

forced landings

chapter 8



You should be prepared at all times to cope with the emergencies that will exist should you have partial or complete engine failure. From time to time your instructor will give you simulated force landings by retarding the throttle and calling, "Forced landing" over the interphone. These simulated forced landings will prepare you to act promptly and efficiently in an emergency. They will develop accuracy, judgment, planning, technique, and confidence. Normally, you will never know in advance when a simulated forced landing will be given; so be alert at all times to the possibility of your instructor's giving you one. Probably at no other time in your training will your ability to use calm judgment be more severely tested.

The simulated forced landing procedures outlined in the following paragraphs will simulate, insofar as possible, the actual characteristics of the aircraft with a dead engine. The simulated forced landing condition will establish a glide ratio and rate of descent similar to that which would be encountered in an actual forced landing. The simulated approach will allow you to descend low enough to determine approximately where the aircraft would land under actual conditions.

SELECTING THE FIELD

An alert pilot is constantly on the lookout for suitable forced-landing fields. Naturally, the perfect forced-landing field is an established airfield. The next best substitute is a

hard-packed, long, smooth field with no high objects on the approach end; but since these are not readily found in many places, you must be able to select the best available field. Cultivated fields are usually good. Plowed fields are good if you land with the furrows. Avoid selecting fields that contain large boulders, ditches which are contoured, or other features which are not characteristic of a good landing field.

There are many factors to consider in determining how long a field is needed on which to land an aircraft. When you are landing into strong wind on a level field, the distance needed for landing may be only a small fraction of the distance which would be required if you were landing down-wind. If you are landing on an upslope, the aircraft will decelerate rapidly. Try to select a field that is wide enough to allow you to correct for errors in altitude and distance by varying the base leg and the point of turn onto the final approach. Remember, an aircraft will stop in a much shorter distance if it is landed wheels-up. This eliminates the possibility of a nose-over because of the gear's digging in. *It is always good practice to land wheels-up on all forced landings unless you are over an established airfield.* If it is impossible to land into the wind because of low altitude or non-availability of a suitable field, then land cross-wind or down-wind.

DETERMINING WIND DIRECTION

You should always be aware of the direction

from which the wind is blowing. Wind direction can be determined in many different ways. Other than the wind indicators at an established field, best indication of wind direction is blowing smoke. If the smoke rises slowly and then drifts off, there is a very mild wind condition; however, if the smoke rises and then abruptly drops down close to the earth in a straight line, the wind velocity on the surface is fairly high. Grass and grain fields ripple in the direction of the wind. Dust is another excellent wind indicator. During inclement weather and high wind, cattle will normally stand with their tails into the wind. If you are unable to determine wind direction

by any of these means, use the direction of the wind at the time of take-off.

ELEMENTARY SIMULATED FORCED LANDINGS

An elementary forced landing is a proficiency exercise. It will prepare you to perform the necessary cockpit checks and procedures accurately and promptly before you make a 90° turn to a suitable forced-landing field.

There are definite steps and procedures to be followed in any simulated forced landing. Although these differ somewhat from the procedures used in an actual emergency, you should learn them thoroughly, and as you execute them, shout them out loud.

100-MPH glide

Change the fuel selector (check fuel pressure).

Gear and flaps up

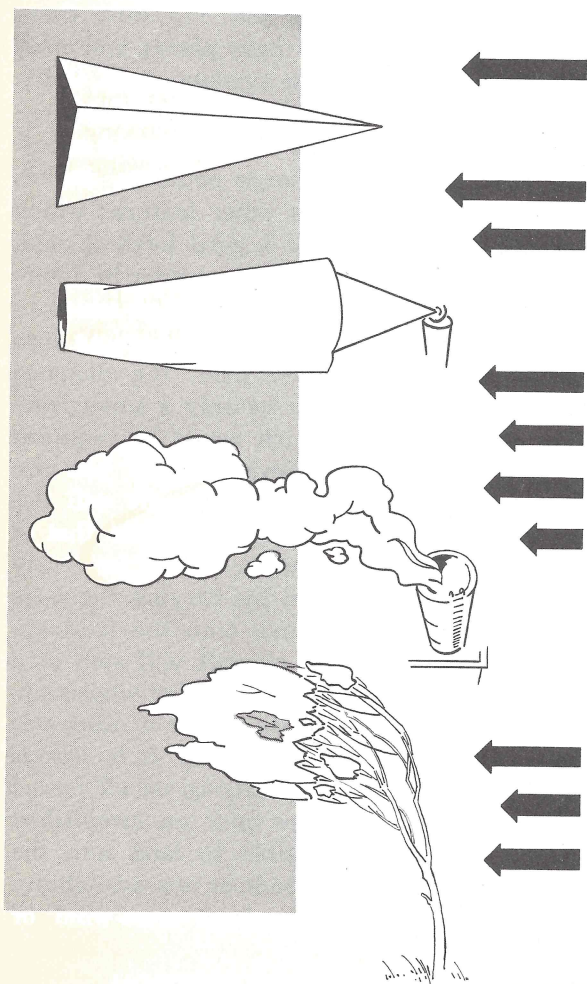
Mixture set on rich

Prop at full increase

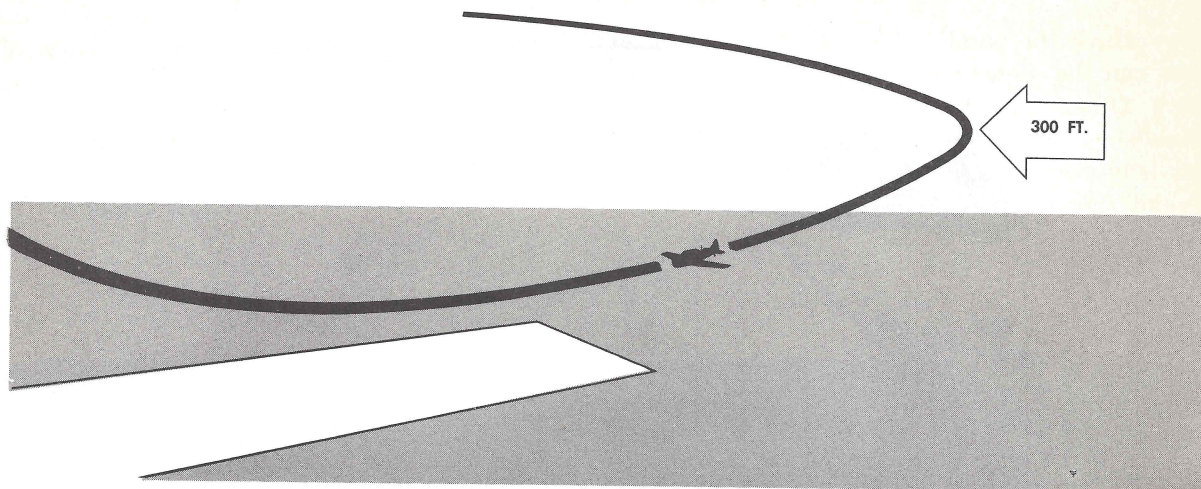
Canopy open

Shoulder harness locked

When your instructor calls, "Forced landing," if your airspeed is above 100 MPH, you should accomplish the above cockpit procedures while maintaining altitude and waiting for the airspeed to dissipate to 100 MPH. If, however, the airspeed is at 100 MPH or below, the nose of the aircraft must be lowered immediately to maintain a safe flying speed and the cockpit procedure must be accomplished during the glide. On your first few forced landings, your instructor will place the aircraft in such a position that you will be simulating a turn from the base leg to the final approach. After the instructor has set the aircraft up on the base leg, he will point out a field which you can easily make before he calls, "Forced landing." All that is required is that you accomplish the proper cockpit procedure and turn onto the final approach at the proper time. Maintain a 100-MPH airspeed throughout the final turn and final approach. If the turn on the final approach was proper, the gliding angle should give you the impres-



Observe All Wind Indications



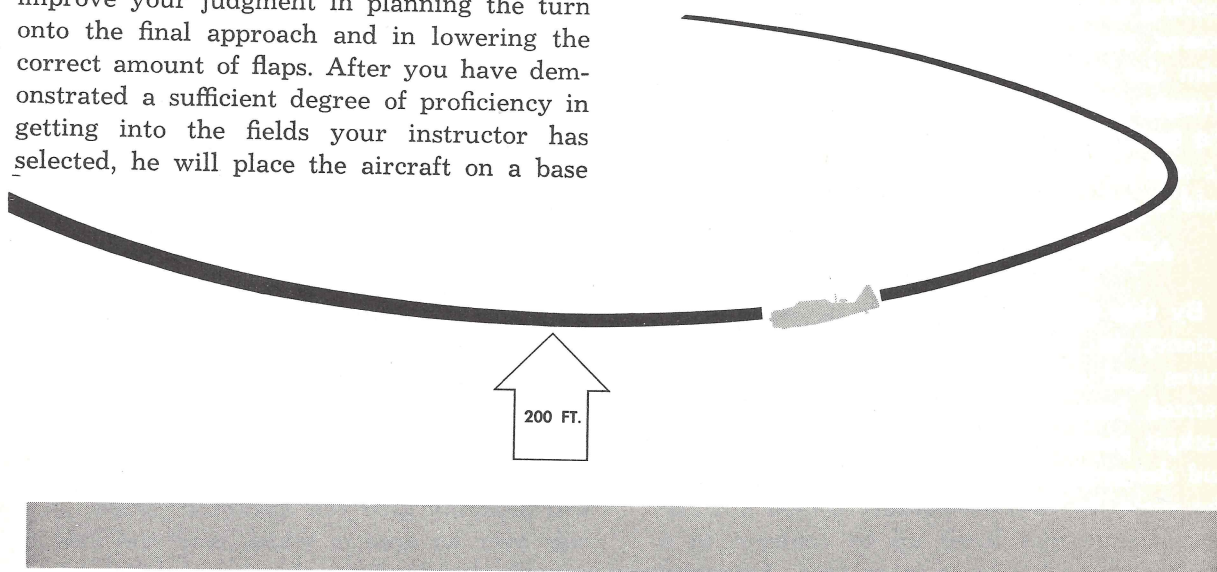
Complete Final Turn Not Lower Than 300' above Terrain

sion that the aircraft will land in the middle of the field. When you have determined this, call, "Full flaps." The actual use of flaps would cause the aircraft to land in the first third of the field. *Remember that you only call "Full flaps"; you do not put them down; you merely simulate using them.*

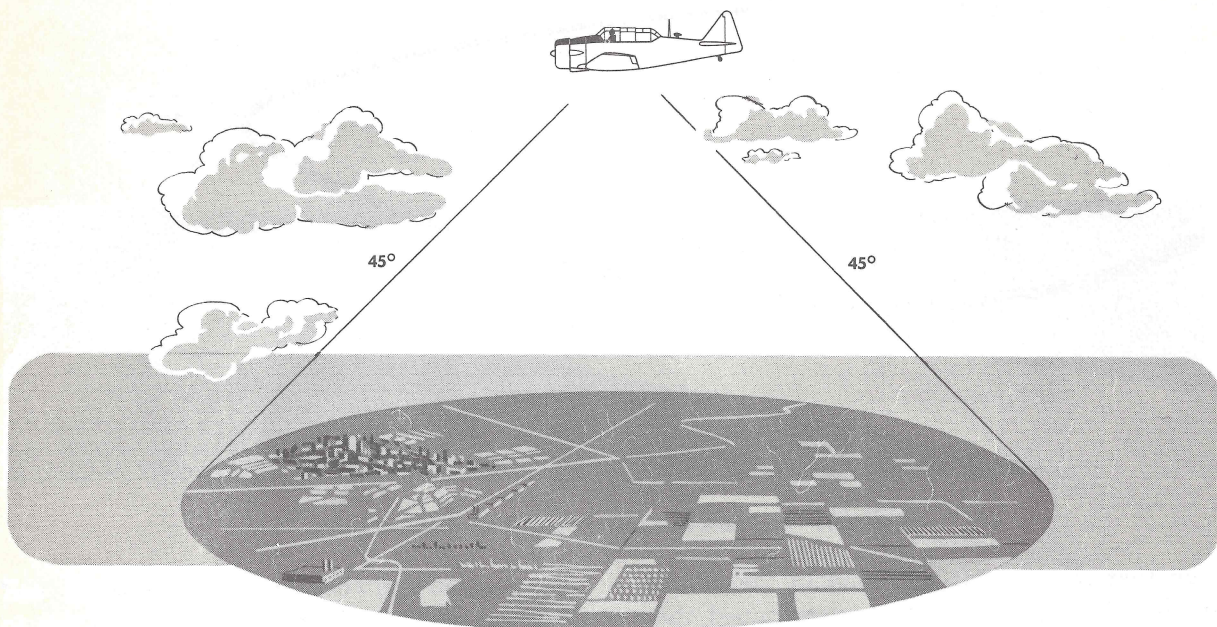
After several simulated forced landings, you should be able to determine how much wind is blowing from the amount of crab necessary to hold your track on the base leg. This will help improve your judgment in planning the turn onto the final approach and in lowering the correct amount of flaps. After you have demonstrated a sufficient degree of proficiency in getting into the fields your instructor has selected, he will place the aircraft on a base

leg position between several fields and call "Forced landing." Now it will be up to you to determine which field you can get into and from which direction the wind is blowing. Remember that if a field is within a wing tip's distance, it is usually within gliding distance of your aircraft.

During all simulated forced landings, your instructor will handle the throttle. He will keep the engine cleared for you and advance



Do Not Descend Lower Than 200' above Terrain



Select a Field within the Gliding Range of Your Aircraft

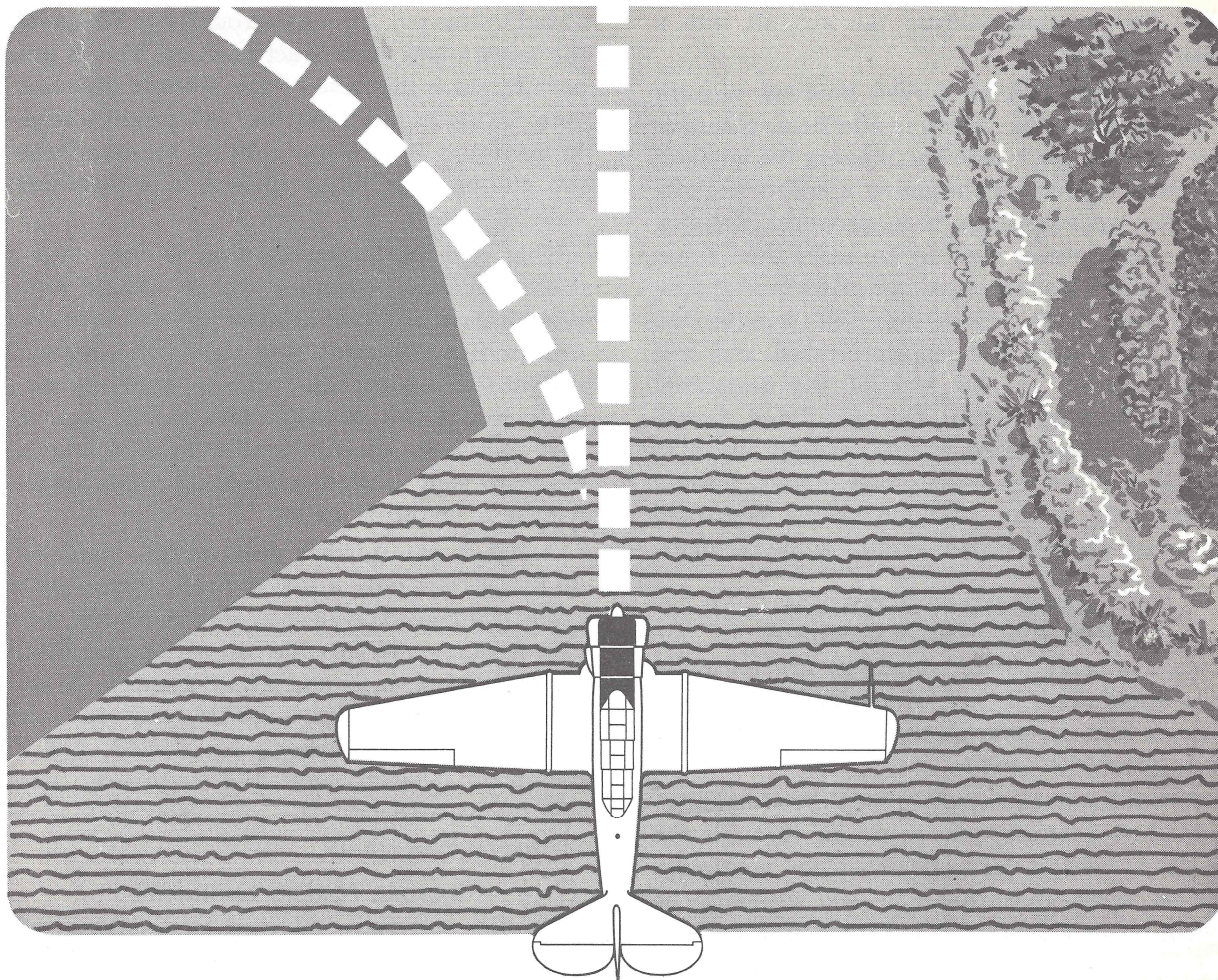
the throttle when the simulated forced landing is over. *The final-approach turn must be completed at least 300 feet above the terrain, and the aircraft will not be allowed to descend lower than 200 feet above the terrain on any simulated forced landing.* After the forced landing is completed and your instructor adds power, reset the propeller to 2000 RPM and trim the aircraft to establish a normal climb straight ahead until you reach 500 feet above the terrain. At this point make a normal traffic exit in the direction which affords the best field in case of engine failure.

ADVANCED HIGH-ALTITUDE SIMULATED FORCED LANDINGS

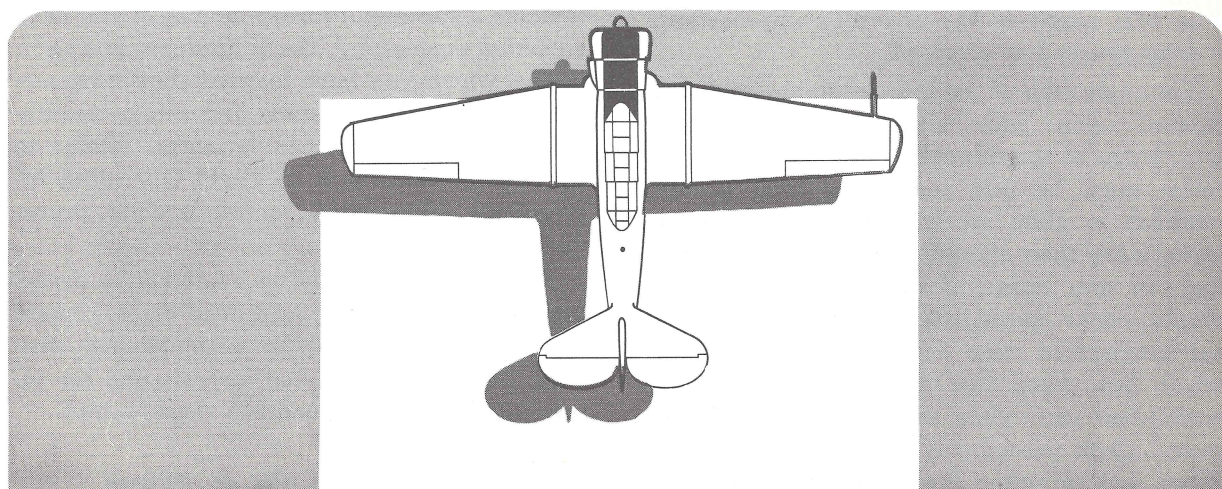
By this time you will have developed proficiency in elementary forced-landing procedures and will be ready to progress to advanced forced landings. Remember that the cockpit procedures, method of field selection, and determination of wind conditions remain the same. In your elementary forced landing, the aircraft was lined up to conform to a standard base leg for a given field. Advanced forced landings are usually initiated from high

altitudes from which you must plan an approach to a field of your choice from any direction or altitude.

During your first few advanced forced landings, maneuver the aircraft to conform with a modified 360° overhead approach, a 180° side approach, or a normal 90° approach. When your instructor calls "Forced landing" at a high altitude, go through your normal cockpit procedure, select the best field available, and proceed with one of the standard approaches that you have been taught. You must realize that the wind velocity at low altitudes may vary as much as 50 MPH from the wind velocity at high altitudes and may be blowing from a different direction. You must take this into consideration when maneuvering the aircraft to a point from which you can make a standard landing pattern. Keep your aircraft over the selected field. Do not let the wind blow you away from your chosen spot. Your instructor will probably give you advanced forced landings over an area in which only one field is suitable for landing, thereby making it imperative that you use the utmost judgment



STRAIGHT AHEAD OR A SLIGHT TURN. BE SURE THE
SELECTED LANDING AREA IS CLEAR.



Low Altitude Forced Landing

and skill in maneuvering the aircraft into a safe landing.

Remember that all forced landings require good judgment in selecting the field, planning the approach to a base leg, playing the wind on the base leg, and maintaining a constant glide. If your approach has been properly planned, you should never need to use more than a medium bank. During all advanced forced-landing practices, your instructor will handle the throttle to keep the engine cleared and will apply power at the end of the simulated forced landing. After the simulated forced landing is completed, climb straight ahead to 500 feet above the terrain and make a normal traffic exit in the direction of the best field in which another forced landing could be made.

ADVANCED LOW-ALTITUDE SIMULATED FORCED LANDINGS

Low altitude forced landings are normally associated with a loss of power immediately after a take-off and usually occur less than 500 feet above the terrain.

When your instructor calls "Forced landing" at a low altitude, you must go through the normal cockpit procedures with maximum speed. Remember that you will probably be climbing at 110 MPH when the necessity for a forced landing occurs, so you must immediately lower the nose of the aircraft to establish a 100-MPH attitude. *Any delay in lowering the nose will result in the aircraft's approaching a dangerously low airspeed.*

Your selection of the best available field will depend upon your altitude, position, and knowledge of the immediate terrain. Your decision must be fast and exact. You should establish a glide straight ahead and never make more than one 90° turn in either direction. *In any event, if an actual emergency should occur immediately after take-off, do not attempt to turn back to the field from which you have just left.* After you have established your glide attitude and completed your cockpit procedures, select a field slightly ahead and to either the right or left of your path. Do not attempt to select a field straight

ahead unless you have a thorough knowledge of the terrain and your exact position. This is important since the nose of the aircraft obscures your vision of any field that is straight ahead. In addition, it is very difficult to determine the gliding ratio when gliding long distances straight ahead.

This type of forced landing is very often caused by fuel starvation. *If you should happen to leave the fuel selector valve in a position halfway between two tanks, the aircraft engine will usually quit shortly after the aircraft leaves the ground.* This is the reason that the fuel selector is the first item you check in your cockpit procedures while establishing a 100-MPH glide.

An alert pilot always plans ahead. You will be flying from only a few airfields during your basic training. You should memorize the terrain features and suitable forced-landing fields off the end of each and every runway. If engine failure occurs on take-off, you may not have time to look around for a field; but if you have selected your spot previously, you will have saved precious time. You must plan for every eventuality.

ACTUAL FORCED LANDINGS

As you may have inferred by this time, all of the practice and instruction that you have had in simulated forced landings have been given to you for one purpose: to prepare you to make a successful forced landing if you have an actual emergency. The procedures and techniques which you have learned should be second nature to you by now and can be readily adapted to actual forced landings. (Refer to the "Pilot's Handbook of Flight Operating Instructions" for actual forced landing procedures.)

Your chances of making a successful forced landing will be greatly improved if you remain calm. The landing can be accomplished with very little damage to the aircraft and no injury to the pilot. Remember these points:

Remain calm.

Accomplish your cockpit procedures.

Select your field as you did in your routine.

simulated forced landings.

After you have selected your field, do not change to another one.

Plan your approach and follow your plan.

If time permits, attempt an air start.

Do you remember how you always aimed for the center of the field in simulated forced landings? There was a very good reason for teaching you that technique. *During simulated forced landings the engine of the aircraft is still idling with power. No matter how slight the power, it is still developing a certain amount of thrust. This thrust is sufficient to increase your glide ratio slightly. If you experience complete loss of power, the aircraft will not glide as far as it did with the engine idling under power.* Proceed with your approach and when you have the field definitely

made, lower the flaps an appropriate amount. *At slow speeds or because of internal failure, your engine may stop turning. When this happens, your engine-driven hydraulic pump is no longer operating and the emergency hydraulic hand-pump must be used.* A full-flap landing is desired because it reduces your stalling speed.

Since there is no hydraulic hand pump in the T-6G, the flaps could not be used if the engine stopped turning.

Make your landing in the same way that you would make a normal, three-point landing and just prior to touch-down, brace yourself forward against your shoulder harness. The aircraft will slide along on the fuselage for some distance after touch-down. After it comes to a complete stop, abandon the aircraft at once and leave the immediate vicinity.

Things To Remember

If you land into the wind, your touch-down ground speed is reduced by the wind velocity.

If you land down-wind, your touch-down ground speed is increased by the wind velocity.

Do not change your mind at the last minute about your selected landing field, because you may be forced to turn at a dangerously low altitude.

If your glide is too fast, you may overshoot the field; if it is too slow, you may stall on the final approach.

If you make a dangerously low turn, you may strike the ground in a banking attitude which could result in a serious accident.

If your cylinder head temperature gets below 100°C. during a simulated forced landing, inform your instructor immediately, because your engine may quit.

For safety reasons you must complete your final turn at least 300 feet above the terrain during simulated forced landings.

Do not go below 200 feet above the terrain on simulated forced landings.

Engine failure on take-off may be caused by fuel starvation. Check that selector valve.

Your first turn after a simulated forced landing should always be in the direction of another field in which a landing could be made.

You only call "Flaps" during simulated forced landings; never use them.

Your aircraft will not glide as far with complete power failure as it will when the engine is idling under power.

If your engine stops turning, you will not have any hydraulic pressure.

Always land wheels-up unless you are over an established airfield.

During an actual forced landing, do not put flaps down until you have the field definitely made.

After you complete an actual forced landing, abandon the aircraft immediately. There may be a fire.

Things To Remember (continued)

Just prior to touch-down on an actual forced landing, brace yourself forward against your shoulder harness. This safety procedure may prevent a neck injury that might otherwise ensue as a result of rapid deceleration.

NOTE: After the landing is completed do the following:

1. Notify the home station immediately by radio, telephone or telegraph (government collect).
2. Direct telephone calls to your group commander, telegrams to the commanding officer Field.
Give this information:
Place: Tell exact location and type of field
Cause of the landing
Condition of personnel
Condition of aircraft
Directions for contacting the pilot by telephone or telegraph.
3. Stay with the aircraft until you receive instructions or assistance.
4. If injured, enlist help to send your message and to guard the aircraft.
5. Do not leave until authorized by competent authority to do so.

