BMW R1150GS Muffler Modification

by
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Some Background

When I purchased my used R1150GS, it came equipped with a Two Brothers Racing titanium exhaust system. In short, I hated it. It was far too loud and, worse, it popped and backfired whenever the engine decelerated. It short order, I traded the system for a whispery quiet stock exhaust set-up. Still, I was convinced that there had to be something in between these two extremes. Being a dyed hard experimenter, I decided to check into the possibility of modifying the stock BMW exhaust system.

Thanks to the magical world of E-Bay, I located an almost new R1150GS muffler and catalytic converter to use as a guinea pig (FYI: $75). If I ruined it, I'd still have my original exhaust system. The result of my muffler experiment exceeded my expectations and the step by step procedure is documented as follows. (Next comes the catalytic converter modification – not yet completed)

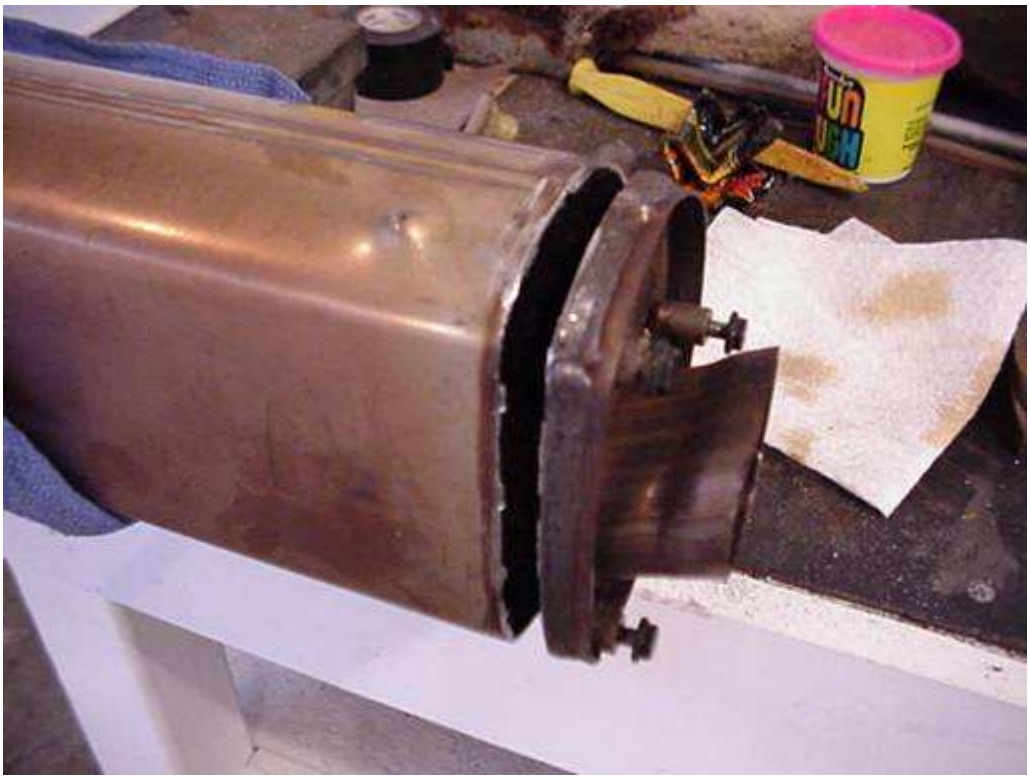
Disclaimer

Be aware that modifications to your exhaust system may void your warranty, may violate Federal laws, and possibly render your bike illegal for use both on and off the road. Of course, none of these laws seem to apply to the legions of un-muffled Harleys that currently occupy the highways.

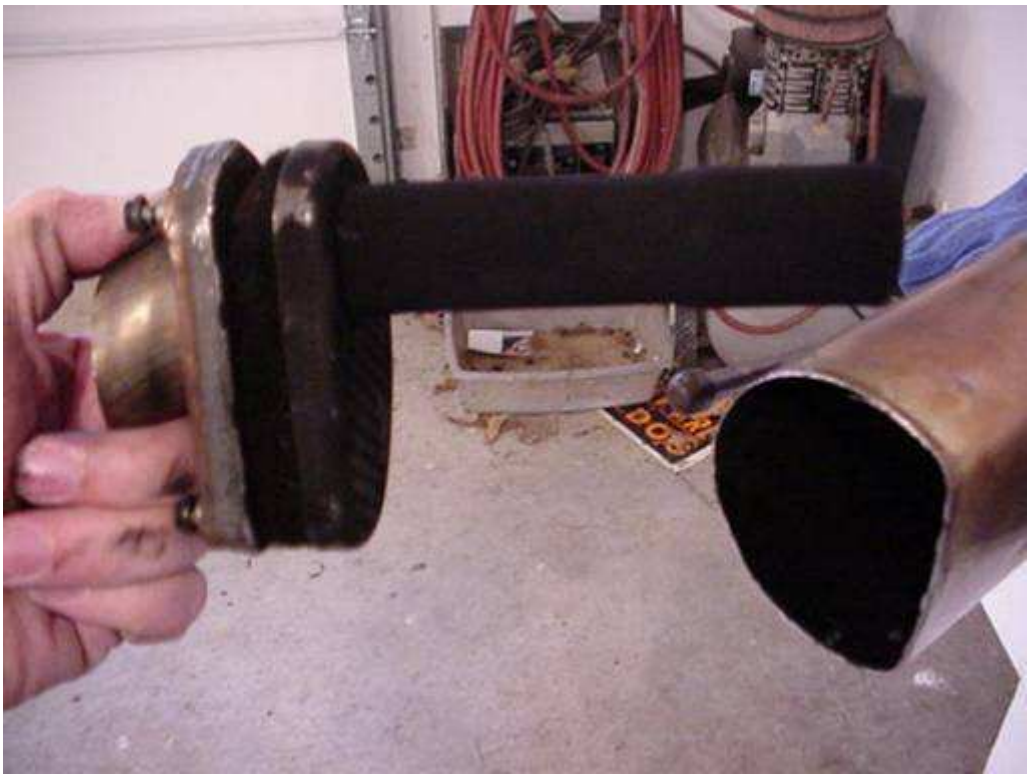
Disassembly

1. Remove the muffler from your bike. It's a two bolt operation: one on the muffler clamp and another on the hanger bracket.
2. Remove the three 4mm screws that hold the black trim piece at the rear of the muffler.
3. Remove the four 6mm bolts that mount the muffler hanger bracket.
4. Slide the cosmetic shell off the outlet end of the muffler as shown below.

5. Beneath this cosmetic shell you will find a very ordinary automotive looking muffler. Using a hacksaw carefully cut through the outer shell of the muffler as close as possible to the factory weld at the outlet flange.

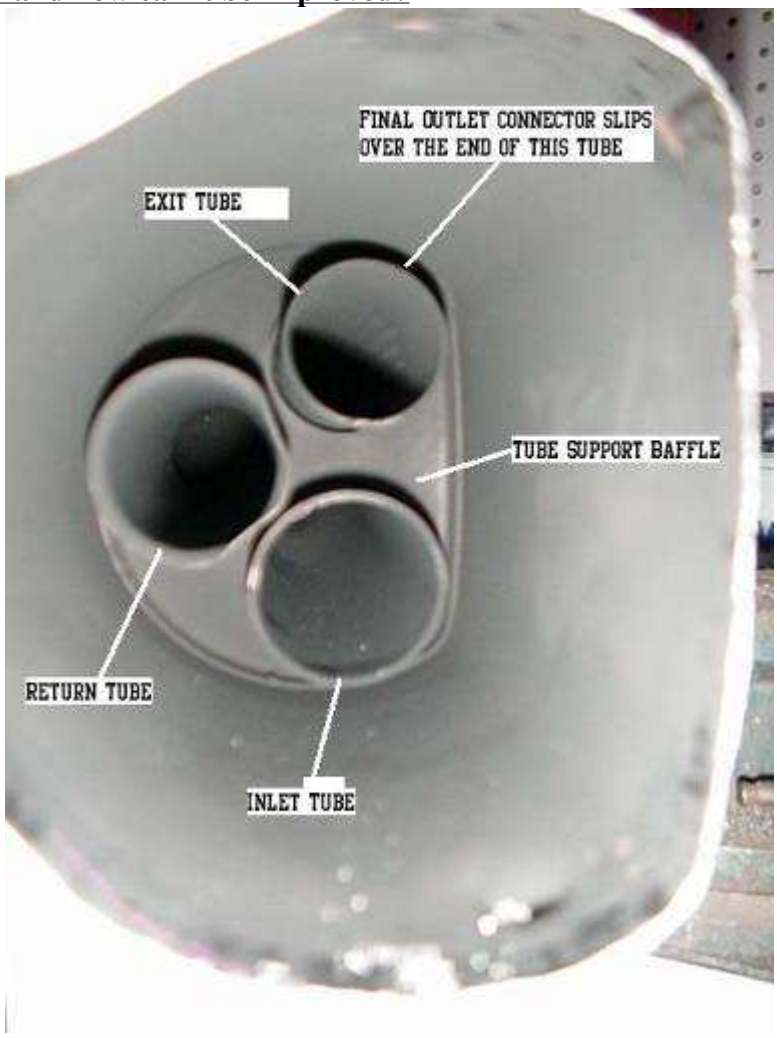


6. Tap, tug, and pull the outlet assembly out the rear of the muffler. Notice that I purposely avoided using nasty adjectives such as pry and beat. Be patient, you'll be reusing these parts.



7. This is what you are going to find attached to the end plate.

Now that it's apart, how does it work and how can it be improved?

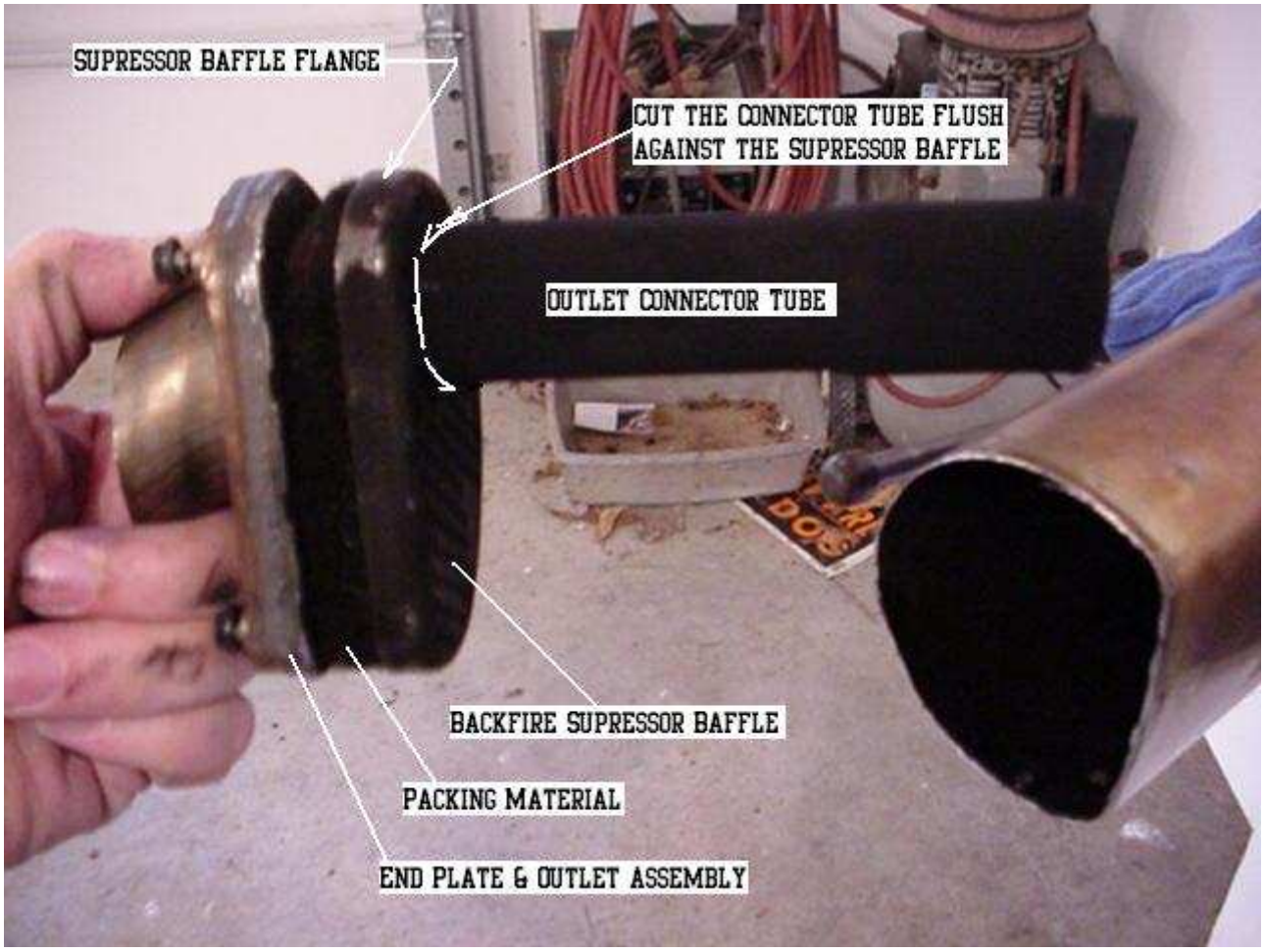


If you peer inside the muffler, you will note that the crafty BMW engineers have employed a silencing system utilizing a classic two-chamber three tube design. The two chambers are divided and sealed by the tube support baffle, shown in the photo posted on the right.

Exhaust gas enters the muffler via the inlet tube, sealed from the forward chamber and open to the rear chamber. The gas then makes a 180 degree turn and travels to the front chamber by way of the return tube. From there it must make its way into the exit tube by way of its perforated sidewall. The exit tube is not perforated within the rear chamber and is connected to the muffler's final outlet by means of the outlet connector tube. (Which you just removed)

In a nut shell, all exhaust gas must travel the length of the muffler three times, make two 180 degree turns, two 90 degree turns, and encounter numerous sharp edge orifices in order to escape into the atmosphere. It's a small wonder that a stock GS sounds like a constipated librarian. Worse, all of this comes at the expense of lost horsepower.

Lucky for us, probably by accident, those crafty BMW engineers designed in a very simple and elegant solution to all of this.

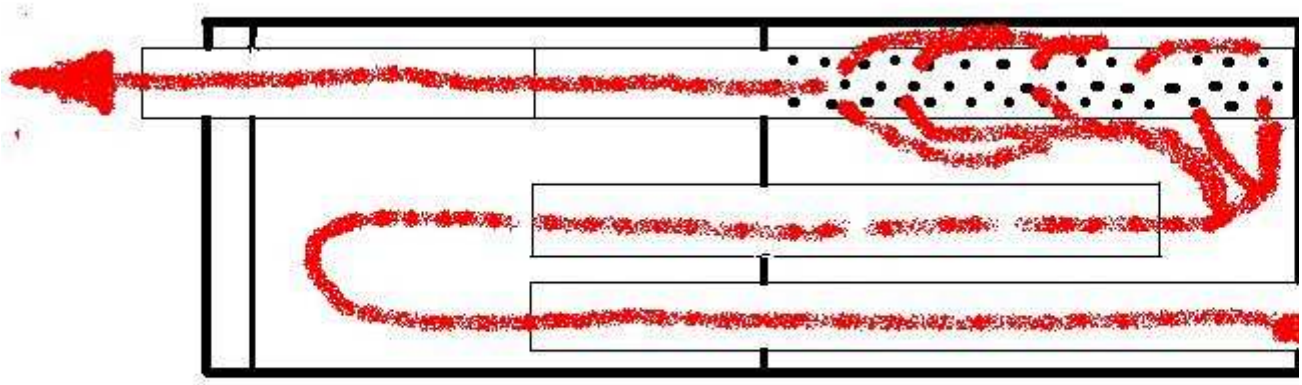


8. Take your hacksaw and cut off the outlet connector tube flush against the backfire suppressor baffle. Put it in a safe place in the event that the EPA, the US Forrest Service, or the FBI is watching. This modification is reversible.
9. Now, take a moment to study the design of the backfire suppressor baffle. You will note that the outlet tube is welded to the baffle and there is a spacing bushing welded between the baffle and the end plate. Best of all, there is a very nice ½" wide flange around the perimeter of the backfire baffle. Do you get it yet?

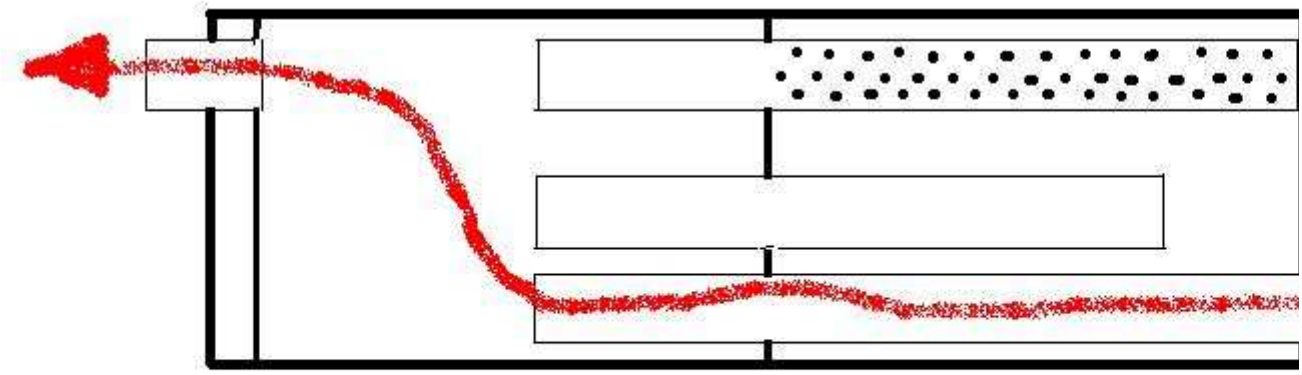
10. OK, you get it! File away the burrs on the saw cut edge of the muffler can and tap the outlet assembly back into the muffler. If you wish, employ some high temperature RTV sealant. Layout and drill three or four 3/16" diameter holes through the sidewall of the muffler, making sure that they mate with the center of the backfire baffle flange. In my case, this measurement was 1-3/8". Don't trust my measurement. Install 3/16" diameter blind rivets. Why use rivets instead of welding? I can see no reason not to. Many aftermarket mufflers, such as Two Brothers, are assembled with blind rivets. As an added benefit, you now have an easy way to get back into your muffler.

So, what did this do?

The new and improved exhaust gas route now involves a straight shot into the rear chamber. From there, the gas travels directly out the final outlet. Gone are the switchbacks and restrictions. Your engine can now breathe easier and the exhaust note takes on a deeper, yet unobjectionable, tone without being "loud".



Gas Flow - Unmodified



Gas Flow - Modified

The annoying slip-on muffler deceleration popping doesn't seem to occur and, perhaps best of all, the finished product looks completely stock. I ask you, does this look like a modified muffler? Now, take that wad of money that you didn't spend on a custom exhaust and use it for gas and tires.

Return