

Make your own bike trailer for about \$20

By Steven Muir

Introduction

Check out my website www.cyclingchurch.org.nz. You might like to consider buying a copy of my very funny book called “PROSACC – Profound Revelations Of Sunday Afternoon Cycling Church.” Also check out the supermarket challenge results which demonstrate how bikes and trailers are better than cars even with a couple of kids along for the ride, and in the rain.

I have now constructed several bike trailers for around \$10 with basic home tools such as drills, hacksaws, spanners and vices. I'm also in the process of producing aluminium kitset trailers that are lighter and look better than the typical trailer made from recycled materials, but they cost about \$100. The trailer described here weighs 19kg compared to the kitset aluminium one which weighs 6kg.

I find they are very useful for doing shopping, taking supplies for biking with kids, carrying my bass amp and guitar, going around garage sales, picking fruit for bottling (complete with 3m ladder), carrying long lengths of pipe for making more trailers, taking my kayak out to the beach or down to the river. The longer I have them the more uses I find for them. Kids love to ride in them and can bike each other around in them if the environment is safe enough. My five year old bikes 2km to and from the local garage carrying our 15kg gas cylinder for refilling and is very pleased with the effort given he can't lift the filled cylinder for more than a meter. The social, spiritual, environmental and health benefits from using trailers are all very good.

Please send any feedback on these designs to thepope@cyclingchurch.org.nz. I'd like to improve them as much as possible so anything that's not clear - let me know.

Recommended Materials

- One old bed made from angle iron (typically \$5 at an op shop)
- One or two old bikes for wheels, brake cables, and tow bars. A women's 10-speed is useful and 20" (inch) wheels off a kids bike are ideal size. 26" wheels are ok but 27" tend to develop speed wobbles very easily. \$5 for an old bike is quite achievable. Preferrable the wheels should have good tyres or you'll soon blow the \$20 budget. Bolted axles are preferrable to quick release, but quick release can be used if that's all you have. Wheelchair wheels are also very good – check out the local wheelchair repair shop in the yellow pages. You will need a bike axle with cones to mount the wheelchair wheel. Bike shops often have old ones lying around.
- One old trampoline spring for the hitch (free).
- About ten 6mm x 20mm bolts, and six 6mm x 50mm bolts all with washers and nylock nuts so they don't vibrate loose (\$3).
- Two bins eg. recycle bins, apple crates, or visit plastic box (might blow the \$20 budget though).

1. Get your old bed and remove the springs using pliers. Mine worked best removing the spring from the wire rather than the frame end of the spring.



2. Remove the right hand end of bed frame with a spanner, or if its welded, use a hacksaw or angle grinder with metal cutting blade.



3. Mark and cut two lengths of angle iron off the two long edges of the bed that are the same length as the width of the bed (typically 900mm). These are the *inside wheel supports*.



4. Cut a further two 100mm lengths off the two long edges of the bed. These are the *outside wheel supports*.



5. Get an old bike and strip it down, removing brake cables, front forks, wheels and main sprocket.



6. Prepare your two wheels for putting on the trailer. Re-greasing the bearings is a good idea with old wheels depending on their condition. For rear wheels a 10 speed type gear cluster can be removed by a bike shop, but with kids wheels just leave the rear gear sprocket on.

7. Drill holes in the centre of the four wheel supports large enough to put the wheel axles through (typically 10 mm). Holes should be centred about 15-20mm from the top angle edge of the metal to allow room for the spanner and bolt to turn.



8. Attach the wheels to both the inside and outside wheel supports and tighten up the bolts or quick releases.



9. Support the main frame of the trailer on blocks. Drill holes and bolt one of the 100mm outside wheel supports to underside of the right hand edge of the bed frame in the centre of the frame, ensuring the wheel is as straight as possible. Use two 6mm x 20mm bolts.



10. Bolt the ends of the long inside wheel support to the underside of the bed frame. Again ensure the wheel and wheel support is as straight as possible. Use two 6mm x 20mm bolts.



11. Get your bins and place them against the long wheel support. Place the other long inside wheel support (with wheel fitted) against the other edge of the bin and mark it's position such that the bin is a snug fit between the two wheel supports.



12. Drill and bolt the second long wheel support into place. Again ensure the wheel and wheel support is as straight as possible. Use two 6mm x 20mm bolts.



13. Place the right edge of the bed frame (cut off at the start) into position, then drill and bolt it to the bed frame and the right hand 100mm wheel support. Again ensure the wheel and wheel support is as straight as possible and the trailer is square. Use four 6mm x 20mm bolts.



14. Construct your tow bar. Ideally it should attach onto your bike at a 25-30 degree angle to allow for right hand turning and have no sharp edges where your spokes might connect with it. The main bar(s) of a bike and handle bars are ideal. Often there are different size tubes on a single bike that can be bolted to make a longer tow bar. Cut the tubes off the bike. I used two of the main bars which were a nice snug fit, then the handle bars which were a looser fit, so three bolts were used to keep it steady.



15. Find a section of pipe that either fits inside or outside your trampoline spring. 22mm external diameter pipe which are common on handle bars will fit inside a trampoline spring or 30mm on the outside. Cut a 100mm section of the pipe.



16. Place a length of brake cable (>300mm) inside the pipe and squash 20mm of the end of the pipe in a vice.



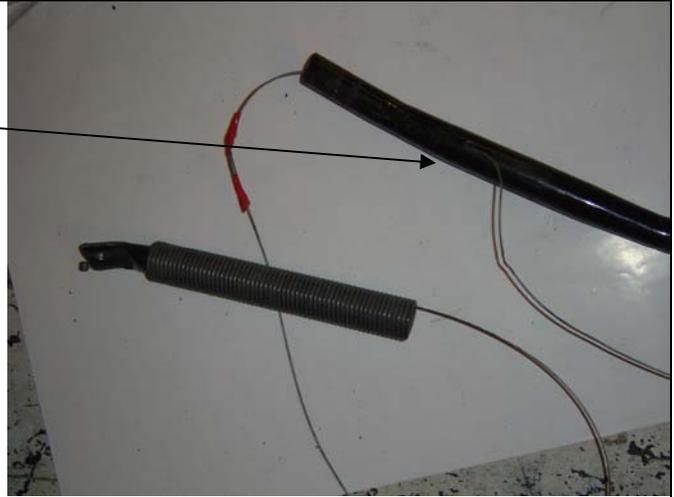
17. Bend the squashed pipe with a hammer to about 20 degrees. Don't over-bend it or it may crack after a bit of use. This is where the trailer will bolt on to the rear wheel of the bike. You could avoid this step by buying one of my pre-made hitch bases for \$15, which is stronger and gives a better angle.



18. Drill a hole through the squashed section of the pipe about 12mm from the top left edge. Use a 10mm hole for bolted bike axles or 6mm hole for quick release bike axles.



19. Put the hitch together with the brake cable through the centre of the trampoline spring and through a hole drilled in the end of the tow bar a few cm beyond where the spring will end up.



20. The trampoline spring needs to be held firmly in place between the bent end of the hitch and the wider section of the handle bars. There should be about 1cm of space between the two ends of pipe surrounded by spring. If you are not using handle bars with a natural widening a bolt can be used as a stop for the spring.

21. Cut the head off the handle bar stem to be used to clamp the cable

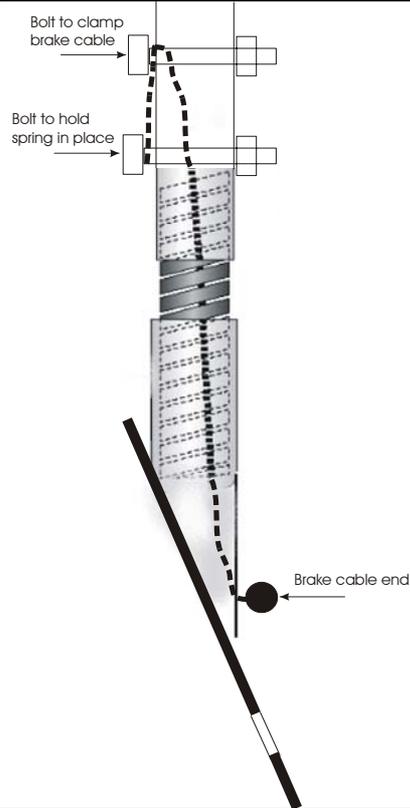


22. Pull everything as tight as possible and wind the end of the cable twice around the handle bar stem head, then tighten the bolt to clamp the cable to the tow bar. Alternatively a bolt and washer right through the pipe can be used to clamp the end of the cable.



23. Diagram of a hitch

Note that this is not the same as the one in the photos, but shows the spring being held in place by a bolt, and the cable being clamped with a bolt rather than the handle bar stem.



24. Bolt the tow bar onto the trailer frame at approximately 25-30 degree angle. Use two 6mm x 50mm bolts, one on the front of the trailer and one on the edge.



25. Cut a piece of pipe off the bike to use for a brace. One of the rear wheel supports has a nice bend that helps line it up with the bottom of the tow bar which is lower than the frame of the trailer.



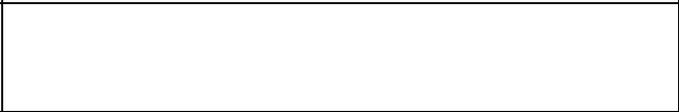
26. Bolt the brace between the frame and the tow bar (underside of the trailer).



27. If there are not already holes where the springs were removed, drill some holes for hooking bungy chords into.



28. Fit a safety rope from your bike to the trailer frame in case the hitch should fail for any reason.



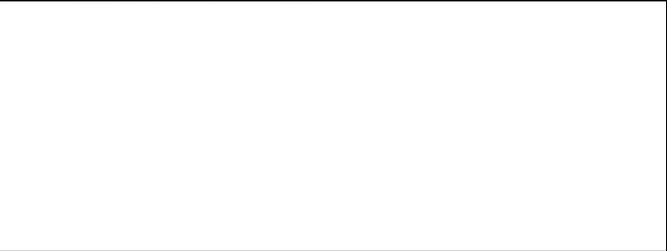
29. Fit the trailer to your bike using the rear wheel bolt or quick release.



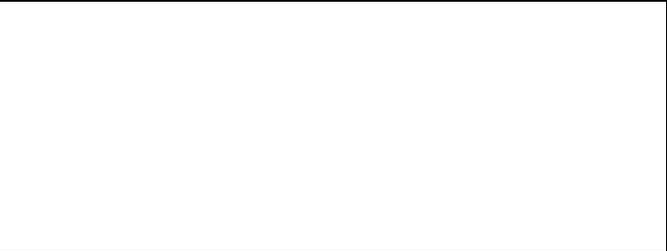
30. Check what happens on a hard right turn. Make sure the tow bar hits the rubber of the wheel and nothing touches the spokes (unless you want expensive wheels repairs).



31. An optional flag can be constructed from an old ski pole or fishing rod. Some sort of fitting for rear lights is also good for night riding. Making your own lights with high intensity flashing LED's is good, using an old 9V smoke alarm battery and a 400 ohm variable resistor to limit the current.



32. Optional 10mm galvanized threaded rod can be welded or bolted onto the front of the trailer with nuts and washers, so that front forks of a bike can be bolted on – very useful for carrying the kids bikes when they tire out, or collecting bikes from garage sales.



33. Optional wheel guards are useful to prevent loads getting caught in the spokes (eg dogs tail).



34. Ride the trailer everywhere and have a great time.



Safety hints

- Take it easy going up onto footpaths – it's easy to clip the square edge of the curb and flip an unloaded trailer.
- Don't overload the trailer. They typically cope easily with 70kg. You can carry more than that but you need a third pivoting wheel at the front to support the extra weight. The third wheel is also good for loads that move or are unbalanced eg pets.
- Go easy on right hand turns. The tow bar can rub against the wheel. U-turn to the left.