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NEWSLETTER

In This Issue

Make A 18mm Engine Retainer From A Water Bottle

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Apogee Components, Inc. — Your Source For Rocket Supplies That Will Take You To The “Peak-of-Flight”
3355 Fillmore Ridge Heights
Colorado Springs, Colorado 80907-9024 USA
www.ApogeeRockets.com e-mail: orders@apogeerockets.com
Phone: 719-535-9335 Fax: 719-534-9050

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Make A 18mm Engine Retainer From A Water Bottle

By Chris Michielssen

Are you looking for a way to save money on your rocketry projects? How about recycling a plastic bottle and turn it into an engine retainer.

In a recent online post, Geoffrey Dean Johnson developed a very inexpensive 29mm motor retainer. He made it with a screw on Gatorade bottle cap.

This is a brilliant idea.

Now the wheels start turning . . .

While Geoff made a retainer for 29mm, I searched for a way to make a motor retainer for 18mm model rockets.

I've got a few pint size water bottles in the recycle bin. Why not?

It was apparent that this size of bottle cap wouldn't fit on a BT-20 or BT-50 sized tube because it would stick outside the airframe of the rocket. But, a BT-55 and larger size rocket might work fine.

Picture 1: Geoffrey Dean Johnson created this 29mm motor retainer using a Gatorade bottle cap.

My damaged Semroc Centurion would be a good candidate for the retainer. If it didn't work out, I wouldn't be out much. The Centurion recently crashed into a tree after a bad staging separation in high winds.

This simple retainer replaces an engine hook in a BT-55 or BT-60 mainframe sized rocket. This is very similar to what some mid power rockets use for engine retention, but on a smaller scale.

We'll be using the screw cap and threaded nozzle from a 1 pint plastic water bottle.

When installed on the rear of a model rocket:

You unscrew the cap, drop in an 18MM engine and screw back on the cap - DONE!

No engine hook, no friction fit or tape wraps. The engine will not eject out the back!

This simple retainer can be found on the top of 1 pint water bottles.

Look for the water bottles with the short white cap. They do this so they can claim the the bottles use less plastic than an ordinary bottle. The good thing is the cap is just under ½" long including the narrow retainer ring.

Picture 2: This pint-size bottle can be turned into a 18mm engine retainer.

Continued on page 3

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Newsletter Staff

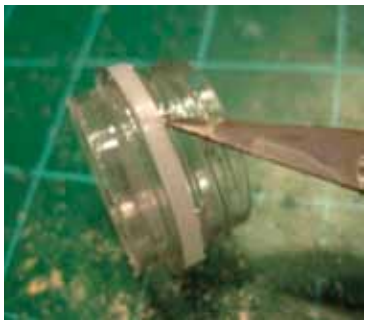
Writer: Tim Van Milligan
Layout / Cover Artist: Tim Van Milligan
Proofreader: Michelle Mason

Continued from page 2

Make A Water Bottle Engine Retainer

Picture 3: Cut off the nozzle below the raised bead with a razor saw.

With a razor saw, cut off the threaded nozzle end behind the raised band as shown in picture 3. Use the raised band as a guide for the saw.



Remove the narrow retainer ring with your hobby knife as shown in Picture 4 to the left.

Picture 4: Remove the security seal ring.

Your next step is to sand the cut smooth on 220 grit sandpaper.

As it is now, clear the nozzle piece is too large to fit on the 18mm motor mount tube. We'll shim it up with cardstock wraps.

Cut a two strips of 110 lb. cardstock ½" wide X 11" long. You can use a glue stick to adhere it to the motor mount tube.

Wrap the entire strip tightly. When you reach the end, check the fit of the clear threaded nozzle piece. You'll have to add about five inches more to the strip you just layed down.

Picture 5: On the engine mount tube, build up the thickness using thick paper wrapped and glued around the tube.

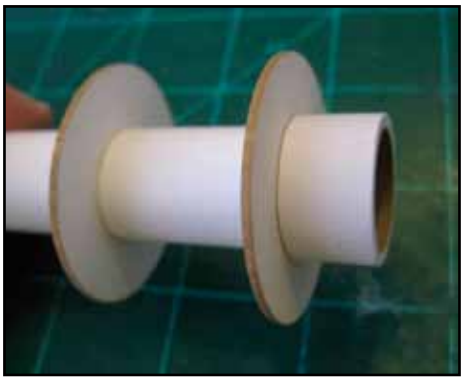
Continued on page 4

Continued from page 3

Make A Water Bottle Engine Retainer

Check the fit of the nozzle again and adjust the cardstock wraps until you get a tight slip fit.

Install the centering rings as you normally would, butt the lower ring up against the cardstock wrap and apply glue fillets.



Picture 6: Butt aft centering ring of the engine mount against the paper strips.

For a cutting guide, trace around a BT-5 and cut a hole in the center of the cap. In the end the hole should be round and a little wider than ½" in diameter.

For the best fit of the cap against the engine, trim down the inside ridge of the cap as shown in Picture 8 to the right.

Picture 7: Cut a hole in the plastic cap. Use a 13mm tube as a size guide.

Install the engine block as normal so the engine casing extends out the back by 1/4". Remove the casing and allow the glued engine block to dry.

Picture 8: Carefully trim down the ridge inside the cap. This will allow the motor to be closer to the rear edge.

After the engine block glue is dry, slide an engine casing into the motor mount tube up to and against the engine block.

Picture 9: Slide the cap over the end of the tube.

Screw the white cap onto the clear threaded nozzle.

Slide both the nozzle

Continued on page 5

Continued from page 4

Make A Water Bottle Engine Retainer

and cap over the extended casing and onto the cardstock wrapped tube.

Press the cap and threaded nozzle forward until it stops when the cap touches the rear end of the motor sticking out of the tube.

If you did it right, the inside of the cap should be against the rear of the casing.

Carefully remove the cap, leaving the threaded nozzle in place on the cardstock wraps.

Apply medium CA glue to the joint between the cardstock wrap and the inside of the threaded nozzle. Let dry.

At this point, the 18mm retainer is done! All you have to do is complete the construction of the model. Then just slide in an engine, screw on the cap, install an igniter and fly!

Picture 11 show how the retainer looks in my well-worn Semroc Centurion.

Picture 10: Apply medium viscosity CA glue to the joint where the engine tube and threaded portion meet.

Picture 11: Remember to leave the engine mount sticking out a little, so you can unscrew the cap.

The plastic cap doesn't melt, but may have a little black soot on it after a flight.

The water bottle retainer looks like a ridged nozzle out the back of your rocket. It may not be as easy to install as a standard engine hook, but it's a great change from the ordinary.

About the Author

Chris Michielssen is a master model builder. He is trained as a graphic designer, but currently is a full-time musical entertainer living in Orlando, Florida. He also has a passion for rocketry, and is currently producing kits as Odd'l Rockets (www.oddlrockets.com). In addition, Chris offers a blog on building rockets at: http://modelrocketbuilding.blogspot.com/

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