

Report from Strasburg Observations

On Friday, November 14, 2008 I met with Rick Musser at the Strasburg Railroad Company to inspect work progressing on the firebox of Engine 39. I am pleased to report that much has occurred on the firebox since my visit three months ago on August 19.



From this photo we see that the roof sheet and upper side sheets have been cut away and removed from the Belpaire firebox. The roof sheet was removed because it is too thin for the “bolt pitch,” the number of and distance between staybolts supporting the sheet. The roof sheet will be replaced with thicker steel to make up for the bolt spacing, “pitch.” Additionally, this provides for easy inspection of the support rods and the composition of the side sheets. Note the numerous bare spots and numbers on the backhead.

In August a chalk line grid had been drawn upon the boiler in preparation for Ultrasonic Testing (UT). Since August, grids have been placed on all parts of the boiler and firebox and UT readings have been taken and recorded. It is from these readings that decisions are made on what to repair and replace.



In this photo of 39's side sheets, note the polished metal evenly spaced between each staybolt hole. It is here that the UT readings are taken. The number is the thickness reading found at that location.



UT readings and their numerical findings cover the rear flue sheet and inside the crown sheet.





Here we see photos of the many support rods, (backhead braces), that have been uncovered by the removal of the roof sheet. These rods will be Magnaflux tested for soundness. You may recall that one of these rods had been found broken during my August visit, that rod and any other rods that do not pass testing will be manufactured and replaced by Strasburg.



Inspection of the side sheets has uncovered quite a lot of steel impurities or laminations, (“dirty steel”).



Here, Rick points to evidence of lamination in the steel plate. The laminations must be removed and repaired by welding so the material is "sound" as per the National Board Inspection Code. If the laminations and/or pitting are too extensive, the side sheet will be replaced.



You may remember my discussion in August about the “dirty steel” being used in Pennsy locomotives of the time. Welding must be done only on material that shows no evidence of laminations. To check the steel for impurities before welding, the craftsman employs a Magnaflux machine. Seen above, the appliance sets up a tremendous magnetic field around and through the material being tested. A powder composition of iron filings is cast upon the edge of the material. Wherever there is banding, the filings collect and create a pattern that “illuminates” the lamination. Further testing is done to see how far the impurities extend into the sheet. If there is extensive deep penetration of impurities and it becomes impossible to find good steel to weld on and the old material is replaced.



The old upper side sheets and roof sheet, removed from the firebox, rests outside at the Strasburg Railroad Company Erecting Shop.



Before the roof and side sheets were removed, Masonite templates were made to assist in the formation of the new side sheet material and roof sheet.



Here we see the troublesome area of #39's roof sheet. (Also a problem area affecting the restoration of Pennsy K4 #1361.) As discussed in August, the pitch of the staybolts supporting the 3/8" thick roof sheet lowered the locomotive's acceptable operating pressure below the normal 208 lbs. To correct this issue, new 1/2" thick sheet steel will be used to replace 39's roof sheet - increasing the structural strength to support an acceptable operating pressure.



A final photo of interest. In the lower right hand corner of the firebox is a stamping placed there by Pennsylvania Railroad Craftsmen at the time the boiler was built. It reads: NEW BOILER JL SHOPS 6-27-29.

On Friday, November 28th we Trustees will travel to Strasburg as a group to view the work in progress. Rick Musser will be on vacation at that time but Linn Moedinger will meet with us, explain the work in progress and answer our questions. We will be in a working shop and proper clothing is necessary. Please wear comfortable work clothes and proper foot wear that day, work boots or work shoes, please no sneakers or dress shoes.

Submitted 17 November 2008
Don Fisher