

Beech on a Budget

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By Mike Caban

Baron Engine Control Cable Replacement

It pegs the difficulty meter.

This year's annual on my B55, serial number TC-971, addressed a couple of major items: the right engine's fuel system, right engine hoses, and both engines' mixture and throttle control cables. With about 1900 hours on the great-running factory reman IO-470Ls, it was time to invest in bringing the circa 1999 fuel system and hoses up to a "new" standard. Last winter the mixture control cables had been showing signs of tightness at temperatures under 50°F, and on one occasion the force necessary to move them caused one of them to shift in its locking block (inside the cabin) resulting in something less than full rich at wide open throttle. They were not going to survive another winter! The shame of these cable designs is that they only delivered 49 years/5,000 hours of service. But seriously, in my opinion, with that kind of service it did not owe me another hour.

As background, in 2007, at about 4,200 hours airframe total time, the prop control cables were binding up at about 50°F and below. They were replaced in conjunction with a top overhaul of the right engine at that time. Under my IA's supervision we tackled the prop cables. The biggest mistake made was not changing all six cables. After experiencing the prop cable change-out, I began dreading the day when the next four cables would reach their end of life. Fast-forward seven years...

Let me tell you, changing engine control cables in a Baron is the most painful and tedious project that I have tackled in 10 years of Baron ownership. I would rather change a fuel bladder. It's as if when they started building the airframe they laid the cables on the factory floor and built the rest of the plane around them.

This month's article will outline for you just what you are in for if you are brave enough to tackle this job with the required A&P supervision. The flip side of this knowledge and understanding will highlight why such a job will likely be quite expensive when performed by a service provider.



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First, note that the Baron Maintenance Manual states:

Models B55 and 58 airplanes have been manufactured with engine control cables supplied by two different vendors. All six control cables for each airplane must be of the same vendor. The cables are not interchangeable and in the event replacement is necessary and the part number of the cables presently used are not available, all six cables must be replaced with the available type cables.

There are two places of effort: the engine bay cable ends and the lever ends in the cockpit. The engine bay ends are reasonably straightforward. Take pictures of the hardware in place at each cable end so you can

reassemble it in the same manner. The hold-down clamping points in the engine bay are a little more tedious to reach and their hardware will be small and possibly corroded. Pre-soaking these hold-down fasteners with your favorite lubricant the day before will be helpful. The prop cable hold-down runs along the case-to-ump interface below cylinders 2, 4, and 6. The lower cowl will need to be removed to access this fastener. I found the throttle cable tiedown clamp was best accessed from below. It sits just below and to the rear of the alternator. Removing the air box and alternator will enable easier access to the areas on the throttle cable side. The mixture hold-down utilizes a bolt and lock nut positioned horizontally

on a plate on the back side of the engine behind cylinder 1. I found it best to access it from below while lying on the floor. For all of these hold-downs you will want to have a nice selection of small/stubby wrenches and small stubby 1/4" drive ratchets, and nimble hands and fingers.

These are the items that must be removed/disassembled inside the cabin to remove the old and install the new cables:

- 1 Front seats
- 2 Front floorboards under the rudder pedals
- 3 Console front and side panels, and gear pointer if equipped
- 4 All instruments in center panel



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Figure 1 shows the entry point from the engine bay to the inner leading edge of the wing (**Figure 2**). The cables enter the fuselage (**Figure 3**) and then route around behind the rudder pedals (**Figure 4**). They are secured by Adel clamps. These Adel clamps are in excruciatingly hard places to reach. Bear in mind, you will be working over the seat tracks and stretching to reach these, so have an old sofa cushion or pillow to prevent seat track imprints in your chest. The forward screws for the console side panels are also excruciatingly difficult to access. Having a ratcheting screwdriver or battery-powered driver is very helpful for this area.



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FIGURE 1

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Cables run through clamps

FIGURE 2



FIGURE 3

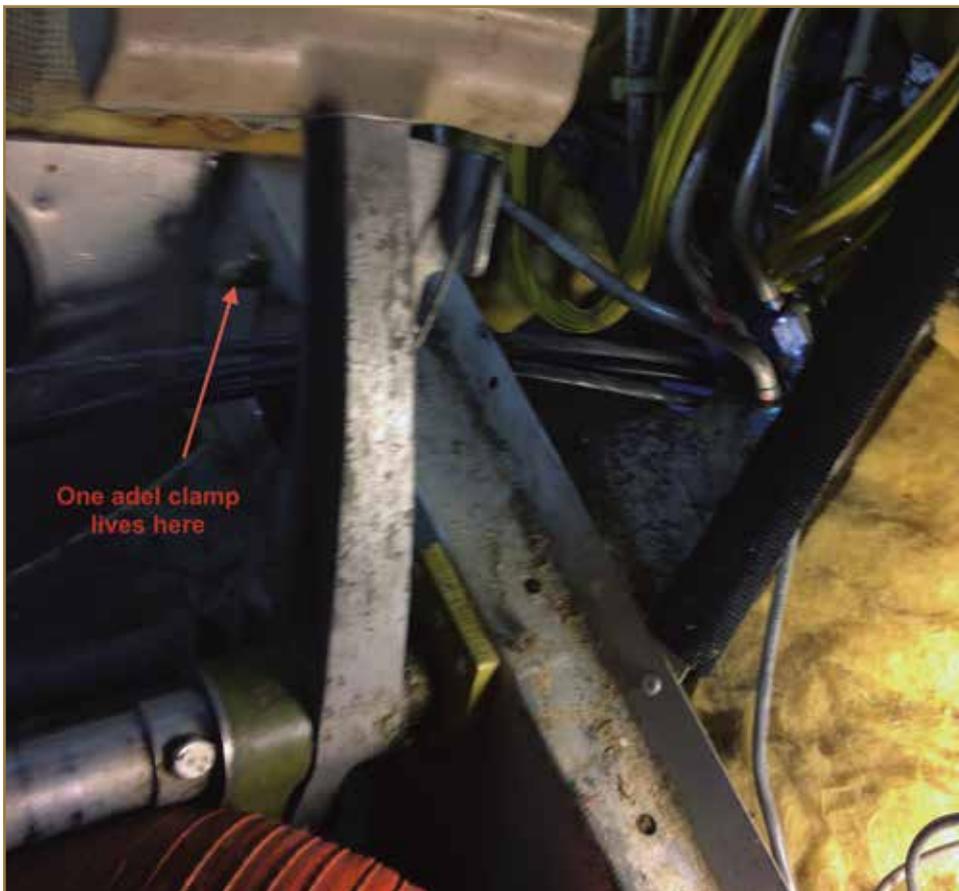


FIGURE 4

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FIGURE 5

Another area of caution is the landing gear pointer indicator (if your aircraft is so equipped). **Figures 5, 6, and 7** show the little arm that connects the pointer arm to the nose gear idler arm such that when the nose gear rod is pushed forward, the rod transfers this motion into a motion that pulls on the pointer arm.

Side note: You can see that the pointer is only capable of telling you that the nose gear rod was pushed forward so it pulls on the indicator pointer. It does not tell you anything about the real position of the wheels. If all the gear rods and landing gear mechanism is intact, then all will be well. The little rod arm retainers are quite small and easily lost, so be sure to keep track of them for reassembly.



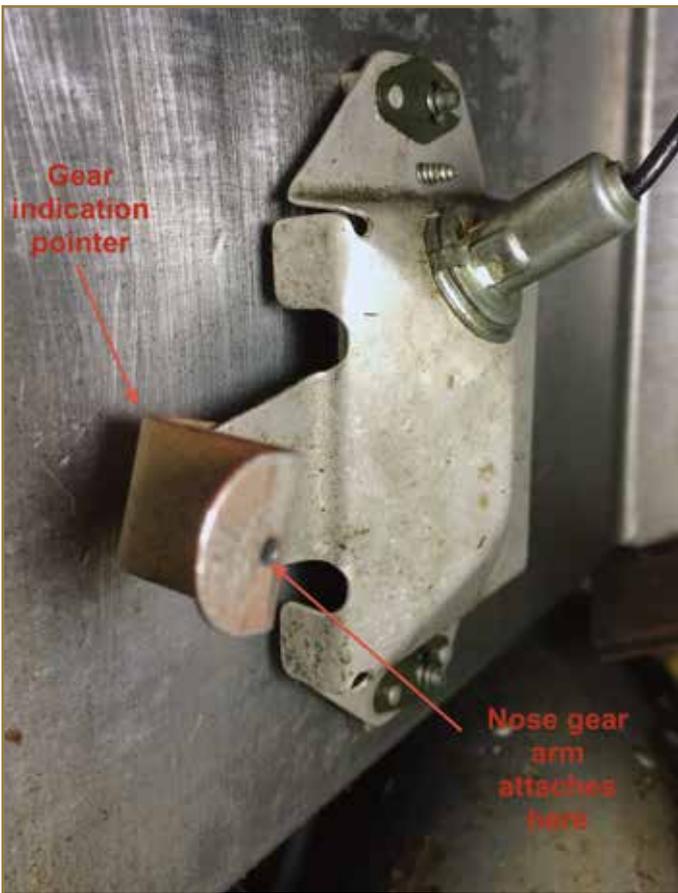


FIGURE 6



FIGURE 7

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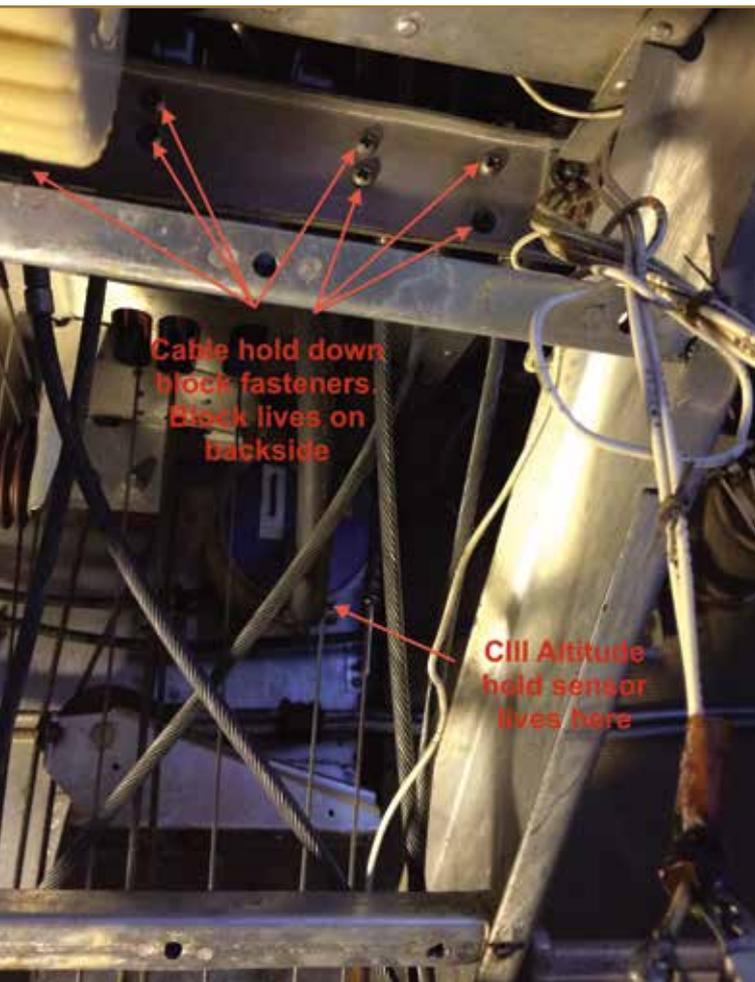


FIGURE 8

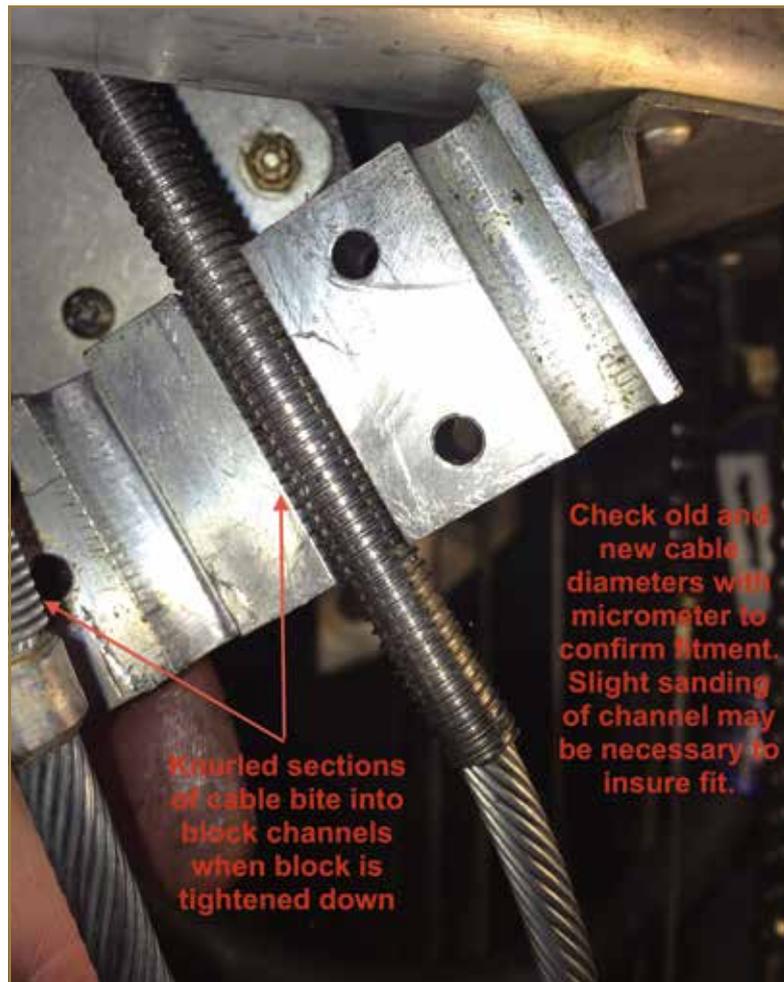


FIGURE 9

The inside cables are held in place by a pair of aluminum blocks that are fastened to the console framework. **Figure 8** shows the block's fasteners and **Figure 9** shows the hold-down block itself. The grooves in the block form a clamping force around the knurled section of the cable and the

console frame arm. These fasteners are small and quite old so you might consider sourcing new ones especially if the Phillips heads start to show any signs of destruction.

The last leg of the interior journey is the rod end attachments at the levers (**Figure 10**). This is where you

will need the center instrument panel cleared of all the instruments so as to operate a stubby flathead screwdriver and wrench. It's a great idea to photograph or draw a diagram of how all the hardware is oriented so that all the screw heads and nuts are oriented exactly as found on the levers.

A55 and B55 throttle levers have an extra complexity of micro switches that hang off the end of the cable rod to activate the gear warning horn at a particular throttle position and hence an approximate manifold pressure setting. Assuming that you are happy with the MP setting of your gear horn, take careful note of the place on the threaded end of the cable where the gear warning actuating rod lies, and place it in nearly the same spot on the new cable. Use a sharpie or other marker to identify this spot on the cable.

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FIGURE 10

Other critical cable placements and hold-down positioning in the engine bay and the interior blocks include the positioning of idle/mixture cut-off for the throttle and mixture cables, and full RPM and feather for the props. In my experience, leaving the console open until you are nearly finished is a good idea. This will allow you to make the final feather adjustments for cable throw, and use the interior hold-down block for any final positioning adjustments that are needed. If you close up the console and have the misfortune of not being able to achieve feather with the adjustments available on the prop governor rod end, you'll be kicking yourself for having to go back and open up the console again.

While I did not keep track of time, it seemed to be very nearly 40-45 man hours to accomplish everything, including the fine-tuning cable adjustments.

As you can see, this is a massive job, one that can easily cost thousands of dollars at a shop (not including cable costs). Sourcing cables through some parts suppliers or low-time serviceable cables from salvage yards can be an option to lower the cost of the project.

Thankfully, you might be able to get nearly 50 years out of a set of new cables! Happy skies! 

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