

Means of Production

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Intro

Since corpgov relies on the slave wage third world labor, finding locally made fair trade goods is difficult. Most tools and machine equipment is made in the main financier of Amerika, the Rulers Republic of China. We know how to bring back production of everything from bicycles to bedframes to weapons into our garages and shops. These are the tools to free your purchasing power from the medium and light industrial trusts.

All of these machines require serious safety precautions to prevent loss of fingers and eyes as is true with all machine tools! Remember to always goggle up and only work when sober and awake!!

Welding

Most of us are too poor, or too infrequent, of welders to go out and buy an arc welding machine so here is how to make one.

Materials:

- Three 12 volt automobile batteries
- A set of jumper cables
- Arc welding glass or goggles
- A length of #8 fence wire and vice grips (for variable resistor)
- Two jumper cable pigtails (to join batteries)
- Welding rods

Most auto stores sell the heavy wire and big clips for making jumper cable pigtails. The #8 fence wire resistor is shortened or lengthened to allow use of smaller diameter welding rod. This wire gets very hot, check that it is not dropping, it might droop so far that it touches and melts the side of your battery.

Wire the three batteries in series to get 36 volts like this:

ground+battery - pigtail+battery - pigtail or resistor+battery - welding rod

Before welding remove all screws and bolts from your project and use a wire brush to remove paint at ground and where you are welding. As is standard, we suggest a positive ground (your bike frame) and negative rod. If you go below 36 volts (you have less than three batteries) it will be difficult to keep an arc going. ALWAYS use goggles! If you can't find welding goggles make a mask from your welding glass taped into a homemade cardboard welding mask. **If you don't protect your eyes you will be in a lot of pain and may lose vision! You can't even see the UV light that damages your eyes, so use proper eye protection!**

Practice with junk metal before welding on your precious bicycle frame. Between welds check your battery voltages, if any of them drop below ten volts it is time to stop and recharge.

Earth first gatherings in the UK usually hosts a welder who can help you along in his workshop.

Precision cutting

If you are out on the road and need to replace a custom part like a gear sprocket or derailleur cage on a bicycle or you just have no money for a custom part the easy way to precision cut some sheet metal or tubing to make a replacement is electrolytically. All you need is:

- A DC power supply (A car battery charger or computer power supply are perfect but even a little wall wart transformer will work)
- A non-conductive basin
- Paint
- A tracing of your part
- A sharp tool or knife
- A piece of scrap metal

Here is what to do:

- 1- Make an exact scale (1 to 1) outline of your part on paper.
- 2- Find a piece of sheet or tube metal the right thickness for your part.
- 3- Paint the whole surface of the part that will be submerged (Leave a little bit bare for your positive [+] electrode).
- 4- Tape drawing to the painted metal.
- 5- Using a sharp point, carefully scratch the outline where the metal must be cut.
- 6- Attach the Positive [+] wire to the bare spot on your metal.
- 7- Attach the Negative [-] end to a piece of clean metal scrap.
- 8- Fill your non-conductive basin with water and add salt until the water is very salty tasting.
- 9- Place both your part into the water so all etches are submerged but the wire and bare spot are above water.
- 10- Put the Negative scrap into the water, keeping the wire above the water.
- 11- Bubbles should form. You might smell chlorine; if so, the process is working.
- 12- Watch the water turn weird colors. You can turn off the power and pull the metal out to look at if you like to see if everything is cut.
- 13- Once everything is cut, you should be able to easily pop the finished parts out of the paint.

Note: If the etch on a larger circle finishes before a square inside the circle the inner shape etch will stop as there is no circuit there anymore. If you are using a small wall wart type transformer, keep the scrap electrode just close enough to your sheet metal to cause only small bubbles. Don't ever let the two electrodes touch. If using a computer power supply you must keep the electrodes far enough apart that the supply does not go into surge protection mode (past whatever hundreds of watts rating it has...). You can also use this mask and etch method using strips of tape or paint for a mask to etch the excess copper from a printed circuit board.

Multimachine

The multimachine project is a community effort that bypasses the expensive tool companies and designed and improves on an inexpensive, quality, full feature machine shop tool which would normally cost several hundred thousand dollars that anyone can build with recycled parts like old engine blocks and pipe. Several PDF files with complete instructions and a discussion and assistance community are available at <http://opensourcecmmachine.org/>

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How can an easily built machine tool that is made from junk be "all purpose" and also accurate? Pretty simple! In almost every kind of machining operation, either the work piece or the cutting tool turns. If enough flexibility is built into the parts of a machine tool involved in these functions, the resulting machine can do almost every kind of machining operation that will physically fit on it. You may have heard of 3-in-1 machine tools – basically a combination of metal lathe, mill and drill press. The MultiMachine starts there but adds many other functions. It can be a 10- in-1 (or even more!) machine tool that is built by using vehicle engine blocks in a LEGO-like fashion. The MultiMachine uses 6 unusual construction techniques to build 5 very simple "modules" that bolt to a worn out or broken vehicle or industrial engine block. The Multimachine

- Using engine blocks as building blocks is the first MultiMachine feature. Since cylinder bores are bored exactly parallel to each other and at exact right angles to the cylinder head surface, MultiMachine accuracy begins at the factory where the engine block was built.
- The second MultiMachine feature is that in the most common version of the MultiMachine, one that has a roller bearing spindle, this precision is maintained during construction with simple cylinder re-boring of the #3 cylinder to the size of the roller bearing outside diameter (OD) and re-boring the #1 cylinder to fit the overarm OD. The best part is that these cylinder-boring operations can be done in almost any engine shop and at low cost. An engine machine shop provides the most inexpensive and accurate machine work commonly done anywhere and guarantees that the spindle and overarm will be perfectly aligned and at an exact right angle to the face (head surface) of the main engine block that serves as the base of the machine.
- The third MultiMachine feature is that the spindle can be as simple as a piece of pipe made to fit the inner diameter of the bearings.
- The fourth feature is the addition of a third bearing to the spindle. The three-bearing spindle is necessary because the "main" spindle bearings just "float" in the cylinder bore so that the third bearing is needed to "locate" the spindle, act as a thrust bearing, and support the heavy pulley.
- The fifth MultiMachine feature is our unique way of clamping the engine blocks together. It's easily built, easily adjusted, and very accurate.
- The sixth feature is a concrete and steel construction technique that we resurrected. It was heavily used in industry during the first world war.

An almost no cost version of the machine can be built by using engine blocks originally made with cylinder "sleeves" and then replacing bearings, adjusters and pulleys with parts cast from a very strong zinc/aluminum alloy that can be made from vehicle salvage. The details of the MultiMachine are available at the link included below. Additionally, at the group website there are plans for electric welders built from vehicle alternators, a design for an easily built hand-powered drill that is capable of cutting through the hardest steel and an easily cast metal alloy that is almost as strong as cast iron. Feel free to contact me directly for more information or visit our group site here: <http://groups.yahoo.com/group/multimachine/>

Multimachine Developer Pat Delany Palestine, Texas

Get the PDF "how to Build a Multimachine"

http://opensourcemachine.org/files/How_to_build_a_multimachine.pdf

Casting

If you can't make your part with sheet metal or tubing maybe casting aluminum is your answer. This is a great way to make parts for equipment you need or even jewelery to give as gifts or sell while on the move.

Scrap metal

For the best quality aluminum try to harvest an overhead cam aluminum cylinder head that doesn't use separate cam bushings. Ask a mechanic to find such an engine model, then scrounge the junkyards. It is fine if the engine is ruined, we just want the metal. Get this large part near melting point and break it up with a hammer, now put the chunks back on the charcoal fire inside a steel pot you might need to use a blower to get enough heat, a shop-vac in blower mode might be too much a hair dryer on low should do the trick, attaching a steel pipe or tube gives the standoff to prevent a melted blower. Zinc can also be melted on a kitchen stove in a pot, silver needs more heat like aluminum.

Lost Wax Method

Lost wax casting is an ancient technology and can be used with most metals. Be sure that the mold compound will take the temperature of the molten metal.

- Make a full scale model out of wax. (paraffin isn't wax, Beeswax is, look at art stores or some fancy sculpted candles)
- You can copy an existing broken part by making a two part mold from modeling clay, with talcum powder separating the halves, around your glued or stuck together part. Once you have the clay mold, pour wax into that clay chamber after you carefully remove the original part. Once the wax cools, smooth the area where the original was cracked.
- Attach a conical stem to your wax model also made of wax for the future pour hole.
- You can use many mold compounds. (Plaster of Paris works and can be found in hardware stores for drywall repair.)
- Make a cardboard box about 2-3 inches larger on all sides than your wax model but on top.
- Drip hot wax onto the a flat surface and stick the top of the wax cone onto it. It will look like a disc of wax supported by the cone.
- Stick long pins box and into the wax object at several locations These are important to let air bubbles escape during casting.
- Mix the molding compound and pour into the box around the pin suspended wax model

- Pour a mold-making compound around the whole wax model, the end of the wax cone should stick out.
- Shake or vibrate to get all of the air bubbles out, use your fingers in the mush to get bubbles away from your wax model.
- Once the mold has hardened bake upside down in an oven over an aluminum pan to remove the wax.

Caution! Let your mold bake all day to remove all wax but more importantly to remove all water, or the mold might explode from steam spraying molten metal!

- Pour your metal (if you are using a furnace or kiln suspend a steel funnel with your metal scrap above your mold)
- Let everything cool overnight.
- Crack the mold material off with gentle hammering.

For small objects you might need to have a good quantity of extra melted metal weight behind it to overcome natural surface tension(which leads to rounded off corners, this can be trimmed off when cool and recycled for other projects.

How to use a microwave oven as your metal furnace: <http://home.c2i.net/metaphor/mvpage.html>

Plastic

You can use this lost wax method to also produce plastic and nylon parts. Be careful to not burn your plastic! Cooking plastic scrap covered in an oven along with the mold is smarter than a pot on a stove top. Adding carbon or glass fiber strengthens plastic and nylon. If your widget needs a partly sheet metal frame one can be inserted into your mold before you heat it up and pour the plastic.

Often plastic molding requires a vacuum assist. Connect a pipe to your normal floor vacuum cleaner and on the other side to your mold. When the plastic is melted in the oven and you are ready to pour, have a friend connect and run the suction.

Extruded polystyrene foam (aka styrofoam) can be "melted" with acetone. The act of pouring acetone on styrofoam turns it to a thick malleable mixture which is highly flammable. As the acetone dries out, the plastic becomes solid. It can also be used as a white napalm mixture before it dries.

Scrap Plastic

Thanks to the recycling movement most plastics are numbered to make recycling easy. This makes our life easier too, since now you can collect scrap based on the properties that you require in strength. Look on or near the bottom of containers you plan to melt. Numbers 1 and 2 are the most useful types of plastic. Number 3 is almost useless except for burning. Be careful of mixing numbers as they are sometimes quite different and a mixing could ruin your whole batch.

Recycling by the numbers

- 1 - PETE (Polyethylene Terephthalate): Soft drink and water bottles, vinegar bottles, medicine containers, backing for photography film.

- 2 - HDPE (High-Density Polyethylene): Containers for: laundry/dish detergent, fabric softeners, bleach, milk, shampoo, conditioner, motor oil. Newer bullet proof vests, various toys.
- 3 - PVC (Polyvinyl Chloride): Pipes, shower curtains, meat wraps, cooking oil bottles, baby bottle nipples, shrink wrap, clear medical tubing, vinyl dashboards and seat covers, coffee containers.
- 4 - LDPE (Low-Density Polyethylene): Wrapping films, grocery bags, sandwich bags.
- 5 - PP (Polypropylene): syrup bottles, yogurt tubs, outdoor carpet.
- 6 - PS (Polystyrene): Coffee cups, disposable cutlery and cups (clear and colored), bakery shells, meat trays, "cheap" hubcaps, packing peanuts, styrofoam insulation.
- Other: A mix of numbers one through six or something else

Other good sources are rope which is usually either polypropylene or Nylon-6 (nylon being much more useful).



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