

Instructions for building small power bogies.

Colin Edmondson January 2026



The power bogie is identical to that used in the 'TYKE' loco, and as such has been well tested.

Please use these instructions in conjunction with the shopping list provided.

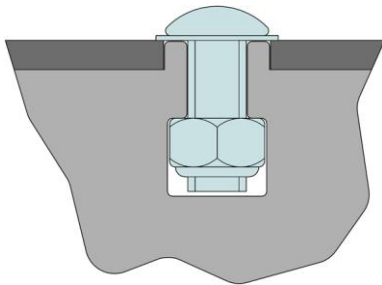
The bogie kit is supplied in good faith from one enthusiast to another, you build and use it at your own risk.

All laser cut mild steel parts are supplied pickled and oiled, you will find it easier to clean and degrease them before bolting up the assemblies, although once degreased they are more susceptible to rusting.

Remove the black deposit left on the cut edges with a wire brush. To aid painting consider rounding off sharp edges and lightly sanding the surfaces before fabrication, it is a lot easier than doing it afterwards.

As development of any design is continuous, some of the parts supplied to you might not look as they do in the construction photographs. This is nothing to worry about, I know that they will go together just fine as examples have been built.

Use thin form B washers under every screw head, it prevents the screw marking the paint and gives the screws the correct clearances in the slots.



This shows the bolted slot and tab method used throughout the build to join the steel parts together, with M6 x 16 button head screws and thin 'form B' washers. The M6 thin nyloc nut is slid into the slot, and the screw tightened to hold the parts together.

Suggested tools

I am assuming that you already have the basics, spanners, screwdrivers etc.

Metric allen keys.

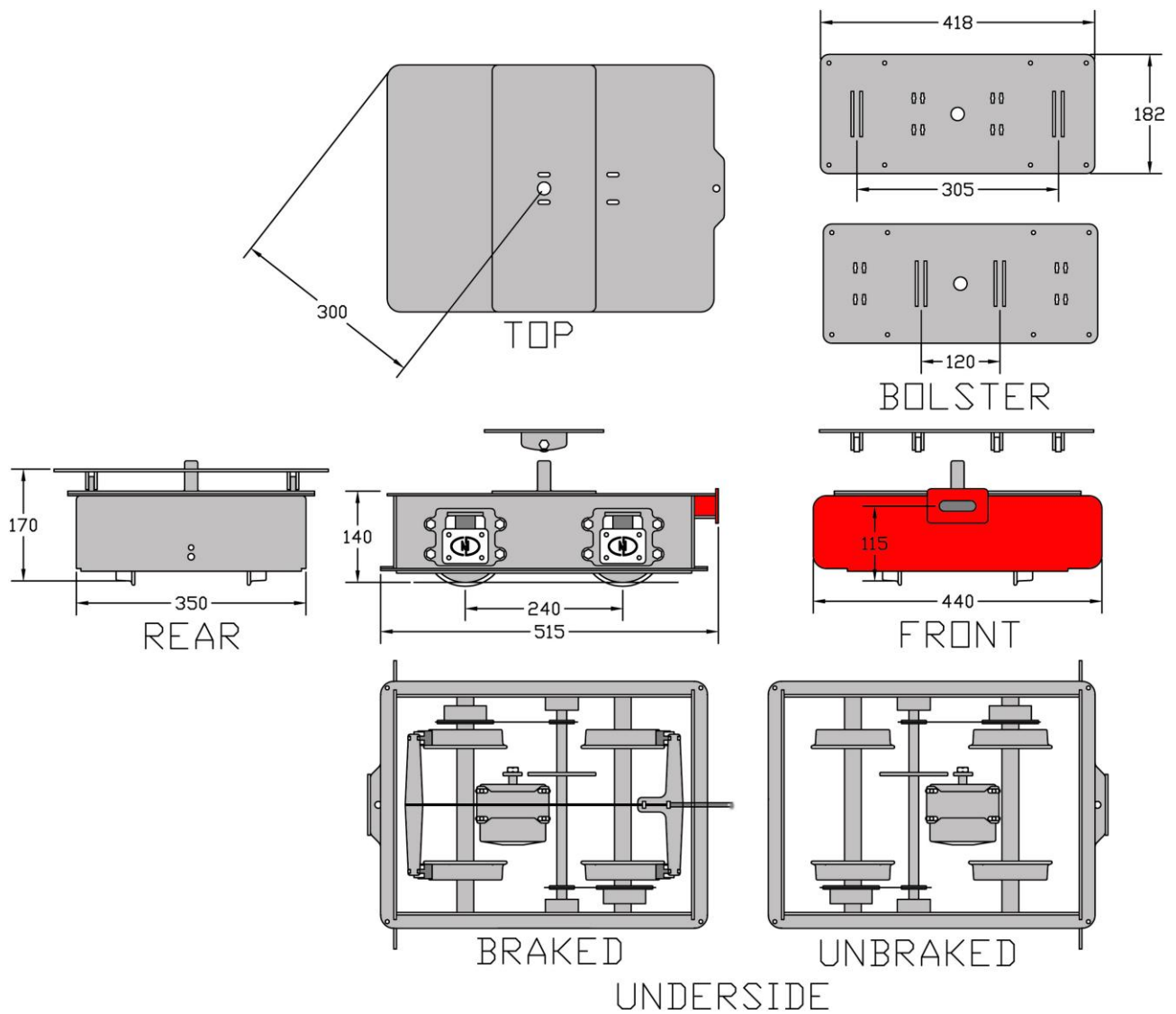
Wire strippers and crimping tools.

Soldering iron.

A battery drill with adapters for allen keys, 10mm and 13mm sockets will speed things up a lot!

I do hope that you find this kit both easy to build and a pleasure to use. I enjoyed designing it, building the Tyke prototypes and refining the design, and look forwards to seeing photos of your build on facebook as it progresses.

Take care and enjoy the build, **Colin Edmondson**



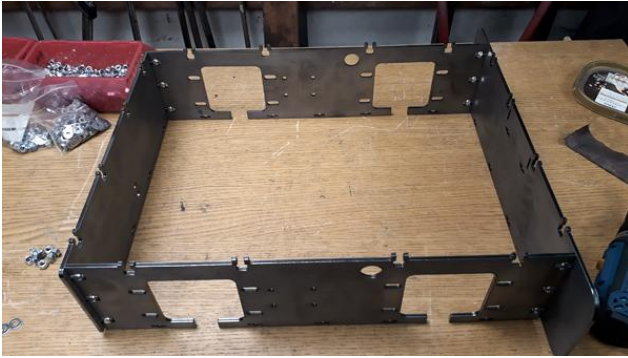
Showing the major dimensions for the small power bogie

One bogie is braked, the other unbraked. The brakes are cable operated, CMD can supply a variety of different brake levers from the DIY range.

The bolster is screwed to the underside of your frame. The bolster brackets can be fitted close together to allow the bogie to rock, or far apart for stability. I fit the braked bogie under the driver with the brackets far apart, and the brackets close together at the other end of the loco to allow the bogie to rock and follow twist in the track. Putting the braked bogie under the driver means the maximum weight is available for braking adhesion.

In the rear buffer beam is a hole for the brake cable and a hole where a clevis can be fitted. In the Tyke the bogies are coupled with a drawbar to keep all the traction and braking forces low down level with the couplings which helps to prevent the bogies rearing up under load, the rear one pivots in a hole but the front one requires the pivot hole opening out into a slot.

Bogie frame assembly.



< Slot together two side frames and a front and back buffer beam and screw them up with M6 x 16 screws. You will be glad to hear that the parts will only fit together one way, but check against the photo.

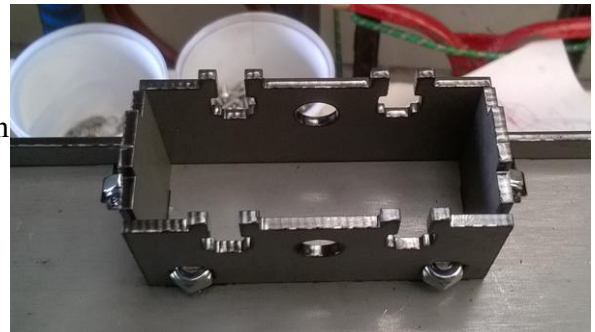
> Turn upside down, add the end and side ribs and corner screws and the lower coupling pocket.



< Fit the top plate and the bolster plate, which will have the pivot pin already welded in place.



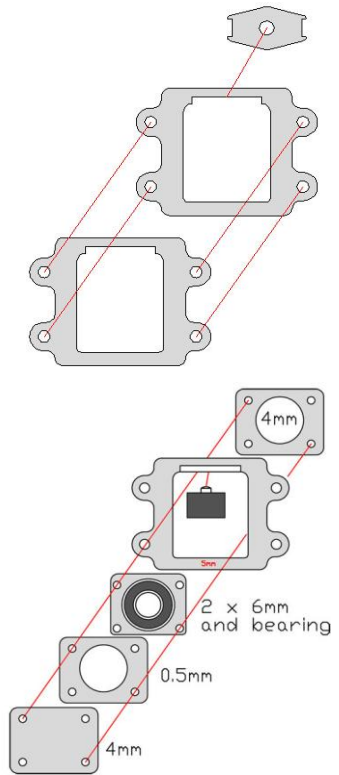
Add the sides of the coupling pocket, they are a snug push in fit. >



< Add the coupling front. Now repeat for bogie number two.

Horn guides and axleboxes

Take two 6mm thick axlebox pieces. Take a look at the bearing housings and you will see that the surface next to the cut is slightly discoloured on one side and clean on the other. The two clean faces face inward, fit the bearings in from the clean side first as the hole is sometimes fractionally larger. Clean up the bores with a file and press a bearing into one piece using the vice as seen in the first photo below, doing your best to keep it square, turning it frequently and doing it a bit at a time. You will find it suddenly enters the hole and presses in smoothly. Then press a second piece on to the bearing, closing up the gap and finally setting them on top of the vice jaw and tapping them with a hammer to get them perfectly aligned. Now try them for size in the slot in the horns. Touch with the file or grinder if required, then assemble as shown, using one 5mm thick and one 6mm thick horn guide for each guide, adding a plain axlebox cover and thin spacer one side and one with a hole on the other, using M6 x 30 hex screws and nyloc nuts. (If you are fitting outside cranks then see separate sheet for assembly details). Make sure that you align the parts so that the tops of all four pieces are level, this is the surface the rubber spring sits on. The thread on the rubber mount needs to be cut down to 4mm long or less before assembly, place a couple of washers over it as a guide and use a cutting disc on the angle grinder, or mark it and use a hacksaw. These assemblies can then be loosely fitted to the outsides of the main frames with M8 x 30 screws, you will need to remove them later to fit the axles and adjust the chains.



Axle sprockets.

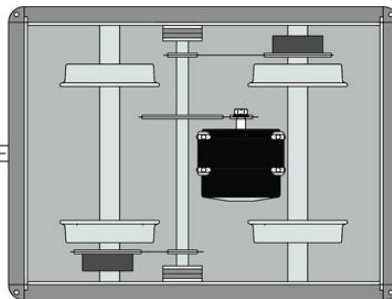
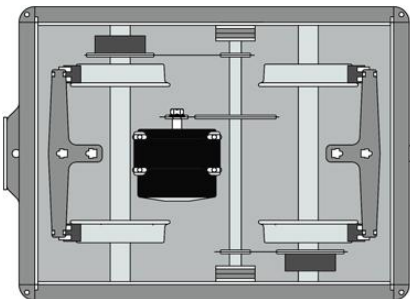


I choose to use taperlock sprockets on the axles and mount them outboard of the wheels so that they can be quickly changed if you want to alter your top speed and pulling power. If you want to use the loco as a 'Gentleman's light sporting locomotive', go for 20 tooth sprockets on the axles and lean into the bends, for a more sensible top speed of around 5-6 mph and greater pulling power choose 27 tooth sprockets, or choose 24 tooth for a compromise. Axles and taperlock bushes need to be cleaned and grease and paint free, note that the bushes are sometimes supplied oiled for rust protection and the hole needs to be degreased.

Put just a spot of oil on the thread of the grub screws as you put them into the two opposing holes. The sprocket is set with a 10mm gap between sprocket and wheel face, using the head of an M6 bolt as a guide.

The taperlock sprockets are tightened up a bit at a time, first one side, then the other, then the first side again, until the set screws are as tight as you can get them, then tap the bush into the sprocket with a drift as shown above and tighten them again. (I mean tighter than that, it helps if you grunt). If you ever need to release them undo the grub screws and fit one of them in the central hole instead. Tighten it as tightly as you can, then tap the sprocket inward with a copper hammer and it should jump free. If you are building the outside crank version only one axle on each bogie needs to have the sprocket fitted.

Assembling the bogies



Although it is of no great importance, I suggest that you lay out the motors and layshafts as shown. With this setup both motors run in the same direction and the wires come out on the most suitable side.

Rear braked bogie (viewed from the bottom) Front bogie

After fitting the sprockets add 20mm shaft collars to the axles between the wheels and the bearings to provide better side to side location of the axles. With the axles placed in the bogie a good dollop of grease is put into the axle end and into the bearing and the axlebox is pushed onto the axle and loosely bolted to the frame with M8 x 30 screws and nyloc nuts. The collar position can now be set.





With the axlebox screws tightened up the shaft collars are set as follows. Push the axle fully to one side, push the collar against the bearing, nip the grub screw up gently, then slide the axle fully to the other side. There will now be a gap between the first shaft collar and the bearing, slide the collar across until the gap is about half what it was and tighten the grub screw.

Push the axle across to close that gap and fit the collar on the other side with a slight gap between the bearing and the collar, shove the collar hard home then move it back by eye and nip it up gently. The slight gap ensures that the axleboxes aren't pressed hard against the frames and are still free to slide up and down, and the end of the axle doesn't rub on the inside of the axlebox cover.

Now check the alignment of your sprockets with the layshaft sprockets, and if necessary adjust the collar positions slightly until the chain lines up and the collars give an axle about half to 1mm side to side movement. Once you are happy fully tighten the grub screws to lock the collars to the axle.

Motor sprocket.

> The motor sprockets have to be replaced with 9 tooth 06B (9.5mm pitch) to suit British chain standards. Being the smallest this is the sprocket most subject to wear, spares are available from CMD.

The edges need to be chamfered as shown to give a gentle lead in to the chain, just using a file is sufficient or stick it over a bolt in the vice and use a flap disc in the angle grinder, the sprocket will spin fast so don't let it escape.



(Alternatively wait until you have fitted the sprocket to the motor and spin it on a battery while you use a file or angle grinder to chamfer the sprocket and smooth the edges).



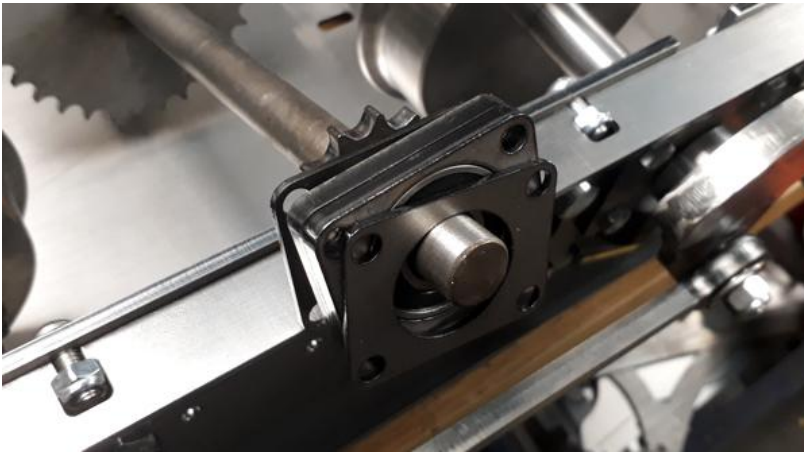
< Hold the sprocket in the vice while you undo the nut and replace it with the new one. Note that the nut is a **left hand thread, turn it clockwise to undo it**. Clean up the hole in the sprocket with small files to remove the 'pip' left during laser cutting, and slightly chamfer the edges of the hole to make it easier to fit. You may need to tap the new sprocket on, hammer very gently on a socket placed over the shaft to avoid accidentally damaging the thread or the motor bearings. Tilt the socket to the left, right, up and down so that each tap of the hammer eases it a bit further, if it is too tight then ease the hole with a fine file. Nut lock adhesive on the thread is a good idea, and don't overtighten it as the metal is not of the best quality.

> The motor then simply bolts in place, using M6 x 25 hex screws, with washers next to the slot. Slide the motor to the ends of the slots nearest to the layshaft. Some motors have threaded holes in the base, in which case use M6 x 16 hex screws and skip the nyloc nuts.

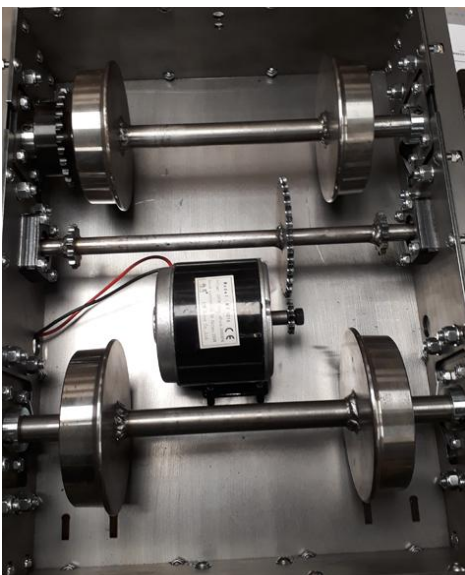
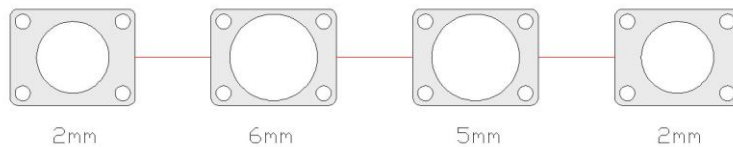


Layshaft

The layshafts are made by CMD from 15mm bright steel round bar so that they just fit between the bogie frames. You may have to use fine emery cloth to slightly reduce the size of the shaft to get it to fit easily into your bearings. The fit needs to be such that it is easy to slide the bearings on and off the ends by hand.



< The 15mm layshaft bearings are pressed into the layshaft bearing housings just as you did for the axleboxes earlier, using a 6mm thick and a 5mm thick piece each side to suit the 11mm thick bearing, with a 2mm thick piece on the inside and outside to keep the bearing locked in place but still allow it to rotate freely. Smear a blob of grease on each end of the shaft to aid assembly and future dismantling. Fix with M6 x 30 hex screws and nyloc nuts.



< The photo shows a bogie which was to be fitted with Tyke side rods, so although the layshaft has a full complement of sprockets only one axle has one fitted, the sprocket on the other axle would be at the opposite corner. Take your length of chain and thread it round the sprockets, with the free end somewhere on the large sprocket. With the motor pushed towards the layshaft and the axle pushed towards the motor mark with a permanent marker where you will need to cut the chain so that you end up with two inner links together ready for a split link to be fitted.

> Not having a chain splitter I find that this is the easiest way to cut chain to length. With the chain in the vice cut through the outer link with a cutting disc in the angle grinder, taking it a touch at a time so that you don't cut through the inner link. Cut both sides and the chain will part leaving the remainder of the link to be pushed out. Put the cut chain back in place with the two loose ends



meeting somewhere on the larger sprocket, this keeps them neatly in place and at the right distance apart for you to fit the connecting link. When fitting the link it is good practice to fit it with the closed end of the spring link pointing in the usual direction of travel, so that if anything catches it then it won't spring off.

The chain from the motor to the layshaft is tensioned by sliding the motor, if you stand the bogie on end then gravity will help. Ease off the bolts, slide the motor to full stretch of the chains, push the chain slightly in the middle of the free run to create a little slack, then hold it while you tighten the bolts. The chain should now run freely without any tight spots, but also without excessive slack which can cause it to be noisy or even to jump a tooth.



< The tensions of the axle chains are set by sliding the axleboxes in the slots in the frames. I use a screwdriver in the gap as shown to move the axleboxes back and to until they are just right as shown. You can check that the axles are kept square to the frames by measuring the position of the axleboxes on opposite sides using the blunt end of a drill pushed into the gap as an aid to measurement. As mentioned above, chains should be fitted with a tiny bit of slack, rotate the axles to make sure that they don't bind at any point.

Don't be tempted to over tighten the chains, it robs power and leads to accelerated wear in both chains and bearings as well as preventing free movement of the suspension.

Brakes

Only the rear bogie has brakes fitted, utilising the weight of the driver for increased braking effort.

> Drill a 6mm hole through the PNP brake block as shown in their YouTube channel, '*Video showing how to drill brake blocks for model and miniature railway locomotives and rolling stock*', then assemble them onto the brake hangers with M6 x 25 screws and nyloc nuts, making two right hand and two left hand, as the blocks are tapered and radiussed on one side to match the wheel tread.



< The brake equalising beams need to have the various brackets twisted off, cleaned up and assembled with M6 x 16 button head screws, washers and nyloc nuts as shown. Take care to fit the small brackets which guide the cable into the correct holes as shown here.

The brake hangers hook into the slots in the footplate, making sure that the taper on the block matches the taper on the tread. An M6 x 16 button head screw, washer and nut are added as shown to trap the hanger in place.



< The equalising beams drop into the slots in the hangers and rotate to lock them in place, with the one with the two cable brackets on what will be the top side once the bogie is the right way up, and the one with the clamping plate with the clamp on the underside, where you can get at it. The next photo shows the orientation.

> In this photo the coupling is at the right, the cable exiting the bogie through the rear buffer beam. (The rear chain is missing as this Tyke bogie was fitted with coupling rods)



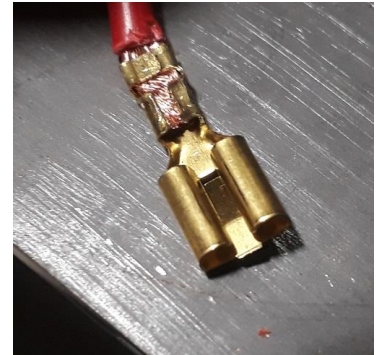
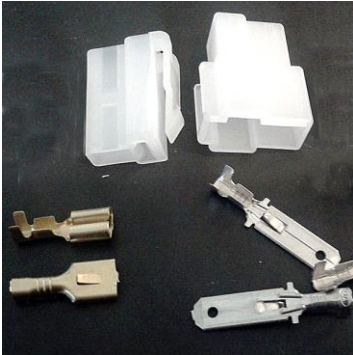
< Showing the brake cable fed through the hole in the inner end of the bogie and through the guides on the equalising bar. This is done after the cable has been attached to the brake lever.

The wiring



< A cable tie attaches the wires to the underside of the bogie top plate to keep them clear of the working parts.

This is the connector I used to join the bogie wiring to the main frame wiring. I fitted the positive as the 'upright' of the 'Tee', and the negative as the crossbar, using the same orientation on all my locos and battery boxes. The female connectors, shown in the centre photo, are fitted to the frame wiring, the male connectors to the bogie. Use a proper crimping tool, and for long term security it is best to solder the connection as well. Anderson connectors can be used as a heavier duty alternative.

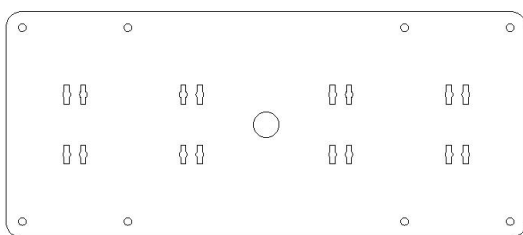


Failure to achieve forward motion or lack of power is most commonly caused by failure to connect one or both plugs and sockets up!



< The wires passing through the holes in the bogie sides need to be protected against chafing. You could use spiral wrap, I split a length of rubber hose, wrapped it round the cable and secured it with cable ties.

Fitting the bogies once the frame has been built



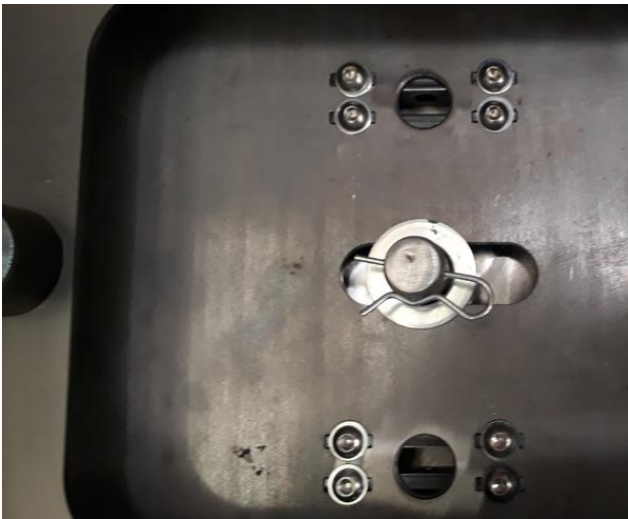
Now take the two bolsters and the eight roller brackets. Loosely assemble the 24mm diameter roller bearings with M8 x 30 screws, washers and nyloc nuts, then add the assemblies to the underside of the bolsters with M6 x 16 button screws, washers and nyloc nuts. Finally gently tighten the screws used as axles.



They are fitted to the outer holes in the bolster at the heavily loaded driver's end and the inner holes at the other. This allows the lightly loaded front bogie to rock to side to side more easily to cope with undulations in the track.

The bolsters are fitted to your loco frames by welding or using the fixing holes provided..

The following photo is of the bogie fitted to a Tyke, your installation will look rather different but the same principles apply.



< Add the bolster to the underside of your frame and lower the frame over the bogie pivot pins, with the braked bogie at the back. Add M20 washers and 'R' clips to keep them in place.

Suitable cable operated hand brake levers to complement the brakes are available from CMD.

Attach the heavy duty brake cable to the base of your brake lever as shown in the lever instructions, with the brake lever pulled up one notch from the fully off position to give the fitted cable some slack.

Thread the cable through a hole in your floor and clip it up sufficiently to stop it dragging, the cable must have some freedom of movement. The cable is fed into the rear bogie through the upper hole in the rear of the frame and fed into the guide hole in the rear equalising beam. The cable inner then passes through the guides in the equalising beam and is clamped under the clamping plate on the other beam by two M6 x 20 hex head screws and nyloc nuts. If the cable outer needs to be shortened then slide the inner out and cut the outer with a cutting disc in the angle grinder. This is also the neatest way to cut the inner cable without distorting it. You can then set the cable length so that the brakes come on fully before the brake lever is moved to it's full extent and fully tighten the clamping screws.

If in the future you need to remove the bogie for maintenance then by slackening off the adjuster at the brake lever end and removing the discs that trap the nipple on the end of the cable you should be able to remove the cable from the base of the brake lever without undoing the cable at the bogie end. Snipping the cable ties will allow you to release the bogie with the cable still attached. Don't forget to replace the ties on reassembly, or the brake cable could catch on the track.