

## 18) No Flexible Bolts In Backhead

The firebox of the 14's boiler has received \*most\* of an AAR flexible staybolt pattern. While upgrading a locomotive boiler to having a full AAR flexible bolt pattern is a railroad standard practice, and highly advisable, it must be done in full. In this case, the backhead received no flexible bolts. The result of this incomplete installation will result a high occurrence of broken bolts around the backhead due to allowance for additional movement along the ends of the sidesheets.

## 19) The First Three Rows Of The Crownsheet Bolt Holes

The first three rows of bolts had dramatically oversized holes (double bolt diameter, several of which are still visible. Those still visible are approximately 7/16" oversized. Approximately 18 bolts have been removed to allow for the weld build up of the holes. This was done so poorly that the original enlarged diameter is still visible at multiple locations as well as pockets of slag within the welds.

While it is unclear as to why, the water side surface of the sheet has been built up with weld. The thickness of the .375" sheet has increased to over .625". I conclude that this was done for the purpose of hiding sheet misalignment. The welding rod utilized for this welding is not appropriate for use on pressure vessels.





# NEXT Generation



## 20) Crown To Doorsheet Fit-up

The welded joint between the crown sheet and doorsheet was found to be far in excess of ASME/NBIC parameters. These standards were discussed above regarding the corners. In addition to the sheet misalignment, the accompanying photo depicts torch cut holes, and threads present in the welds joining the bolts to the crown sheet.



What was unable to be adequately captured in photos is the amount of misalignment. At the center of the crown sheet it is almost full sheet thickness. In order to achieve this fit up, only the leading edge of the doorsheet knuckle was bent upward. When the new sheet was made the knuckle was bent about 10 degrees beyond 90 to allow for fit up. Instead of just the leading edge, the



transition in alignments should have flowed back into the radius.

## **21) Material Test Reports (MTR's)**

No MTR's are present for any of the material which was installed into the boiler. The materials lacking MTR's consist of the firebox sheets, rigid bolts, crown bolts, rivets, tubes, caps, sleeves, and stud material.

