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Analysis of Weld Crack of Main Steam Governing Valve Steam Turbine Case

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Abstract : This paper describes the inspection procedure, root cause analysis, the rectification of crack, and how to apply the procedure with other similar plants. During the operation of the steam turbine (620MW), instruments such as speed sensor of steam turbine, the servo valve of main stop valve and electrical wires were malfunction caused by leakage steam from main steam governing valve. Therefore, the power plant decided to shutdown steam turbines for figuring out the cause of leakage steam. Inspection techniques to be applied in this problem were microstructure testing (SEM), pipe stress analysis (FEM) and non-destructive testing. The crack was initially found on main governing valve's weldment by visual inspection. To analyze more precisely, pipe stress analysis and microstructure testing were applied and results indicated that the crack was intergranular and originated from the weld defect. This weld defect caused the notch with high-stress concentration which created crack and then propagated to steam leakage. The major root cause of this problem was an inappropriate welding process, which created a weld defect. To repair this joint from damage, we used a welding technique by producing refinement of coarse grain HAZ and eliminating stress concentration. After the weldment was completely repaired, other adjacent weldments still had risk. Hence, to prevent any future cracks, non-destructive testing (NDT) shall be applied to all joints in order to ensure that there will be no indication of crack.

Keywords : steam-pipe leakage, steam leakage, weld crack analysis, weld defect
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