# Be Kind to Your Nosewheel

## Landings are easier than with tailwheels, but carelessness can get you in as much trouble


by ALAN BRAMSON

■■ In the days when all aircraft, big and small, were taildraggers, the landing demanded great skill of a pilot, first to get the plane on the ground gently and straight, and then to avoid the always incipient groundloop.

Then the nosewheel came into general use and the groundloop became a thing of the past. Landings—and roll-

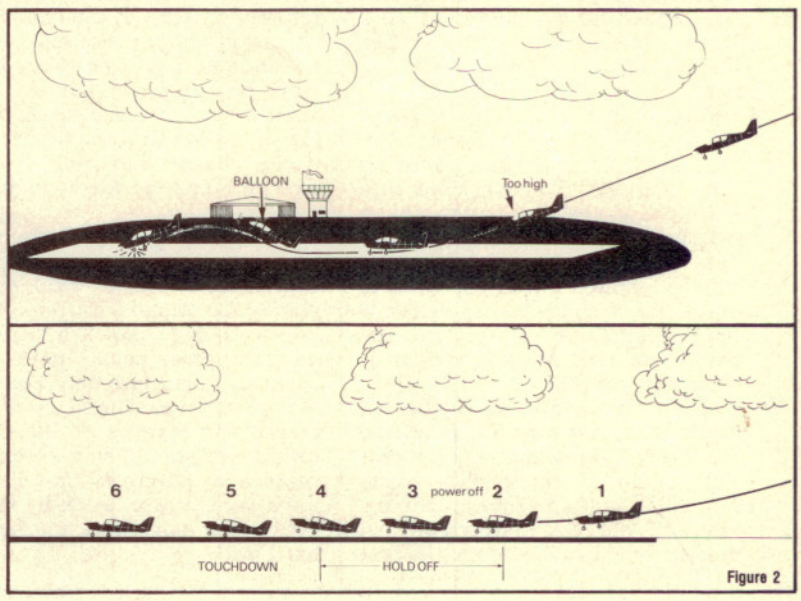


Figure 2

*The effects of "too fast and too high." Pilot lands too far down the runway touching down at high speed. A bump on the runway or a little back pressure on the elevator control can easily cause a "balloon" (lift-off). Speed then rapidly decreases and a heavy landing, nosewheel first, is the result.*

*The right way to do it. This shows the first quarter of the runway only. Note the correct positioning of aircraft 1 during roundout, followed by a progressive hold-off (2, 3 and 4). When at low speed, a touchdown occurs on the mainwheels only (5). Brake should not be applied until the elevators can no longer hold up the nosewheel and it makes contact with the ground.*

outs—became easy. But people got lazy. Since finely tuned skills were not so critical anymore, landing techniques became sloppy, pilots drove airplanes into the ground rather than landed them—and they started busting nosewheels.

Hang around your local airport and watch the light aircraft landings for these three common faults: partial flaps only are used; there is no hold-off, the aircraft touches down on all three wheels simultaneously; and, many aircraft land at least a third of the way down the runway.

The first fault was covered in "To Flap or Not to Flap" (PILOT, April) and it will suffice here to say that misuse of flaps has a bearing on faults two and three. Failure to hold the airplane off is a two-fold evil—the aircraft touches down at a needlessly high speed and, because altitude and speed are closely related, it usually arrives on all three wheels or, worse yet, touches down on the nosewheel first. The latter can lead to a balloon-stall-bounce, with the second contact on the nosewheel more of a shock on the nosegear structure thanks to the hammer effect of the heavy engine helping to pound the nosewheel onto the pavement. You may come away from a gentle rendition once or twice, but metal fatigue will eventually catch up with you and, if the gear doesn't collapse during a hard landing, it might give up when you're not even punishing it.

Fatigue stresses are not confined to the landing. The same bad pilot techniques are often to be seen during the takeoff, when no attempt is made to relieve weight from the nosewheel as soon as directional control is established. The result? A compulsion to keep the nosewheel in firm contact with the ground means that on anything other than a smooth runway the front strut takes a beating from rough ground below and the hammer reaction of the engine and its propeller.

In extreme cases, excess forward pressure on the elevator control can lift the mainwheels off the ground, allowing the aircraft to continue the takeoff run on the nosewheel alone. One only needs a crosswind to assist torque reaction and slipstream effect for the aircraft to start pivoting around its front wheel. Such a phenomenon is known as "wheelbarrowing" and, unless one is quick in getting the mainwheels on the ground again, the situation can get out of hand.

People are rarely hurt when the nosewheel assembly collapses, but a surprising amount of damage almost invariably follows such an incident. Not only is there the cost of the nosewheel assembly itself to consider but it is not uncommon for the firewall to distort.

The propeller is bound to be bent, possibly beyond repair and, since the


*By applying techniques to minimize structural shock to the nosewheel, the pilot can reduce the likelihood of the embarrassment—and cost—of a collapsed gear.*



stresses and hammering travel up the blades to the crankshaft, the engine will have to undergo a shock load check which could reveal additional serious damage. Then the engine cowlings and the prop spinner will most likely need attention so, one way or another, the busted nosewheel can be surprisingly expensive.

What can be done to cut down the number of these futile accidents? Clearly there must be a new awareness among pilots that the little wheel up front has to be treated with consideration. If I were asked to draw up a poster for a "Be Kind to your Nosewheel Week" this is what I would say:

**While Taxiing**

- Avoid ruts, holes, rough edges or bad junctions between taxiways and grass.
- Never brake sharply; this throws the aircraft forward onto its nosewheel.
- Hold the wheel aft of neutral while taxiing unless there is a strong tailwind, when it should be allowed to go forward a little. In this way weight will be removed from the nosewheel. This is particularly important while taxiing on soft ground.
- When you stop at the holding point for an engine runup be sure the nosewheel is straight before putting on the parking brake.

**During Takeoff**

- When you are certain the aircraft is running straight, ease back on the control wheel just enough to get the weight off the nosewheel. You can actually feel the reduced strain up front.
- Know the correct liftoff or "rotate" speed for your aircraft under various conditions (partly or fully loaded, without takeoff flaps or, when it is recommended in the owners/flight manual, with flaps).

**During Landing**

- For a standard engine-assisted approach, lower partial flaps on the base leg, reduce speed to that recommended for best glide performance, add 1,400 to 1,600 rpm (according to aircraft type) and retrim.
- On final, reduce speed 5 to 10 knots below best gliding speed and on short final, lower full flaps (unless there is a significant crosswind when usually it is best to limit flaps to about half or two-thirds maximum). Since the aircraft is now slightly on the back of the drag curve it will be possible to control the descent path to fine limits and so arrive over the runway threshold at an ideal height for the roundout.
- After the roundout (and not before) ease back the throttle to the idle stop and keep the airplane flying by progressive and gentle back pressure on the control wheel. The aim is to delay landing until the aircraft is in a tail-down attitude.
- Because the center of gravity is ahead of the mainwheels, there will be a natural tendency for the aircraft to pitch onto its nosewheel on landing. Apply back pressure on the elevator control and hold up the nosewheel for as long as possible.
- As the aircraft decelerates and the elevators or stabilator run out of power, the nosewheel will lower onto the ground. Then, and not before, the brakes may be used to halt the aircraft. The control wheel should be held back all the time.

By adopting this method, touchdown speed will be low, the nosewheel will be kept off the ground until there has been a further decrease in speed, the risk of nose strut damage is more or less eliminated and your tires will last longer. And—your insurance company will be happier, too. □