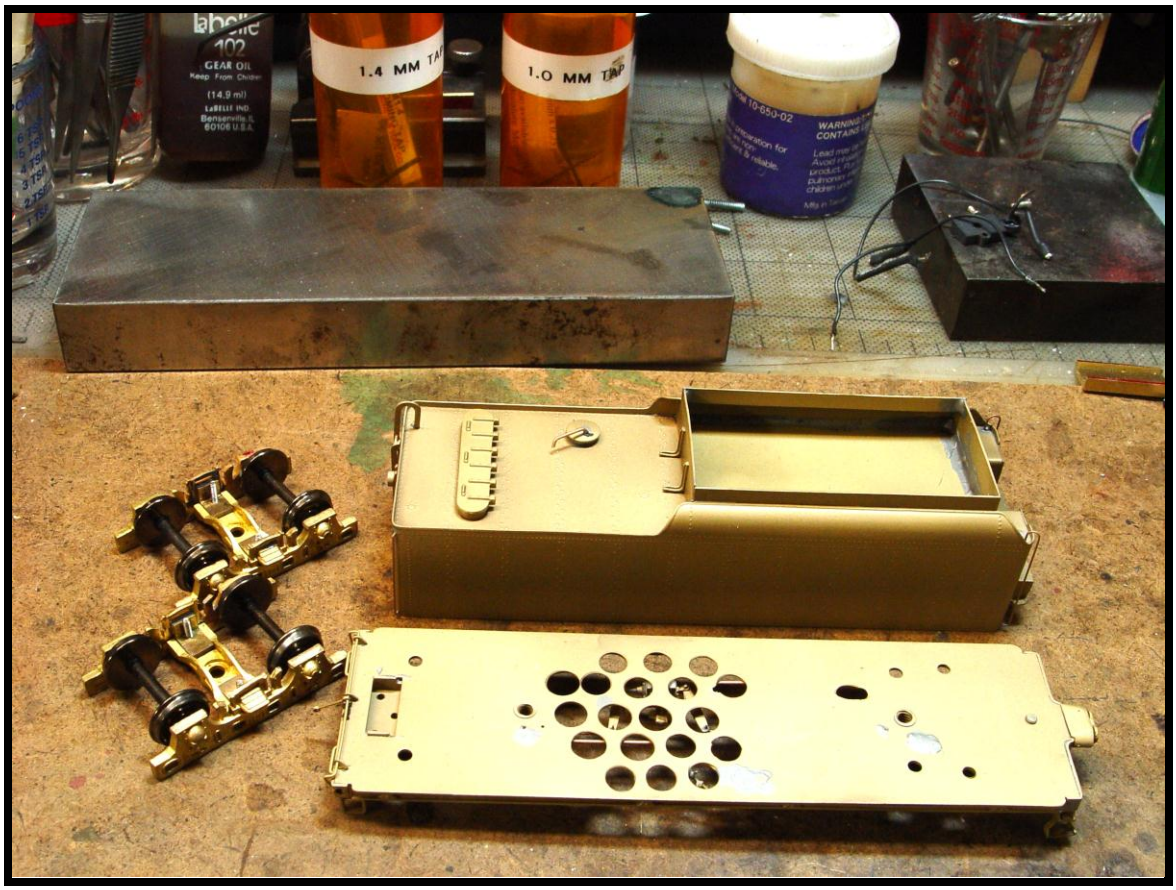
Modeling the O&W
A tune-up for the NPP Class Y-2 4-8-2 – Part III
No. 47 in a Series
By Mal Houck

A significant portion of the modifications done to this locomotive is devoted to the tender and with this effort now risen to considerably more than a "tune – up". In this age of DCC control and sound decoders the aftermarket alterations to a brass steam engine tender that are needed can be quite involved. In the instance of this NPP NYO&W Class Y-2 4-8-2 the work was indeed more than just simple changes; -- but the outline of the work I performed is easily transferrable to most any brass locomotive tender. I shall illuminate the process largely by means of photo images.



This image displays the major tender components after modifications. The near prototype coal bunker has been removed in its entirety to provide more space within for DCC - sound decoder and speaker installation. A 0.015 brass plate was cut to fill the opening left by removal of the coal bunker. It is well soldered in place. . . with all seams generously beaded with solder. What is left is sufficient for a representative coal load and my usual method is to load and dry shape the scenic material of preference as a tender coal and then flood it generously with diluted matte medium. Since the coal load is virtually the last

step after painting, lettering and weathering this compartment must be "water tight" to prevent leakage of the matte medium, and thus avoiding the general mess that creates!

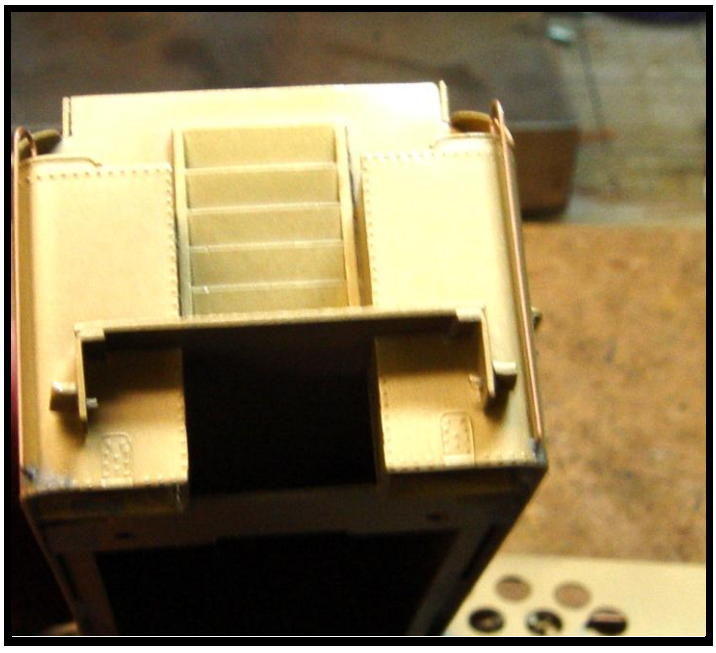
The tender deck has the additional detail left off by NPP's builder; -- the top lid and relief vent of the Elesco Oil Separator. The Y-2 "Big 400" 4-8-2's of the O&W were all fitted with Franklin trailer truck Booster engines. With the booster cut in and working tractive effort was increased from 60,620 pounds to 71,850 pounds: -- all a very worthwhile feature over the grades of the O&W. Indeed, by the 1929 date of the delivery of the Y-2 engines to the O&W modern steam locomotive design had matured to the point where trailer truck boosters had virtualy become de riguer for the mainline contemporaries of these engines. Steel passenger cars and larger capacity - heavier freight car loads justified the additional cost and maintenance of booster engines. Furthermore, and whereas the railroad operating paradigms were shifting from an emphasis upon increased average train tonnage to increased average train speed, booster engines provide additional tractive effort when needed to keep speed, but without adversely affecting overall operating economy.

In operation the (cylinder chest) exhaust steam employed to power booster engines was exhausted from the booster through piping in the tender where it could be condensed to supplement the supply in the tender cistern. However, having twice passed through reciprocating engines well lubricated with valve oil, that valve oil had to be separated from the condensate. In a relatively simple and typical separator that was accomplished, but yet this twice exhausted steam still had some pressure above atmospheric. A vent on the lid of the separator simply spewed this steam out onto the tender deck . . . further dispersing it. Cold weather photos of Y-2's lugging tonnage freights on the heavy grades to Forest City, or out of Summitville southbound to High View Tunnel, even out along the East Branch of the Delaware making up time, exhibit the wonderful image of steam locomotives working hard as they were intended, with steam boiling up, out and over the tender decks!

This image also shows and over all view of the tender frame, well drilled for a forthcoming installation of a DCC sound decoder and High Bass speaker. I find brass locomotive tender trucks very often to be next to pitiful; -- with very nicely cast side frames but then joined with no more than light dimensioned brass strips formed as truck bolsters. I am willing to sacrifice other trucks with cast truck bolsters to fit to my locomotive tender trucks, as shown in the image above. I machine some angle stock and then cut pieces to fit the bolster to be used. Those small angle bits are soldered to each side frame. I then match drill and tap for 1.4 mm screws; -- all then create a very useful tender truck which will not bend and deflect even with careful handling…….as do the originals!

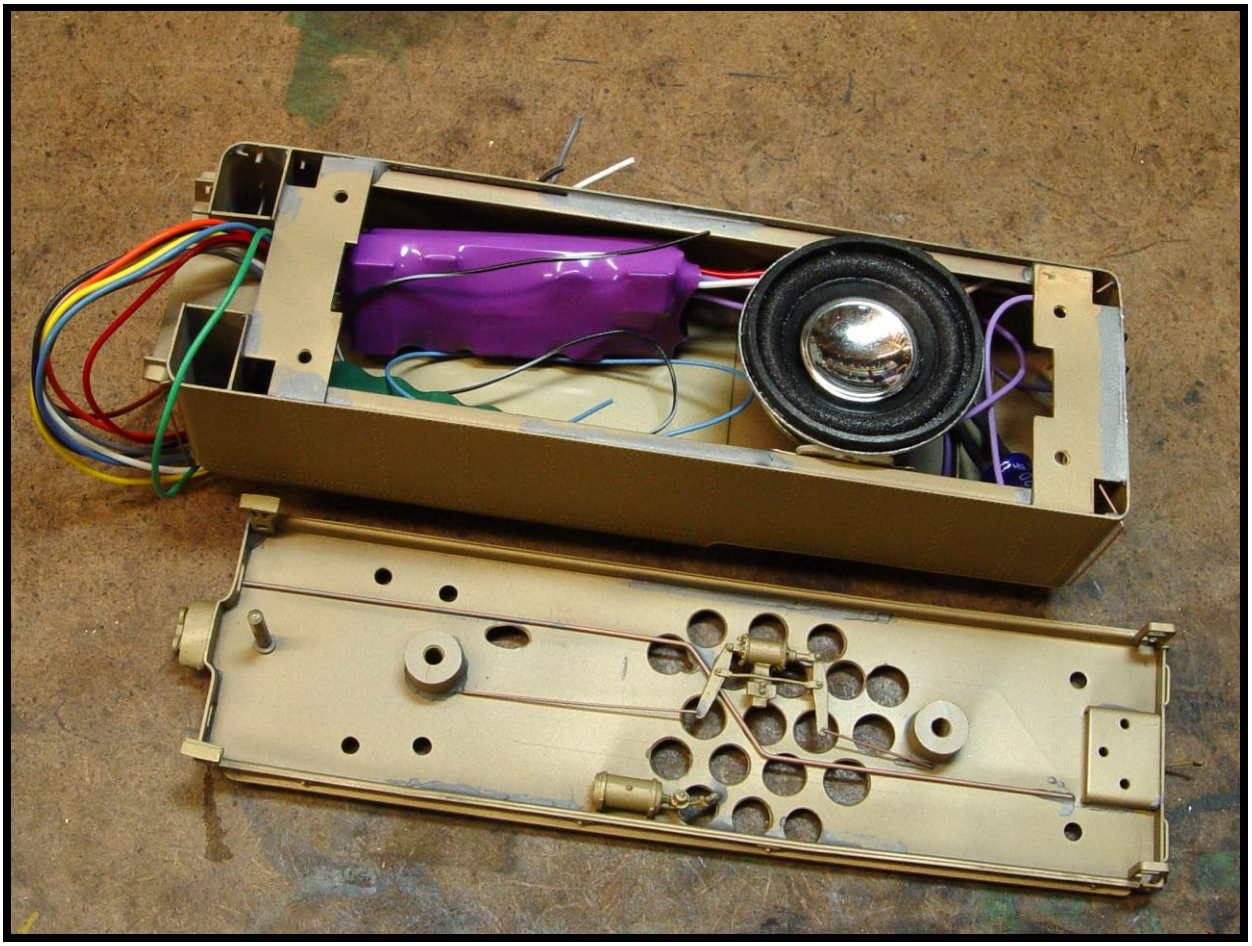
The image following shows the tender shell that has been "gutted" to allow access to the interior. A comparison with the image in the earlier Part I blog clearly shows the difference; -- before and after. I simply removed the oversized bottom plates and cut away the unnecessary excess material. I re-soldered the end pieces; -- the rear portion left with its stock mounting holes and with the front remnant drilled and tapped for 2 mm screws in a position further forward and out of the way of the front tender truck.

Very evident in this image is the vastly increased internal volume of the tender superstructure that removal of the coal bunker affords. Never quite trusting completely the "oven soldered" joins of brass imports I have beaded some solder on the joint between the superstructure sides and the stiffener angle pieces at the bottom. Even with a careful technique in removing the former bottom plates one of the angles had broken its solder joint to one side. This minimal repair cured that defect and for good measure minimized the likelihood of a joint separation on the opposite side.



Removal of the plate between the water legs (and the photo etched faux stoker inlet) allows an easy route for the DCC decoder wires from tender to engine. A benefit here is that all wires are at centerline, thus avoiding any stress on wires or forces which

might tend to annoying derailments or otherwise troublesome operational features (all learned by experience(!)).



A final view here shows the "rough-in-place" of the various DCC components, and clearly illuminating the need for space for which, amongst other considerations, has driven the fairly extensive modifications to this NPP tender.

For a variety of reasons my longstanding preference with respect to the operations of and modifications to brass locomotive tenders is to render them "Ice Cold." Very early steam engine models had tender pick up wired to the insulated motor brush aboard the engine via a single and very visible, and often unsightly, heavy gauge cloth insulated wire. Early pioneer locomotive scratchbuilders avoided shorts from tender to engine frame or superstructure, on the necessarily much sharper than prototype model railroad curves, by making tender frames and platforms from wood stock and then wiring the tender trucks to that single lead to the insulated motor brush. A number of articles by longtime and prolific RMC contributor Bill Schopp described how he used this wooden floor method to isolate a metal tender shell from his engine. Maybe the most well-known locomotive scratchbuilder of all, Mel Thornburgh, also used this wooden tender floor method with regularity. Longtime John Allen collaborator Jim Findley produced an article published in the March 1980 RMC which described, based upon his experience with Allen's use of wood tender

floors in cast zamac tenders of the era to insulate steam engine tender shells, an updated method using simple bus strips between tender trucks in brass tenders.

As annoying as shorts between engine and tender might be in analog DC operation, those shorts are or can be the more so with the constant AC track voltage [higher than average analog variable DC voltages] in DCC operation. A short involving the electronic components of a DCC install can damage or completely destroy either a speaker or decoder, or both! So, a few extra remarks about the extent of modifications are:

- Notice the extra screw holes at the front of the frame, as mentioned before. The original spacing of the holes (those in line with the truck mounting lug; -- not here willing to call it a "bolster(!)") defied any tender disassembly without removing at least the front truck.
- Those "lugs" for mounting trucks have first been soldered to the tender floor to supplement the attachment merely by a formed rivet end at the top above the floor plate. The floor is then set up a jig and, with several test and trial measurements while in process, these lugs are milled off to a uniform measurement from the floor (eliminating the uncertain and out – of - level stance of the factory product).
- The mounting lugs are then drilled and tapped of 4-40 nylon screws. With 0.010" Teflon® washers between the truck bolsters and mounting lugs the truck are completely insulated from the tender. With the trucks pivoting on the 4-40 nylon screws the tender is then electrically inert.
- I further drill and tap the truck bolsters for 1 mm screws. A pickup wire from each truck is then screwed to the truck bolster (via small solder lugs) and the wires from each are then routed through the tender floor to the decoder above.
- While I still use the insulted bushing and washer through the loco frame for the drawbar I customarily make a new drawbar from a non-conductive material. I have used PC board material, but find it to be just brittle enough to snap on occasion when packing or unpacking a loco-tender for transport. I now use that incredibly flexible and strong material trimmed from discarded plastic credit cards or expired membership cards - all per a suggestion from Bill Schneider. I have yet to have any of those drawbars break, and now even fortify them with an additional lamination of thin ABS material.
- Lastly, I spin a 2mm or 2-56 die down the drawbar pin on the tender frame. Once all of the needed DCC wires are fed from tender to engine my experience suggests that it is worthwhile to keep both engine and tender coupled unless some disassembly for maintenance is needed. Once the drawbar is connected a 2mm (or 2-56) nylon nut is turned down the threaded tender drawbar pin to keep the drawbar from popping away and disconnecting.
- I am somewhat ambivalent about a choice for the holes in the tender floor; -- fewer large holes vs. more smaller holes. I've done sound installs with both, and only prefer, thus far, the larger sized holes for large tenders that will accept a large high bass speaker……..a choice, but only a choice.

More later……Mal Houck