

If you spend enough time on the trails, you're guaranteed to see breakage that just cannot be fixed through any "normal" means on the trail. Sometimes you get lucky and someone has an on-board welder, and whatever the carnage is, it can be pieced back together. But what happens if you don't have one of those expensive on-board welding systems around? We've all heard the stories while trading tales around the campfire, "Jimmy-Joe-Bob broke an axle one time, and they welded it back together with a coat hanger!" But does it really WORK? Well, the honest truth is, yeah, welding with a coat hanger does work. But there are easier ways to make a trail welding setup for a few dollars using parts you already have.

Simply put, to weld metal together, you just need the ability to melt the base metals together. Where do you find the juice you need when you're on the trail, though? Well, chances are, you don't wheel alone, so you've got at least two batteries hanging around between your truck and others. The fact is, you can weld with just one if you really need to, but two batteries wired in series will give you a far better weld. To hook them up in series, you just need a cable -- a full-fledged battery cable with battery terminal connectors on the end is your best bet, but in a pinch, using one of the wires in a spare set of jumper cables will work wonderfully.

The easiest way to strike an arc for welding is to go out and buy yourself some welding electrodes, also known as "sticks" or "rods". This is much easier than using a coat hanger, and not a whole lot more expensive. There are literally thousands of different kinds of sticks out there, some better for use in certain situations than others. Fortunately, if you don't know what you're looking for, not to worry -- your local hardware store, Home Depot, or Lowes will only carry a couple different kinds anyway. I recommend the 6013 sticks for less-experienced welders -- these sticks are known as "contact sticks" in that you don't have to hold a minimum space between the stick and the material in order to maintain the arc. You just lay it on the work and it will spark up. As you gain more experience welding, you can move to the 6011 sticks, which generally yield better penetration and weld better on dirty metal -- but they're much harder to use.

While you're at the hardware store buying sticks, you'll want to pick up some eye protection. A full-face welding helmet is your best bet, but if you're looking at this setup as an emergency-only trail welder and don't want to have to carry anything big with you, you can get away with a set of welding goggles. Just make sure you get a set of goggles with a shield dark enough for welding. You may have to buy the shield separately from the goggles, as most goggles sold in local stores are brazing goggles. These use a much lighter lens than is required for adequate protection while welding. The darker replacement lenses should be located in close proximity to the goggles, just make sure they're marked as replacement welding lenses. While you're there, you might consider a pair of welding gloves, although these are not entirely necessary if you're careful and don't mind a little bit of welding splatter splashing back at you.

Once you've got your batteries, goggles, sticks, and cables, you're ready to weld. Just remove the two batteries from the vehicles, and hook the positive terminal on the first battery to the negative terminal on the second battery. This will hook up the two batteries in series, yielding 24 Volts of power.

Once you've got the juice flowing from one battery to the next, you need to harness all those

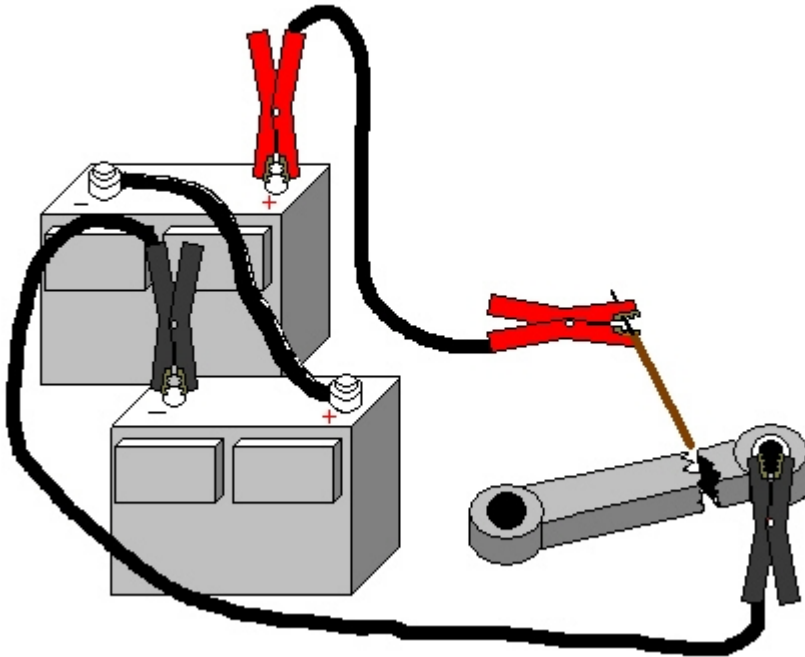
cold cranking amps and put them to work for you as a welder. For this you'll need another set of jumper cables (or a first set if you've used a battery cable to hook the two batteries in series). Hook up the negative lead of the cables to the empty negative terminal, with the other end attached to the work piece. Hook the positive cable to the empty positive terminal, with the other end clamping the electrode. At this point (after protecting your eyes, of course) you can go ahead and strike the arc to begin welding.

You could use this same theory to get even more juice by using three batteries. It works the same way -- hook the positive on the first to the negative on the second. Then hook the positive on the second to the negative on the third. In fact, you could do this with an unlimited number of batteries -- but there comes a point where you'd be vaporizing the metal instead of welding it together. Try it with two batteries first, and if you still feel you need some more juice, give it a go with three batteries if another is available.

Believe it or not, this setup actually works, and has been used successfully countless times to get people out of the woods and back to civilization where more suitable repairs could be made. You already probably have access to two batteries, and the rest of the materials can be picked up at the local hardware store for under \$20. Chances are even if you've never welded before, you've got just about everything you need already -- the only things you'll have to buy are welding rods and goggles, which can be found for as little as \$5 total. The downfall of this setup is that there's no way to regulate it -- you get the full cold cranking amps the battery or batteries are putting out, nothing less. This can lead to welds that are too hot if you're not careful, and instead of melting the metals together, you could wind up putting holes in the work.

In a perfect world, the ideal weld would be made between two pieces of clean, bare metal. This would involve grinding and other forms of preparation. On the trail, though, you'd just be happy to brush all the mud off a part before welding -- remember, this is only supposed to last long enough to get you off the trail. The purpose of this article is simply to describe a quick and easy way to setup a welder for emergency trail fixes -- not to teach you how to actually perform the welding. I'd recommend you try this several times before putting it to work for you on the trail, and unless you become quite proficient at it, don't trust your welds as anything but emergency fixes, just enough to get you back to civilization. Failure of field fixes such as these on drivetrain, steering, or suspension components could lead to serious injury or death. There are many books on welding that can explain the ins and outs of the actual welding procedure, and if you really want to improve your welding skills, most times you can find a welding class offered at the local college or adult school.

diagram...



Believe it or not, my uncle was doing this with coat hangers in the early 60's! He welded up the drive line on his Land Cruiser in the middle of the night up in the Catalina Mountains above Tucson with his battery and a metal coat hanger. Of course, he's also been known to pull a piston out that is shot and stuff a chunk of manzanita (sp) into the empty cylinder, fill it with water till it swells the wood, and drive out of the mountains till he could get to a shop.

<http://www.youtube.com/watch?v=8tHJ0NSjZnM>

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