

Removing Triumph Sludge Tube



The first challenge is removing the slotted plug from the flywheel. Removing this plug gives you access to the sludge tube. The plug should not have been Loctited and should only be prevented from unscrewing by the center punch on the face of the flywheel.

If it was Loctited by a previous mechanic then this procedure, and a little bit of heat (200-250F) from a MAPP torch (or propane although much slower to heat things) applied to the face of the plug, should release the Loctite enough to allow the plug to be removed. If red Loctite was used you will have to heat the side of the flywheel where the flywheel's bolt screws into it. Don't use force to remove the flywheel bolt. These flywheel bolts are thru hardened, and can break easily.



We don't want to put any more stress risers on the face of the flywheel, so we start by drilling straight into the face of the plug. What we want to do is only remove the flywheel metal that is pushed against the plug.



We started the drill a little bit back from the edge of the face of the plug and now we need to work the drill bit toward the edge toward the center punch divot. Slowly tip the drill aiming it toward the edge and let it start cutting away the folded metal. To free the plug you will have to remove a little bit of the flywheel in the area of the divot, but be careful. Remove as little as possible.



The drill was first started straight, then tipped. Then the drill bit was allowed to walk toward the edge. When the edge of the drill bit starts to cut the flywheel metal distorted by the center punch it is time to stop. If the plug was not Loctited you can use a modified drag link socket (looks like a large screw driver blade on the end of a socket.) I like the Snap-On 1/2" drive screw driver blade shown below. Modify the tip of the blade so it fits firmly in the plug's slot. With a ratchet, impact wrench or a hand impact driver to remove the plug.



So it appears that this plug was installed with a high strength Loctite. Time for plan B. There are a lot of ways to approach this. If you have welding equipment you can weld a nut to the face of the plug. Weld the center to the plug and use a socket and ratchet to remove the plug. The heat from the welding will loosen the Loctite. If you don't have welding equipment you can use a drill to drill three contiguous holes in the slot and drive in the blade of the screw driver. Use a Mapp gas bottle to heat the face of the plug. Depending on which Loctite was used will determine how hot the plug will have to get before releasing the Loctite's bond. Starting with the first drilling I continue and drill three holes along the plug's screw driver slot. I then drive my Snap-On 1/2" drive screw driver bit into the three holes. I try to keep the holes as close together as I can. To connect the three holes, and allow the screw driver bit to get a solid purchase in the plug, I use a small chisel or carbide bit in my air grinder. A lot of people use an easy-out, but one large enough isn't easy to come by.

If you don't have a impact gun use your 1/2" drive ratchet to finish removing the plug.



To remove the sludge tube you will have to remove the flywheel bolt adjacent to the tube. This bolt should have been installed with Red Loctite. **Because it is a hardened bolt (brittle) you want to be sure to release the Loctite before you apply any pressure to remove it.** With your Mapp bottle apply heat to the head of the bolt and the side of the of crankshaft where the bolt's threads are located. Failing to release the Loctite greatly increases the chances you will break the bolt off in the crankshaft. If you do it will be one of those moments you will remember for a while. While with age, the Loctite that was used to retain the bolt will degenerate and the bolt can be easily removed, If it does not come right out I find it safer to heat the head of the flywheel bolt to about 200-250 degrees F. I also heat both sides of the flywheel where the bolt's threads are located.

Because some mechanics mistakenly choose to use Green Loctite on this bolt, heating the bolt and the area the flywheel that houses the threaded portion of the bolt, is very important!

If one doesn't take some precautions removing this bolt, it is easy to break it. If this happens removing the piece that remains in the flywheel can be a confounded nuisance and a job best suited for an expert.



I use a Tempastick to determine when I reach the temperature I am looking for. I try to constrain the heating to the head of the bolt. If I am having trouble getting the Loctite to release I apply localized heat to the bolt retaining area at the crankshaft. Lacking a Tempastick one can use a drop of water which will sizzle when the temperature reaches 200 – 212 F.



You can see where the three 1/4" holes were drilled in the plug to remove it. Even though the flywheel bolt has been loosened do not remove it as you will need it in place to keep the sludge tube from turning as you offer the removal tap.



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In the old days people hooked the head of a spoke in the sludge tube and struggled to pull out the tube with a set of vise grip pliers. If all you have is a spoke you can get the tube out, but it will take a while and some heat to loosen the gunk that is holding it in place. I find it is easier to use a tap, large easy out or other threaded device to do the job. On a 650-750 twin I like using a 5/8"x 11 tap. You start threading the tap into the end of the sludge tube until it has just firmly caught the tube. It usually takes less than a one full thread to have enough purchase to remove the tube. You are not setting out to cut a thread in the tube. You just want to get the tap caught in the tube.

When the tap is secure in the tube I thread a 5/8"x 11 nut onto the tap. You just made a puller that will pull the tube out of the flywheel. Just tighten the nut against the side of the flywheel. As you tighten the nut it is time to remove the flywheel bolt the end of which resided in the tube and locates it. Once the flywheel bolt is removed place a 5/8" x 11 nut onto the tap and tighten it against the side of the flywheel. This will pull the tube out of the flywheel.



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Tighten the nut against the face of the flywheel to withdraw the tube.



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Actually this sludge tube appears pretty clean...



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Use a screw driver, gun brushes and some spray brake cleaner (CRC Brakleen) and scrape and brush until the tube starts to get clean. Then wrap a paper shop rag around a medium sized screw driver and twist it into the hole. More spray cleaner and a half dozen, or more rags, clean the hole until you think it is spotless, and as my mentor always said, "Then clean for another ten minutes."



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Don't forget to clean the threads in the flywheel! Gun brushes are handy for these kind of jobs. Don't forget the oil feed holes that feed the connecting rods and the oil supply drillings in the timing side main shaft. A spray can of brake clean, with the small plastic tube, is handy for getting the oil ways clean.



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The remains of the Loctite can be seen on the threads. You can also see the “tit” that locates the sludge tube. Clean the bolt until it sparkles. Be sure it is free from any grease, or oil.



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When you offer the new or cleaned tube to the flywheel, be sure to locate it so as the “tit” on the flywheel bolt can enter the larger of the three holes. Look down the flywheel hole to be sure the hole is properly aligned before offering the flywheel bolt.



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For most people hex driver flywheel plugs are the way to go (Use a reliable dealer as there are some oversize ones being sold).

To have as few stress risers as possible I like to re-punch the face of the plug, instead of the flywheel, into the area that was originally punched. This leaves the crankshaft with only the original stress riser from the original center punching.

This displaces metal into the depression left from by the original punching. Place the tip of the center punch near the edge of the plug and drive a small bit of the plug into the original divot on the face of the flywheel. **The plug is not a place where you want to use Loctite!** If

you are driven to use something, a very little bit of Hermatite Blue sealant, ThreeBond #4, or Loctite 515 or 518 anaerobic gasket sealant on the threads.

When looking for a replacement plug there are a couple things you should be looking for. You want a plug where the thread isn't chamfered, or is only chamfered a very little bit, on the back face. The threads in the flywheel stop about 1/16" before the oil transfer hole. By having little, or no chamfer, there is no way a plug can block the oil hole.

If you get a plug that is loose in the crankshaft, or is heavily chamfered, return it and get one that fits better.



A few drops of blue Locite (243) and the flywheel bolt is ready to be installed (If you are racing use Red Loctite 272 or the later version 278), but understand that you will have to use more heat to release it when doing future service. Modern Red Loctite (243) is considered for permanent applications. It releases at 550° F which can present a challenge (it is possible to break the bolt) when doing future service.



The flywheel bolt must be tightened to 33 foot pounds. Resist the temptation to believe that the Triumph engineers didn't know what they were doing and over tighten this bolt. It would be a real pain if the bolt broke as you tighten it. Worse, if it broke later at speed.

Some observations about Loctite:

To work it has to be used with an active metal. Active metals are iron (including steel) and copper. Active metals are high in metal ions. Loctite is an anaerobic adhesive. It will cure in the absence of air **and in the presence of metal ions**. It will not properly work with metals low in metal ions. When two inactive metals are partnered such as stainless steel, zinc, magnesium, black oxide, cadmium, anodized aluminum, passivated, titanium, and others, a **primer** is needed to cure **Loctite®** Threadlockers. If only one inactive metal, no **primer** is needed. Also for early versions of Loctite like 221 (yellow), 242 (blue), 272 (red), and 270

(green) they do not work well, if at all, in the presence of grease, or oil. More modern versions of Loctite like 222 (yellow), 243 (blue), 278 (red), and 276 (green) are much more tolerant in the presence of grease, and oil.

So what does this mean?

When relying on people's experience with Loctite you must remember that they understood how it works. That is the need to be in presence of an active metal. and the parts needed to be totally free of oil or grease. In short, in a lot of cases the Loctite just didn't work that well, if at all. So when red Loctite was used it either didn't work or its strength was compromised. People didn't understand that for the Loctite to work on stainless , or plated, hardware they need to use Loctite Klean and Prime so that it would cure. With a bit of "tongue in cheek" it allowed the bike to be serviced with out spending hours removing hardware.

With the new Loctite (222, 243, 278 and 276), with it working with hardware that isn't free of grease, and oil, and isn't as reliant on getting the missing ions to cure, using it is a totally new experience. It can make a situation, where when Loctite says the bond is permanent, they mean it. You can be in a situation where you have to heat the part to over 500°F to get it apart. Be aware of what you are doing. Modern Blue (243), used with clean active metal, can really work.

There are other ways of removing the sludge tube.

Some people use a large Easy Out while others, like Paul Ackerman, a dealer in Maine, make a puller:



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Using a short length of 1/2" threaded rod available in most big box stores for a few dollars and a 1/4" x 1/2" x 20tpi allen head grub screw you first drill and tap the rod 1/4" x 20.



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The 1/4" allen grub screw is in fore ground while the threaded rod is being tapped 1/4" x 20.



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You remove the sludge tube plug and flywheel bolt. You slide the 1/2" rod into the sludge tube while looking down the flywheel bolt hole. When the threaded hole in the 1/2" rod aligns with the flywheel bolt hole place the allen screw on a long allen wrench and lower it into the hole until you are able to thread it into the 1/2" bar. Be sure the top of the screw is clear of the flywheel bolt hole, but is sticking through the hole in the tube as illustrated above. Place a 1/2" nut, and a washer if necessary, on the rod and tighten the nut. This will pull the tube out of the flywheel.

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