Flying Safety

HEADQUARTERS UNITED STATES AIR FORCE • RESTRICTED FEBRUARY 1949

THE COVER PICTURE

Even with a visibility restriction of 1½ to 2 miles in haze, the pilot of the burned F-80 on the cover flew a larger pattern than usual. He reduced power to about 50% rpm on peel-off and when he saw he was undershooting the runway on final it was too late to develop enough thrust going from 50% to 100% power. Consequently, the F-80 stalled and hit 2,000 feet short of the runway. The pilot escaped with minor injuries.

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SHARE YOUR IDEAS

FLYING SAFETY Magazine welcomes comments, criticisms and editorial contributions from all members of the United States Air Force. Readers can help the magazine promote safe flight by offering information on procedures, equipment or training methods that have been effective in decreasing aircraft accidents. Address your letters direct to the Editor, FLYING SAFETY Magazine, Inspector General, First Region, Langley Air Force Base, Virginia.

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OUTSTANDING AIRMEN

Every example of pilot error resulting in an accident is reported in one publication or another. But numerous examples of outstanding feats of airmanship often go unmentioned. Commanders and flying safety officers are invited to tell the editors of FLYING SAFETY about such flights. Whenever superior airmanship, piloting or maintenance saves an airplane or crew from disaster, we want to publish the story to the entire U. S. Air Force. The personnel concerned deserve a "well done" on these pages.

FLYING SAFETY

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FLYING SAFETY is published monthly by the Department of the Air Force, Flying Safety Division, Office of The Air Inspector, % Inspector General, First Region, Langley Air Force Base, Virginia, with the approval of the Bureau of the Budget, Executive Office of the President of the United States.

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BEHAVE YOURSELF

IN SEEKING ways and means to eliminate aircraft accidents there is an essential way too frequently ignored. After an accident, we look for materiel failure, for pilot error, for violations of regulations. But how about courtesy?

Good manners, or consideration for the other fellow, can make flying safer. For the lack of so simple a thing as a decent greeting an airplane can be wrecked.

Not so long ago a pilot landed at a large air base to unload military personnel. He was instructed to park at the far end of the ramp and he was left to walk nearly a half mile to operations. The walk annoyed him. After filing a new clearance and checking weather, he inquired if his plane had been serviced. Operations bluntly told him that a gas truck had not yet been sent out, but that his plane would be serviced "when we can get to it."

They didn't get around to it at all. After twice changing the estimated time of departure on his clearance, the pilot walked back to his plane, switched on the fuel gages, counted the gallons and made an estimate. Two hours of fuel, at least. His flight plan called for one hour plus 45 minutes.

He called the tower for taxi and takeoff instructions and was cleared to go. He ran out of gas en route and bellied the plane in on a sod field. He was wrong, of course, and was charged with a pilot error accident, and with a violation of the regulation requiring enough fuel for flight to destination plus 30 minutes on VFR. Yet his lack of respect for regulations and the safety of others was no more glaring than the bad manners displayed by the base personnel too busy with their own affairs to offer courteous service to a transient.

Courtesy is not bowing or kneeling. What it is is good tempered respect for the other person. It is waiting for a clear channel before beginning a radio transmission. It is turning a plane for the engine run-up so that the prop blast does not bowl over the next plane. It is flying at proper altitudes over towns and cities. The courtesies with which operations personnel assist the pilot in planning a flight, in obtaining weather information and briefings all will affect the safety of the flight. The care with which a mechanic repairs an engine is a form of courtesy in that when he considers the man who will fly the plane he will do a safer job of maintenance. The inspector who thinks of the other fellow when he releases an aircraft for flight is making use of courtesy to foster safety.

Officials charged with the protection of lives along the highways have long recognized that the first law for automobile drivers must be courtesy. Aviation, with its more complex problems of traffic, servicing and maintenance calls for an even greater use of courtesy and respect if flying is to continue to grow and gain in popular esteem.

SHORT CUT
TO
DISASTER

It seems that when things start to happen they happen all at once — fast, to say the least. That is what happened to this B-29 instructor pilot and his crew.

The instructor pilot had been assigned to give transition to two other pilots. Along with them were four crew members. One of the pilots receiving instruction was in the left seat for takeoff and the instructor was in the right seat.

Takeoff was uneventful except that the left landing gear failed to retract completely, leaving the doors in the full open position. Also, the right rudder was binding; it had little action especially at 180 mph and above.

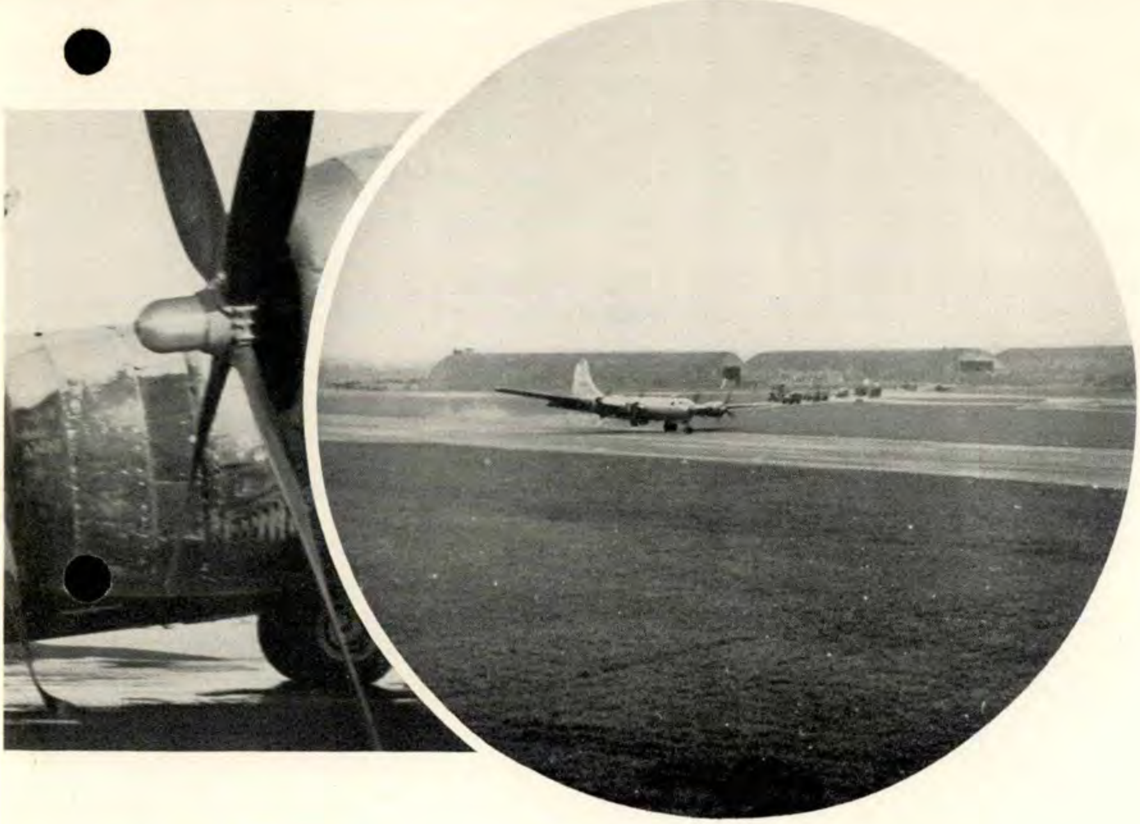
At an altitude of 1,300 feet above the ground the instructor pilot decided to return to the field, land and have a maintenance check of this B-29. Because of traffic in the pattern, the pilot had to make a 360° turn to the right in order to enter traffic at the correct interval.

The instructor pilot felt he could exercise more accurate control from the left side, so he started changing seats with the pilot. During this process, the No. 4 engine rpm slowed down almost to a stop. Thinking the engine had been feathered momentarily, the engineer cut the switches and mixture control on No. 4 and asked the pilot if he was trying to feather it. Upon receiving a hasty negative answer, he turned everything on again and asked the pilot to try and feather No. 4 because the scanner reported smoke and oil were pouring from it. The instructor pilot tried feathering No. 4 several times, but to no avail. They found that by holding the feathering button down they could keep the prop within limits.

The tower was alerted for an emergency landing. They entered the traffic pattern at 900 feet indicated, field elevation 185 feet. Things were really getting interesting about this time and they still had the gear to contend with.

As the gear switch was put in the DOWN position on the base leg, the right gear came down normally. But the left gear remained stubborn in the halfway position. By this time they were heading for pay dirt at 145 to 150 mph with 300 to 400 feet left.

They decided to put the gear switch in the UP position as the instructor didn't want to take a chance on skidding into the GCA unit near the left side of the runway. However, in the UP position the left gear started on down and the right gear started up. Immediately, they put the gear switch back in the DOWN position and started the flaps



down. The nose gear and left landing gear were not down and locked at this time, but just prior to touchdown the safe to land light came on for the *left* gear. There was also a strong odor of electrical fire in the cockpit.

The instructor pilot, knowing the nose gear was not down and locked, landed the B-29 in a nose high attitude and held the nose off as long as possible. Ignition, battery and APU switches were cut when the nose started settling.

After skidding along for most of the length of the runway, the B-29 came to a stop and the crew evacuated with no injuries to the seven aboard. It was believed that the instructor pilot did an excellent job of landing the crippled B-29.

Now to get to the causes of all his troubles. The Form 1A had carried a write-up two months previous saying: "left gear fails to retract all the way." A successful retraction test was made a few days later. However, two subsequent flights were made with the same write-up as before. During the 24 days prior to this accident, repeated entries indicating malfunction of the landing gear system had been entered in the AF Form 1A.

To review, the purpose of the AF Form 1A is:

1. To bring to the attention of pilot personnel the mechanical status of aircraft prior to flight.

2. To provide engineering personnel with data concerning performance and operation of aircraft.

3. To provide a basic record from which is obtained data for preparation of Air Force maintenance and engineering reports.

In this case, it took the failure of the No. 4 engine (internal failure and nose reduction gear failure), a solenoid relay failing in the left landing gear, and nosewheel retracting motor burning up to really mess up the situation. But often it doesn't take anything more than the initial failure to follow up a report on the Form 1A to cause serious damage and fatalities. Failure to follow through on a Form 1A write-up is a short cut to disaster.

A commissioned officer with qualified airmen as assistants is now assigned the primary duty of Technical Inspector at this base. This is to assure adequate inspections, record keeping and follow-up of maintenance activities.

If the Air Force is to maintain the highest degree of operational effectiveness, complete utilization of the information recorded on these forms cannot be overemphasized. The 1A requires conscientious and accurate entries by the pilots and the same kind of follow-up by maintenance personnel.

THERE IS A DIFFERENCE

IN THE ENGINE MIXTURE CONTROL SYSTEMS OF B-29 AND B-50 AIRPLANES

By D. MOWRER, *Chief Service Engineer, Boeing Airplane Company*

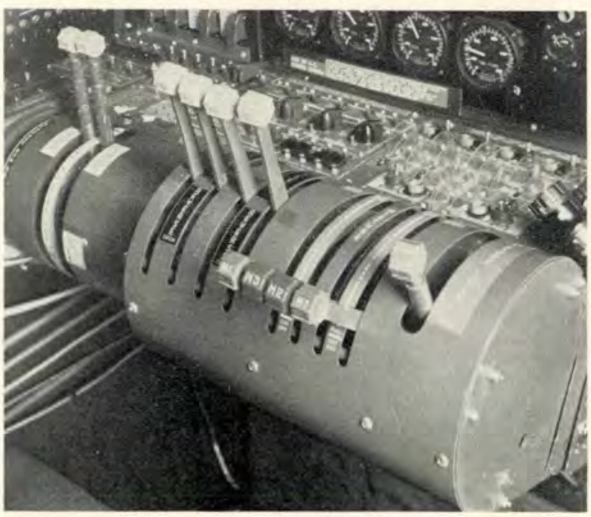
A RECENT NEAR-ACCIDENT occurred while an Air Force crew, well-experienced in B-29 operation, was preparing to land their B-50 airplane. This near-accident was due to the fact that the mixture controls at engineer's station on the B-50A airplane are operated directly opposite the mixture controls on the B-29 airplane. In this particular incident the flight engineer's alertness to note the dead engine while changing mixture from Auto Lean to Auto Rich on one engine at a time undoubtedly prevented this incident from being a repetition of a disastrous four-engine airplane accident. Its cause was believed to have been the simultaneous movement of all four mixture controls into cut-off position instead of Auto Rich during a landing approach.

The B-50 engine controls have been standardized with other airplanes so that the movement of the control levers from the position of the crew member for whom the controls are installed is consistent with the effect produced. In other words to decrease power, the crew member pulls back on propeller, throttle, and mixture control levers, or to develop full power the levers are in corresponding positions away from the flight engineer.

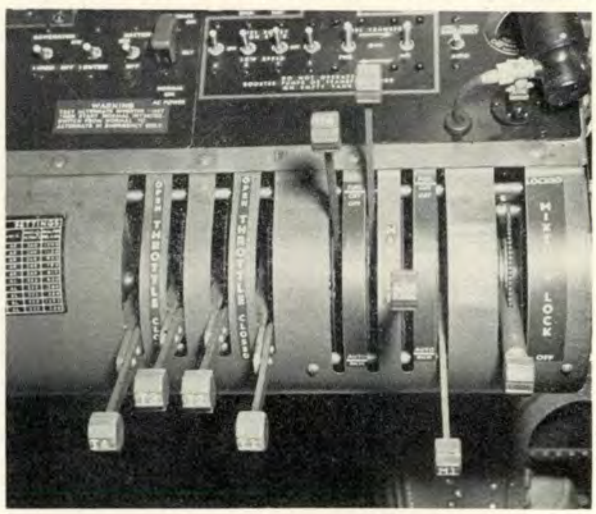
It is unfortunate that this standardization did not occur in time to affect B-29 airplanes as well. Because the change had to be made some time, it was considered that flight engineers would be adequately trained for B-50 operation and thus minimize the accident potential. However, it must be realized that the possibility of a flight engineer moving the mixture controls in the wrong direction is enhanced by the fact that most B-50 crew members are B-29 crew members and in some known cases are actually engaged in operation of both types of airplanes.

The accident potential of this seemingly small difference between the two airplanes cannot be underestimated. The Boeing Airplane Company is endeavoring through the medium of its publications and by personal contact of their field service engineers with operating personnel to bring this difference to the attention of all B-29 and B-50 flight crew members.

On B-50 both throttles and mixture controls are pushed forward for Open and Auto Rich, pulled back for closed.



On B-29 the throttles are pushed forward to Open position and mixture controls are pulled back to Auto Rich position.



more on the ANTHROPOMORPHS

Two DUMMIES have been used to test the ejection seats of the new North American B-45 jet bomber. The plane's pilots sit in tandem, and the copilot dummy was covered with a white material to show any marks left by powder burns from the pilot's seat as it was shot 46 feet into the air. Neither seat hampered or endangered the safe operation of the other seat or its occupant.

Engineers were able to compute that the trajectory of an ejected pilot would be safe at speeds of over 480 miles per hour.

RUBBER —

An inertia tire testing machine used in the Aircraft Lab at Hq., AMC, for the Air Force acceptance check on contractors' tires. The tire is subjected to 200 landings on this machine, plus radial load, casing, and burst tests.

"THE ACCIDENT was caused by the failure of the right main tire shortly after the landing roll was started." "The aircraft had taxied approximately 250 yards when the left main landing gear tire blew out." "A normal landing was made but just as the nosewheel touched the runway, the nose gear tire blew out causing a violent shimmy." "The left tire blew out due to excessive use of brake required to hold the plane straight." "Condition of tailwheel tire indicated possibility that tailwheel may have blown out on landing roll." "Contributing factor: a tire blowout at 90 mph or above."

Those excerpts from investigation reports are only a few of the many instances where tire damage is involved in aircraft accidents. However, proper maintenance procedures and understanding of what airplane tires will withstand can do much to reduce the damage to tires and wheels and to insure maximum service and safety.

Proper inflation is the most necessary maintenance function to obtain safe, long service from airplane tires. Tire pressures should be checked with an accurate air gage at least once a week, and it is recommended that they be checked every day. Otherwise, if a slow leak should develop, it could cause excessive loss of air within two or three days, with resulting damage to the tire. A newly mounted tire should be watched even more carefully and should be checked daily for several days, after which the regular inflation schedule may be followed. This is recommended because air is usually trapped between the tube and the casing at the time of mounting, which gives a false pressure reading. As this air seeps out under the beads of the tire, or through the valve hole in the rim, the tire may become severely underinflated within a day or two. Both overinflation and underinflation can be very harmful to tires, and each has potentially dangerous effects. The bible to follow for proper inflation procedure is TO 04-10-1, dated 15 August 1946.

Loading airplane tires above the prescribed limits can also cause many bad effects. The load per square inch of tread contact surface is increased,

Handle with Care!

causing faster wear and increased susceptibility to cutting. Undue strain is put on the cord body and beads of the tire, reducing the factor of safety and service life. There is a greater chance of bruising upon striking an obstruction or upon landing. Additional air pressure to offset increased load can reduce excessive tire deflection, but it puts an added strain on the cord body, reduces the stretch of the cords, and lessens the ability to withstand impact. Overinflation to offset overloading is not recommended. Also, under the severe strain of an extra load, a wheel may fail before the tire does.

In mounting and dismounting airplane tires and tubes, extreme precautions must be taken. Otherwise, the tube will be distorted and early failure might result. To mount a tire, first inflate it to shape the tube, then deflate it to give the tube a further chance to shape in place, and finally reinflate it to get rid of the trapped air.

Tires that are UR'd because of blisters are often the result only of improper mounting. The trapped air between the tube and inside of the tire creeps through ply after ply until it comes to the rubber, finds a weak spot and forms a blister. This air can be bled by penetrating the rubber with a sharp probe similar to a sewing needle. The performance and life of the tire is not endangered by this probe if inspection reveals the casing is satisfactory in all other respects. *If a tire is UR'd by a service in the field, the number of landings should be noted on the UR.* This is to insure a more detailed analysis of the trouble.

Thorough tire and wheel inspection, both with tire mounted and with tire and tube dismounted, should be made in accordance with the recommended procedures of the manufacturers and the appropriate Tech Orders. The ideal condition for tire and tube storage is a cool, dry and dark location, free from air currents.

There have been cases where the peculiarities of landing gear geometry have caused abnormal and excessive tread wear, so that the subject of wheel alignment warrants consideration. While wheel alignment on a new airplane is accurate, it is important after a hard landing or accident which might involve injury to the landing gear, to have the wheel alignment carefully checked. The alignment may be affected by the passenger and gas load, so it should be measured under the average loaded condition of operation. By following these recommendations, you will obtain maximum tire tread life.

Improper handling of a plane during taxiing can cost a lot of rubber. Most of the gross weight of the plane is on the main landing wheels — on either two or four tires — and sometimes this weight is tremendous. The tires, which are inflated to absorb the shock of landing, will deflect about 2½ times the deflection of passenger car or truck tires and are, therefore, more subject to fast tread wear and to certain types of damage than car or truck tires are on the same surface. An airplane is more difficult to handle on a runway than an automobile or truck, and there is always a likelihood that one landing wheel, particularly when making a turn, will get off the runway and perhaps suffer damage when it comes back on. With dual landing wheels even greater opportunities exist for such damage if one tire is forced to take the impact which two should receive.

Increase in ground traffic causes more use of brakes and often results in more pivoting, with the result that more rubber is scuffed off the tread. Brake heat causes the tube to stretch into corners and cook there — subsequent thinness and failure

at such a point is the result. Severe use of brakes can cause flat spots in the tire, thus causing the tire to be out of balance, necessitating treading or replacement. To avoid this, taxiing speeds should be held down so that severe application or locking of the brakes is not necessary. Brakes should be applied moderately.

If pivoting on airplane tires could be done in a wide radius, the life of the tire treads would be materially increased. But when an airplane is turned by locking one wheel, the tire on the locked wheel is twisted with great force against the ground or runway. A small piece of rock or stone that ordinarily would cause no damage can, in such a case be literally screwed into the tire. Whenever a turn is made, the inside wheel should be allowed to roll on a reasonable radius, say 20 to 25 feet.

Airplane tires and tubes are always under a strain on landing. Under normal conditions, however, with proper maintenance of the tires, they withstand a great number of these landings without damage and come back for more. Tire damage at the time of landing is usually due to poor judgment or unforeseen circumstances. Experienced pilots, however, can make landings that will result in longer tread wear, and eliminate much of the excessive strain on the tires at the moment of impact.

Regardless of preventive maintenance and the care taken by the pilot and ground crew in handling the plane, tire damage is almost sure to result if the runways and aprons of a landing field are in poor condition.

Just a little care — a few precautions — in the hangars and around the landing field will help to prevent both minor and serious tire injury.

— S. EISENMAN.

Once is enough!

A quick checkout in a "Jug" was almost too much for this pilot . . . as a matter of fact, almost too much for the "Jug."

THERE IS ONE FLIGHT so ineffaceably stamped in my memory, I shudder every time I think of it. I was a very eager beaver in those days, and when the slightest opportunity for a checkout in a new aircraft arose, no chains could hold me until I had mastered it.

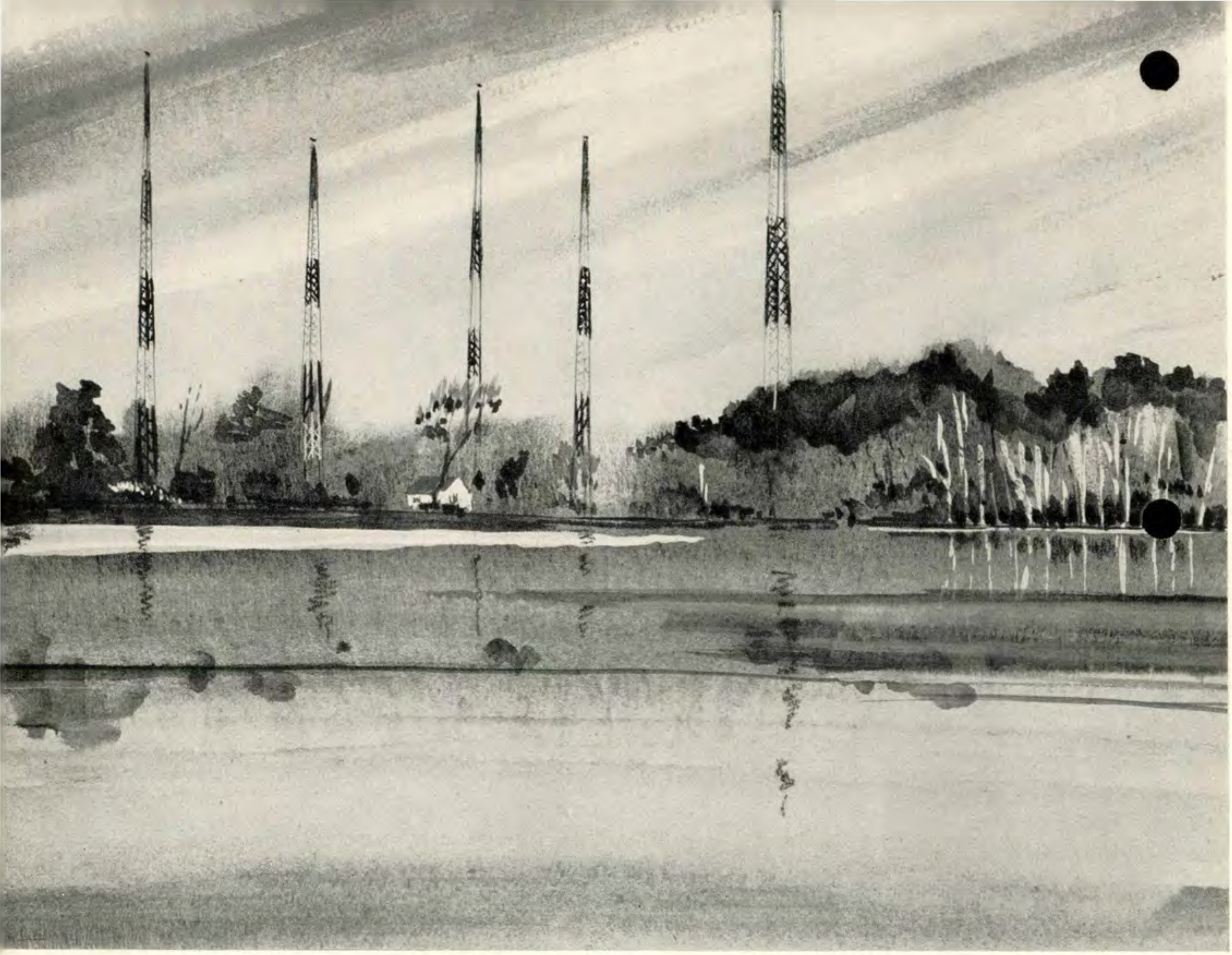
At this particular time, I was assigned as an advanced single-engine instructor pilot, with not too much fighter time under my belt. I did a little pinch-hit instructing in P-40's in which our cadets were required to get ten hours prior to graduation, and — you guessed it — thought I was about the hottest thing this side of Hades. Well, to make a long story short, four F-47's were ferried in for assignment to our base. As it happened, only two pilots on the base had ever flown "Jugs," and being great pals of mine, they proceeded to get me checked out. No Tech Orders on F-47's were available, but that deterred us not in the least.

My pre-flight instructions consisted of the following: "The 'Jug' is not so much different than the P-40 — there's just more of it. There are a couple of things you gotta check, however, which you don't do on a P-40. Take this gimmick here — that's your electrical prop control. When you check it, put the toggle in DECREASE RPM till you get a decrease of 400 rpm, then in INCREASE RPM to bring it back up. After that, put it back into AUTO and forget it. Check mags at 2300. This is your super-charger control. After you get your throttle all the way forward at altitude, you can use the turbo for a throttle. Remember on the takeoff, pull it off at about 100. Glide at about 130." With these voluminous instructions under my helmet and a grin which stretched from ear to ear, I taxied out for takeoff.

I was uncertain as to whether the super-charger control should be full forward or full back for takeoff, so I promptly forgot about it and left it back. I lined up with the runway, poured the coal on, and sat back to watch developments. As the end of the runway approached, I began to get a little disturbed about the airspeed, which was not building up too fast, so I decided that 35 inches manifold pressure was not quite enough. After rolling off the end of the runway, I managed to stagger into the air and promptly depressed the button on the end of the gear handle and lifted up. I had heard that 160 mph was the best airspeed for climbing a "Jug," but at that airspeed and 40 inches, we were still hovering down amongst the tree tops. After a few minutes of this, the tower called and informed me that my gear was still down. Wonder of wonders — a manual latch on the gear handle prevented moving the lever all the way up. At about 50 feet altitude, I checked myself out on this and finally got the gear up.

After fooling around for 45 minutes, I decided that I would attempt a landing. I peeled off from my initial and proceeded to show those poor souls on the ground what a hog "Jug" pilot I was by making a really tight 360° pattern. I started turning on the final at about 150 mph at 800 feet, and suddenly realized that I was overshooting the turn. I was in a vertical bank, so — being used to P-40's — reefed back on the stick to pull in. The next thing I knew, I had to look up to see the ground. During the next few seconds, I think I pushed and pulled every gadget in the cockpit and made 240 complete circuits with the control stick. I can't imagine how, but I scooped out about two feet from the ground. The only thing I can figure out is that the ailerons, rudder and elevator were flapping so fast that they created enough lift and thrust to fly me out. Just as I straightened out, the mobile control tower nonchalantly announced I had missed him by only a couple of feet, then queried, "Thunderbolt 9, are you having difficulty?" To this day, that remark remains the grossest understatement of this era of the airplane. Needless to say, my next approach covered five or six sections of land and was made with one-eighth needle-width turns.

Gentlemen, since that day, I have been an ardent supporter of comprehensive checkouts.—*Submitted by Caribbean Air Command.*



In the past few years a chorus of new aids to navigation, instrument flying and instrument letdowns have raised a din and clamor to be recognized and accepted by the flying world as the answer to the pilot's problems in the field of weather flying. Each new system has received its due share of publicity, and fliers, from the Sunday Afternoon Clubs to Air Force command pilots, have listened to the shouting and accepted each for its individual merits. But beneath this uproar, earphones on skyways around the world continue to echo with the dit-dah of the host of radio range stations which will continue to be, for some time, the mainstay of radio navigation and instrument letdown procedures.

Yet despite universal acceptance and usage, radio ranges are often not properly understood by the pilots who use them. Frequently this lack of understanding leads a pilot into trouble.

In flying the range on actual instruments, what are your reactions? Possibly you want to get on the ground as soon as you can. You thumb through the letdown procedure for the particular station concerned, fly the altitudes and times specified, make the proper letdown and you're on the ground. But how about those pilots who hit a hill on their procedure turn or while they are inbound to the cone of the final approach? Why didn't they fly the letdown procedure as you did? Maybe it was because they became a little careless, or they didn't understand why certain times and altitudes must be so strictly adhered to.

Let's start at the beginning and gather a few points on activation of a range, its flight checking for accuracy and reliability, and the methods of detecting and reporting discrepancies in radio ranges.

After the various applications, coordinations and approvals which are necessary when a radio range station is requested are complete, and real estate, equipment and supply problems are ironed out, the actual process of installing the range begins. The first concern is to be sure the N's and A's are in the right place and that the instrument approach procedures, altitudes, distances, etc., are correct. The rules which are followed in deciding these matters are established by the Airspace Subcommittee in Washington, D. C. This subcommittee of the Air Coordinating Committee is composed of representatives from CAA, CAB, USAF, and the Navy. They have an established procedure for processing and approving instrument approach procedures which, while uniform, are flexible enough to cover any airport regardless of terrain or obstructions.

Initial approach altitudes are the minimum en route cruising altitudes authorized for an airport between the last "primary" radio fix and the radio range station. These altitudes are based solely on clearance above terrain and obstructions to flight. The altitudes shown for initial approach on any radio range course assure you of at least a 1000-foot clearance above all obstructions *except* for those areas designated as mountainous areas.

Initial approach altitudes for mountainous areas should not be less than the published en route minimums; where no en route minimums have been established, a clearance of at least 2000 feet over all obstructions must be maintained. Initial approach altitudes assure terrain clearance in an area five miles each side of the centerline of the radio range course from the last radio fix (radio range station or reliable intersection) to the range station, provided that no maneuvering is contemplated for this course.

The procedure turn is normally an initial left turn through the course followed by a turn to the right to return to the range course. The altitudes established for the procedure turn will normally provide for 1000 feet terrain clearance over all obstructions 10 miles from the range course centerline for the maneuvering side, five miles from the range course centerline for the opposite side of the final approach course, and 10 miles from the range station. The distances of 15, 20 and 25 miles shown on the letdown charts are shown as an advisory item to pilots who feel it necessary to go beyond the 10-mile increment, but it must also be noted that the procedure turn altitude sometimes increases if the greater distances are used.

The final approach, as related to radio range procedures, is defined as beginning at the point at which the procedure turn is completed. The aircraft is headed back toward the range station, and descent to final approach altitude over the range station is begun.

The altitude over the range station on final approach will be *at least 500 feet* above all obstructions between the point where the procedure turn is completed and the range station, and normally will provide this clearance for an area of five miles either side of the centerline of the radio range course, provided the procedure turn has been completed within 10 miles of the range station. All terrain and obstructions beyond the 10-mile limitation must be cleared by at least 1000 feet.

Only one altitude will be shown over the range station on the final approach and shall not be less than the minimum ceiling authorized for regular minimums for the airport served by the radio facility. However, descent will be discontinued at the authorized minimum applicable to the airport. These altitudes are shown to the nearest 20-foot interval, i.e., 510 feet is indicated as 500 feet; 511 feet is indicated as 520 feet, etc.

Minimum altitude over airport is established by the approving agency and is usually 500 feet above airport elevation, and the pilot should be in visual contact with the ground at this altitude. If not, an immediate climb should be commenced, approach control notified, and the missed approach procedure followed.

The point at which an instrument approach will be discontinued (missed approach) and the missed approach started will be either at the range station or within a specified distance of the radio range station not to extend beyond the nearest usable portion of the airport expressed in miles. Time limitations should not be used because of the variations in the approach speed of different types of aircraft.

The recovery from a missed approach is normally made on the radio range course whose outbound bearing most nearly approximates a continuation of the bearing from the range station to the airport.

The altitude to which flight will proceed in a recovery from a missed approach will be not less than the initial approach altitude for the course involved.

There is a revised AF Regulation 55-6 coming out soon which will outline the criteria and procedure for processing and approving instrument approach procedures.

After a radio range is installed and operating, it is flight checked by several agencies. AACS is one of the first to check a new range. Their check is usually coordinated with pilots of AMC, and it is very thorough.

First of all, the check pilots draw the magnetic courses of the range legs on a sectional map of that area. Then they fly a 10-mile circle around the range station, checking for on-course and signal changes. Prominent landmarks are picked about 25 to 35 miles out on each of the four legs of the range as they fly out each range by checking for multiple course or bent beams. By flying exactly perpendicular each way on each range leg near the prominent landmarks and by using time and distance, they check the proportion of the beam or its width. To be in proportion and on course, the beam can't be over 1.5° out of alignment.

The check pilots fly out the maximum distance on each leg that range signals can be received clearly, and that is the distance marked on the sectional and regional maps. At 50 to 60 miles out, a check on the proportion and alignment of each leg is made again.

Voice procedure is checked for clarity and distance. And the check pilots see that the voice does not interfere with the "range" position on the jackbox in the airplane. Of course, the equipment in the airplane must be in perfect working order.

The cone of silence is flown over to make sure that it isn't leaning or pushed to one side and to check its size. It is checked at 1000 feet, 500 feet, and at the maximum altitude that approach control will stack airplanes.

A Z-marker is checked at 1000 and 5000-foot levels while the fan marker is flown over at the approach altitude. If it is a bone-shaped fan marker, it is checked on up to maximum stacking altitude usually not over 10,000 feet. This fan marker is flown over parallel with the range leg at one-mile intervals. Then, the actual area in which the marker light comes on in the cockpit is marked on the sectional and regional maps.

This flight check usually takes 4½ to five hours and as described is very thorough.

After the radio range is in place and operating, a proposed instrument letdown procedure is worked out and submitted in accordance with AF Letter 55-6 to the Flying Safety Division for flight check and approval. Flying Safety Division screens the proposed procedure for the minimum criteria as established by the Airspace Subcommittee and flight checks it from a flying safety standpoint. Particular attention is paid to clearances over local obstructions such as smokestacks, water towers, frequency modulation radio towers, etc.

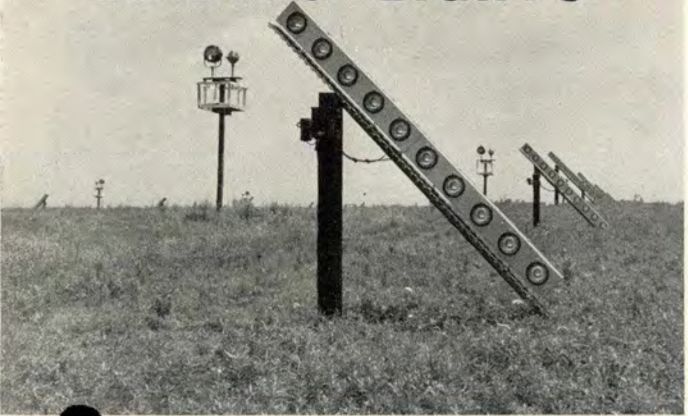
After the range has been subjected to all of the above tests and approved, it is published in detail in an AN 08-15-3 and also noted in the radio facility chart.

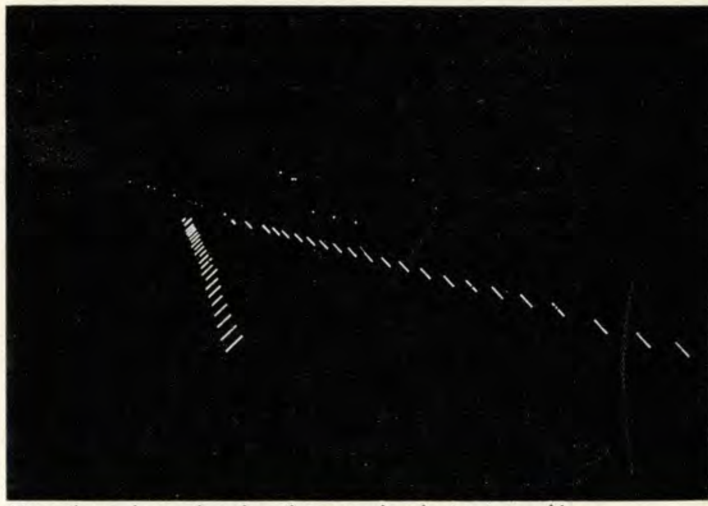
If any pilot notes a discrepancy in a range, he should notify the base operations officer at the field involved and Notams should be sent out immediately. The AACS squadron at the base will be notified of the discrepancy and will check into and correct the situation.

With a knowledge of the many factors considered in making a range safe for instrument approaches, a pilot can fly the prescribed approaches and letdowns with complete confidence. Until the new radio navigation aids now under development are universally installed, the familiar four-course radio range will continue to be a dependable friend to the man in the soup.

1st Lt. Rodger W. Little

GUIDING LIGHTS





View above shows what the pilot sees when he is approaching low and to the left. Note all lines point to the right.

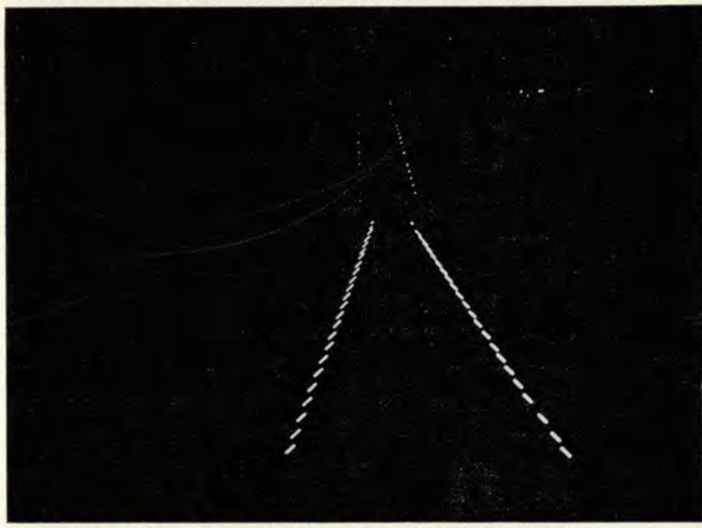
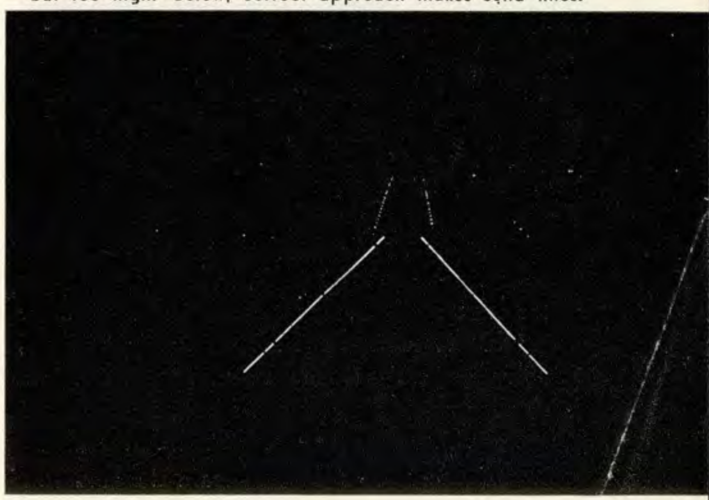


Photo above shows when pilot is on good approach course but too high. Below, correct approach makes solid lines.



METHODS FOR improving approach lighting to assist pilots in the last few seconds of landing under bad weather conditions have been under study and development for a long time. Now a strikingly simple system of "slope-line" approach lights has been approved as standard by an Air Force-Navy-Civil committee which will be installed by CAA in the very near future at eight airports.

This new system was developed on the idea of placing rows of lights in such planes that the pilot would see a simple "funnel" of two rows of lights leading him to the end of the runway when he was on the right approach path, and other patterns when he was off to the right or left, or too low or too high. After experimental work at Arcata, Calif., and Indianapolis, Ind., units were developed, each consisting of 10 sealed beam automobile lights mounted in a metal box or on a board 10 feet long and one foot wide.

The units are mounted at an angle of 45° to the ground, the top pointing inward toward the centerline of the approach path. They may be installed on rolling ground and still give the same indication to the pilot. This eliminates the need for structures to raise individual units to a level of the others which, in many cases, is an important item of expense. Some of these experimental lights at the Arcata, Calif., Landing Aids Experiment Station are actually in small gullies alongside the approach path.

Here again is the result of the constant research and development being conducted by engineers and scientists to aid pilots with improved facilities and thereby reduce the hazards to flying.

Two F-51's taxied out for takeoff. The pilots had been briefed for an instrument training flight in which the pilot with the instrument card filed the clearance and was to lead the two-plane formation.

Radio contact had been pre-arranged. The lead pilot was to do all the contacting of towers and the range stations, and they had agreed to switch to C channel after cruising altitude had been reached.

However, the lead pilot was unable to contact the tower for permission to line up for takeoff. His wingman called the tower, obtained permission, taxied out onto the runway and motioned the lead pilot to do likewise. The lead pilot (indicated as F-51A in diagram) acknowledged before moving onto the left side of the active runway.

Then the lead pilot started his takeoff run. From the testimony of eyewitnesses he didn't accelerate very fast, and after passing the intersection he slowed down and drifted to the center of the runway.

In the meantime, his wingman had waited the normal 15 seconds before starting to roll, and now he was roaring down the runway. When he got the tail of his F-51 in the air, he was right on top of the leader. He veered to the right but the left wing of his F-51 traveled through the leader's empennage assembly, and sliding up and over the fuselage, smashed the radio antenna, canopy, and armor plate. The propeller of the wing airplane chopped through the right wing of the lead airplane just outboard of the gun position.

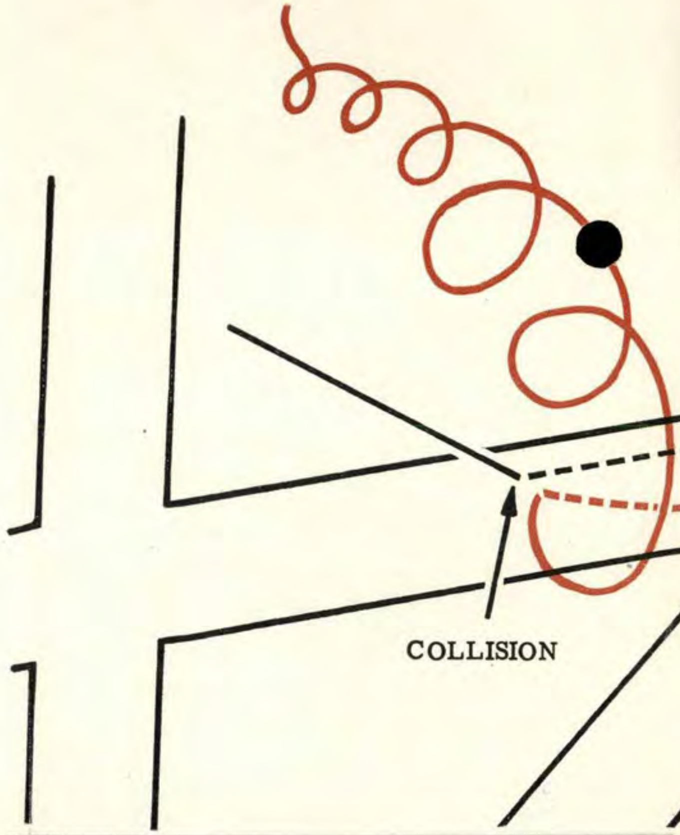
The left landing gear assembly of the wing airplane lodged in the root section of the lead plane's right wing. All of this happened on the right side of the runway.

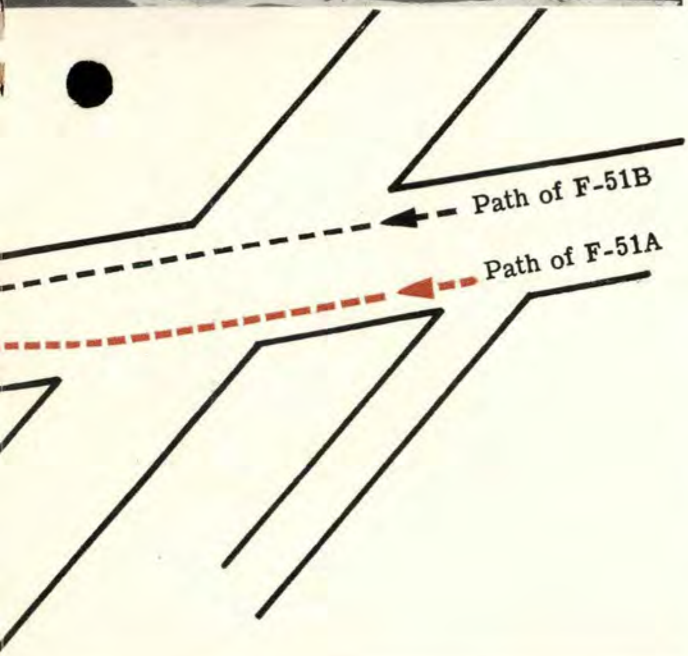
After the collision, the wing airplane skidded on down the active runway another 210 feet and stopped. The pilot of this Mustang dismounted, unhurt.

But the lead plane was not through cavorting. It veered sharply to the left, momentarily stopped at the edge of the runway, and then regained momentum. With its engine turning approximately 2000 rpm, the F-51 started circling to the left and gradually traveled in a northwesterly direction. The pilot was either unconscious or dead.

Several people tried to get aboard the wild Mus-

RUNAWAY MUSTANG





tang but its erratic orbits at about 20 to 30 mph precluded the possibility of anyone's getting into the cockpit. The F-51 continued wheeling for approximately 20 minutes during which a State Trooper had the area cleared of personnel and began to shoot at the tires of the plane. He fired five rounds from a .38 caliber service revolver and six rounds from a 12-gage shotgun before he was successful in deflating both tires and slowing the plane down. Then personnel climbed onto the aircraft and cut power and switches.

The pilot was immediately removed and taken to a hospital. However, upon arrival there he was pronounced dead as a result of a basal skull fracture.

Tracking back to the reason for collision, it was found that close formation takeoffs were not permitted at this field because of the narrow (100 feet) runways. In formations a minimum interval of 10 seconds was to be maintained for takeoff of individual airplanes. The wingman was unable to see the lead plane at any time before the collision because of the proximity of the two aircraft on the narrow runway. Also, the flight leader, for some reason, didn't use full power for takeoff and allowed his plane to drift to the right side of the runway which his wingman was using.

The wild Mustang was run up after the accident and the engine checked O.K. and the VHF set worked properly. If the lead pilot did have radio trouble, as evidenced when they were taxiing out, he should have either turned back or relinquished the leadership to his wingman. Several very serious accidents have occurred recently where lack of radio contact by the leader of a formation has spelled doom for someone.

Local regulations at this base are being revised so that aircraft without two-way radios will not be permitted to take off. Planes at this base will not be cleared for formation takeoffs, but each will be held by the tower until the preceding aircraft has cleared the runway. It was also recommended that crash helmets be provided and worn by all pilots flying fighters.

Briefings aren't really thorough until they cover all possible conditions that may be encountered during the flight. Also, standard SOP's should be stressed regarding positions and radio procedures in formation.

Flying Safety BRIEFS . . .

BELLY KEELS

THE EARLIEST AIRPLANES were equipped with landing skids, but since the date when wheels were first used, the Beechcraft Twin-Quad, a new two-engine light transport, is believed to be the only airplane built with integral landing keels or skids on its belly for emergency use.

A Twin-Quad on a routine flight developed engine trouble with the hydraulic system and the landing gear could not be extended properly. The factory test pilot considered the built-in keels and informed the control tower operator at the Beech factory that he would belly-land the airplane on the grass beside the runway.

According to the pilot, rudder control was available during the short landing run of about 615 feet, and the landing was very easy. The landing caused no buckling of the skin on either the sides or the bottom of the airplane.

The keel tracks plainly show that the bottom of the airplane itself did not touch the ground at any time, although the soil was extremely soft due to recent rains and was incapable of supporting an automobile.

The bottoms of the keels are covered with stainless steel and project three inches below the bottom of the airplane. Their unit pressure on the soil is slightly greater than the pressure on the sole of the shoe of a heavy man.

The method of lifting the Twin-Quad from a belly position is interesting. The equipment required is one shovel and one air bottle. The wheels are lowered to rest on the ground and the shock struts are deflated. Shallow trenches are dug to allow the struts to assume a vertical position, and the landing gear is locked down. The air bottle then inflates the struts and lifts the airplane approximately 10 inches. It is then taxied out of the trenches under its own power.

The Twin-Quad's belly keels were designed as a safety feature so that a pilot in trouble could land on almost any flat surface without significant damage to the airplane. The short landing run of 615 feet on wet, soft ground at an airport with a density altitude of 3,000 feet at the time of landing indicates that the keels met their safety design requirements.

THREE-DIMENSIONAL RADAR

By SGT. MARLYN AYCOCK
Hq., 8th Air Force, Fort Worth, Texas

Radar, a war-born invention which was the nemesis of enemy planes, is paving the way for flying safety at Carswell Air Force Base, Fort Worth, Texas.

Military aircraft flying over this sector of northeast Texas are assured of more safety this winter than ever before.

Recently developed is a new radar height-finding instrument which will enable operations personnel at Carswell to determine the height of any plane flying within 80 miles of the base.

The ground-controlled-approach (GCA) unit now in operation is "two-dimensional." It can determine only the distance from Carswell, and the exact location of planes on a map. But the new device tells in addition, the altitude at which a plane is flying. Thus, when two or more planes are in the same area, radar personnel on the ground can tell how high each is flying and warn them of other planes. This should make the possibility of mid-air collision in the area extremely remote.

Operation of the height-finder will be on a 24-hour basis. After its construction by 7th Bomb Wing personnel, it will be turned over to AACS for operation. The 1921st AACS Squadron presently operates the GCA and other radar equipment at Carswell.

FIFTH AIR FORCE SAFETY WINNERS

Four units of the Fifth Air Force were presented trophies for maintaining the best flying safety records during the second phase of that command's flying safety competition.

The 8th Fighter Group at Ashiya Air Force Base took top honors in single-engine classification with a record of no major accidents for the three-month period of the current competition. In presenting the trophy to the 8th Fighter Group, Maj. Gen. Earle E. Partridge, Commanding General, Fifth Air Force, praised the group for recording the lowest rate of any fighter group in the Fifth Air Force. The group's major accident rate in the past 15 months compares favorably with the rate of any similar unit throughout the Air Force.

The flying safety awards were the second in a series of competitions. The current winners retain their trophies for three months. Units with the lowest accident rates for the full year will be entitled to keep the trophies permanently when the competition is completed.

Shown below are winners of Fifth Air Force flying safety competition who were awarded gold trophies in a recent presentation ceremony in Nagoya. Colonel Thomas K. Hampton, left, Commanding General of the 317th Troop Carrier Wing, accepted the award for the 39th Troop Carrier Squadron, winner in the cargo-rescue-photo classification. This squadron flew 13 months without an accident. Colonel James R. Gunn, Jr., Commanding General of the 3d Bomb Wing, holds the trophy won by Yokota Air Force Base, which had the lowest accident rate of all Fifth Air Force bomber and fighter bases. Major General Earle E. Partridge, Commanding General of Fifth Air Force, who presented the trophies. Colonel Charles T. Olmsted, Commanding General of the Eighth Fighter Group. Colonel Preston P. Pender, Commanding General of the 38th Bomb Wing, was presented the trophy won by the 38th Bomb Group in the twin engine class. This group recorded 4,000 accident-free hours of flying. On the right is Capt. Rowlet Lewallen, Fifth Air Force Flying Safety Officer.

Violation! KING SIZE

By 1ST LT. AQUILLA D. SUGG, *5th Rescue Squadron, Pope AFB, N. C.*

THE KID IS PRETTY SOLID when it comes to flying. Gets a good night's sleep, checks his weather thoroughly, marks his maps properly, briefs his crew and passengers, gives the old crate a good checking . . . all that stuff that helps pilots live to draw old age pensions.

So it was all according to SOP when he completed his flight from Atlanta to Chattanooga without any trouble on a VFR plan. He called the tower, got his landing instructions, made with the checklist and put "it" on the ground ever so neatly. After seeing that the chocks, locks, and pitot cover were in place, he walked away.

We don't know what he did after that. Probably had a good time in Chatta-choo-choo that night.

But there were lots of other guys having fits that day. And it was all his fault.

Here's the way it happened:

On 19 July 1948, there was good weather all over the eastern part of the United States, and lots of planes on cross-country flights.

At 1045E, the Air Rescue Service flight at Pope AF Base, N. C., got a call from Maxwell Flight Service on the "plan 62" squawk box. There was an overdue aircraft. (To save embarrassment, we've forgotten the type plane and pilot's name.) The last four numbers were 0683. "A/C 0683," said Maxwell FS, "departed Atlanta VFR to Chattanooga at 0818E, ETE 1 plus 00, 3 plus 00 fuel. Airspeed 160. Fuel will be exhausted at 1118E. Unreported and unarrived at destination. Flight Service has checked Atlanta Navy, Gunter and Lawson with negative results. We'll continue a communications check of all fields in the vicinity of the proposed flight path."

Flight "C," 5th Rescue Squadron, alerted its air crews and got them all set with a preliminary briefing for a possible search.

Shortly thereafter Flight Service called back to the ARS rescue control center, with the report that they had checked 12 fields, Memphis control had checked seven, and ramp checks had been made at three fields. All results negative.

At this time, the missing plane should have had eight minutes of fuel remaining. Fort Worth control was alerted and an advisory sent to Meridian, Miss. The Georgia and Tennessee State Police were notified.

Another pilot, who landed at Chattanooga, was contacted and he stated definitely that the missing #0683 was not on the ground when he arrived at Chattanooga.

At 1120E, two minutes after the plane's fuel supply should have become a mere memory, Maxwell Flight Service notified the Air Rescue Flight at Pope that all communications checks were negative. The rescue control officer assigned search areas, and the Flight "C" crew members started for their planes. Other military aircraft already in the air or filing clearances were asked to visually check all auxiliary fields along their routes for the missing plane.

The Rescue Control Officer asked for one last ramp check at Chattanooga.

The Air Rescue L-5's began taxiing out, and the SB-17 pilot was turning over number four engine, when ARS got a final report: "#0683 landed at Chattanooga. Arrival time unknown."

The L-5's returned to the ramp, and the SB-17 pilot cut his mixtures.

It had been a hectic hour and 45 minutes, but at least this incident was closed without the usual expense, and with all concerned safe and sound. Also, it probably meant the ARS guys could spend the night at home. Thus ends a story. Everybody was happy.

But what caused all this expenditure of man hours and money, when everything was actually OK from the start?

The pilot of the missing plane had landed safely but had made two small mistakes: First, he gave the tower the *WRONG* plane number before he landed. Second, he didn't bother to close his flight plan.

The Air Rescue boys hope he doesn't make these mistakes again.

"Alerts" on overdue, missing or crashed aircraft come in to the USAF rescue control centers at the rate of about 1700 per year. Fortunately, many of these are "false," as with the pilot who landed at Chattanooga, but many thousands of dollars and many valuable man hours are expended on these needless false alerts, before the safety of personnel can be ascertained. They also hamper search and rescue operations where actually needed, by diverting part of the manpower and aircraft of ARS.

In this particular incident, it seems probable that Chattanooga did not make a thorough ramp check on the first time around, and the other pilot landed at Chattanooga made a positive statement, although he was in error.

"False" alerts can be minimized and there are several primary rules, which if followed by everyone, will accomplish this.

The Pilot: can help by filing and following a proper flight plan, by making radio checks often and correctly, and by making certain that his flight plan is closed upon landing. (AF Reg. 15-23 and T.O. 08-15-1, Radio Facility Chart.) When forced to land at other than proper destination, notify the nearest Flight Service center, or military air base if necessary, by the most expeditious means available. (*Only* the pilot can do these things—no one else is responsible.)

Operations: can help by double-checking clearances for correctness, by seeing that flight plans are closed in case the pilot fails to report to operations after landing, and by making certain that a complete, visual ramp check is made when such is requested.

Communications: can help by correctness of all flight messages, and by fast notification of proper addresses of all messages.

Note too, that the combined efforts of all units, responsible personnel and the pilot—if placed together and mixed well—will serve as an additional check on that double-check which we mentioned before.

Failure to file an arrival report is a violation of Air Force regulations. In some cases it has been punished by loss of pay and removal from flying status.

OIL CONSUMPTION

An all-out drive is being made to lengthen the life of aircraft engines and yet keep them safely in operation.

One of the bigger strides in that direction was the origination of T.O. 01-1-322, 1 September 1948. This Technical Order states that oil consumption limits will no longer appear in future publications of pilot handbooks. The T.O. does not provide for engine change solely because of high oil consumption.

Oil consumption varies with engine power settings used, hence maximum cruise versus minimum cruise is the problem. As an example, a pilot of a plane with a 32-gallon oil capacity per engine, using high power settings, may use 16 quarts per hour and get only seven and one half hours' flying time. On the other hand, another pilot using the same plane with lower power settings could extend the oil supply to last 11 hours using only 10 quarts per hour. Also, due to variations in oil system capacity for different type aircraft using the same engine, an engine on one plane may be out of oil while the same type engine installed on a different plane, though using the same amount of oil per hour, has a larger capacity and thus still has oil for a few more hours of flying.

To operate properly, an engine requires a quantity of oil sufficient to cover completely the oil tank outlet to the engine under stabilized operating conditions. For tactical use an engine must also have a residual volume of oil for high altitude operations in various flight maneuvers. This is provided for by the 15 per cent reserve (see chart).

On the back of T.O. 01-1-322 is a chart indicating how many hours you can fly, depending on the engine's rate of oil consumption. As an example of the flexibility of this chart, a B-29, with 16 quarts per hour rate of consumption per engine, is able to fly for approximately 18 hours.

Sometimes just a couple of cylinders in an engine are using oil excessively. If that is so, UR the engine and mention the cylinders using the oil rather than just a general UR of an engine with high oil consumption.

One of the basic reasons for the existence of T.O. 01-1-322 is economy. It also prevents someone from using high oil consumption as an excuse to pull an engine when actually the real trouble lies elsewhere. An engine which was constantly giving trouble, usually due to lack of condition, could have been changed with the excuse—high oil consumption. Then, when the UR'd engine arrived at the depot, they looked for trouble that never was there.

It might also help the originator of the UR to be truthful in the first place as to why he pulled the engine and thus save time and trouble at the depot.

Notes on Maintenance

There is a move under way to eliminate 25% time extensions on aircraft engines. There will be just a basic time to get on the engine, such as 1000 hours. This is going to call for the utmost effort in keeping the engine in good condition but it can be done, as the "Vittles" effort is so ably demonstrating today.

Pilots are continually being reminded to put a clear and complete write-up in the Form 1A. The same applies to URs. If a pilot is taking off and his engine conks, that isn't the end of the story for him nor for the maintenance personnel involved. T.O. O2A-1-88 should be strictly adhered to *before* the engine is removed in order to determine why it conked and thereby correct the engine malfunction. If the cause of the difficulty is not determined while the engine is installed in the aircraft (with the same accessories, carburetor, etc.) it is seldom ever determined. Engine Disassembly Inspection Reports are of little assistance in most instances like this.

Another thing, URs from the overhaul depots show that approximately 40% of the radial aircraft engines received for overhaul because of metal particles found in the oil screen or sump reveal that all engine parts are in good condition. No metal has been found on subsequent inspections. Evidently, hard carbon particles were mistaken for metal particles or there was a hidden desire to remove the engines prior to completion of allowable operating time and install new or newly-overhauled engines.

To prevent this, it is best, first of all, to maintain a good, clean lubrication system. Secondly, check the "metal" particles by putting them in a solvent or using a magnet in testing them.

Unsatisfactory U.R.

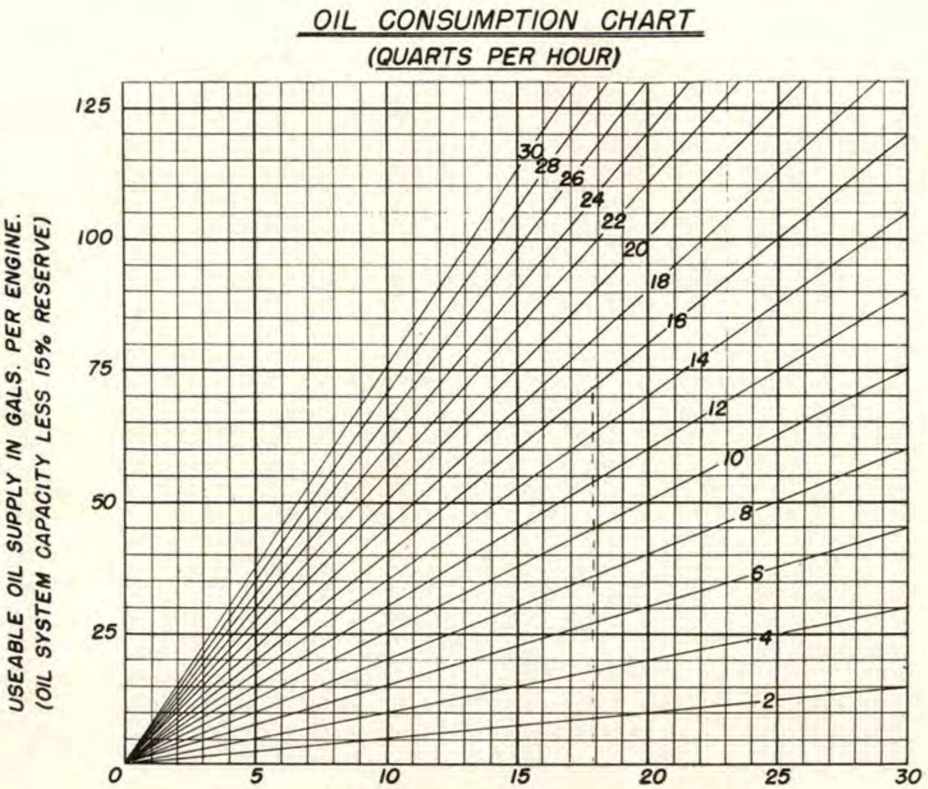
Here is another example of an unsatisfactory Unsatisfactory Report. The UR read: "An aircraft, B-50, was cruising at 16,000 feet with 34 inches manifold pressure, 1600 rpm, 180 PSI torque pressure, one to two degrees cowl flap opening, indicating 230 degrees Centigrade cylinder head temperature in auto-lean. Airspeed was 185 mph. The engineer went forward to converse with the pilot. Upon his return three minutes later, the engineer noted all cylinder head temperatures reading 300 degrees Centigrade and airspeed had dropped off to 170 mph. The engineer immediately opened cowl flaps and cylinder head temperatures returned to normal one minute later. Oil leaks were then noticed in No. 1 and No. 4 engines, the No. 4 engine leak being excessive. The propeller of No. 4 engine was feathered and the aircraft was returned to its station.

Ground inspection revealed evidence on all engines of the top rear two cylinder rows having been exposed to extreme heat (near the combustion point of the rubber seals). Push rod seals were carbonized, rocker box covers could be moved by hand due to deterioration of gaskets, ignition leads were burned, and all engine oil screens contained steel. Probably the cause was exceeding operating temperature limits on all engines due to the loss of air flow over the engines. Corrective action taken: "Subject engines removed and serviceable engines installed."

Those who are supposed to be in the know are still wondering how all four engines overheated under normal conditions in three minutes. It might be recommended that operating personnel observe more closely the cylinder head temperatures.

A pilot wants a safe, dependable engine; maintenance personnel want to keep it that way; and AMC is striving to give them the best engines that money can buy and to provide the necessary instructions and equipment to care for them.

Only by each of the three knowing their job completely and cooperating with each other can they achieve success.



EXAMPLE: Oil tank capacity of B-29 airplane is 85 gals., less 15% reserve is 85 minus 13 equals 72 gals. usable oil supply. Assuming that information from AF Forms 1-A and/or 41-B indicates the highest oil consumption per engine to be 16 quarts per hour, the maximum flight time is found to be 18 hours.

FIRE PROTECTION PROGRAM

THE TECHNICAL DEVELOPMENT service of the Civil Aeronautics Administration has been carrying on an extensive fire-test program at its Indianapolis experimental station with facilities for simulating actual conditions under which fires take place in flight. Specifically, the purpose of this program is to develop means for protecting aircraft against fire in flight, and to determine design criteria for minimizing the occurrence of fire in flight. The assumption was made at the beginning of the program that the power plant was the most hazardous source of fire and, therefore, studies have been made on power plant installations of the B-29 and L-49.

Also, an investigation was made of the relation between temperature and airspeed in a dynamically clean exhaust-stack well which will prevent ignition of inflammable fluids. It was concluded that an adequate propeller feathering system should be maintained, that fire detectors should be located in exhaust-stack shrouds, and that rubber hoses carrying inflammable fluids should be replaced with flexible, stainless steel hoses. It was also decided that fuel and oil lines should be relocated to avoid passing over or near hot surfaces, exhaust-stack shrouds, or turbos; that the air seal diaphragm should be kept tight and only stainless steel parts should be used adjacent to it; and that double-layer shrouds as in exhaust-stack wells should be continuous over the entire surface with no gaps and no pockets where fluids may collect.

CHECK RIDE — ON THE GROUND

Several serious ground accidents have occurred when airplanes were being taxied by crew chiefs or mechanics. In one case it developed that a DC-4 was being taxied with the hydraulic by-pass in the UP position. Taxiing crew did not use the check-list. How often are ground crews checked? Million dollar aircraft are not toys. How many air bases have established procedures similar to check of pilots, to check ground operating personnel?

Another mechanic had two taxi accidents within 16 days. The last accident was a collision with a maintenance stand. Medical check showed he suf-

fered from double vision (diplopia). Corrective action taken by a major airline:

> "Inclusion of diplopia tests for mechanics qualified to taxi, and rigid compliance with maintenance regulations requiring physical standards for mechanics qualified to taxi.
>
> "System-wide campaign to prevent ramp equipment from being left in taxi areas."

HORSING AROUND

While being flown from Europe to the United States recently, a horse broke loose and killed himself by banging his head against the overhead heating duct. Investigation revealed that the horse had made trips before, and the only apparent difference between this flight and others was that dogs were also carried (this horse was a race horse, not a hunter). The horse was in a stall which weighed over 500 pounds. A shoe on the horse was found partly ripped off and bent, which acted like a scythe as the horse thrashed around in the cabin.

If you have occasion to transport horses or mules, make sure the animals are unshod and that no critical equipment can be damaged if they become excited. If practical, build strong stalls not too far

from the center of gravity, as 1300 pounds acting erratically could be serious as a weight on a long lever arm. A belly strap can be placed under the horse and attached to a simple block and tackle. Then if he stampedes, he can be lifted and his energy directed harmlessly downward.

CONTROL CABINS FOR LARGE AIRCRAFT

It is pointed out by M. L. Michael in Western Flying Magazine that comfort decreases pilot fatigue, and thus improves safety by diminishing accidents attributable to pilot error. The design engineer who goes only on an occasional engineering test flight never fully appreciates the significance of irritating factors such as glare, noise, vibration, and temperature extremes, since the severity of the fatigue incurred is chiefly a function of time.

Items contributing to comfort can be divided into those which help reduce fatigue and those which provide additional luxury without decreasing fatigue. The former items are of greater significance.

It is shown that a control cabin which permits standing erect greatly reduces fatigue. The location of jackboxes and the hook for the microphone is one of the seemingly minor things that can lead to a lot of pilot irritation and pilot error. The jackboxes should be placed where they can be located automatically and with a minimum of movement. Standardization of controls and control positions is another desirous item. Even having the same color on the same controls in different airplanes would be a step in the right direction. Strides are being made at Boeing on the problem of temperature control.

Sharp corners is another of the seemingly unimportant but nevertheless irritating factors that cause pilot fatigue. The elimination of as many sharp corners as possible would greatly cut down the torn clothing, scratched hands, and bruises incurred while piloting airplanes.

WELL DONE

TO

MAJOR ROLAND E. DEATON

140th AFBU (RT), Municipal Airport
Sioux City, Iowa

MAJOR DEATON took off in a T-11 one Sunday morning with a copilot and three passengers aboard.

The takeoff and climb were uneventful. After leveling off at cruising altitude, the pilot settled back and flew for 30 minutes. Suddenly he started to lose a little altitude while cruising along and consequently pulled back on the wheel. Nothing happened so he pulled the wheel all the way back—no elevator control.

Very cautiously the pilot tried the aileron and then the rudder controls—they were still operating. He then found that it was possible to maintain straight and level flight by using the trim tabs to control the elevators.

The pilot had the bombardier go up front and check the PDI to make sure it was disengaged; the cables were checked and were all right. Then he had all of them aboard put on their chutes. Meanwhile, the pilot had managed to get the airplane over the airport at destination and advised the tower of his troubles.

The commander of the unit advised the pilot to turn the plane to a magnetic heading of 280 degrees and bail everybody out. The three passengers bailed out but the pilot and copilot stayed aboard the hapless T-11 hoping to save it.

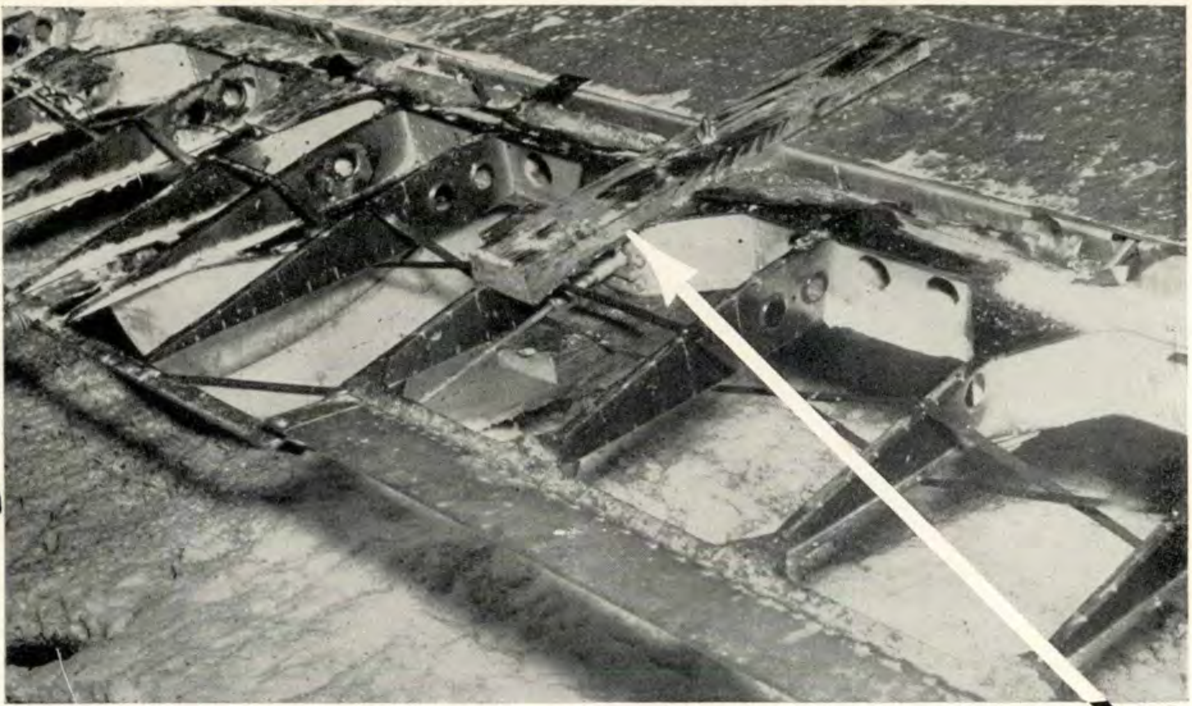
The pilot tested the airplane at 6000 feet and found that he was unable to keep the nose up with power off and landing gear down. After this experiment, the pilot and copilot decided to make a wheels-up landing on the runway using the trim tabs to operate the elevators.

They landed the airplane with a minimum of damage and both walked away without any injuries.

The elevator control loss was caused by a bolt coming out of the elevator end of the control linkage. Investigation revealed that the bolt had had a castellated nut on it but it had been poorly keyed or not at all.

The pilot of the T-11 has been commended by his commanding general for the skillful landing made without normal elevator control.

Major Deaton, left, and his co-pilot 1st Lt. James E. Peterson



THE FORGOTTEN LOCK

THE PILOT of a C-45 took off in a hurry with external elevator control locks in place. He was killed when the plane crashed before it got beyond the boundary of the field. At first consideration, the situation faced by this pilot might appear to be almost identical to that of the pilot on the opposite page who lost elevator control. Actually, the two problems are exactly opposite.

The pilot of this C-45 was a command pilot with over 3000 hours flying time and 260 hours in C-45 type airplanes. He made his external check for a local night proficiency flight with one of the crew chief's signal lights because he had no flashlight. He removed the rudder locks but failed to remove the elevator lock.

Witnesses testified he taxied to the takeoff runway and paused not longer than 15 seconds before starting the takeoff roll. Immediately upon leaving the ground, the plane went into a 45-degree climb and then into a vertical climb. At 200 feet, the nose dropped abruptly and the plane rolled to the right into an inverted position in which it struck the ground. An explosion and fire followed immediately.

The accident investigating board returned a pilot error finding, stating that if the pilot had made a thorough external check, a cockpit check or a pre-takeoff check, the locked control would probably have been discovered. Obviously the checklist was not used.

Following the accident the factor of reverse trim-tab effect on locked elevators was brought up. The fact that the plane increased its climb from 45 degrees to vertical indicated that the pilot attempted to lower the nose by rolling the trim tab forward. This acted to raise the nose further instead of lowering it. When an elevator is rigidly locked, the trim tab acts as an extension of the elevator and forces the tail down when rolled forward.

In a plane flying with the elevator control swinging free, the trim tab reacts in normal manner. It was used in the landing described on the opposite page in the normal manner.

It is worth remembering that with elevator, rudder or aileron controls rigidly locked, the trim tabs produce exactly the opposite effect of their normal reaction.

CURTAIN CALL

By CAPT. JAMES B. DEAN and CAPT. PAUL W. ECKLEY
Continental Air Command

Do YOUR FLYING SAFETY MEETINGS put audiences to sleep? Do pilots rush to get on TDY the day you have a flying safety meeting? Would you like to have an audience that looks forward to your meetings for weeks in advance?

If your answer is "yes" to these questions, best you get next to an idea that has caught on like a prairie fire and has sold flying safety like world series tickets to pilots of the Twelfth Air Force.

The method is simple. They put on a play. And audiences that used to leave flying safety meetings with that dark brown look depart reluctantly amid gales of laughter with the lesson of the meeting thoroughly digested.

Each organization at March AFB, where the skit idea was developed, is notified well in advance of its turn to present a flying safety skit. Units vie with one another in an attempt to put on the best show and put the point across best. Flying safety people beam, and pilots eat it up alive.

The last skit was presented recently by officers of the 1st Fighter Group. This presentation, designed to be humorous and easy to digest, brought home to all flying officers of March Air Force Base the serious factors involved in a comprehensive flying safety program.

The skit revolved around a mythical situation which came about when three jet fighters, flying independently of each other, became lost in weather. These planes, of Russian, English, and American nationality, all had accidents while attempting to land on a neutral airfield in Berlin. Due to the political pressure brought to bear by the three governments, the accident investigation was turned over to the United Nations which formed the International Flying Safety Board. The flying officers of March Air Force Base were fortunate in having the opportunity to observe the board's first meeting.

The group went all-out on characterization of the representatives from Britain, Russia and the United States, and the audience showed its appreciation in howls of mirth.

An uninvited representative of the French Government was present as the board convened, but because there were only three seats made available for the board, he was eliminated when a game of "Russian Roulette" was agreed upon as the only way to settle the seating problem.

Worked in cleverly with the humor of the situation were three very serious accidents, each of which was analyzed in a manner from which all pilots could learn and profit. The lesson was so sugar-coated it was all the more effective for the impression it made upon the listeners. No one who saw the skit is likely soon to forget the troubles of the three allied pilots whose accidents brought them before this board.

Opening scene of an earlier skit, called "Rocky Soup," takes place at "Sleepy Hollow" Air Force Base. The operations office depicted is complete with dozing operations officer, doodling weather man and tired, travel-worn and travel-stained transients. The voices of the pilots, both recently assigned to "Sleepy Hollow," are heard in the background, searching for the operations office.

Finally locating the office, they awaken the operations officer and request a Form 23. No forms can be found except a torn, half-used one, but it serves the purpose so far as the operations officer is concerned. The pilots and operations officer argue a bit about whether or not they should get the weather before taking off. Some difficulty is had in obtaining the aircraft number and determining whether or not the plane has fuel, but eventually the pilots wander over to the weather officer. Here they ask for the weather to Baltimore. Upon the mention of this word Baltimore, the pilots are immediately surrounded by all five of the transients who clamor to be taken to Baltimore. After much to-do they agree to take the transients and since they have no engineer for their B-26, select one of the transients for that duty.

While the weather officer is handing out his patter about cold waves, troughs aloft and sequence reports, both pilots pay no attention to him and carry on their own conversation, during which the pilot agrees to check-out his copilot while on the trip. Midway through the weather briefing the pilot decides to check up on something else and wanders out. The copilot waits a few moments, asks for the wind direction and velocity, and in the middle of this tosses the clearance to the operations officer and walks off the stage accompanied by the transients. The weather officer drones on, finally turns around and to his amazement and consternation, finds the pilots gone.

The second scene takes place in a B-26 mockup, complete with a retractable nose gear. Everyone is aboard. Error after error occurs before they are able to start the engines and take off. The pilot hasn't flown a B-26 for quite some time, has trouble locating switches, both pilots forget to check for pitot covers and gear locks, etc.

Airborne at last, after a few minutes of flight they finally remember to retract the gear. The copilot discovers they have left their maps in operations. They'll rely on the radio compass for navigation (besides the pilot knows the route by heart), but they place the compass on a commercial station in order to listen to their favorite dance band.

Night falls, the cockpit lights aren't working, the copilot uses his cigarette lighter to read the instruments. A thunderstorm is being approached, part of the severe weather which had been forecast. Who cares? Not this pilot. In the middle of the storm with lightning flashing and crackling, the copilot learns that they are short of fuel and the pilot has forgotten how the fuel system should be handled. Turning to the crew chief for assistance, they learn that he had been under the impression that they had asked for a T-6 crew chief. The storm grows rapidly worse. Panic strikes. And with the pilot screaming "Maytag" the curtain falls.

The original Twelfth Air Force skit dealt with a pilot who entered a thunderstorm when low on fuel and eventually became lost. Upon receipt of Crash and Consequences, Number 29, several days before the skit was presented, Twelfth Air Force personnel noticed the similarity of their skit and the accident narrated therein. Copies of the Crash and Consequences were passed out after the conclusion of the skit and the similarity between the ridiculous and real life pointed out. In this manner the moral of the story was amplified.

It doesn't cost money, and judging from the groups who have presented skits it's more fun than blackjack. Actors are always at hand; there are two or three born hams in every outfit. And most important, the flying safety skit has proved a potent method for driving home the lessons learned from aircraft accidents that are our best source for preventing similar accidents in the future. Why not try a flying safety skit at your base?

The "International Flying Safety Board," composed of Lt. A. W. Nielsen, British member; Capt. W. A. Higgins, USAF; Maj. B. L. Morrison, Soviet. Standing is Lt. F. Asla, French.

LETTERS TO THE EDITOR

Several requests have been received recently for copies of AF Manual 62-58-1, Examining the Instrument Pilot. As we do not stock these manuals, please do not request them from FLYING SAFETY. *Requisitions from Air Materiel Command should be made in accordance with paragraph 15 of AF Regulation 5-22.—Ed.*

Dear Sir:

I am always very interested in the wealth of information contained in each issue of FLYING SAFETY, and I read it from cover to cover as soon as we receive our office copy.

In perusing the November 1948 issue I answered the questions in the column titled, "What do you know about engine conditioning" and found that I incorrectly answered the ninth question, "Spark plug bushings should be tapped out" (when?). The correct answer was, "At the time of each plug change."

I was not satisfied with the general broad answer which was correct for this question in that any plug bushing might be tapped at plug change. This is not true in engines which use Heli-Coil inserts. Heli-Coil inserts will be cleaned only with a small wire brush. It is my opinion that your answer should be clarified in that Heli-Coil inserts may be inadvertently cleaned by use of a tap. Technical Order No. 03-5E-1 states that cleaning of Heli-Coil inserts with a tap is prohibited as permanent damage to the insert will result.

JAMES C. MORGAN, *T/Sgt., USAF,*
Howard AFB, Canal Zone

Thank you for your astute reaction, sergeant.—Ed.

★

Dear Sir:

This morning on entering the crew caravan, I noticed a magazine with a strange cover, and on looking closer I found that it was FLYING SAFETY. May I say how pleased and interested I am to have been able to find out a little bit more about the USAF and also to learn a little about your GCA crews.

Here at Lyneham we have occasional contact wtih aircraft and crews of the MATS but only as voices in our earphones and echoes on our tubes, so therefore your magazine has come as a most welcome visitor.

DUDLEY R. CARVER, *L.A.C., Royal Air Force,*
Lyneham, Near Chippenham, Wiltshire, England

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Dear Sir:

I quote from next to the last paragraph of the article, "Your Instrument Check," page 21 of the December 1948 FLYING SAFETY magazine:

"One pilot being checked recently made several GCA approaches and each time he maintained an altitude of approximately 50 feet above the glide path. Finally the check pilot asked him why he was staying above the glide path. He replied that he believed it safer than getting down low on the glide path. His trouble was in failing to trust GCA. If you have that trouble you will be safer if you make a regular instrument approach and let GCA work with someone else. You cannot fly your idea of GCA's instructions. If you don't trust them, don't use them."

I have discussed on several occasions the use of GCA with a number of pilots of my acquaintance. While we do not condone the action of a pilot in arbitrarily electing to fly at an altitude of approximately 50 feet above the glide path, we should nevertheless like to present for your consideration a few thoughts on flying GCA.

GCA is a valuable if not indispensable aid to our pilots, but is a pilot relieved of the responsibility for utilizing any additional cross checks on position or altitude that are within the capabilities of the pilot and the equipment installed in the aircraft? The automatic compass tuned to a range station or a homer beacon or an ILS beam or a radio range leg coinciding with the final approach can provide checks on the position of the aircraft. Possibly these checks should not be attempted by all pilots, but should not each pilot evaluate his ability to assimilate and coordinate the information available and govern his procedures accordingly? During final approach, should not each pilot periodically check the altimeter? If at any time during the final approach a dangerously low altitude is indicated, would it not be wise for the pilot to take action? Is pulling up and going around on a GCA approach any different from going around on a normal landing approach? In flying, shall we use all safety factors available? Determining the reason for a discrepancy in your position or altitude may require a few minutes, but may it not also save your life?

LOUIS B. COLE, *Captain, USAF*

We agree. The pilot alone is responsible for the safe landing of his plane. GCA can not fly the plane for him, but only assist him as an advisor.—Ed.

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Dear Sir:

I just completed reading the December issue of FLYING SAFETY magazine. The article by Captain Eckley, "Slow Down Chum," is very interesting. However, I have a few comments on the "Why the Hurry?"

First, any pilot having gone through the prescribed training period for pilots in the training command had this hurry, rush drilled through him throughout the training period. From classroom to classroom and to the flight line it was double time. I remember while in Primary Flying School we had 15 minutes to go from the clasroom, dress in athletic clothing, straighten our bunk area, and be on the run to the athletic field. From the athletic field, to our barracks, shower, change of clean clothes, fall out for chow was a total time of 30 minutes. This 30 minutes also included straightening up our bunk area again. They said this rush was part of the training to see if we could take it.

On the flight line we were continually having impressed not to hold up that airplane but to get in the air as soon as possible in order to get as much flying in as possible. Get on the ground on time so the next man would not be held up on his flight. Frequently after a flight we had 30 minutes to get to the link trainer for a period of this type of flying. If we were late we caught hell from either party.

After this came the RTU's and OTU's. Here it was a continual rush to get as much training in as could possibly be done within a given time after reporting to the time we were scheduled to leave. That was training. Hurry, rush! We haven't much time!

Today most of us are primarily administrative men and secondarily pilots. You have your office work and flying minimums to meet also. When you finally have scheduled a ship, it is for a given time over a definitely assigned period. So you desire to get in the air as soon as possible in order to get as much flight time as possible and then get on the ground as soon as possible so some other pilots will not be held up. Probably there are urgent papers on his desk that need to be taken care of. Training? Maybe.

I agree with Captain Eckley, but also I see the reason why many are in a rush. I do not, however, see this rush to the extent of overlooking some planning or checking that is bound to endanger a pilot and others. I learned this the hard way. By not checking my flight controls for freedom of movement I tried to take off with control locks on a C-47. I was lucky, I didn't crash but did burn out a set of good brakes and held up a badly needed airplane for a period of time.

HERBERT L. BALLARD, *1st Lt., USAF*

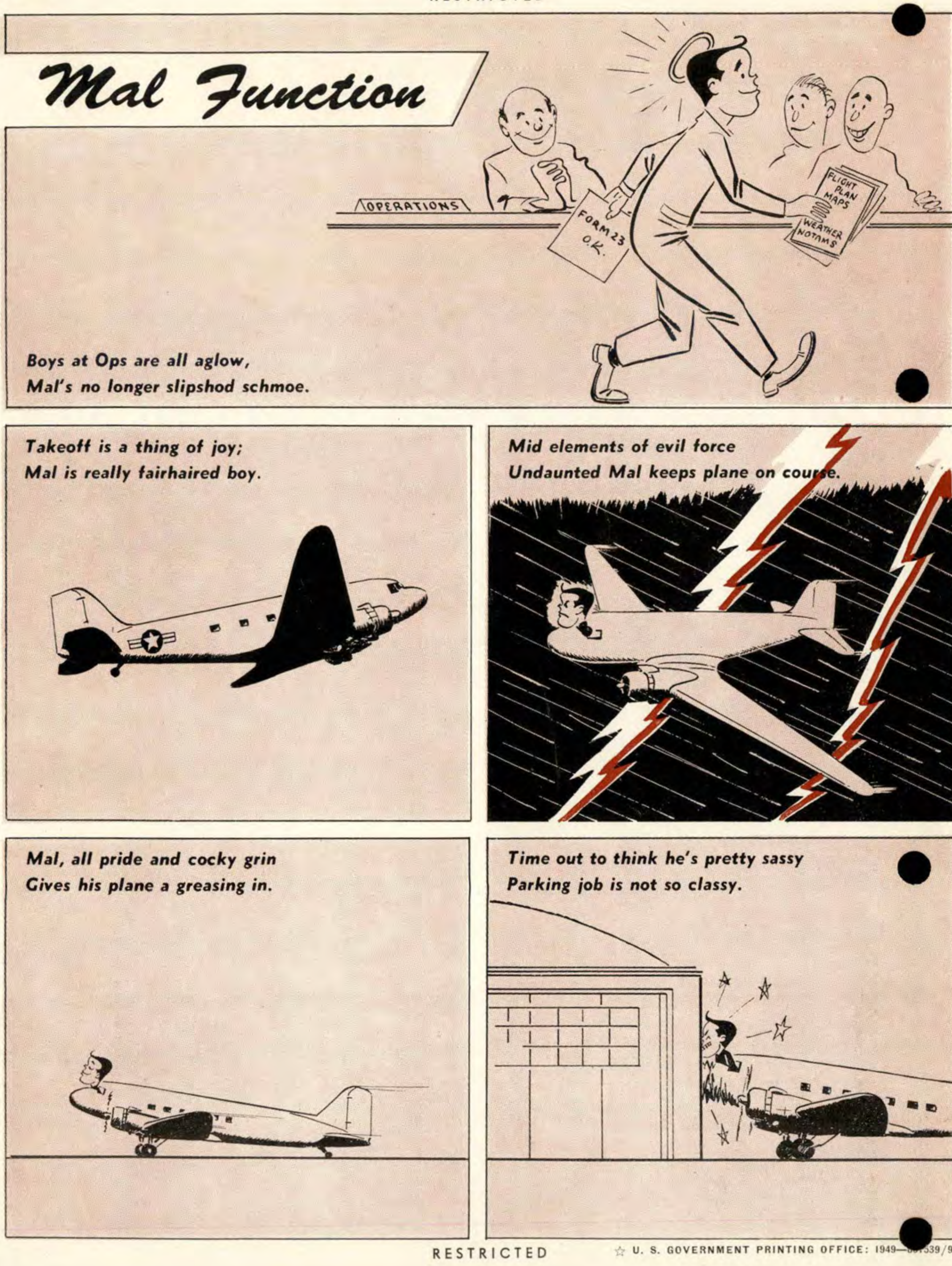
WHY?

THE PILOT OF THIS C-45 was cleared to make a GCA approach while flying under the hood. His copilot was acting as safety observer.

While making the approach as directed by GCA, the pilot was advised by the final controller that he was below the glide path approximately 1½ miles from touchdown. The pilot made corrections; the C-45 came over the fence and hit the ground approximately 40 feet beyond the fence and 900 feet short of the runway.

The landing gear collapsed and the airplane slid onto the runway on its belly. The C-45 was wrecked but there was no injury to crew members.

Why did the C-45 hit before it reached the runway if the pilot had made the necessary corrections, as instructed by GCA to get back on the glide path, and had maintained the correct rate of descent thereafter? Why did the safety observer let the pilot fly into the ground? Why did the pilot continue to stay under the hood when he knew he was nearing touchdown and had no definite agreement with his safety observer to take over?



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