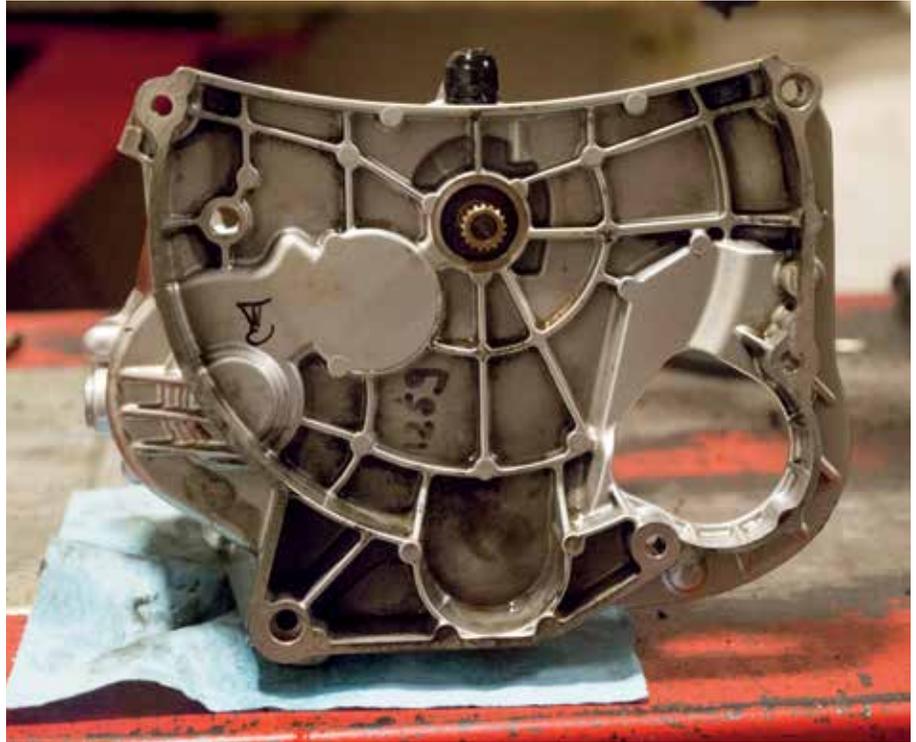


All I needed was a clutch – Part two

By Wes Fleming #87301

GEORGE ALREADY HAD THE OLD seals out when I arrived, and the new seals went right in. It helps, of course, to have the proper tools to seat the seals. In a pinch, you could use a socket, which requires a much steadier hand than I trust myself to have. This is one of the reasons it makes sense to take these jobs to professional mechanics – they will have the special tools needed to make things like seating seals 100 percent accurate. Unless you plan on doing a lot of seal replacements, it doesn't make a lot of sense to spend the money on those tools.

With the new seals in place, it was finally time to install the new clutch components. Months ago, when I first started thinking about this repair, I remembered coming across a Siebenrock part I thought might be a good idea to use – an oil-resistant clutch disc. Since Siebenrock parts are available in the USA through Wunderlich America, I gave them a call to talk about the disc and its availability. I was glad to hear they had one in stock, and it was soon on its way to me. Many people know Wunderlich for accessories like



A clean transmission.



One bolt connects the counterbalance weight to its shaft; the seal keeps oil inside the engine, where it belongs.



Tip the engine forward to keep oil from gushing out if you have to remove the counterbalance shaft seal. Wipe clean all mating surfaces and anything else you can get at with a rag.



Counterbalance shaft seals – one new, one leaky.



You can't install the counterbalance weight incorrectly. The screwdriver points to an extra-wide tooth that marries up to an extra-wide slot on the shaft.

mirrors, handlebar risers (which I have on my GS) and handlebar muffs (which I reviewed in the February 2017 issue of *Owners News*), but what you may not know is the folks at Wunderlich are hardcore parts junkies. They have a number of excellent parts available for a lot of different BMW bikes. The oil-resistant clutch disc is an upgrade costing essentially the same as the OEM clutch disc, so it made sense to get it and address a key weakness of any dry clutch system, the fact that even a small amount of oil contaminating the components can lead to a quick failure. Even though Siebenrock purports the disc to be oil-resistant, I still cleaned all the mating surfaces between the clutch and pressure plates thoroughly, just like it was any other clutch plate.

The bolts connecting the housing cover to the flywheel are short, so it requires a decent bit of concentration and hand strength to compress the spring on the pressure plate and get a couple of the bolts started. It's important to use a special tool that centers the components and keeps them aligned; once the bolts are torqued to the proper specification, the alignment tool goes back into storage. Incidentally, Wunderlich sells those too, and since George's is a little bent, I got him a new one for Christmas.

With the clutch components in place and properly tightened, the freshly cleaned and re-sealed transmission went on like a dream. Tightening the transmission back down takes a little finesse; the housing is aluminum and, while it's by no means weak, cranking down one corner of it could lead to disaster. It's best to support the transmission from underneath – either with a helper or a small jack – and get all three bolts started. Hold the transmission against the engine and hand-tighten all three bolts, leaving the support in place. Once they're torqued to the proper spec, you're all set and you can reinstall the clutch cover (you cleaned it, right?), the starter and the starter cover. It's not strictly necessary to replace the starter cover at this point, but it's a lot easier than waiting until the bike is all back together.



The counterbalance shaft seal and weight in place. Be sure to look up all torque values and use a quality torque wrench to secure all fasteners.



Housing cover and pushrod.



Shiny new clutch components – pressure plate on the left, housing cover in the middle and Siebenrock oil-resistant clutch plate on the right. The new pushrod is under the housing cover and the new slave cylinder between the pressure plate and housing.



Pressure plate. This is the side that mates against the clutch plate; the hole in the center is where the pushrod goes. It pushes against the circular spring, releasing the pressure against the clutch plate and allowing it to spin freely, which is why you can shift gears.



Siebenrock's oil-resistant clutch plate (imported by Wunderlich) is an easy upgrade that costs about the same as the OEM part. In operation, it has a slightly more positive feel than the stock disc.



Splines of the transmission input shaft, cleaned and lubricated. Note the clean, fresh seal. Molybdenum-infused grease goes on these splines, but not in huge quantities, so be sure to wipe off any excess. You don't want to start your new clutch's life with a bunch of goeey moly paste slinging around inside the housing and possibly contaminating the friction surfaces.



The clutch assembly is bolted onto the flywheel and the transmission is back in place, ready for the clutch cover to be installed. Note how clean everything is!



Next to the spanking-clean transmission, the starter looks positively disgusting. Be sure to clean any corrosion or rust from the electrical connections – hit them with sandpaper, steel wool or a wire brush to ensure the mating surfaces are fully clean.



Ready to finish the reassembly. Putting the starter cover on at this stage makes it much easier to attach than if you wait until the back half of the bike is back in place. Note the gear shift potentiometer at the bottom of the transmission – this is what tells your bike's computer what gear you're in. It's plastic and costs \$219.40 to replace, so be careful not to damage it when you're moving the transmission around.

This is the place in my Haynes manual where it says, "assembly is the reverse of disassembly." Despite the obvious sarcasm inherent when the first author wrote that line, it is essentially the case. It's not always easy, though. We were tired and kept getting interrupted by phone calls and shop business, including a hauling service showing up to take a customer's freshly repaired airhead to his home in West Virginia.

When it came to reassembling my motorcycle, the major difficulty we faced besides interruptions and fatigue was my shoddy electrical wiring practices. While we weren't rushing, we were trying to hurry, because George had to catch a plane to get to upstate New York for his brother's 50th birthday celebration. The wiring was confusing, however, and even though it took a little longer, the smart move was to disconnect, reroute and reconnect the wires for all my accessories – auxiliary lights, the unbelievably loud horn, GPS power and the wires for my heated jacket. George chastised me for using wires too big for the application, but we stopped short of replacing them with appropriately gauged wires. Rewiring everything properly is on my to-do list for next winter.

The last part of the repair we had to undertake was replacing the clutch control assembly up on the handlebar. When we first started looking at the clutch and its components back in June (after it failed), there was debris in the clutch fluid master cylinder. Clutch fluid is a special type of oil, and it shouldn't have little bits of debris floating around in it. It was an indicator that either the seals in the master cylinder deteriorated, or that I was nearing a catastrophic slave cylinder failure. That's where the Spiegler line I bought came in (see Part 1 in last month's *Owners News*), and it went on with the new clutch control assembly. It took an extra few minutes to swap out my shorty clutch lever with the stock lever, but everything bolted right up into place.

It took a while to fill and bleed the clutch line, mostly because the slave cylinder was totally empty when we started; there was a lot of air to push out of the line as a result. Even after 10 minutes of pumping the clutch lever, we were still getting tiny bubbles in the fluid reservoir. We had to combine pumping the lever with forcefully rotating the rear wheel to get the clutch to disengage, but eventually it started working.

The test ride was successful, though we quickly discovered hot clutch fluid smells sickeningly sweet as it burns off the exhaust pipes. I'm pretty sure breathing clutch oil smoke for even a few seconds shaved some time off the end of my life. George left to catch his flight and I finished reassembling the bike.

I returned the next day with a trailer to take the bike home; unfortunately, nobody was available to give me a ride 100 miles to the shop. The following day was Sunday – my chance to give the clutch a solid break-in ride. I headed to the Richmond BMW Riders' monthly breakfast meeting, excited to be back on my GS after a five-month hiatus. At first the clutch was a bit grabby, and downshifting took more patience than usual. Everything eased gradually, and by the time I returned home – having taken the long way home from the meeting and brunch afterwards with one of the longtime members of the club – my clutch was operating normally. Just to be sure all the air was out of the line for good, I zip-tied the clutch lever in the disengaged position (pulled in) and left it overnight. It's been a joy to ride since then, and I anticipate this clutch lasting through the remaining life of the motorcycle.

My pleasure at a job successfully completed aside, I studied the symptoms, events and processes involved in the long story of my clutch failure. One of my goals as a motorcyclist is to learn as much as I can, whether than knowledge is about the act of



Most of the big components are back in place now. Reassembly at this point is all about detail and making sure the wiring is routed properly.



Bubbles in the clutch fluid. It's important to bleed the line at the slave cylinder – until there are as few tiny bubbles as possible. Magura Blood is a special type of mineral oil designed specifically for use in hydraulic clutches like those on BMW motorcycles. Removing the clutch fluid master cylinder lid requires a special flat wrench (photo at left) to squeeze the teeth on the lid that fit into the notches on either side of the reservoir. The lid is designed to be tamper-proof; without the special tool, you can only tighten the lid.

riding or the mechanics of my motorcycle.

The first lesson from this sequence of events is never to pass up the opportunity to measure your clutch material thickness when it presents itself. Last year when I had the bike torn apart, I should have taken advantage of the situation and removed the starter so I could measure the clutch material thickness. It would have stunk to discover I needed a clutch at the time I was

doing the previous work, but it would have been a real bonus to have that information 3,000 miles ago before my bike got sidelined for five months while I looked for a new full-time job.

Lesson number two is to plan on replacing all the seals you can easily get to. If I'd prepared in advance with the seals, we could have finished the job in one day. The three seals cost about \$75 total, but the



The special release tool for clutch and front brake master cylinder covers. It is BMW part number 83 30 0 402 038 and costs about \$15. Any BMW dealer can order one for you

time saved by having them on hand was worth way more than the cost of the parts and the frustration of having to wait a whole day to finish the job.

Rounding out the top three is paying closer attention to the drive shaft – not the thing that's part of the transmission BMW calls the drive shaft and we call the input shaft. I'm talking about the actual drive shaft connecting the transmission to the final drive. We cheated a little by leaving it in place in the swing arm and just popping it off the transmission, which came back to haunt us during reassembly. For some reason, it worked itself loose from the final drive during the 28 or so hours the back half of the motorcycle sat propped on the center stand. It would have been more of a hassle to drop the final drive and remove the drive shaft during the disassembly stage, but it would have saved us nearly 30 minutes during reassembly – as well as some barked knuckles and hateful comments possibly blaming our troubles on a lack of intercessional grace from either Saint Catherine or Saint Eligius.

Another lesson is to clean everything you can as you go. It's rare to get this far into your own motorcycle, so on the occasion(s) that you do, go ahead and spend an extra hour or two cleaning everything you can get a rag on. We used a wire brush on the rusty splines and I spent 30 minutes hunched over the parts washer getting every nook and cranny of the transmission as clean as I could. The inside of the housing where the clutch goes was covered with an eighth of an inch of sloppy, greasy muck. Now I know it's clean, which means if there's ever a problem in the future, it will be easier to track it down.

One thing I can't repeat enough is a two-part lesson: use the manual and use a torque wrench. I didn't impart any torque values in this article because it's imperative you look them up and verify them for your motorcycle. While the process of replacing these dry clutches is similar across all the models, there are parts variations, and with those come differing torque specifications. Buy a quality torque wrench and learn how to use it properly. It could save your life someday.

Finally, be methodical every time you touch your motorcycle. I would have benefitted from using more than one box to keep nuts and bolts in, that's for sure.



The author after his first ride in five months on his freshly-repaired R 1200 GS. Ignore the Indian cap – all his BMW hats are dirty! Photo by Joe Sokohl.

Instead, the starter fasteners were in a bag over there and I just tossed everything else in this box over here. While doing this didn't result in any critical problems or lengthy delays, I often had to ask George, "Hey, what's this bolt for?" I was lucky to have an expert on hand for immediate guidance, but not everybody has that resource. Next time I do something this extensive, I'll use sandwich bags and label them as I go.

Replacing a dry clutch is certainly at the far end of the scale of do-it-yourself repairs, but it's not an insurmountable job for the home mechanic. It requires expensive parts and some special tools, but it is absolutely

manageable in your own garage. Prepare, be methodical, clean as you go, take your time and – if you're lucky – you won't have a leftover screw like I did.

Visit the MOA's YouTube channel to watch a video of this clutch job – the link is tinyurl.com/R1200GSclutch 📺