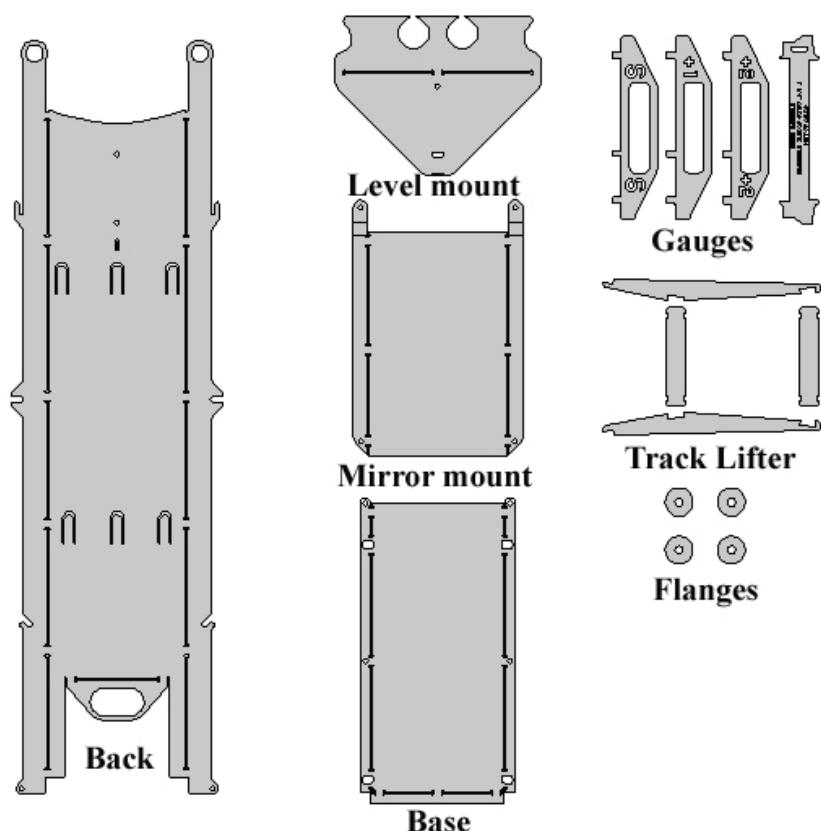


The track checker and fixer, assembling the kit.

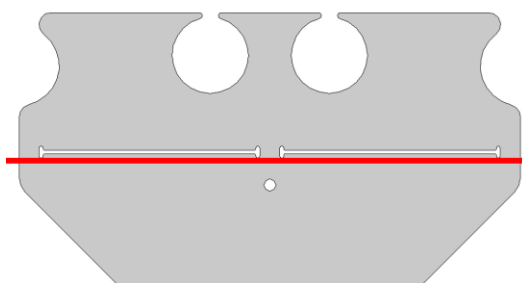
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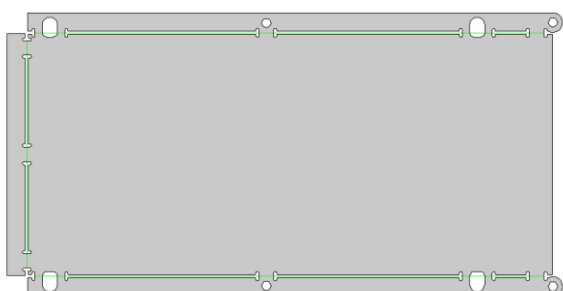
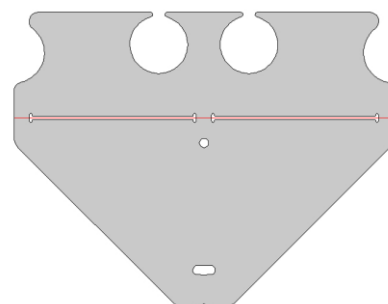
The contents of the kit

Folding

Folding should be done in a workmate, with the bottom edges of the slots aligned with the top surface of the workmate as shown. Folding is done by hand, taking care that the fold is even at each tab and is as close to 90 degrees as possible.

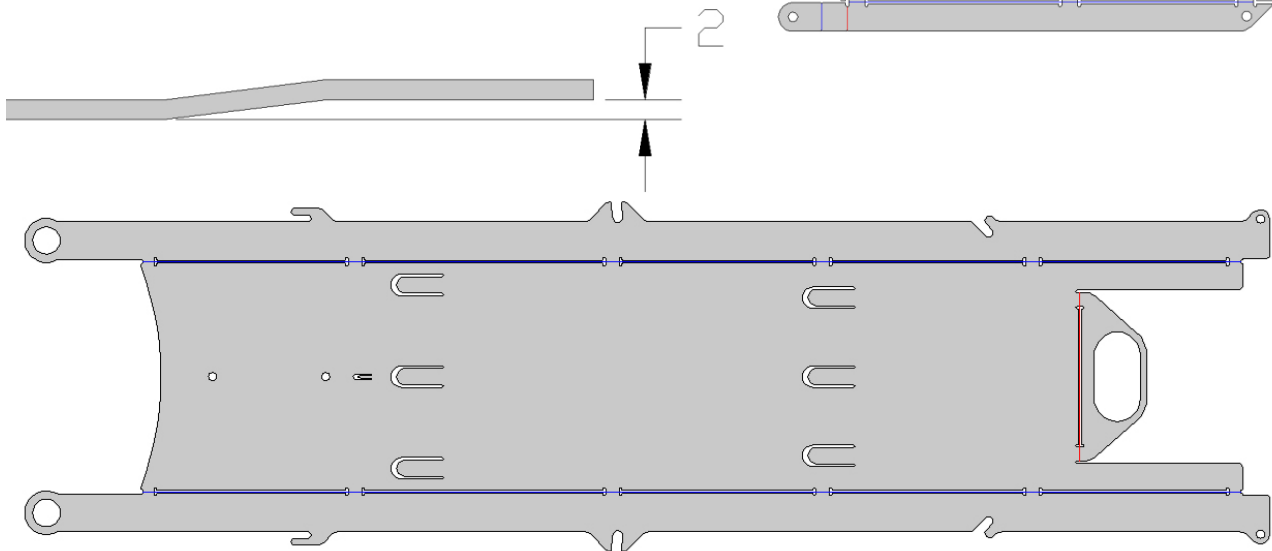


Start with the spirit level mount, fold up or down as shown by the red line. Getting an even 90 degree angle on this part is important.



Do the base next, fold the two long edges first, gripping the short flange in the workmate and folding down the rest of it towards you at 90 degrees. This is followed by the short edge, which is best folded in the bench vise. If one tab has to hang over the edge of the vise because the jaws are too short then grip the lower edge with a pair of mole grips at the tab so that the narrow flange stays flat.

Now fold the mirror mount. First fold the two long flanges to 90 degrees as described above. Now you need to joggle the two lugs outwards by the thickness of the metal, 2mm. The fold points are shown by laser engraved lines and notches in the edges of the sheet, I just use a pair of pliers. Just make slight folds so that the lugs joggle outwards by 2mm as shown below.



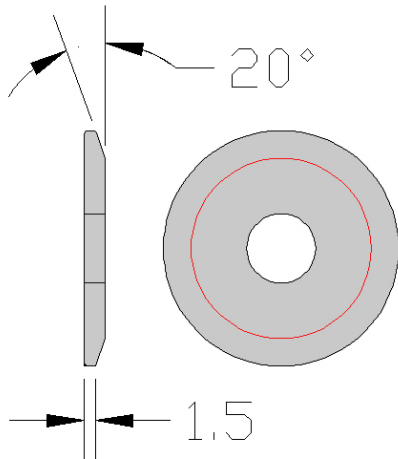
Having got the hang of folding, now do the back plate. This is too long for the workmate, so grip the flanges at the right hand end, where the cutout is, and use the pair of mole grips to hold the flange in line as you ease the plate over to 90 degrees, doing it carefully a bit at a time so that the flange stays flat and doesn't end up with a twist in it. Twists can be removed but by then the metal has stretched and will cause deformation which will impair the accuracy of the spirit level readings in the future. Fold out the bit with the oval hole in the opposite direction to the flanges, this can be done by hand.

Now fold out the brackets to hang the gauges, with the flanges towards you push them out from behind to about 45 degrees, then turn it over, lay a piece of 6mm steel between peg and back and knock the bracket over with a rubber mallet or a block of wood.



Finally push out the little pointer which aligns with the angle gauge, it should project about 3mm or so on the same side as the hanging pegs. I use the blade of a screwdriver.

Wheels and flanges



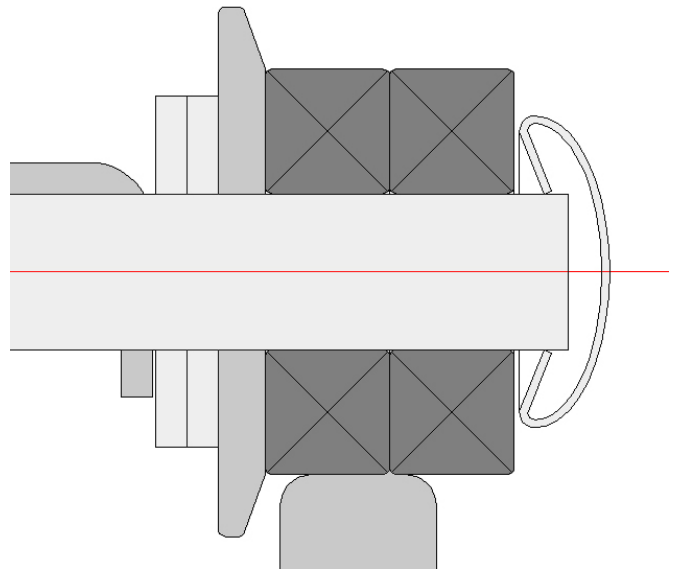
The wheels are made from standard ball races, but we need to add the laser cut flanges. These need chamfering off at twenty degrees as shown using the laser etched line as a guide to when to stop. I pushed an M10 screw through the hole and nipped it up tight, then turned them in the lathe and rounded the corners off. An alternative would be to mount the screw in the chuck of a drill on slow speed and grind away the flange with a flap disc in an angle grinder until you have the required angle. Accuracy isn't that important, but you do want a smooth finish or else the flanges will tend to grip the rails and ride over them. The hole in the centre needs to be a fairly loose fit on the axle so that the flange can revolve freely.

The axle is a piece of 10mm diameter bright mild steel round bar. Try them through the holes in the base, you might need to touch the holes with a round file to get them to fit accurately.

Add two nylon washers, then your tapered flange, then two ball bearings, and finally hold in place with a 'Starlock' fasteners, which needs to be tapped on with a soft rubber mallet.



The assembly needs to be fairly tight, if you think it is too loose then add another washer between the ball bearings and the Starlock fastener.

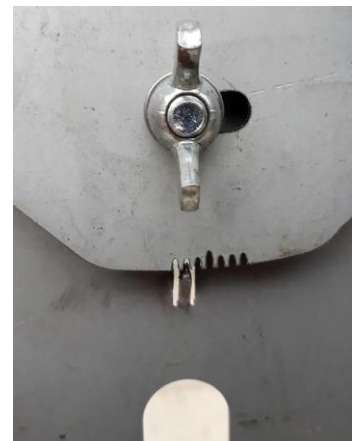


This isn't easy as the Starlock fasteners are single use only, pulling them off destroys them, so you need to modify a nylon washer as shown and push it on from the side.

Bolting the parts up



Pop an M6 screw through each of the two holes in the back as shown, add nuts and washers, fit the spirit level mount, add two more washers followed by spring washers and a nyloc nut on the top screw, which is the pivot. Nip it up until the mount is tight, then back it off a touch until it can just be moved. Add a wing nut on the bottom screw. Your mount can now be aligned with the pointer, the centre position is zero degrees, with each notch being one degree of movement.





Bolt the base to the back, with a washer between the parts, then add the mirror mount with a washer between the mount and the base. The upper lug is fitted with a washer and wing nut on the outside so that it can be easily undone to fold the assembly flat.



The mirror is a piece of A3 acrylic, and is fitted with velcro to allow easy removal and storage in a padded envelope when not in use. Stick one side of the adhesive velcro to the mirror, add the other piece on top, remove the backing tape, and with the checker resting on the rails rest the mirror on the rails in front of it and tilt it back until the velcro sticks to the mount.

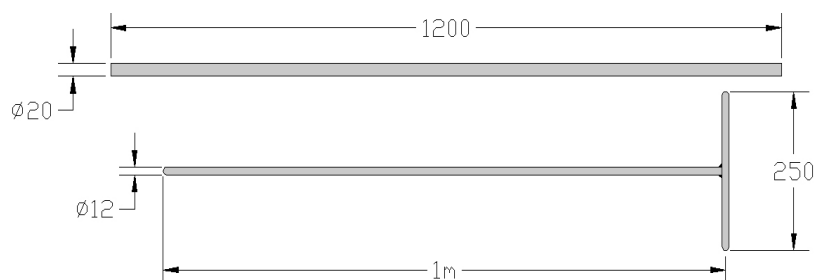
The SLOW sign is intended as a warning when work is taking place during a running session, and can be stuck into the ground as required.



Take a piece of 10mm or 12mm tube about 500mm long, squash both ends flat in the vice, point one end and screw the sign to the other end with M6 screws. There are lugs on the front of the checker to hold the sign when not in use.

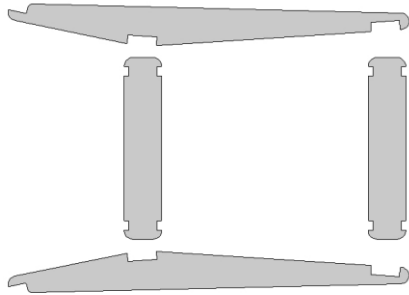
The handle is a piece of 20mm tube 200mm long pushed through the holes, with a plastic plug in each end and a length of heat shrink tubing shrunk into place with a hair-dryer to keep it in place.

Finally the track tools, the rammer is a 1.2m length of 20mm black round steel, and the 'T' bar is welded up from 12mm round steel as shown, with the ends well rounded.



The foot crowbar is used to lift points for packing under the sleeper ends and is made from 6mm steel.

Lay out the parts as shown, drop the spacers into the slots in the side bars and add some weld to hold them in place.



If you have dropped joints where the amount of bend in the end of the rail exceeds a couple of millimetres then I suggest that you make a tool like the one I have made.



The stem is a piece of 50mm x 50mm by 3mm wall box section about 1.2 to 1.3m long. The cross bar handle wants to be fairly thick walled 25mm x 25mm box section, it needs to be comfortable to hold and capable of taking your weight bouncing on the end.



The 'pegs' are 25mm x 10mm flat bar, offcuts from the scrap box, mine are spaced at 100mm centres which suits our 25mm high rail. (For deeper rail section increase the centres and increase the length of the stem box.) These are very securely welded to the box as shown, the little blobs of weld on the edges help to stop the tool sliding around under load, and you will be using a fair bit of wellie at times!.



To use hook the peg under the rail as close to the joint as the sleepers will allow, with the other one resting on top, getting them as close to the rail as possible. Get a mate to stand on top of the track on the other side of the joint to weigh it down, if the track lifts ballast may drop under a sleeper and spoil the chance of getting a smooth alignment.

Shopping list

20mm diameter black mild steel round bar	1 off	1200mm
12mm diameter black mild steel round bar	1 off	1300mm
10mm or 12mm tube, or copper pipe	1 off	about 500mm long
25mm heatshrink tubing	1 off	165mm long

Spirit level, with magnetic base, 200 to 250mm long. If you want to be posh buy a digital one.

Finishing off

The material used is Zintec, which is zinc coated, so it is naturally rust resistant, and takes paint well. It is up to you whether you decide to paint it or not, but if you do then put some kind of self adhesive vinyl sheet on the base and the back where the gauges hang to stop the paint getting scratched off.