

## Atlantic Shore Railway Locomotive 100

Curatorial Report no. 12

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**The general state of things** – With moderate temperatures and a variety of projects requiring staff attention, 100's progress is somewhat subdued. However there has been significant forward movement toward having an operating locomotive in mid-October 2009. Most of the work has been on the wood part of the body.

**A 'flatcar' again** – When you enter the 'box' now you will find a rather large (30 x 9 ft.) 'flatcar' with a deck. **Project Manager Phil Morse** took advantage of some free time at the end of the school year, when his services were not required at the M. L. Day School in Arundel, to make a huge change.

**Working on two fronts over the past two months** –

- Decking layout and preparation for installation
- Cab ends – 'arch' replacement, paint stripping

**The Deck** – Using the original as a pattern, **barnstormers!** milled recycled red oak to same cross-section as the original tongue and grooved boards. The originals came in various widths as Laconia Car Co. made best use of the wood they had in stock. **barnstormers!** made only two.

Order placed with barnstormers! 16 Dec. 2006 (It should be noted that the actual delivery took place about 1 year later.)

### **Red oak**

Wood decking (floor) Tongue-and-groove. Tongue adds approx ½ in. to the width of each piece.  
(Sketch of exact design to be provided.)

2 in. thick. Widths vary from 5 ¼ to 8 ⅛ in. (Note this is an average thickness, the best compromise)

We have decided to use much of the original floor, partially because it is hidden and partially because it is original and has the wear marks that are appropriate for a machine of this age.

### Outer decks (ends of locomotive)

Pieces are 107 in. long and we need to cover 164 in. total width for the two decks.

### Hood areas

98 in. long, covering 24 in. width

### Cab floor

96 in. long, covering about 24 in. width

The actual measurement of the 'new' flooring turned out to be 1 ⅞ in. thick. As was common in flooring the upper section above the tongue was thicker to allow for wear 13/16 in. vs. 9/16 in. below. Following Laconia's practice, the pieces have face widths of 4 ⅝ in. up to about 8 in. with the majority being 5 ⅝ in.



“New” recycled oak decking

**Phil Morse**, the one who had removed the original flooring and had carefully documented the widths and layout, first carefully put the originals back in place, using photos of the original layout. This was confirmed by the tape measure appearing in the photos and measurements made of the extant hoods. At this point all the original floor boards in the cab will probably be re-used. There is a section 16 in. into the cab and 34 in. wide by the right-hand door which was replaced at some time, either by YUCo or STM because of rot.) Under the no. 2 hood, which contained the air compressor in latter days, all of the boards, have been well preserved with the saturation of oil from the compressor, will be re-used. Under the other hood, pieces 1, 5 and 8 (of 8) [counting out from the cab] were replaced. This amounted to 18 in. of the total of the original 46  $\frac{3}{4}$  in.

Because the flooring on the decks beyond the hoods was not protected from the weather, all of it had been replaced, very likely by Seashore, because of its condition. Although it was oak, the boards were rough and square-edged. This wood has been removed and discarded and replaced by all ‘new’ wood. Because of the small amount of replacement and re-using the entire cab floor, we ended up with quite a bit of extra oak but it was difficult to predict this surplus going into the job when everything looked pretty bad!

After the boards were laid out, they had to be fitted over the bolt heads and reinforcing plates over the bolster. Phil did this using a skill saw, drill press and chisels so the boards all fit down level. He was able to use them to the full length, avoiding any splices in the middle.

It was difficult to tell exactly what the width of the floor should be because of the deterioration of the long sill cover timbers along each side of the cab. Ultimately we determined about 1  $\frac{1}{2}$  in overhang (over the sills) matched what we could see in the photographs of 100 in its various eras.

There is a 17 ft 3 in. piece of SYP (southern yellow pine) along each side of the cab, the top of which is even with the ends of the floor boards under each hood. It is directly against the 3 x 3 in. cab sill. The original pieces were the full length ft. long but we were only able to obtain 15 ft. 8 in. we had to add a 19 piece on each side to extend them to the full length. Outside of the hoods, the floor extends the full width to 107  $\frac{1}{2}$  in.

The flooring will be nailed directly to the longitudinal sills with two 4 in. stainless steel common nails per sill. Because YUCo added the reinforcement plates over the sills at each bolster the nails could not be used so they added a 3 x 3 in. block of what appears to be spruce, nailed to the side of the sill as a nailer.



Phil Morse proudly showing off his 'notching' work.



No. 1 end deck fitted

Within the cab, at each end, the air pipes come up through the floor for the engineers valves. Because we are re-using the original floor it is important that the pipes come back up through the same holes. Phil, who has not had much experience with threaded steel pipe, learned very quickly how it was done. It was very tricky because of the number of pipes and fittings within the small space at the end of the main reservoir, the cross and side sills. Currently the pipes on the no. 1 end extend up through the floor but will be temporarily removed when the cab is replaced on the deck.

The oak flooring initially appeared to be really beautiful material and, in many sections, is excellent. However, it has a number of knots and holes. These will be filled with a mixture of West System epoxy and sawdust. From what can be seen, there is no evidence that the floor was ever painted. It may have been given a treatment of linseed oil at some time but that too is not evident. For protection, we will saturate all surfaces with Cabot's Teflon Waterproof Sealer no. 1000.

**The cab ends** – On each end of the cab is an arched piece of wood following the curve of the roof. The roof boards extend 8 in out from the actual cab as an overhang and this piece supports it as well as serves as a nailer for the roof canvas. Each of the originals was somewhat deteriorated and missing about 18 in. which had rotted away leaving only a lot of rusted-away nails as evidence they had ever been there. The arches appear to be made of oak or ash but there is a possibility they may be elm, a common practice for bent members. The wood is 1 1/8 in. thick x 1 1/2 in. wide and about 102 in. long. The arch is 8 1/4 in. high. There is a small tenon on each end which is inserted into the longitudinal side frames of the roof. The bottom of each side has a 45 degree bevel which we put on with a router.

It might have been possible to bandsaw new pieces from wide pieces of ash (the wood we chose to use) but it would be wasteful as well as quite weak. So we took the longer but more accurate and stronger route of bending them. First the arc of the original was laid out on a 4 x 8 ft. piece of OSB. (The center of the arc is about XX in. higher than the ends.) Then we modified the contour sharper by progressively moving the line lower until the ends were about 6 in. lower than the original. This was done to compensate for spring-back.

To prevent the outside (convex) of the piece from breaking out as it was bent, a tension strap was made of 14 gauge steel about 1 ¼ in. wide, about 14 in. longer than the arch piece (which was also about 2 ft. longer than necessary for leverage when bending). The strap was then bent around both ends and held in place with a wire. It was also wired in the middle to keep it in place while being soaked. The center of the piece was marked for location on the bending form.

The form was simply 1 ½ in. scrap wood blocks about 6 in. long, screwed to the OSB. We don't have a good source of steam so we boiled the wood. Bernie Bisnette welded a cap to the end of a piece of 4 in. steel pipe 10 ft. long. This was then propped up at about 45 degrees and a propane burner placed under it near the bottom. The tube was filled with water and heated for about 1 ½ hrs. (based on a rule of thumb of 1 hr./inch thickness) We had to maintain a small stream of hot water coming in to replace what was boiled out.



Softening arches prior to bending.

After boiling, the wood was quickly removed, pulled around the form and clamped in place where it was left overnight. When removed it sprung back a significant amount but when clamped to the cab, it pulled into place with a nice curve. When the tension strap was removed there was no breakout on the outside of the curve.

We had made three pieces of stock to ensure we had an extra one if it broke and boiled all three but took only one out to test its fit. It would have been easier to install if it had been more sharply curved so the form was modified with a sharper bend and the other two pieces were re-boiled the next day. They went around the form easily.



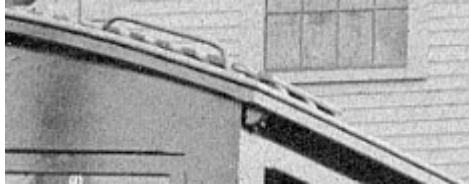
Technicians Chris Skulsky and Bernie Bisnette bending arches.



Tension straps around end of arch wood.

The arches were fastened to the roof boards by 1 ½ in. common nails, two per board. Since the originals were ‘bright’ (un-plated) when installed 102 years ago, they had rusted to the point they were impossible to pull out. So each had to be cut off using a hacksaw blade in a special handle.

As we were removing the arch we noticed two sets of nails driven into the ends the tongue-and-groove roof sheathing. One set was the tacks that held the Seashore-applied roof canvas. The other was 4d (about 1 ½ in. long) common nails with no obvious purpose. After some thought we realized that these had held a long-missing half-round wood trim that was over the edge of the canvas and extended around the entire periphery of the roof. It must have disappeared during the Seashore re-canvassing and the nails simply driven flush. The moulding is quite prominent in most of the older photos so it can be duplicated. It appears to be about 1 in. wide and about ½ in. thick. We will make this from ash using the router.



Now missing roof molding on 1907 photo of 100.



The ends of the tongue-and grooved roof sheathing which is 13/16 in. thick, particularly the no. 1 end, were split so we dribbled West System epoxy into them to fill the splits and keep them from growing. There was only one small area (3 x 8 in.) which required replacement.



No. 2 cab end with new arch. Stripped and ready for priming.

To fasten the arches we are using 1 ¾ in. galvanized ring nails. In order to keep them from bending it was necessary to pre-drill. Ultimately entire roof will have to be re-nailed.

**Paint removing and colors** – The area under the overhangs is covered with many thick layers of alligatored paint. The latest layer is a tile red. We are uncertain if this was on 100 when it came or whether it was Seashore applied. Underneath are several other layers, down to the blackish color recommended by the BCA paint analysis. Between is some mud brown. (We have left some areas untouched for reference by the next generation.)

For the paint removal we are using Savogran's strongest methyl-chloride remover SI-5. The actual scraping is with a carbide scraper. Because of the thickness of the paint many places took a dozen or more applications. Final cleanup was a solution of TSP in warm water applied with a Scotchbrite pad. This was then sanded with the random-orbital sander using 80-grit paper discs.

Around the end windows of the cab we found that the green was only in the very outermost layer or two. One was Seashore-applied in about 1955 and the other must have been the very last paint applied by YUCo in about 1948. (very likely when they installed the second trolley pole) Under that was a bright red, far brighter than what shows up in the extant color photos of 1947. The only colored photo we have is from 1947 and shows the entire cab end to be a sort of buff with the only red on the hoods and side wainscot. Mixed in with the red was a creamy or buff layer which shows in the 1947 photo. Below that was a muddy brown and right on the original wood was what may have been primer—a slate gray. We have left some areas untouched for future generations to ponder.

The exterior wood is largely poplar and is in good shape. The area over the no. 1 end left front sash shows signs of some sort of gashes some of which were patched with small pieces of pine. Some of the exterior post covers are separating from the posts so should be removed and re-nailed. We will take that opportunity to treat the now untreated back sides.

**Lost wires** – On the no. 1 end there are traces of now bypassed wires for the auxiliary circuits. (about no. 12 gauge) They must have been tapped into the main wire near the trolley base before coming down through the roof and in through the bulkhead to the various fuses. There is also the copper strap which held the main wire that came from the 1948 installed second trolley pole and must have fed the no. 1 circuit breaker. Each breaker was then fed separately but for all but about one year of its life there was only one wire from the roof.