Atlantic Shore Line Railway Steeple Cab Locomotive 100
We're through the tunnel!!
Curatorial Report 18
21 April – 7 October 2009
by Donald G. Curry, Shop Manager

The big day is coming and the big day has passed. Over the last few weeks, things have come together rapidly for ASL 100. Here's a brief chronology of recent events:

- 6 July – first toot of its whistle
- 10 July – first tentative application of brakes
- 10 August – Moved from box to Pit (towed)
- 31 August – lights came on first time
- 31 August – compressor ran the first time
- 1 September – First application of power to controllers – first move
- 1 September – First trips around the Visitors Center Loop (both ways)
- 2 September – Remedial action for interferences found on Loop trips
- 3 September – Second trips around V. C. Loop (both ways)
- 3 September – First trip to Talbott Park (and back!)
- 4 – 5 September –Remedial action for interferences found on Loop trips
- 5 September – the light at the end of the tunnel lit – its portable headlight!
- 25 September – Debut for invited guests

The big move (on 10 August) - For those who aren't familiar with the route, it's out the back door of the Shop, cross over a rather persnickety switch, all the way possible to the "Burma" road.[1] Then it's reverse direction and head south down Track 1, out and into the Shop Yard, down to the first switch where it will be reversed and pushed onto the pit. It should be noted that, unlike its October 2006 'grand entrance,' it was not possible to apply power because there are many areas under the car that weren't accessible on the concrete floor. These had to be finished on the pit. This involved such things as the motor axle bearings, gear cases, truck 'binder bars' and even some smaller wiring. The 'locomotive', as is often the case, was the *Pettibone.*[2]

[1] That reminds me that 100 is now longer than it was when it came in because it now has two pilots with footboards. We thought it might be necessary to dig out the road behind the dumpster, but this turned out not to be necessary.

[2] Since the tracks were now as wide open as they could be, it would never be easier to move in the next project for the 'box': Boston Elevated Railway center-entrance car 6131. This was pushed up track 1, through the box (where the 'locomotive' Type III plough just barely fitted) and out back. The *Pettibone* was then used to pull and push it into the box. Because of the radius of the curve and its guard rail was tight, the car tried to go straight and climb the guard rail. It took a lot of grease and much pushing force to get the car in place. This is the reviving of the return of this former sand car into its original passenger configuration, started in the very place it now occupies but there was no box at that time. The project was stopped because funding ran out and the sponsors were unable to raise more. Work will not start until well into the winter because of ongoing projects.

Phil Morse and his ubiquitous 'flip camera' recording for YouTube, Jack Coyle's connecting 100 to the *Pettibone* while Dick Avy prepares to give the 'go-ahead' signal.

Seeing the first light of day

The exterior from the top down – Since it's obvious from the above list that 100 has run under its own power, the trolley pole and base must be in place. **Dick Avy** blasted, primed and painted the trolley base using Awlgrip 545 gray epoxy primer followed by Awlgrip's *Super Jet Black* polyester enamel. **Jim Mackell** and **Phil Morse** installed the pole and set the upward pressure at 25 lbs., Seashore's standard.[3] The heavy copper wires extending to each overhead circuit breaker were then installed. It is likely that one of the two wires was not original but was probably installed at some time when Seashore returned it to the single-pole configuration. From the photographic evidence it appears that 100 only sported a second pole for about one year at the end of its life.[4]

Phil carefully caulked all around the edges of the roof behind the half-round canvas moulding, using Phenolseal gray caulk. He then installed the overhauled roof mat ladder and gave the roof another coat of Cabots oil-base stain.

Doors – Jim Mackell installed the two cab doors, both of which had been reglazed and painted with Fine Paints of Europe's "Oxide Red" floor and deck enamel. He blasted and primed the escutcheons

[3] This came from recommendations in the NOPSI book.
[4] We feel it was for the Pioneer Plastic's siding which was on an elevated structure and close to a building which would make it difficult to swing the single pole around.

for each door latch and installed them. Using one original and one donated by **Dick Avy**, Jim installed the old fashioned household style door latches. **Bernie** restored a rather badly corroded knob made of very thin sheet steel. His welding technique is amazing! Holding the doors open are the original standard Laconia door catches which drop on top of the door.[5] Over time each of the two must have been located in three different places given the holes found in the surrounding woodwork.

Identification – At long last, after lo these many years, 100 now can tell you its operator: ATLANTIC SHORE LINE RAILWAY[6] and its number. There had been considerable discussion about how it could be applied:

1. Hand-painted using a pounce stencil
2. Vinyl computer-generated letters as on 639 and 1227
3. Computer-generated stencils with hand-painted letters.

We chose the last option because it would give the feeling of a hand-painted job but much more easily applied than 'painting between the lines'. Even our local sign painter, Arundel Signs (Charlie Neville) wouldn't do it. The cost of the stencils and the vinyl for the logo was $240.

Antonio Steffon removing the masking from the side lettering
Donald Curry "squeegieing" the Laconia Car Company Logo

Using the two best photos we have showing the lettering[7] **Jim Schantz,** using Adobe *Illustrator*, did the necessary computer work to create a disc which Arundel Sign could use to create the stencils. Additionally, using information we furnished he created the Laconia logo.[8] Because the original was not clear we had to improvise on the lower lettering.

The paint used was *One Shot* Lettering White. We purchased a quart and, even going over the characters twice, only used a few ounces. It was applied using a foam brush.

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[5] Bay State 4175, Manchester 60, P D & Y 108 and Manchester 38 all have the same type of retainer.
[6] It should be noted that having this lettering on the car in the period to which we're installing it had long been gone, possibly on the car's first repaint.
[7] One is the famous photo of 100 in the mill yard in its original configuration, so it must have been in 1907 as the car was delivered in November 1906. The other is 102 in 1909 (now in its double-sized cab configuration) towing a single-truck car that had been pulled out of the 'drink'.
[8] Recently O. R. Cummings pointed out that our wording on the logo may be incorrect. He referred us to the cast bronze nameplates

The cab numbers presented a bit more of a challenge because of the 'groove' on each piece of siding wainscot. To keep the paint from running it was necessary to use some green masking tape as a 'dam'.

Because of the delicate character of the logo we went with pre-cut vinyl. It would have been impossible to make a stencil for this.

The hoods – Jim Mackell completely rebuilt the hoods, using as much original wood as possible.[9] We are uncertain if the tops, which were made of common tongue and groove pine with black roofing paper for a covering, were as York Utilities would have made them—or was this a Seashore expedient? From what remains can be found, at some point in their life, and probably up through 1948, they were covered with canvas.[10]

He used no. 8 canvas, the same as on the roof. When we disassembled the hoods we found traces of tacks across the front of the cab, in the wainscot, which held the canvas. Since the tops of the 'new' hoods (post-1907) were hinged[11], the joint had to be sealed. Jim fastened the top edge of the canvas with tacks as originally and put a ½ in. x (about 3 in.) strip of wood (with a slightly tapered top edge) under the rabbett formed by the window sills. This kept the canvas vertical while the rest came down over the top of the hood and was wrapped around and tacked underneath the lid. All edges were also pulled down so none were visibly exposed.

The canvas was thoroughly saturated by two coats of Cabot's semi-transparent oil-based decking stain and followed by two more coats of semi-solid stain.

Then the wood on the hoods was painted Fine Paints of Europe's "Nut Brown" deck enamel.

The decks – The exposed parts of the decks were not original and had largely been replaced by rough oak planks (probably) installed by Seashore, and the unexposed parts under the hoods and the cab floor showed no sign of treatment we had no clues as to what, if any, was there originally.[12] The likely traditional treatment, and the one we decided would be most appropriate, was boiled linseed oil. We had thought it would take thinning for it to penetrate the oak decking but, it seemed to penetrate sufficiently in full strength. It took less than a gallon for two coats.[13] We will not put any on the cab or hood floors except the patched areas where 'new' material was used.

Cab interior – <u>Remains of an old fire</u> - Because there is much to be learned of a car's history we had decided to leave the no. 2 end 'left-hand' corner's paint unfinished. However, we subsequently decided the untouched area was too large, so **Phil** scraped down and painted more, reducing the area considerably but still large enough to give show what was there over time. In doing this he found a

[9] The no. 1 hood contains the traction motor resistors and the headlight resistor. The no. 2 hood contains only the GE CP30 air compressor.

[10] In the famous 1907 photo, the hoods were definitely covered with metal but this was quickly replaced by the present configuration. Several people commented on how nice they looked then and would have liked to have us return to it. But, if we did that, we would also have had to make a number of other changes that would have been nearly impossible.

[11] The lids were not raised in the 1906 configuration. We still have questions about what was in both of them.

[12] The only 'treatment' was the floor under the no. 2 hood where the air compressor's oil leakage had saturated the boards leaving some in like-new condition.

[13] The bottom side of these planks had already been treated with Cabot's #1000 Teflon sealer. We felt it would be unsafe to use on the top because it made the surface slippery.

large area that had been scorched—behind the seat and up that paneling, tying into a scorched area along the window post and up to the panel over the windows.[14]

This even more confirms the theory of the line switch mounted upside down in the original wood cabinet. There must have been real blast from an arc which shot out from the opening near the bottom side of the cabinet, spreading up the wainscot and possibly reaching the unwary motorman.

Remaining castings – The Brass Foundry does excellent work but delivery is always a problem. Currently for 100 we are waiting for 5 sash lift bottom castings, 2 top lifts and two Laconia builders castings. The latter are for presentation to donors. After the castings come, new leather sash lifts can be made. Cost for the castings is $405.

Castings we're still waiting for (including some for 1160

The stove – The little pot-bellied stove is now securely fastened down in the cab. **Phil Morse** cleaned it up and installed the special bolts which keep it from tipping over. Under it and behind it is a galvanized steel sheet spaced away from the wall and floor to allow air to circulate. Although we don't intend to use it (for fire safety reasons), it does look real. Haley's Metal Shop fabricated a stove pipe and 'chinamens' hat stove pipe which appears to go through the roof but actually doesn't.

[14] This scorching has been noted in previous reports however we did not connect it with something major from below. It was very likely this incident that lead to the 'modernization' of the car's controllers from K-28F to K-35-G2.

The stove before installing the smoke pipe

Controllers – The two controllers were completely re-assembled and installed. As much as possible the fingers and segments were replaced using the variety of styles, old and new, as they were before overhauling. The obsolete locking tips were purchased from Eureka at a cost of $17.50 ea. While the common lap-type tips would have cost only about $3.00 each, we felt it important to preserve this bit of authenticity. All were installed and the controllers adjusted.

On the debut trip with cab full of 'luminaries' we were surprised when controller No. 1 jammed in the first point and would go no further. When it was opened we discovered the finger tip for the R1 finger (2nd down from the top) had caught and bent inward about 90°. A quick change by operator **Avy** to the other controller got 100 safely out and back.

The finger in question was of the older style with a 'Russell' reversible tip.[15] The 'arm' of the finger is somewhat flexible, so when the finger tip caught, it bent inward. After the run we made a swap of the more modern compensating type which is much more rigid.

On 1 October, while shifting the car out, we noticed the same thing, the controller would not go past the first point. This time we opened the arc chute and the controller turned freely. The problem seems to be that the finger tip is catching on the arc chute. By opening it about ¼ in., the controller works but this may tend to defeat the purpose of the arc chute and allow a stray arc to go where it shouldn't. We will have to get inside with a feeler gauge and flashlight to see just how and where it is catching and sand down the separating plate.

Connexions – To ensure that proper wiring connexions have been made, each wire is 'rung' out, using a bell set continuity tester. This was done to the resistors as well as the traction motors. When we actually tried the car we still found that two motors were trying to go backward, *i.e.* would turn opposite from the direction the reverse handle is pushed. Correcting this is easily done by reversing the "F" and "FF" connections of the 'offending' motors.

[15] The Russell tip is actually double-sided. By squeezing the holding part of the end of the finger, the tip may be turned over and used until it wears out. These were made by Russell in Niagara Falls, NY and we purchased a number about 30 years ago but the company has since gone out of business and, to our knowledge nobody else can or will make them.

The connectors are the set-screw type as originally used. However, because of the extreme corrosion we found on the originals we replaced the steel screws with stainless. (10-24 x ⅜ in. round-head machine) The original connexions were insulated in various ways but most commonly with cambric tape covered with layers of friction tape. For ease of access in case of problems, we chose to use standard insulated 'loom' tubing, secured on each end with vinyl tape.[16]

Installing the motor lead connectors. (Isn't there an easier way!?)

Because 100's motors are 'inside hung'[17], the motor lead wires come out toward the center of the truck, next to the bolster. This is an advantage as the wires don't travel very far as the truck swivels.
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Hand Brakes – These are operated by a wheel on a vertical shaft about 1 ft. to the left of each controller. The shaft has a 'ratchet wheel' on the floor with a neighboring 'pawl' to hold it in whatever position is desired. It also extends through the floor down to a pivot point bracket. Each operating wheel applies the brakes to one truck and, as we found out, in an emergency, both can be used simultaneously. Like those on other cars and in an automobile, they are only marginally effective but will bring 100 to a stop. (**Dean** is to be thanked for making the necessary under-body adjustments.)

Operation – In the spirit of caution the first attempt at putting traction power to 100 was via a welder but, for whatever reason, this was insufficient to move the car, so it was then necessary to use the trolley power. The motors were tested in pairs. (1 &3; 2 & 4) This is done by cutting out one pair of motors via the motor cut-out switches in each controller. On the first try, one pair went 'backward' and was quickly changed. Then it was tested on all four—it worked!

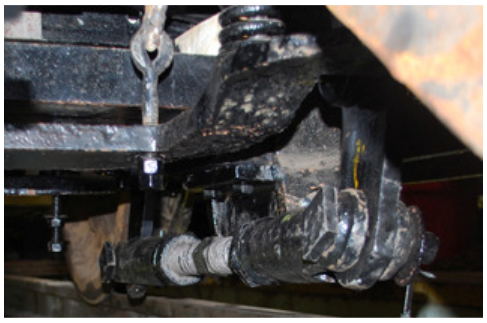
Looping the Loop – On 1 September the car was ready to leave the Shop for a test operation around the Visitors Center Loop. This operation was especially critical because that loop has the tightest radius of any of the Museum's tracks. The car was carefully brought to about 1/3 of the way around the loop, the maximum curvature and an inspection was made of all possible points of interference. It turned out there were several. Because during the reconstruction, everything was replaced as it was originally, we believe that in its operations, even in the factory trackage in Sanford, the clearances were not as tight and the guard rails shallower than those at Seashore.

[16] We had recently heard of a problem Pennsylvania Trolley Museum had with motor connection insulation where they used rubber heater hose. It turned out this conducted electricity!

[17] Outside hung motors are used primarily on city cars where the radius of the curves in the track is smaller. The wheel base is shorter. Inside hung can be used on railroads and most interurban cars where the curves are less severe. They also give a smoother ride. "Inside" means the motors are between the axles and the bolster, whereas the 'outside' hung have the motors outside the axles, away from the bolster.

Interferences found and corrected (some requiring a second treatment to get full clearance):

- Air piping – no. 2 end left where the pipe goes to the main reservoir. No. 1 end down below the brake valve. (under the floor)[18] With considerable difficulty the pipes were was re-routed giving more clearance.
- Train line over no. 4 motor – rubbing on top of motor case. Pipe was raised where it goes through the bolster by a block of wood held in place by bolts.
- Radius bar on each truck tended to pull up out of the angles on each end which were supposed to keep it in place. Also they could not move through their full travel because of interfering bolts whose purpose was not evident in the disassembly. The bolts were relocated and the radius bar greased which meant the pull from the brake lever was straight. The radius bars and associated levers and bars now remain in the proper place.
- The radius beam roller plates touched the above air piping so were cut off on an angle. This does not interfere with their proper functioning.
- A cab sill bolt projected down to the point of interfering with the radius bar. It was (and several others were) cut off.
- The sander hoses[19] jammed between the wheel and the inner cross beam of the pilots. The beams had to have a long notch cut out using a Tiger saw.



Low hanging slack adjuster and that's just the running rail

Cut-away area under pilot brace to clear the sander

- Slack adjusters (two per truck between each set of wheels) Rubbed on top of the guard rails. **Dean Look** was able to adjust the supportive linkage as well as cut off the ends of several of the brake levers to reduce the interference to the point that they barely touch the rail, simply sliding along the top.[20]

[18] This is the 'knot' of pipe which we copied from the installation that came with the locomotive. YUCo must have re-located the feed valve inside the cab where it could be near the stove. This created the 'knot'.
[19] These are actually flexible coils of steel wire about 2 ½ in. ID. Designed to direct the sand from the sand boxes and sanders on to the rails in front of the no. 1 and no. 4 sets of wheels. They appear to have been only marginally effective at best. Note that it appears these sanders were installed between 1935 and 1940.
[20] The guard rails in the VC Loop are approximately 1 ¾ in. higher than and 1 ¾ inside the running rail.

Dean checking for interferences

Other observations:

- The air compressor is very noisy. In Dean's words, it's "thrashing about". We do know that it was completely disassembled by A. C. Electric and that it's o.k. electrically but, partially because this work was started before the writer's involvement and because the technician at A.C. died while in the middle of the work, we are not sure how much mechanical work was done. Dean would like to check on the crank shaft bearings which have shims and can be taken up without disassembling or removing the compressor from the car.[21] We also need to monitor its oil usage. To this point there is no oil shown when the air reservoirs are drained.
- Train line valves (at the ends of the car) leak.
- Overheated journal bearing (Upon return Randy removed it and scraped the 'galled' bearing surface.

The first trip to Talbott Park. (3 Sept. 2009) **Chuck Griffith** brought along his Garmin with which he recorded the speeds:

- Full Series (5th notch) top speed 12 mph.
- Full Parallel (8th notch) top speed 24.9 mph.[22]

One of the purposes of the run was to see if there were any tight bearings. **Randy** felt each bearing and discovered one journal bearing (no. 2 R) had become uncomfortably warm. The next day he removed that bearing and found the surface had galled. Using a babbitt scraper, he removed the high spots which had caused uneven contact as well as heating also due to inadequate lubrication. Another trip was made shortly thereafter. This time, using the infra-red temperature sensor on each bearing, he

[21] Since the project was done we found that A. C's Auburn Shop does not have the means of testing a compressor on full voltage and pressure.
[22] But with the windows opened it seemed like a lot more!

determined that the 'hot' bearing, which he had scraped was about 104° F. or just warm to the touch- Much improvement. The temperature range of the all other bearings was 88-100° F. - satisfactory.[23]

Randy taking temperature of the journal bearing that had overheated on a previous trip

Air Brakes – The first tests of the brakes while the car was still in the 'box' were done by **Linc Reed-Nickerson**, a visiting member of Orange Empire Railway Museum and air brake expert and consultant to Seashore, **Dave Garcia.**

The first job was to pump up the car from the Shop air supply. At first this was done using a standard quarter-inch hose through a quick-connector at the bottom of the large main reservoir. This proved to be more frustrating than it was worth because the small diameter of the hose didn't allow enough air into the system to keep up with the leaks. Still on 6 July there was enough air pressure to blow 100's 'trombone' whistle. For those present, it was a triumphant bet very ear-splitting moment as the sound bounced around inside the confines of the box. (In fact, even out in the open it's still deafening because it's right up next to the operator. It's mounted on the front of the cab above the centre window.

To get more air flow, the feed was converted to a ¾ in. hose and larger quick connectors. Then the pressure began to creep up. Over the period of several days Linc, with the help of **Dick Avy** and **Jim Mackell** and some large pipe wrenches began the tedious process of tracking down the leaks and correcting them. In some cases they were so large that it was not necessary even to use the soap bubble test. We were concerned about applying the brakes while the car was in the box because they were not completely connected. If they were applied too suddenly there would be nothing to absorb the force and the piston would slam against the end of the brake cylinder.[24]

They got the leakage down to a manageable amount so test applications could be made to the brakes. (with the cylinder cut out) There was some action but not regular. Linc's farewell 'present' to us was, on the day he left he had discovered the smaller main reservoir and the only remaining (of 3) original,

[23] There has been some comment that this is not an accurate measure of temperature. While that may be true, it is accurate enough for the purpose of testing for an overheated bearing.

[24] With 303, the car was sifted under power at one time with only one truck connected to the brake system. The unbalance force broke the end off the brake cylinder. (**Fred Perry** quickly brazed it back together and it has operated flawlessly since.) In another instance, while the Birney was on horses being rebuilt in the 1970's, air was applied to the brake cylinder which was not connected to anything. The piston slammed to the end of the cylinder, cracking the piston which, again had to be brazed together. It too worked satisfactorily thereafter.

had a small leak on the top and should be replaced.[25] A new one was found, the same diameter but about a foot shorter than the original. The length difference was not a concern because the replacement for the main reservoir on the other side of the car was about a foot longer than the original. Additionally, we do not intend to haul any trains with 100 so there is plenty of capacity for Seashore's operations.

After the car was towed over to the pit **Dean** hooked up the various linkages on the brakes so a proper test could be made. Also at that time he also installed the gear cases and motor axle bearing caps which could not be put in while the car was on the concrete floor. Then the brakes were tested again and they began to work after more air leaks were found and corrected. (This process of correcting leaks went on for a couple of weeks.)

Mysteriously the air brakes performed differently, one end from the other. On the no. 1 end they were erratic and it took a long time to discoverer why. During all of the tests more leaks showed up including in the two cut-out valves under each engineers valve. **Chuck** and **Dick** determined that at least one of the cut-out valves under the engineer's valves was leaking around the stem. They lapped it in taking care of that leak. But after it was installed the brakes still performed erratically. Finally we decided to see if the valve handles actually related to the proper position of the valve: *i.e.*, in railroad practice, when the handle is crosswise to the pipe the valve is on. To determine this we removed the valve in question and actually looked down through it and observed its handle was 90^{o} off. Then we discovered another little trick of WABCO. On the handle end of the valve stem is a scribed line corresponding to the position of the valve. For whatever reason, the handle on this valve had been put on incorrectly. So, after modifying this and riveting the handle in its proper place, the brakes now worked the same with both valves.

The duplex air gauges with which the car is equipped, give you no indication of air pressure in the brake cylinder. The best way to tell if the brakes are applying is to listen to the sound they make as the levers move.. (Although you can see the black hand--train line pressure—drop, there is none that shows actual brake cylinder pressure as in a normal trolley.)

Headlight – The light at the end of the tunnel - 100 now is the only car in the Museum's collection that sports an operating portable *Golden Glow* headlight. This is the one which was found in the car when we started work but we don't believe it's the original. **Jack Naugler** calculated that the resistor under the no. 1 hood was sufficient for a (now very rare) 150 Watt headlight bulb. It was a bit difficult to tell, the resistor looks as if it was set up to be divided and sufficient to run two headlights simultaneously. This would have been logical because of frequent changes of direction in a switching operation. We chose to use a still available 56 watt headlight bulb so had to add to the resistance using two more 56 watt bulbs in series with the resistor. These are also mounted under the hood next to the resistor. The light actually looks quite nice.

Phil disassembled and completely removed the corroded black paint and repainted it. He then reassembled it with a new lead. The original was too stiff and had broken inside the brass plug. There are still two on-off headlight switches in the cab. (Reworked by **Dick Avy**) When not in use there is a bracket also under the hood.

[25] We are questioning out method of testing reservoirs. This one had been pressurized at 200 psi and no leaks were found. Apparently in moving it around it was disturbed enough to break loose whatever was keeping the tank sealed.

Thanks go to those many volunteers who made the project come to a successful conclusion, in time to make the debut date and reasonably close to budget. We especially want to thank Project Manager **Phil Morse** for the countless hours he has put in by sheparding the project through the bureaucratic maze, organizing the 'grand opening' ceremony and especially for his willingness to put in so much genuine 'sweat equity'.

Railway Museum Quarterly – When RMQ's Editor and good friend **Aaron Isaacs** offered to reprint these curatorial reports he said at ARM's Annual Meeting at the Western Railway Museum on 20 September, he 'had no idea of how prolific Don Curry's writing would be' when he made that offer. After the meeting he wrote the following:

> At the ARM membership meeting, I asked if the assembled members would prefer to continue the serialized ASL 100 curatorial reports in RMQ. I have published nine reports to date and have been concerned that readers might think it too much of a good thing, especially since #100 is now complete, but I still have 2 years of reports to run.
>
> The alternative is to close out the series and let readers access the remaining reports on the web. By a modest majority, that was the members' preference. We'll put a link from the ARM website to Seashore's #100 page.
>
> Rather than announcing the end abruptly, I'd like to reprint Phil Morse's excellent project summary from the July-August Dispatch, along with a good photo of the completed #100.
>
> Could you please send me the text and a couple of appropriate photos?
>
> By the way, I'd be happy to run photos of recently completed cars 639 and 1160, if they are available.
>
> Thanks as always,
> Aaron

So the reports have been written and submitted. We have greatly appreciated the notoriety that Seashore has gained and the interest shown by other museums in the project. We might add that the vote was not overwhelming but nearly balanced but slightly in favor of Aarons alternative. There are other similar projects underway at other museums but covering different aspects of restoration so they need to be given the chance.

Donald G. Curry, 183