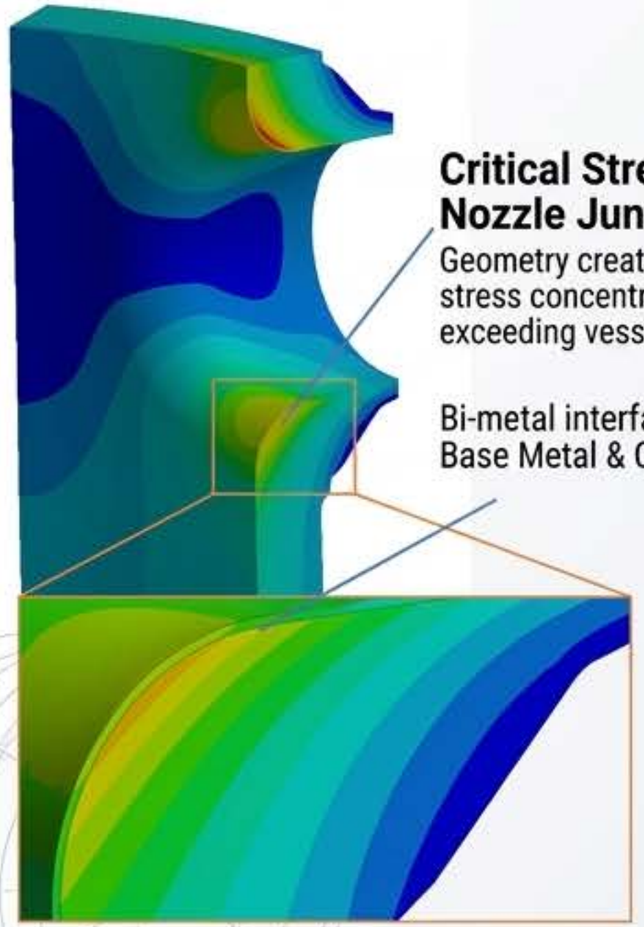
Safety in the Core: Advancing Fracture Assessment for Nuclear Reactor Nozzles

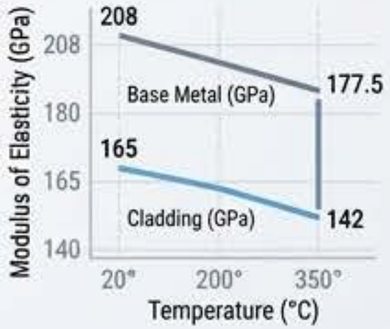


Critical Stress at Nozzle Junctions

Geometry creates high stress concentrations exceeding vessel wall.

Bi-metal interface: Base Metal & Cladding

Material Stiffness Differences

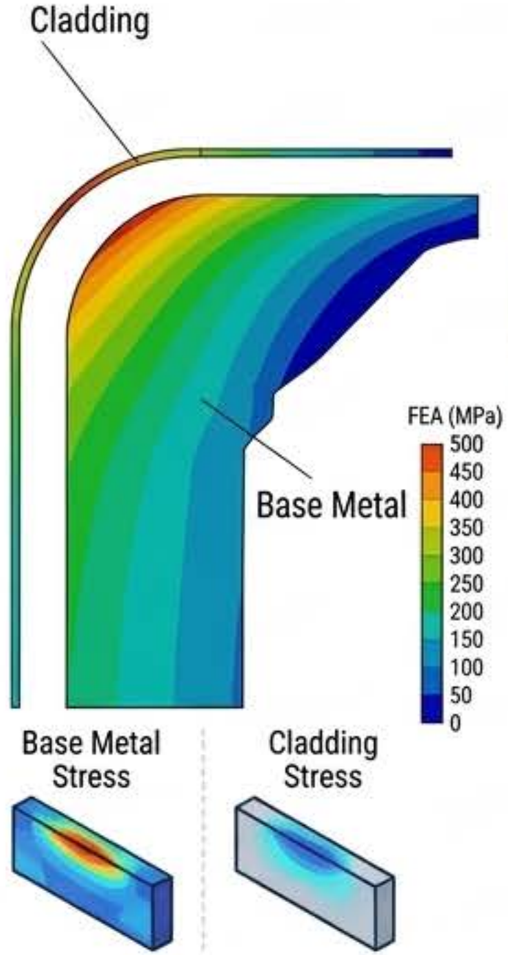


The Cladding Discontinuity

Interface between steel and cladding causes steep stress gradients; often ignored by standards.

The Computational Bottleneck

Traditional 3D simulation is too slow for real-time monitoring or massive probabilistic safety assessments.



Dual-Metal Stress Decomposition

Method separates total stress into base metal and cladding components for precise evaluation.

Express Evaluation Tool

Fast, tabulated solutions enable real-time safety monitoring and integration into national regulatory standards.