

EMERGENCY

Landing Tips



'Wishful thinking' is no substitute for reason when the chips are down. Discretion is the better part of 'valor'

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■ Once airborne, all pilots share a certain distrust of the ground, for it is in the inevitable reunion of plane and land that the fate of the pilot's tomorrows will be decided. That reunion, as reams of National Transportation Safety Board (NTSB) reports testify, can be an ugly affair. So the natural instinct for any pilot is to keep flying until he reaches an airport, and only then to descend from his secure haven in the sky. This instinct is true—most of the time.

Consider the plight of hapless Harry, chugging beneath an overcast with just enough fuel to reach an airport somewhere in the soup ahead. Harry realizes the dangers inherent in continued flight but winces at the thought of an off-field landing. He's faced with an unsavory dilemma, but choose he must. Instinct wins out, and Harry flies on into the thickening muck. Who knows—what with a good bit of luck, Harry may make his airport, land unscathed, and regale one and all with his seat-of-the-pants adventure. Then, too, Harry may end up

dead. So to Harry and those who would follow, we wish Godspeed. They'll need it where they're going, and one way or another they're going down.

Now let's turn to pilot Rooster Coghurn, a man renowned for his true grit. Faced with a similar dilemma, Rooster chooses to make an off-field landing rather than gamble his life for the sake of his Wichita flying machine.

That Rooster, and not Harry, acted rightly is backed by an NTSB study that notes, "Unfortunately, too many situations calling for a precautionary landing are allowed to develop into immediate forced landings when the pilot uses wishful thinking instead of reason . . ." A well-executed crash landing on a mountainside can prove safer than an uncontrolled touchdown at Dulles International.

Three factors undoubtedly surfaced in Harry's psyche to prevent him from biting the bullet as he should have done. First, he didn't want to get hurt. Who does? Second, he didn't want to bend his \$30,000 airplane. Expensive, especially when you still owe \$25,000 on it. And last, there was that old nemesis, instinct—knowing only the ground could do him harm, Harry kept flying for Valhalla Airdrome with little more than positive thought for fuel.

Let's face it, it does take an awful lot of grit, sometimes, to do what's right. A

pilot has got to be able to say, "It's doubtful that I will reach an airfield, and instead of inviting an uncontrolled crash, I am going to land my plane in those trees down there. The plane will probably be ruined, and I may get cut up, but if I continue flying I may get killed." Such a precautionary crash landing (or "tree landing" for the weak-hearted) is a very large pill to swallow, but it means a lot more toward survival than a crash, period. And living or dying is what emergency landings are all about.

All emergency landings fall into one of three categories: precautionary—a controlled landing when further flight is inadvisable; forced—landing when further flight is impossible; and ditching—either a precautionary or a forced landing on water.

Of the three, a precautionary landing is generally the least hazardous, because it provides the pilot with more time for terrain selection and the power to compensate for mistakes in judgment or technique. In a forced landing, the pilot takes whatever comes his way.

A common judgmental error is often made in determining just what is a suitable landing area. Traditionally, the concept is formed the first time an instructor pulls the throttle and the student begins looking for a grassy plain somewhere below for the simulated emergency landing. Pulled throttle—pasture below—again and again until "emergency landing site" and "pasture" become synonymous for the student,

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and nothing else fits the description. That sort of conditioning can be disastrous.

Quoting NTSB again, "Too many fatal weather accidents, classified as 'maintained VFR in IFR conditions,' undoubtedly resulted from desperate attempts to get through because the underlying terrain did not fit the pilot's mental picture of an emergency landing area." The fact is that in an emergency the nearest pasture may be 80 miles away, and a forest may be all the pilot's got to work with. Well, even a forest will do in a pinch. In fact, the NTSB study says, "almost any terrain can be considered suitable for a survivable crash landing" provided the pilot is in control and knows what he is doing.

If a hard landing is in the offing, the pilot should use anything dispensable to absorb the shock of the stopping process, because it's that deceleration force which can kill. In terms of the aircraft itself, wings, landing gear, or fuselage bottom can be regarded as expendable, shock-absorbing items. In terms of terrain, vegetation, trees, and even man-made structures may be used to absorb the shock. Crops such as corn or grain are almost as effective in bringing an aircraft to a stop with repairable damage as a runway arresting device. Brush and small trees provide considerable cushioning and braking effect without destroying the plane.

The only essentials in an emergency are the living and that which protects them. All other matter is expendable. Thus, of primary concern to the pilot during the landing is keeping the cabin area relatively intact and the occupants restrained. Though the number is growing, few lightplanes currently have shoulder harnesses. Therefore, nose-first impact against solid obstacles should be avoided to minimize the danger of passengers' "jack-knifing" over their seatbelts and slamming their heads into the control panel or seat backs.

The overall severity of the deceleration process is governed by groundspeed and stopping distance, with the former being the most critical factor. If the groundspeed is doubled, the total destructive energy is quadrupled. For example, it is three times more dangerous to crash at 104 knots than at 60 knots. Consequently, the pilot should use everything at his command to slow the aircraft to the minimum *controllable* airspeed before touchdown.

The stopping distance is directly related to groundspeed; when the deceleration forces are spread evenly over the landing area, very little stopping distance is required. If the crash deceleration takes place at a uniform 9 Gs—a force under which most general aviation aircraft will still protect occupants—a plane touching down at 50 mph will stop in 9.4 feet. If touchdown occurs at 100 mph, however, the stopping distance quadruples to 37.6 feet.

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the wind prior to tree contact, full flaps in use and gear down. He should try to "hang" the plane in the trees, in a nose-high attitude, while still at minimum controllable flying speed. Trees best suited for such a landing are low, closely spaced ones with dense crowns near the ground. Tall trees with thin tops allow too much "free fall" after contact.

Mountains. Mountain or hill landings should be made upslope, if possible. When landing is being made on a pronounced upslope, enough speed should be maintained to flare from a descending flightpath to a climbing one just before touchdown.

Water. The fear with which some water-shy pilots regard ditching is not necessarily merited. True, the plane will sink eventually, but a fixed-wing aircraft that is ditched at minimum speed and in a normal landing attitude is not likely to sink like some leaden rock. Wings and fuel tanks should buoy the aircraft for at least several minutes, which is time enough for escape. Although the cabin of a high-wing plane may quickly submerge, it will be just below the surface of the water, initially, and the wings will help maintain that condition for a short period of time.

Since a wide expanse of smooth water can cause a loss of depth perception, when making an approach for a ditching the pilot should drag the plane into the drink when possible. If the plane is a low-wing type, no more than intermediate flaps should be extended. This lessens the possibility that one or the other flap may give way as a result of water resistance, causing the aircraft to slew. Retractable gear should remain up.

Prior to ditching, the pilot would be well advised to consider the water temperature, proximity to land, availability of flotation gear, and physical condition of his passengers. Additionally, he must insist that all passengers remain in place until the plane has come to a complete stop. This is to ensure impact protection and prevent disorientation with respect to the nearest exits.

Snow. If the emergency landing is to be made on snow, the same "drag-in" principle used in ditching on water should be applied. Again, a loss of depth perception can be anticipated through "whiteout." The pilot should also be wary of any pronounced snow-covered humps; these may hide large obstructions and should be avoided.

Trees, creeks, mountainsides or snowbanks—almost all can be viewed as Mother Nature's unimproved landing strips. But regardless of the terrain, an emergency landing's success hinges primarily on the pilot's control over the aircraft and himself. He must first admit he is in serious trouble and then do something about it, immediately, even if that means the virtual destruction of his plane. A pilot can always buy another airplane, but tomorrow has never been for sale. □

