Do It Yourself Comprehensive YZF600R 2nd Gear Fix

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Last Modified: January 16, 2007, jmr

Ok, so I know I started this once before, but I didn't do anything with it. Today I finally decided I'm bored enough to sit here and write it out.

Symptoms of 2nd Gear Problem

1. Second gear pops back out to neutral when accelerating.

   2nd gear dogs worn down, bent shift fork, 6th gear will also have abnormal wear where the geardogs mate to it. Also, your shift cam drum will need to be replaced.
2. Gets stuck in nuetral/second gear occasionally, hard to downshift, or stuck in a gear and cannot get it to do anything. Thats more than likely a broken/bent tab on your shift shaft, and it will have to be replaced.

a couple of clear Plano tackle box's are a HIGHLY recommended idea. You can put all your bolts separated to what they came from, and write on the cover what is in the spot below it and where they came from.

Tools Required:
Asstd. metric sockets

8,10,12,13,14mm are the most common ones needed

1/2" impact gun

Asstd. allen keys/allen key sockets if you can get them....T handle allen's are also a great thing to have.

3,5,and 8mm are the most common ones

Get allen sockets so you can use the torque wrench.

Clutch holding tool (if you dont want to buy one, further down in the thread I have a mini how-to on making your own for like 6 dollars from stuff you can buy at any Home Depot Store.

A head-strap flashlight is a nice addition to have, they are really bright and keep both your hands free.

Carb Cleaner Aerosol Can or degreaser.....might as well clean as you go, it can get pretty dirty in certain areas.

32mm socket (to remove the front sprocket)
28mm socket (to remove the clutch boss/basket nut) (jmr I think this is 27mm)

30mm socket for the oil cooler nut.

NOTE a good digital camera is highly recommended, take MANY pictures as you go along, your reassembly will go much smoother

NOTE2also, do yourself a favor and order a manual for the bike. it will carry all torque specs and such, and have detailed measurements and whatnot.

You will also need a torque wrench which can do INCH pounds, NOT FOOT pounds. Those are a little harder to come by, I don't think most auto parts stores carry inch pounds torque wrenches, but I could be wrong.

Replacement Parts:
(borrowed from other posts, I believe from slug)
1 4TV-15461-00-00 GASKET, CRCS CVR 2 -4.07
1 4FM-12213-00-00 GASKET – 0.99
4 NKG-CR9E SPARK PLUGS -
1 4TV-17261-00-00 6TH GEAR -.56.80
1 4JH-17221-00-00 2ND GEAR -46.49
1 4JH-18511-00-00 SHIFT FORK 1 -20.33
1 4JH-18540-02-00 SHIFT CAM ASSM. -71.77
1 3TJ-11351-00-00 GASKET, CY -10.15
1 4JH-11181-00-00 GASKET, CLY HEAD -25.00
1 4TV-13414-00-00 GASKET, ST -5.57
4 90468-12069-00 PISTON CLIPS –.99
1 (NO PART#) FACTORY PRO SHIFT KIT

You will also need Case Sealent.....Possibly some silicone if you dont want to buy the cover gaskets....although it is said your better off buying the gaskets, its only a cover, and if you use the silicone sparingly/correctly, i wouldnt see why you would have any problems. if your that worried about it though, you can buy gasket paper in rolls from discount or autozone and trace/cut your own gaskets. i believe its the blue paper you want to use. Prices above will vary.

To order your parts, i used www.flatoutmotorcycles.com they had the cheapest cost on all the parts (came out to 279 for what you see above, but upon teardown i also needed to purchase a new clutch boss $56, and a new shift shaft ($36 new). the only thing with flatout is it may take up to 2-3 weeks to get your parts, as they order them to their shop and then ship them out, they do not offer direct ship) Some other good sites are www.dgy.com and www.bikebandit.com i have ordered from both of them, and their shipping is a lot quicker, though the prices are a little higher.

TORQUE Specifications: *NOTE* NM=newton meters
Clutch nut-70nm

Clutch spring bolts-8nm
Crankcase bolts
6mm bolts-12nm
8mm bolts-24nm
cylinder head nuts
initial -20nm
final-35nm
these are the important ones, the rest if your good you can do by hand. If you need any other torque specs, PM me.

Obviously, your initial steps will be to take at least the seat, gas tank, front lower fairings, upper cowling, headlight, and various other trim pieces. this should be fairly straight-forward, the headlight and upper cowling can be a bit tricky, but you will figure it out as you go.

Next, you want to remove the airbox and ram-air tubes from underneath where the gas tank was. At this point, you should see the carbs, and a few connectors under there. Disconnect all your connectors, paying attention for the battery ground strap which is located just above your clutch side cover, almost right above the oil fill cap. After all this, there will still be a plastic cover near the front forks which will have the coils strapped to it. Take a picture of anything you might forget how it fits or where the wires go. I myself took a picture like every 20 min, the more pictures, the less the chance you will forget or put something back on incorrectly.

Drain all your oil and coolant....its a good idea to let the motor drain the oil overnight, even after you drain it all there will be oil everywhere coming out of everything as you disassemble the motor.

Remove clutch cover, generator cover, peanut cover, clutch release/front sprocket cover.

Remove chain...this was a pita for me, all my other bikes were shaft driven. At the back end of the swingarm, there is a bolt on each side with 2 nuts on it. this is your chain slack adjusters. loosen these nuts all the way or remove them. You will need a 24mm I think to loosen the rear spindle nut. It does not need to be removed. After loosening this nut, push the tire/rim as far forward as it will go. After that, you just need to work the chain off. If needed loosen the 2 rear brake caliper bolts to allow the caliper to move with the rear axle.

After that, you should be ready to drop the motor. Bike stands would be rather helpful, but you do not need them. I did mine just on the kickstand...just make sure not to move the bike around to much. I used a car jack with a piece of plywood between it and the motor. Raise the jack up till it barely is touching the bottom of the motor. Remove the front and rear motor mounts. Slowly drop the jack, while keeping a hand on the motor for support. It might want to stick a little bit, so you might have to move the motor around a bit while taking it out. Its heavy, but if your a pretty strong guy like me, you can pick it up by yourself. Another person is a big help(jmr).

After removing the motor, place some plastic sheeting or a tarp down, and set the motor on it. Things

start to get fun now.

Remove the valve cover. On the back side of the cylinders, there will be a protrusion with a bolt in the center. Its the timing chain tensioner. Loosen the center bolt first and be cautious, its spring loaded. Loosen the 2 socket screws at the housing and remove it.

Now, back up at the valve cover. At the front of the valves, there will be a long black rubber/metal piece right in front and under of the front cam sprocket. Grab hold and carefully pull it out, it goes quite far down into the motor. This is the front cam chain guide. Next, remove the timing chain from the cam sprockets and let it set to the side of them. Now, unbolt the cam holders. Unbolt each bolt equally, say a half to full turn or so on each one. Start from the center, and work your way out, going from top to bottom each time you switch sides of the cam gear.

After those are off, carefully lift the cams up and out, but watch the chain does not score the lobes or bearings. Take note to which cam was in the front and which direction they go in and such. The cams are marked 'E' for exhaust, and 'I' for intake. On one end is a disk, drill in the edge of each is a tiny 1/16 inch hole, this is the Alignment mark. NOT the 5/32 inch hole in the disk! The cam caps are also marked and numbered, I1, I2, E1 and E2. Keep these aligned and the bolts in order.(jmr)

Now, below where the cams just were, there will be say....10 holes. They may be filled with oil, so use a rag to clean them out. These are your cylinder head nuts. Get out the appropriate allen socket, and remove them. Use the same technique, loosening each bolt equally. Start in the center again, moving outwards, switching top to bottom. After those are removed, carefully lift the head up and off.

DO NOT turn the head upside down, as all your shims and lifters will fall out.

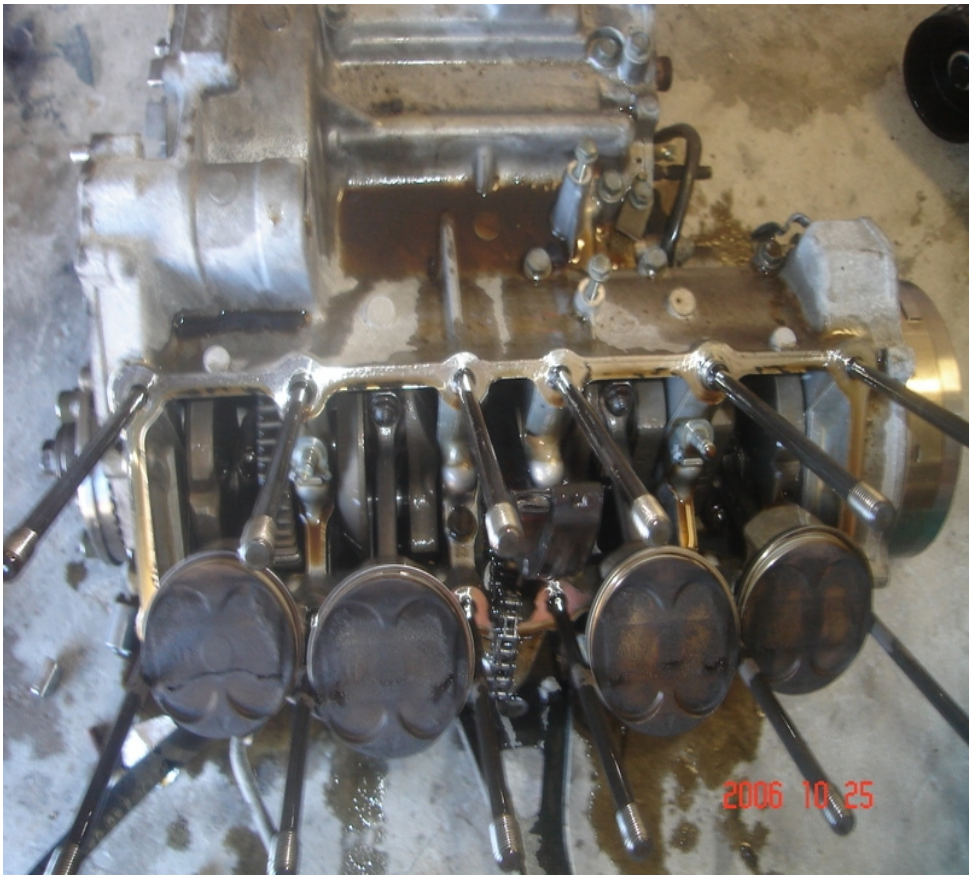
If you get those mixed up, your in a whole heap of trouble and extra work. Place the head down on a shirt or something, where it wont get dirty. Cover it with another shirt or sheet of plastic.
The cylinders are directly below the head. Grab hold, and lift it out. As you lift, the pistons will pop out of the bottom.

Now you have 2 choices. You can either remove the pistons, and later put them back in the cylinders and reconnect them to the rods 2 at a time as you put the cylinders back on. Your other option, is to leave them on, and try to fit them through the bottom of the cylinder as you put it back on. The second is going to be harder, because you need to keep the ring gaps in their appropriate order and try to fit them into the cylinders at the same time.

Actually, the second method is the manual described method. Using 2 ring compressors, you compress the inner 2 pistons and insert into the cylinders. Then compress the outer 2 cylinders, rotate the crank and insert them. This is actually easier than the clip method.

Anyways, there will be small circlips on either side of the piston which hold the rod in that holds them to the connecting rod. Carefully insert the end of a pick or something similar into the small cut back section, and pop them out. Once its out (you only need to remove 1 of the 2 for each piston) push on the other side with your finger and the rod will slide out of the other side. Put the rod back into the piston, and set it somewhere safe. You will need to keep each cylinder matched with its corresponding piston, or you may have problems with the rings once they are re-installed. If you spray the pistons

down and clean them as you pull each one, you can write on them with a permanent marker and make up some sort of numbering system for them.



Now, remove the starter from the motor. 2 bolts hold it in, then you just kind of wiggle it out.
inside the peanut cover (where the starter/idle gear is) you will see a small gear with a rod in the center. Remove this gear and rod, place it somewhere safe.

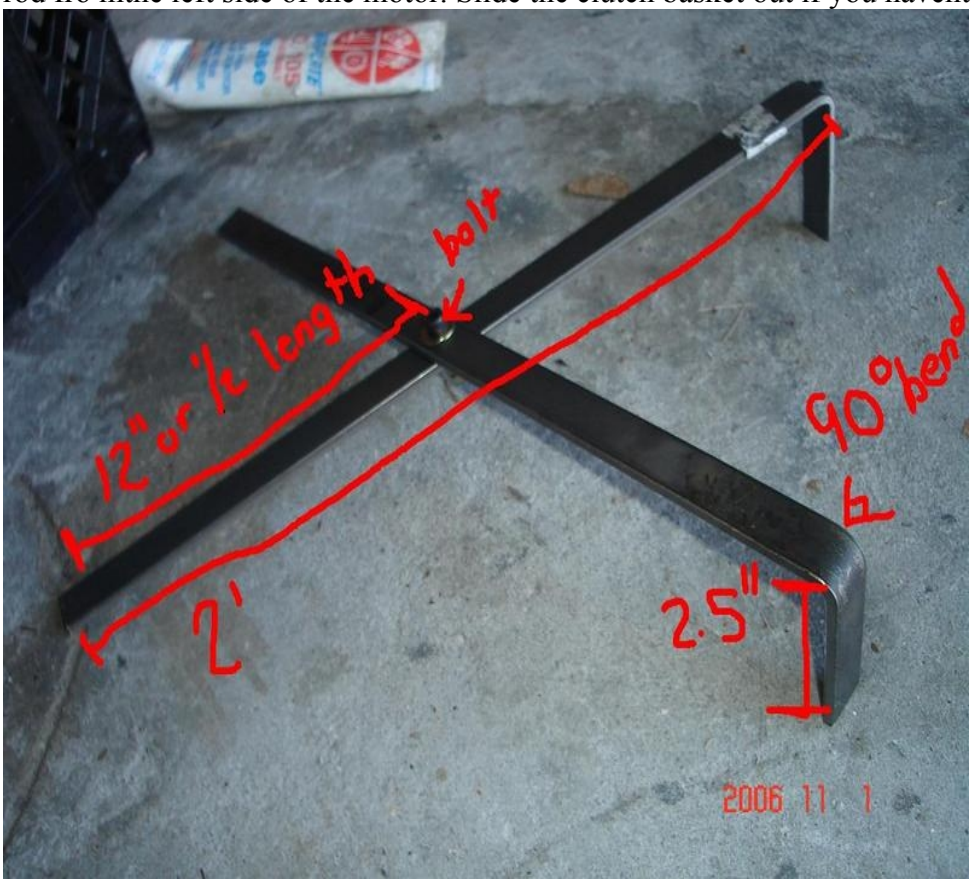
Now, remove the pressure plate bolts/springs from the clutch. Loosen each one equally, and in the same way you would bolt on a car rim, in a star pattern.

YOU MUST KEEP THE CLUTCH DISKS IN ORDER AND IN THE SAME DIRECTION AS YOU REMOVE THEM.

Keep them all together and in order. I wrapped mine in newspaper and taped them nice and tight so that they wouldn't get lost or knocked out of order by anyone.

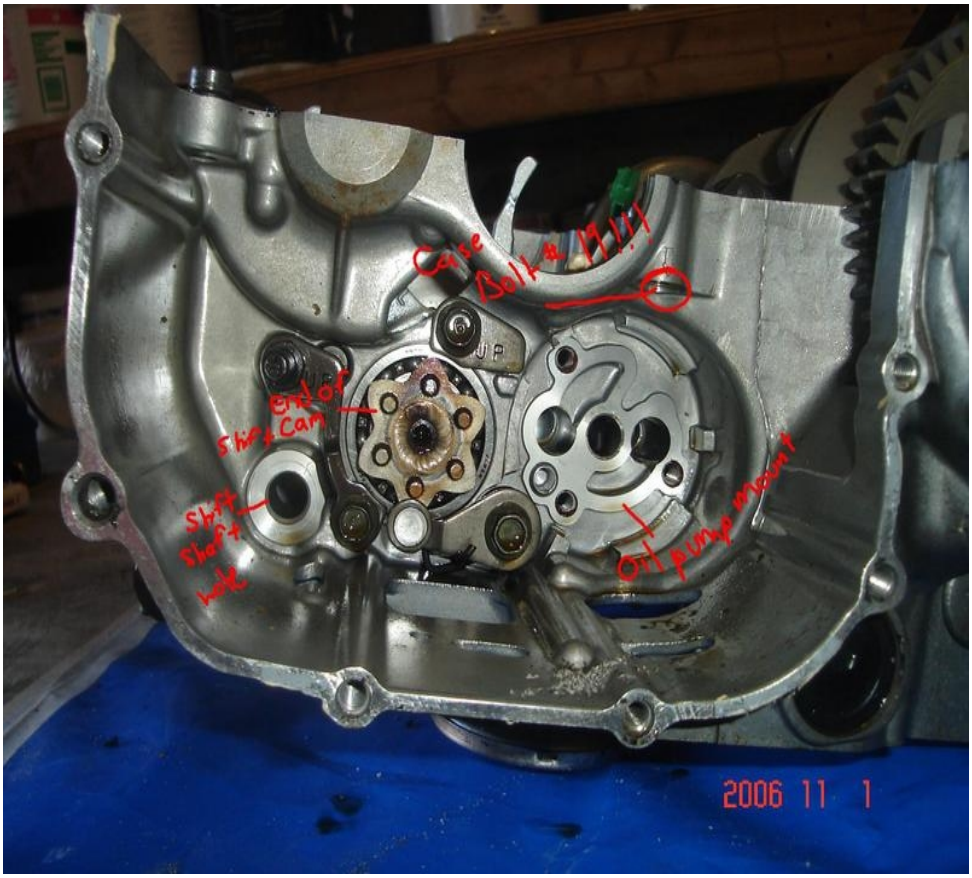
Then use your clutch holding tool (learn how to make your own below this paragraph) it goes on the clutch boss (the center piece with the splines on the outside of it, where the inside of the clutch disks rest). Bend the tabs back flat on the nut-lock, and use your impact and a 28mm(27) socket to remove the nut. Remove the inner clutch boss and disk behind it. Now, you have the remove the sleeves from the clutch housing. Wiggle the cluch basket in and out, and you should see a small sleeve protruding from the center. use a shirt to get a grip and pull it out. There will aslo be a bearing in there you need to remove. Now reach onto the other side of the motor, and push the rod that goes through the motor. a small ball bearing will pop out of the center of the shaft you just removed that nut from. Remove the

rod fro mthe left side of the motor. Slide the clutch basket out if you havent already done so.



^^ this my homemade clutch removal tool. ican make them for you if you need, for materials plus shipping ($15) More expensive ones have vice grips onthe end, which i could make but you dont need if you have an impact gun.

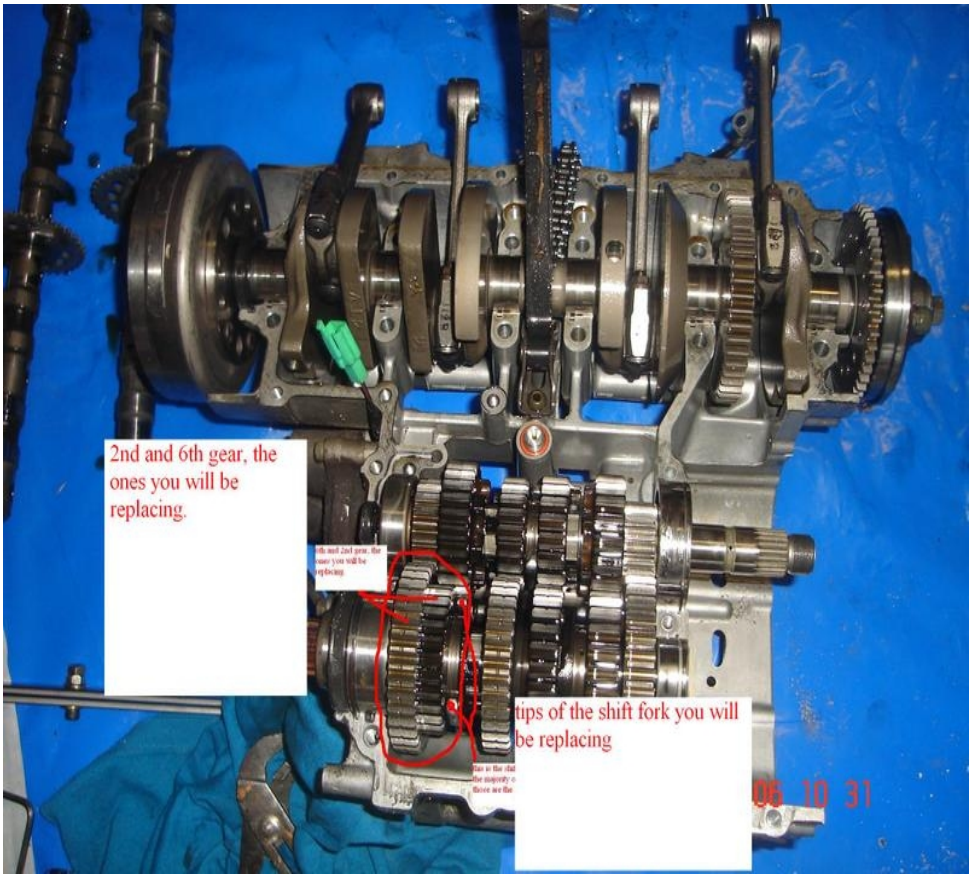
Now go ahead and remove the oil pump (3 bolts that are behind the gear directly behind the clutch basket). there are holes in the gear you will have to put your allen socket through to get to these bolts. Pull it out, set it somewhere safe. NOTE bolt ## 19 is also located in this area, directly above the oil pump. Note picture below.



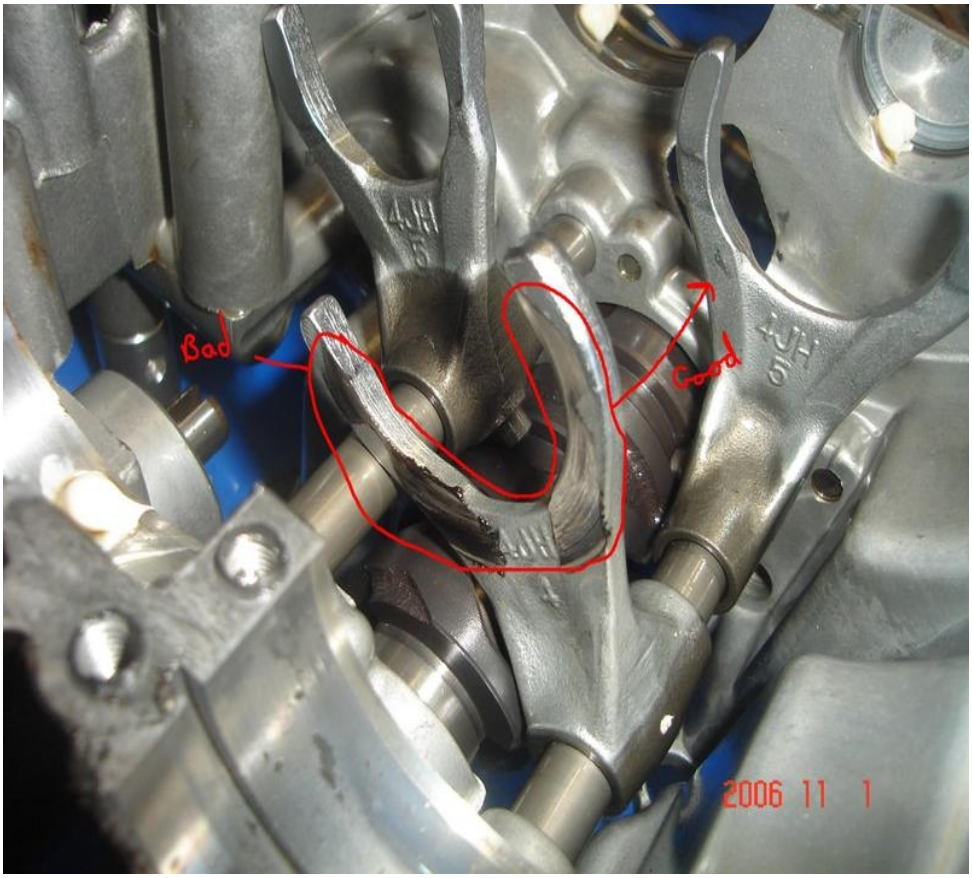
This is a good time to remove and inspect your shift shaft. This is a picture of what it should NOT look like.

Now, on the top and bottom of the case, there will be about 32 -34 bolts you must remove. It is important you remove them in their reverse numerical order. You will ahve to remove the oil pan to get to a few of them on the bottom half. Dont forget bolt 19!!
after they are all off, split the cases. this might be a pita, just use arubber mallet and ONLY hit on the large casting protrusions. IF you hit on the small ones, or try to use a scredriver to pry, you might crack the case or break off one of the protrusions.

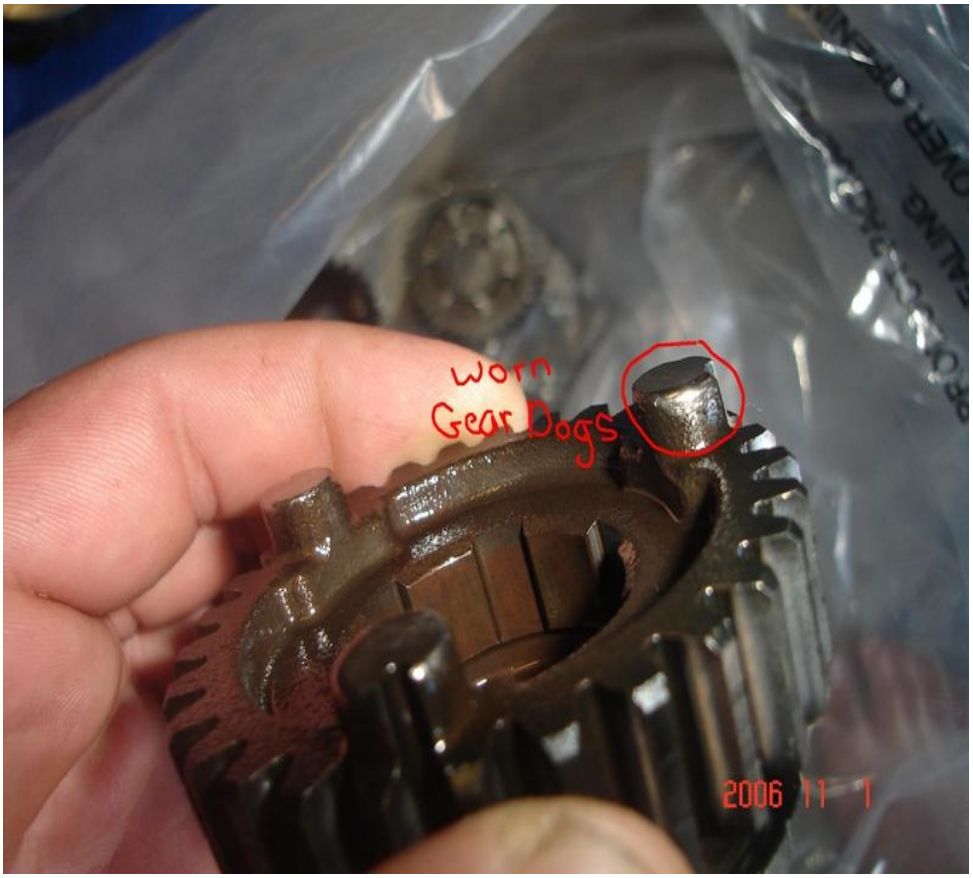
After you have the cases split, it will look like this. This picture also shows what gears we are after. I forgot to mark the shift cam though but you will figure it out.



the input/output shaft of the transmisson should now just lift right out of the case. they may feel stuck, but they arent. Just pull you little girl!! jk lol Now, that they are out, this is what it will look like. This picture also shows the abnormal wear on the shift fork.



The shaft i marked before, 2 of the gears on the right side will want to just fall off when you remove the shaft, so be careful.
To get the rest of the gears off, you need a pair of snapring pliers to remove the snaprings from each gear as you slide them off. Here is a picture of what the wear on 6th and 2nd gear looks like.


Worn
Gear Dogs
2006 11 1


Normal Wear
Excessive Wear
2006 11 1

The shift forks come out by removiing the shaft and shift cam, which is held in by 2 or 3 bolts where the Star ppiece with the nubs i mentioned earlier are.

Reassembly....you have the torque specs, you have the pictures, and you hopefully have your manual and good memory

A good thing to have is some assembly lube, put a small layr of this on all the cam lobes, cam bearings, shaft bearings...you get the idea. this is what the tube looks like :

This lube is made for assembling motors, it will not hurt anything. Make sure to change your oil about 600 miles after you put her all back together.

make sure you have lots of room for parts!!!

thats not even half of them lol

Any questions feel free to PM me, or if you have any advice to add, post it up.

Mike

Last edited by Mike...yeah, its me. on October 31 06, 5:07 pm; edited 1 time in total