

**Atlantic Shore line Locomotive 100**  
**Curatorial Report No. 7**  
1 April--9 September 2007  
*by Donald G. Curry, Shop Manager*

First, let me make an apology for the long time since you last received a curatorial report on this project. The ‘excuses’ are:

1. It’s our operating season so we need to spend a lot of time on keeping the fleet running.
2. It’s painting season so we do that in the un-heated areas.
3. There are many other projects in process simultaneously, 5 to be sort of exact, that need our attention.

However, we know you will soon agree that the project is far from dead. In fact, it’s extremely alive and well, especially for these past three weeks.

**Traction motors** – All four have been completely overhauled by A.C. Electric at a cost of approximately \$13,500. This includes installing the rebabbitted motor bearings. Because the truck frames are not complete the motors are being stored at no charge by A.C. and will be delivered when the truck work is completed.

American Power Service, in Georgetown, MA did the rebabbiting and **Dean Look** machined them to the diameters requested by A.C.’s Shop Supt. Roger Paradie. They are now installed in the motors, all of which have been test-run.

**Trucks** – We have deliberately left most of the one truck together with the exception of the wheel-and-axle sets, the motors, journal boxes and equalizers. All of these parts are ready when the time comes for re-assembly. When a project spreads out over time and personnel change, there still is first-hand evidence of how things were. The first truck has been partially assembled by **Bill Pollman** and **Randy Bogucki**. This includes the two new transom channels, arch bars, truck pedestals and wear plates, and all new bolts. The equalizer bars with associated spring seats were also re-assembled. This turned out to be quite a puzzle (Imagine one with 150 lb. pieces!) because the hole spacing on them varied. As we assemble everything, we put caulking on mating surfaces as well as ‘Never-seeze’ on bolts, just in case they have to be disassembled.

Meanwhile the beautiful double-elliptic springs have arrived and are ready to do into place. Also the journal bearings (“brasses”) have been received from Mid-West Locomotive and Machine Works. They were babbitted by American Power Service but still need to be machined. **Dean** is uncomfortable doing the job so is working with some a machinist from his old stamping grounds “Down East”, who says he can do the job.<sup>1</sup> Dean also said he would very likely to have done it if our Milwaukee horizontal milling machine were set up again.<sup>2</sup> Fortunately the motor axle (suspension) bearings were not badly worn and can be re-used, possibly with some repair of the dowel pin holes which tend to work to an oval shape.

Truck work largely stopped when the weather got warm enough to do outdoor work.<sup>3</sup>

**Body bolsters** – In our last exciting episode, **Dean Look** had his welding torch poised and ready to weld up the rounded ends of the top member of the body bolsters. He did than and ground away the excess metal and they look exactly like the originals.

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<sup>1</sup> Dean is from Jonesport, ME

<sup>2</sup> When the machine shop was reorganized several years ago, it was considered surplus so was stored outside (under a good coating of preservative), it was then moved back in but out into the area under the visitors gallery. It still needs to be wired in and ‘de-cosmolined’.

<sup>3</sup> Unfortunately Randy Bogucki found a good job with GE in the Erie, PA area. His was a great loss to the project.

Then it was necessary to drill the holes in the bottom plate to line up with those in the top plate through which the bolts holding the side bearing castings, which also hold the bolster together, must run. Because the plates slope up from the bottom where the center bearing is bolted, to above the side bearing mounts, it meant drilling into an angled plate without having the drill ‘walk’. As mentioned in the last report the hollow “**Hougan**” bits will move right across the face of a piece of steel unless the magnetic drill press which turns them is very solidly anchored against thick steel. After some thought, a jig was created using a surplus piece of 1 x 8 in. plate as a base and the drilling proceeded with no ‘walking’ or snapping of expensive bits.

Then the primed pieces were given the requisite coat of *Awlgrip* Super Jet Black and everything was bolted together. For several months the no. 1 bolster assembly was set on the shop floor under its future location but on 30 August, it was raised against the ‘waiting’ longitudinal sills for its trial fit—some change from the nearly rusted-away original. The no. 2 end bolster is drilled but is awaiting the disassembly of the original bolster which contains the center and side bearing castings.

**A Family Affair** – At the beginning of the summer we received an E-mail from a Susan Dow speaking of her son’s intense interest in railroads and trolleys and how it would be great if he could work on restoring one with his grandfather, who is a first-rate cabinet maker, some time this summer. Time went by and nothing further was heard until 13 August when we got a phone message. She, her mother and father and son were in near-by Cape Porpoise and they were ready to come over and help out. I invited them to come right over and we all introduced ourselves. Then I said, to Tom (Susan’s father), “Are you related to Sterling Dow?” Tom said, “Yes, he’s my grandfather.” So that made Susan his great granddaughter and Christopher, Sterling’s great-grandson!

As I thought about what they would like to do over the next three weeks it became ever so logical they should work on 100. (Sterling Dow was General Manager of the Atlantic Shore Railway and York Utilities<sup>4</sup> from 1918-1924!!) Tom said he had absolutely no idea of the family’s trolley connection.

So, I said, “I’ve got just the project for you!” As you will see, during their all-too-short visit, 100 rapidly transformed. Of course we didn’t want to leave Sue and Christopher out of the action. Chris would assist his grandfather in addition to doing a BAM.<sup>5</sup> Sue would work on much needed upgrading of the displays on the Shop Visitors Gallery.

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<sup>4</sup> The following is a reply from Historian O. R. Cummings in response to an E-Mail I sent him related to the Dow’s visit. . Donald: I have very little information about Sterling T. Dow. (but he did say the following)

York Utilities (YUCo) was incorporated on 1 February 1923. During that time one-man operation was instituted and a new line was built along Main St. Sanford. He was identified on June 30, 1910 as assistant treasurer of the Atlantic Shore Line Railway and he subsequently was assistant treasurer and freight agent of the Atlantic Shore Railway through 1917. He was named ASRy general manager in 1918 as successor to Lee H. McCray, who left Maine to accept a post with the Emergency Fleet Corporation, a World War I federal agency. He was the first general manager of the York Utilities Company in 1923 but had been succeeded by William M. B. Lord in 1924.

(the late) Howard Moulton (another trolley historian from Portsmouth) told me he had once contacted Mr. Dow but found him unresponsive when queried about street railway matters. He was not included in a list of Cumberland County Power & Light officials in 1925 (operators of the Portland Railroad) -- nor was he listed among officers of any other Maine street railway in that year. I had heard that after leaving the YUCo, he became associated with the Fidelity Trust Company of Portland. You might find his name on some ASRy tickets in my scrapbook for that system. I have no picture of the man.

<sup>5</sup> Be A Motorman. He had hoped to attend training classes but there were none scheduled at this time of the year. However, on 31 Aug. he got his turn at the controls of 1267.



Three generations of Dows

These displays were large rectangular wood frames 14 x 40 in. with glass, which can easily hold four 8 ½ x 11 photos. So we had a number of photos laminated along with captions 5 of which have been installed on the visitors gallery, either on top of the box or on the wall. Sue ran out of time so there are a number more to do. Of course we want to have one featuring the Dows at work and have the necessary photos to do that.

**Making the chips fly**-As soon as I discovered the family connection I knew just what Tom would do well: rebuild the wood structure of ASL 100. It was poised and ready except for one thing: Barnstormers! still hadn't delivered the long-promised vintage southern yellow pine. Sue volunteered to go to Portland, where they are located in the old Union Station train shed, to get the wood in her Ford Explorer. We made phone contact with John Rousseau, the owner and soon she was off, returning an hour later with front wheels barely touching the road and vintage SYP hanging long out the tail gate. Now we could do something. (She had been given the understanding that we now had all the SYP we were supposed to get except the long side sills, but it turned out not to be quite so.) Still Tom had all he needed to keep him very busy.

**Step 1. Make the sills solid and even.** Over time the 6 inner sills have twisted, rotted and drooped with the weight of the coupler and weakening due to the rot. In our initial figuring of what was needed<sup>6</sup>, following along with the style of repairs made by ASL/YUCo, we figured we would need to remove and replace 3 inches of the top of the six inner sills and 3 in. from the bottom of at least two. So, for the no. 1 end we ordered eight 3 x 5 in. pieces of SYP in lengths of two to eight feet, depending on the condition of the sill to which they were being fastened. In some cases this was simply replacing the repairs made by ASL/YUCo which and deteriorated and for others it a new repair. By using a nail and/or screwdriver, it was possible to poke and the sills to determine how solid they were.

<sup>6</sup> The no. 1 (presently south) end appears to be more deteriorated than the no. 2 end. This was the end which had deteriorated to the point the pilot had fallen and/or been taken off and the end sill and associated wood was almost totally missing. Until the body bolster is removed, it is very difficult to tell the condition of the bottom of the sills, so we may require some additional replacement pieces.

Tom was always concerned that we weren't going to leave anything of the original sills. (We had long determined we would preserve the original inner six sills as intact as possible and, in no case, cut one completely through.)

He made a jig from a 6-in. wide strip of plywood fastened to each side of the sill in question. This kept the saw cutting the same depth through the entire cut. It was necessary to make many cuts about 1 in. apart across each sill; then remove the remaining wood with a chisel. Because of the depth capability of the skill saw it took two settings to reach the full 3-in. depth. He then evened up the surface with a belt sander using a coarse grit.

**Step 2. Fasten the new tops (and bottoms).** Here we used West System (two-part) epoxy with their 406 high density filler. To keep it from running, even with the filler, which thickened the mixture, he had to apply waxed paper to the glued-up joint, clamping it in place with wood scraps. The ASL/YUCo held the fillers in place with  $\frac{3}{4}$  in. square-headed bolts vertically down through the filler and sill. We are considering whether to do use bolts in addition to the epoxy or simply depend on the epoxy's strength. (We've heard that it doesn't hold up well in shock situations, as in coupling up to a railroad car. Anybody know anything about this?)

**Step 3. Replace the missing end tenons.** On the end of each sill are two tenons which hold the sills in line and support the big end sills. The tenons range from  $1\frac{3}{8}$  in to  $1\frac{1}{2}$  in thick by 5 in. wide on the inner sills and about 3 in. on the outside sills. A number of them had deteriorated or were missing. We noted that some of the sills had twisted during Laconia's period of building 100. In order to keep the tenons in line, the horizontal surfaces were made level but, because of the twist, they were actually slanted in relation to the sill. This took some careful measuring.



Before and after showing the tenons on the ends of the long sills and the new end sill ready to fit.

**Step 4. Replace rotted and hollowed-out interiors.** When the locomotive operated, the first parts to move were the trucks. Their force was then transmitted through the truck bolster, the truck center bearing, the body center bearing, the body bolster and finally the body. Holding this all together were the twelve three-quarter in. diameter by 14 in. long square-head bolts which ran down from the top of the sills through the top plate of the bolster. (The end ones went through both plates which came together for their last few inches.) As the car operated, great strains were put on these bolts and the wood surrounding them. As the wood aged, it shrank somewhat allowing the bolts to loosen slightly which then allowed the bolts to work slightly-more and more over time. At the same time, water worked its way down along the bolts, deteriorating the wood as well as the bolts.



Hollowing out deteriorated sill

Originally the bolts very likely only had washers under their heads, barely enough to hold the structure solidly together. So, at some point,  $\frac{3}{4}$  in. x 6 in. plates with two holes were set in notches on top of the six inner sills. The outer sills were reinforced with  $\frac{1}{4}$  in. plate rough-cut with a torch, as were the ends of the inner pieces. These served well as reinforcements until the end of 100's operating life.<sup>7</sup>

However, when we removed these plates and their associated bolts, we found most of the holes in the sills had greatly enlarged and needed to be filled. Using a specially purchased 4-in. shank with a 2 in. carbide cutting blade router bit, Tom used a router to first cut away a notch across under side of the sill, similar to the one on top. He made a guide frame which kept the router horizontal. Then he chiseled out the deteriorated wood in the center of the sill, being careful not to totally destroy its longitudinal integrity. He fitted 'new' pieces of SYP and epoxy glued them into each cavity—gigantic 'dental work'.

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<sup>7</sup> It was the rough cuts that demonstrated these were not original pieces. Laconia would have sheared the plates, giving a more even end.



Tom Dow routing out deteriorated wood on bottom of longitudinal sill

The six plates on top of the sills plus a couple of small ones at the kingpin are in good shape only requiring sandblasting, priming and painting. The outer ones may require replacement although we should be preserving some of their 'rustic' quality.

**Step 5. Cutting the mortises and drilling for the through-rods.** Although we have a large hollow-chisel mortiser, capable of cutting the mortises, it would have been very awkward to manipulate the big<sup>8</sup> end sill on the router table as well and hold it in place. So Tom decided we should drill and chisel them. Using a big multi-spur bit in the Rockwell drill press and hand chisel, this was done quite quickly.



Under grandfather's watchful eye, Christopher Healy Dow learns how to chisel out a mortise in the new end sill

Through each end sill run the four 1 ¼ in. steel rods which run from one end of the locomotive frame to the other (about 30 ft. 6 in.) We purchased a 1 ⅜ in. ship auger bit to make the holes.

<sup>8</sup> 7 ⅝ x 9 ⅝x 105 in.

**Step 6. Installing the body bolster** – As mentioned above, this critical piece of the locomotive’s structure was bolted to the sills. Using a Masonite template, Tom bored 13/16 in. holes up from below through the top of the sills. Then he and **Dick Avy** jacked the new bolster up against the frame and dropped the bolts right down through where they fitted perfectly. The bolster now is temporarily in place for ‘show’ but will have to be dropped when we treat<sup>9</sup> the surrounding wood and add caulking.



New body bolster trial installation

On 29 Aug. Barnstormers! John Rousseau finally arrived with the two 30 ft. 6 in., 5 x 11 ¾ in. side sills. **Dan Cohen** was of invaluable assistance with “Mr. Lifto”, the truck with the hydraulic crane and flat bed, in getting off the long sills. In fact, with **Randy Leclair** and **Ed Dooks’** help, he slid each sill the full length of 100 so one is positioned on the floor on each side, right below where they will eventually end up. Barnstormers! also brought down the big end sill for the no. 2 end and the two 2 x 8 x 104 in. spacers which go across the top of the body bolster through notches in the longitudinal sills.



Danny Cohen operating Mr. Lifto while Ed Dooks, Dean Look and Randy Leclair handle the long side sill

He said the big timbers came from the bleachery at the Bates Mill in Lewiston, Maine. The other smaller timbers came from a mill in Fitchburg, Massachusetts.

<sup>9</sup> The original sills on 100 as well as most of the cars we have of that period have their wood coated with a maroon colored material, which must have been the consistency of stain. We have seen references to “Saum’s Wood Preservative” but don’t know anything about it. On some restoration work we have simply painted on a maroon stain. We probably will do something like that with 100 but will also use an epoxy sealer like ‘Seep-‘n Seal’ to keep moisture out of all joints.

We did some more careful figuring and decided we had omitted two 5 x 8 in. x 120 in. fillers which are bolted to the inside of the long outside sills under the cab. (We had thought they were a later addition, but after finding the antique carriage bolts holding them in place and the porcelain tube, in one, leading the wire to the original under-the-floor air compressor, we decided they were from day one.) Also, after studying the photos for the 'nth' time, we determined we had forgotten two 2 x 6 ½ in. x 18 ft. trim beside the cab on top of each side sill, also beside the cab. These run the entire length of the cab including the two hoods whereas the one above ran only beside the cab itself.

Most of the timber has longitudinal cracks which do not detract significantly from its strength. We have discussed whether or not to fill them. We probably won't except on the outer exposed surfaces. And even then, not entirely. Given its age, the timber certainly has had time to stabilize but we are concerned about whether the crack might open again and fall out. It's interesting to note visible splits on 100's outer sill even when it was fairly new.

Still to come is the oak for the end decks and the pilot as well as a few more pieces of SYP: especially the filler pieces for the sills on the no. 2 end.

**The through-rods.** These four 1 ¼ in. diameter x about 31 ft. rods extend through the end sills on each end of 100 and basically tie the locomotive together. The center two also go through the couple support blocks<sup>10</sup> and the top two of the four holes holding the coupler. These run straight though without any bends although they were somewhat bent when removed. Because of their connection to the coupler casting, they took a lot of strain and it appears the some of the ends of the rods may have been replaced by welding at some time or other. As they passed directly through the wood they were corroded to the point their cross-section was diminished so we decided to replace all four ends. **Dean** cut and threaded on the lathe, four pieces of 1 ¼ in. rod, ground one end to a point and welded them on.

The outer rods pass through the poling pockets on each corner of the end sill, are horizontal as far as the bolster on each end, where they are supported on a 4 x 6 block set on the bolster filler. Then they bend down about a foot, to become horizontal for about 10 ft. before bending up and then horizontal for the other end. They bear upward on some special castings (of which we only have one original of the four needed) which serve to hold the center of the sill up, keeping it straight.

On most cars these truss rods can be adjusted by means of a turnbuckle in their center. However on 100, the adjustment is via a large square nut on each end. It would appear that 100 remained quite straight for all of its days, probably because of the strength of the eight longitudinal sills. These rods, although pitted over time, were in good enough condition so they did not require any repairs. **Randy Leclair** removed the loose rust with an air-operated C.R.U.D.<sup>11</sup> disc tool. He then applied a coating of black *Chassis Magic* epoxy rust sealer. This will be followed with *Awlgrip* Super Jet Black enamel.

**Air compressor** – 100's big GE CP 30 air compressor is still at A. C. Electric, in the process of overhaul. Some time ago they removed its two main bearings and sent them down to us, feeling they were worn too badly and their babbitt lining was badly cracked. Instead of bronze, these are steel shells, line with babbitt. Unlike bronze, where the babbitt metal actually solders itself to the shell, in steel shells it is held in place by 'dovetail' grooves cut on the I.D. of the shell.

Don, Good morning,

We have inspected the air compressor motor and found that two bearings are defective, and need to be repaired. I will send them with John (their driver) today so you can take care of them

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<sup>10</sup> 6 ¾ x 5 ¾ x 16 ¼ in. SYP

<sup>11</sup> 3M's Corrosion removing utility disk

One bearing is a Crankshaft bearing (the short one) and the journal diameter is 2.7485 - 2.7490"  
This bearing should probably be bored to 2.755"

The long bearing is the armature bearing (motor side) and the journal diameter is 2.2483 – 2.2485"  
This bearing should probably be bored to 2.258"

These are only recommendations for the new bearing bore, and if anyone has a spec for them I would use it instead.<sup>12</sup>

Regards, Roger P(aradie).

**Norman Down**, who lives in Georgetown, MA, where American Power Service, the company which did the motor and journal bearings for 100, is located. We asked for estimates, either to re-babbitt and machine them to dimension or just to re-babbitt the shells for us to turn them to the recommended dimensions. For both estimates the cost was extremely high. Here is the E-mail which I sent to **Dean Look** regarding this:

ASL 100 compressor bearings: Possible scenarios

1. Do nothing and simply put the originals back as they are
2. Have American Power Service rebabbitt them and machine them (\$2,012)
3. Have A. P. S. rebabbitt them and we machine them. (\$1,007)
4. Have STM enter the babbitting field-much cheaper and much easier than 639's armature bearings.
5. (If that doesn't work) Machine new bearings out of bronze bearing stock. (Say about \$200 or less for materials)

What is the opinion of the lead machinist?

His reaction was that both costs were outrageous but we had no alternative.

The next step was to determine what the alternative was, starting with bronze tubing from which we could machine new, if not quite historically accurate, bearings. These would not be babitted but would have oil grooves cut in them. This turned out to be quite expensive too and you would have to purchase a 13 in. tube even though one bearing is only 3 in. and the other 6 ½ in. long. The alternative we have gone with is 'oilite' bearings from Bearings Specialty Company, which we will machine to exact size for about \$200 for the two of them.

**The 'one-hood' photo.** A week or two ago, you should have received a photo taken in the 1920s at the River St. carhouse (we're guessing) of 100 with only one hood. This was discovered by **Norm Down** in the STM Library. We scanned it and got the details we needed from it. **Phil Morse** has subsequently taken it to a company in Biddeford which specializes in photographic restoration for them to bring back to original condition.




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<sup>12</sup> We don't know of any.

At the River Street Car House, probably late 20s early 30s  
In the process of having current (GE CP30) air compressor installed under missing hood.

**The wheels.** P D & Y 108 was in the Shop recently being serviced for Pumpkin Patch. As it was there we noted its interesting spoked wheels and realized these were probably the same type 100 had when it first operated on the ASL. 108 came to the ASL from the P D & Y on a flat car *sans* wheels. ASL was scrapping the big interurban cars so they had plenty of appropriate trucks.

**The location of the locomotives.**

More from O. R. Cummings. “The new carhouse on River Street, Sanford, was built in 1923-24, using materials salvaged from the coal pocket near Town House Junction. I do know that Nos. 100, 101 and 102 all were in Sanford in 1927 and that the body of No. 101 was sold to a private party a few years later. You may recall seeing it south of the Route 1 bridge over the B&M in Biddeford.”

Yes, I do recall it well although I was too young and without the means to do anything about it. This was at Underpass Auto Parts, often referred to by Seashore people as “Underpass Overparts”. It was used as a storage shed, perpendicular to U. S. 1 about 30-40 ft. in from the road but clearly visible including ‘101’ on the end. I remember it was painted a sort of mud brown. I also remember seeing it burning as it was in the way of some sort of improvement project.

‘Grouchy Mac’<sup>13</sup> did go there and get the two operators’ seats which he then installed either in 838 or 1391. The actual seat folded in an upward direction. I think they’re painted a forest green.

**The Color Match** has been completed by Building Conservation Associated, Inc. of 580 High St., Dedham, MA 02026 and their paint analyst, Brian Powell. Unfortunately we have not been able to visit them but do have their detailed report. Their results may be somewhat underwhelming but they’re what you might expect on such a work-a-day machine. Their report will be on a separate report to be sent shortly after this one. (This will make it easier for my dial-up line to handle.)

**Coal Stove** – Thanks to a connection made via **Jim Hamlin** and the **Maine Narrow Gauge RR**, we now have an appropriately sized cast iron pot belly stove.

**The word is out** – Those of you who receive the *Railway Museum Quarterly*, published by the Association of Railway Museums (A.R.M.) have seen the first of a series of articles they will run on ASL 100. We have developed a very good relationship with Aaron Isaacs, the Editor of this fine publication. Here is his preface to the story in the Summer 2007 issue:

According to the RMQ Reader Survey, published in the Fall 2006 issue, readers want to see more “how to do it” articles on restoration. Nobody does a better job of reporting on a restoration than Donald Curry of Seashore Trolley Museum. And nobody does a more thorough job of the restoration itself. By happy coincidence, Seashore last year began the TEA21-funded restoration of Atlantic Shore Line (York Utilities 1922-47) wood steeplecab locomotive #100 (Laconia 1906). RMQ will be publishing Don’s Curatorial Reports as they appear, hopefully until the project is complete.

In each *Quarterly* Isaacs has items about the multitude of railway museums all over the country which he has visited. Often there has been a mention of Seashore, as well as the great photo of Cleveland 1227 on the cover of a recent issue. Aaron regularly receives our *Dispatch* as well as copies of the curatorial reports such as this but we seldom saw anything but an occasional reference to the restoration work we do. He said that it was difficult to report on projects that spread out over many years. The reader doesn’t see any obvious progress and it can get to be as interesting as watching paint dry. He had been looking for a major project that wouldn’t

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<sup>13</sup> Joseph E. Maclaughlin, an early Seashore volunteer from Portsmouth, the first ‘Shop Foreman’.

stretch on for too long a time and ASL 100 was it. This came together as we spent an afternoon in the lobby of the convention hotel in Sacramento at last year's A.R.M. convention and we're really pleased that we can accommodate his getting the word out.

**The near future.** We were not planning on working on the underframe until heating season so Tom Dow's availability pushed that phase way ahead. A.C. blasted and primed a number of brake parts including the slack adjusters and brake cylinder and hand rails. They have been painted black *Awlgrip*.

We would like to re-assemble the first truck and now have all the materials to do that. **Dean Look** is working with a machine company in Machias, Maine to machine the journal 'brasses' to fit the various diameters on the ends of the axles.