

Field experience of stress position detection technique

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As a non-destructive testing method, stress position detection is a technology that finds stress positions present in welds and materials. SPD(Stress position detection) is based on the inverse magnetostrictive and magnetomechanical effects. Also at the stress positions, there are domain boundary formation and growth on dislocation walls. Stress position shows effect of magnetic field leakage by structural and mechanical inhomogeneities under conditions of the metal's natural magnetizations. The results of applying this method to power generation parts and power transmission towers showed stress positions in welds were well matched with defects. By ultrasonic testing and metal analysis stress positions were verified and the correlation was confirmed. The stress position found at boiler furnace corner tubes, there was sulfur containing corrosion defect which size was 0.5 mm length. At reheater dissimilar welds stress position found out fatigue cracks 0.3mm length inside tube wall which was almost impossible by conventional NDT methods. In the boiler high pressure pipe 45mm thickness, it revealed lack of fusion flaw depth 37mm and length 27mm which was confirmed by ultrasonic testing. Several defects were found out in the power transmission tower welds at the stress positions. The advantages and benefits of SPD are such as it doesn't need preparation of inspection parts, special magnetization is not required since natural magnetization formed during product include operation and it can be applied both operating and shut down parts.