MECHANICAL BRANCH MODELS

GENERAL INSTRUCTIONS

FOR

Assembly and Finishing

20,000 GALLON CAST IRON WATER TANK AND STEEL STAND KIT (WITH ALKALINITY PLANT)

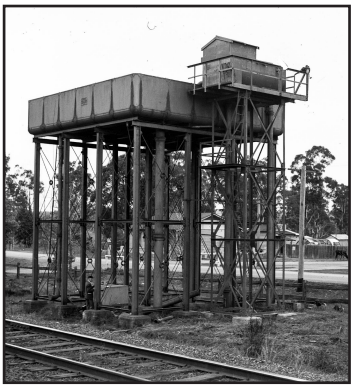
FROM 1st OCTOBER, 2017
(And Until Further Notice)

PART I

Mechanical Branch Models take pride in the accuracy of their products. However, sometimes compromises have to be made to enable assembly. Parts are as thin as possible which means they are easily distorted and damaged. Always exercise care when handling and assembling parts.

It is recommended that soldering be used for assembly, unless otherwise noted. Drill holes prior to removing parts from the fret.

Remove etched parts from the fret only as they are required so that they can first be identified.



Bargo

Kempsey

Penrith

1. Prototype information

Water tanks were an essential component of any railway in the steam days. At their peak there were over 400 watering locations which employed tanks of different capacities and heights depending on operational considerations.

While the NSWGR eventually settled on standard components and construction methods, few tanks were identical. However, there were definitely similarities and tanks using the standard 4'-2" x 4' -2" cast-iron panel and rounded corners panels became very common from around 1910.

The tankstands also employed common parts and construction methods but also varied based on the tank size and height.

20,000 Gallon Tank and Tank Stand

The single-tier tanks of 20,000 gallon capacity was a standard design, examples of which were at Bargo, Beckom, Bourke, Gloucester, Griffith, Kempsey, Newcastle Yard, Telegraph Point, Valley Heights and West Maitland.

This particular model is based on tanks which existed at Coffs Harbour and Demondrille which were constructed in 1944. Both have since been removed.

Alkalinity Plant

The Alkalinity plant was one of several designs employed by the NSWGR to treat the water prior to use, to improve locomotive efficiency and maintenance. The plant was in-line with the supply and mixed the water with salts as the tank was filled. The plant usually stood beside the tank on its own stand. The pumper would use the jib at the top of the stand to hoist the bags of treatment chemicals up from a store, usually adjacent to the tankstand.

This design dates from about 1944; examples were installed at Albury, Broadmeadow, Coffs Harbour, Demondrille, Dungog, Enfield, Glenapp, Glenreagh, Gloucester, Gosford, Hawkesbury River, Junee, Kyogle, Muswellbrook, Parramatta, Penrith, Rylstone, South Grafton, Wagga Wagga, Wollongong, Wyong and Yeerongpilly.

^ Telegraph Point

Orange

2. General guidelines

Solder assembly is recommended. Excellent results can be obtained with a 140 degree tin/lead solder and a solution of 10% Phosphoric acid as a flux.

Clean as you go and remove all flux residue by washing in CLR or soapy water to prevent corrosion.

A fibreglass brush is recommended for polishing.

Side or end-cutters are recommended for removing parts from the fret.

File any residual material off until the edge is flush and smooth.

3. List of parts

Tankstand

Description	Part number	Quantity
H Column - 8” x 6” short		20
H Column - 8” x 6” long		2
Tension ring	incl w/ assy jig	32
Tension member	23mm wire, 0.3 dia	128
H-Beam 6” x 5”		7
Assembly jig - 8” x 6”		2
Assembly jig - 6” x 5”		2

Tank

Description	Part number	Quantity
Tank side		4
Tank bottom, inner		1
Tank bottom, outer		1
Tank corner casting (vertical)		4
Tank corner casting (horizontal)		12
Internal bracing	1001	20
Tank top flange		1

Alkalinity Stand

Description	Part number	Req'd Quantity
6" x 3" RSJ Columns, 3'3 1/2 long		4
3" x 3" Angle Bracing (4'6-1/2" long)	Styrene	2
3" x 3" Angle, Front Bracing 5'4-1/2" long		1
Centre landing	1027	1
Centre landing support, 3"x3" Angle, 8'-11" long	Styrene	2
		1
Top platform	1021	1
Top platform escutcheon	1026	1
Handrail - outside		1
Handrail - ladder end		1
Handrail - jib end		1
I beam bearers 6" x 5", 8'5" long	1025	2
6" x 3" channel top platform bearers	1022	5
6" x 3" channel 8'6" long, top brace	1024	1
Bottom ladder	1003	1
Top ladder	1004	1
6"x3" Channel, 13'-4" long	1024	2

Alkalinity Plant

Description	Part number	Quantity
Chemical tank		1
Chemical tank cover		1
Equilibrium valve, incl:		
6” flanged bend		1
6” flanged pipe assembly		1
Valve		1
Inlet pipe		1
Outlet pipe		2
Tank outlet casting		1
Outlet chute		1
Float assembly		1
Water indicator gauge	1005	1
Water indicator float		1
Lever arm	Brass	1
Plungers	Brass wire, 0.3mm x 8mm long	2

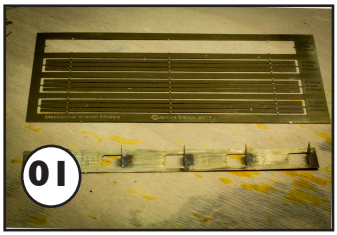
Footings and groundwork

Description	Part number	Quantity
Footing, small		14
Footing, large		4
9” valve		1
9” pipe		1

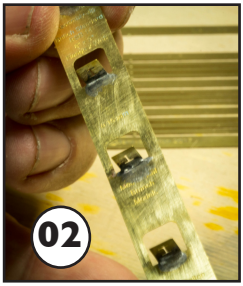
4. Assembly

Part A: Tankstand

A1. Assembly of steel sections



A1.1 For scale accuracy, structural sections are soldered together using the jigs provided. Each 'I' beam joist is comprised of two flanges separated at a distance by a "web". They are assembed using the jigs provided (Figure 1). This can be a fiddly operation, but there are many joists required, so persevere and you will become proficient and fast.

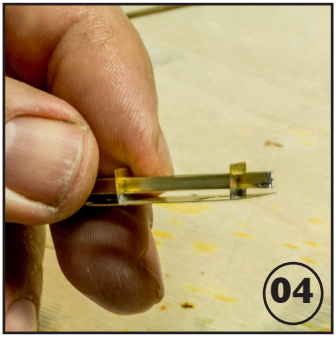


There is a small difference in size between the web and flanges of the joists and they must not be confused or they will not fit in the jig.

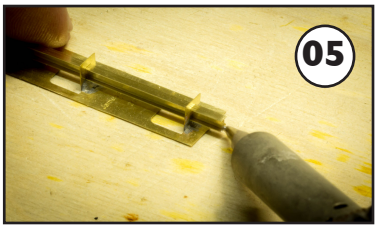
Fold the jig verticals up as shown in the figure and reinforce the bend with solder. (figure 2)

A1.2 Remove the flanges and web from the etch and remove the tabs. This is best acheived without bending the brass by placing the strip in a piece of 9mm ply which has had a groove cut in it with a razor saw, and filing across the edge of the strip to completely remove the tab. (figure 3)

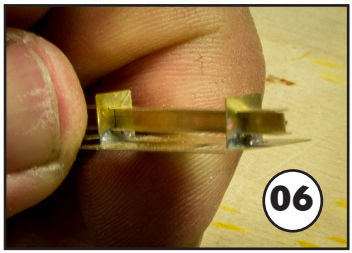
A1.3 Feed the bottom flange into the jig, through the vertical guides. Tweezers are useful for this. Feed the web through the vertical guides, followed by the top flange. If the top flange does not fit, the web may be too wide and require more filing (Figure 4).



A1.4 Align the ends of the flanges and web. The end should be protruding clear of the jig vertical by about 10mm. It is important not to contaminate the jig with flux or solder as it can make subsequent use impossible. (figure 5)



A1.5 Support the end of the beam with a piece of scrap balsawood. Apply flux to the joint and apply solder to the end of the beam. Hold the iron against the end of the beam - you should see solder flow along the joint towards the jig. Feed out some more of the beam and continue to solder. Frequently check that the a good joint has formed top and bottom. (figure 6)



A1.6 Remove excessive solder with solder wick. Be careful to do this as you go, in the jig. Applying heat when the beam is not held by the jig risks distortion and collapse of the whole assembly (speaking from experience here). (figure 6).

A1.7 When the beam has been soldered from end to end, remove flux and wash in in CLR solution.

In total there are:

- 16 beams of 6" x 8" RSJ x xmm long
- 7 beams of 6" x 5" RSJ x y mm long
- 2 beams of 8" x 6" RSJ x 37' a mm long
- 2 beams of 8" x 6" RSJ x 25'6" b mm long

It is suggested that you assembled all of these prior to moving on to Section A2.

A2. Assembly of box sections

A2.1 This tank is supported by four "boxes", one at each corner of the tank. Each "box" is a self supporting, braced structure . You will need to assemble four identical "boxes" using the 6" x 8" joists made in section A1 and the etched jigs provided.

For a two-tier panel, each side of the "box" is comprised of two panels, where a panel is formed by joining the cross-members to the 6" x 8"joists.

A2.2 The jigs are designed to construct the two cross-member assemblies and to join them to the columns so that they are square and parallel.

This kit is available in two variants of cross member centre fixing; a tension ring (figure 7); or a plate clamp (Figure 18). This kit is provided with only one style of centre fixing, which you chose when ordering. However, these instructions describe the two options of assembly.

A2.3 Assembly of cross-members

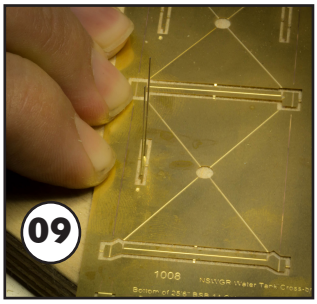
A2.3.1 FOR TENSION RING DESIGN

(Figure 7) The tension rings are a distinctive characteristic of this model and it is suggested that time and care be taken in their assembly.

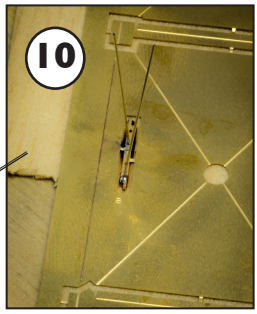
Jigs are provided to assist (Figure 8)

The rings are formed from straps, each with four holes for the tension rod cross-members. If the straps are bent into a ring they will fold at the location of the holes and a square shape will result every time. To avoid this, the following method is recommended.

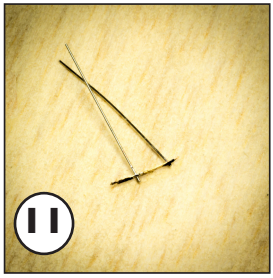
A2.3.1.1. Using the jig (figure 8), measure and cut four lengths of 0.3mm nickel silver wire, each approx Z mm long.

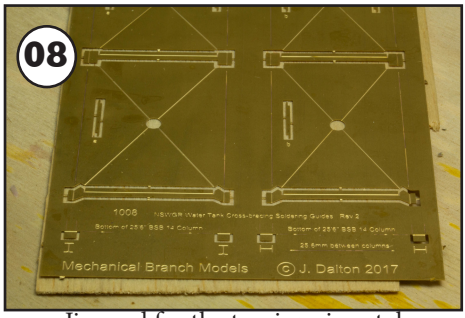


A2.3.1.2 On a piece of 1mm balsawood, lay the jig. Insert the 1" dia wire (0.3mm) into holes 1 and 3 or 2 and 4 (Figure 9). Solver in position (Figure 10).



A2.3.1.3 Cut the strap out of the jig. Trim the wires so that 2" (0.6mm) protrudes past the inner surface of the strap. (figure 11).





Jig used for the tension ring style cross-member. (Part number 1018).

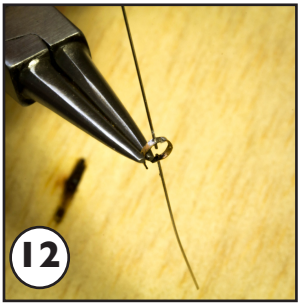
A2.3.1.4 Now the wire can be used to form the strap into a ring shape. Fine needle-nosed pliers are also indispensable in forming a smooth ring. (figures 12, 13)

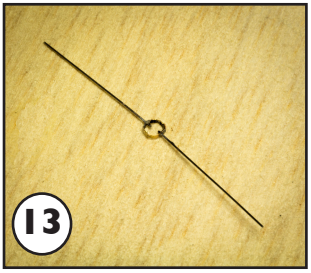
A2.3.1.5 Lay the ring into the centre of the jig. Insert the two remaining tension rods into the ring and carefully solder in place. Notice that the holes are not equally spaced. Ensure the holes are aligned with the tension rod positions marked on the jig. used. (figure 14)

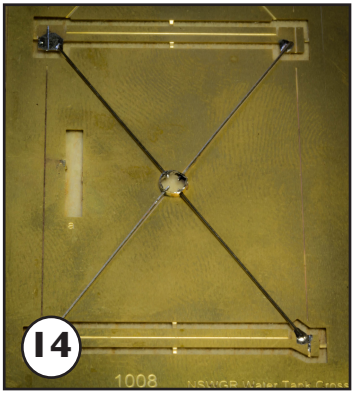
A2.3.1.6 The rods should protrude into the ring approx 2" (0.6mm). (figure 15)

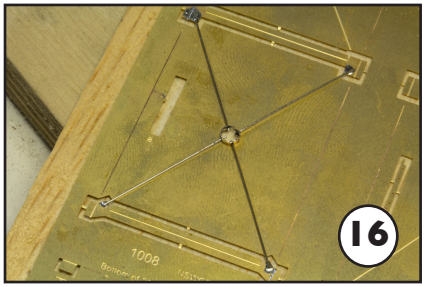
A2.3.1.7 Check that the ring is still an even circle and gently solder where the two ends of the strap join to form the ring. (figure 15)

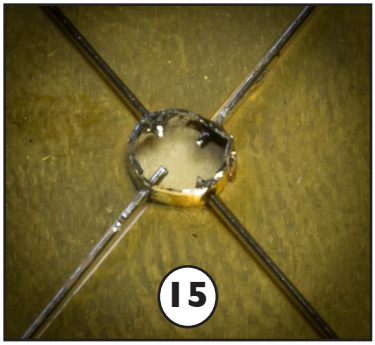
A2.3.1.8 You should now have a ring with four rods radiating outwards, and symmetrical on the horizontal and vertical axes. Each wire can be soldered to the brackets in each corner of the panel. Minimise the amount of solder used. (figure 16)





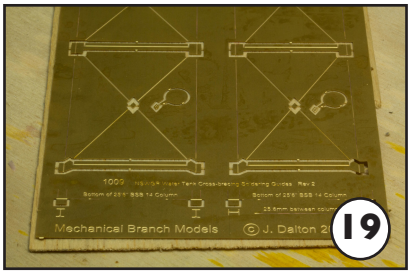






A2.3.2 FOR CLAMPED PLATE DESIGN
Many tankstands employed a clamp between the cross braces, which comprised two 4" x 4" diamond-shaped plates bolted together at their intersection. (figure 18)

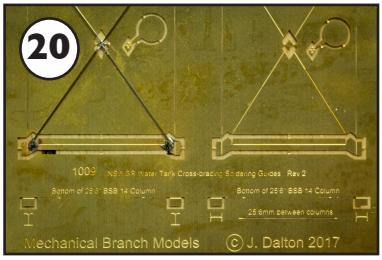
A2.3.2.1 The jig used for assembling panels with clamped cross-members is part number 1009 (Figure 19). The inner clamp is part of the jig.



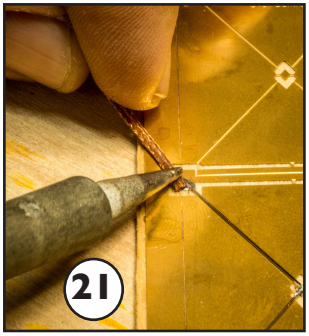
Jig used for the clamped-plate style cross-member. (Part number 1009).

A2.3.2.2 Cut four pieces of 1" (0.3mm) nickel silver wire approx Z mm long. Place these in the grooves of the jig where the cross braces are shown (figure 20).

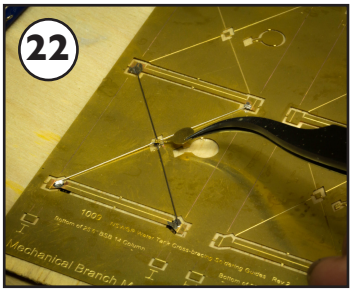
A2.3.2.3 Align the ends of the wires on the centre clamp plate and four brackets. Trim if necessary. Solder in place. Ensure the wire and solder is clear of fold lines. (Figure 20)



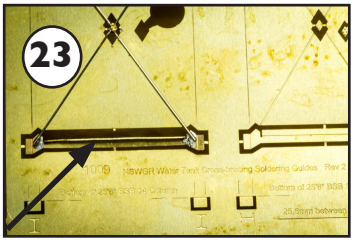
A2.3.2.4 Use solder sparingly and remove excess with solder wick if necessary. (Figure 21).



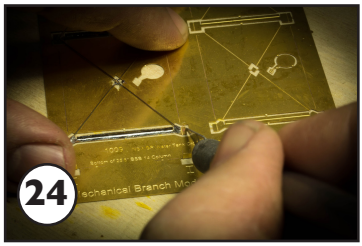
A2.3.2.5 Cut the top clamp out of the jig. There is a circular tab connected to the part to assist in handling this tiny part and positioning for soldering. Apply flux and sweat the top clamp into position (figure 22).



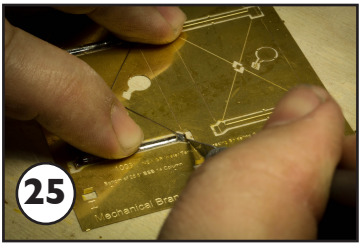
A2.3.2.6 Remove circular tab. Form the angle iron braces by folding as shown in Figure 23.

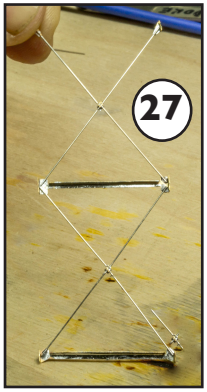


A2.3.2.7 Carefully cut the brackets out of the jig (Figure 24) Fold the tabs at the ends as shown (Figure 25). These represent the angle brackets that join the cross members to the columns. (figure 14). Remove the cross-member assembly from the jig.



A2.3.2.8 After soldering all four brackets, Turn the jig over and cut the bottom clamps out. This should free the assembly from the jig (figure 26).





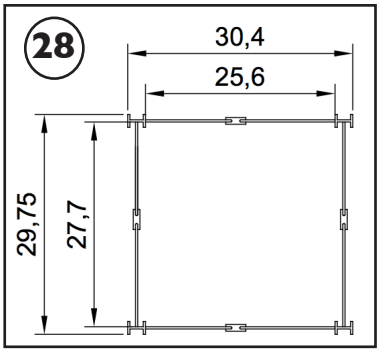
A2.3.2.9 Figure 27 shows a finished assembly. Wash carefully to remove flux.

A2.4 Panel Assembly

A2.4.1 See figure 28. Although the boxes are 8'-0" (28mm) square, connecting between flanges and webs requires two different jigs.

This is because the distance between flanges is 6'-6" (19.7 mm) and the distance between webs is 7'-6" (22.45mm).

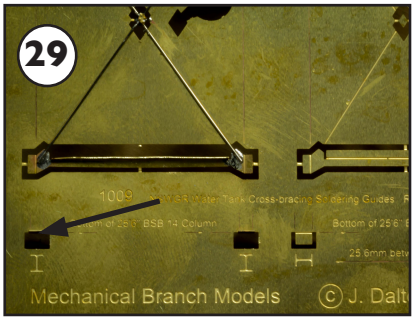
IMPORTANT: Make sure you are using the correct jig when joining the cross-member assemblies to the joists.



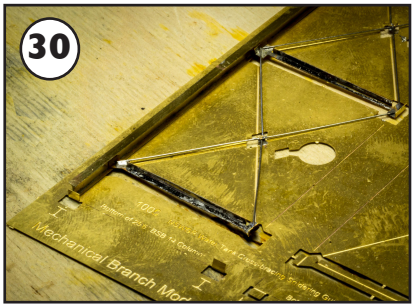
A2.4.2 See figure 29. Note that the orientation of the joist is etched into the jig. Bend up the locating tabs as shown.

A2.4.3 Place a joist in the jig in the orientation shown on the jig, flush with the locating tabs (figure 29).

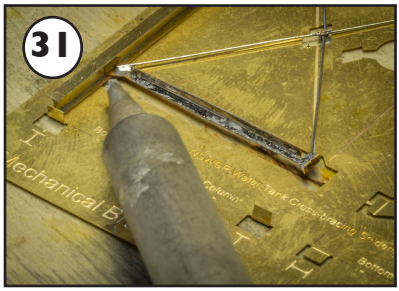
WARNING! Orientation is important. The two columns forming the side of the "box" should be in the same orientation; also the cross-member assemblies should be in the correct orientation. Once they are cut our of the jig, it is easy to mistakenly solder them upside-down!

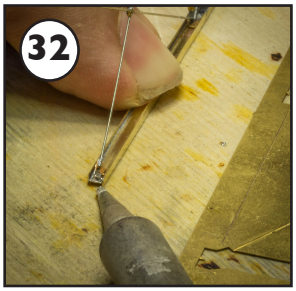


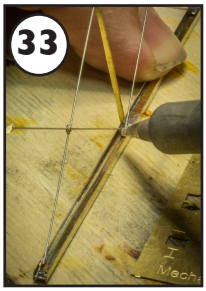
A2.4.4 Align the panel assembly with the marks on the jig (figure 30).



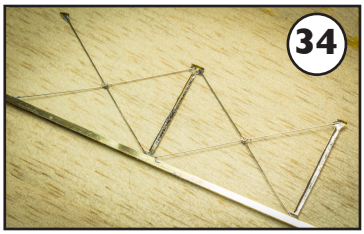
A2.4.5 Tin both the joist and the brace before applying flux to the joint. Quickly solder the bracket to the joist to avoid damaging the adjacent solder joints. Solder all three brackets to the joist. (figures 31, 32, 33).





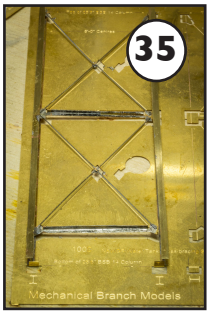


A2.4.9 You should now have a completed panel which looks like figure 34.



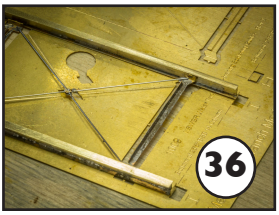
A2.4.10 Solder to the joist to complete the panel as shown in figures 35 and 36.

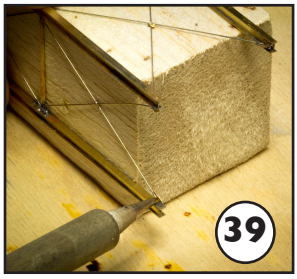
A2.4.10 Complete the adjacent panel in the box. Solder to the first panel using the jig, as shown in figure 37. It is easier to position and form one joint in the jig and then remove and form the two other jigs over a balsa former or similar. (Figure 38).

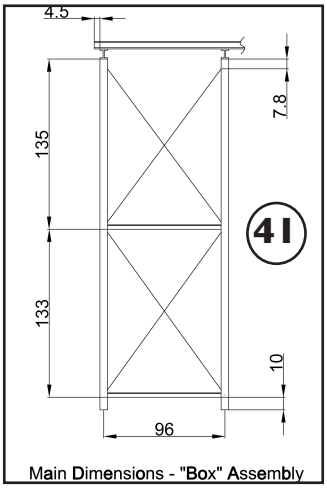


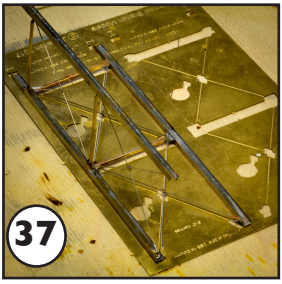
A2.4.12 Now the two opposite panels can be joined together to form the box. Ensure the brackets are soldered in the correct positions and that the box is square in cross-section and to the ground. (figure 18).

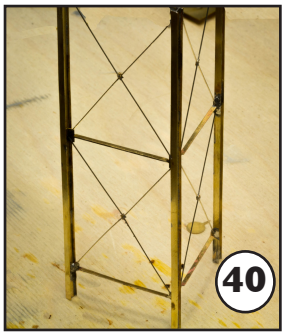
A2.4.13 Repeat Section A2 for the other three boxes so that you have four in total. The outline dimensions for the "box" assemblies are shown in Figure 41.

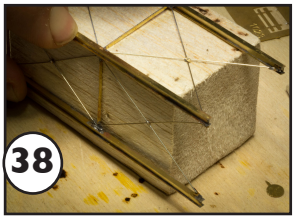








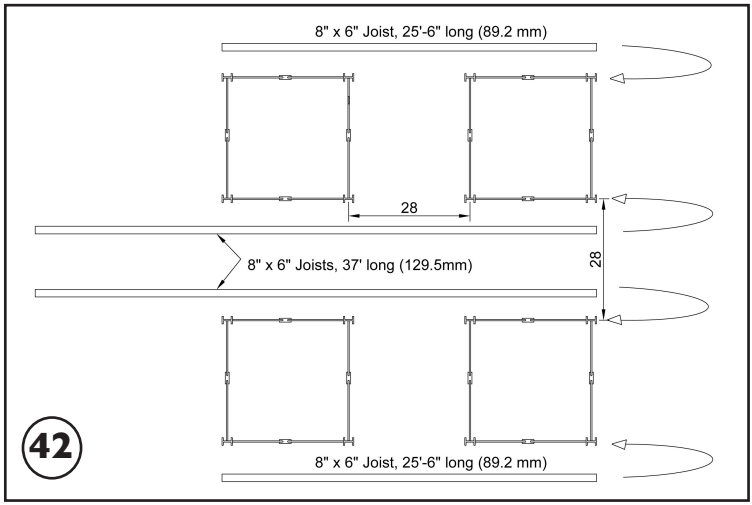




A3. Tankstand Assembly

A3.1 The four "box" assemblies are held in correct relationship to each other by four longitudinal 8"x6" beams and seven lateral 6"x5" bearers. Two of the 8"x6" beams are 37' long as they also support the alkalinity plant. The other two are 25'6" long. Assemble these four beams using the jigs provided and the method described previously.

A3.2 Solder the 8"x6" beams to the tops of the columns as shown in figure 41. Notice that the beams are oriented so that the web is vertical ("I" orientation). The relevant dimensions are shown in Figures 41 and 42.

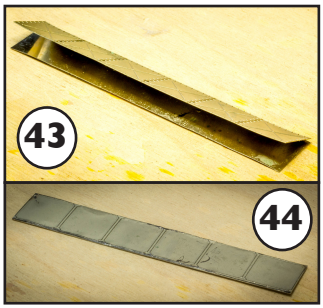


A3.3 If not already done, prepare the seven 6"x5" bearers using the jig provided. These will be used later in the assembly of the tank.

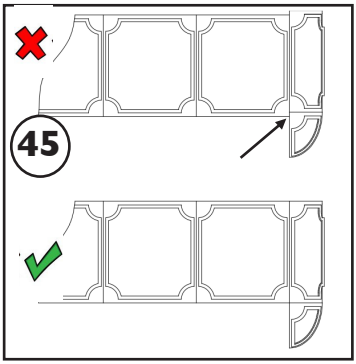
A3.4 Solder a length of scrap material to maintain the 8' spacing between the two tankstand assemblies. These will be removed later, so tack in place using a small amount of solder.

Part B: Tank

B1. Tank sides



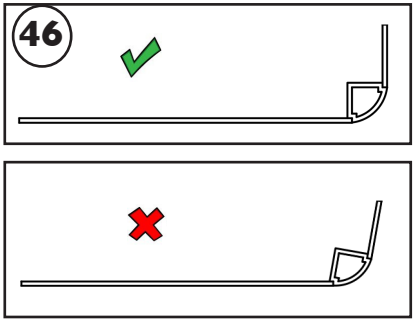
B1.1 Fold the four tank sides along the fold-line shown. Tin the inner edge and join the inner and outer sides together. (figures 43 and 44)



B1.2 Identify the tank corners. Superglue a corner to a side ensuring the top of the corner piece is level with the top of the side. (figure 45).

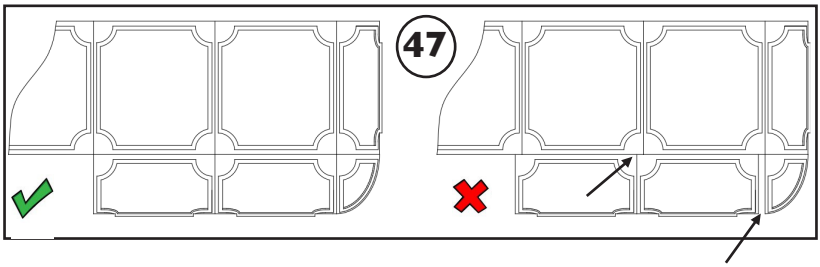
B1.3 Glue the second corner to the other end of the same side. Ensure corners are square (figure 46). A jig would be useful here.

B1.4 Repeat B1.3 on a second side.



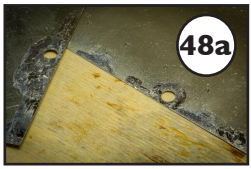
B1.5 Superglue the curved bottom edges to the inside long edge of the side. Check that the panels line up and minimise the gap between the end piece and the bottom piece.(Figure 47) Set aside for glue to dry.

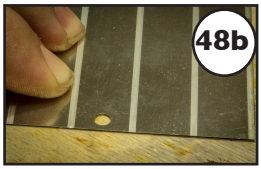
B1.6 Glue a third side between two ends of sides 1 and 2. Glue in the fourth side. Ensure the assembly is square. Set aside to dry.

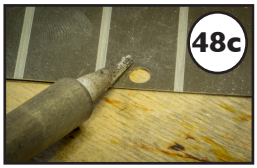


B2. Tank bottom

B2.1 Solder the inside of the tank bottom to the outside tank bottom. Figure 48a shows the tinning of the inside edges; 48b the aligning of the t inner and outer etches; and 48c the sweating of the two together.





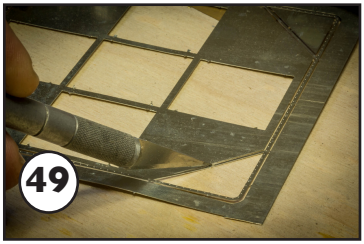


B2.2 Solder the seven 6”x5” bearers to the tank bottom in the half-etched tracks. Be careful not to apply too much heat to avoid damaging the bearers. A safer alternative can be to use adhesive or a lower-melt solder.

B3. Tank final assembly

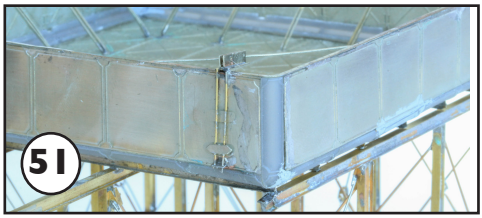
B3.1 Invert the square tank assembly. Place the bottom of the tank into the assembly. With minimal fitting, it should fit neatly between the bottom corner pieces all the way around. Superglue in place.

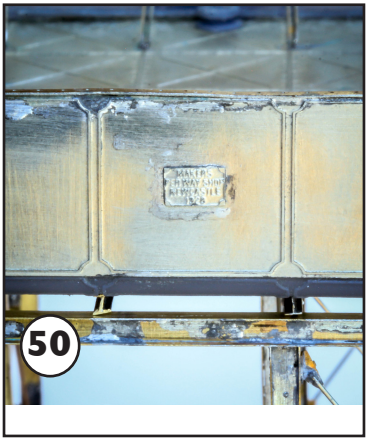
B3.2 Carefully remove the top edge of the tank - this is an etch which represents the edge of the cast-iron tank sides. Check for fit and adjust the sides if necessary. The outside edge of the part should be flush with the outside of the tank. (figure 49).



B3.4 Tack-solder to the top of the tank. When satisfied with the position, carefully solder the edge to the sides around the tank, filling gaps with solder. Figure 50.

B 3.5 Larger gaps can be filled with putty. File and sand so that the join is invisible. Figure 51.

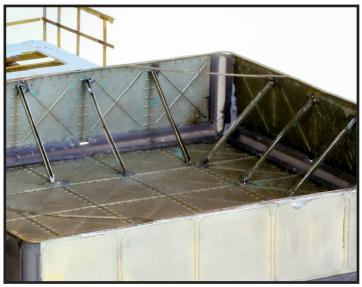




B3.6 Solder the maker's plate to the side of the tank. It was usually in the centre of one of the centre panels (figure 52). Check photos of the prototype if you are modelling a specific tank. Plates with different years of manufacture are provided (Figure 53); other years are available if required.

B3.6 Solder the maker's plate to the side of the tank. It was usually in the centre of one of the centre panels (figure 52). Check photos of the prototype if you are modelling a specific tank. Plates with different years of manufacture are provided (Figure 53); other years are available if required.

B3.7 Form the 20 internal braces and solder in place between the bottom and side of the tank. There are slots to indicate the postion (see Figure 54).

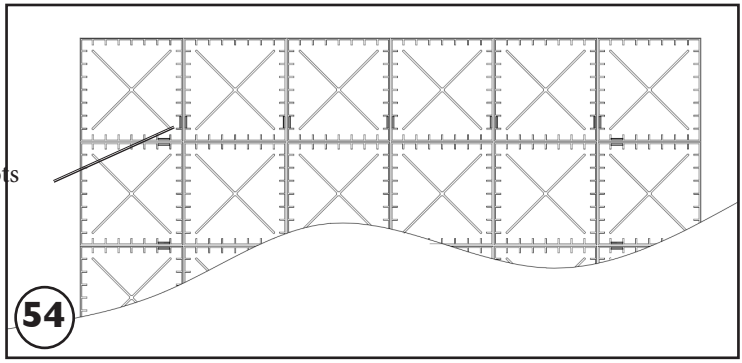


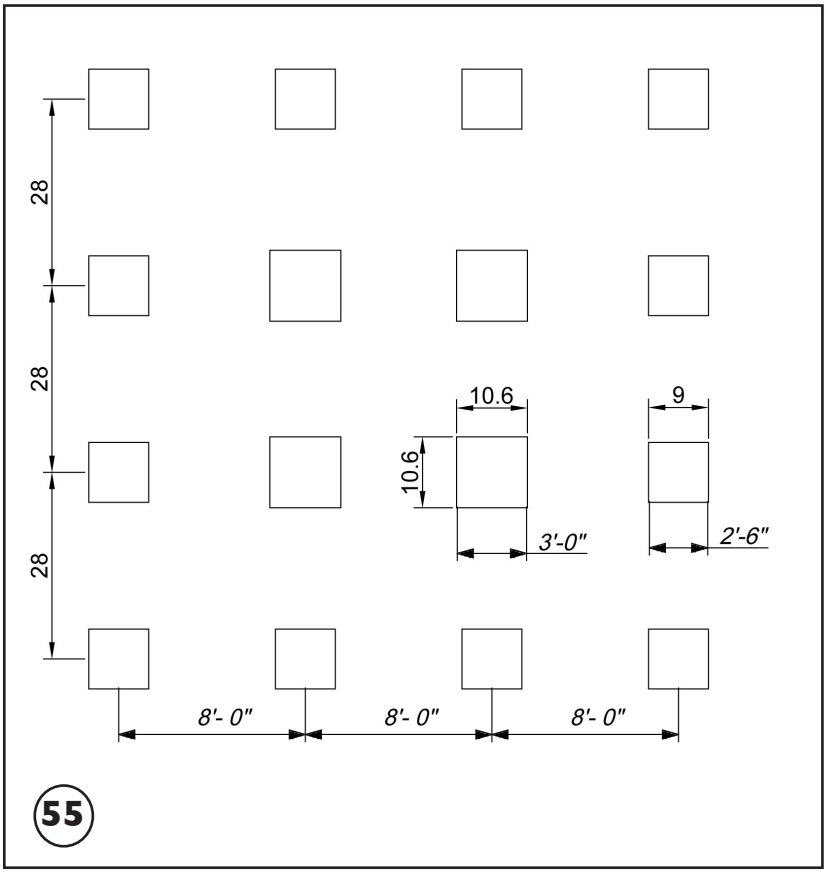
Part C: Assemble Tank to Stand

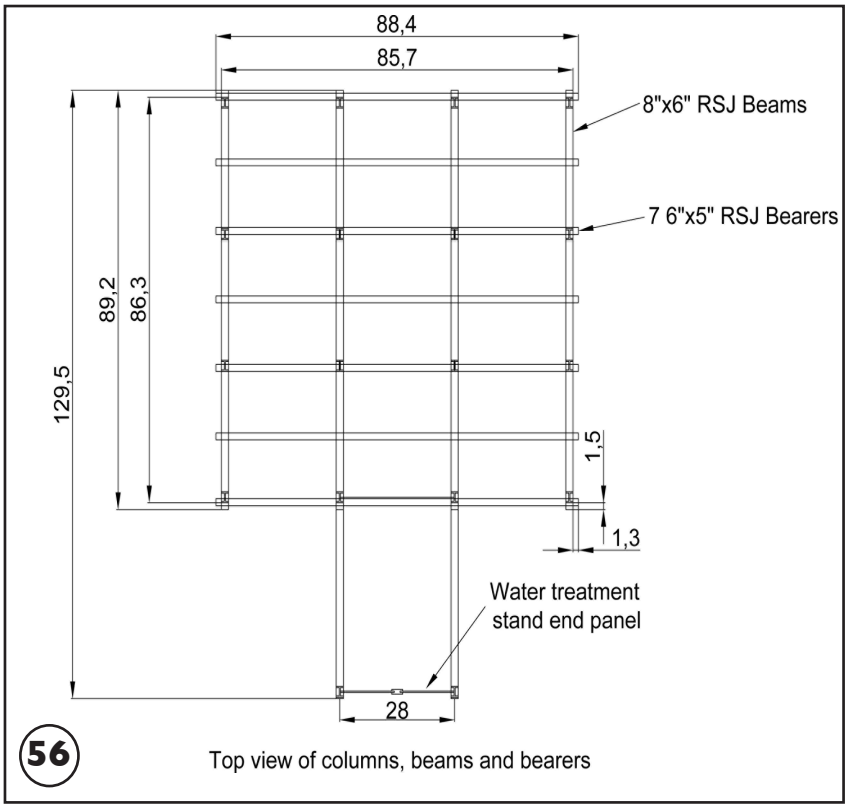
C1.1 Place the stand on a level surface marked out with at least the corners of the stand as shown in figure 55.

C1.2 Remove the temporary part used to join the two stand halves together (from step A3.4).

C1.3 Place the tank on the stand ensuring that the relationship of the 6"x5" tank bearers and the outer (shorter) 8"x6" beams on box assemblies is as per Figure 56. Also check the orientation - the maker's plate should not be on the side of the water treatment plant or it will be obscured. When square, solder the bearers to the beams where indicated (it's not necessary to solder at all points where the bearers intersect the beams - just enough to hold the stand in the correct relationship with the tank).


slots
54


28
28
28
10.6
10.6
9
3'-0"
2'-6"
8'- 0"
8'- 0"
8'- 0"
55



Part D: Water Treatment Stand and Platform

D1. Preparation

The tank and stand are now substantially complete. Two 8”x6” beams should extend from one side, which are the supports for the water treatment plant. (Figure 56). This stand had an intermediate platform (where the ladder came through the floor) and a second ladder to the top platform.

D2. Water Treatment Stand

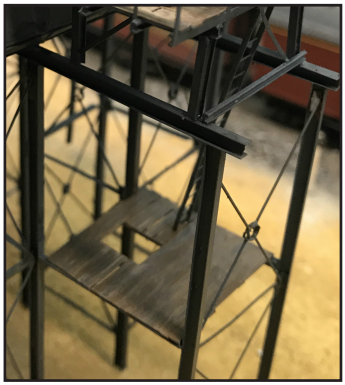
D1.1 Prepare a cross-braced panel using two 8”x6” RSJs as per 2.3 and 2.4. Refer to Figure 56 for the correct orientation of the RSJ columns.

D1.2 Solder the top of the colums of the panel to the ends of the extended beams (dimensions as per figure 56).

D3. Centre platform

D3.1 The centre platform is approximately 8'-11 x 8'-0" wide. The platform is supported by two lengths of 8'-11" angle bracing. Cut these two lengths and solder to the underside of the platform on the long sides.

57



D3.2 Align these to the dimensions shown in Figure 101 and solder to the joists at each corner.

End of Part 1