

that he understood the tanks held 30 gallons each. He had flown an hour and thirty-five minutes when the engine quit, and fuel consumption at 65% power would have been about 13 gallons per hour. In that the tanks held 19.5 gallons instead of the 30 gallons the pilot thought they held, the engine quit at about the proper time. The pilot did not attempt to switch to the full tank after the engine failure.

These two cases illustrate the gas troubles which arise when a pilot isn't familiar with an airplane. There are a lot like these, and each time the pilot is faced with a double handicap—he has to make a forced landing in an airplane he didn't understand well enough to keep gas running to the engine.

### Gear

Landing gear troubles cause a lot of embarrassment. We heard not long ago that there is one gear up landing a day in General Aviation. Then, just today, somebody told us the figure is two a day. The GUARD (Gear Up Automatic Response Device) which Mr. Pope of Lincoln, Nebraska, has developed, and which was covered in *Air Facts*, ETC for March, 1964, might someday help to alter this record.

It is easy to see how gear up landings happen. It only takes one slight error of omission and a few favorable circumstances to keep from being warned of the error.

line's thorough pilot check out on a new model with the average General Aviation check out, though, it's no wonder our bending rate is higher. General Aviation accidents involving people without much time in type can be broken down into three categories pretty easily: Gas, gear, and technique.

### Gas

The gas trouble can have pretty serious consequences. Take the 3,000 hour pilot with under ten hours in type who experienced complete engine failure shortly after take-off. He tried to turn back, stalled in the turn, and slid to a fiery stop.

Later the pilot said he had placed the fuel selector between the "Both On" and the "Right On" position, believing that the selector was really only a mixing chamber. He didn't realize that the in-between setting would restrict the flow of fuel from the tanks and cause the engine to stop running.

Another pilot, this one with 650 hours and 9 in type, had an engine failure on final approach and knocked the landing gear from under his plane in the process of alighting in a wheat field. The right tank was full, the left tank empty, and the fuel selector was positioned to the left tank.

The pilot said the left tank indicated full before he took off, and

## Time in Type

*A time to be careful.*

INSURANCE PEOPLE know a lot about the trouble airplanes have with pilots. They know because they pay for a lot of the trouble. A lot of time is spent around insurance company offices trying to figure out what kind of pilot is likely to bend an airplane, and what kind of pilot is not likely to bend an airplane.

We were in New York talking to Kent Robinson, Vice President of Associated Aviation Underwriters, the other day and he mentioned that a pilot's "time in type" has come to mean a lot to them in their handicapping. Type is FAAese for: "...a specific make and basic model of aircraft, including modifications thereto that do not change the handling or flight characteristics."

At AAU they made some rough calculations, based on the best information available, and came to the conclusion that, proportionately, a very great lot of airplane accidents involve pilots flying airplanes in which they don't have much experience. This trouble is not confined to pilots without a lot of total experience, either. In many instances a pilot's total time doesn't seem to mean as much as does his time in the particular airplane he is flying.

It is interesting to look through the CAB accident reports and examine the troubles which people with low time in type seem to have. It is possibly one way to develop some sort of defense against a silly mistake, for we can't all take smart pills and have a lot of instant time in type in everything. When trading up pilot's often start with little or no time in type. When new airplanes are introduced everybody has to get used to them together, and there is often a somewhat painful period while pilots adjust to a new airplane's peculiarities.

### The Airline Way

When the airlines get new airplanes they go hurtling into the air guided by pilots with only a few hours time in type. The airline pilots, though, have a helper to read to them out of the manual when they fly should any troubles come up, and they have checklists which are carefully followed. They also have considerable ground school in type and are required to understand their airplane and its systems thoroughly before they are allowed to fly it. They still have occasional troubles, even with all that. When you compare an air-



The best of pilots under the best conditions have done it, and once the airplane is sliding along on its belly there isn't a thing in the world which can be done about it. High time in type pilots have their gear troubles, but the ones with low time in type seem to have more trouble—and this is multiplied if the pilot hasn't much experience with retractable gear aircraft as well as with the particular type.

Take the fellow who traded his fixed gear airplane for a retractable—took off, circled the field, and landed wheels up. A week later, after the damage had been repaired, he again took to the air with his new retractable, flew it around the field, and landed it with the wheels up again. His comment: "Darn, I do that every time."

That's not really a true story.

The following ones are, though.

A twelve hundred hour pilot with one hour in type took off in a retractable gear airplane, but didn't retract the landing gear. After flying about for a while he re-entered the traffic pattern, retracted the gear, and landed wheels up. Had he been more familiar with the airplane he would have surely noticed the effect the extended gear had on the performance of the aircraft. As it was, he probably flew around thinking bad things about the manufacturer of the aircraft because the airplane wouldn't climb very well or go very fast.

A five hundred hour pilot with two hours in type landed and retracted the gear instead of the flaps in the landing roll. The gear on most aircraft has a device which prevents retraction on the ground, but unfortunately this can't be relied on while the airplane is rolling at high speed. It operates off a micro switch on one of the landing gear shock struts and while an airplane is rolling at good speed—especially with the flaps down—it is light on the wheels and the slightest bump will extend the struts, and let the gear retract if the switch is in the up position.

A further retractable gear trouble which low time in type pilots have is also related to flying technique. This involves premature gear retraction after take-off, with the aircraft subsequently settling back on the landing gear after the retraction process has started. This often damages the gear mechanism and keeps it from functioning properly prior to the next landing.

### Technique

It is just plain flying technique, though, which causes the most trouble when a pilot operates an airplane with which he is not familiar, and most of the trouble comes on landing.

Some examples.

A twenty-three hundred hour pilot with ten hours in type—a four-place, fixed-prop, fixed-gear—bounced ten to twenty feet high

several times before bringing the airplane to a stop on the runway. The prop and the nose gear were damaged in the series of bounces.

A 114 hour pilot with three hours in type—another simple four-place, fixed-gear, fixed-prop airplane—bounced several times and finally the nose gear gave up and failed. The plane then slid to a stop on the bottom of the nose section.

Those two were simple enough, involving bad landings in tricycle gear aircraft. The causes might likely have been due to the pilots not being familiar with tricycles, and thinking that it was cricket to just fly the airplane into the ground nose wheel first, which never seems to work.

A more serious sort of accident involving pilot technique and low time in type comes after an overshoot, or a too-fast approach. It is human nature to use a little extra speed in an aircraft with which you aren't familiar, but this is OK only as long as there is plenty of runway to take care of the extra speed.

### Double Trouble

It often seems, though, that troubles tend to multiply when a low time in type pilot starts at a small airport.

A 110 hour pilot with two in type—a four-place fixed-gear and fixed-prop airplane—landed about half way down a 1,200 foot long

sod strip. The runway surface was wet, so the brakes weren't effective in stopping the aircraft and it ran off the end of the runway and over an embankment, coming to rest on a road below. The front of the airplane was pretty badly damaged. You can draw your own conclusions regarding the pilot's judgment in attempting to land an unfamiliar airplane on a 1,200 foot strip.

Another pilot, this one with eighty-six total hours and nine in the same type aircraft involved in the preceding accident, touched down about two-thirds of the way down a 2,500 foot strip. After initial touchdown the airplane skipped about 300 feet and then, under maximum braking, ran off the end of the runway and hit a fence and a ditch.

It's significant that the type airplane involved in the two preceding accidents was the same. Accidents like that happen to all types, but this particular airplane got a bit of a reputation as a floater right after it was introduced, and it got the reputation because of a series of accidents like those two. In truth the airplane is as good in short fields as the others in its class—it just takes the proper technique, which in turn takes a little time and practice to develop.

On the subject of new airplanes—they don't always gain a reputation based solely on the flight char-



acteristics of the airplane. A lot has to do with what class airplane it is, what pilot group it attracts, and what size airport it is flown from.

A new twin which attracts a large number of former single-engine owners has, in its introductory period, a time when it is flown entirely by people with low time in type, and largely by people with low time in class—i.e., multi-engine.

A new four place airplane in the bottom price bracket is likely to find its way to more small airports than a more expensive airplane. Thus, while pilots are getting used to the airplane many of them are doing so on small airports—sort of double jeopardy.

A new high-performance single-engine airplane with retractable gear, controllable propeller, power operated flaps and possibly cowl flaps, attracts many pilots who formerly flew much simpler airplanes. The added complications can tend to keep the new airplane ahead of its pilot until he has some experience in his new bird.

All of which is to really say that if a new airplane seems to have an unusual amount of trouble with pilots it's good to study the situation thoroughly before deciding the airplane has a flaw in design, or a particularly mean flight characteristic.

### *The Nasty Ones*

Unfortunately, all the accidents

### AIR FACTS REPRINTS

involving pilots without much time in type aren't as simple as the ones mentioned up to this point.

For example: a fifteen hundred hour pilot with no time in type took a passenger riding in an ex-military fighter aircraft. On a low and slow final approach the aircraft struck an obstruction 800 feet from the approach end of the runway, rolled over, and crashed inverted.

In another case an instrument rated, thousand hour pilot with four hours in type made an early morning instrument take-off in a dense fog condition. After take-off the airplane made a sharp 180 degree turn and then came in contact with the ground in a nose low, wing low attitude.

Lack of time in the type airplane being flown causes more trouble than we ever thought it did, and it causes trouble among a more experienced pilot group than we thought it would.

### *How to Try Not To*

It's interesting to look at the accidents used as examples, which are representative of the over-all picture, and imagine how to keep such a thing from happening to us.

On the gas trouble, we only have to make sure we understand the fuel system, and that we get our briefing from someone who knows the system from experience. Then add to this a strong measure of conservatism on fuel range until after enough flying in the airplane

### TIME IN TYPE

to really know how much gas it uses under all circumstances.

Gear trouble is easy to cure. Just always remember to put it down before landing, and don't pull it back up until safely airborne again. More seriously, though, leaving the flaps down after landing until the airplane is parked can eliminate the possibility of retracting the landing gear instead of the flaps in the landing roll. Leaving the gear down after take-off until definitely airborne can eliminate the possibility of settling back on a partially retracted gear. Then, just being extra conscious of the fact that the wheels should be down before landing is about all to add to the horns which blow and the lights which flash if it isn't.

Most of the technique trouble comes on landing, especially on short fields. So, when flying an airplane in which we don't have much experience it is very helpful to determine the landing distance required over a 50 foot obstacle, as per the airplane owner's manual, and then make the required runway length twice this figure until we prove we can do better.

It's not a good idea to do any instrument flying in an airplane until after flying it for at least ten hours, some of which should have been under the hood. And, it is a good idea, regardless of a pilot's experience, to get a complete check-out from someone who is experienced in type before starting out in an airplane which doesn't know you.

