

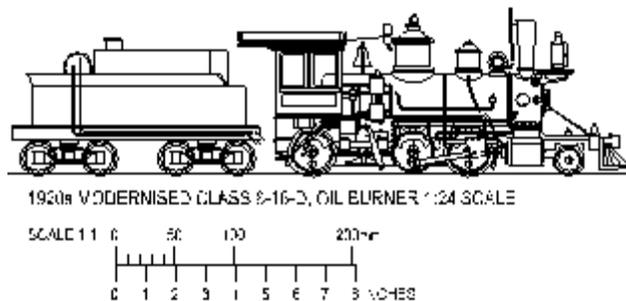
# Masters-2001

## Build a Baldwin 8-16-D 2-6-0

**A Locomotive Adventure**  
**By David Fletcher**  
**Melbourne, Australia**  
**Color Photography by the Author**

### Chapter 5 - The Locomotive Cab:

#### Background - Construction - Detail



**....anyone for tennis?...**

Welcome back. You've been dying for this chapter. Lets face it, a loco just doesn't look right without a cab, and you've been admiring your boiler for weeks now, just waiting to see what it looks like with a cab on it. Fear not, this week the loco gets a cab - and a damn stylish cab it'll be too.

[Background](#) - I don't have much to reveal in this chapter about cabs and their origins, however, I'll use this section to simply demonstrate locomotive cab styles.

[Construction](#) - We'll cover the construction and fitting of the cab to the loco, covering several cab options including:

- Modifying the 1:24 scale Delton Brass cab
- Modifying the Bachmann 2-4-2 Columbia Cab
- Scratch making your own cab from styrene in 1:24 or 1:20.3
- Scratch making you own cab from wood in 1:24 or 1:20.3

[Details](#) - Just some minor stuff this week, including the roof hatch, roof lining and sliding windows.

## **Background**

**(Ex loco Scientia)**

### **The Locomotive Cab** **Bringing Folks in out of the Rain:**



The locomotive cab's origin is a mystery. It probably owes its invention to common sense. Through the 1830s, as a locomotive's speed increased, a light rain could feel like a typhoon to anyone on the footplate. Ever ridden a motor bike on a rainy day? Even an average rain at 60 miles per hour means you're soaked through in about 10 seconds! Thus with increased locomotive speed, the cab went from being a luxury to becoming a necessity.

I don't know which loco was first to have a cab, or even a cab made from wood, but we do know the first iron cab was fitted to the 'Novelty' of the Pennsylvania & Reading RR in 1847.

### **Locomotive Architecture - The Forgotten 8th Wonder of the World**

From the 1840s, through the 1850s and into the 1860s, the locomotive cabs of the US were to display some of the most ornate joinery in history! There were times in the 1850s, that the typical 4-4-0 looked more like mobile Roman architecture than a locomotive. Sometimes the prosperity of a nation can be summed up in its architecture. Architectural grandeur can speak volumes about the wealth of a nation. Even the fledgling mining towns of Colorado or California of the 1800s could celebrate their success when the first brick or stone building was constructed in town. This suggested wealth and a certain permanence.

The locomotives of the post 1840s were an object of supreme importance. They were man's most complex machines and had the power to connect distant places or even countries. The typical Locomotive Engineer or fireman enjoyed a position in Society (while terribly dirty) not unlike the captain of a Boeing 747 or Concorde might enjoy today. The locomotive was important, and the crew was important. It is not surprising these early locomotives were adorned with much decoration and architectural styling equivalent to a city's finest public buildings of the day. A typical locomotive cab might have had arched windows supported by finely carved pilasters, wood paneling made from Walnut, sometimes fully inlaid with decorative teak or ebonite elements. Gold Leaf was used to highlight the Corinthian column capitals and entablature.

By the 1870s practicality began to override this excess and somewhat plainer, yet finely crafted cabs were to emerge. Often the more timber jointing, scrollwork and fine detailing implemented

on a crafted cab, the shorter its life. Driving rain, sun bleaching heat, soot and vibration all served to very quickly compromise the joining of these early cabs, water would penetrate the timbers and rot set in. The railroads were left to construct their own replacement cabs, and usually these were designed with an emphasis on longevity

On the Narrow Gauge lines of the west, times were often tougher than experienced on the big roads of the east. While there were thousands of narrow gauge locomotive designs of the post 1870s, proportionally very few new NG locos were designed after 1900. We've seen how some of our li'l 8-16-D 2-6-0 from 1875 were to serve lines for over 50 years. Two of the Rio Grande's priceless C-16s were in service to that one road for over 70 years, while a 3rd D&RG C-16 served on 5 lines over a 70 year period (NCNG #8!). This was typical of NG life. The roads were most often built quickly during the Silver booms of the 1870s, and nearly bankrupted by the 1890s, when the US economic policy turned its back on Silver to align with world markets. Over the decades as the lines struggled on, the equipment was well maintained, but functional. A review of the styling of locomotive cabs from the 1870s through to the 1950s, demonstrates this swing from the ornate to the practical. One last point to make about NG loco longevity is that you can be certain that the cabs photographed so brilliantly in the history books, are more than likely not the original cabs these locos were born with. Over all those years of service, a loco could expect to have had as many as 15 new cabs! When considering the cab for your 8-16-D 2-6-0, cab styling and material selection can be virtually anything. While there are common Baldwin design standards on this model that cross all eras, you can be sure the original Baldwin-made cab was gone within the first 5 years. Guys, anything goes - you can make any type of cab you desire! Any style, wood, iron or steel, and even height is optional. The as-built 1875 8-16-D had such a small cab, the crew would bump their head on the roof framing. These same locos by the 1830s often had extended height cabs. Sometimes the cab was taller than the stack as seen in the 'Nevada' NCNG #2.

We'll now embark on a visual plethora of cabs. Sit back and enjoy a tale of many cabs.....

## **Cabs Through the Ages:**

### **A Cab Style Fest**

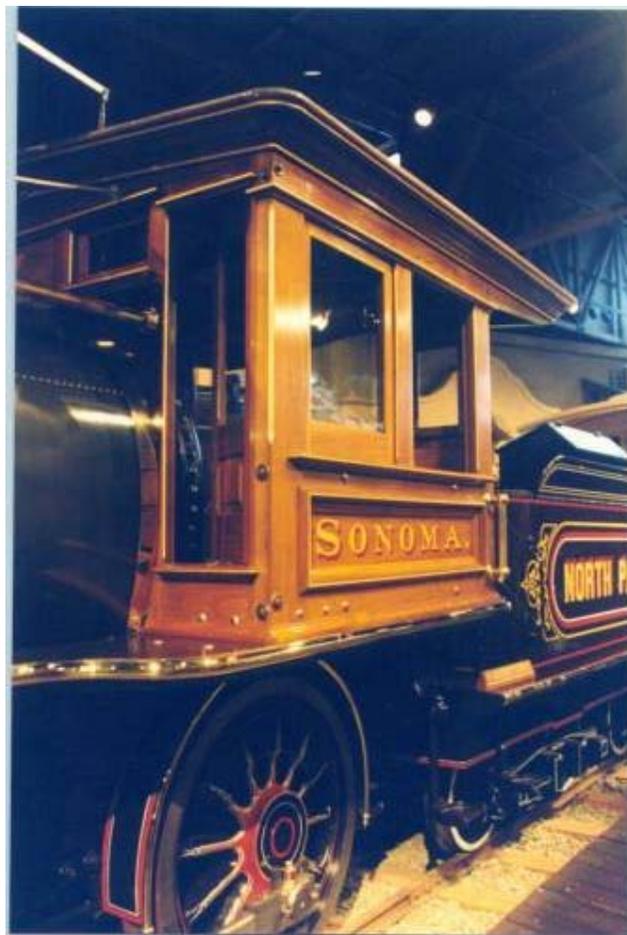


*The classy wood cab of CP #1 "Gov Stanford", Norris 1863  
This replica wood cab matches the as built look with all the wood paneling, and 3 paned window panels.  
Cal State RR Museum.*



*The arched windows of V&T #13 "Empire"*

*This timber cab is a replica of the Baldwin 1873 cab this loco was built with. Note the pin striping and carved stretched oval windows to the cab rear wall.  
Cal State RR Museum.*



*The cab of NPC #12, "Sonoma"*

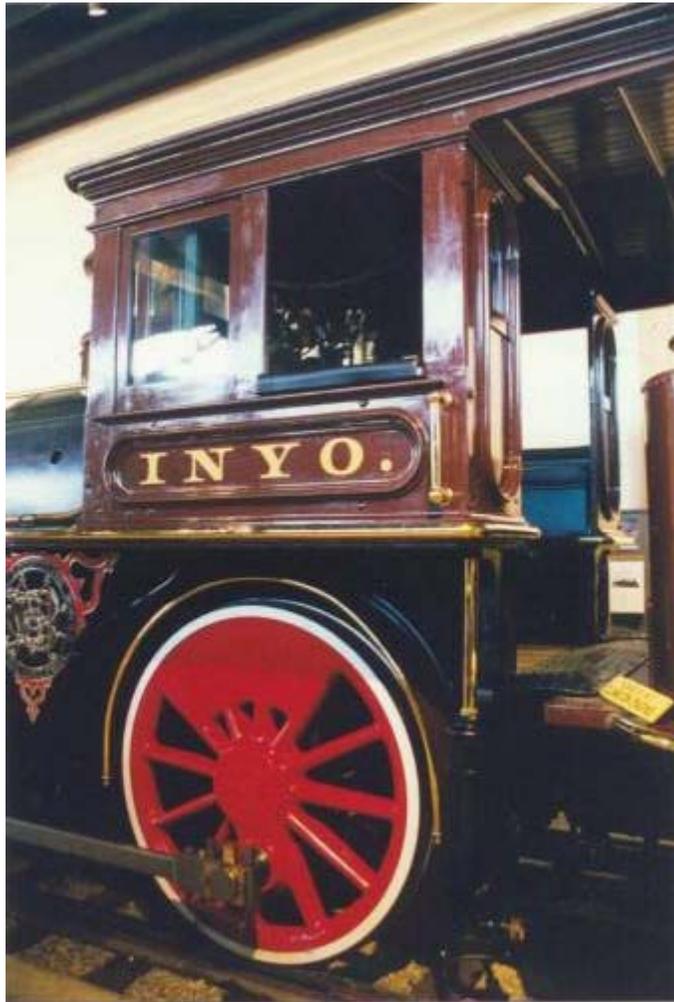
*A delight in polished walnut. Replica 1875 Baldwin cab. Gilded lettering and line work amid careful cornice detailing. Note the large metal washers on the cab walls at the head of steel bars that run through the cab, tying the walls together.  
Cal State RR Museum.*



*The V&T #12 "Tahoe",  
1875 Baldwin loco featuring a 3 paneled glazed system (2 panels slid out of sight in this view). Extended vision for a handsome  
freight loco.  
Strasburg RR Museum, Penn.*



*The rebuilt cab of 1873 Central Pacific Shops built, V&T #18, "Dayton" The cab reflects the 1882 appearance of this loco.  
Nevada State RR Museum.*



*The cab of Inyo, Rebuilt to the 1893 look of this Baldwin 1875 loco.  
Note the Classic 1870s Baldwin rear wall, with elongated oval windows.  
Nevada State RR Museum.*



*The 1882 0-4-2 from HK Porter & Co, "Joe Douglas".  
A simple but classy wood cab with minimal molding.  
Let's take a close look...*



*Note is this close-up of the "Joe Douglas", the painted metal sheeting joining the curved boiler to the wood cab walls.  
Nevada State RR Museum.*



*What with all this V&T Action, I thought I'd dig up a pic of our meet with Nevada Tiny, in '99. That's Tiny on the right, Alison my-dearly beloved and me on the left! Getting a hang of the hand cart.  
Nevada State RR Museum.*



*Ahhh no nort the Camel Back!! This 1869 cab offered the most luxurious of warm accommodation during the cooler months. You can do anything you like with your 2-6-0 model...but no Camel backs please!! B&O #217, Mt Clare Museum, Baltimore.*



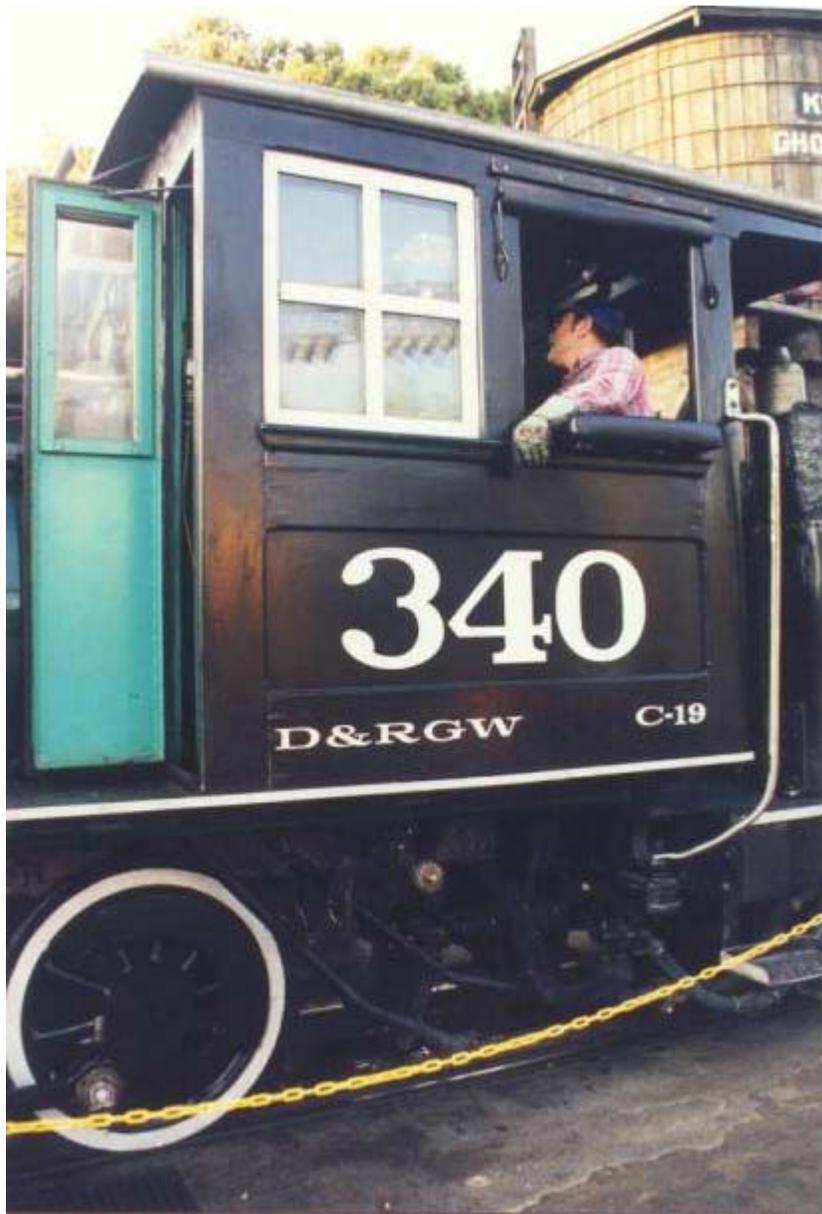
*The South Park EJ-1 2-8-0, Baldwin 1880. This cab is typical of the South Park and D&RG Class 60 (C-16) and Class 70 (C-19) 2-8-0 cabs of the 1880s and 1890s, with 4 panelled cab walls. Colorado State RR Museum.*



*This 1888 Mt Clare Built 2-8-0 features a simple wood cab, with divided pane windows. The dividing of the glass into smaller framed units was a design feature of cabs to come.*



*A close-up of the Mt Clare 2-8-0 demonstrating the simple timber molding detailing.  
Mt Clare Museum, Baltimore.*



*Turn of the Century style D&RG built wood cab. Simple lines and basic panelling. Robust. Typical of most D&RG equipment post 1900 to 1930s.*

*D&RGW C-19 #340, Knotts Berry Farm Cal.*



*The 1920s wood cab of D&RGW T-12 #168, Colorado Springs.*



*The steel clad wood cab of the D&RGW, post 1920s  
Designed to weather the elements better than a wood cab. Also note the multi-paned glazed windows. D&RGW C-19 #346  
Colorado State RR Museum.*



*The simple but robust steel cab of Argent Lbr Co #5,  
Nevada City, California.*



*The steel clad timber cabs of the late outside frame Baldwin export 2-8-0s. 30" gauge 2-8-0,  
Mexico City (a loco not unlike the proposed new Bachmann 1:20.3 2-8-0).*



*The Author enjoying the well weathered steel cab of Carson & Colorado,  
Southern Pacific NG Lines 4-6-0 #9, Baldwin 1909.  
Laws California.*

# Construction



## The Locomotive Cab

Please review the entire contents of this chapter before proceeding with the work, items described in the 'Detail' section will need to be carried out in conjunction with the work in 'Construction'. At the end of chapter 4, your model should look something like this: give or take the colour!!



## Options for the Cab

There are essentially 4 options in providing a cab for this cute lil 8-16-D 2-6-0:

1. Modify a commercial cab - We'll discuss modifying two commercially available cabs for installation on the 1:24 scale versions of the 2-6-0.
  - The 1:24 scale brass cab as originally produced by Delton Locomotive Works in the 1980s for their CP Huntington 4-2-4 loco. This cab is now available as a surplus item from J&W Trains (refer chapter 1 for details on purchasing one). The cab is a very 1870s style, but appropriate for all era versions of this 2-6-0.
  - The plastic cab as produced by Bachmann for their Columbia 2-4-2 loco. This cab is ideal for post 1920s versions of the 1:24 scale 2-6-0.

2. Purchasing a purpose built cab for either the 1:24 or 1:20.3 2-6-0 versions. Cabs are available for purchase as custom made wood cabs. These finely detailed cabs are laser cut to shape from the construction drawings of this Masterclass, using walnut and birch plywood for strength. If interested in using a real wood cab on your 2-6-0, please direct your questions to:

Vance Bass  
 FH&PB Railroad Supply Co.  
 6933 Cherry Hills Loop NE  
 Albuquerque, NM 87111 USA  
<http://www.nmia.com/~vrbass/fhpb/>

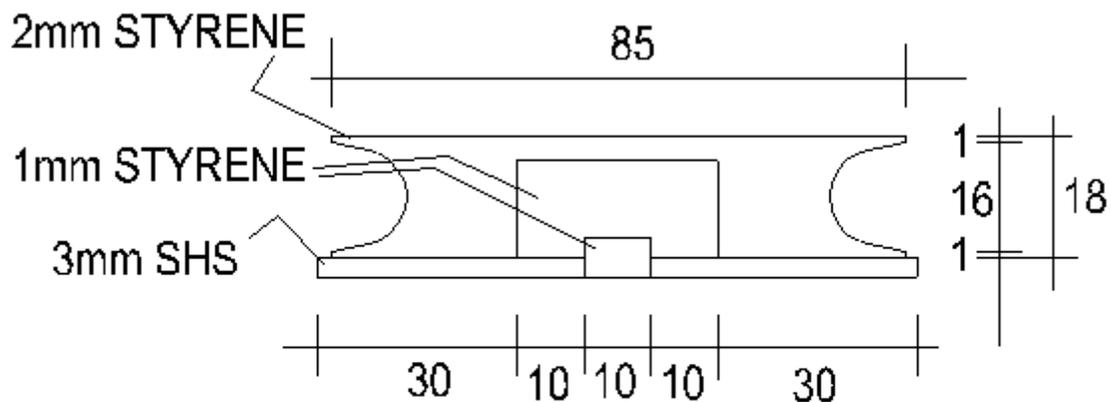
3. Scratch making your own cab in 1:24 or 1:20.3 scale in styrene. This chapter will cover the making of your own cab using nothing but a knife, 2mm and 1mm sheet styrene.
4. Scratch making your own cab in 1:24 or 1:20.3 scale in wood. Vance Bass will cover construction techniques using wood. Direct any questions about constructing in wood directly to Vance Bass, because I too will be the student in this section! Many thanks to Vance for outlining the fun in working with real wood on a model locomotive.

## Fabricating the Rear Cab Support

In order to prevent cab sag over the rear cab floor, locomotives have a substantial beam running below the rear floor of the cab. The beam has some stylish attributes and is also used as a step-up to the cab itself. This beam is needed on all versions of the locomotive including all cab types.

### Step 1

Cut the beam section out of 2mm styrene sheet to the profile shown here, note the cute curves to the ends. Note the diagram covers steps 1-5 below.



## REAR CAB SUPPORT BEAM

### Step 2

Trim the curved ends with a 3mm wide 0.5mm strip of styrene. Place the strips over the cut ends centrally and weld into place...use your lil finger to push the strips into the contour.

### Step 3

Weld a 30mmx16mm rectangle of 1mm styrene sheet over the exposed centre area of the beam (this simulates the lower cab floor area between the rear drivers)

### Step 4

Weld a lower trimmer beam of 3mm SHS plastruct along the bottom edge of the support beam.

### Step 5

Weld onto the lower centre area of the beam, a 10mm x 5mm buffer pad. This pad is the buffer point where the tender meets the rear of the locomotive.

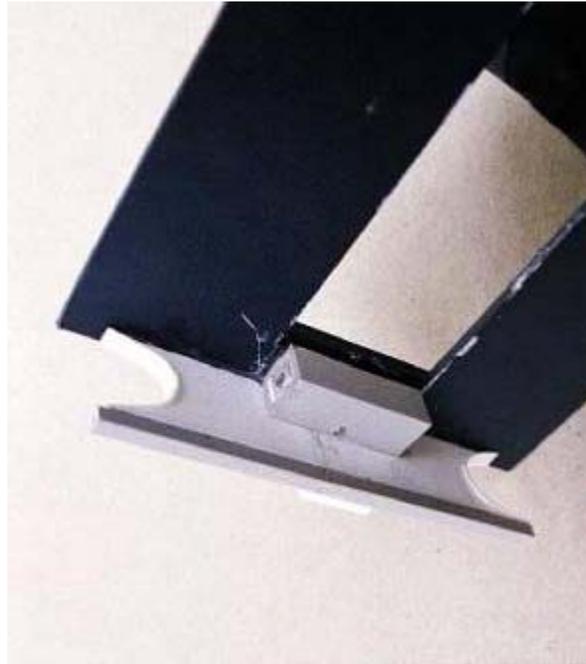
At the completion of these 5 steps, your cab support beam should look like this:



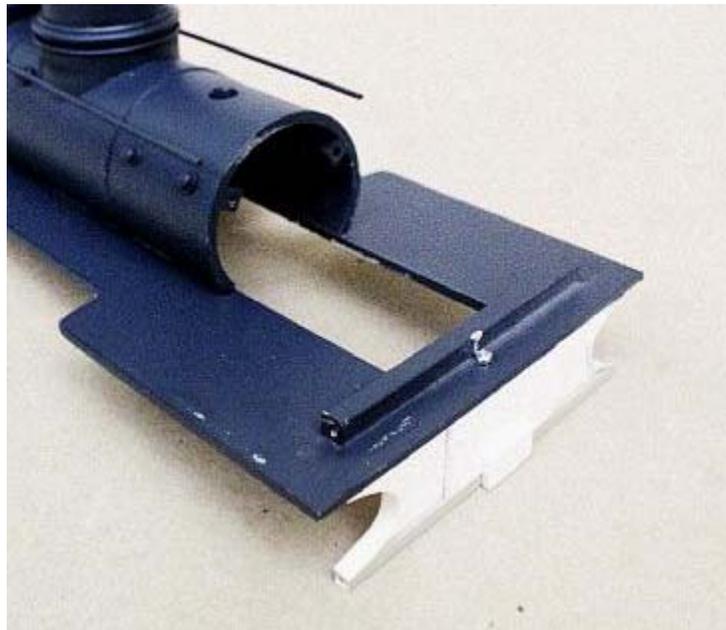
*In the photo you'll see the 2mm styrene overall beam with 3mm wide strips trimming the curved ends. Note the 1mm styrene rectangle and smaller central buffer. Note also the 3mm SHS plastruct lower beam along the bottom.*

Now I know what you're all thinking...what the hell is this thing for??!! Well it gets fixed to the rear end of the cab floor area like this:

Go ahead and weld it into place to the underside of the floor. For real good structural support, weld this end beam to the mounting block we installed under the floor in chapter 4. You may need to pack the mounting block out a little to fix the beam in the right place - what is the right place? This rear cab support beam is to mount hard up against the very end of the locomotive chassis frame. It's to look as if the beam is infact mounted to the rear chassis (which is exactly what is done on the prototype). Thus place the boiler superstructure over the chassis (if not already bolted in place anyway) and then weld the end beam to the cab floor, hard up against (but not glued to) the end of the chassis.



This photograph is taken looking up under the rear cab floor, showing the end support beam welded in place (chassis removed). Note how it is fixed to the mounting block of chapter 4. Please take care to pack the mounting block out using 1mm and 2mm styrene strips in order to locate the end beam in the correct position. A second mounting block could be installed for 1:20.3 versions as the rear beam is further back than on the 1:24 scale versions. Hopefully when the end beam is in place, the rear cab floor extends beyond the beam by about 1mm - thus:



*Photo showing the end beam in place.*

With the end beam in place, it is time to make the cab itself. Please choose which of the 4 cab options you intend to take, and refer to the part of the chapter relevant to that type of cab. We begin with modifying the Brass Delton cab.

## Section 5.1 - 1:24 scale cab - Modifying the Delton Brass cab

### Step 1 - Cutting the Cab

Cut off the base of the Delton cab casting, as outlined in the conclusion of chapter 4. Make sure you retain the base strip to your cab, a 2mm wide strip that extends around the entire cab, approx 17mm up from the base of the unaltered cab - cut like this:



*Note the cast-in trim around the base of the new cut cab, make sure you keep this trim with the cab, otherwise the cab will be a tad too short!*

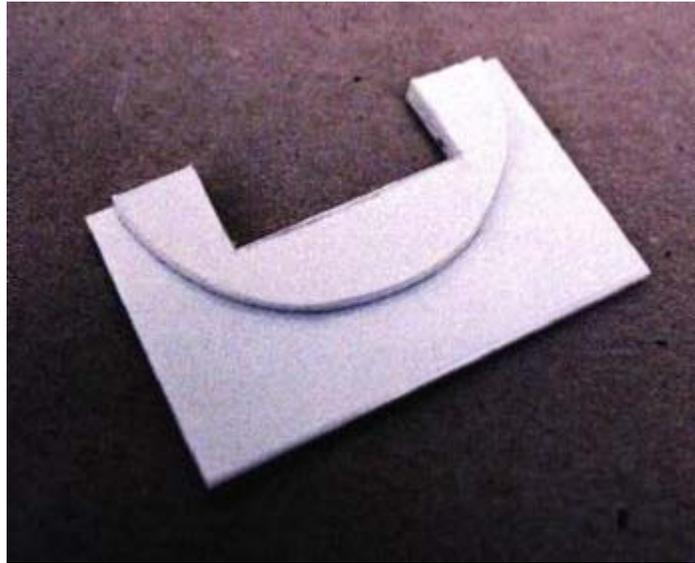
Using fine sand paper and files, carefully clean and remove the brass flash, grunge and general crud that disturbs the clean lines of the brass cab.

### Step 2 - Patching the Cab

Using 2mm styrene sheet totally infill the arched boiler opening in the cab front wall. Cut a 30mm long X 15mm high rectangular penetration in the styrene wall to enable the motor block to pass through the cab wall. The infilled cab arch should look like this:



Next install a second, backing layer of 2mm styrene to rear of the arched infill, the backing rectangle is to be 57mm long X 35mm tall, with a corresponding motor block penetration at the bottom. Weld the two layers of 2mm styrene together like this:



Using 5 min Araldite, glue this unit to the cab front wall from within the cab, thus:



### **Step 3 - Inserting the fixing holes in the cab wall for the boiler/cab connection**

This is where we drill two holes in the styrene cab wall to correspond with the boiler washout/rear boiler fixing points, fabricated in chapter 4.

Place the cab onto the locomotive in its correct position. Make sure it is square, centered and hard up against the boiler end. Using the exposed boiler washout plugs as a 'line of sight' mark with a pencil, the location on the styrene front cab wall where the centre line of the washout plugs align....This is an indication of the position of the SHS's fixed to the inside rear of the boiler. Next measure the distance between the centre of the SHS's and the outer surface of the boiler. Measure this same distance from the pencil marks on your cab wall...this is the place to drill the two holes in the cab front wall. Select a couple of 12mm long self tapping screws that screw nicely into the boiler SHS's and drill the two holes in the cab front wall to a size about 10% wider

than the screws. Drilling the fixing holes larger than the screw will allow for a bit of play when finally screwing the cab to the boiler via these holes, allowing for errors, but clamping the cab solid when the screws are tightened. All up your front wall with drilled boiler fixing holes should look like this:



*Seen from the front (the holes turned out to be right on the brass/styrene interface on my model, but that all depends on where you fitted your boiler washout plugs in chapter 4!)*



*The two fixing holes as seen from within the cab. Note the crude chunk taken out of my cab wall is to allow for the tender power lead to run from the plug on the motor block. You will not need to cut this lil slot if your block penetration rectangle is the full 30mm x15mm (step 2 above) My rectangle was a couple of mm shy and the power cable tended to lift the cab!*

#### **Step 4 - the cab floor fixing points**

Take a close look at the photo directly above seen from within the cab. Note on the two side walls at the base are two plastruct angles. These plastruct angles are 10mm X 10mm angles, cut to the length of the cab. Drill three 3mm holes in the vertical side of the angle (the side that fixes to the cab wall)..then 5 min araldite these angles to the cab interior. You will notice Araldite oozing through the 3 holes you drilled..its guey, but those three holes really help to lock the angles to the cab walls. Later on we will fix the cab down to the loco floor, by drilling and screwing into the base of these two angles...thus the angles must be firmly fixed to the cab walls.

## **Step 5 - The Roof**

Here's the bit you've been waiting for...putting a roof to your cab. Some of you will have been lucky enough to obtain one of these brass cabs with a brass roof already soldered on...great! You can choose to keep the cab as-is, or choose to thicken this brass sheet roof up a little by pasting a new roof of 2mm styrene onto this brass roof. I felt the brass roof looked a little on the thin side to be a convincing 1870s wood cab roof. If your cab came with no roof at all, you'll be making the same 2mm styrene roof anyway.

Cut a 112mm X 96mm rectangle of 2mm styrene. Score a line down the center of the roof, and fold the styrene along the line to produce the gable....just bend the roof a tad, do not snap the styrene. Place the roof onto the cab and test the gable angle.

Next add a trim of 2mm wide, 0.5mm thick styrene strip around the roof, 3mm in from the edge of the roof on all 4 sides. Take a look at the photos above to see the roof trim in place.

You can either 5 min araldite the styrene roof to the brass cab walls or brass roof, or refer Section 5.4 -'Scratch making a styrene cab' to see how you might screw the roof to the walls to allow future cab access. If gluing the styrene roof on top of the existing brass sheet roof, be sure to spread the araldite as evenly as possible across the entire roof area. This will prevent any cupping, or gaps between the two roof sheets. Use weights to hold the styrene roof down firmly, check it is not gliding to a crooked position!

If building a post 1800s version of this loco, you'll need to add a roof hatch, please refer to the 'detail' section of this chapter.

## **Step 6 - Final Details**

In the area where the boiler meets the cab wall, there is a rectangular detail cast into the wall. In reality this was often a sheet metal interface between the rectilinear lines of the wood cab, and the curvature of the boiler. Since our boiler sits higher than the top of this cast on detail, we need to extend the interface rectangle by adding a 5mm tall length of 0.5mm styrene as seen in this photo. We also need to fill the gaps under the front wall doors at floor level using 2mmx2mm styrene strips:



*Note the extended rectangle above the old boiler arch and the styrene infills where the front doors meet the floor.*

Finally we add some hand rails to the cab side walls near the rear. There are again stylistic choices:

- Hand rails only below window sill height (1870s -1900ish)
- Full height hand rails (post 1900)



In the above photos you can see I added full height handrails. The handrails are fabricated using 0.6mm brass rod or plastruct wire. Drill small holes in the cab walls and insert the hand rails, fix using CA glue. These are just bent wire, however, for older style hand rails, you can choose to insert small brass rail stanchions and run a brass rod through the stanchions...check the 'background' photos for hand rail styles

## **Step 7 - Painting**

Its now time to spray paint, or hand paint your cab prior to fixing it to the locomotive. The colour again is up to you, however I can also offer these tid bits. Originally this 1870s loco would have had a polished wood cab, very much like the Sonoma cab shown in the 'background' section. Both the insides and outside of the cab is plain polished wood. By the 1890s, when wood cabs were painted, the interiors were often painted green, while the exterior may have been black, brown, Maroon etc. In the 1890s the interior green was painted to the interior walls and roof soffit alike and was a real bright fluorescent green, like the colour of really green grass. As time moved on, the green remained the most common cab internal colour, right to the end of steam, but the colour became progressively darker, toward the drab, or olive green colours.

## **Step 8 - Glazing**

There are a couple of good ways to glaze the cab windows. The most obvious way is to cut squares of shirtbox clear plastic and mount the glazing to the inside rear face of the window frame. This system offers the easiest and probably the strongest way to glaze a window. Glaze all windows on each wall with a single plastic sheet. If using this method, please do not glue the glazing in the walls with CA, cement, this will fog up the windows terribly. Rather I use dabs of 5min araldite...you don't even have to glue along each edge of the glazing, just run a line of glue along the top and bottom edge of the glazing plastic.

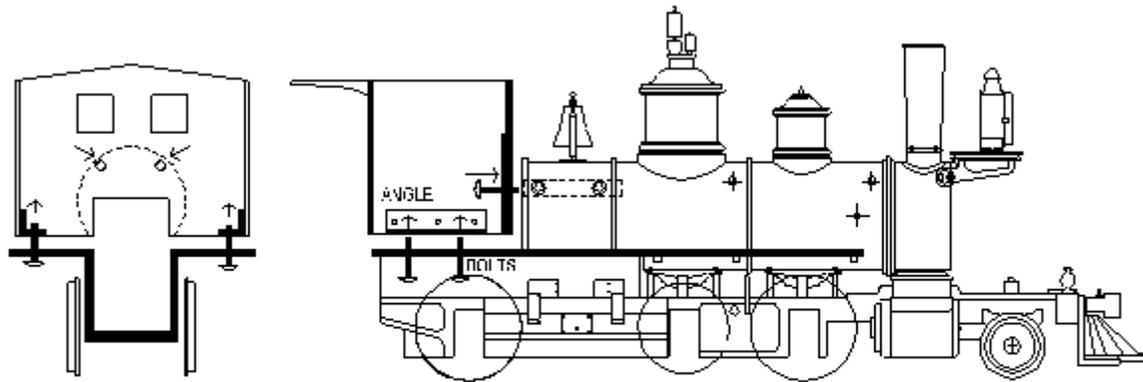
The 2nd way to glaze a cab is to do it the prototypical way, and that is to individually glaze each window frame, within the window frame thickness. It requires precision cutting of the glazing to get a perfect butt joint fit within the window frames...one thumb knock on the window, and the glazing is likely to pop out. Glazing options include shirtbox type clear plastic, or real glass. Real glass can be purchased in the form of glass slides used in Laboratories, microscope slides etc. Score the glass with a knife and snap the glass to size...watch you don't cut yourself!! You'll probably break and destroy 4-5 glass slides for each successful window!

## **Step 9 - Fixing the cab to the Locomotive**

Place the cab into position on the loco. Insert the two self tapping screws through the two holes in the front wall and screw tightly into the boiler SHS tubes/washout plugs. Use a drop of CA on the screw head if you wish, we'll not be removing the cab again.

Next roll the loco onto its side and drill 4 holes up through the sideboard/cab floor into the plastruct angles mounted to the cab walls. Provide two holes per side, or two per angle. Using small self tapping screws or small nuts and bolts, bolt the cab down to the floor.

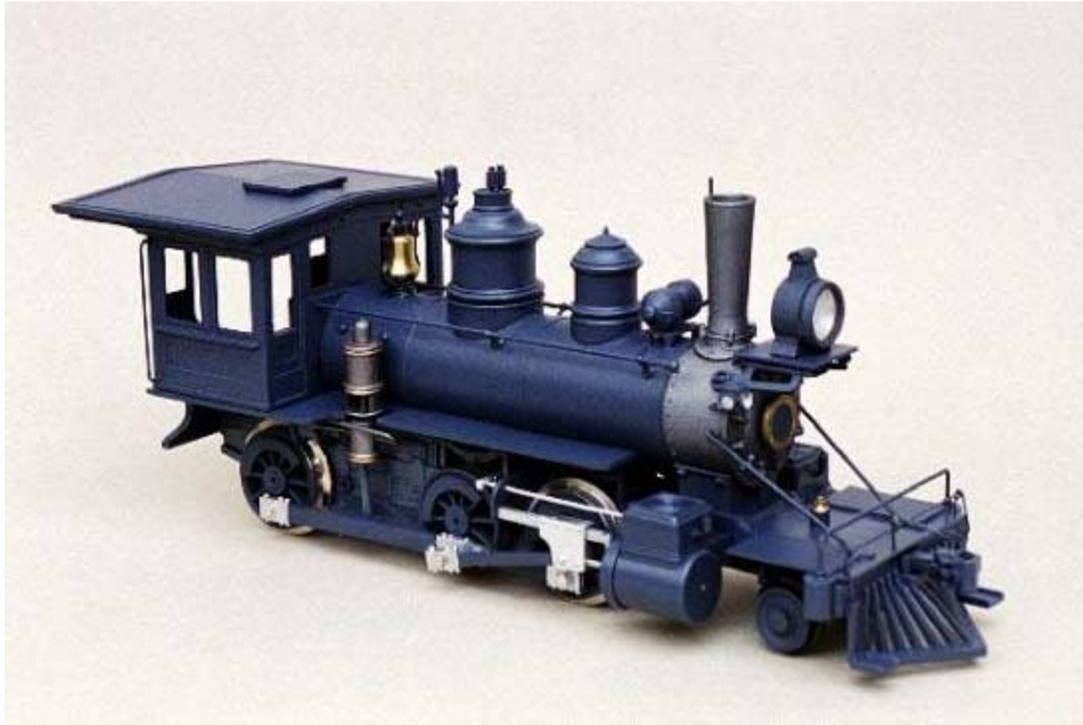
The fixing of the cab to the locomotive is summarised in the following diagram:



PLACEMENT OF CAB ON LOCOMOTIVE  
(DELTON & BACHMANN CABS)

Once in place and fixed into position, your locomotive should look something like this:





Nice....

### **Section 5.2 - 1:24 scale cab - Modifying the Bachmann 2-4-2 Cab.**

Using the Bachmann 2-4-2 cab is very easy. First make sure you did the appropriate alterations to your model along the way to make provision for this cab...i.e., a shorter boiler, and narrower cab floor.

The 2-4-2 cab is a little on the tall side for this type of locomotive, so the first thing to do is to get out the razor saw and trim off the bottom. Take off about 9mm from the bottom of the cab around the entire perimeter, lowering the cab by 9mm.

Next infill the opening in the front cab wall, drill the boiler fixing holes and install the floor fixing angles to the lower walls in exactly the same manner as outlines in Section 5.1, steps 2 -4 above. Paint the cab and fix to the locomotive as outlined in step 9 above.

### **Section 5.3 - Purchasing a Purpose Built cab for either the 1:24 or 1:20.3 2-6-0 Versions.**

This involves fixing the professionally produced wood cab to the locomotive. Please discuss the options for fixing the wood cab down to the styrene floor with the manufacturer. The boiler to cab fixing will have to be done in the same manner as outlined above in Section 5.1, step 3. You will have to locate the positions of the fixing holes relative to the boiler washout SHSs and drill the holes in the cab front wall as per step 3. Also review Step 9 of section 5.1 above as a guide as to the fixing of the cab to the locomotive in general.

### **Section 5.4 - Scratch Making a Styrene cab in 1:24 and 1:20.3 scale.**

Scratch making your own cab from styrene is a whole lot easier than it looks! The hardest part is the cutting...cutting out those windows, from thick 2mm styrene is real hard on the hands!!

The system is this:

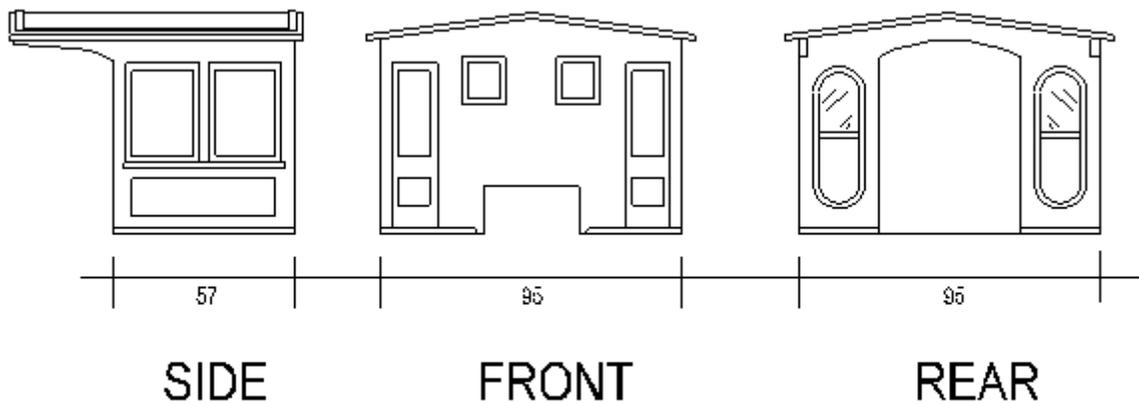
We fabricate each of the 4 cab walls from two layers of styrene. There is the inner 2mm styrene wall layer, forming the basic structure of the cab, and there is the outer 1mm detail layer of styrene that gives the cab it's style, provides the window frame relief and wood paneling.

The outer 1mm styrene wall layer is slightly larger than the inner 2mm wall layer, to provide for a clean overlap of the walls at the joints. The 4 walls are then reinforced internally at the joints by welding in a 6mm SHS plastruct section...this is the same section used to provide various bolting points for the locomotive, and again in this case, the 6mm SHS rods are used to fix the styrene cab down to the cab floor.

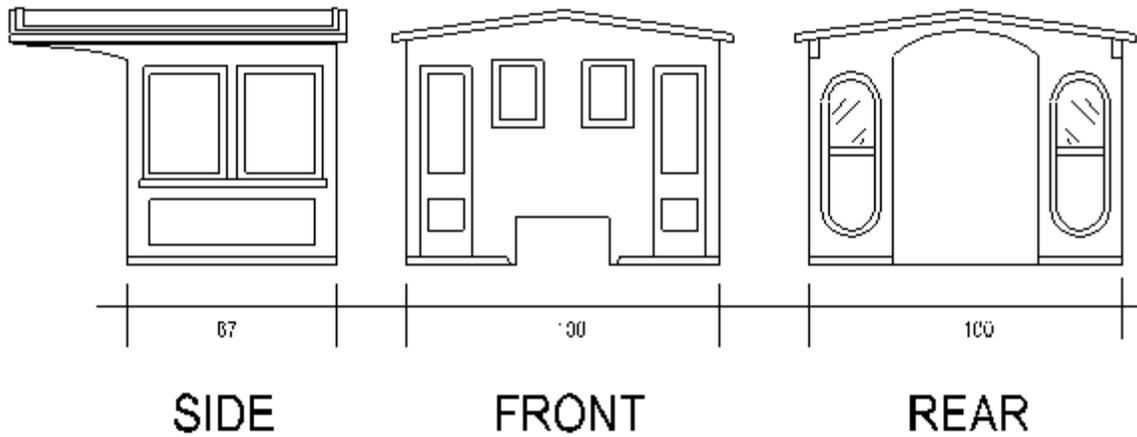
Choose which cab scale you're building and proceed with the steps:

### Step 1 -The Cab Walls

Review the overall finished sizes and look of the completed cab as shown here: use this as a guide as to the locating and fitting of the various templates shown in later steps. The point to note here, is that you can deviate from this cab style if you wish, re-arrange the windows, change the paneled area below the windows -oval shape, 2 or 3 separate panels or even just a steel riveted panel. Refer the photos in the 'background' section for ideas. The cab shown here is a fairly plain 1880-1890s style that is suitable also for later era versions. The dimension numbers in the templates may be hard to read on-screen, so think about printing these pages, or saving into word, and zooming in to the templates to read the figures better. So here it is, the finished cab, from which the templates in this chapter will build, both 1:24 and 1:20.3 versions.



1:24 SCALE CAB - ASSEMBLED

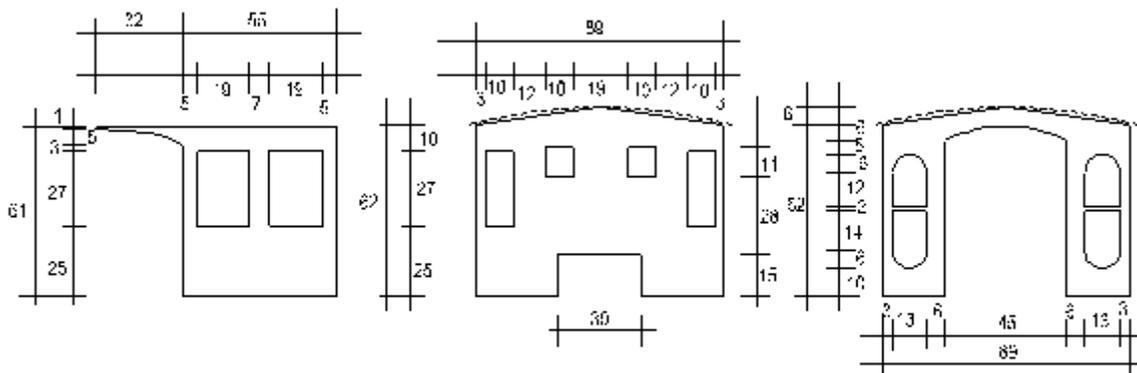


## 1:20.3 SCALE CAB - ASSEMBLED

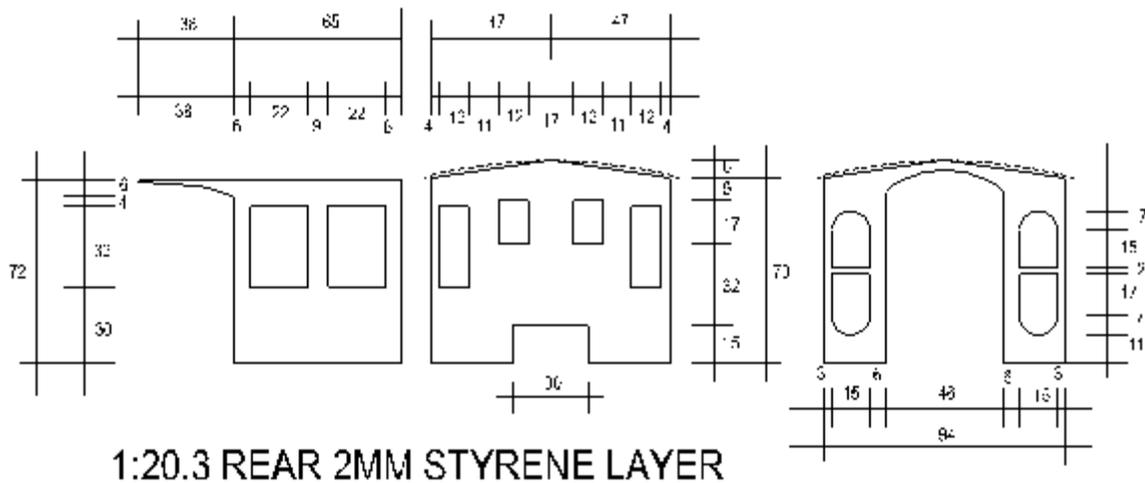
The oval shaped rear windows are a treat aren't they...pure 1870s Baldwin styling! You can do square windows if you like. Note in the oval type, the glazing is only in the upper part, the lower area is just timber paneling.

### Step 2 - Cutting the Cab Walls

We begin by cutting the inner structural walls of the cab, using the template shown here, cut out 4 walls from 2mm styrene. (mirror a 2nd side wall). The first template is the 1:24 scale cab, the 2nd is the 20.3 version.



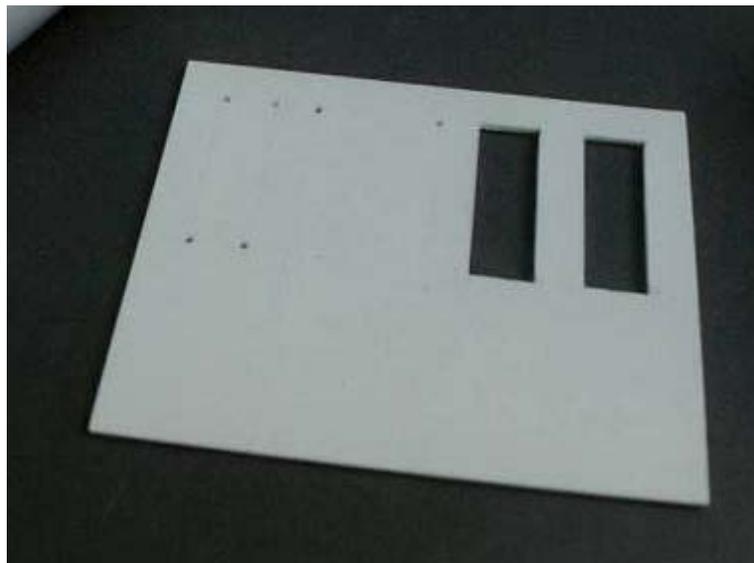
### 1:24 REAR 2MM STYRENE LAYER



Notice the templates provide for either a gabled/peaked cab roof or curved roof (shown dotted). Choose what you like.

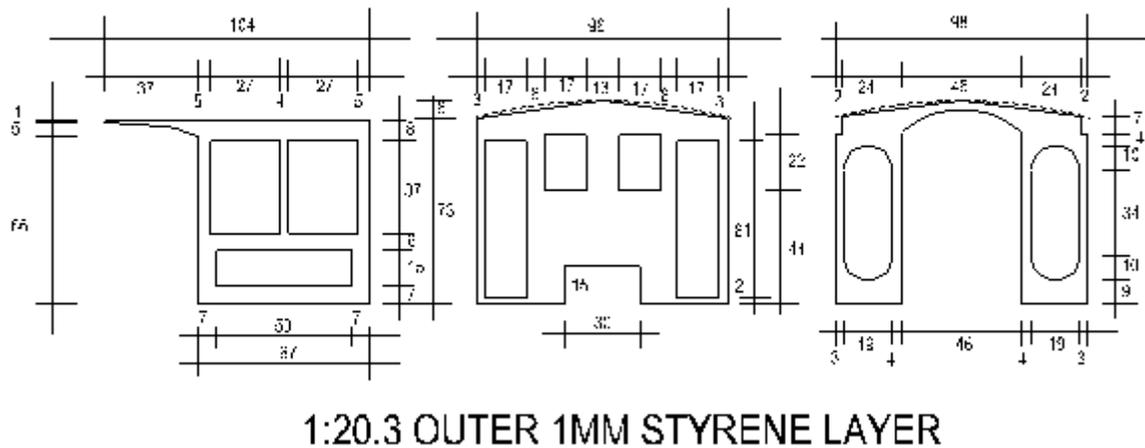
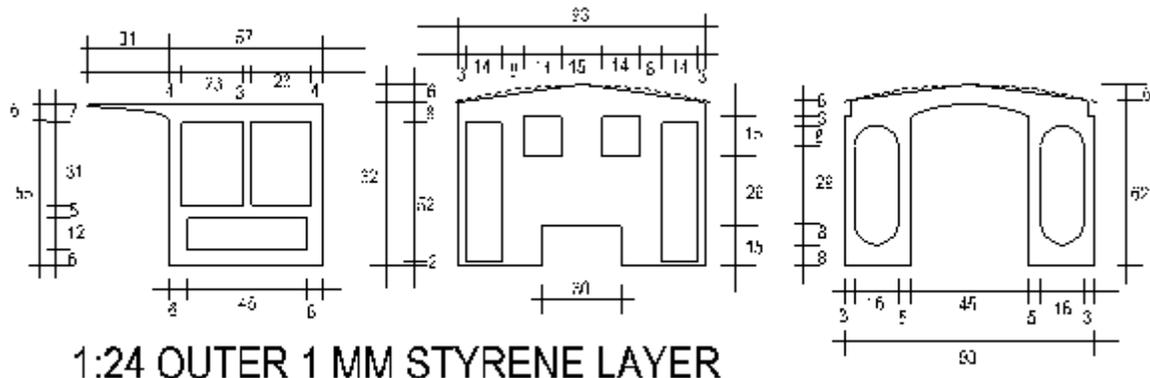
This is what I call the 'Blood & Guts Routine!!' In order to make the windows, you have to use your modeling knife to cut clean through 2mm styrene, and do it clean and with straight lines. Take your time doing it.

Tip: In order to avoid cutting beyond the window areas (run-away knife!!) try drilling 1mm holes at the corners of the window frames then simply cut between the holes.



The above photo is an example of cutting the windows out of the rear 2mm styrene wall layer, note the small holes drilled in the corners. This photo is actually a photo of a cab being made for an 0-6-4 Mason Bogie!

When you have cut your 4 walls of 2mm styrene, it's time to cut the outer 1mm styrene wall layer. Using the templates shown here, cut out 4 walls from 1mm styrene. This time it's a lot easier to cut out neat windows. Also remember to cut out the wood panel detail below the window if that's the style you desire. Compare the inner and outer wall layer templates and you will notice the outer layer has larger windows and the wall length is a couple of mm longer...don't worry, this is intentional. Here are the outer layer templates:



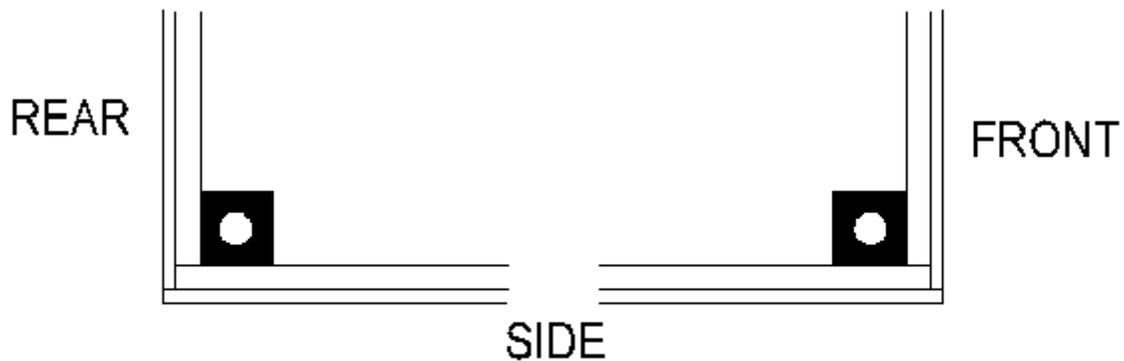
### Step 3 - Laminating the wall Layers Together

Using the welder cement, carefully weld the 1mm outer layer over the 2mm inner layer. Align the base lines, and center the windows within each other, so that there is the appearance of nice even window frames. Again don't be alarmed if the 1mm outer wall extends beyond the inner wall length, by 1-2mm. Apply the welder evenly between the layers and avoid any of the welder squirting into your window or panel areas.

#### Step 4 - Fixing the Walls Together

Stand up your 4 cab walls and lock them into place by running a drop of welder cement along the inside joints. Make sure all the outer layer styrene is overlapping the corner joints nicely, hiding the thick 2mm inner layer at the joints. Next cut 4 lengths of 6mm plastruct SHS rod, the length to cut is from floor level to 2mm below window sill. Weld these SHS rods into the internal corners of the cab, weld them well, for these are major structural reinforcing elements.

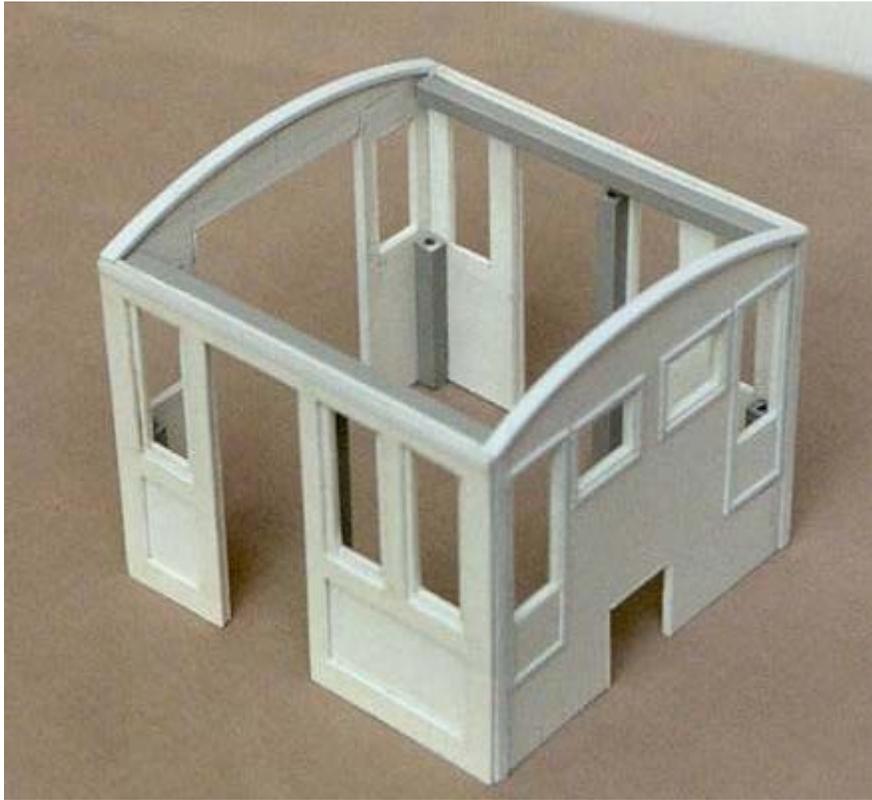
Your corners should look like this when all welded together...this weird diagram illustrates the wall corner interfaces in plan.



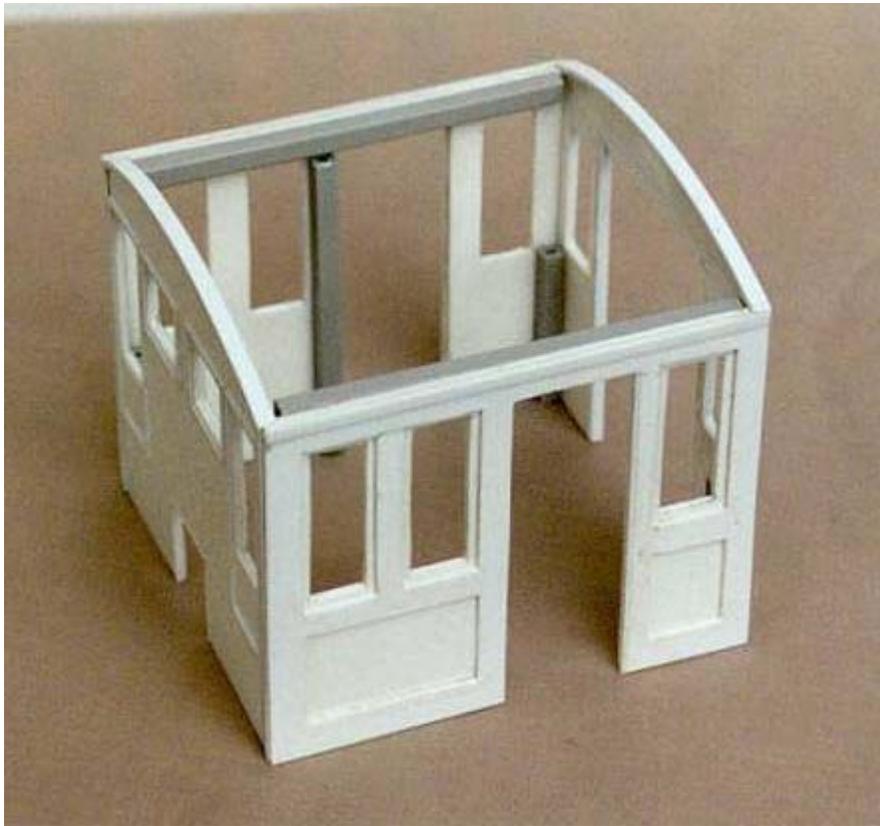
PLAN OF WALL LAYER OVERLAP

The 6mm plastruct SHS rods are shown in black...these have a tubular hole running through the center, which we shall be using as screw holes to fix the cab down to the cab floor/chassis.

The overall principle of inner and outer layer styrene, corner jointing and 6mm SHS rod reinforcement in the corners can all be seen summarized in these photos of the 0-6-4 Mason Bogie loco cab being fabricated.



Note in the above photo the two cab wall layers create the effect of window framing and paneling below the windows...here's another shot:



Note the use of 6mm plastruct SHS rods in the corners of this extended Mason cab, and middle SHSs as well! This cab was actually bolted down to the cab floor in 6 points. The cab for the 2-6-0 will have 4 fixing points, at the corners only.

### **Step 5 - Outer Detailing**

Depending on the era, style of your cab, you can now add outer detailing to the cab walls. These may be added 1mm styrene strips around the wood panels to provide added relief/cornice detailing similar to the Sonoma Cab. A 2mm styrene strip might be added along the base of the cab as a cab to floor cornice. Check Somoma/Inyo cabs for ideas. You can also add window armrests/sills below the windows. Check the finished cab drawings above. Note the front doors that lead from the cab onto the side boards have a panel in the door below the window. This can be made as a relief, by simply welding a patch of 0.5mm styrene to the door front. Likewise the rear oval windows only have glazing in the upper area, fill the lower half of the oval by lining in the inside face of the cab there with a patch of 0.5mm styrene.

### **Step 6 - Making the Cab Roof**

You can make either a curved roof or a peaked roof. Don't necessarily think peaked roofs are for the 1870s versions only, for some locos had them right into the 1930s...Inyo, Genoa, Empire, Reno, Sonoma, etc to name a few! So do what you think you'd like.

**If making a peaked roof-** Cut a rectangle of 2mm styrene to make the roof, measure the size of the rectangle from the finished cab elevations above. Score a line down the center of the roof, and fold the styrene along the line to produce the gable....just bend the roof a tad, do not snap the styrene. Place the roof onto the cab and test the gable angle.

Next add a trim of 2mm wide, 0.5mm thick styrene strip around the roof, 3mm in from the edge of the roof on all 4 sides. This trim indicates the change from plain wood to metal roof cladding, just inward from the edges of the roof. To prevent sparks burning holes in the wood roof, often a layer of sheet metal was nailed over the roof. Sometimes this sheet metal was Russia Iron.

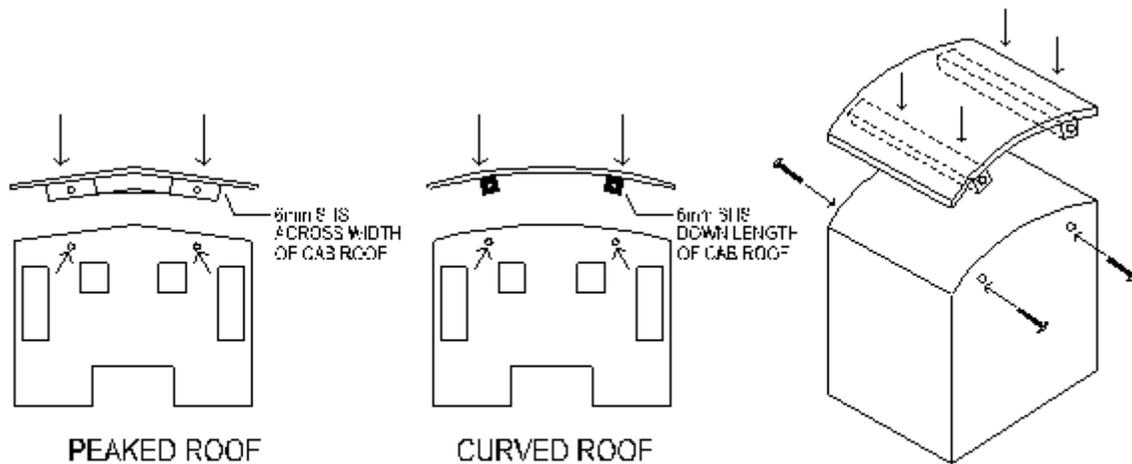
To fix the roof to the cab walls, you can either just glue it on, or provide a forward and rear under frame of 6mm plastruct SHSs, that run across the underside of the roof. These are almost like roof trusses, and the gable of these SHSs will need reinforcement with a slither of styrene in the form of a gusset plate under the peak. Then place the roof onto the cab walls, with the 6mm SHSs behind the front and rear walls. Drill two holes through the front and rear walls into the SHS and fix the roof to the walls with 4 screws....check the diagram below for the peaked roof option.

**If making a curved roof-** use the cab template diagrams above to measure out a rectangle of 2mm styrene for the roof. Hold the styrene element over a heater, gas flame etc and warm the styrene up. Slowly start bending the styrene to a curved roof. The best way to do this is to heat it up, bend it and let it cool...while it cools, the roof will start to bend back to flat...so heat it again and bend it again, and so-on. Slowly the cab roof will bend more and more and not spring back.

Make sure you get the roof to a curve that matches your cab walls, do not presume you can keep a miss-formed roof correctly bent by fixing it to the cab walls. It might distort the walls! Take care to:

1. Not set fire to your roof
2. Not burn your hands
3. Not over bend and snap the warmed roof.

Once the roof is nicely curved to the correct profile, we fix the roof to the walls. You can either simply glue in on with welder cement, or preferably screw it down. To screw the curved roof onto the cab walls, use two lengths of 6mm SHS plastruct rod, the stuff with the small tubular hole down the center. Weld these two rods to the inside face of the roof, along its length. Only go as far as the distance between the front and rear cab walls. The roof will extend beyond over the tender deck etc. Place the roof onto the cab walls, with the 6mm SHSs inside the cab. Measure out the locations of the centers of these SHSs on the front and rear walls, and drill 4 holes in the two walls. Insert self tapping screws into the holes and tighten into the SHSs, fixing the roof to the walls. Refer the curved roof diagram below.



FIXING CAB ROOF TO CAB WALLS  
SCRATCH MADE STYRENE CAB

## Step 7 - Painting the Cab

Its now time to spray paint, or hand paint your cab prior to fixing it finally to the locomotive. The color again is up to you, however I can also offer these tidbits. Originally this 1870s loco would have had a polished wood cab, very much like the Sonoma cab shown in the 'background' section. Both the insides and outside of the cab is plain polished wood. By the 1890s, when wood cabs were painted, the interiors were often painted green, while the exterior may have been black, brown, Maroon etc. In the 1890s the interior green was painted to the interior walls and roof soffit alike and was a real bright fluorescent green, like the color of really green grass. As time moved on, the green remained the most common cab internal color, right to the end of steam, but the color became progressively darker, toward the drab, or olive greens.

## **Step 8 - Glazing the cab**

There are a couple of good ways to glaze the cab windows. The most obvious way is to cut squares of shirtbox style clear plastic and mount the glazing to the inside rear face of the window frame. This system offers the easiest and probably the strongest way to glaze a window. Glaze all windows on each wall with a single plastic sheet. If using this method, please do not glue the glazing in the walls with CA, cement, this will fog up the windows terribly. Rather I use dabs of 5min araldite...you don't even have to glue along each edge of the glazing, just run a line of glue along the top and bottom edge of the glazing plastic.

The 2nd way to glaze a cab is to do it the prototypical way, and that is to individually glaze each window frame, within the window frame thickness. It requires precision cutting of the glazing to get a perfect butt joint fit within the window frames...one thumb knock on the window, and the glazing is likely to pop out. Glazing options include shirtbox type clear plastic, or real glass. Real glass can be purchased in the form of glass slides used in Laboratories, microscope slides etc. Score the glass with a knife and snap the glass to size...watch you don't cut yourself!! You'll probably break and destroy 4-5 glass slides for each successful window!

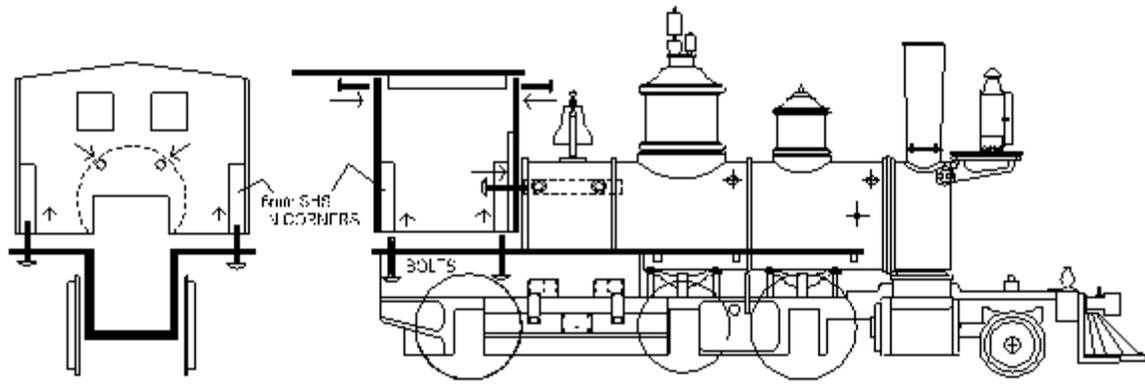
## **Step 9 - Fixing the cab to the Locomotive**

Place the cab onto the locomotive in its correct position. Make sure it is square, centered and hard up against the boiler end. Using the exposed boiler washout plugs as a 'line of sight' mark with a pencil, the location on the styrene front cab wall where the center line of the washout plugs align....This is an indication of the position of the SHS's fixed to the inside rear of the boiler. Next measure the distance between the center of the SHS's and the outer surface of the boiler. Measure this same distance from the pencil marks on your cab wall...this is the place to drill two holes in the cab front wall that are used to fix the cab to the boiler. Select a couple of 12mm long self tapping screws that screw nicely into the boiler SHS's and drill the two holes in the cab front wall to a size about 10% wider than the screws. Drilling the fixing holes larger than the screw will allow for a bit of play when finally screwing the cab to the boiler via these holes, allowing for errors, but clamping the cab solid when the screws are tightened.

Next, while firmly holding the cab in place, and with the cab roof off, dip a 150mm length of brass rod into a jar of black paint! While the end of the rod is still wet, dip the rod into the open tops on the 6mm SHS in the corners of the cab. Take the cab away and look at the cab floor...you should have a painted dot indicating the corner SHS locations. Drill out these 4 dots.

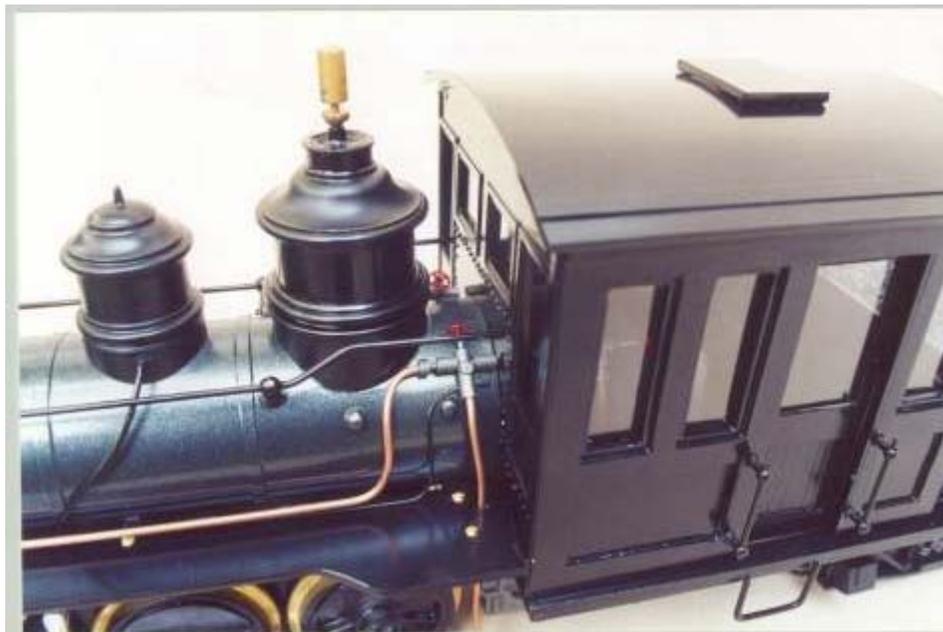
Place the cab back into position and insert the screws from within the cab into the boiler washout SHS rods within the boiler. Tighten the screws, clamping the cab to the boiler end, use a drop of CA on the screw tips if you wish, you'll not be removing the cab again.

Roll the loco onto its side and insert 4 screws/bolts up into the cab corner SHSs from below the cab floor and tighten. That's it, done! The diagram below indicates the principle of fixing the cab to the loco, and also shows the curved cab roof being screwed onto the cab walls.



PLACEMENT OF CAB ON LOCOMOTIVE  
SCRATCH MADE STYRENE CAB

The following series of shots show a typical styrene cab in its finished form, on the 0-6-4 Mason Bogie. Note the integration of the inner and outer styrene layers to form a well profiled cab. Also note the 2mm styrene curved roof, screw fixed to the cab walls with 6mm SHS rods. The hand rails on this loco were done using small brass stanchions and brass wire rails.





### **Section 5.5 - Scratch Making a Wood cab in 1:24 and 1:20.3 scale - An Afternoon with Vance Bass**

Most of you will know of Vance and his work in the large scale scene. Known for his company that makes wood cabs and pilots for the Accucraft Ruby loco, and also an assistant to the Garden Railways magazine. We're delighted that Vance is offering some words of wisdom in the field of building things from wood. So here he is...Vance Bass.

To build any cab for a model loco, you should first understand basic the construction methods used on the original prototypes. Though we are building models of "iron horses", cabs were originally built by carpenters using cabinet-making techniques. The woods they chose were sturdy and attractive -- oak, walnut, maple -- and finished with clear varnish.

The construction method can be likened to that of a typical raised-panel door in a house. The basic structure of the cab (or door) is defined by a finger-jointed frame, with the panels held in grooves between the frame members. Similarly, a loco cab has a frame with interlocking joints at the corners, and the large areas are filled with some sort of paneling, usually made of tongue-and-groove boards, though sometimes beveled raised panels like those in a door were used.

Constructing such a cab for a model loco can be as complex or as simple as you wish. A fellow modeler is working on an exact scale replica of a Baldwin cab for his Bachmann Centennial. It has about 80 parts from various hardwoods, all with the tongue-and-groove joints, beveled edges, etc. On the other hand, some expensive brass models come with fairly primitive stamped metal cabs. You should choose the technique, number of layers and parts, etc. to match the level of detailing you've done elsewhere on the locomotive.

Probably the most productive method for modelers is the "two-layer" method, which minimizes the number of parts you must produce, while giving a realistic representation of the cabinet-maker's art. In this method, you cut a sheet (wood or plastic) to the size of the entire cab side, then attach another layer on top of it to represent the framing. The top layer can be a single piece, or it can be made up of individual strips. Using stripwood for the top layer produces a more realistic wooden cab because the grain on each piece will be oriented properly, whereas a single piece will have the grain all in the same direction.

Wood choice depends on what you can get locally and your personal preferences. Many hobby shops that stock wood for R/C aircraft construction will have a small selection of hardwood veneers in addition to the usual balsa, basswood and spruce. Basswood and spruce will make a beautiful cab, but should be stained to resemble one of the harder woods. Typical thickness of frame members was 2" or so, which would be on the order of 3/32" in our scales. A laminate of 1/32" veneer over a 1/16" inner layer will give a realistic appearance.

Laying out the cab can be done in a variety of ways. The traditional is to read dimensions off a drawing and transfer them to the material you are using. If you wish, you may take the CAD drawings and print them out to get a full-sized template. This can be used to transfer the dimensions onto the wood, using carbon paper for example. You can also glue the paper to the wood (or plastic) with a light coat of spray-on contact cement, cut the parts, then peel off the paper. I have used this technique often and it makes short work of layout, and produces excellent parts.

The ornate cab chosen for this model actually suggests three layers, and my drawings based on Fletch's originals show three layers for the front and back. This could be simplified, of course, to suit your taste. I have offset the edges of the layers in order to give a "stair-step" at the corners. This is done to provide more gluing area and give a stronger joint than a simple butt joint. Alternatively, you can make the edges of each wall flush (sand them after the glue has dried to make the edge smooth and square) and use brass angle inside the corners to strengthen them.

After the cab is glued up, it should be finished with clear, gloss-finish varnish. Put on a couple of light coats, with plenty of drying time between, before applying your lettering. Then apply the final coat to make the surface of the lettering blend with the cab. Attachment can be permanent (CA glue), or you can make it removable if you wish. On live steamers, I cut brackets by slicing off about 1/4" of a 1/4"x1/4" brass angle. These are glued inside the cab at the corners, then drilled and tapped. I drill holes in the footplate (slightly larger to clear the screw threads) and run screws up from below. For the typical electric model, this is probably unnecessary, though, and gluing the cab down should suffice.

Laser cutting takes many of the techniques above and automates them. The designer lays out everything in the computer drawing, and the laser cutter is the "printer", drawing cut or scribed lines that are 0.005" thick. This kind of precision makes certain jobs much easier, of course, but anything the laser can do, you can do with your hand tools, time and patience. Just imagine that you're working with oak 2x6" boards, study the doors in your house, and go to it!

## Conclusion

..and that is what's involved in adding a damn stylish cab to your loco! For those wanting to add the roof hatch and other odds, proceed to the 'detail' section of this chapter. Otherwise, at this point you have a pretty decent looking lil 2-6-0. In chapter 6 we'll explain the purpose of and fit all the boiler pipe work and cab interior back head details, including injectors, tri-cocks, lubricators and air pipes.

At this point, your loco might be looking something like this:



Forgive me for my many vanities, I omitted the fact that I added a tender here just for the photo! We don't build the tender till chapter 7!

Good luck,

Fletch  
August 2001

## Detail



## The Locomotive Cab

### The Roof Hatch

For those building post 1880s versions of the model, you might like to add a roof hatch to the cab. You can either make a dummy non-working hatch or a real hinged job.

**The dummy hatch** - Cut a rectangle of 2mm styrene, 15mm X 28mm approx, weld two strips of 1mmx1mm styrene rod just inside and under the rectangle/hatch along the sides. Next cut two 2mm x 4mm patches of 0.5mm styrene and weld to the front edge of the hatch to simulate the hinges. Weld cement the hatch to the roof center line, with the 1mm strips running down the length. These strips lift the hatch and provide a clean level fixing to the peaked or curved roof. There is a gap under the hatch, but only a fraction of a mm, and no light passes.



Sorry about the quality of this photo, but you can just see the roof hatch welded in place. The hatch is not centered in the roof area, but centered over the enclosed part of the cab, this means the roof hatch is aligned with the central mullion between the 2 side windows.

## **Making a Hinged Roof Hatch**

To make a working roof hatch, again cut out a 15mm x 28mm rectangle of 2mm styrene. In the roof itself, cut out a 13mm x 27mm hole. Using strips of 5mm tall lengths of 2mm styrene, line out a box in the roof opening, welding the 5mm tall walls to the inside edge of the roof opening. See that approx 1mm of these styrene walls are seen above the roof peak.

Go to a craft/doll house hobby shop and check out the hinges used in 1:12 scale doll house construction. These tiny hinges are used to hang operable door in the houses. Buy two of them. Using 5 min araldite, bond the ends of the hinges to the front wall of the roof opening and the inside front edge of the styrene hatch...take care not to glue the hinges solid! That's how we make an operating roof hatch. The hinges are usually pretty tight so the hatch will not flop open and closed, or bump around as the loco runs.

## **Operable Cab Window Sashes**

If you'd like to have sliding window sashes in your loco cab, there is a way. In a typical cab as shown above, usually the 2nd window sash is a sliding unit, which slides in behind the lead window on the cab side walls. I don't advise a sliding window in the 1:24 scale version, as the sliding window sash appears too far in behind all the thick layers of styrene, and does not look realistic. The 1:20.3 cab is substantially larger and the wall thickness isn't such a problem.

To make an operating sash, cut out the 2nd window to the full opening size (or the size shown measured in the outer 1mm wall template). Only cut out the 2nd window to this larger size. Using 3mmx3mm evergreen or Plastruct 'U' section rod, weld a length of 'U' section along the full length on the inside face of the cab walls. Weld the lower section to align with the window sill height, with the 'U' facing upward. Weld a 2nd length of 'U' rod to align with the window head, with the 'U' facing downward.

Next cut out a rectangle of 2mm styrene to a size slightly wider than the width of the open window, and to a height to fit within the two 'U' channels. Using the rear 2mm wall template, measure out the actual glazed opening size and cut this out of the center of the styrene rectangle. You now have a framed window sash. Add a slither of shirtbox clear plastic to the rear of the sash, paint and insert into the channels. You might have to bend the sash a little to get it into the channels. The sash will now slide along the channels from a fully closed position to an open position behind the lead window. An engineer can then sit at the window, arm hanging out....ah the pleasure of it all.....

## **Timber Ceiling Lining**

This is but a minor detail, but an obvious one to anyone who ever looked up into the interior of a real cab from the ground. Wood cabs on the prototype locos, on the whole, look pretty smooth, with flush jointing and careful, smooth painting and polishing. The ceilings however have exposed planked timber lining. The planking usually runs the length of the cab from front to rear and thus works well to fit the inside curvature of the roof. You can add this detail to your Delton, Bachmann, or home made cabs in a couple of ways.

You can either buy or scribe your own 'V' groove planked styrene. Evergreen make a number of planked scribed siding appropriate for ceiling lining. Look for a styrene sheet with the scribed lines

about 4mm apart. Then weld or araldite the lining to the underside of your roof. Be sure to have the lining stop about 3mm back from the edge of the roof in the eave area over the tender deck.

You can plank the ceiling using real bass wood planks, butt them in there side by side, paint or polish to finish.

Well Folks that's it for this chapter. Enjoy.  
Fletch