

NG Sand & Gravel

014 Industrial Layout Part 6 – Pipes, Pump, Cyclone & Storage Hopper



Photos: REVIEW Studio

SINCE THE LAST PART OF THIS SAGA¹ a great deal has been accomplished. In fact, the diorama is very nearly completed (if not finished). The sand processing plant and the pair of storage hoppers are now in place, along with the cyclone separator and the associated pump house. Not shown in the above photograph are the lagoon and workshop 'Nissen' hut (to be covered later). Only the small details remain – though experience shows that the 'dressing' of any layout can often become the most time consuming part.

The hopper structure, with the cyclone on top, had been ready for some time, appearing in earlier photos of the layout. It lacked the discharge gates however, so these were added, along with the operating gear. The whole was then given a blow over with fine abrasive (pumice powder), to clean off the inevitable tarnish, degreased in thinners, then blown over with etching primer. A finishing coat of green Humbrol No. 76, weathered with ochre Humbrol No.83, plus some 'Rustall' finished it all off. The 'feet' – which are meant to be concrete, were painted in 'pale stone' Humbrol No. 121 – heavily sprinkled with pumice powder when still wet to give a nice textured effect.

Lengths of Imm brass wire were soldered into the six 'feet' and holes drilled through the scenery to accept them. At the same time, the tipping lorry² was similarly treated, with brass wire fitted into the bases of the tyres. This latter was positioned under the nearest hopper, which was modelled as being full, ready for discharging.

¹ - NG Sand & Gravel Part 5 – 'Aids to Creativity' – appeared in REVIEW Issue 63, pages 300-302.

² - See Model Railway Journal, Issue 160, pages 173-176.

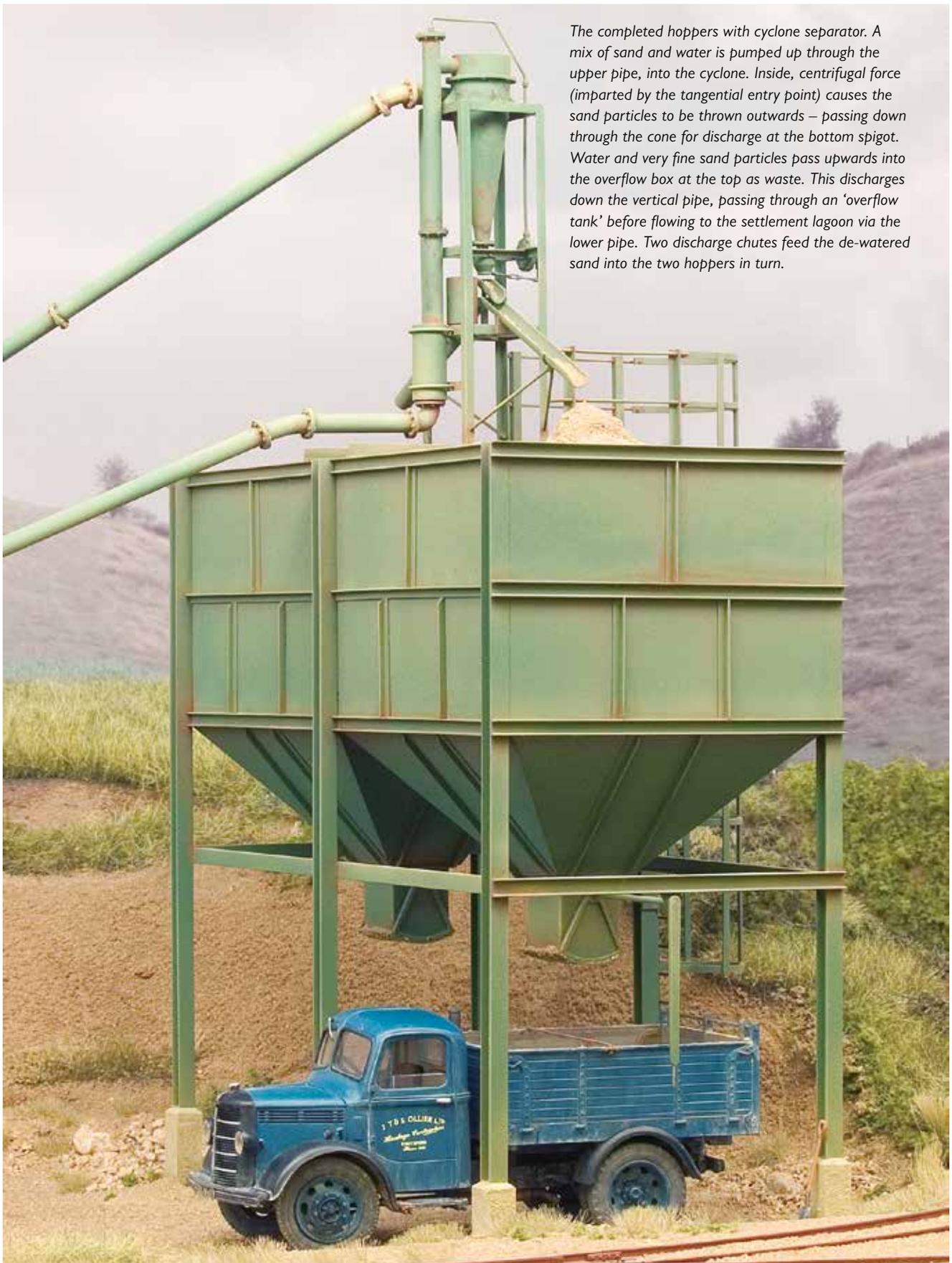


I had originally intended to heavily rebuild an old Dinky Toy Bedford tipping lorry for the diorama. Fortunately, Classic Commercials superb kit appeared, saving me a great deal of sweat and tears!

Under the baseboard, the protruding wire was coated with epoxy adhesive to hold both items firmly in place.

PUMP & PUMP HOUSE

Now the pump and pump house could be constructed and, once completed, this would allow the plotting and manufacture of the delivery and discharge pipes for the cyclone. The pump is based on a Linatex design, driven by an electric motor. Its function in the prototype is to force the screened sand and water mix up to the cyclone, where the water is separated out and the sand deposited in the hoppers.



The completed hoppers with cyclone separator. A mix of sand and water is pumped up through the upper pipe, into the cyclone. Inside, centrifugal force (imparted by the tangential entry point) causes the sand particles to be thrown outwards – passing down through the cone for discharge at the bottom spigot. Water and very fine sand particles pass upwards into the overflow box at the top as waste. This discharges down the vertical pipe, passing through an ‘overflow tank’ before flowing to the settlement lagoon via the lower pipe. Two discharge chutes feed the de-watered sand into the two hoppers in turn.

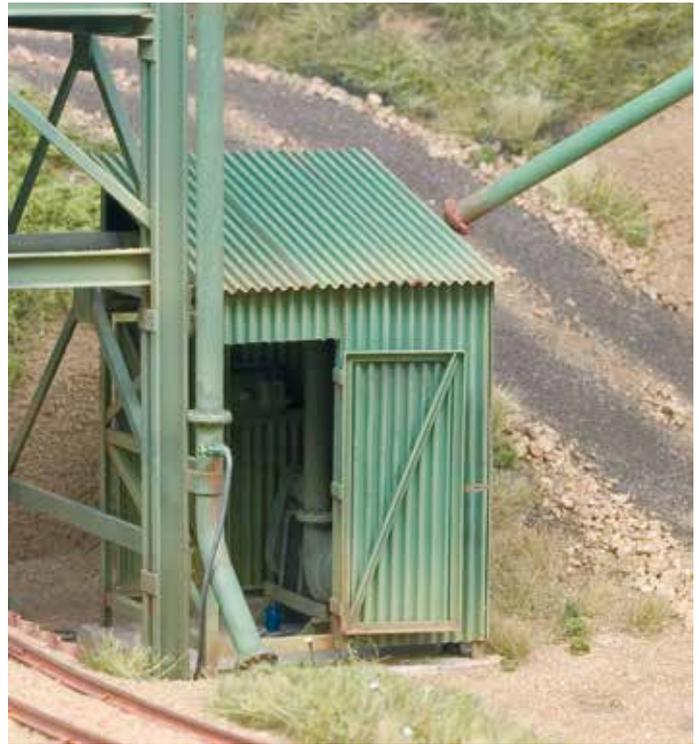
Making the pump was relatively simple, as I used some of the lost wax castings I created for the project - the electric motor and pipe flanges. The pipes themselves are $\frac{5}{32}$ inch dia. brass rod (K&S). A simple turning forms the pump body, which is filed to accept the brass rod on one side, the assembly being silver soldered and filed to shape. A supporting frame of brass angle and channel, plus a motor support frame and drive belt cover completed the assembly.



A base of 3mm ply was set next the wet screen and painted to represent concrete as noted earlier. For the shed, a simple frame of 1.75mm brass angle was formed and clad in sheets of pressed steel 'corrugated iron' from Metalsmith Ltd of Kettering. This latter can be soldered to the brass angle and looks very realistic. A rivet tool was used to simulate fixing bolts.



A false ceiling of 0.5mm brass sheet was made, with a circular aperture to accept a small speaker, facing downwards. This provides the 'wet screen' sound – provided by my 'Ossynths' sound system. Doors were made from similar brass angle to the frame and clad with the same corrugated sheet. Hasp and staple fixings were made from brass strip and wire, while the hinges are 7mm Meridian etchings. A brass panel was fixed where the outlet pipe would be; this carries a short length of brass tube, intended to

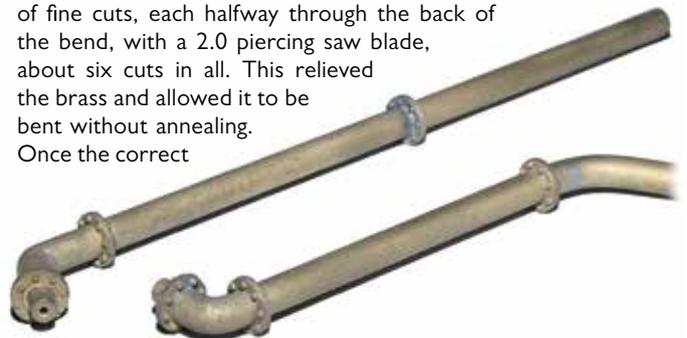


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give some latitude when fixing the delivery pipe in place later. The final detail was a little brass 'distribution board' on the rear wall, with a lostwax brass switch box and turned brass 'light switch'. Some brass wire forms wiring. Cleaning and painting is as for the hoppers.

PIPEWORK

All the pipework is formed from $\frac{5}{32}$ inch dia. brass rod with lostwax pipe flanges carrying the all essential bolt detail. On sloping or vertical pipes, make sure you place these latter with the bolt heads uppermost, nuts beneath. One problem was forming tight angled bends in the rod. I solved this by making a series of fine cuts, each halfway through the back of the bend, with a 2.0 piercing saw blade, about six cuts in all. This relieved the brass and allowed it to be bent without annealing. Once the correct



angle was achieved, the bend was heated up to red and flooded with silver solder. This acts as a filler and puts the strength back into the weakened rod. Some cleaning is required afterward but the completed rod looks completely homogenous. The pipe flange castings, once the runner is removed, are lightly reamed with a five sided broach and slid into place onto a smear of solder paint. A quick flash of the torch fixes them neatly in place. Once I had all the required pipe sections, and had satisfied myself that they fitted satisfactorily, they were cleaned and painted as noted.

The final fixing of the pipework required a pair of supports to carry the cyclone discharge pipe over the railway I made these from 3.5 x 1.5mm brass channel and brass strip. Getting them into place caused a little head scratching, as the scenery was a bit thin in the area they needed to be. I made a plasticard cradle to support the pipes, fixing the supports to the horizontal pipe in place with cyanoacrylate and setting their bases into the foam scenery with thick PVA. The next day, when all was set solid, I cut away the plastic support.

LAGOON

I'd been dreading the moment when I could no longer put off forming the edge of the 'lagoon'. Over the past year, various ways of creating it were pondered, the front runner being pouring it in casting resin, suitably tinted. Keen observers will have noted the depression formed in the front of the diorama for the lagoon and my immediate problem was how to stop any resin, or similar, from running out onto the workbench. I cut a length of scrap 2mm perspex and screwed it firmly to the baseboard front, creating a 'dam'. The inner face was coated with a release agent so nothing would stick to it.

Before pouring resin into the lagoon, I made a few experiments, all of which were quite disastrous; either the resin stayed sticky, or set too fast and shrank alarmingly. Getting the right colour, using available pigments also proved nigh on impossible.

After a lot of pondering, I went 'back to basics' and asked myself questions regarding exactly what I needed to achieve. I wanted the appearance of still water, fouled by sand and silt. In fact, the 'water'

did not really need to be clear at all, just flat and very smooth. With a sigh of relief I experimented with some 1mm thick clear high gloss plastic used for vacuum forming. It has a 'peel off' protective mask on both sides, which makes it easy to keep perfect while being worked. To provide a surface for it to go on to, the 'lagoon', which still had its 'dam' in place, area was simply filled with fine moulding plaster. After a couple of false starts, the underside of a pre shaped sheet plastic (with the film removed!) was airbrushed with two different 'sand' colours – light and dark. I can't tell you what the mix exactly was, since I did it in the external mixing cup, pulling paint direct out of Humbrol tinlets using a brush. The aim was to simulate some 'depth'. The third go provided what looked to me to be 'just the job' and it was fixed in place when thoroughly dry, with PVA, direct onto the plaster, which had previously been painted black.

Next day, the top film was pulled off and the result admired – it really looked good! Except that is, for a nasty little blob of darker colour that the airbrush had obviously spat out, un-noticed. Now, with the paint on the underside of the plastic, and the plastic stuck firmly in place – what to do? After a bit of head scratching I took a 'Blackdog' resin crate moulding, cut it with a razor saw at an angle and glued it over the offending blemish as floating 'debris'.

Some finely sifted sand was sprinkled around the edge of the lagoon to cover the edge of the plastic sheet. This was set in place with very dilute PVA adhesive. Some Silfor tufts and specks of Woodland Scenics foam completed the lagoon edge. The reflections visible in the clear plastic are a joy.

Next: The Workshop 'Nissen' hut.

