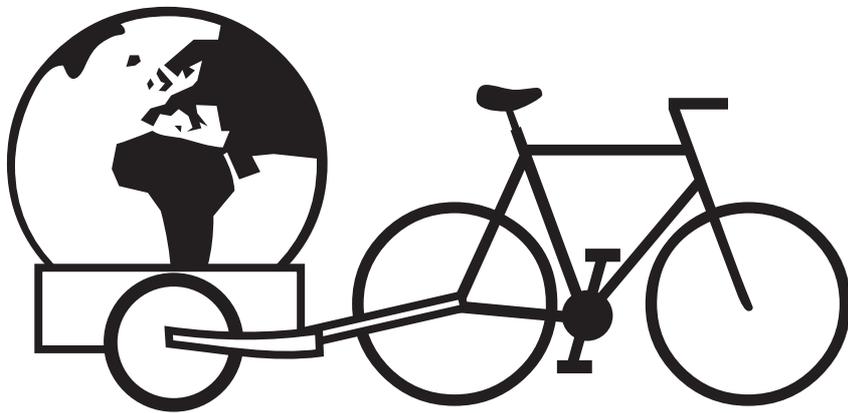


Re~Cycled Bicycle Trailer

Construction Guide 1.0



2003@Re~Cycle

Take an unwanted bike lying in the UK, ship it to a country where it's really needed and teach the local people the skills to fix and maintain it.

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WWW.RE-CYCLE.ORG
(Online donations accepted)



Introduction

Transport of people and goods is vitally important to any economy. Where motor vehicles are not available, a sturdy bicycle trailer will enable traders and farmers to move goods, machinery, tools and materials further and faster than they could ever be carried on foot. Fetching water is another critical use, rather than carrying it or using a wheelbarrow, leading to saved time and cleaner / healthier living.

We set out to design a robust, low cost, simple trailer made from globally available materials and unwanted bicycle parts. Any moderately technically minded person can succeed in this project.

Ideally it should be welded together using a simple arc welder, or it can be assembled using nuts and bolts if no welder is available.

It has been designed to carry heavy loads (up to 100kg) and has been refined to interfere as little as possible with the safe and comfortable handling of the bicycle. This is achieved by mounting the trailer to the cycle's rear axle (rather than the seatpost) using a specially designed, flexible joint (again using bike parts!). *Please note that if you make refinements to this design, we would very much like to include them in these documents. Please email trailer@re-cycle.org with suggestions. Updates will be posted at www.re-cycle.org*

Ingredients

Old bicycle parts:

2x Forks of the same length. Avoid extra thick mtb/bmx forks as they do not allow for attachment to the frame using the standard spindles.
1x Bicycle frame with standard top tube (not ladies style)
1x Standard type stem (not A-headset)
Handlebars (aluminium racer or steel straight bars)
2x Wheels, 20" or smaller.

To buy:

4m of 25mm angle-iron
150mm of 3mm wire rope
2 Small U-clamps
1x Length of pipe bender*
Metal Primer

If you plan to bolt your trailer:

5x 6mm bolts (50mm in length)
10x 6mm bolts (20mm in length)
15x Nyloc nuts

Tools needed:

Hacksaw
Vice (optional)
10mm spanner
Adjustable spanner
Drill + 3mm, 6mm and 10mm drill bits
Pliers
Metal File
Arc welder (optional)

* A pipe bender (or plumber's spring) is a metal tube made from spiralled steel, essentially a very strong, tight spring. It is normally inserted into metal pipes allowing them to be bent without them collapsing. Here it is used to make a flexible joint between the bike and the trailer. It has the crucial benefit of being flexible without expanding or compressing.

Concept: Richard Andrews

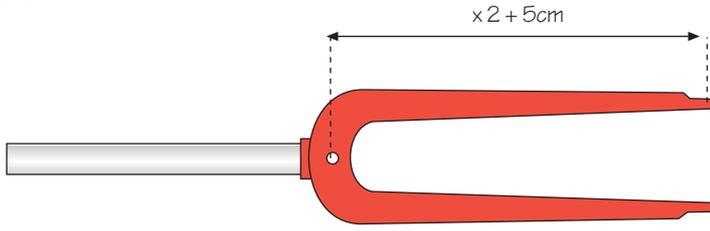
Realisation: Ian Benford

Tweaks: Michael Weltikle and Merlin Mathews

Instructions: Henry Godfrey (henryg@ukonline.co.uk)

Thanks to FIDEMA PROJECT

1.

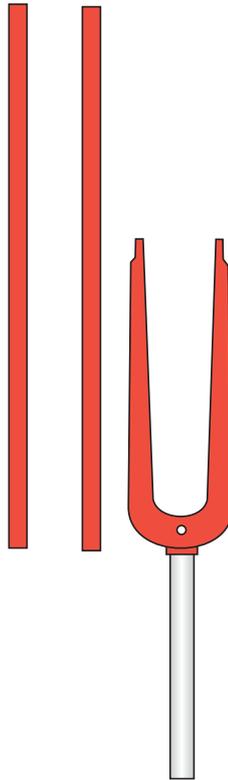


Lay one fork onto the ground and measure the distance from the crown to the dropouts.

Multiply this measurement by two and add 5cm (2"). This will be the length of your trailer.

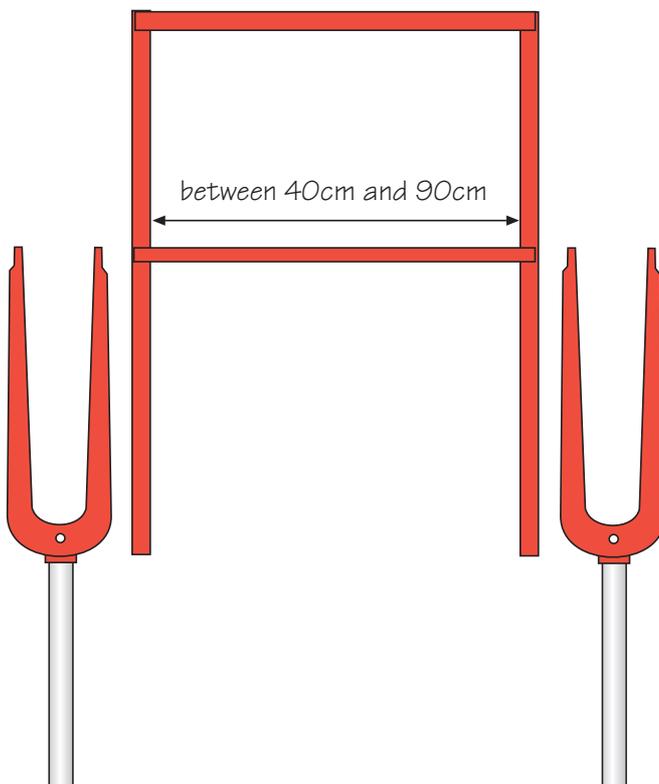
Any longer and it may be unstable when loaded.

2.



Cut two sections of angle-iron to the required length (given by step 1).

3.

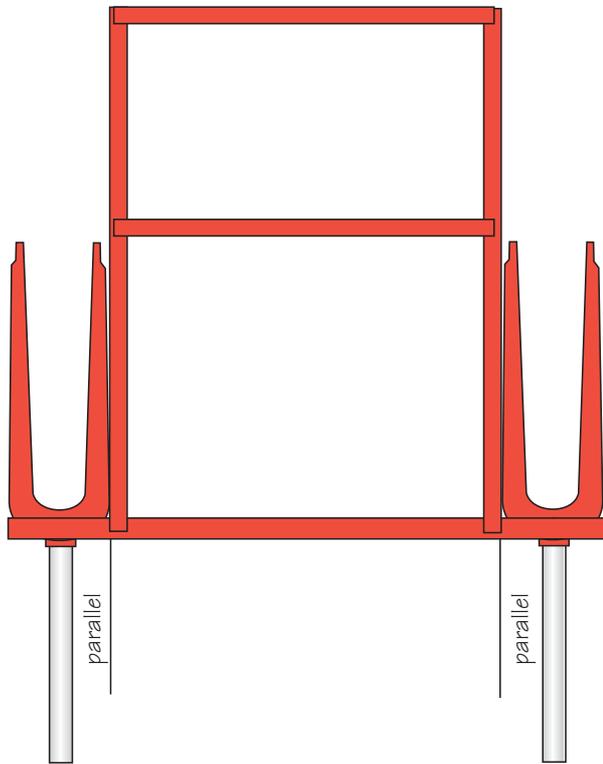


Decide how wide you would like the trailer to be. Ideally it should be between 40cm (16") and 90cm (3').

Cut two sections of angle-iron to your chosen length and position at the rear end and at the middle point.

Tip: You may wish to design the trailer around a standard size, e.g. bread crate, or water barrel.

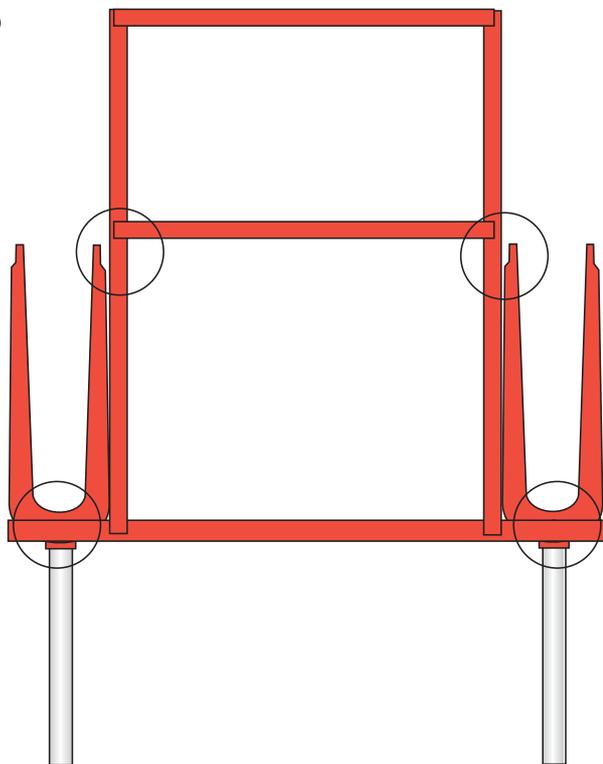
4.



The final cross section needs to be long enough to attach both forks to.

Before welding or bolting, ensure that the sections are all square and that the forks are parallel with the trailer frame.

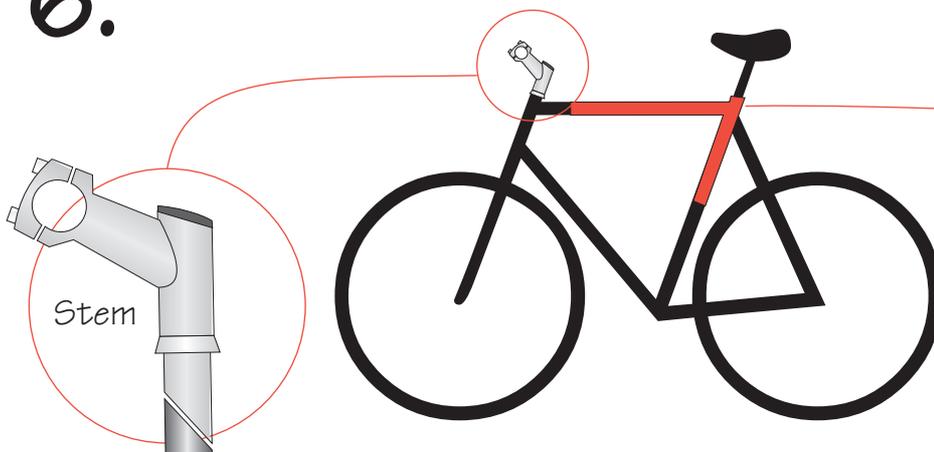
5.



Mark the points where the wheel axles will go through trailer frame and drill holes on both sides first using a 6mm bit, then widening with a 10mm bit. Its very important to get the holes centred for the wheel axles. Too low and its difficult to get the nuts on, too high and the angle iron will be weakened

Now you can weld or bolt the frame together. If you plan to bolt the trailer, you can use the brake holes at the top of the forks.

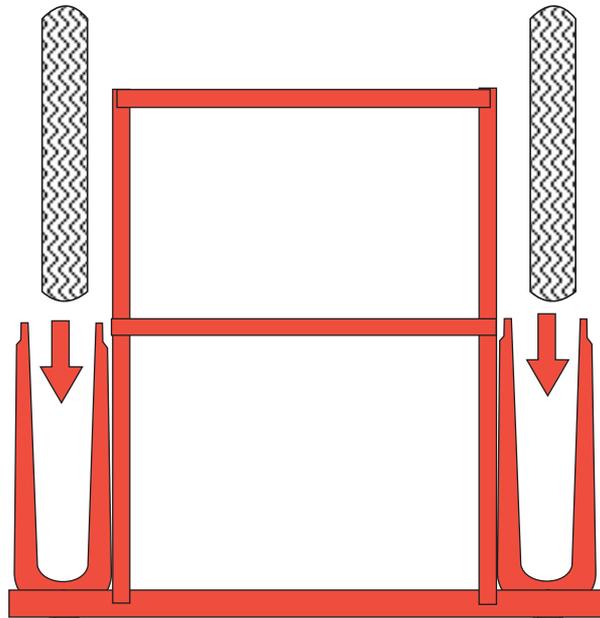
6.



From your bicycle frame, cut a section that includes the top tube and the seat tube. This will form the towing bar.

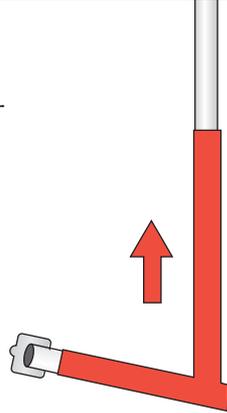
Also remove the stem and the handlebars.

7.



Cut off the right-hand fork stem and file off the rough edge.

The section of frame should fit over the fork stem giving extra strength.

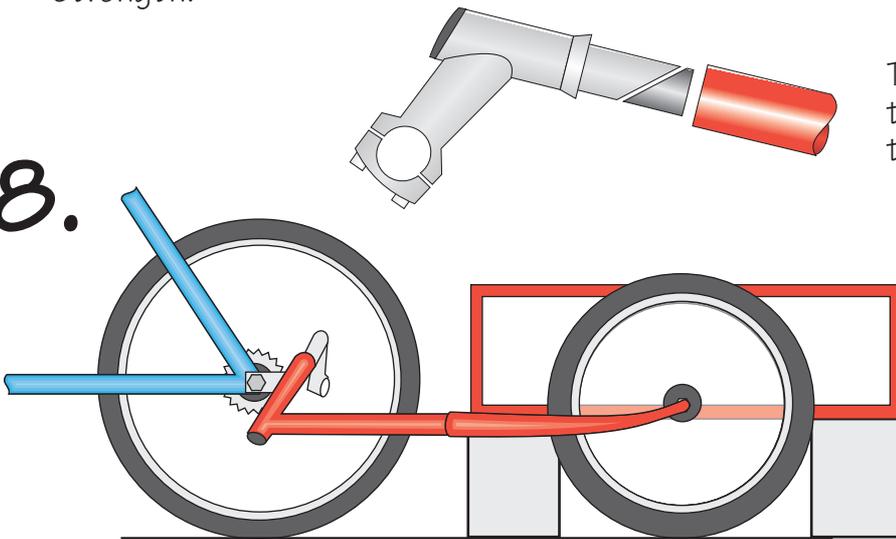


The next part is the towing bar. It needs to line up exactly with the left hand rear wheel mount.

The towing bar will be welded in place later.

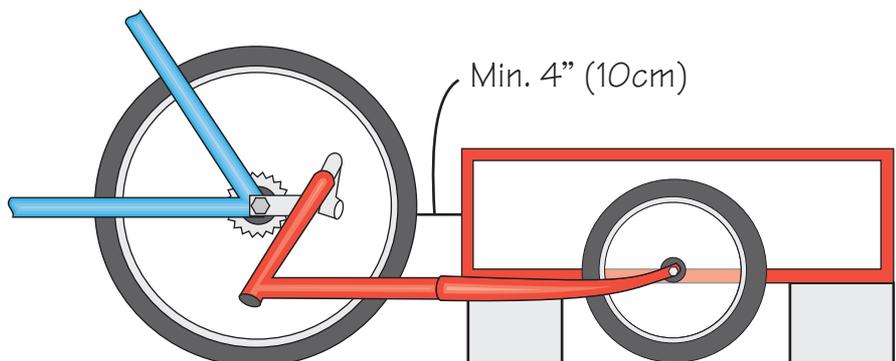
The stem fits into the top end of the towing bar.

8.



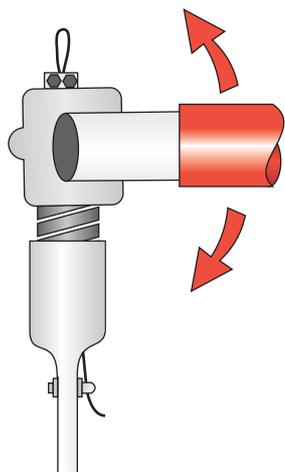
The angle and length of your towing arm will vary according to the size of your wheels.

Attach the wheels and place your trailer onto blocks so that it is completely level.



Min. 4" (10cm)

When lining up the arm to fit onto the fork stem, so that the trailer is level and the bike centred, use a felt tip pen or similar to mark the points on both parts. These can then be lined up in a more convenient position for welding or drilling.



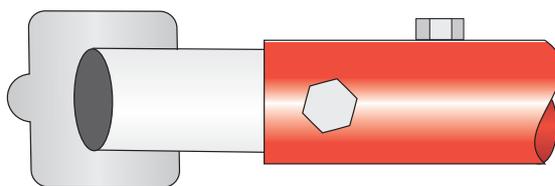
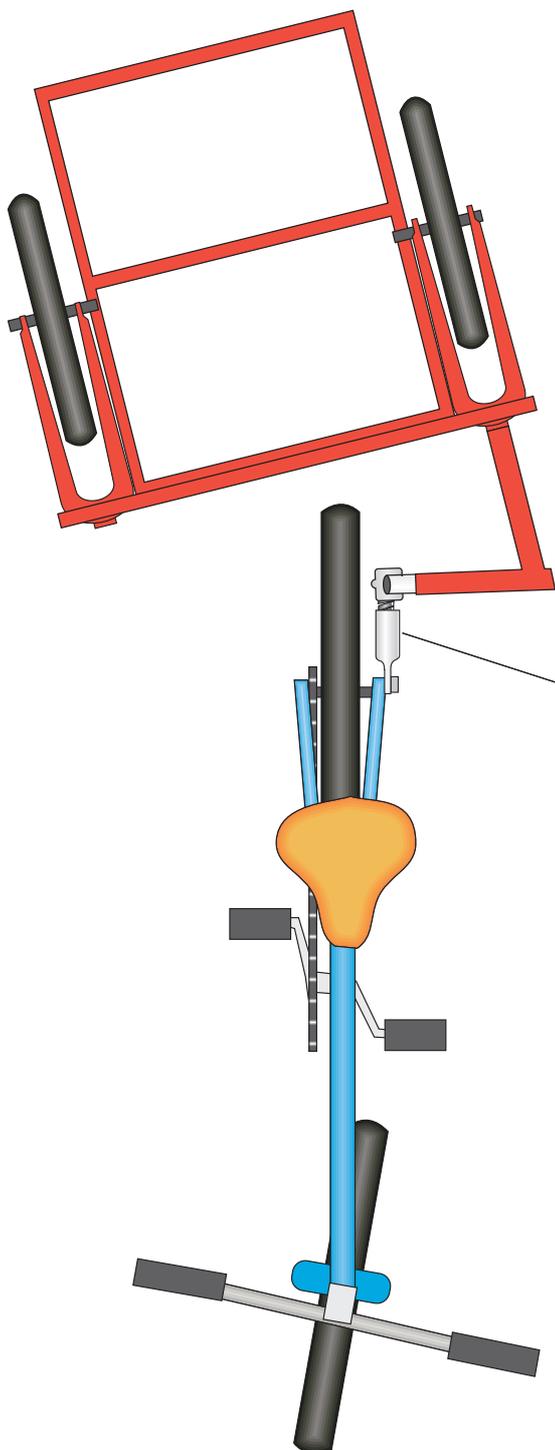
9.

The joint between the trailer and the bike is made from a bicycle stem, two sections of handle bar and a section of pipe bender.

Pipe bender is ideal because it will bend in any direction, but it will not stretch or compress causing the trailer to lurch back and forth.

If no pipe bender is available, good quality rubber/plastic pipe, or old bike tyres can be used to make the flexible joint, pipe bender is the best though.

An alternative to using the handle bar stem, is a curved section of racing handle bars, cut so that a right angle is obtainable, and fit in a similar way using the flexible joint.



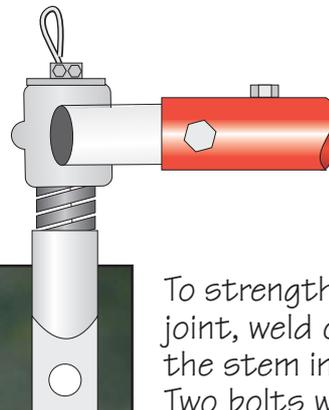
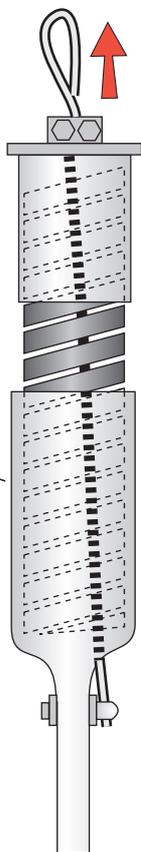
10.

The shorter section of handlebar goes into the stem.

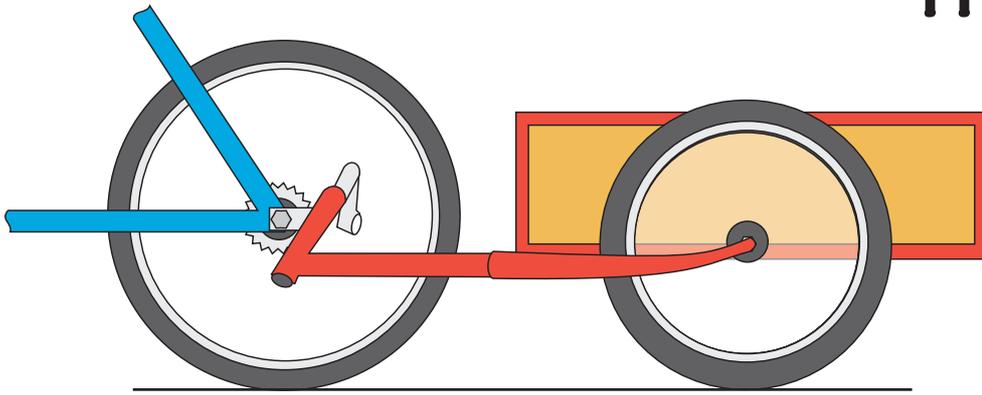
The pipe bender should fit into handle bar sections.

The longer section of handlebar is flattened at the end and drilled with a 10mm hole. It can be flattened using a vice.

Steel cable is used to keep the joint together. U-bolts secure it at both ends.



To strengthen the joint, weld or bolt the stem in place. Two bolts will be needed to prevent the towing arm from twisting.



11. To attach the trailer, use the bolts that hold the wheel.

For quick release wheels, remove the spindle and insert the attachment between the frame and the wheel. Replace the spindle and re-tighten.



Tips:

File all sharp edges as children will like to touch your trailer.

Load the trailer with the heaviest items in the middle.

You may find it convenient to add a stand to your bicycle.

Avoid using inner-tubes with unusual valves. Stick with Schrader (car type) valves or use the same as fitted to the bicycle.

A bolted trailer can get out of shape. Carry a spanner for adjustments

Bolted trailers need a sturdy base.

Finishing: Line the trailer with whatever is available. Plywood is reasonable light and weather resistant. Metal merchants sell mesh in sheets that can be welded in place.

Prime the metal with rust inhibiting (zinc) primer or Hammerite.

Warning: Car drivers do not expect bicycles to be towing trailers! Paint yours with bright colours to make it more visible. Add lights, reflective tape or even a flag.