



# Removing Broken Bolts

By Copperhedz

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Here's what I've come up with. Broken bolts are something we've all dealt with and including myself screwed up more then can be fixed. A good friend of mine showed me how to extract a broken bolt without screwing up the threads in the engine block, I just want to share it and hopefully help someone. All it takes is a little time and patience.



This pic shows some of the tools for the job:

- Drill Index
- Easy outs
- Grinder
- Center Punches
- Drill Bushing
- Hand Drill
- 6mm Tap



When a bolt is broken off, First thing is to take the cover off, if the nub of the bolt is still protruding out and theirs not enough to apply a wrench, Take a grinder and grind it down flush with the engine block. Make sure not to grind into the machined surface of the engine block.



Once you have it flush place the cover and use only a couple bolts to hold it in place. Using a 1/4" center punch, insert the punch into the hole that has the broken bolt and tap the punch until there's an indentation in the center of the hole.



Using a tool called a drill bushing, its a bushing with a 1/8 hole through the center to keep the drill bit in the center of the bolt as your drilling through it. Its important to have a sharp drill bit so to keep the bit from wondering to the threads.





Place the drill bushing in the hole and with an 1/8" drill bit, start drilling. Do not apply a lot of pressure as it will cause the bit to wander. Take your time, when the drill bit gets close to the end of the bolt, it will in most cases start grabbing more metal, because the metal is getting thin at the end of the bolt and we don't want to break the bit off in the bolt.



After drilling through the bolt, remove the drill bushing and cover. The hole in the center of the bolt will be the guide for the next size drill bits, Which is a 9/64" The last bit to use is a 5/32" before using an easy out, Fill the hole up with penetrating oil or PB blaster and let sit over night. This will better the chances of getting the bolt out.



Using a 1/8" easyout, Tap the easyout down into the bolt until its tight. Take an ajustable wrench and screw it out. Do not get aggressive With an easyout, It will break



The broken bolt is out. In some cases bolts are hard to remove, even with penetrating oil and an easyout. In this case, Go up to the drill bit size that will leave just enough of the bolt without getting into the threads. Take a small chisel or punch, Start tapping on the punch to knock the thin part of whats left of the bolt to the inside, If the bolt has been dilled out thin enough it should come loose from the threads with easy. After 3/8" of the bolt has been removed, Blow out the chips in the hole with compressed air. Apply wd40 or cutting oil, Take a 6mm tap and ease it down until it tightens up, Take the tap out and blow it out again. Do this proceedure until all of the bolt has been extracted.

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