Upright Trike Plan

For this project you will need:

-3 bikes to salvage from
-hack saw
-sand paper (or some other means of removing paint from the bike parts in areas they will be welded)
-welding machine

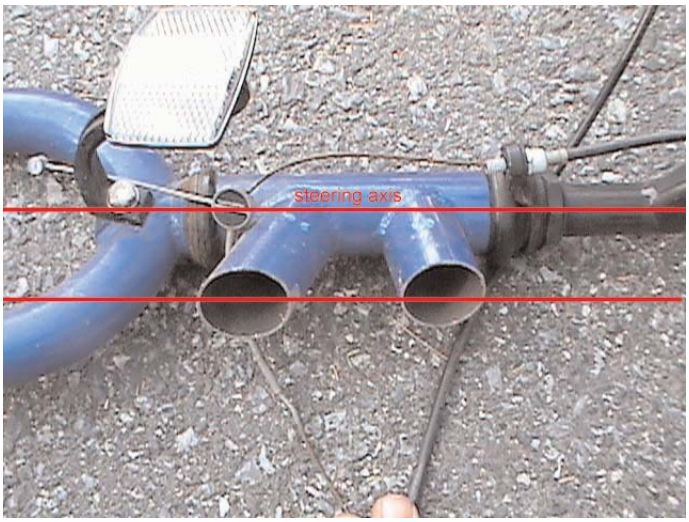
The following pages will walk you thru:
1-3 Building the frame
4 Steering
5 Floatation

This is a relativly easy project that will give you a solid base to make art around. The most difficult part is making sure parts are aligned properly. Taking the time to cut straight and be precise with measurements and alignment is the key to success on this project.

Illustrations on this page by Hardy Smith

STEP 1 Prep Front Forks

Begin by cutting the front fork off of two bikes. The photos only show one so you will have to do the steps on this page twice.

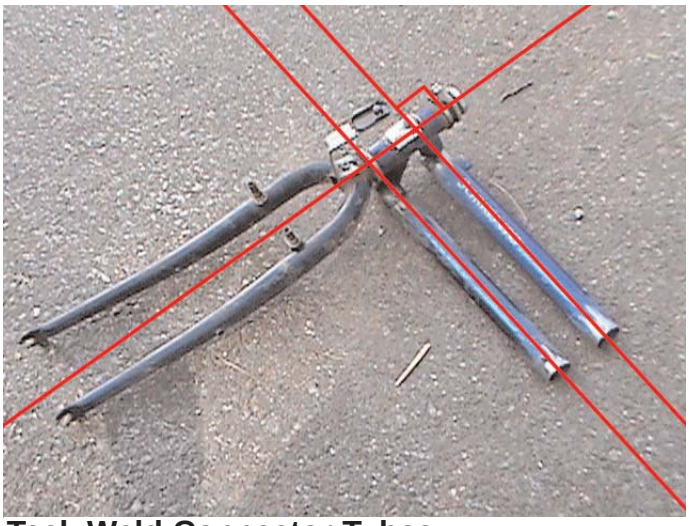


Take your time and make a well crafted cut. These 2 bars need to be cut on the same line, parallel to steering axis.

Cut the Connector Tubes

You can use the bike frame left after cutting off the front fork to get the 2 tubes to connect to the main bike. For this bike the tubes were cut 1' long. Longer will make the bike wider and more stable, shorter will make it narrower and less stable.

Remove paint from the ends of the bars for welding.



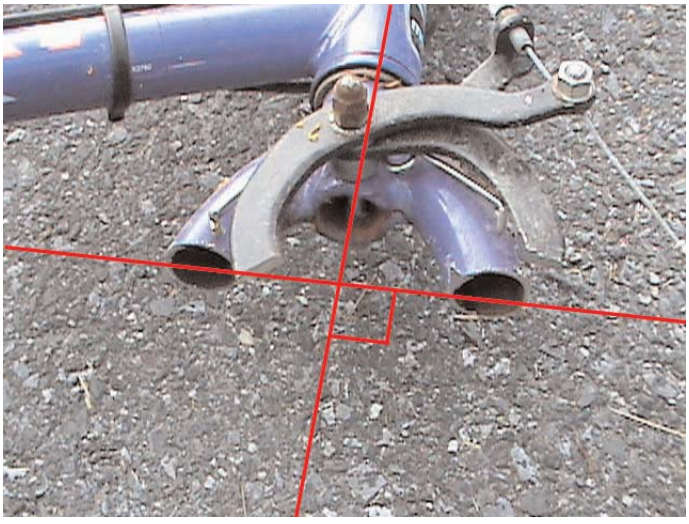
Tack Weld Connector Tubes

Tack weld the two connector bars to the front fork at a right angle.

An assumption in this design is that the 3 bikes you are working with have the same sized tires and similar frames. The distance between the two connector bars just attached needs to meet up with the main bike frame. If the frames you are working with are significantly different in shape or size you may need to make some adjustments.

STEP 2 Prep Main Bike

The completed pair of front forks and pipes to attach to the main bike frame.



Cut Front Fork

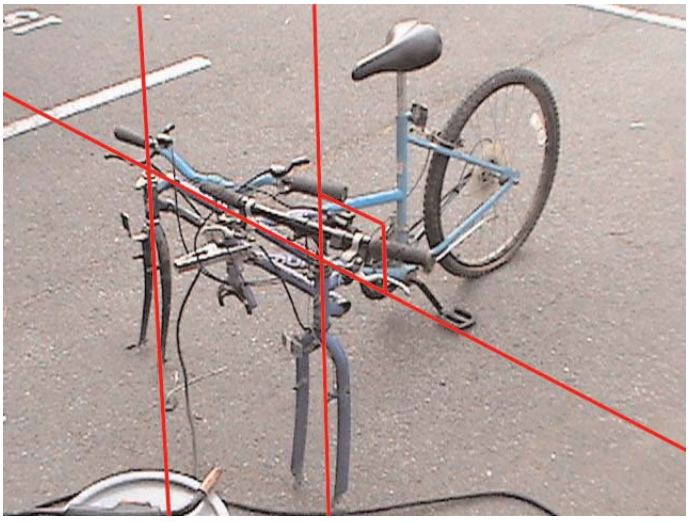
Cut off the 2 sides of the front fork just past where they straighten out.

Be sure the cut is straight and perpendicular to the steering axis.

STEP 3 Attach Front Forks to Main Bike

Tack Weld

You may need to set up some sort of jig to keep the parts aligned while you tack weld.



Check Alignment of Frame and Forks

Take your time and get the alignment right before you make the welds final.

Complete Welds

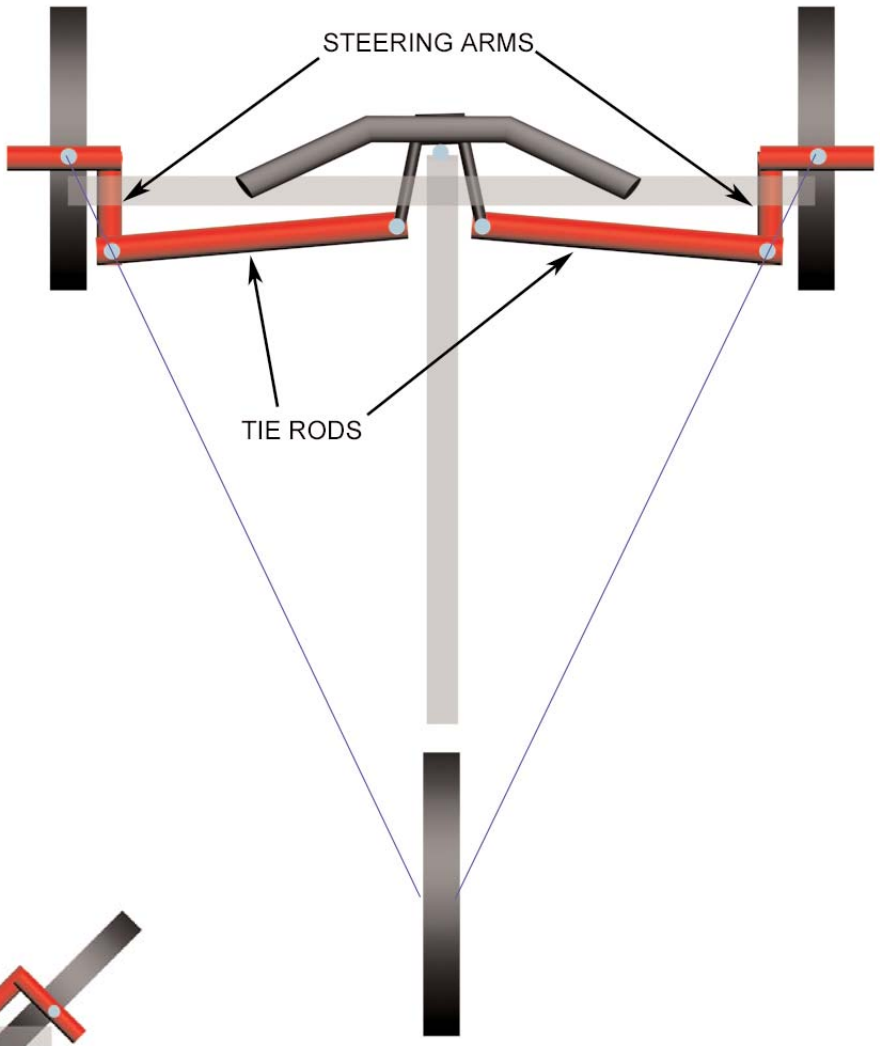
Not just the ends seen here, but also on the other ends of the 4 connector tubes.

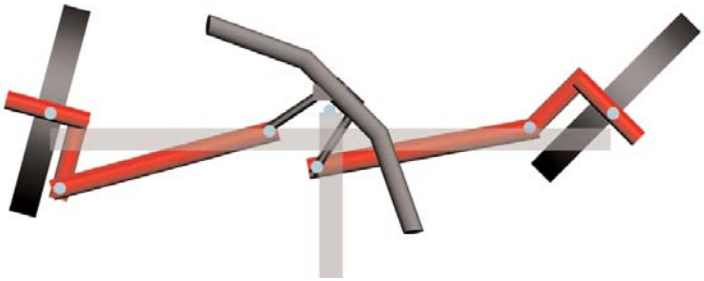
STEP 4 Steering

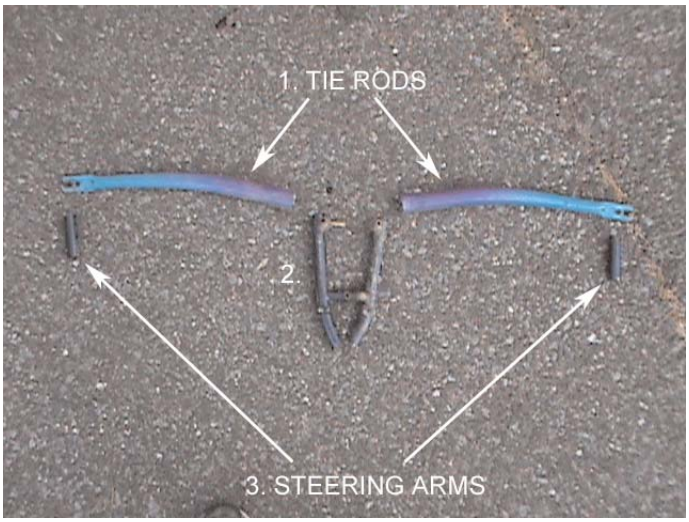
This is the most tricky part of the build. **I recommend reviewing the sections on steering before this step.**

Ackerman compensation is key to this design working. In other words, the steering assembly needs to be built in a way that ensures the inner tire turns sharper then the outer tire. Notice the different angles of the left and right tires in the illustration and photo below.

In the illustration to the right, pivot points are light blue. **Notice that the pivot over the front fork & the pivot on the steering arm are points on a line (blue) that meets the center of the rear tire.** This alignment is what makes the tires turn to the correct angles.



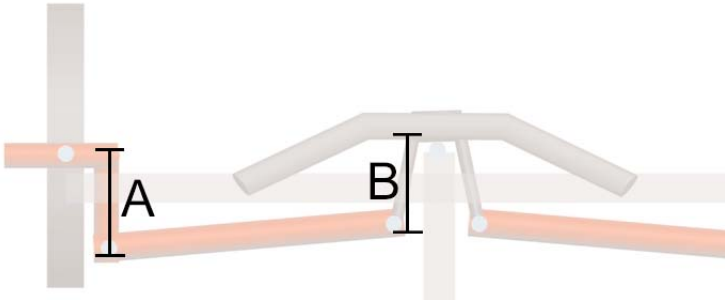




PARTS

1. Front fork arms that were cut off the main bike to be ***tie rods***. The should be about 1" longer then the **connector tubes** you cut in step 1. This extra length will give you flexibility in making the fine adjustments to the steering but will probably be trimmed off later.

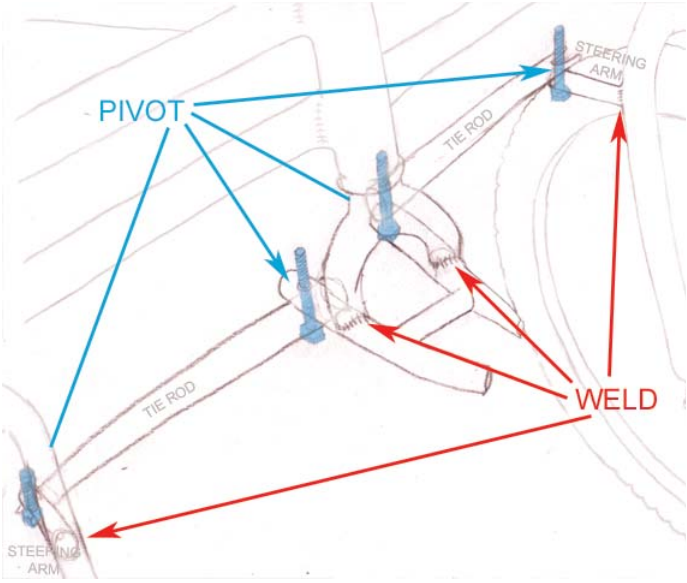
2. A section cut from the rear triangle of one of the salvaged bikes. It will be welded to the bottom of the front fork cut off in STEP 2. The length between where this piece (B) is welded and it's pivot point should be the same as the steering arm's (A)



3. 2 short sections of tube from the same rear triangle were cut for ***steering arms***.

4. 4 BOLTS for pivot points. 8 NUTS to lock against each other on the top of each pivot bolt. The bottom of each pivot bolt is welded in place

ASSEMBLE



1. Weld the steering arms and piece #2 in place.

2. On the parts you just welded, drill holes thru where the pivot bolts will go. Also drill a hole on each tie rod where it will pivot with the steering arm.

3. Loosely bolt the tie rods to the steering arms. *To keep from bumping each other the left tie rod is attached to the topside, the right tie rod on the bottom side.*

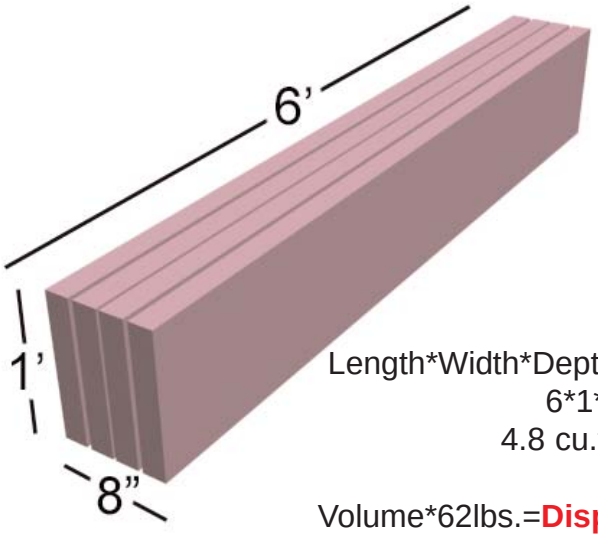
4. Set the wheel alignment. Mark and drill the 2 remaining pivot points on the tie rods (center of bike). Loosely bolt these last two points and test the steering. When the steering is properly aligned, weld the bottom of the 4 bolts in place and tighten 2 nuts against each other on the top of each bolt.

STEP 5 Floatation

I recommend reviewing the section on buoyancy before attempting this step.

1. SIZE OF PONTOONS

Each of the pontoons need to be large enough to keep the combined weight of the pilot and vehicle afloat (see “pontoon effect”). We will assume the vehicle and pilot weigh under 300 lbs. A pontoon 6’ by 1’ by .8’ will support about 300 lbs. There are many ways to make pontoons but a block of foam is probably the simplest. “Great Stuff”, the can spray foam for insulating around windows and doors works great for gluing foam together.



Length*Width*Depth=**Volume**
6*1*8=Volume
4.8 cu.ft.=Volume

Volume*62lbs.=**Displacement**
298lbs. of Displacement

2. ATTACHING PONTOONS

On land your pontoons are relativly light and it won’t take much to support them but, in the water those same supports will need to hold the weight of the vehicle and pilot. In the illustration to the right you can see the parts we added to attach the pontoons in red. Holes were cut thru the pontoons to slide onto the bars(see bottom right photo).
Salvaged bike tubes can be used to build most of this. One nice example of effective use of salvaged parts is detailed in the photo below. The tube the seat post inserts in from one of the salvaged bikes has been used to mount the rear assembly for attaching pontoons.

3. PROPULSION

There are many ways to propel a vehicle in water. For this project an oar works great.