Stress analysis with ultrasonic in pipe welded by electric resistance

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This work aims to present the behavior of the acoustic effect during the production process in pipes API 5L X70 manufactured by the ERW process and used in the oil and gas transportation. The nondestructive residual stress measurement with portable methods is of great interest for industry segments. The ultrasonic birefringence technique is that present a larger potential [1-3]. This research consists of determining the acoustic birefringence during the stages of mechanical conformation from metallic plate to pipe, after hydrostatic test, and after the cut of the pipe with edge miller. The results show a difference in the acoustic behavior of the pipe during the conformation stages from plate to pipe (Figure 1). This difference was caused by internal stresses which are mainly created due to the heterogeneity of deformation, in which levels stress are different at de same time in different locations during the conformation stages from plate to pipe. In spite of the heterogeneity of deformation, it was possible to estimate the residual stress in circumferential point in each stage the processing of the pipe (Figure 2).

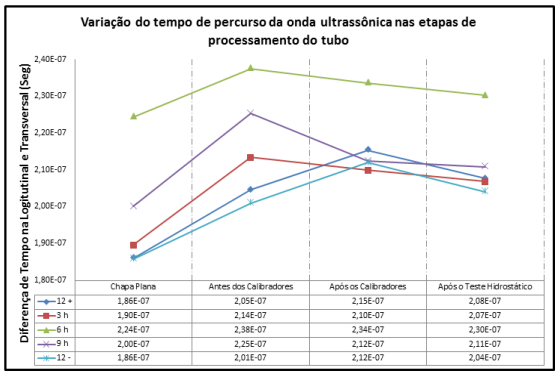

Figure 1 - Difference in the acoustic behavior of the pipe during the conformation stages.

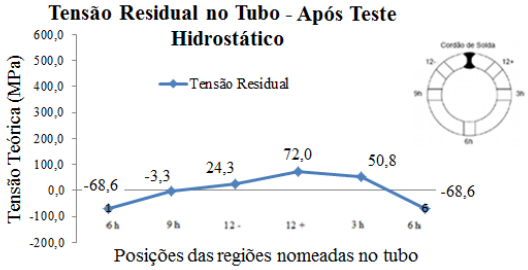

Figure 2 - Residual stress in pipe after hydrostatic test

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