

LOCK-N-STITCH Inc. Casting Repair Specialists

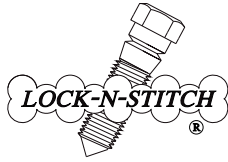
1015 S Soderquist Rd Turlock CA 95380
800-736-8261 209-632-2345 Fax 209-632-1740 www.locknstitch.com

October 30, 2011

Repair Final report



DIESEL GENERATOR # 4
CYLINDER UNIT # 3

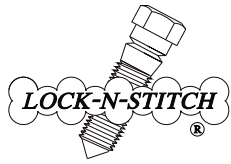


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Scope of work for metal stitching and machine work for GMT- Sulzer 8 ZAL 40 S

1. Receive parts from customer
2. Furnace braze broken pieces together to make a template
3. Deliver template to the foundry to make the pattern for the new casting to be poured
4. Pack all tools, machines and supplies to ship to job site.
5. Travel to job site
6. Unpack and inventory tools
7. Stitch crack in lower bore
8. Fit patch in scavenging trunk
9. Stitch patch in broken out section in scavenging trunk
10. Stitch crack in floor of cambox
11. Fit and stitch new section to create new floor for cambox
12. Mill and trim both sides of large hole on sidewall of block
13. Mill face of the cambox floor parallel to new section on backside of new casting
14. In process inspection
15. Fit new casting into large hole
16. Metal stitch both vertical joints of the large replacement section using our Castmaster stitching pins and L30, L40 and L50 locks as required.
17. Hand grind contour and blend the inside surfaces of the metal stitched joint.
18. Bore out lower bore for new sleeve
19. LNS manufacture new sleeve and ship to job site
20. Install lower bore sleeve and leak test
21. Manufacture FPS15 plug for oil hole and ship to job site
22. Mill external surfaces on new section
23. Drill and tap bolt holes as required
24. Inspect all repairs at completion to make sure no gaps are left between stitching pins.
25. Travel back to LNS

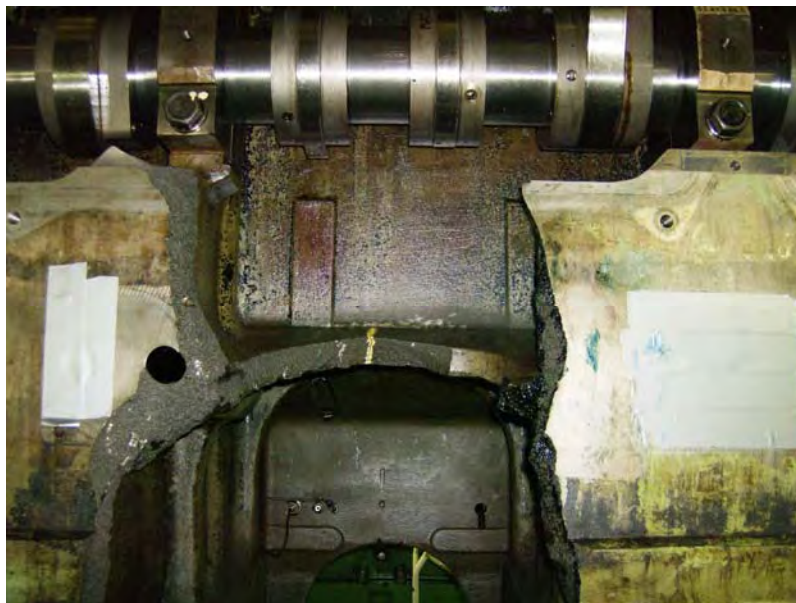


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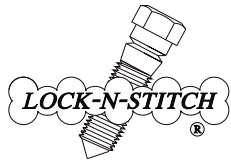
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Large hole on sidewall of engine block



Cambox damage



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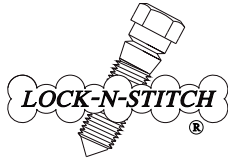
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Lower bore damage



Scavenging trunk damage



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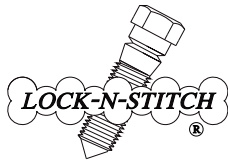
Broken pieces were shipped to LNS to make a template



The pieces were welded together and missing sections were replaced to create a pattern. The pattern was used to make a mold for the new casting.



A new casting was cast by a local foundry to create the new sidewall. This casting was made slightly larger to provide excess for fitting into the engine block.



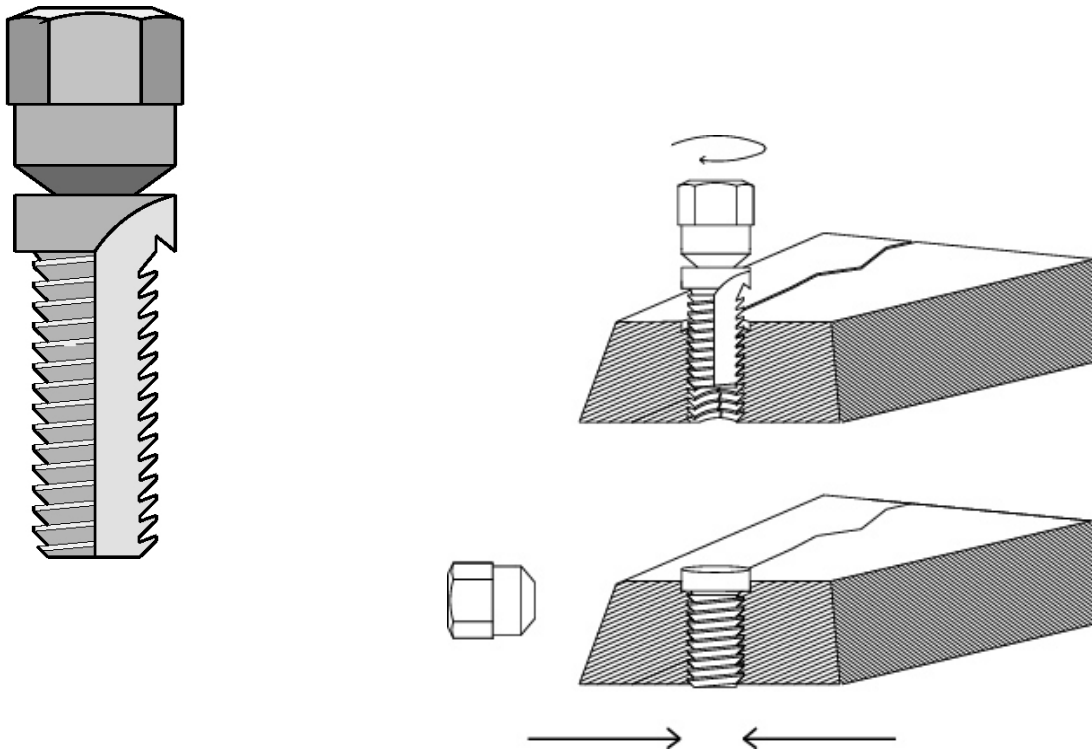
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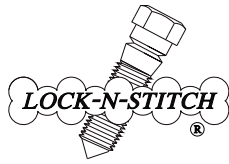
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While the new sidewall casting was being produced in California, the smaller repairs were being performed onboard the Statendam. The repairs were performed using our patented metal stitching process and products. Each individual repair was carefully trimmed and fitted with a new section of cast iron to match the original casting.

CASTMASTER® Stitching Pins

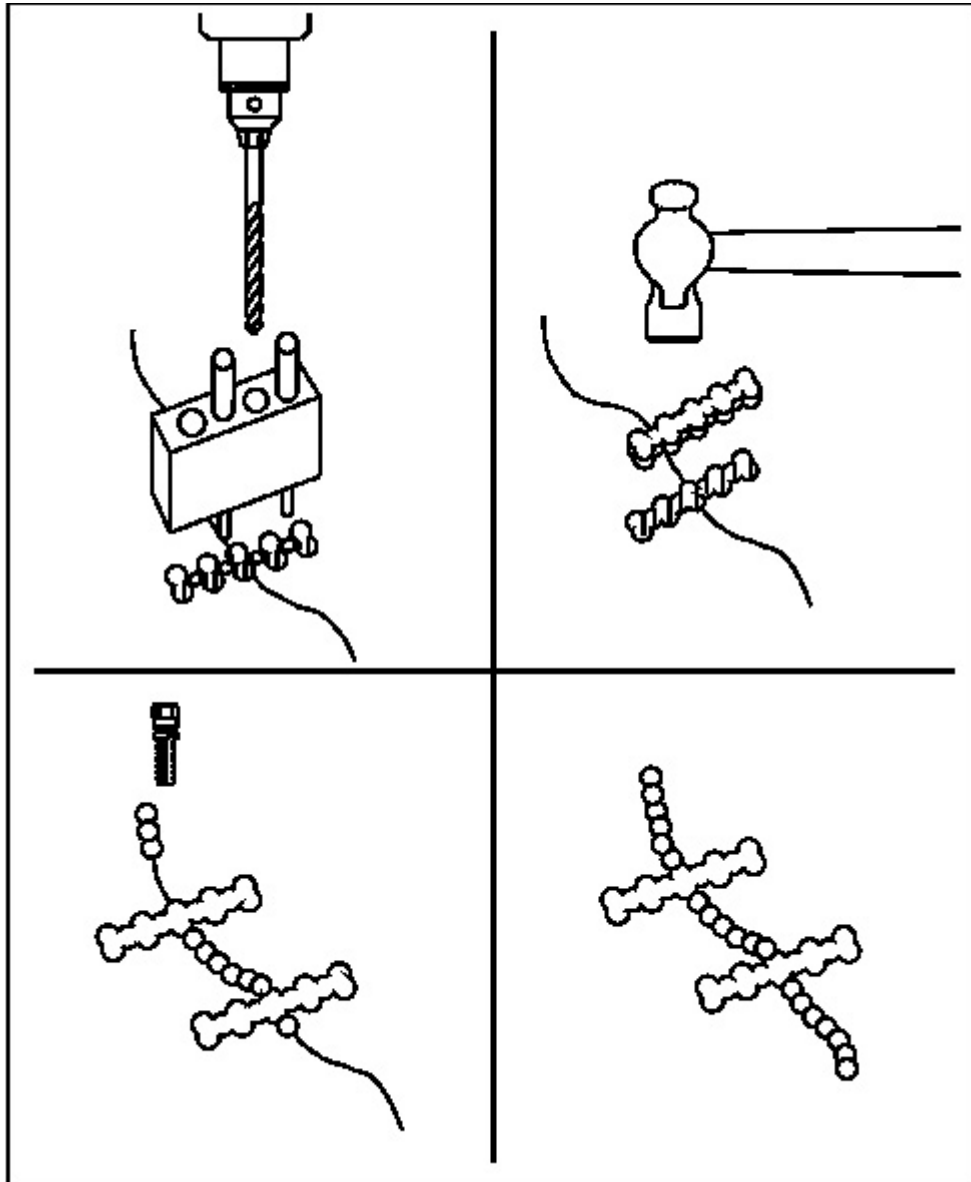
CASTMASTER stitching pins have the unique ability to draw the sides of a crack together when tightened into the drilled, Spotfaced and tapped hole.

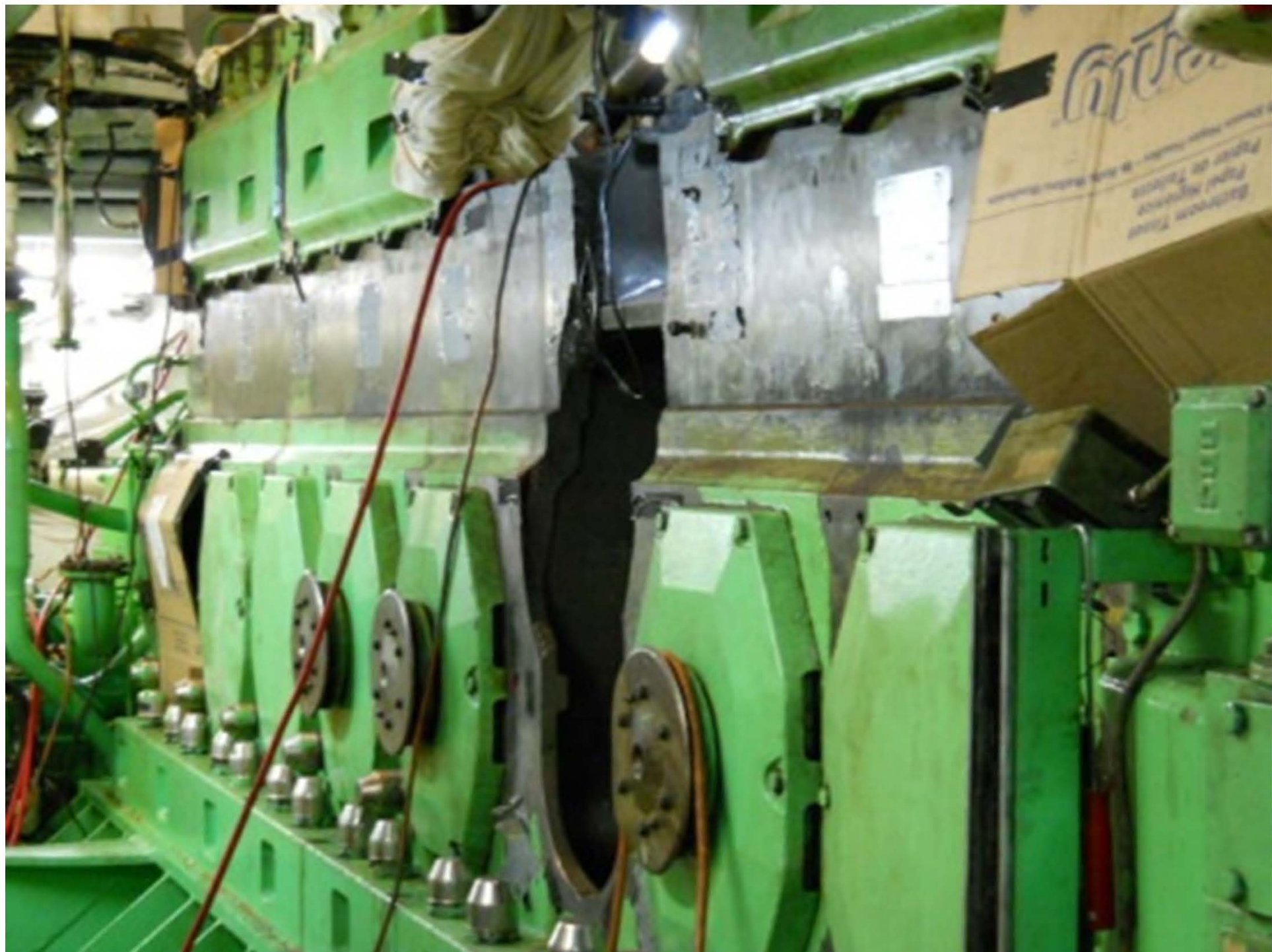




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1. Cracks around the lower liner bore



1. Repairing the lower liner bore damage required installing a patch



1. Castmaster pins were used to build up the bottom edge to support the sleeve



1. Machining the lower bore to accept a sleeve



1. The lower bore sleeve installed



2. Broken out internal gusset



2. Cutting out the replacement patch



2. The patch is in place



2. Drilled holes for the first row of pins



2. The stitching is finished



3. Cam Box floor missing



3. Stitching the new floor in place



3. Boring out the oil drain hole



4. The new floor patch is finished



4. Broken connecting rod blew out the side of this engine



4. Trimming the edges for the patch



4. Making the template



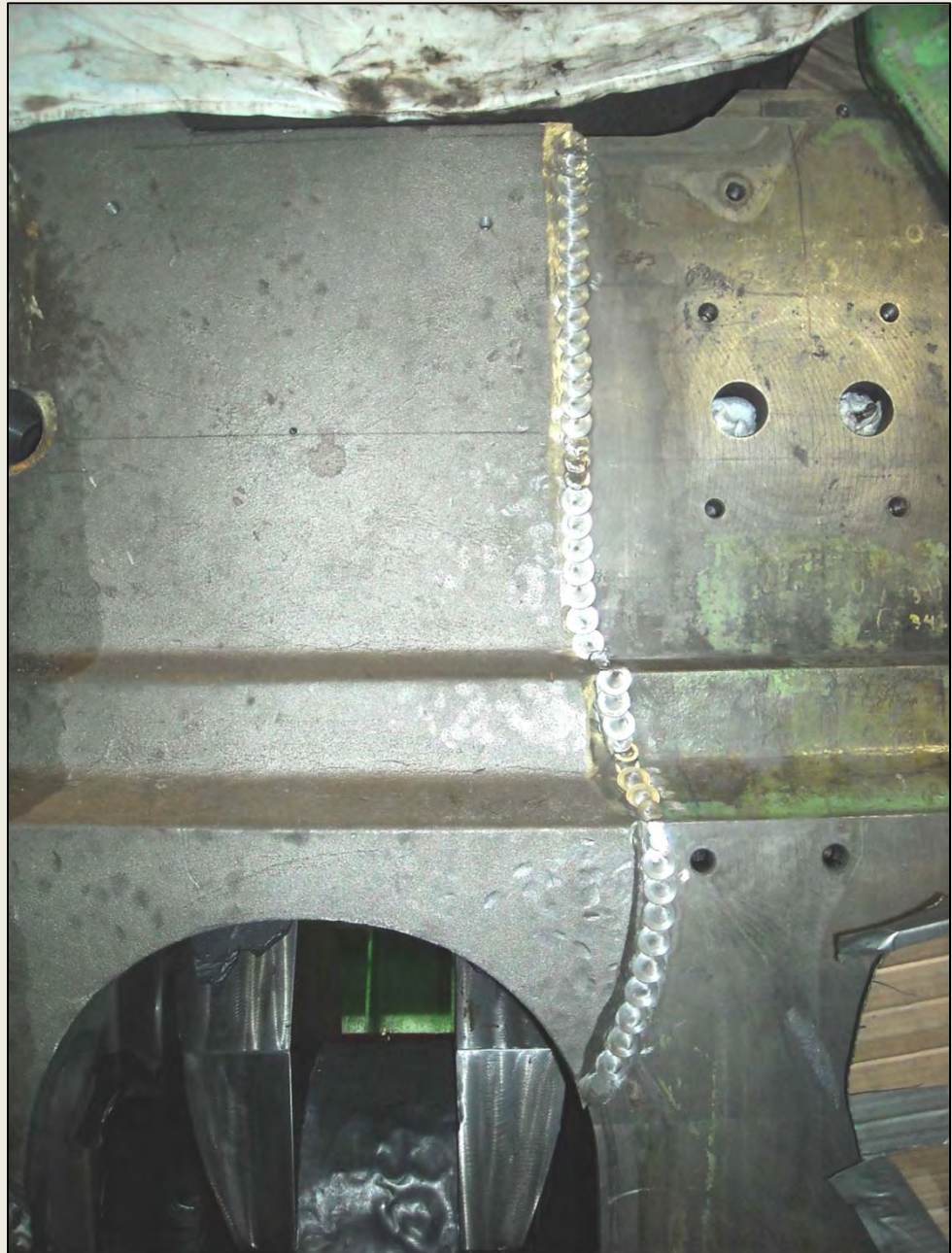
4. Fitting the new side-wall patch



4. Trimming the edges to fit the patch



4. Stitching
with 1 inch
diameter
stitching pins



4. Stitching
up the other
side



4. Setting up the portable milling machine



4. More milling



4. Installing L50 Locks



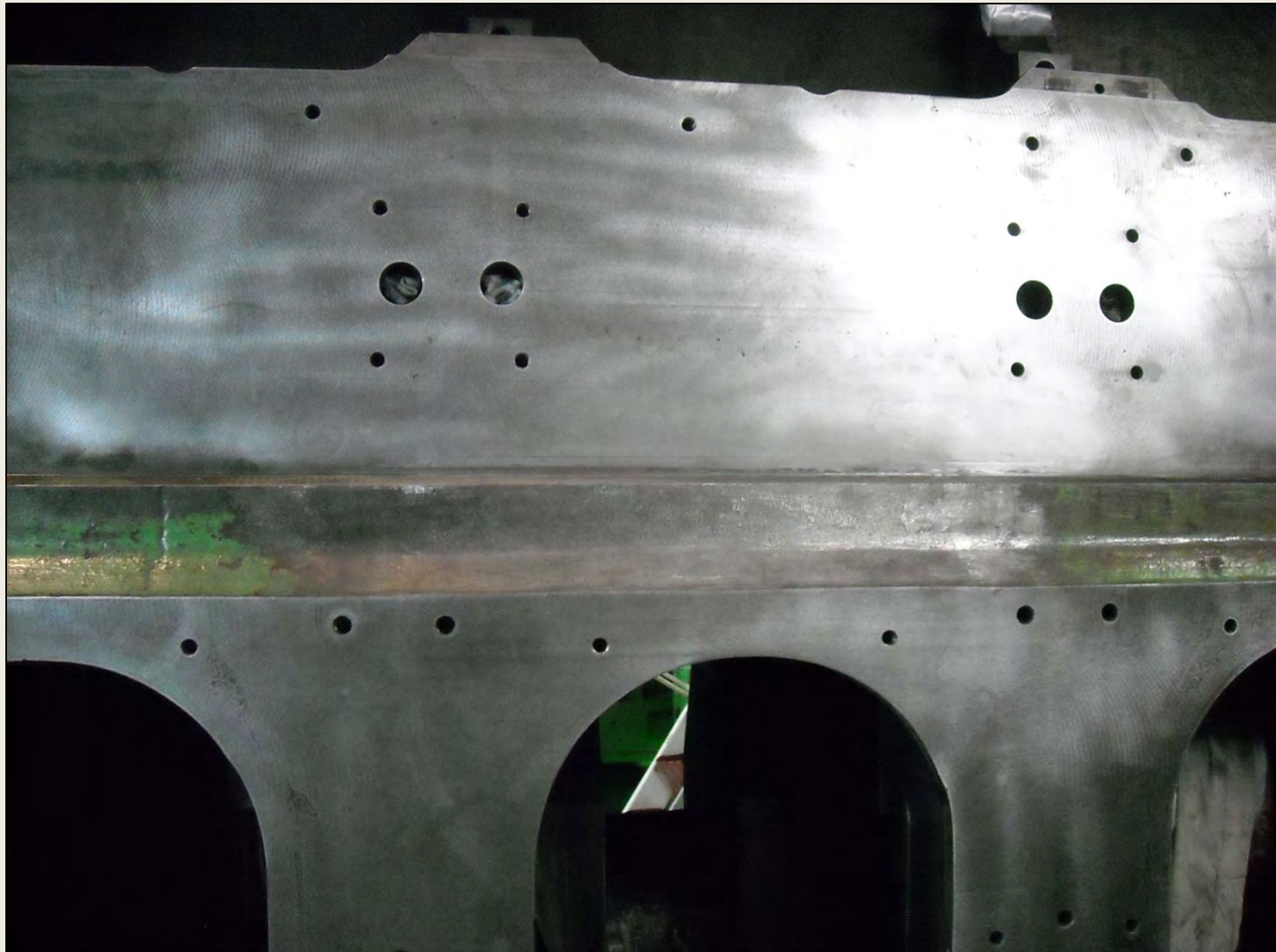
4. Installing more L50 Locks



4. Inspecting the upper part of the repair



4. Completed Sept. 2011



4. A very happy customer!

