

Bashing The Hanger 9 Cessna 182 ARF

Part 2

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Pongo Air

This is a four part series covering a variety of modifications, which I incorporated in a Hanger 9 182 ARF. This article addresses the incorporation of a new engine mount and nose wheel brake.

Engine mount upgrade and nose gear bracket installation

In part one of this series, the safety issues with the firewall were addressed and the firewall was upgraded. During that activity, a cardboard template of the firewall was created. The centerlines for the engine mounts and nose gear mounts were transferred on to the template and then back onto the upgraded firewall. It is assumed that those markings were successfully transferred onto the new firewall and that the fuel tank has not been installed.

Required materials:

Qty	Description
4	8-32 x 1" machine screws, Stainless Steel
4	#8 flat washers
4	#8 split lock washers
4	8-32 T-Nuts
4	4-40 x 1" machine screws, Stainless Steel
4	#4 flat washers
4	#4 split lock washers
4	4-40 T-Nuts
1	30 minute epoxy kit
1	Acid brush
1	Cardboard template
1	Nose gear mount
1	Engine mount
1	30 minute epoxy kit
1	Acid brush

I chose an OS-46 2 stroke engine with a Slimline brand pits muffler for the Cessna 182. To mount the engine, I elected to use a Dave Brown brand engine mount. This particular mount is a one-piece design with a set of alignment points scribed onto the mount ring, making the positioning and alignment of the mount a snap.

Using the cardboard template, verify the alignment markings for the engine mount and nose gear bracket are in the correct position. If not, make adjustments accordingly. Position and align the engine mount on the firewall.

Mark the engine mount holes on firewall. Measure the diameter of the T-nuts, drill the mounting holes in the firewall based upon the diameter of 8-32 T-nut mount sleeve. Install the T-nuts from the inside of the airframe. Secure the engine mount in place using the 8-32 hardware.

Position and align the nose gear-mount bracket on the firewall. Mark the bracket holes on firewall. Measure the diameter of the T-nuts, drill the mounting holes in the firewall based upon the diameter of 4-40 T-nut mount sleeve. Install the T-nuts from the inside of the airframe. Secure the engine mount in place using the 4-40 hardware.

Cover the inside of the firewall bulkhead and mounting hardware with a light coating of epoxy.

Nose wheel brakes

Required materials:

Qty	Description
1	Rocket City Brake kit #4
1	Silver Solder kit
1	#10 flat washer, steel
1	Wheel collar
2 Ft	Steel cable, vinyl covered
1	Servo screw eyelet

The Rocket City brake kit consists of a pair of brake hubs, brake springs, length of pull string and a collection of plastic stand offs which would be used as a pull cable guide. The design is very simple. A set of plastic fingers from the brake hub engages with the spokes of the aircraft tire rim. Friction is applied to the brake hub through the use of a brake spring, which is wrapped around the brake hub. When the brake spring is relaxed, the hub turns freely. Manipulating the spring results in a drag force being applied to the brake drum.



Figure 1 Brake Kit

Brake spring integration

Examine the brake drum assembly for good quality bonding of the Bakelite drum onto the brake hub. Test fit the drum and hub assembly on the nose wheel axel. Verify that the drum and hub turns true and correct on the nose wheel axel. Integrate the brake spring onto the brake drum by winding the spring onto the Bakelite drum.



Figure 2 Brake Drum and Spring

Nose Gear Modification

The nose gear supplied with the kit requires the incorporation of a brake cable pull guide and an inside wheel collar. The brake kit manufacture supplies a brake cable guide in their kit however, it did not look as if it would be easy to incorporate onto the nose gear. I chose to take the easy route and fabricate my own from some scrap piano wire.

Prepare the nose gear by thoroughly cleaning the entire nose gear assembly below the spring with a wire brush or wire wheel.

The brake cable guide is constructed from the 2-inch long 1/32 inch diameter piece of piano wire. The brake cable guide is positioned 1/2 inch below the nose gear spring, perpendicular to the nose gear strut and facing aft. Wrap one end of the piano wire 1 1/2 turns around the nose gear.

Slide a #10 steel washer onto the nose gear axel. This will serve as the inside wheel collar. Position the washer as close as possible to the vertical strut, ensuring that the washer is perpendicular to the axel.

Give the area to be soldered one last cleaning using IPA. Silver solder the brake cable guide into place. Allow the area to cool. Silver solder the wheel collar into place, allow to cool. The completed assembly should be similar to the one in figure 3



Figure 3 Nose Gear Modification

Brake spring modification

The brake spring requires two modifications. Incorporation of a cable pull point and a spring anchor point. The cable pull point is incorporated on the brake spring by forming a downward facing U-bend in the longer of the two spring arms. Reference figure 4.

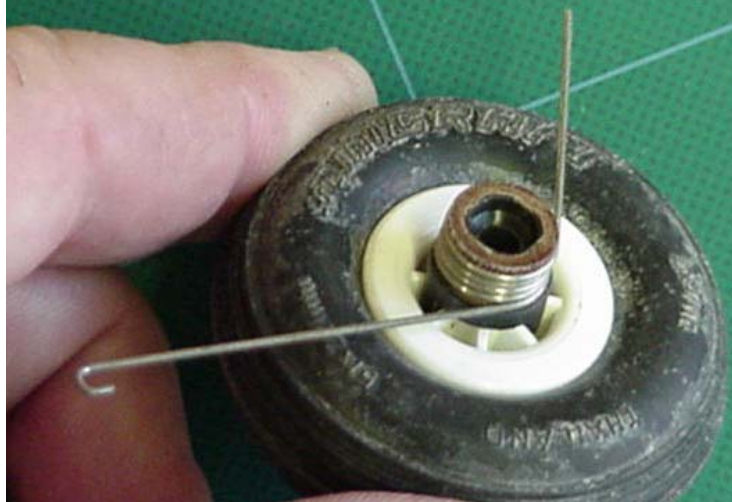


Figure 4 Brake Spring Cable Pull Point

Incorporation of a spring anchor point is accomplished by reforming the shorter of the two spring arms so that the arm captures the nose gear strut. Figure 5 shows the bends made to the spring anchor arm so that it will capture the nose gear strut



Figure 5 Brake Spring Anchor Arm

The final assembly – Mount the brake spring and hub assembly on the nose wheel axel as shown in figure 5. Rotate the spring and hub assembly so the spring anchor arm engages the nose gear strut. Mount the nose wheel on the nose gear axel ensuring that the fingers of the brake hub engage with the nose wheel. Mount the outside wheel collar on the nose wheel axel.

If you are incorporating the wheel pants on the plane, you will need to drill a small hole in the top of the wheel pant to allow for the routing of the brake cable. The placement of that hole should be even with the end of the cable pull point incorporated on the brake spring. Drill a hole large enough so that one of those spare servo screw eyelets may be used to prevent wear and tear of the fiberglass wheel pant.

Here is a picture of the nose wheel brake, cable guide, brake cable and nose gear wheel pant integrated onto the Hanger 9 182 ARF.



Figure 6 Main gear mounted

In part 3, I will explain how to connect up the brake to the elevator servo, incorporation of landing lights and upgrading the servo tray.