

**Atlantic Shore line Locomotive 100**  
**Curatorial Report no. 9**  
17 December 2007 – 13 January 2008

**Turning the corner** – At long last it looks as if we've turned the corner. We've removed the last significant pieces of wood and are putting on new.

**The ends** – All deteriorated framework pieces have been replaced or repaired with an infusion of West System epoxy and new/old southern yellow pine (syp). The no. 1 end is level and ready for the big 8 x 8 in. end sill, fabricated by **Tom Dow** last summer. We done a temporary leveling of the sills on the other end but some fine shimming and trimming is still required. We still have to dado near the outer ends of sills 4 and 5 on each end for the heavy reinforcing plates over the coupler braces.

**To bolt or not to bolt** – The original sills were solid 5 x 11 ½ in. 30 ft. solid pieces of syp. At some time ASL or more likely YUCo had do the same kind of replacement of the top 3 in. of their ends. They did an excellent job of trimming and smoothing the remainder of the long sills so the new wood lay smoothly on the old. To fasten the joint they used two ¾ in. square-head machine bolts. We have used the West System epoxy and no bolts but are wondering if we shouldn't do a 'belt and suspenders' thing and also install bolts. If we do, we'll have to make another 25 or so bolts.

**The body bolsters** – These heavy steel fabrications are located about 5 ft. in from each end and in addition to their function of connecting the truck with the body, also tie the eight longitudinal sills together. Before the 'new' outside long sills could be installed, both bolsters had to be solidly in place. The no. 1 bolster was installed in the fall and in December the no. 2 put in.



No. 2 end original bolster and Donald Curry installing new one

As we put them together we noticed that YUCo had installed shims between the side bearing castings, the center bearing and the bottom of the bolster frame. Those on the side bearings are rectangular pieces of steel about ½ in. thick. Over the center bearing the two pieces are strips of steel about 4 in. wide x 18 in. long with a large scoop out of each to make clearance for the king pin. We wonder why they felt they had to do this because the castings are shaped to 'surround' the bottom plate of the bolster? These ridges on each casting are about ½ in. high so, with the shims in place, the only thing which keeps these castings in place is the tightness of the bolts. Could it be the springs in the trucks or the wear of the wheels lowered the height of the couplers so they didn't meet those on freight cars properly?

Because we had covered and/or filled in the pair of holes down through each sill at the bolster with new wood, and because the new holes in the bolster were slightly different than the original<sup>1</sup> getting them to line up all the way from the top to the bottom was a matter of careful 'guestimation'. To make the holes through the wood we used a 13/16 in. x 24 in. wood bit. We then drilled up from the bottom and down through the top with a metal-cutting bit about 9 in. long. The holes lined up better but still there was a bit of a bent, making it very difficult to get the bolt down through. So we then purchased an extra-length 13/16 in. twist drill which could go through the metal. This did the trick. With the help of **Dick Avy** and **Brendan Barlow** all 12 of the 14-in. square head bolts were inserted in sills 2-7 and the bolsters are firmly in place. Now there is something to support the side sills.

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<sup>1</sup> The original bolsters were so badly corroded, it was impossible to get an accurate layout of the holes, we could only guess where they were.



Drilling for bolster bolts with help from Brendan Barlow

**The long sills** – as you look at the front of 100 from the no. 1 end, the sills are numbered 1 through 8 from left to right. The original no. 8 sill has been gone since 1965, replaced by a large spruce timber by an enthusiastic group of early Seashore restorationists. On 12 January, a ‘new’ no. 8 s.y.p. sill was hoisted into place by **Fred Poore, Randy Leclair, Dick Avy and Chuck Griffith**. The no. 1 sill had been fabricated and installed the week before.

We would love to have seen the huge machinery at Laconia Car Company which made the two tenons on each end of the sills. We didn’t have that advantage. After carefully laying them out, we cut the tenons with a combination of circular saw (which could only get half-way through the 5 in. thickness), a very coarse-toothed timber saw and a chisel. On the bottom end of each sill we copied the ‘aerodynamic’ curve of the original, telling people this apocryphal tale:

The Cabot Paint Co. has been in business for well over 100 years and there is no question that Laconia Car Co. used it on their cars. So, they must have used one of Cabot’s gallon cans as the pattern for the curve because it was exactly the same as what we found on the old sills.

This involved cutting with the coarse saw followed by some ‘trimming’ with the very coarse belt sander.



Forming ends of the long sills

However, first the old sills had to be removed. Fortunately **Paul Cronin** arrived right in time to do the necessary bull work. There were a number of bolts that required the use of the Sawzall, then driving out to be turned into no. 1 scrap. He cut the no. 1 (original) sill into ‘bite-sized’ chunks about 8 ft. long so they could be taken out.

We had pondered what to do with the no. 8 sill, which was still in one piece without rot or deterioration. However reality set in as we saw it would be impossible to store it inside anywhere, let alone handle it so; reluctantly we also cut this into three chunks. It’s probably going to end up as first-class blocking.

**Cross sills** (needle beams) - About 1/3 of the way down the body from each end is a cross sill, 5 x 7 in. s.y.p., with notches in the top into which the longitudinal sills were set. These must have served to hold the sills in line as the frame was constructed. There is a ¾ x 14-in. square head bolt going down through the sill and holding the cross sill in. place (two each on sills 4 and 5). Their other function

is to hold and be the anchor for the casting<sup>2</sup> under which the longitudinal truss rods pass. The truss rods also pass through the end sills and the pole pockets in each corner of the car. As the big square nuts on the ends of the rods are taken up, the truss rod, which is now unsupported in the middle bows way down, will tend to straighten and provide a lifting—straightening force to keep the outer sills straight. **Donald Curry** did the notching in the sills and **Fred Poore** assisted in getting them into place.

As this is written (12 January), the cross sills and side sills are all ready to be drilled and bolted into place.



Fred Poore installing needle beam

**Finishing treatments** - Unfortunately the physics of drying large pieces of wood means they will inevitably form longitudinal cracks. The two long sills have cracks which do not affect their strength however, we have filled them with the West System resin and sawdust mixture and sanded them down smooth with a Bosch random-orbital sander and 60-grit paper. They are now probably as smooth as those which left the Laconia plant.

We were pleased with how smooth the beams were considering their size. John Rousseau, President of Barnstormers! told us that they were cut using an electric-powered 'Woodmizer' horizontal band saw. He didn't have one with a sufficiently long carriage so he ended taking the beams across Massachusetts to a company which did.

There is strong evidence of a wiring fire between sills 6 and 7 above motor no. 4. The surface of these sills was charred to a depth of about ¼ in. (The motor wiring in general seems to be a patchwork of spliced and friction taped bits, so there probably were other incidents of this sort that didn't get to the point of actually starting a fire.) Using the random-orbital sander with 60-grit paper this area was quickly sanded down to solid wood and given a coat of Cabot's stain.



Sill 6 showing charred area of wiring fire in motor no. 4 leads,

<sup>2</sup> In 100's present situation and as we received it, there is only one original casting, the other three having been replaced by a piece of 1 ½ x 2 in. channel about 6 in. long—obviously part of some rebuilding by YUCo. Probably, when the outer end of the needle beams deteriorated, the original castings fell off somewhere *en route*.

and remains of leather mounting straps for motor wires

**Probably not curatorially correct, but it looks pretty good!** – As you look at the most famous photo of A. S. L. 100 in its near-builder's condition, after the car is only a year old, look at the long side sill (with the lettering). There, for all to see is a crack running its entire length. And because the lettering is unblemished, there's little question that the crack was there when the engine arrived in Sanford. Are we being a bit too good by using the epoxy? Actually the real reason was to keep water out. Hopefully 100 years of drying out has stabilized the wood.

When the locomotive was built the under framework, except in the very outer surfaces was given a treatment of some sort of wood preservative—a barn red. We have seen this in virtually every wood car we have but don't know what it was. We have found it has lost any preservative value as it scrapes or sands off readily. (The air compressor, located under the no. 2 end hood, must have leaked oil badly because the sills in that area are coated with a mixture of dust and oily mud, which has done a good job of preserving the sills' integrity. We have scraped off as much of the grit as we can.)



Paul Cronin cutting off old sill



Randy Leclair with ready to upright new sill no. 1

For want of anything better we have painted what we can reach of the sills with Cabots' oil-based wood stain, Barn Red. It covers well and looks about the same as the original treatment. We apply it with a small foam roller. Where there are joints—at the intersections of the sills, we will insert a layer of Phenolseal caulk.

As we were scraping the tops of the long sills, in the area of the air compressor, where things were better preserved, we note the remains of a white coating. It is probably white lead. We did try the Seep 'n Seal but found our supply was old and didn't dry. So we're going to go a bit modern and use strips of ice and water shield, the rubberized sheeting used to prevent ice dams on house roofs. While not necessarily curatorially correct it will provide the best possible protection for these vulnerable areas.

The paint system, for the wood areas will be Fine Paints of Europe *Hollandlac* enamels over their gray primer-undercoat. These will be brushed and rolled on. The price is now \$100 per 'euro gallon' (2.5 liters) for the enamels and \$90 for the undercoat.

1. Basic body exterior black
2. Cab interior lower wainscot brown
3. Cab interior window posts and ceiling ochre
4. Windows and doors tile (barn) red

**What's next for the body work?** Before anything can be done above the sills, while things are open and accessible, the following must be done (starting from the least flexible):

1. The two truss rods (between sills 1 & 2 and 7 & 8)
2. The two coupler through-rods (between sills 3 & 4 and 5 & 6)
3. Air piping and air brake equipment (we have a purchase order to get the pipe)
4. Motor wiring and headlight wiring, ground wire (the wire is now on hand)

**Barnstormers! makes their final delivery** – On 11 January, John Rousseau delivered the remainder of the recycled wood, placed November 2006. For that we presented him with a cheque for \$4,750, the other 50%. We have enjoyed dealing with him finding him genuinely interested in what we do, and furnishing us exactly what we asked for including some extra (just in case!). He apologizes for delays but also says you can't rush in this business.



John Rousseau and Donald Curry discussing the source of the timbers for A. S. L. 100

What came in this delivery was red oak for the decking and pilots. Some of the pieces are absolutely beautiful—fit for living room use! The decking is milled to 1 7/8 in. thickness and in 6 and 8 in. widths. (The original was in various widths.) It has been stacked up against the walls of the box enabling us to walk safely around the body. (Now with the sills in place the box is actually much more 'spacious'. The pilot 'kit' is a bunch of 2-in. pieces all labeled and ready for milling and assembly.)

**The cab – Bob Reich and John Fatula** are overhauling the ten cab sash. (six rectangular ones for the ends and four large squarish ones for the sides) The end sash are in pretty good condition although they are repairing any deteriorated joints. They have noted that whatever the original coating on them was, it is extremely hard to remove! Paint remover and elbow grease don't work as well as they would like.



Bent cab sash



Bob Reich & John Fatula scraping cab end sash

The wood appears to be cherry but it's hard to tell. What I have seen looks as if they used the light coloured sapwood that they would not use in a passenger car. It's very hard to tell what the color was originally and we couldn't afford another colour match. What they have found under the present very deteriorated barn (or tile) red is brown, green, white, black, *etc.* Possibly the sash was originally varnished but, since we're going for the 1930s era, we're going to use a barn red enamel, inside and out.

One of the side sash appears to have been a replacement. Whatever wood was used was certainly not kiln dried and has warped about 2 in. along the stiles (sides) (bow-shaped) from being straight. We will have to make a new sash in this case while the others appear to be salvageable.

For some reason the two side sash on the right side have the glass divided in half by a horizontal rail, while the two on the left side are the original single pane. There is evidence of this change having taken place quite early and certainly was there during our period of restoration. The work of adding the rail is a bit crude so it definitely wasn't Laconia.

**Truck work** – **Dean Look** fabricated new motor mount angles to replace the eight originals that are badly rust-eroded. The original angles were bent from 1 x 4 in. bar in Alco's blacksmith shop, very likely using a steam or mechanically operated bulldozer. Dean joined these from two lengths of the bar by beveling one end of each piece and filling them with weld. **Chuck Griffith** trimmed off the corners of the angles and ground the welds. **Bill Pollman** and **Bert Rendall** primed and painted them. Bill is now fitting and installing them on the first truck. Dean fabricated eight motor mount bolts from  $\frac{3}{4}$  in. rod and square nuts. **Lloyd Rosevear** blasted them, preparing them for Bert to prime them.



Old and new motor mount angles (before trimming corners)  
Bill Pollman installing them on the truck frame

With the extreme (record) amount of snow in late fall and early winter we are recalling how lucky we were last year when we were able to take the trucks apart outdoors before bringing them inside for their final disassembly. Also it was fairly comfortable in the box because of the warm temperatures.



Bill Pollman installing brake shoe head on rebuilt brake beam

**Air reservoirs** – 100 is equipped with three reservoirs, all of which are the old-style riveted construction:

- Two main reservoirs 16 x 48 in.
- One auxiliary reservoir 12 x 36 in.

We were planning to send them to A. C. Electric for sand blasting but it seemed prudent to hydro-test<sup>3</sup> them before that. Also Dick Avy reminded me that we might not be able to re-use the original mounting blocks if we had to replace the reservoirs with new ones should they fail the test. So **Chuck Griffith** and **Dick** volunteered to do the test.

On 5 January they set up the high-pressure test pump and found it leaked to the point it required repacking and a new check valve. Fortunately it is a simple-minded device and was easy to fix. Main reservoir no. 1 passed at 185 lbs. (1.5 times the operating pressure of 110 lbs.) But on 12 January they set up the other two tanks for testing but before they even filled them with water, they found holes

<sup>3</sup> Water is used for this test because it does not compress. Should there be a failure the only symptom is a small stream of water visible.

in each. On both the failure was under where the supporting straps were—not an uncommon thing.<sup>4</sup> They also found that the auxiliary tank had been brazed in at least two places, not a good sign. Both tanks were unusable.

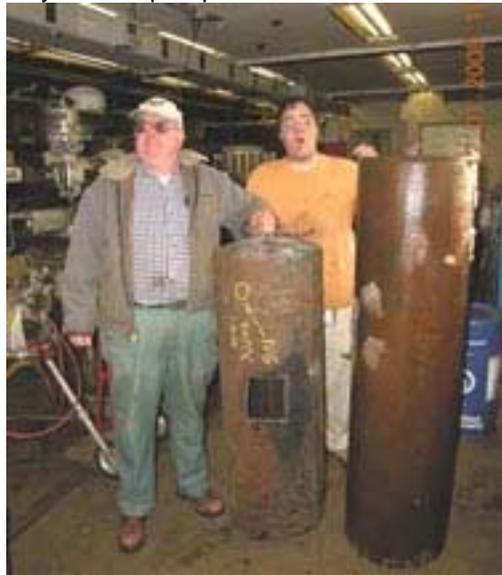
So we set out to look at our large and varied supply of air tanks, scattered here and there on the grounds. Unfortunately many were buried in snow and all are in areas which make them subject to corrosion. We did find one 16 x 60 in. as a replacement for the secondary main reservoir. Fortunately there is room for the larger tank on the locomotive's left-hand side where there is only that tank. The auxiliary reservoir will be a very new tank, constructed in 1999. This tank was designed to be mounted to brackets welded to the tank but we plan to carefully remove them and return to the original strap style of mounting. Because there are two tanks on the right side there is limited room so it can't be any longer than the original 36 in. (The distance between the trucks is short. Given the poor conditions under which our spare tanks are stored, it's very likely many more of these tanks will fail their test. Thanks go to **Dan Cohen** for assisting in this search.



Chuck Griffith with hydro-test pump



Holes in the main reservoir



Dick Avy and Mark Sylvester with original main reservoir and replacement

#### Some significant purchase orders recently issued:

- Abrasives-60 grit discs for the random-orbital sander. These will be used up in fairing the side sills and the exterior of the cab. We also included a new backing pad for the sander as it will be used up with all this rough sanding.
- Reciprocating saw blades (Sawzall) to cut the remaining bolts and pipes
- Friction tape (1 ½ in.) to bind the motor wiring into a cable. (20 rolls)
- Schedule 40 galvanized pipe and fittings. 1 ¼, 1 in. ¾ in. ½ and ¼ in. We will replace virtually all the pipe and most of the fittings unless they are special. Total not to exceed \$1,072
- Fine Paints of Europe – finish paints and primer & mineral spirits \$692.

<sup>4</sup> Among others the air tanks on cars 2052 and 5821 failed in these areas when the cars were restored.