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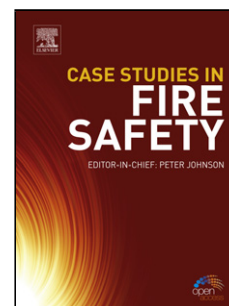
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Stress Corrosion Crack Initiation in Machined Type 316L Austenitic Stainless Steel in Simulated Pressurized Water Reactor Primary Water

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Highlights

- Machining promoted SCC on annealed 316SS in high temperature water
- SCC initiation was always associated with machining marks and did not occur in polished surfaces
- Porous inner oxide layer was identified as a main reason for the SCC initiation on the machined surface
- Residual stress induced from machining did not appear to play an important role on SCC initiation under SSRT
- Optimized machining parameters that compromise productivity and SCC resistant were identified

Abstract:

The effect of machining on stress corrosion crack initiation of annealed Type 316L stainless steel was investigated through accelerated testing in high-temperature hydrogenated water. It was observed that stress corrosion cracks only initiated on machined surfaces with machining marks perpendicular to the loading direction and a porous inner oxide layer was identified as an important factor contributing to crack initiation. Furthermore, most cracks stopped within the machining-induced near-surface ultrafine-grained layer and the machining-induced residual stresses did not

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