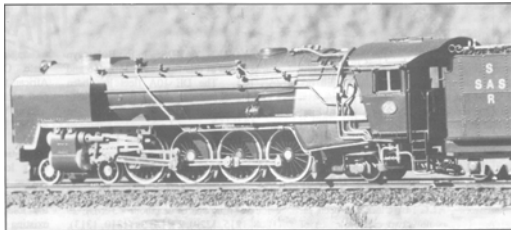


Preservation ... in Miniature - Mastercraftsman's Models by: Shand Jacobs

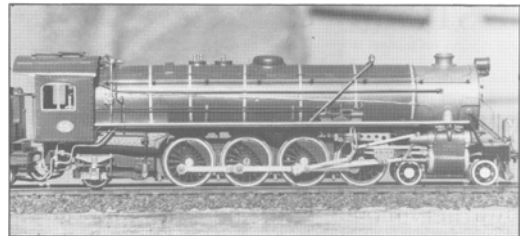
It is uncommon these days to find someone with either the inclination or ability to set about realising a dream, even if achieving that dream means years of laborious and sometimes even tedious handwork. It is more common to just buy something that is close to the dream and either live with the difference or -"imagineer" it away. Martin van Tonder is not a person to live with less than best, and, suffering from the very common ailment "SAR-itis", set his mind a long time ago to creating with his own hands models of the locomotives he had grown to love so much. The accompanying photographs, and those in previous issues, even if minutely scrutinised, bear witness to the patience and care devoted by Martin to the creation of his magnificent models and the realisation of his dream.

Martin has Classes 15CA, 16DA and 23 on his roster, and has 75% completed a 16E. He describes for us here his method of building the 23, but the process he used for all his models was the same, so this description covers all. These are his own words:-

"The loco height is 52mm, width is 39mm, and overall loco and tender length is 350mm. It is built to a scale of 4mm = 1 foot or "OO" scale and is designed to run on a track gauge of 16,5mm. I chose to build in this scale because this size model has a good "bulk" appearance with my other HO American models. If it were made to HO scale it would look too small and the cylinders would have to stick outwards of the running boards to accommodate the HO track. This looks ridiculous to me on such a model. Building in OO scale lets you tuck the cylinders under the running board as they should be, and the error in the track gauge is not too obvious. The correct gauge for OO scale should be 14mm for SAR 3ft 6ins and is equal to Sn3. Of course S scale works out correctly for the HO track gauge, but then one is out on a limb entirely. At least with OO scale you can use many of the British makes of OO scale lineside structures, which are quite appropriate for SAR, especially the older types. For instance the Ratio make of LNER signal posts, item No. 486, is typical of SAR types."



The Class 23 showing careful attention to the pipework.
Note also the excellent rivet work on the front of the tender.



Broadside view of the 15CA.
(BW Photos by Ben Dekker)

1) Construction of the Locomotive:

"The underframe sideplates are made of 1/16" thick brass plate separated by the cross ties and silver soldered together. Slots are provided for the axle boxes. Driving wheels are 21 mm Romfords with the flanges turned down for better scale appearance. Wheel counterbalance weights are correctly shaped from brass and fixed to the wheels with "superglue". Brass bearings are provided for the axles, and these can move up and down in the slots in the sideframes. The drivers are fully sprung and compensated by means of rocking spring beams. Thus all drivers are always in contact with any track misalignment. The vertical movement of the axle boxes is 1,5mm. A Sagami motor 200 x 28mm long is fitted into the firebox area and drives worm gearing of 35:1 ratio. Each driving wheel axle is gear driven by means of a Maerklin gear soldered to its centre, thus avoiding the transmission of any forces whatsoever through the side rods and eliminating the poor running so commonly experienced through quartering errors or misaligned coupling rod holes. Very quiet and smooth running is achieved in this way without any of the gears being visible from the outside of the loco.

The cylinder block is built up of brass plate soldered together and the valve gear bracket is constructed the same way. These assemblies are then screwed to the underframe. The crosshead slides, connecting rods, coupling rods and all other valve gear are made from stainless steel with fluting being applied where required by a grinding process. Coupling rods are articulated to allow for the vertical movement of the drive wheels and are a loose fit on the crankpins so as not to transmit or create any forces. They are riveted together with common steel pins, but are free to move as required. The crosshead itself is made of brass, but it is fitted with a steel piston rod.

The boiler is made of 10 thou brass plate rolled and soldered to circular former rings tuned for the correct boiler diameter. It is held to the underframe by three screws. A lead weight is placed towards the smokebox end to counterbalance the motor so that the centre of gravity of the engine is exactly at the centre of the driving wheel wheelbase. The boiler is filled with cast epoxy resin. This gives greater mass to the loco and fills up all the cavities so that any noise coming from the drive mechanism is deadened. A cavity is left in the firebox just large enough for the motor. Fittings, brackets, running boards etc., are all made from brass and are soldered in place. The chimney, dome, steam reverser, handrail knobs are tuned up from brass. The pipework is carried out using brass wire of the correct diameter, and the handrails are made from a guitar string.

The cab sides and roof is a single piece of 10 thou brass whilst the cab floor, steps and brackets are made from 15 thou brass. Microscope glass is fitted to the cab windows. The completed cab assembly is held to the underframe by two screws.

The boiler back head is fully detailed with a firebox-door, coal stoker, gauges, levers, pipes etc all mounted on a brass plate, which is removable from the firebox rear. Two screws also attach this assembly.

The smokebox front plate, door, etc. is one unit, which is removable from the boiler front. The front buffer beam with footplate, cowcatcher, smoke deflector plates, etc. are all one unit made of brass components soldered together and held to the underframe with one screw. A Kadee coupler is fitted, but its operating lever is cut off to improve appearance. The leading bogie has a brass frame. The trailing bogie is also made of 1/16" brass plate with all details like springs, hangers, compensating beam, etc. soldered on. The wheels for these bogies are made from brass turned in a lathe with the correct number of spokes cut into the discs by hand.

A keep plate is fitted below the underframe to retain all the driver axle boxes in position. This plate also carries the brass brake blocks and rods positioned so that there is 0,5mm clearance to the driving wheels to avoid electrical short circuits. "

2) Construction of the Tender:

"The underframe floor plate, longitudinals, cross-bars and buffer-beam are made of 15 thou brass plate soldered together. The body is 10 thou brass. Rivets are first impressed into the platework before bending up and soldering together. The ladder, steps, vacuum pipes and brackets etc., are also brass parts soldered either to the tank body or the buffer-beam. The tank body is attached to the underframe with four screws, one near each corner. The brake gear assembly consisting of vacuum brake cylinders, tanks, levers and brackets is soldered to the under frame.

The six-wheel bogies are made of 1/16" brass plate silver soldered together. Slots are provided for axle boxes. The wheels are turned of phosphor bronze and pressed onto 2mm diameter steel axles with one wheel per axle insulated with a plastic bush at the axle. The ends of the axles are turned down to 1 mm diameter to allow free running in the axle boxes. The axle boxes fit into the sideframe slots with 1 mm vertical movement. They are fully sprung and equalised within the bogie frame similar to the method used in the loco underframe. These bogies are fitted to the underframe with a plastic bush so that they are electrically insulated from the tender underframe. Electrical pick-up is from the right-hand wheels on the loco, and the left-hand wheels on the tender. A wire connects the two tender bogies direct to the motor. The drawbar between the loco and the tender is not insulated; therefore the loco and the tender superstructure have the same electrical polarity. This is so that any chance contact between the loco and the tender, such as on a tight curve, would not cause a short and halt the loco. The drawbar carries all vacuum pipes, water hoses, steam pipes, safety chains etc., which are all, made of the appropriate size of brass wire. A Kadee coupler is fitted at the rear of the tender. "

3) Construction General:

"Some of the details like the headlamp, generator, brake-blocks, stoker, back head valves and gauges are imported brass castings from Cal-Scale or Kemtron, and although made for American HO scale, work, work out nicely for SAR in OO. Other details peculiar to SAR designs, such as the steam reverser, are hand-made.

The model is painted with automotive Duco, using my own colour concoction to give dark gray-blue-black. Normal black is too dark and dead in appearance. The smoke box and tender underframe are painted in a graphite colour. The buffer beams fore and aft is signal red. Wheels have white rims. Pipes and fittings are brass coloured, the handrails are left in natural steel.

It is intended to fit an electronic sound system into the tender to reproduce the chuffing sound, picking up exhaust rate timing from the rear drivers. The top plate of the bunker will have a series of holes drilled for the sound of the speaker to come through. The coal pile is made of real coal glued onto brass mesh formed into the bunker. The fire irons and brackets are soldered to this assembly and the whole unit is removable.

Finally, the mass of the loco is 560 grams and of the tender 220 grams. The model will negotiate minimum radius curves of 750mm. "

Our grateful thanks go to Martin for this informative article – SA Rail / SA Spoor.



Three quarter rear view of 16DA.



The 16E's boiler detail

(Corrections made to original article)