

JKL TRADERN<sup>o</sup> 76141 in Register Book.Calculations for riveting of doubler patches fitted to bottom of main boiler shells.

Case see blue print attached.

W.P. 180 lbs/10" int'l diam  $14\frac{3}{8}$ " original shell 1"

$$\left. \begin{array}{l} \text{Req<sup>d</sup> Efficiency for shell.} \\ \text{neglecting corrosion allowance} \end{array} \right\} E = \frac{180 \times 2.83 \times 14\frac{3}{8}}{32 \times 28} = \underline{\underline{81.5\%}}$$

Doubler Patch.  $\frac{3}{4}$  plate.  $\frac{15}{16}$  rivet holes.  $2\frac{9}{32}$ " rivets  
 longitudinal pitch  $5\frac{1}{2}$ " circumf.  $2\frac{3}{4}$ "

$$\text{Longit. Plate Eff} = \frac{5\frac{1}{2} - \frac{15}{16}}{5\frac{1}{2}} = 83\%$$

$$\text{Rivet Eff} = \frac{.69 \times 23 \times 5 \times 1}{28 \times 5\frac{1}{2} \times \frac{3}{4}} = 69\%$$

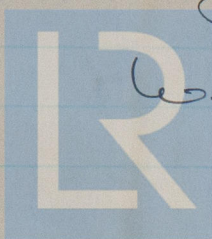
$$\text{Combined Eff} = \frac{5\frac{1}{2} - 2 \times \frac{15}{16}}{5\frac{1}{2}} + \frac{.69 \times 23 \times 1}{28 \times 5\frac{1}{2} \times \frac{3}{4}} = 79.8\% \text{ say } 80\%$$

$$\text{Circumfer. Plate Eff} = \frac{2\frac{3}{4} - \frac{15}{16}}{2\frac{3}{4}} = 66\% \text{ say } 67\%$$

$$\text{Rivet Eff} = \frac{.69 \times 2 \times 23}{2\frac{3}{4} \times 28 \times \frac{3}{4}} = 55.5\% \text{ on } \frac{3}{4} \text{ plate} \\ (41.5\% \text{ on } 1" \text{ plate})$$

As patches are in the nature of doublers & the shell plate would need to fail before patch rivets were sheared, 99% rivet eff. in longit. seam may be considered satisf.

In view of firm's (owners) experience of persistent leakage at three ply riveting, & their reluctance to have shell plates cropped, the fitting of patches with circumferential welded joints was adopted.



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Foundation

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