything that can shatter the confidence a somehow found his way into the smoothly running engine inspires in aircraft's air intake and been carried flight. But at a Oueensland coastal down into the carburettor heater box. aerodrome, not so very long ago, the pilot Eventually the unfortunate creature was of a visiting Cessna 172 complained that drawn into the throat of the carburettor, all was not well in the power plant presumably when the pilot applied department – in fact the engine was carburettor heat. running very roughly indeed, especially at As if to show that the odds against such high power. The problem was soon apparent impossibilities are not as great as diagnosed as an obstruction of some sort they seem, a Heron aircraft operating in the engine's air intake system. Well, from a base in the tropics suffered a very we've occasionally heard hoarse pilots similar affliction in one engine not long and others complain that they "had a frog in their throat," but we never afterwards. The engine had started and imagined that aeroplanes would catch the run normally, but during take-off it failed complaint. For that's just what the to give full power. The situation was trouble proved to be when the air intake somewhat puzzling for a while until the hoses were removed and the carburettor induction system was dismantled and was inspected - there in the throat of the there in the carburettor's venturi tube carburettor venturi was a very sorry was the carcass of the extremely belooking frog! By some well-nigh un- draggled bird as shown in the photoimaginable series of events, he had graph!



"... in the carburettor venturi extremely bedraggled bird.





The piece of grass protruding from the "honnet"



.... but the birds had flown!



On a less gory note, there was the case "dressed" in a horizontal position.

Returning to the aeroplane a few days later, he found obvious and unmistakeable signs that birds had been using the propeller as a very convenient perch. The alert pilot also noticed that a couple of strands of grass were protruding from the joint between the upper and lower engine cowlings. His curiosity well and truly aroused, he opened the "bonnet" to find aircraft, he left the propeller in a vertical spider! position. His uninvited guests did not

And talking of livestock getting into air a Bonanza had left his aircraft parked in 172 who had just taken off from himself:

> "After a normal take off and departure to the western training area, the aircraft was at 1200 feet and trimmed at 70 knots in a climb, when I turned to my wife, who was in the front passenger seat next to me, to ask if she was enjoying the flight.

Suddenly a shadow flashed downwards on the left side of the cockpit, I looked a large bird's nest sitting snugly on top of to the left and there was a quick one bank of cylinders, immediately ahead movement on my chest. I was momentof the firewall. Next time he parked the arily stunned by the sight of a large hairy

I shouted, hit the spider with the flat of return - deprived of their perch, these my right hand and threw it at the feet of story, like the others, is a pretty good feathered airspace users had apparently my wife who crushed it with her shoe. We decided to set up home somewhere else. returned to the airfield quite shaken!

Had this incident happened while solo, at Archerfield recently, where the pilot of intakes, there was the pilot of a Cessna on rounding out, or just prior to touch down, or immediately on lifting off the the open with the propeller neatly Parafield. But let him tell the story ground, the result could have been disastrous. The spider had been in the air vent at the top left corner of the windscreen, until blown out by the stream of air passing into the cockpit. My lesson learned? Part of the daily inspection is 'air vent closed' - and it stays closed!"



We can't altogether agree with the pilot's solution to the problem, especially if the weather is warm. But at least his indication that in flying, it's a sound rule to be ready for anything! -



With two passengers on board this Cessna 210 a private pilot departed from Cudal, New South Wales for Merimbula via Bankstown. The initial stage of the flight was uneventful, but on landing at Bankstown the pilot discovered that the starboard brake was not working at all With the assistance of a local instructor, the pilot diagnosed the fault as a hydraulic leak and refilled the reservoir. The instructor suggested looking into the problem further, but the pilot declined, saying that he would have the trouble rectified on his return to the workshops at Cudal Immediately after take-off the tower notified him that the starboard undercarriage had failed to retract. The pilot subsequently cycled the gear several times, but this failed to rectify the problem, so after an aerial and visual inspection from the ground, the pilot was given permission to return to Cudal for an emergency landing. All preparations were made at the field and detailed instructions were passed to the pilot on how to conduct the landing. After touchdown the pilot held the wings level with aileron for as long as possible, then as the wing began to lower, he swung the aircraft to the right. In this way he was able to keep the wing tip off the ground until the aircraft had almost come to a stop.

The pilot is to be congratulated on his skill in landing the aircraft with a very minimum of damage. Nevertheless, it needs to be said that the accident could have been avoided altogether if the hydraulic leak had been investigated at Bankstown. This would have revealed that the starboard undercarriage actuator spindle had fractured.



In Brief

Even a 150 can bite! With an experienced agricultural pilot as passenger in the right hand seat, a private pilot took off from a property in his Cessna 150, to make a short survey flight over a cotton crop. He wanted to assess the results of defoliation spraying which the agricultural pilot had carried out a few days before. After about 25 minutes, the private pilot turned back towards the airstrip intending to make a straight-in approach. But as he neared the strip, the aircraft was obviously still too high, so at a height of about 500 feet he decided to make a descending 360 degree turn to adjust his approach. He lowered half flap, reduced the power to idle and held the airspeed between 40 and 45 knots. The turn continued until, with the aircraft almost realigned with the strip and the angle of bank reduced to about 10 degrees, the pilot thought that they were now undershooting and he applied full power. Immediately the nose pitched up, the left wing dropped almost vertically and the aircraft crashed to the ground, cartwheeling to a stop with its back broken. Both occupants, who were astounded by the manoeuvre performed by the aircraft, received only minor injuries. It was obvious that the pilot had allowed the airspeed to decay to a dangerously low level during the turn.



Having two light industrial engines to transport from Kalgoorlie to Laverton, W.A., a private pilot hired a Cessna 180 for the purpose. He departed at 0800 hours and after a little over an hour, arrived at his destination and estimated the wind to be from 140 degrees at 10 to 15 knots. Electing to land on runway 16, the pilot began a normal circuit. During the pre-landing checks he noticed that the right hand brake pedal felt spongy, but he did not suspect that there was any serious problem. The aircraft touched down smoothly and the pilot did not experience any control problems while the rudder remained effective. But as the speed decreased and he tried to use the brakes for directional control, he found that the right one had no effect. He then applied full right rudder, in an attempt to keep the aircraft straight, but shortly afterwards it began to weathercock to the left. He was unable to stop the swing and the end result was a violent ground loop that dislodged the starboard undercarriage. When the cause of the brake failure was investigated it was found that the brake pad linings had worn completely away and that all hydraulic fluid had been lost from the system.





Approaching Kabwum, New Guinea with a load of cargo and two native passengers on board, the pilot of this Cessna 206 made a higher than normal circuit because of a departing Twin Otter. Although he realised the Cessna was still high when he commenced his final approach, he decided to "give it a go", thinking he would overshoot if this became necessary. He flew the approach with 20 degrees of flap and the power at idle, but when the aircraft arrived over the strip it became obvious that he would be forced to overshoot. The pilot applied full power and raised the flaps, but the aircraft seemed to lack performance, and the airspeed decreased quickly to just above the stall. It was now too late to use the escape route to the left of the strip, and the pilot's only course of action was to attempt to outclimb the rising terrain beyond the airstrip. This proved beyond the capability of the aircraft and it stalled a few miles beyond the airstrip and crashed into a coffee plantation. All three occupants were seriously injured. Under normal circumstances, an over-shoot from this strip is quite feasible if it is commenced early enough. A strip examination of the engine showed that it was capable of delivering full power at the time of the accident.





A squall line could be seen approaching a country aerodrome in Victoria, but an instructor decided there would be time to conduct two or three circuits with a student before the weather deteriorated. In preparation for the flight, the student quickly added a few gallons of fuel to their Auster J5, bringing the total contents to eight gallons distributed evenly between the two tanks. The instructor and student then boarded the aircraft, taxied to the northern end of the strip and, with the student at the controls, took off into the south. Suddenly, when the aircraft had reached about 200 feet, the engine failed. The instructor immediately changed tanks, took control of the aircraft, and began turning to the left, but as he continued the turn, the aircraft entered an area of severe turbulence and began losing height rapidly. When the aircraft was within about 20 feet of the ground, the engine burst into almost full power. The instructor pulled hard back on the stick, but was unable to avoid trees ahead of the aircraft. The Auster hit the trees at a slow airspeed and in a stalled attitude, then crashed to the ground upside down. Both occupants survived, but the aircraft was almost totally destroyed. The reason for the engine failure could not be positively determined.

A private pilot had planned a flight in his Cessna 175 to Yarrawonga. Victoria to visit some friends. He had flown there on several occasions, each time landing at the local aerodrome which was just over ten miles away from his friends' home. However, he had noticed a paddock adjacent to his friends' cottage and had obtained the owner's permission to land in it. On this flight he decided to inspect it from the air with the thought of landing if it appeared suitable. He first circled the area at about 500 feet, sighting the two sets of power lines on the approach end of the paddock which he had noticed during a previous ground inspection. The Cessna then approached the field with full flap lowered and minimum power. It successfully cleared the first set of wires, but struck the second set with the nose wheel. The aircraft decelerated rapidly, and as the wire broke, the aircraft fell to the ground nose-first and overturned. Both occupants were seriously injured. The pilot could offer no explanation as to why he did not avoid the second obstacle, but it seems that while concentrating on the surface of the paddock, he might have momentarily forgotten the second set of wires.

For the past three months this Hughes-369HS had been operating in the hot and dusty northern regions of Western Australia. Unknown to the pilot, the vanes of the engine's compressor section had become severely erroded during this period. On the morning of the accident the pilot commenced operations at about 0730 hours and proceeded normally to a survey position an hour's flying time away. Returning to the base camp in the early afternoon the pilot realised that the wind was fairly strong and gusty and called the ground crew when approaching the camp to request a wind check. A licensed engineer standing near the pad replied that the wind was varying considerably and swinging. The pilot then brought the helicopter to a hover about five feet above the pad, but was being severely buffeted by the gusting wind. He remained in the hovering position for 10 to 15 seconds, but then decided that conditions were unsuitable for a landing and started to climb away. As the helicopter was accelerating and climbing, the engine failed suddenly with a loud screeching noise. The pilot landed the helicopter straight ahead, but on touchdown the main rotor blades severed the tail boom. A strip examination showed that the engine had failed because erosion damage to the third stage compressor vanes had allowed them to come into contact with the compressor blades, caused severe impact failure.

In Brief



In Brief

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At the end of a charter flight to Gulargambone, N.S.W., the pilot of a Cherokee had difficulty in finding the airstrip adjacent to the town. He had not landed there before and as a result of recent heavy rain, the area had become overgrown with long grass. The pilot therefore flew to another strip on a private property four miles away. This strip also was overgrown but its outline and tyre markers were clearly visible. After a normal landing, the pilot parked the aircraft and the occupants went into town. Returning several hours later, the pilot and his passengers walked along the strip and found the surface satisfactory. They boarded the aircraft and the pilot began his take-off run. But when the aircraft had accelerated to about 60 knots, several sheep suddenly ran out of the long grass directly across the take-off path. The pilot immediately lowered an additional notch of flap and attempted to lift the aircraft over them, but its speed was too low and it became airborne only briefly. As it did so, the occupants felt several severe thumps. As the aircraft sank back onto the ground, the pilot closed the throttle and moved the mixture control to idle cut off and the aircraft gradually heeled to the right until the wing tip contacted the ground. The occupants climbed out unhurt to find the starboard undercarriage leg collapsed and the wing badly buckled. Further back along the strip were three dead sheep which had obviously been struck by the undercarriage.

Late on a clear, still afternoon at Orange, N.S.W., a private pilot decided to take an Auster J5 on a local flight. He inspected the aircraft very thoroughly, as it had not been flown for some time, and ran the engine for about half an hour. Everything appeared normal and so he took off and after making some touch and go landings, headed for the local training area. After a further 45 minutes he returned to the aerodrome, and, after descending to circuit height, he attempted to apply power again to maintain altitude.

Although the throttle lever moved, the engine failed to accelerate above 1,400 RPM and it was obvious that the throttle had become disconnected. Turning on to base leg, the pilot lowered one notch of flap and then decided to "cut the corner" on to final. But he found the aircraft was now high, so he lowered a second stage of flap. However, the pilot soon saw that he would not be able to complete a landing within the confines of the runway, so he raised the nose and turned left to try and reach a cross strip that was behind him. By the time this 180 degree turn had been completed, the aircraft had lost height and speed. Shortly afterwards it stalled and crashed to the ground. The pilot was not hurt and when asked later why he did not attempt to control the engine power with either the switches or mixture, he replied "I did not think of it".

The student pilot of this Cherokee had been making a practice, during touch-and-go landings, of raising the flaps to the take-off position before applying full power. On the morning of the accident however, the student underwent a dual check with his instructor and the instructor told him to apply power first and establish a climb before selecting the flaps up. At the completion of the check, the student was authorised for further solo. By this time, there was a cross-wind of 10 to 15 knots.

The pilot carried out two successful "touch-and-goes", the first with no flap and the second using only take-off flap. He made his third landing with full flap. At a speed of about 55 knots, he again applied full power but the aircraft began to veer to the left. The pilot closed the throttle and although he prevented a ground loop, he was unable to stop the aircraft before it collided with a wire fence. The nose leg collapsed and the aircraft came to rest on its nose, badly damaged. With the flaps fully lowered, it seems almost certain that the main wheels lifted off the ground when the power was applied, and the aircraft began to "wheel barrow". This condition, which is highly conducive to directional instability, is the result of pilots holding the control column too far forward during the take-off roll.*



*Reprints of the article "Ground Looping in Nose Wheel Aircraft" orginally published in Digest No. 63, are still available and may be obtained from the Editor.

The author of this issue's **Pilot Contribution owned** (and we use the past tense advisedly!) an Auster that he kept hangared on his country property. His story realistically evinces how extremely unwise and hazardous it is to allow persons untrained in aviation matters, to undertake work of any kind on aircraft.

large numbers.

We have an agreement with a well return to the house for a drum of water known firm for the treatment of insect as I had noticed from previous experience pests on our property, and my wife that water was always used to mix the chemicals. He said this was not necessary suggested that we contact them to treat the hangar. This I did, but I mentioned as the stuff he would use was already that I wanted to be present when the job mixed and was a type of gas. I next asked was done as I wished to remove the him to remove his van from in front of the hangar so that I could wheel the aeroplane from the hangar so that it would not be damaged in any way. aeroplane out. He refused, saving he preferred the aeroplane left where it was In due course one morning at about 11.30 one of the firm's workmen arrived as it would need to have some treatment and introduced himself. We invited him such as spraying the wheels, underto have some lunch but he declined. carriage, tie-down points etc. This was the saying he was in a hurry to get back to first time any treatment of the aeroplane had been mentioned. I pointed out that town. I took him to the hangar which is a no spraying could be done inside the aeroplane as it might damage the quarter of a mile from the house, and he instruments and radio. The serviceman requested that I show him exactly where replied that anything he used was the ants were coming out of the Auster. harmless and could cause no possible After inspecting the aeroplane and the ground, he said he had identified the type damage and he asked me to leave the of ant and that the aeroplane was parked Auster where it was. He also said that no spraying would be done inside the aeroplane.

MY aeroplane was housed in a over their nest. He stated he knew the right treatment and asked where the floor. I had noticed that after each flight, power point was. But as no power was At this stage I began to remove the numbers of small red ants were emerging available in the hangar he said he would battery as I wished to check it. I had from both wings and crawling down the use his spray apparatus which consisted distilled water with me, as it had been my struts. Upon inspection I found these of a cylinder about three feet high and intention to check the aeroplane over, pests were coming out of the ground in about nine inches in diameter with a long while the hangar was being treated. length of hose attached. I then offered to The man told me there was no need to

Pilot Contribution



remove anything as he was only going to he had these tablets on a piece of three mixture. The drum burst, spreading its a match, but I then informed him no matches were to be used in the hangar great lengths to point out the fuel tank it, and impressed upon him how susceptible all aeroplanes were to fire. I made it clear that if he had to use matches to prepare any of his gas it had to be done well outside the hangar. I also pointed out how tinder dry the country was, as we were in the grip of a drought.

He then removed the "bomb" from the cabin and told me to get well away from the hangar on the upwind side, as the gas he had in the spray would make me sick. He would use a mask.

I moved outside about 30 yards away, taking the battery with me but, a little later, I noticed the spray equipment was still standing outside the hangar. I came back into the hangar just in time to see the serviceman about to place two of these "bombs" in the fuselage through the hatch in the side where I had removed the battery.

were harmless as they only gave off a harm could result. They certainly looked vapourous kind of gas. I noticed he had a harmless enough. He already had them whitish kind of tablet balanced on a stone primed and they only seemed to be giving which he placed in the cabin. He said off a whitish vapour with no sign of once again that these things were sparks of any kind. However, I told him harmless once they were started off with that if he used them they had to be placed in the battery tray. The aeroplane was fitted with a stainless steel battery under any circumstances. I also went to tray measuring eleven by seven inches with two-inch sides and the piece of with eight gallons of high octane fuel in hardwood, with the two tablets, fitted neatly into it. The serviceman then picked up the hatch cover and promptly put it back in place on the side of the fuselage.

> requested me to leave the hangar as he "bombs" did their job. As I left the small quantity of sugar cane was burnt. hangar, I noticed a white smoke creeping into the cabin of the aeroplane. I drew the serviceman's attention to this and he said this was good and the "bombs" were and was spreading rapidly!

I called for a fire extinguisher but he did not produce one. Instead, in his haste to move his van away from the hangar he We couldn't agree more! Neither could When I questioned him, he pointed out drove over a four gallon drum of his the owner - his Auster was not insured.

use a thing they called a "bomb". They by two inch hardwood and no possible contents over an area of grass near the front of the aeroplane. (I afterwards discovered this mixture was kerosene and that the mixture in the spray apparatus was also kerosene based). At this stage I tried to reach the small extinguisher kept in the cabin of the aeroplane but as it was in a tight-fitting bracket on the floor on the passenger's side, and I was standing on the ground on the pilot's side, I was unable to release it. By this time the flames had burst through the top of the fuselage, and I realised the fire was out of control and little could be done to save the aeroplane.

The Auster was completely destroyed I questioned this too, but he said it had and the hangar severely damaged, despite to be done to keep the gas in. He again efforts with fire fighting equipment which we brought from the house. The said he would spray the ground while the fire also spread to grazing land and a

I believe the fire was caused by sparks erupting from the "bombs" on to the fabric on the lower side of the fuselage.

Another serviceman has since told me doing their job. He reassured me this was the correct way to use these "bombs" is normal. But as the smoke increased I to place them in a deep vessel such as a became alarmed. I returned to the fruit tin etc. He feels sure no fire would aeroplane and removed the hatch cover result if this is done. However he now from the fuselage. A fire had broken out agrees they should not be used in aeroplanes.

Comment

The A.J. Smithwell Research Grant

THE A.J. Smithwell Research Grant has been established to provide grants-in-aid to support research projects in any field consistent with "improving aviation". Financed jointly by the Australian Federation of Air Pilots and the Department of Civil Aviation, it envisages a grant of up to \$1500 in any one year.

Final year or post-graduate students of any Australian tertiary institution are eligible to apply for the grant, and interested applicants are invited to submit research programs for the consideration of grants for 1973. Application forms may be obtained from the A.J. Smithwell Research Grant Committee, C/- Australian Federation of Air Pilots, 136 Albert Road, South Melbourne, Victoria. 3205.

The Research Grant honours Captain A.J. Smithwell, a Qantas Captain and past-President of the A.F.A.P. Captain Smithwell has long been dedicated to the cause of safety in aviation, and Aviation Safety Digest takes pride in publicising the establishment of the grant in his name.-

