

Yamaha DS6 clutch rebuild

by Stuart Holding, April 2022.

Some things are not meant to be taken apart. When Yamaha designed the clutch basket for the DS6 back in the late '60's they intended that you would replace it if it ever failed. But I don't suppose they ever envisaged that we'd still be trying to keep these bikes on the road over 50yrs later. Now, in 2022, new clutch baskets are but a distant memory. At just over 11,000 miles, the usual problem of indents in the basket fingers wasn't too bad on mine and the clutch released fairly smoothly, but what had failed was the shock absorbing joint between the basket and the primary drive gear mounted on the back of it. I'd ignored it for a few hundred post rebuild miles but eventually the clonking noises – particularly at idle - became too worrying. I was going to have to do something.

A quick stripdown soon had the clutch on my bench and a ruler put some numbers on the magnitude of the problem. The gear was able to rotate around the periphery of the basket by about an inch. Quite how much it was supposed to rotate was something I had trouble finding out, but I was sure it was never intended to be an inch. Whatever damping system was inside was no longer functional.



Clutch hub free play

In my Clymer manual there's a sectional diagram of the DS6 clutch and it refers to a 'torsion spring' as the damping mechanism. If there were springs in there and they'd failed, where on earth would I find replacements? Would I be better off trying to find a replacement clutch basket? In a haze of uncertainty I mentioned it to a friend in the US. "I've got a few of those in the barn, I'll go and have a look" he replied. Next day I got an email from him. 'Seems there's two different types. One has springs set into the plate on the back, the other has a riveted plate. The spring versions are from the earlier bikes – DS5's from my bits. The DS6's have the plain plate.' He attached a picture. In it the spring damped hub was obvious. I didn't have that. Mine was the four rivet version. So if it wasn't springs what exactly was in there?



Spring damped and plain clutch hubs

With some trepidation I ground the heads off the rivets and removed the plate. The picture shows what I found inside.



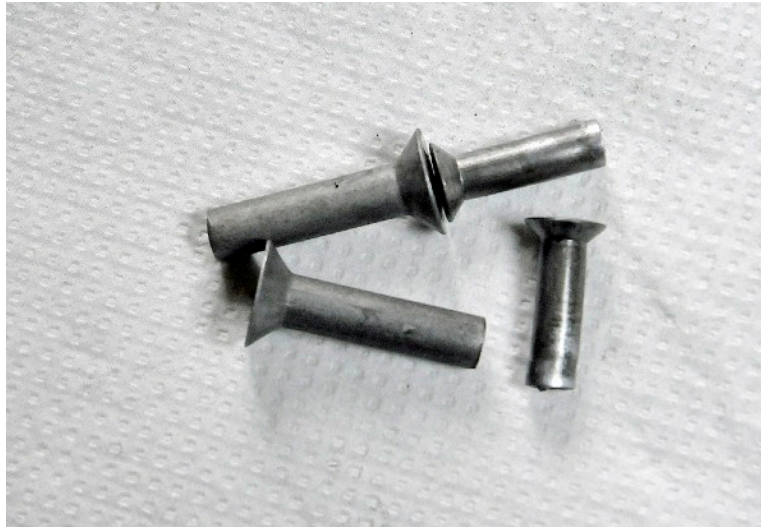
Damping mechanism

It looked as though there were originally eight rubber discs in there but only three of them had survived intact, with a fourth broken and curled in on itself. All of those were on one side of the hub. The other side - the thrust side - had only shredded rubber remnants preventing metal to metal contact. After cleaning the rubber debris out of the hub I had to decide what to replace them with. DS6 parts were not only not available, they never were, even when the bikes were current. But aftermarket discs for the later DS7 and RD250 were available. Whether they would fit or not I had no idea but as they were not that expensive I ordered a set from Yambits along with a set of replacement rivets to reassemble the basket. When they arrived, not only were they exactly the right diameter (22.3mm vs 22.1mm for the somewhat distorted originals) but also virtually the same thickness (9.3mm vs 9.0mm). They fitted perfectly into the hub recesses and reduced the rotational movement to only around a millimetre or two, and that dependant solely on the rubber compressing.



New discs in place

The rivets however were not such good news. The replacements were 6mm diameter versus the original's 5mm and so would not fit without drilling out the holes - something I was reluctant to do. The countersunk heads were also 2mm wider than the originals and would need reducing to fit the basket recesses. The prospect of having to try and peen the rivet heads was also something I could not do satisfactorily. In the end I decided to tap each of the 5mm holes to M6 and use high tensile screws plus permanent grade Loctite on the basis that if it didn't work I could still use the larger rivets. Screws plus Loctite is the method used by a number of aftermarket clutch suppliers (mainly in the MX world) so it wasn't completely a step into the unknown. A local screw supplier came up with some 16mm low head socket screws and much to my delight there was enough clearance behind the hub that the screw heads didn't catch on anything. Only time will tell if the screws are a strong enough answer but they seem to be ok so far. If all else fails the spare clutch hub shown in the second picture has my name on it but I'm hoping it won't be needed.



Old vs new rivets



Finished clutch basket

A couple of days later, after the Loctite had hopefully set, I tested the screws for tightness. They didn't budge at up to 20lb/ft on my torque wrench so the clutch was reassembled. Later on, and with some trepidation, I started the engine. Not a sound came from the clutch, and hasn't since. I hope it's a long term fix, but if it isn't then the option of either using the 6mm rivets or drilling and tapping the holes to take larger screws (8mm) still exists.

My guess is that Yamaha didn't quite get it right when they changed from the spring damped hub and realised their error fairly quickly. Whether there was an issue with the 5mm rivets breaking or coming loose I don't know but they'll have upgraded the DS7 to 6mm rivets for a reason. Similarly with the damping rubbers. The early hollow doughnut shaped ones were quickly superseded by the solid rubber discs I used and they continued right through to the RD range of bikes.

2026 update.

I've subsequently put several thousand miles on the bike since the basket was repaired and for unrelated reasons had cause to strip the engine down a couple of times. Each time I've taken a close look at the clutch and checked to see if anything has come loose or worn out. So far though all has been fine. The screws have not loosened or broken, and the replacement rubbers seem to be holding up ok despite the gearbox oil coming out slightly darker than I'd have liked on the last occasion. At the moment I've no reason to suspect it won't continue to work well for many more thousands of miles.