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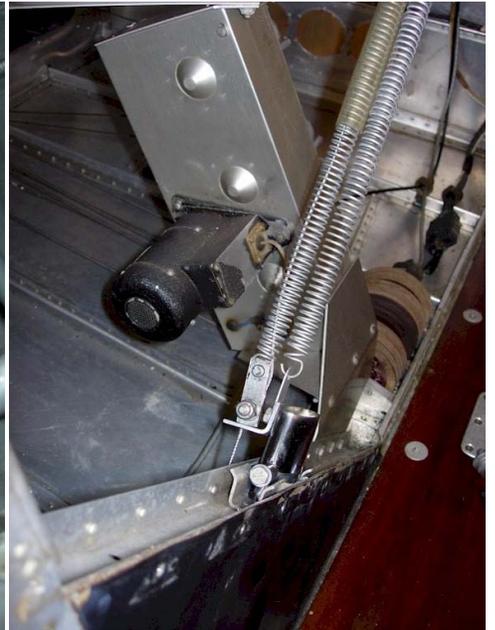
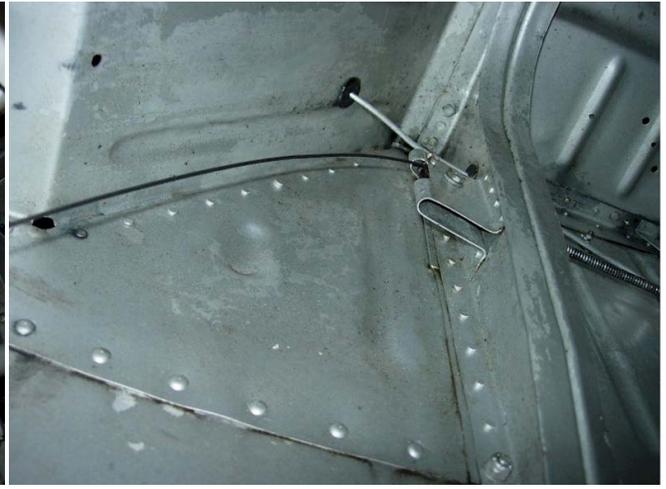
CSOB1 Picks

TBD

▶ Bonanza Retractable Step Details (by Beech lister [Doug G.](#))



The "frangible" link shown above is Beech PN: 35-410434



Here is Doug's detailed pictures and descriptions of the Beech retractable step design below



Close up on the connection to the nose strut (note the dog bone shaped frangible link). This link is designed to break should something bind in the step retract system so the gear can come down. The cable has a swaged ball end that connects to the frangible link with an SA 362 fork end (partially covered by the black tube) and clevis pins secured with cotter pins. The black tube is shrink tube and keeps the cable from getting tangled on the nose gear and ruining your day. I believe the addition of this piece was a Service Bulletin years ago.

Cable info:

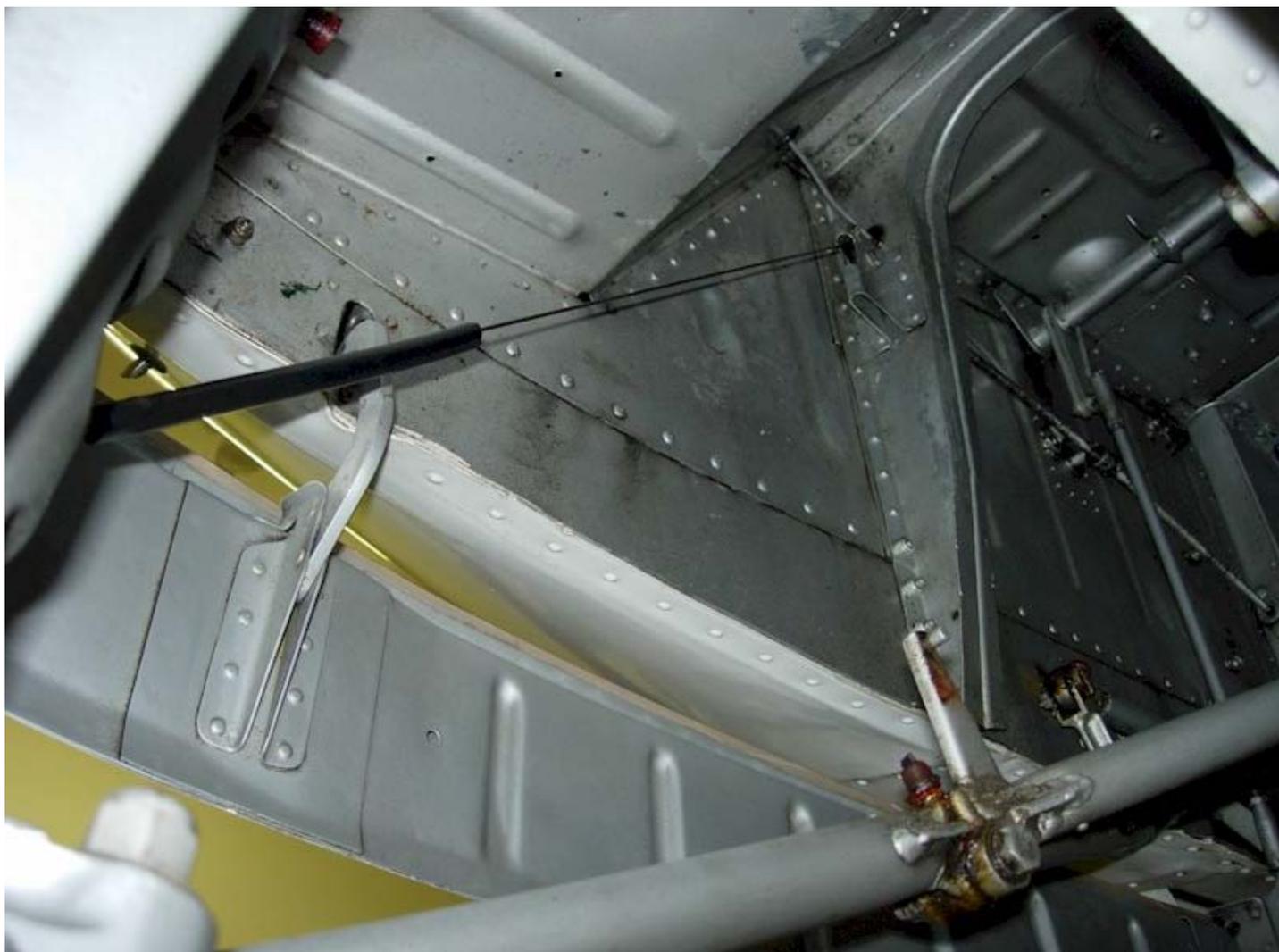
Cable: 1/16 dia. 7 X 7 strand stainless steel or galvanized steel control cable, 14 ft. long. (This will allow at least 6 in. extra length.)

Either a MS20664C-2 ball with single shank or a MS20663C-2 ball with double shank is to be swaged on one end of the cable,

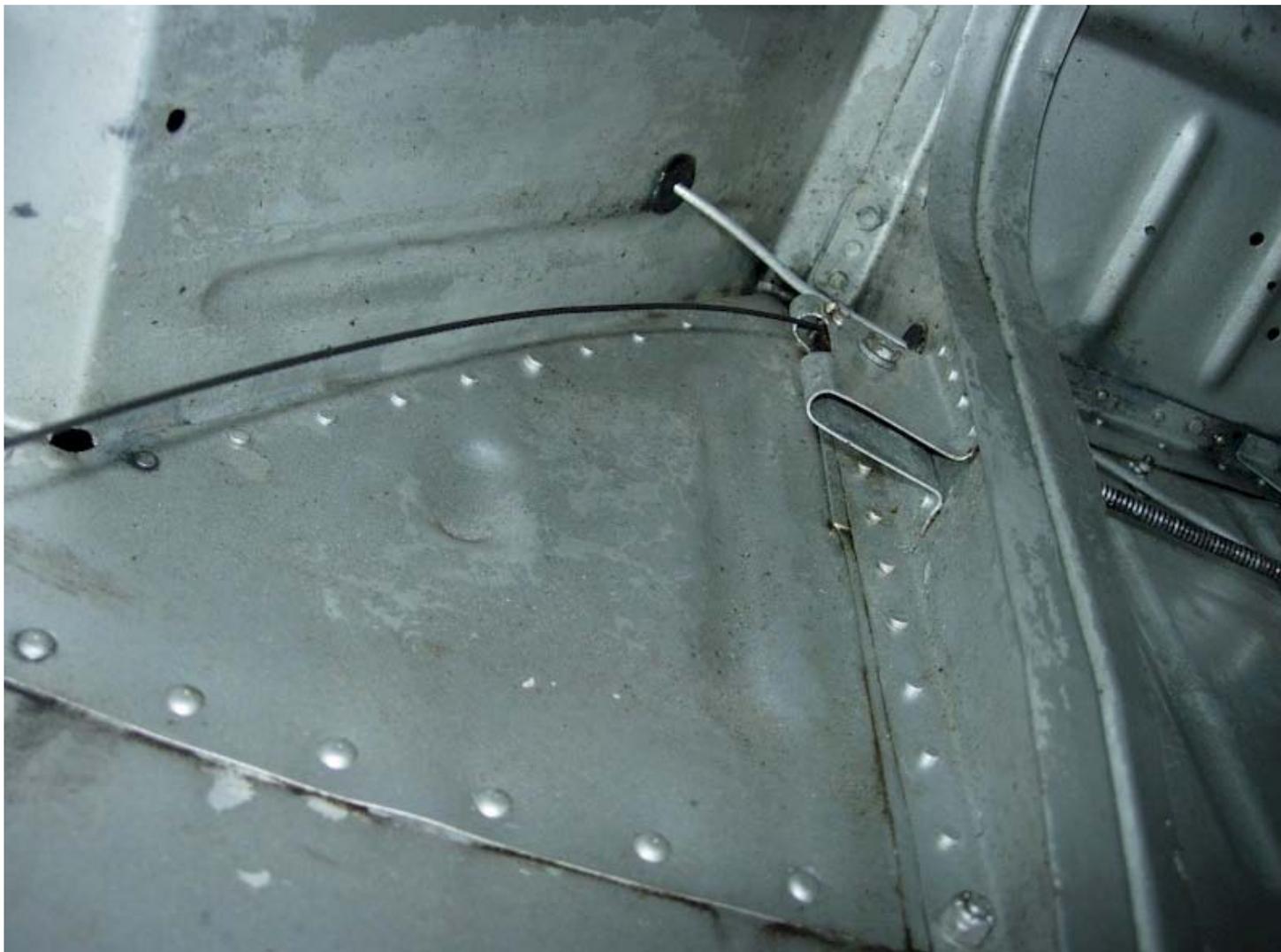
(For 13 cents more, I prefer the double shank ball as there is more swage length. Either will fit into the fork end swivel fitting.)

The 1/16 fork end swivel fitting is SA 362-2. (Old one reusable if in good condition.)

The swivel fitting is attached to the safety link and the safety link to the nose gear with flat head clevis pins AN393-7, cotter pins AN380-2-2 and washers AN960-10L.



The cable goes from the nose strut over a pulley mounted to the bulkhead in the tunnel.



The pulley rides on the bolt shown in the aluminum bent in the deep "U" shape. There is a pin (secured with a cotter pin) forward and above the pulley to keep the cable in the pulley groove. Be sure the cable is UNDER the pin. When replacing the cable it is a good idea to remove and check the pulley (AN210-1A) in the nose well at the same time.



On the other side of the pulley (and bulkhead), the cable goes into the housing. Be sure it goes in square to prevent chafing and eventual cable failure. This is where the cable is fed through to the back. This is one case where you can actually push a rope (if only a few inches at a time). I have found that tinning the end of the cable without the ball with a large soldering iron and filing it to a point is helpful in getting it to slide smoothly into the housing. It also keeps the strands of the cable together at the end. If the housing has years of oily goop in it, you will have a tougher time. If that is the case, you will have to pull up the floorboards to remove the cable housing <no grin>. If your airplane is one that does not have a continuous housing you WILL have to pull up the floorboards.



The cable comes out of the housing behind the bulkhead and parallel with the step. The step has two rollers that fit in the "U" shaped channels that act as the stops to keep the step from coming completely out (this one is not all the way extended). You can see the cable coming up through the "L" bracket and then between the clamping pieces. The bolt has a hole in it to allow the cable to pass through. My understanding is that this hole is a feature added to the kit by the owner <wink>.



These are the springs that are part of a Beech kit to eliminate the bungees that eventually fail and dent the fuselage in the upper right corner. If you don't want to pay Beech prices, the springs are most likely available at the A/N section of Home Depot where they have springs for screen doors.

Thanks Doug! That was an awesome write up of the retractable Bonanza Step Cable.



Here is a narrative from Bonanza Owner Larry G. that describes how he replaced his step cable:

I broke a boarding step-extension cable a few years ago. I went to a local business, Delta Cable, and had a new cable made. It was nothing more than 1/16" twisted-strands steel cable with a ball swaged onto the end. I got stainless. I got it way too long on purpose. I tinned the "bare" end with solder to keep loose strands from catching in the cable housing as I fed it through. Starting from the nose gear tunnel, feed the tinned end over the little pulley and into the end of the cable housing. It's pretty much a straight run to the where the cable housing goes past the rear cabin bulkhead. That's where the "inner" cable caught and would not go the final 7 or 8 inches because the housing bends upward. I removed the aft end of the cable housing from its attach point so I could lay it out flat toward the tail cone. Yes! The cable went the rest of the way through. Reattach the aft cable housing end.

Figure out a way to hold the step extended. I cut a full length slice out of an 11" long piece of 2" inside diameter ABS plastic pipe (leaving a C-shaped section when looked at from the end of the pipe). Pull the step out and slip the pipe over the shaft of the step. I cut the pipe a little short, so I could adjust step extension with shims (electrical tape over the end of the pipe). Secure the forward end of the cable to the nose gear leg (don't forget the shear link!!!). The attach point is a lug held onto the nose strut with a nut. I think it's easier to assemble the cable end & shear link hardware to the attach lug, and THEN poke the attach lug through the gear leg and install the nut on the lug's threaded end.

Loosely attach the aft end so that, with the gear down, the step is almost totally extended. You want about 1/8" to 1/4" of extension travel level left when the step is extended. Enough that the cable is held in tension by the step retraction springs only - not stretched because the step is all the way down before the nose gear is all the way down. But, don't leave enough margin that the step moves too much when you step on it. I can see someone put their weight on the step and suddenly it extends another inch. The person's foot could easily slip off the step and their skull dent your flap and bloody the ramp.

As I said, I did this a few years ago. Then last week, during a gear swing while on one of Linn Kastan's awesome Beech jacks, the swage failed and the step sprung to the retracted position. Startled the crap out of me. I figured the shear link had broken, but it was intact. I found the swage ball on the floor. The guy at Delta Cable took a look at it and said that whoever did the swage, didn't crush the ball on well enough.

Unfortunately, the forward end of the cable went into the end of the housing and I could not pull it through to attach a new ball (which would have been difficult, anyway, with the cable still in the airplane. The end where the ball had been also unraveled a little, making it hard to pull the cable out from the aft end. But, I pulled harder and it came out.

Delta Cable made me a new cable. \$6.31, including a better swaged end. I will install it next week. If you need, I will take some pictures of the attach points in case you have difficulty figuring out how the thing attaches. The front end is pretty easy to figure out. The back end is odd because the 2 springs do not attach to the same pieces of hardware on both ends.

When you have a cable made up, anything larger than 1/16" won't fit in the housing and the next size smaller (3/64") might not be strong enough.

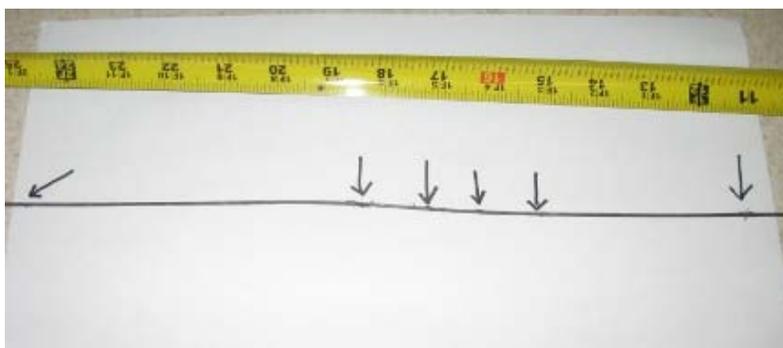
If you can't feed the cable through the housing, you're somewhat screwed. Getting to the old housing to remove & replace has got to be a total PITA. It runs along the belly under seats & floor boards and goes through access holes in the spar boxes. It goes under the aileron cable system. I was hugely relieved when I was able to thread the new cable through the old housing.

Larry

Here's a pirep from retractable Bonanza step owner Al D., on his cable woes:

I felt a slight fray once so for the last few annuals I've been watching the step cable. With the recent thread about the step cable being brought up, I figured now is as good a time as any, so out she came. If

you take a look at the pic you'll see a number of frays pointed out and the tape on top shows the distance from the front end, where it's swedged. Probably the 4 closest (15-18) were at the pulley when the gear is extended. The 11.5 may be when the gear is retracted and the 24.5 was definitely inside the housing!



For S's & G's I called for a price and they were about \$110, waaaay too much for \$7 worth of parts, so I'll have a cable place make one up for me and let my IA determine if it's airworthy, or stepworthy if you prefer. After measuring, 14 feet is plenty long. The swedge is the important part of the equation.

Thanks for the prep on the length All! 🙌

Doug's C Model Bonanza earned him a Lindy! Way to go Doug!



Visit Doug's award winning C35 Bonanza Album [HERE](#)

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