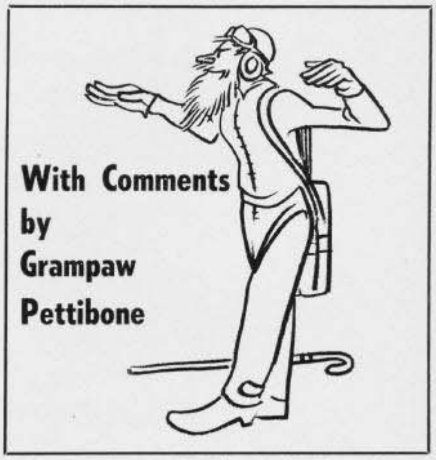
FLIGHT STATISTICS



Pilot Technique When Illuminated by Searchlight

A recent fatal crash occurred during a night familiarization flight when the pilot of a TBF–1 entered a spin at approximately 900 feet, shortly after being illuminated by a searchlight. The searchlight was being used to identify the aircraft and illumination lasted for less than one minute. This pilot had been doing wing-overs in an effort to elude other searchlight beams that night. It is believed he attempted similar maneuvers during the illumination in question and was unable to maintain control of his aircraft due either to blindness caused by the searchlight beam or to lack of ability to recover from an unusual position on instruments. Prior to his flight, this pilot had been instructed to shift to instruments if illuminated by searchlights and to stay on instruments until clear.

Grampaw Pettibone says

Remember that! Shift to instruments as soon as you are illuminated—especially at low altitude. If you are not an instrument pilot, just hold her steady—don't try to turn or make any other maneuver, until you are clear of the beam.

Crash During Altitude Take-Off

During a recent ferry flight the pilot of a PBY–5A landed at an airport at 6,400 feet altitude. Certain repairs were made at this field, upon the completion of which a take-off was attempted with the airplane loaded almost to capacity. Although the runway was nearly 9,000 feet long and the engines functioned satisfactorily, the airplane failed to become airborne until past mid-field and then gained altitude so slowly that it crashed into obstructions at the border of the field. Fortunately, there was no fire or serious injuries.

Bureau Says

The pilot of this airplane was very experienced (over 2,000 hours in this type plane), but he neglected on this flight to take into account the altitude at which he was operating. Although the capacity load carried on this take-off was not a structural overload, it was an overload for normal take-off *at that altitude*.

Air decreases in density in direct proportion to an increase in altitude; therefore wings give decreased lift as altitude increases. This decreased lift increases the stalling speed of aircraft and necessitates a faster landing speed and also a longer take-off run to build up flying speed. Tests have shown that for each 1,000-foot increase in altitude above sea level approximately a 3-percent longer run is required for take-off.

Although it is not known whether air temperature had any effect on this accident, it is also closely allied with operating efficiency and is, therefore, pertinent to this discussion. In addition to a decrease in air density due to increased altitude, there is a similar decrease in air density due to increased temperature above normal temperature. It has been determined by tests that approximately a 3-percent longer run is required for each 10° C. rise in temperature above normal. For information, flight characteristics for landings, take-offs and stalling speeds of aircraft are always based on the following conditions: (a) Sea-level altitude, and (b) 15° C. air temperature at sea level.

The main thing to remember when operating at high altitude or in hot weather is that a longer take-off run is required, rate of climb will be slower, and a faster landing speed will be necessary.

Forced Landings at Sea

The following opinions as to proper pilot technique when "ditching" F4F's and SBD's were submitted from several Atlantic Fleet carrier squadrons in accordance with a recent request for such information. These opinions are based on considerable forced-landing experience and, while not necessarily the last word, merit considerable respect.

1. Wheels should always be up, although one F4F pilot made a successful wheels-down landing at night when his engine cut out in the landing circle. (Additional comment on this item appears farther on.)

2. Flaps should be down; the tripping effect appears negligible.

3. Actual contact with the water should be made at the lowest possible speed, but with the wings in a level attitude. This means that the airplane should touch the water in a full stall attitude, or while slightly above the stalling speed, in order to keep from dropping a wing.

4. Engine should be used, if available, to (*a*) give better control; (*b*) improve selection of landing spot; (*c*) decrease rate of descent. One squadron recommended pilots jump at night if engine is not available.

5. Landings should be made into the wind if force is over five knots and parallel to swells if force is under five knots. Avoid trough of swells, if possible. One squadron was of the opinion that if there is a heavy swell the pilot should bail out.

6. Before contacting the water the pilot should:

(*a*) Lock cockpit hood open or, if possible, jettison it.

(*b*) Jettison all possible weight, such as bombs, fuel, radio, etc.

Bureau Says

In aircraft with bomb bay doors, it is considered more important that doors be closed on impact than that bombs be jettisoned.

(*c*) Get clear of oxygen equipment, radio lines, etc.

(*d*) Push goggles up over helmet, but don't detach them because they will be very useful if pilot is forced to remain in a life raft for any length of time.

(*e*) Unbuckle parachute, but leave straps over shoulders. Even if no gear is attached to the chute it will be very useful, afloat or ashore. The reason for unbuckling the parachute is that, in case the harness should catch on something as the pilot is getting out of the cockpit, he can easily leave the parachute behind.

(*f*) Tighten safety belt and shoulder harness. If shoulder harness is not worn, fly the airplane with one hand and brace against sight or cowling with the other.

7. Force of impact is considerable, but no serious injuries should occur if pilot has tightened shoulder harness or has braced himself well. Pilot may be slightly dazed on impact, with the possibility of unfastening wrong buckles, etc. Shoreside drills and training will help in this.

8. The aircraft will usually remain afloat from thirty seconds to two or three minutes, depending on the success of the landing, sea conditions, type of plane, etc. Planes usually sink in a nose-first attitude, with the tail rising to almost 90 degrees shortly after starting to settle. The pilot should be prepared for a hurried exit and should get clear with needed equipment, in accordance with a preplanned sequence of action.

9. Retention of all clothes, especially shoes, is very important, to help guard against exposure.

10. The mental attitude of the pilot is important.

(*a*) He must convince himself that a water landing is perfectly feasible and that many such landings have been successfully accomplished by other pilots. (See statistics on this in the March 1st *News Letter.*)

(*b*) He must make up his mind to fly the airplane all the way down to the water and execute the landing with skill.

Relative to item number 1, on attitude of wheels, the following interesting arguments for having wheels *down,* particularly in F4F's, were submitted via NAS Jacksonville *News Letter* by a lieutenant with considerable forced landing experience:

(*a*) A wheels-up landing does allow the airplane to skid along the water for a short distance before the nose digs in, but as soon as the nose does dig in the airplane stops with a much greater resultant shock. It is believed that this shock does the damage.

(*b*) With wheels down, the momentum of the shock is dissipated in the roll of the airplane as it tends to go over on its back, after having been "tripped" by the wheels.

Bureau Says

In view of the large majority of recommendations for landing with wheels up and the excellent record of such landings, the Bureau continues to recommend that whenever possible forced water landings be made with the wheels *up*.

The Bureau has an open mind on this question, however, and welcomes additional comments and data. It is quite possible that no hard and fast rule can be laid down; possibly it will be found that different models of airplanes will require different procedures. Possibly, even, the same airplane will require different procedures when landed in calm waters and in heavy seas. Possibly wheels should be neither up nor down, but in a partially lowered attitude.

Likewise, the question brought up in this article, of jumping at night if no engine is available, or in the daytime if swells are very heavy, is open to argument. Here again the answer may be found to vary with different types of airplanes, with different circumstances and, also with the experience and skill of the pilot.

Additional comments would also be appreciated on the "into-the-wind-or-parallel-to-the-swells" argument. Where patrol planes, which land with a considerable run, might land parallel to the swells to avoid smashing into them, a landplane, which takes very little run, might fare better by making a slower landing into the wind. The main danger here appears to be that of smacking head-on into a swell. Send in the dope!

The theory of these discussions is not to get everyone upset and uncertain as to what action to take, but to force everyone to think about these matters and to crystalize procedures. As was brought out in the Jacksonville *News Letter*, because the technique of the pilot is all-important in making a successful landing, it is essential that each pilot should have absolutely fixed in his mind exactly what he is going to do if faced with a forced landing, under any condition; sufficient time to figure things out is seldom afforded when the occasion arises. (Read again item 10 of this article.)

For further information on this subject, particularly concerning launching and usage of the life rafts, see the pamphlet "Dunking Sense" recently issued by the Training Division.

Realistic Training

The other day Grampaw Pettibone was seen waving a handful of long, white hairs (beard) in one hand and a pilot's statement in the other and screaming frantically, "My Gawd, they're training 'em that way now!" We still can't quite believe it, but this is the pilot's terse statement:

"While flying an F4F, I made an approach for *my first night landing with my wheels up*. The landing gear horn was inoperative. I landed."

Take-off Technique in PV Airplanes

During a recent attempted cross-wind take-off in a restricted area, a PV-3 airplane was completely demolished. The pilot employed the following take-off technique: (a) Both engines were brought up to 25″ Hg. before releasing the brakes, (b) Manifold pressure was then immediately increased to 50″ Hg. "in an effort to expedite raising the tail, to promote rudder control." As the tail lifted, the airplane swerved to port and the pilot lost directional control.

The forwarding endorsement on this trouble report stated: "The main lesson to be learned from this accident is that the most difficult take-off in PV airplanes is with a cross-wind on the port side. The normal tendency of this airplane on take-off is to swerve to the left, due to high propeller torque, and a cross-wind, such as existed in this case, greatly aggravates this condition.

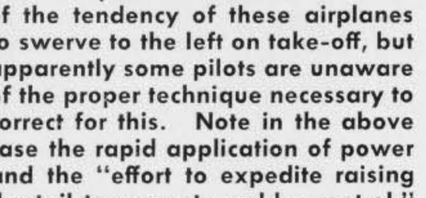
In reporting a similar fatal accident which occurred during a normal take-off in a PV-1, the trouble board recommended that a Circular Letter be issued on the torque effect in this airplane.

Bureau Says

This airplane does have a marked tendency to swerve to port on take-off, due to propeller torque. In this connection, attention is invited to the Pilot's Handbook and Technical Orders 86 and 91-42 wherein this torque effect is explained and the following special take-off technique is recommended: (*a*) Tail wheel locked, (*b*) increase power slowly, with left throttle slightly ahead of right throttle, and (*c*) keep tail wheel on the ground to maintain directional control until rudder effectiveness can be felt (approximately 40-45 knots).

All PV pilots are doubtless aware of the tendency of these airplanes to swerve to the left on take-off, but apparently some pilots are unaware of the proper technique necessary to correct for this. Note in the above case the rapid application of power and the "effort to expedite raising the tail to promote rudder control." Note also that "as the tail lifted, the airplane swerved to port."

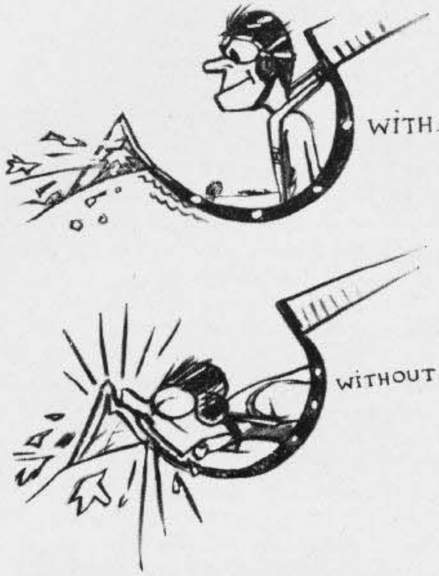
Pilots who have used the recommended "tail wheel down" technique report that "it works." Squadrons should insure that this take-off technique is clearly understood by all pilots operating PV airplanes. Particular stress should be placed on keeping the tail down until considerable acceleration has been obtained, for this is exactly opposite to normal take-off technique and will, therefore, be harder to remember. (This technique is equally applicable, however, to any



high-powered airplane which has a tendency to swerve to the left on take-off).

Don't Be a Sap

During a recent ferry flight in an N2S-3, engine trouble necessitated making a deferred forced-landing. In coming in to land, the pilot hit a tree about 35 feet above the ground and spun into a marsh. From the pilot's statement: "At this time my shoulder harness was not fastened." The pilot received the following injuries: loss of one eye, severe concussions, and abrasions.



In a somewhat similar case, the pilot of a TBF-1, while practicing field carrier landings, lost flying speed in a turn and spun in from approximately 200 feet. From this pilot's statement: "My injuries were minor, due to wearing of shoulder harness. I received a slight scalp wound and a bruised left arm."

Numerous similar reports have been received wherein pilots attribute their escape from injury entirely to the shoulder harness.

Grampaw Pettibone says

I knew it! There's always a certain percentage of smart fatalists who think nothing will ever happen to them; they're the type that never take out insurance. And this shoulder harness is the best accident insurance that's been offered to aviators since the invention of the parachute and the safety belt. It's the kind of insurance on which you, instead of your next of kin, collect.

Maybe this harness does take a little time to adjust, but so does a broken jaw.

Spread Your Wings

A recent ground accident occurred while an SOC-2 seaplane was being rolled out to the line with the wings folded. As the airplane rounded the corner of the hangar, a gust of wind struck the plane broadside, overturning it and fatally injuring one man. The investigating board attributed this accident to the fact that the airplane had been improperly seated on the handling truck, making it impossible to secure the holding-down chains.

Grampaw Pettibone says

A little display of common sense and good seamanship would have prevented this accident; namely, spreading the wings and attaching and manning wing lines.

The center of gravity of a seaplane on a handling truck is very high; even when secured to the truck there is danger of overturning on a rough runway or in a strong wind. Seaplanes on handling trucks should, therefore, always have the wings spread when possible, to give better balance and control.

Danger of Tripping Master Switch

A few months ago there was an SNB-1 forced landing caused by the accidental movement of the master switch to the "Off" position by a passenger as he moved through the cockpit to the bomber's compartment. Shortly after this accident, the squadron to which the airplane was attached designed an effective guard for the master switch. The Bureau adopted the design and issued a change order No. 5 to be incorporated as soon as possible in all SNB-1 aircraft.

In the second week of March an instructor took off at one of the training stations in an SNB-1 and climbed to about 2,500 feet, when one of his students asked to go up in the nose. During the subsequent action in the cockpit both engines cut out. The trouble was not located and a forced landing was made in a lake. The investigating board was of the opinion that the simultaneous failure of both engines was caused by the pilot inadvertently striking the master ignition switch while moving his headphones before leaving the seat.

Personnel are again warned of the danger of accidentally knocking this master switch to the "Off" position. Stations are urged to expedite installation of change No. 5.