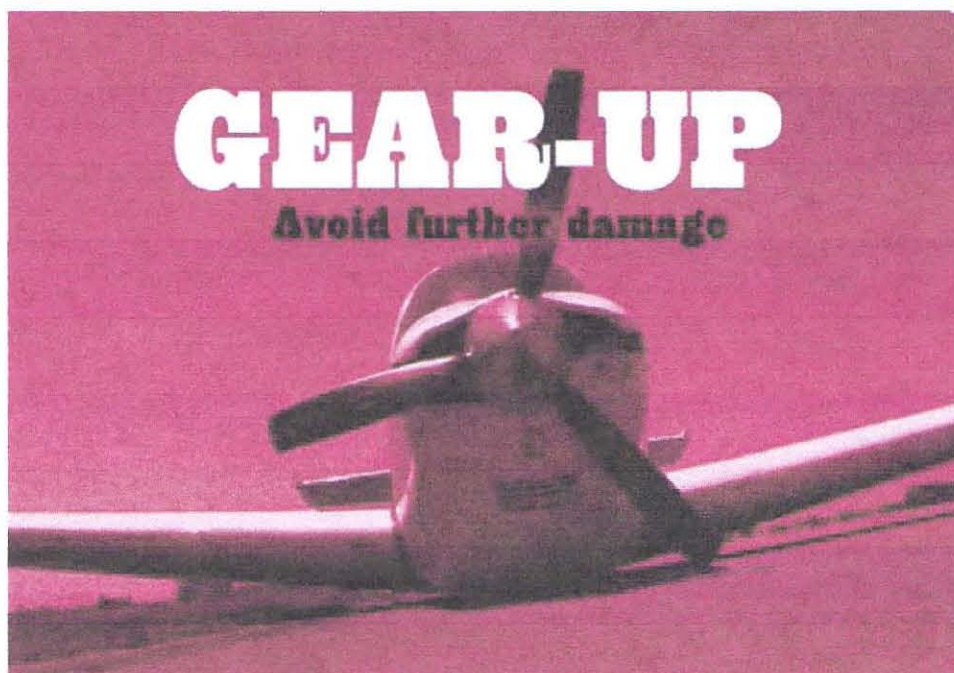


## GEAR-UP Avoid further damage

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There are two groups: Those who have and those who haven't—yet. In August 2004, I switched groups. Apparently, I'm in good company, or at least it's crowded company.

There was a crop duster working off the end of the runway at an uncontrolled field and he kept passing over the runway threshold. I became distracted and as a result made a very soft, flaps-up, gear-up arrival.

It was weird. As I touched down and the prop ticked to a stop, I calmly thought to myself, OK, you've done that... now just keep it straight and don't make it any worse.

Amazingly, it slides a lot farther than one might think. From touchdown to stop was about 1,000 feet on the asphalt.

While the dust welled up around the airplane, I shut off the battery master. I noticed that my good friend Tom Gresham, host of the *Wings to Adventure* television program, was hoofing it across the grass, heading my way.

I was glad—and distressed—to see my friend. As he approached, he hollered, "Hey, wanna do a segment on gear-ups?" (No pleasantries are required between good friends, right?)

"Why not," I fired back. "It looks like I've created a good opportunity."

Within 10 minutes of me messing up a perfectly good airplane, Tom's camera was rolling. The video of how we got her back on her feet can be seen in Episode 21 of *Wings to Adventure* and the photos with this article are courtesy of Tom.

### Avoiding further damage

The biggest risk to an airplane suffering a gear-up isn't the damage from the slide. It's what can happen if the wrong action follows. There have been many airplanes destroyed, or at least more severely damaged, during the attempt to clear it from the runway.

If at an uncontrolled field, first call Flight Service and Notam the runway closed due to vehicles on the runway. Tell them you will call them back as soon as the runway is clear.

Remember that you are in control. Do not relinquish control unless it is to someone of your choosing. Not the police, not Fire & Rescue, not the airport manager and, God-forbid, not the airport know-it-all. That is true at a towered field as well. You might relinquish control to someone who will destroy your airplane in short order.

In my case, an excitable airport employee called Flight Service and said, "Close the airport, there's been a crash," and hung up. That started a chain of distracting events. I politely told the FSDO gentleman who called that no one was hurt during a simple gear-up, and that I didn't have time to talk to him but would call him back when I could.

He aggressively insisted that he was in charge now and that I had to answer all of his questions—right now. I immediately confirmed that I was the PIC and that I was in charge and would remain so until the airplane was off the runway. I politely terminated the phone call. (A supervisor at the FSDO later apologized for his employee's improper approach.)

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Now that you're in control, how are you going to get your formerly beautiful airplane back on her legs? Don't make a bad situation worse. Do not push it off of the runway—especially backwards.

A gang of folks at one airport—led by an FAA employee and the local airport know-it-all—ran out in mob-mentality haste and pushed a friend's Bonanza backwards into the rain-soaked grass. As soon as the step dug into the mud, it twisted the fuselage and buckled the flaps and flap tracks. That pilot had given up control and had a bigger problem than he'd had 30 seconds before.

### Methods of lifting

Lifting any airplane can be completely nondestructive or can ruin the airframe. Your first choice is a set of air-bags designed to lift the airplane under the broad surfaces of the wings and tail and spread the stress over a large area. The airplane is lifted gently to a height that allows the gear to be lowered. The airbags are then deflated—no muss, no fuss. This is the method of choice. Unfortunately, airbags aren't often readily available, but it's worth asking.

Relatively light aircraft have been lifted by a whole host of helpers who reach under both main wings, toward the spar and a few guys under the tail, simply lifting. I remain skeptical of this method, but if it's your only choice, be certain that no one lifts on anything they shouldn't. Be in charge; direct all actions. Tell each person, individually, where to be and how to lift. Assume nothing.

Hoist-lifting generally ends up being the common option. A set of hoist straps around the wings is guaranteed to ruin the airplane. Don't even think about it. Many mechanics have hoist-lifted airplanes by the crankshaft right behind the spinner. Some have even done so without

hurting the airplane, but I consider it a suboptimal approach for Bonanzas for two reasons.



The forward hoist point is directly around the firewall. The aft hoist point is around the station behind the step. Both sides of the hoist straps leave the airframe vertically so as not to place a squeezing force on the airframe.



Place main jacks under the jack points as soon as the airplane is high enough.



Notice that there is no tail stand. A couple of helpers simply balanced the tail in place for the few minutes it took to get the gear down and the jacks lowered.

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First, the lifting arm is long, it puts a lot of stress on the engine mount tunnel and firewall, and it can place significant stress on the empennage where the structure is not designed to withstand that rocking angle of force. Second, it will almost certainly damage, if not ruin, a Bonanza's nose bowl.

To help you resist this apparently obvious, single-hoist method, call Raytheon and price a replacement Bonanza nose bowl. There are other reasons not to do it this way, but they pale in comparison to the two above.

1-2-3, lift!

Use the airframe's strength to your advantage. Two of the strongest parts of the Bonanza fuselage are the C-beam runners that go down the belly from about halfway along the engine mount tunnel all the way to the station right behind the step at the aft baggage bulkhead. These C-beams, along with others in the center belly, give the structure a lot of its strength.

Lift the airplane by using the inherent strength of the structure as the Beech engineers designed it. We decided to lift at the firewall, since it is very strong and the skins would not buckle there, and at the station right behind the step for the same reason. That would anchor all of the lifting forces between the strength of the airframe and balance some of the weight of the engine forward of the firewall strap. This would take stress off the tail and require two hoists.

The forward straps cover the aft ends of the nose gear doors, but this was not a problem since we planned to put the airplane on jacks as soon as possible to ensure stability. We placed the straps and made certain they would stay put. A line was tied from the step to the aft strap to keep it from slipping aft.

Positioning myself between the hoist operators where both could see me—with each hand indicating thumbs up to go up, thumbs horizontal to hold position, and thumbs down to go

down—I signaled each operator what he needed to do. The result was an uneventful and fully coordinated vertical lift.

Lifting halted as soon as the airframe was high enough to place the jacks under the jack points. With the main jacks positioned, I stood so both hoist operators could see me and gave the thumbs down and the airplane gently came to rest on the main jacks.

There's very little force up on a Bonanza tail when the airplane is on a pair of main jacks and it's easy for a couple of guys to balance it. It was not yet high enough to lower the gear, but the airplane was steady and safe; so the straps were removed and the hoists backed away. The jacks were then raised, the gear lowered, and the jacks removed.

Since there had been no gear failure and the gear was up in the wheel wells, there was no need to secure the gear to keep it from collapsing. The airplane could now be towed normally. The only damage had been caused by the failed biological interface to the gear lever before the touchdown.

#### Gear-up actions

1. Turn off the master
2. Notam the runway closed
3. Maintain control
4. Choose lifting method
  - a. Airbags
  - b. Hoist
  - c. People
5. Secure the gear
6. When clear, Notam open
7. Call your insurance agent
8. Ferry permit

#### Follow-up options

Many gear-ups result in the pilot reaching over to lower the gear handle during or right after the touchdown. This results in much more damage and you're better off admitting that you forgot than making matters worse by lowering it. Something not yet broken will get broken. If that happens, you will need to secure the gear from potential collapse across its links before you tow it. If you must then ferry the airplane, do so with the gear down and braced into this position.

Call your insurance agent and tell them what happened and that the airplane is safely off the runway. They'll advise you what to do next.

If the airplane is to be ferried, it will require that the crankshaft be inspected for sudden stoppage damage, a ferry prop placed and a ferry permit acquired from the FSDO.

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A gear-up is not considered a reportable event unless there are injuries or major damage beyond that normally endured. Since you're a stand-up individual, you might as well admit what happened to your pals. They're going to find out anyway and you might as well get your story in first!