BOOT LANE WORKS
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BEATRICE

Thank you for buying this locomotive kit from Boot Lane Works, please read all the instructions carefully before assembly.

Tools & Adhesives

I recommend a few tools to help you assemble your kit –

- Small Bench Vice
- Modelling Knife *(I use a scalpel)*
- Tweezers, Pliers, etc…
- Needle Files, various shapes
- Wet & Dry abrasive paper *(the mixed selection from Halfords is very good)*
- Selection of small twist drills, including 1.5mm & 2mm diameter
- A 90-degree angle *(I use a set block, but a small set square will work well)*
- Personally, can't manage without my small, tapered reamer, look for them on eBay!
  TAKE CARE WITH THE REAMER - MAKE A SMALL CUT, TRY, AND CUT AGAIN

I also recommend the following adhesives –

- Super Glue
  I use Gorilla Super Glue
- Dichloromethane, A liquid solvent for the acrylic
  I use E.M.A. Model Supplies "Plastic Weld"

A little about the printing process.
The printer extrudes a filament of plastic, layer by layer, to create an object. As it does so, it can leave tiny ridges along the object.
The printer can also leave a bit of a "squish" from the build-plate and there is usually a tiny "ridge" around the flat surface of the object that was attached to the build-plate.
For best results, clean the ridges off with a file.

THE RESIN PARTS ARE BRITTLE AND MUST BE HANDLED WITH CARE
The resin is hardened by an ultraviolet light process but continues to adsorb the light after the process.
Please ensure the resin is thoroughly painted to stop the hardening process.

THE ACRYLIC IS ALSO BRITTLE, CARE SHOULD BE TAKEN DURING CONSTRUCTION

***** IMPORTANT *****

Please bear in mind that this kit, although intended for garden use, is a reasonably small power unit, designed for hauling a handful of wagons or a couple of carriages.
We DO NOT guarantee this model if used for "Heavy Haulage"!

BEATRICE is inspired by the Hunslet Engine Company "Alice" Class on the "B" type frames.
The kit is supplied with several variations, that allow for different cab styles, buffer-beams & chimney's etc.
(The history & production of the Alice class is rather complicated, and we can do no better than recommend Cliff Thomas book, QUARRY HUNSLETS OF NORTH WALES).

IRISH MAIL

In 1870, the Dinorwic Quarry placed an order with the Hunslet Engine Company of Leeds for a prototype locomotive. They produced Dinorwic (works number 51 of 1870), which is a clear precursor to the Alice class. This locomotive proved a success, and two further locomotives were ordered in 1877 to an improved design.

Hunslet continued to evolve the design, and when the quarry ordered a fourth locomotive in 1886, Hunslet delivered the first of the Alice Class engines, named Velinheli (No. 409 of 1886). The class name was derived from the second example of this class of engine to be built, named Alice later King Of The Scarlets (No. 492 of 1889). This was done to avoid confusion with the Port organisation (Port Dinorwic or Y Felinheli) which was separate from the quarry operation.

11 locomotives of this class were built for the Dinorwic Slate Quarry, with all surviving into some form of preservation. Hunslet allocated the telegraphic codename VELIN to this class, named after the first locomotive.
(from of Wikipedia)

RIGHT, LETS BUILD A CHASSIS…

There are included within the kit, a couple of jigs to enable a reasonably easy build, and (I promise you) an idiot-proof system to quarter the outside cranks.

We will start with the wheelsets.

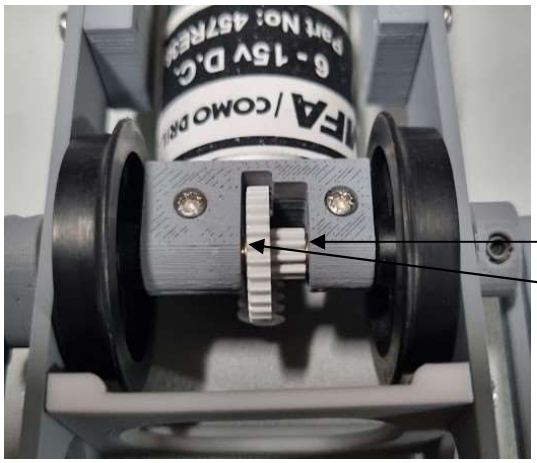
Locate the four Peter Binnie 29mm wheels, the two axles *(one already has a grey gear centred on it)*, two of the small ⅛" brass top-hat bushes and the two white printed tube jigs with a small hole down the centre.

Take the plain axle and carefully push a wheel onto either end. I use a small, tapered reamer to open the hole in the back of the wheel very slightly, to help the wheel start onto the axle. Be careful, if you are using a reamer, take only a tiny twist…
As you push the wheels on, take care to keep them square to the axles. We want to avoid wheel "wobble". I used a small vice to push the wheels onto the axles.

Using the white tube jigs as a depth gauge, push the wheels onto the axle.
You can use both gauges simultaneously *(as in the image)*, or one on its own.

The jigs are the correct depth to ensure that wheels are pushed onto the axle to give you a "back-to-back" of 28mm. And they will give you equal lengths of axle on each side, on which to mount your cranks later in the build.

The second axle requires a brass top-hat bush be placed either side of the grey gear, between the wheel & grey gear. The lip of the brass top-hat bush must be flush against the grey gear on both sides.
Again, use the white tube jig to ensure the wheels are pushed onto the axle to the correct depth.



Locate the two gearbox parts.
(Photo is VARSITY, but the gearbox is the same on BEATRICE)

The two halves of the gearbox are held together with two M2 8mm panhead screws.

Clamp the two gearbox parts over the axle. The two, brass top-hat bushes are clamped up against the grey gear with the lips visible between the grey gear and gearbox.

Do not attach the motor yet, it's much easier to build the motion without the constraint of the motor.

Next, you need to press the cranks onto the crank bushes.

Locate the four bushes, four M3 grub screws, four white printed cranks & the Allen key supplied. A few spares have been provided.

Using a vice, squeeze the bush into the crank.
The hole for the grub screw in the bush needs to align with the hole in the crank. I did not use any adhesive

to attach the crank to the bush, it was just a push fit.
After testing, my cranks have not moved on the bushes, but it's obviously a possibility, and you may wish to use an adhesive?

CRANKS

Once you've pushed the bushes into the cranks, you need to locate two 12mm & two 10mm conehead M2 screws.

Fix the screws into the cranks, the two longer screws will become the longer crankpins for the rear wheelset, the shorter, for the front wheelset.

I painted the cranks before fixing the screws.

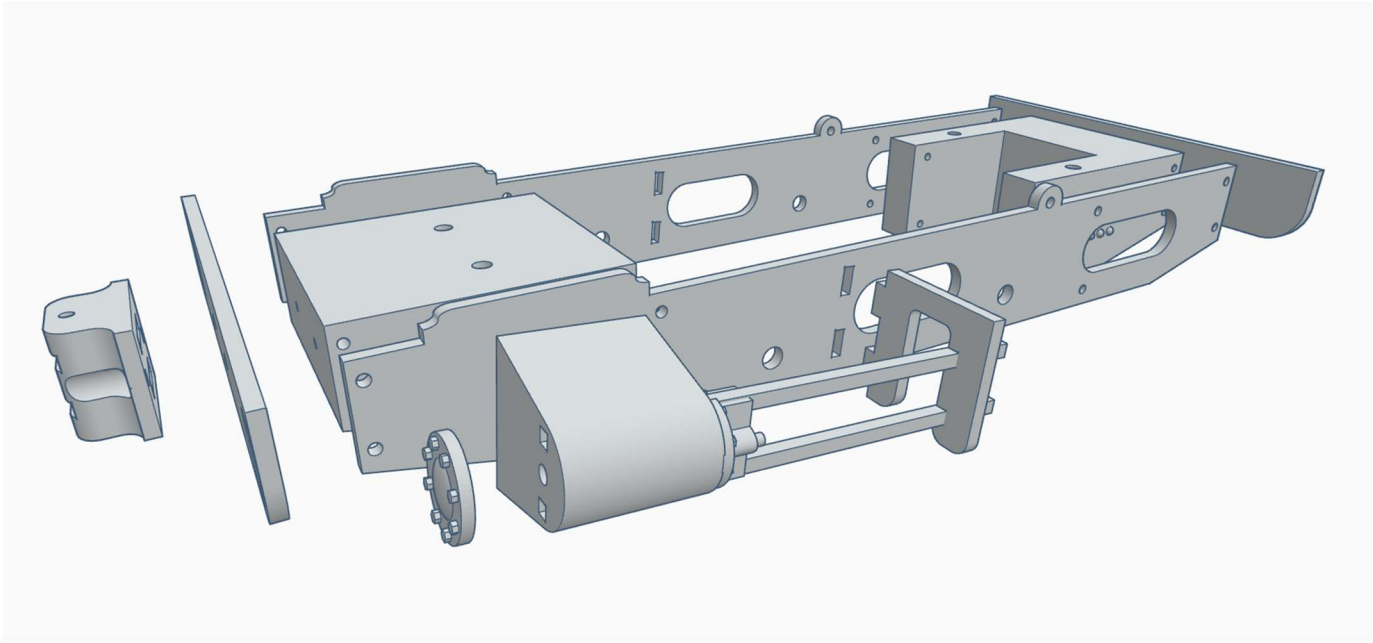
LET'S PUT THE FRAMES TOGETHER

Locate the cylinders blocks, these are helpfully marked with an "L" & "R", you will also need the cylinder-head covers.

Ensure that the 2mm brass rod passes freely through the centre of the cylinders. I also take the time to ensure that the 2mm square brass rod will fit in the slide-bar runner on the rear of the cylinder.
Glue the cylinder-head covers on the cylinder blocks.
I also cleaned and painted the cylinders before attaching to the frames.
Actually, I covered the cylinders with same very thin styrene sheet. In fact, I also covered the smokebox, firebox & saddle-tank with the same styrene…

Take both acrylic main frames, and the two acrylic motion brackets.
Glue (suggest Plastic Weld) a motion bracket to each frameplate, ensure you build a matching pair of left and right.

Note the motion brackets on each frameplate, and the correct orientation for the bracket, top & bottom.
I painted the frame-plates once the brackets & cylinders were in place.
Next, screw the cylinders to each frameplate. These are attached with four M2 8mm panhead screws (two each cylinder).



I have designed the whole loco to allow the screws to “self-tap” into the white filament printed part. However, you can, if you wish, tap out the holes first, before using the screws.

With the cylinders attached to the frameplates you can now attach the stretchers.
There are two stretchers in -
One for the front, the front of which is identified by the two screw holes for the front buffer-beam.
One for the rear, again there are two holes for the rear buffer-beam.

Attach the front & rear stretcher to one of the frameplates using the M2 8mm panhead screws. To make life a little easier.

With one side and stretchers together, the wheelsets need to go in.
Place a brass top-hat bush on each axle end with the lip up against the wheels.

NOTE

The wheelset with the gearbox must go in the correct way round, rotate it on the axle and ensure that the 2mm holes in the frameplates & gearbox align.

The image shows the gearbox mounted with a length (50mm) of 2mm brass rod.
Image is of VARSITY, but the gearbox is the same for BEATRICE.

Finish off by, by attaching the second frameplate to the whole assembly.

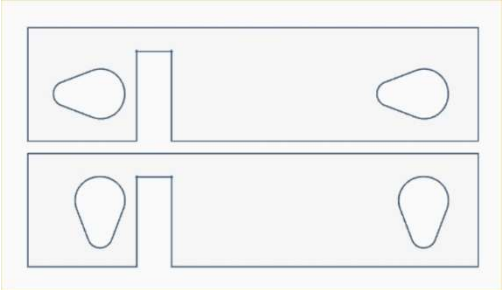
BUILDING THE MOTION

With a smooth rolling chassis, you can now attach the cranks.

Place the cranks on the axle ends, the end on the axle will need to be flush with the bush in the crank.
attach the cranks on one side and tighten the grub screws. Now attach the cranks on the other side, but do not tighten the grub screws.

QUARTERING JIGS

Locate the quartering jigs, these are cut from 2mm acrylic, there are two jigs with the cranks cut away and slots to clear the motion brackets *(right)*.



The jigs are set to the locomotive wheelbase and will fit over both cranks on one side of the engine.

Use the jig with the cranks set horizontally on the cranks you have already tightened.
The other jig will slip over the other side and loose cranks. Because the crank cut away is upright, the grub screws should be accessible on the underside of the chassis to tighten up.
With both jigs on both sides, the cranks MUST be quartered correctly. Although fiddley, with both jigs in place, all grub screws should be tightened, and the model will be properly quartered.

KEEP THESE JIGS SAFE - THEY WILL COME IN HANDY IF YOU EVER NEED TO SERVICE YOUR MODEL IN THE FUTURE

SLIDEBARS

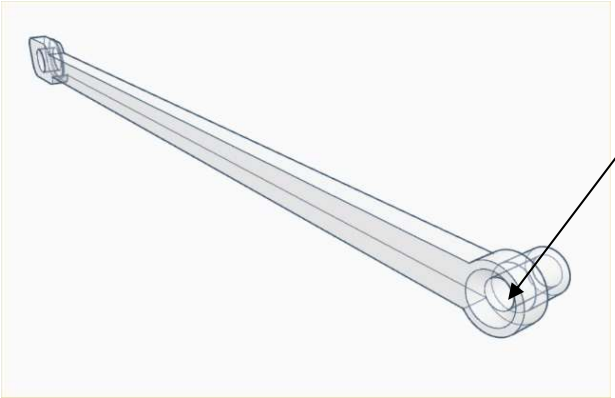
Cut the 2mm square brass rod into 50mm lengths and fixed into place between the cylinders & motion brackets.
A tiny amount of glue will be necessary to secure the bars.

(The image is once again of VARSITY, but the slidebars principle is the same for BEATRICE)

Locate the following –

- Two coupling rods *(the shorter rods)*
- Two connecting rods *(the longer rods)*
- Two crossheads
- Two M2 8mm coneheads screws
- Six M2 nuts
- Six M2 washers
- Four white ABS tubes *(two long & two short)*
- 2mm brass rod, cut to two 35mm lengths

Once again, I painted all the components prior to assembly.



Create a better countersunk hole in the rear of the connecting rods, small end.

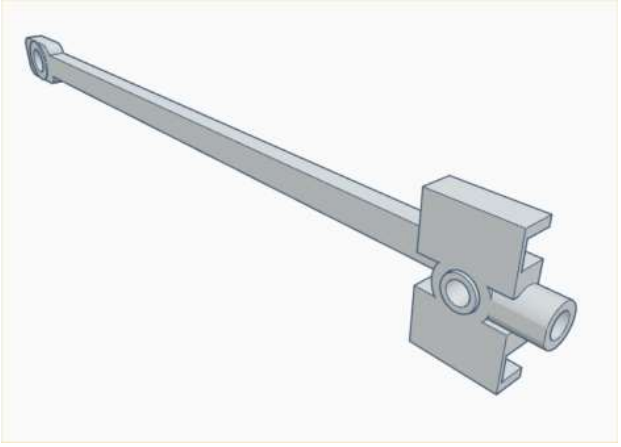
(Unfortunately, it is very difficult to get a better countersink on the printer).

Fit the M2 8mm conehead screws into the countersunk hole, try and get the head of the screw flush with the back of the connecting rod.

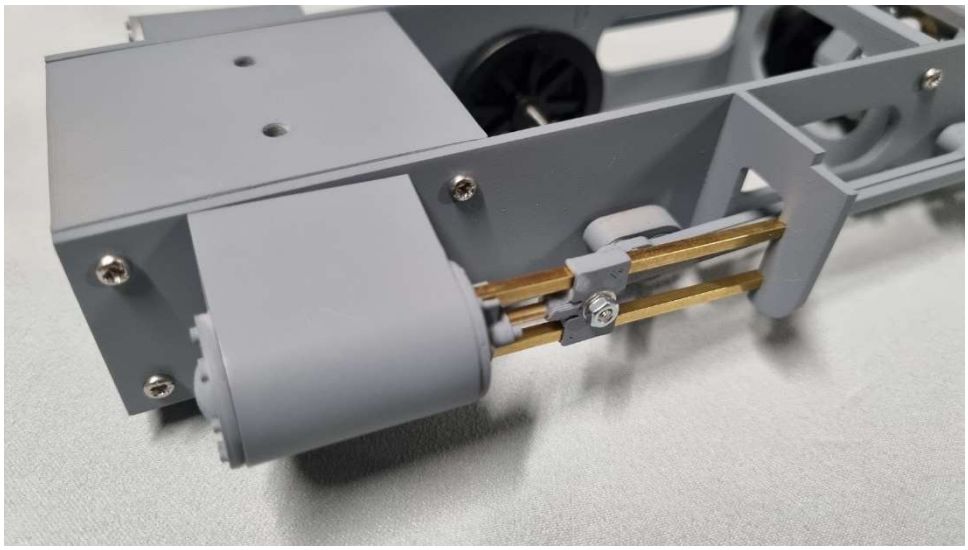
Fit a 35mm length of brass rod into the crosshead, you may need a dap of glue to secure it into place.
Do not push the brass rod too far and block the hole for the connecting rod.

Place the crosshead over the connecting rod, then a washer and finally a nut to attach the crosshead to the rod.

Once tight, the crosshead should move freely on the connecting rod.



Place a washer over a crankpin, this washer will keep the rods off the cranks and stop them fouling as the wheels rotate. Now drop an ABS tube over the crankpin. The long ABS tubes for the rear crankpins, the shorter tubes for the front.
With the ABS tubes over the crank pins, the coupling rods can be dropped over and the M2 nuts to captivate the front crankpins. All the rods have a small boss printed into one side; the boss should face outwards.



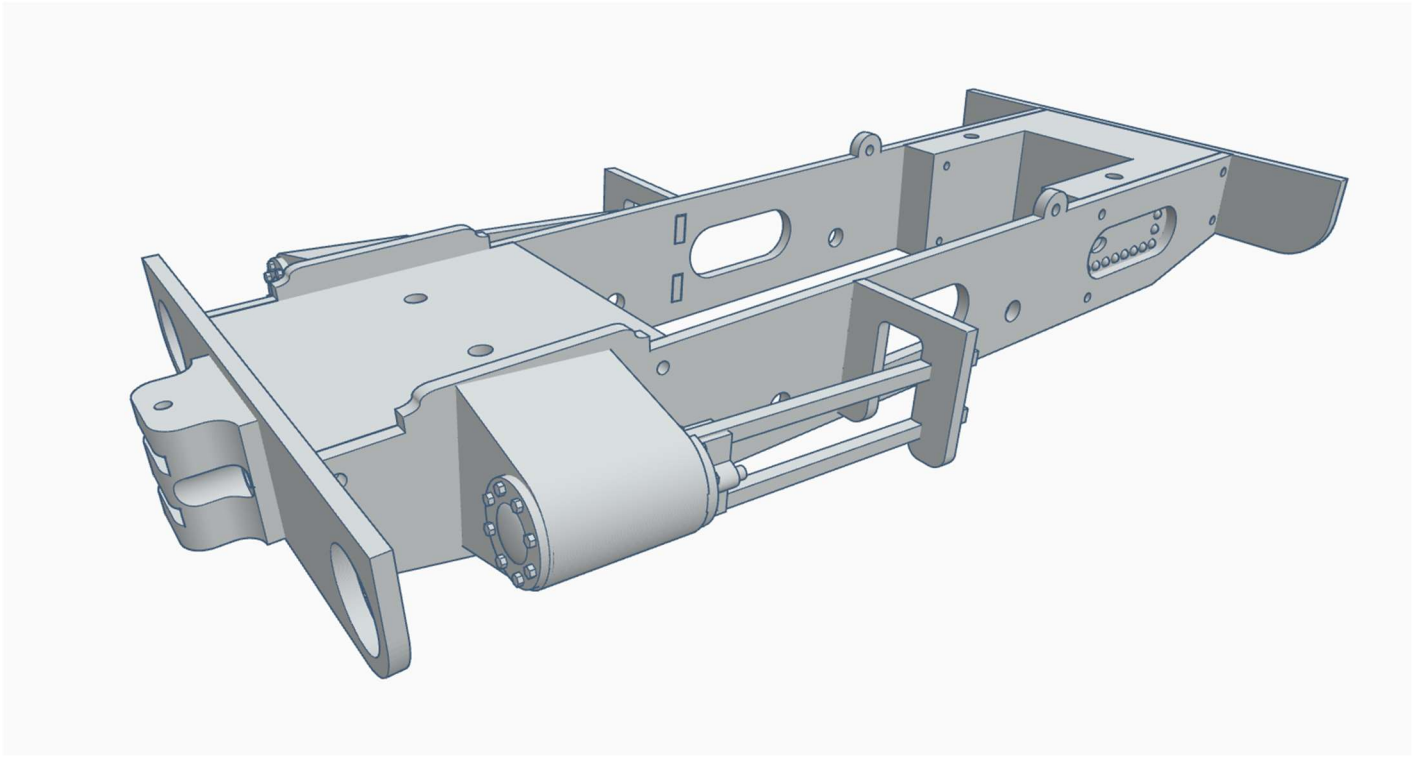
The rear cranks will also require the coupling rods fitting.

You will need to feed the crossheads onto the slidebars, and at the same time the piston rod into the cylinders.

It's a little tricky, but once done, you should have a rolling chassis.

With a smooth-running chassis, fit the motor using the two M3 5mm screws.
The motor gearbox assembly is held in place by a 46mm length of 2mm brass rod. The rod is held in place by the footplate when it is attached.

A LITTLE OIL ON THE GEARS AND ALL BEARINGS WILL WORK WONDERS FOR THE MODEL LOCOMOTIVE – BOTH FOR SMOOTH RUNNING AND LONGEVITY OF THE GEARS, ETC.



THE BODY

The body is a relatively straightforward build, but there are several options included in this kit. Expect leftover parts at the end of the build.

THE FOOTPLATE

There are two footplates included in this kit. The footplate is a single piece of 2mm acrylic.
*The footplate that is to be used with the half-cab has small **holes** to locate the bunkers with M2 8mm panhead screws from the underside of the footplate.*
*The footplate that is to be used with the full-cab has small **slots** to locate the acrylic cut cab pieces.*

The footplate is simply sandwiched between the chassis and the smokebox & firebox using the four 16mm M3 screws. The screws are driven in from below through the stretchers, the footplate and self-tap into the respective filament part, either the smokebox or the firebox.
The smokebox is a single print including the lower boiler barrel. The barrel fits snuggly into the front of the firebox with a little movement to allow for lining up.

THE SADDLETANK

The saddletank fits snugly onto the boiler, a small lug locates the tank onto the boiler.
The tank filler sits in the centre of the tank.
Handrails and handrail knobs are also included in the kit and fit along the tank.

THE CAB

Two cab versions are included in the kit.

The Full Cab
The full-cab is made up of four pieces of 2mm acrylic. These in turn locate into slots on the footplate.
There are two (delicate) filament printed "D" shaped cab beading pieces. These locate along the curve of the cab edge. Carefully drill out the holes in the beading to allow the 1.5mm brass to fit. The brass simulates the two handrails either side of the cab opening. The rearmost reaches to the top of the cab.

The Half Cab
There are three parts to this cab.
The back sheet, the bunker & the righthand side sheet.
All three parts are attached to the footplate from the underside using M2 8mm panhead screws.
There are three pieces of filament printed beading that fit along the top of the bunkers and rear cab sheet.
Carefully open the holes in the beading to accept the 1.5mm brass. The brass simulates the two handrails either side of the cab opening.

The Rear Sliding Doors
The rear cab-sheet has a square hole in the centre. This was a feature of the small Hunslet locomotives, allowing easy access to the firebox from outside the engine. There were sliding doors on the rear of the cab-sheet, these are recreated by the 1mm acrylic.
The large 1mm acrylic overlays the rear of the cab-sheet and represents the sliding doors.
The two 1mm acrylic strips attach to the larger acrylic and represent the door runners.

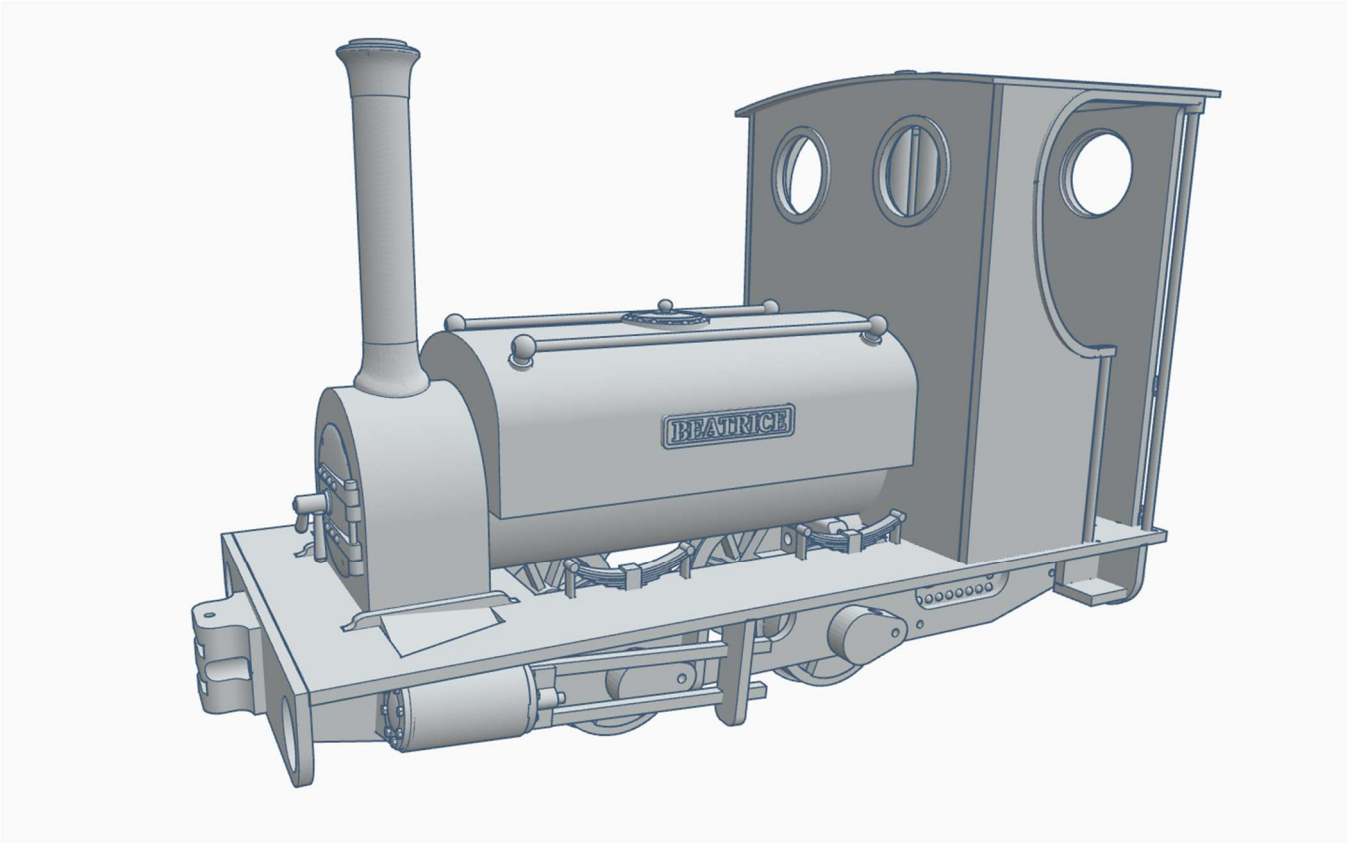
THE CAB ROOF

The cab roof is built up from a filament printed frame, and a 0.5mm piece of cut styrene.
The two should be glued together, I usually support the outside edges on a couple of strips of wood and use a weight in the centre to get the shape while the glue sets.

Two rain strips are created by using the length of 1mm styrene strip provided. Attach along the outside edge of the roof.

OTHER DETAILS

The bufferbeams and buffers are attached with four M2 8mm panhead screws, self-taping into the stretchers. There are six buffer-beams in total, you should be able to find something that represents the loco you are modelling!
The front bufferbeam is the same height as the footplate, the footplate butts up against it.
However, the rear bufferbeam sits under the footplate, where it extends beyond the rear of the engine.



Other details include chimney (there are two, a long & a short), safety valve (again there are two, a long and a short), tank filler, firedoor, regulator, reverser & gauge glasses, smokebox door & dart.

Four spectacle rings are supplied, along with four 1mm acrylic windows.

Four springs are supplied, they locate into holes in the running-board.

2mm acrylic parts are included to represent the steps, these locate into slots in the footplate.

An electronic copy of theses instructions can be found at -
www.bootlane.org.uk

Andrew & Jacqui

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