

Category: Design and Analysis

Example: Finite Element Analysis – Stress analysis drove product redesign

Situation: Family of injection molded housings for filtering systems.

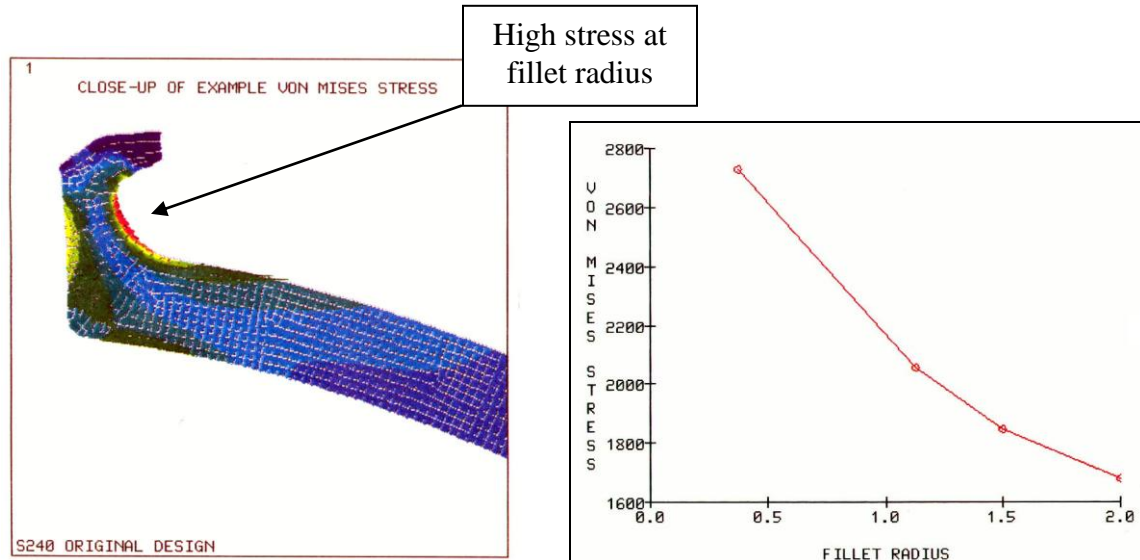


Image 1:
Von Mises Stress in Old Design

Image 2:
Stress vs. Fillet Radius

Problem: Cracks were developing at a radius near the top of the filter housings. These cracks appeared over time, indicating a fatigue problem.

Action:

1. Developed model of tank top with input & approval from customer
2. Stress model corroborated high stresses at failure location (Image 1)
3. Performed parametric studies to determine stress vs. radius (Image 2)
4. Determined target stress based on plastic strength & fatigue properties
5. Created redesign recommendations for entire product line

Result:

1. One filter housing mold remade to incorporate recommended changes
2. Product tested to specification (30K cycles) and passed test
3. Testing continued to 80K cycles without failure; test stopped
4. Entire line of filter housing molds remade