

Build Your Own “Extracycle”

The popularity of “extracycle” (from the brand “Xtracycle”) or “longtail” cargo bikes has been increasing recently, but commercially-made frames and extensions are expensive. Meanwhile, beat-up “normal” bikes sit around in garages and can be found in most dumps. This is a way to turn a pair of normal frames into a longtail bike. It doesn't require welding, just cutting, drilling, and bolting. Credit fro the design goes to Matt Seitzler, who recently led a workshop on the process at the Davis Bike Collective.

Tools You'll Need:

- Power Drill
- Vise
- Hacksaw
- Wrenches
- Bike-specific:
 - Crank Bolt Wrench
 - Crank Puller
 - You might need bottom bracket tools.

Parts You'll Need:

- Two bike frames
- Two left [cranks](#) (square/diamond taper)
- Two M8x1.0x30mm bolts
- Two washers that fit the M8 bolts
- Two other miscellaneous bolts (probably 1.5-2 inches long and 1/2 inch in diameter), with nuts that fit them.
- Everything you normally need to build a bike...

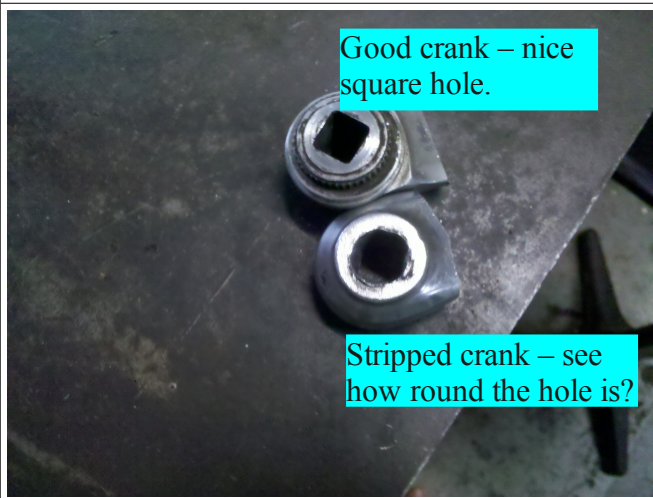
There are a number of tools required for this that are specifically used for working on bikes. You can buy them online, but there's a pretty good chance you can convince the folks at your local bike shop to lend you the tools for a few minutes, and they might even be willing to explain them to you. It's also worth seeing if you have a [Community Bike Shop](#) in your area – they will often let you buy used parts, borrow tools, work on your bike in their shop, and teach you some tricks of the trade.



Picking the front frame: The important thing about the front bike is that it has Y-shaped seat stays (the seat stays are the tubes running from the rear wheel toward the seat). The base of the Y (near the seat) is one of the places the rear bike will attach. If you start with a bike that's intact, all you have to do is remove the rear wheel, the rear derailleur, and the rear brakes, which means less bike-specific work later. I started with a partially complete bike because I have a bike shop at my disposal.

This is the layout of the cargo bike (ignore the tape measure for now). There aren't many specific requirements for the rear frame, but you want the top tube and down tube to pass close by on either side of the base of the Y in the seat stays. The closer together they are at this point, the less bending you have to do later.

That amount of space is really a bit much. Aim for less.



Good crank – nice square hole.

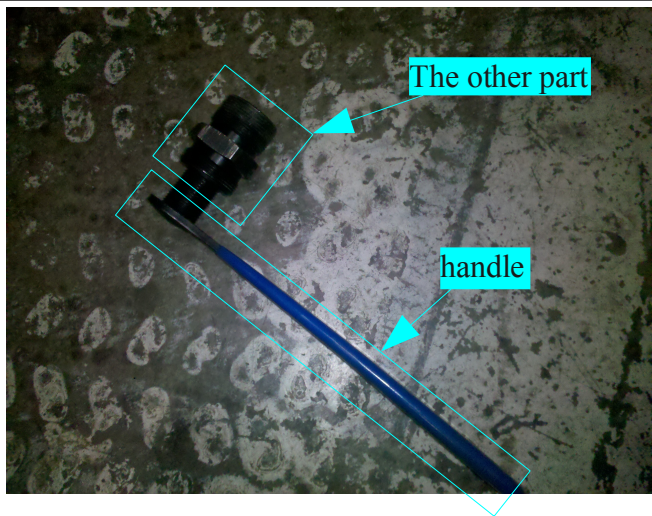
Stripped crank – see how round the hole is?

I had a wide range of parts to choose from, so I looked for things that weren't useful for other projects. The front frame had a severely bent derailleur hanger, one of the cranks was stripped to the point of uselessness, and the rear frame was just something nobody seemed to want.

Note: The cranks at left have already been cut.

You can use a complete bike for the rear frame, too, but you'll be cutting off the front end. You also need to remove the cranks, which are held on both by bolts and by pressure. You can remove the bolt with a socket wrench, but some socket wrenches are too thick to fit inside the crank. A "crank bolt wrench" is a thin-walled socket wrench sold as a specialty bike tool.

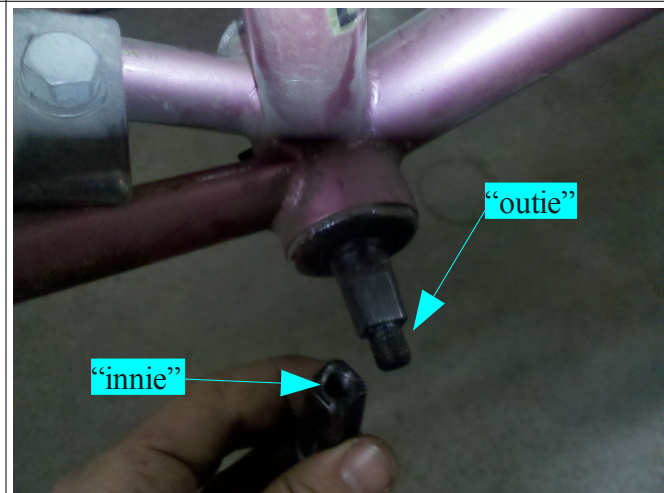




Even with the bolt off, the crank is pressed on to the axle on which it turns. To remove it, you need a [crank puller](#) (at left). The crank puller is made of two parts – the handle and a bolt that extends at a right angle to it, and a second piece that threads onto the bolt coming from the handle. That second piece has threads on the outside which screw into the crank. Once those are threaded in as far as they can go, turn the handle clockwise. It will get harder to turn, and then suddenly easier, at which point the crank should come off easily.

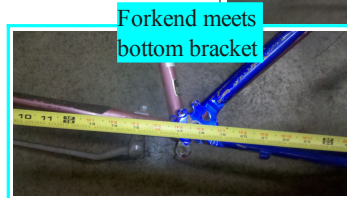
Sheldon Brown has a [longer article](#) on pulling cranks.

With the cranks off, the [bottom bracket](#) axle will be sticking out of the frame. There are two types – the “outie” that has a threaded nub sticking out of either end and the “innie” that has a hole in either end. (These terms are my own, since I don't know of actual names for the two types) For this project, you need an innie. If you can, try to pick a bike with this type of axle and skip the next few steps. If not, you'll have to replace the axle... (There are also [single-piece cranks](#), [cotter axles](#), [splined axles](#), and others, but the two in this picture are the most common – they fit square taper and diamond taper cranks (or “cotterless cranks”). The others, with the possible exception of certain splined axles, won't work for this and often can't be replaced.)



My rear frame has the wrong kind of axle, so I'm going to replace it. This deserves it's own tutorial, so I won't cover it here. “Bicycle Tutor” has a [video](#) on repacking bottom brackets, but you don't need to clean, regrease, or adjust the bottom bracket – just tighten it as much as you can.

Lining up the frames will give you a better idea of where to cut. Arrange them so the bottom bracket axle of the rear frame is aligned with the rear forkend (where the rear wheel attaches) on the front frame, and try to get the rear forkends of the rear frame in the same line as the forkends on the front frame. Mine are above the line, so the pedals will be low to the ground.



Cut near this line.

My hand

It's about time to chop up the rear frame. While the bikes are aligned on the floor, mark the rear frame just behind the seat tube so you know where to cut.

Make the cuts! Just follow the lines you marked. I used a hacksaw, but a bandsaw would be quicker if you have one. (You can also cut up bikes with a large pipe cutter.) I like putting things in the vise when hacksawing.

If you aren't a frequent hacksaw user, keep in mind that the blade only cuts in one direction (usually when you're pushing on the handle, unless the blade is in backwards), so don't press down when you pull the saw back – it will only break off the teeth.





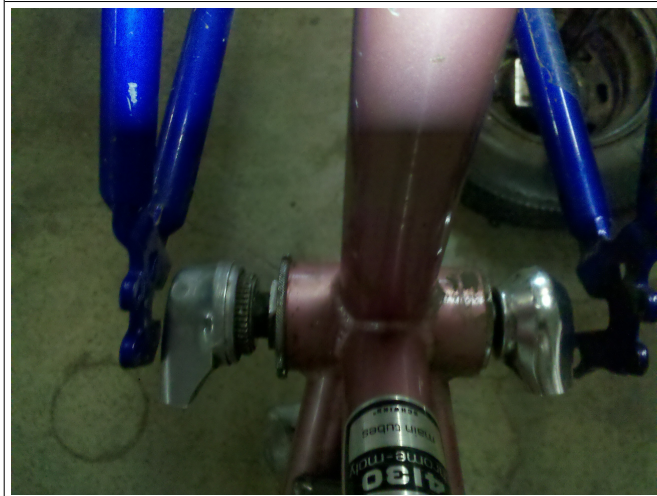
My initial cuts were a little long, so I had to go back and remove a little more tube. Don't cut it too short, though, or you won't have anything to bolt together.

Cut your cranks: At one end of the crank is the squared-off hole where the axle was attached. Cut next to this hole.



The pieces you cut from the crank should slide easily onto the bottom bracket axle of the rear frame.

Usually the rear forkends on the front frame are too narrow to fit the rear frame once the cranks are installed as spacers, but this is easy to fix. Just hold one forkend on the floor with your foot and pull up on the other.



The forkends are almost too wide now, but the rear frame fits between them.

I found it easier to fit the frames together upside down. Put washers on your M8 bolts and thread the bolts into the cranks (just slightly). Then you can hook the rear frame into the front one. Double check the cuts you made on the rear frame, and take it apart again for some bending.





You need a flat surface to bolt through, so put the rear frame in the vise as at right. Make sure it's level, and then start tightening the vise.

Bike tubes are strong, so you might want to put something on the vise handle to give you better leverage.



Keep smashing the tube in the vise. Sometimes it's easier to work on it from different angles, but however you do it you'll probably need to have about three inches of flattened tube.

When you're finished flattening one tube, do the same for the other.



My top tube was too far above the front frame, which will be the case with many bikes. I'm bending the tube down by partially smashing a section of tube in the vise and then pulling on the bike to bend it. Flattening the tube isn't the best thing for structural stability, but it's the only way I can bend it without a torch or a very expensive tube bender.





Reconnect the frames at the bottom bracket and tighten the bolts to hold them together.

The flat parts of the rear frame still weren't quite snug around the base of the Y on the front frame, so I used a C-clamp to help them out.

Drill through the flattened tubes and the base of the Y. Be patient, and use cutting fluid (soapy water is a good substitute).

Put a bolt through your freshly-drilled hole.



Drill another hole and put the second bolt through. Your frame is complete!

You should probably also cut off the sharp corners sticking out from the frame and file them down as much as possible so you don't catch your legs on them.

It's a completed longtail bike! I've already put the wheels on. If you left parts on the frames you should already have a working front brake and front derailleur.

In Part II, we'll install the extended chain and discuss cable extensions for hooking up the rear brakes and derailleur, and then it will be time to build a cargo rack.

