

Changing A Timing Chain

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 Wednesday, 01 December 1999
 Last Updated Tuesday, 19 July 2005

Timing chains stretch and need periodic replacement. This period of miles can run from 10,000 on up (I stretched mine severely at 16K miles). The symptoms are a "skeletony" rattling sound from the front of the engine, poor idle and, with a strobe light, timing marks that jump around. OK, so you have decided to replace your chain. Here what you need, in advance:

- Timing chain (I use the master-link ones from Capital Cycle or from EuroTech)
- Timing chain tensioner (different for single vs double row chains)
- Tensioner spring (for double row chains)
- Seals for the camshaft (1970 through 1978)
- Seal for the crankshaft (all)
- Paper gasket for timing cover (you need to buy or make two round single bolt gaskets for the 2 top-most timing cover bolts)
- Fork oil
- A couple of cans of spray carb cleaner
- Gasgasinch gasket dressing (my preference)
- Anti-sieze for exhaust nuts

Other-than-routine tools needed:

- Exhaust nut wrench
- Alternator rotor puller
- Propane torch
- Puller for ball bearing on end of crank shaft
- Bolt cutters (these have to be big enough to do the job of cutting through a double row chain, but small enough to fit around it in the tight area of the front of the engine. I use a #1 cutter, made by H K Porter, Inc, it is 24 inches from one end to the other)

Getting started: I, having done this a number of times, budget about three to four hours to do this task. I've done it in two hours with everything going well. Sometimes you find the exhaust nuts are frozen on. Sometimes the universe is just not going to let you get that keeper/clip on the timing chain until you have REALLY demonstrated you want it. And so on. First time? Four hours: minimum. I would place this in the "advanced intermediate" category of difficulty.

Change oil if it is nearing that time. Turn engine to Top-Dead-Center. You have to clear away obstructing parts first: namely the front wheel, fender and exhasut system. Drop the exhaust pipes and headers, pull the front wheel and remove the fender/lower sliders, after draining fork oil (now might be a great time to do fork seals too...). It helps to have the bike on the center stand and a couple of 2X4s to get the front end up. Now remove the tank, disconnect the battery ground cable, loosen the carbs and remove the air cleaner assembly. Remove the starter motor cover, this is the cast aluminium piece on top of the engine block, you may have to undo the coils and move them out of the way to accomplish this.

Now you remove the alternator stator assembly; three small allen bolts hold it to the timing cover. Label the wires or draw a picture as you pull them off if you are not familiar with what goes where. Use the rotor puller to get the alternator rotor off. remove the diode board. If your BMW is pre-1979, remove the points plate, with points still attached. Later bikes: remove the two allen bolts and remove the points can ('79 &80 bikes) or the electronic sender unit (later bikes). You now should have all the wires loose, so move the bundle that exits at the top of the timing cover out of the way. Move the wires that thread through the cover as well. Again, label or draw pictures if you have ANY doubts as to remembering what goes to what connector!

Time to pull the cover. Remove the dozen allen bolts and nuts that secure the cover to the engine block. Get all the washers underneath these - "a magnet-on-a-stick" really helps. On some bikes, there are bolts of differing lengths, so, pictures or labels! Heat around the area of the crankshaft as there is an "interference fit" between the cover and the ball bearing underneath. Get it so it sizzles slightly when you spit on it. Tap with a small plastic or rubber hammer as you pull, it should come forward and off easily. set aside. A little oil will fall out (an oz or so), so be ready with a pan. You now can view the timing chain. The ball bearing on the end of the crankshaft should be pulled off. Sometimes they just come off in your hands with a good tug. I have the factory puller for this job but have seen other pullers used. Be sure to put a metal pressure pad on the end of the crankshaft to preserve the taper and threads. Stuff bits of rag or paper towels into all the various holes and orifices into the engine, as you will either be generating chips or working with easy-to-lose small parts. Remove the spring tensioner (double row chains) and spring. They are held on with two nuts. Now, you use the cutters to cut the chain, if it is a double row continuous chain. If this job has been done on this particular bike before, you are

probably lucky and already have a master-linked timing chain. Then, you don't need the cutters and simply undo the master-link. If you have a single row chain (1979 and newer) you have a master-link. OK; the old chain is off. Using the carb cleaner, you want to clean any internal grunge out of the compartment and clean up the edges where the new gasket will be. Look at the two cogs, the little one on the end of the crank, the bigger one is on the camshaft. Check the teeth for wear. Usually, they exhibit little or no signs of erosion of metal and can be left in place. If this is the third or fourth timing chain, it may well be time to replace the cogs as well. These require pullers and installers that are specialized to this application. As the need for this part of the task is rare, I won't go into it here.

Make sure the two shafts have not moved. Make sure the engine is still at TDC. The upper (smaller) cog has an etched line, this faces down (6 o'clock). the lower (larger) cog has its etched line at the 12 o'clock position. The locating keys are at 9 o'clock for the upper cog, at 12 o'clock for the lower. The new chain is laid over the cogs, I find the master-link goes on easiest at the 2 o'clock position of the lower cog. The link goes from front to back, with the keeper part behind the chain. The open part of the keeper faces away from the direction of travel ("little fish swim downstream") is a good way to remember this. It is a bit of a pisser to work behind the chain getting the keeper and clip in place. This is not a part of the task to be in a hurry about. Take your time, get a stool, clean the tools and be sure those holes are blocked. Here again, the magnet-on-a-stick helps. I use a combo of needle nose pliers and a good screwdriver to push on the clip. Sometimes I get it on the first or second try; sometimes on the 26th. OK. Chain in place? Time to install the tensioner. On double row chains, the tension is supplied by a spring, the single row ones get the force from a plunger that works off the oiling system. The springs should be replaced with the tensioner, which should be replaced with every new chain. The later oil-driven system does not need to be replaced (but the rubber/steel tension block does). The ball bearing sometimes just pushes on. Most often, it does not. I heat it in a tin can with an inch or so of oil, on the stove. This is NOT a walk away and maybe forget thing. Stay by and when the oil is hot enough to make noise when a drop of water is dropped in, turn off the stove and fish out the bearing with a piece of wire. With a gloved hand, it should slip on the end of the crankshaft nicely. Didn't quite get it? Pull it off and repeat. Time to replace the cover. Renew the seals if you need to. I like to use gasket dressing "Gasgasinch" (it's popular with VW rebuilders) and apply a thin coating to both metal surfaces and the gasket. Let dry. Install gasket on engine side. Install two separate gaskets at the two uppermost holes for the cover mounting bolts. I cut up spoiled gaskets to make these, or you can buy them as they are a separate part with a part #. After the ball bearing on the end of the crank has cooled, heat up the cover to the same degree of "sizzle hot" as when you took it off. You want to center the lower hole over the camshaft, especially for the '70 to '75 (smaller cam seal) BMWs, otherwise the cam seal will leak, behind the points plate. The hot cover should slip over the ball bearing and seat against the engine. Once you are sure it is centered over the camshaft (early bikes), install the bolts. They are torqued to 8 Ft.Lbs. Replace the points plate, points can or electronic sender unit. Replace the diode board, alternator and stator unit. Rewire per your notes or pictures. Once you are sure the wiring is right, replace the starter cover, put coils back if you moved them. Aircleaner goes back together as well. Exhaust system goes back together now. Hook battery back up. While the view is still clear in front, check and/or reset timing with strobe light. Timing OK? Points cover goes on. Replace fork lowers and fender assembly, renew fork oil. Replace front wheel. You're ready to ride! Timing chain are one of those gradual wear items. Sort of sneak up on you, the noise and all. If it was time, you will find the increased quiet and smoothness rather dramatic.

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