SQUEALER DESIGN PRESENTATION

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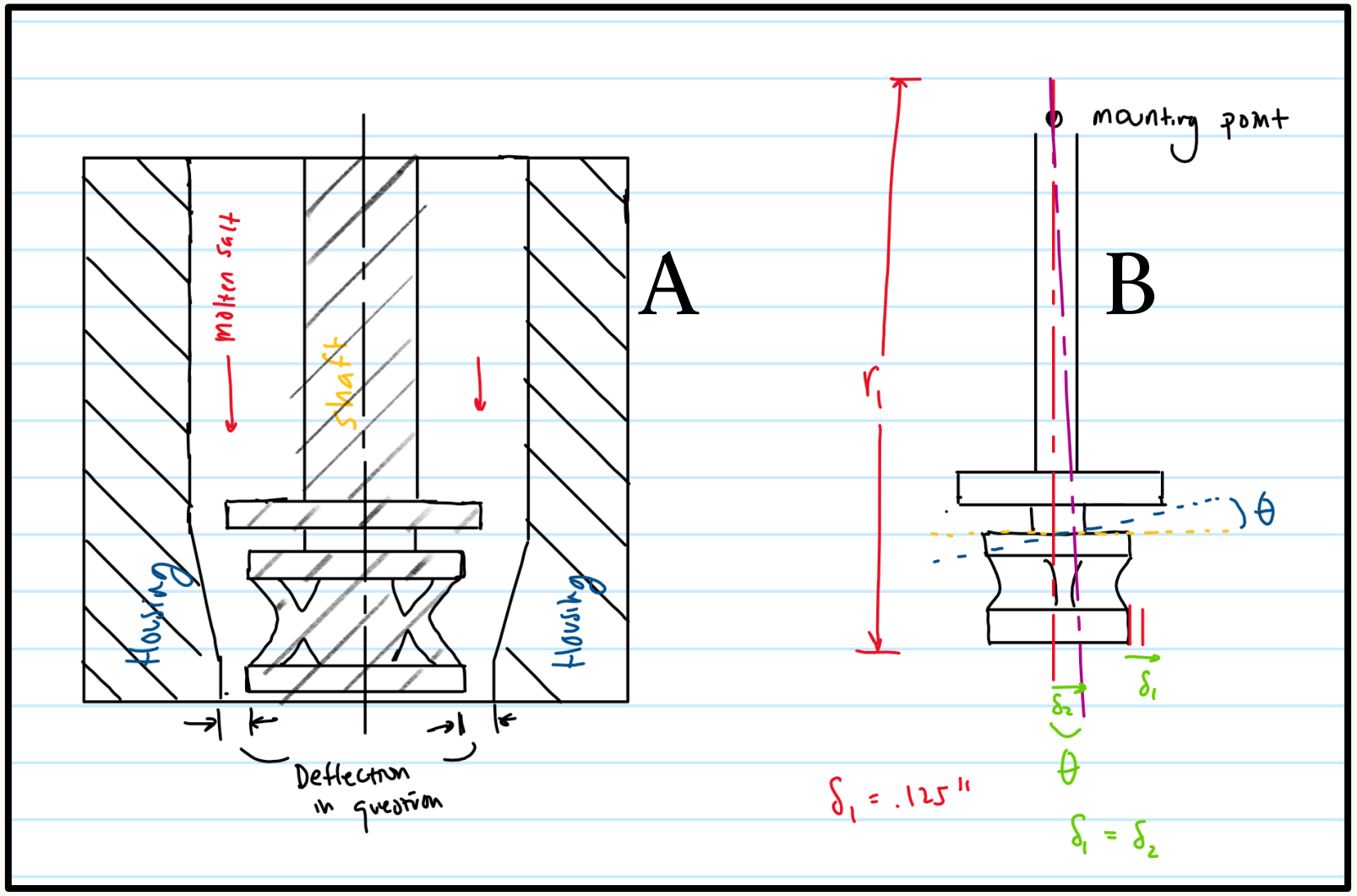
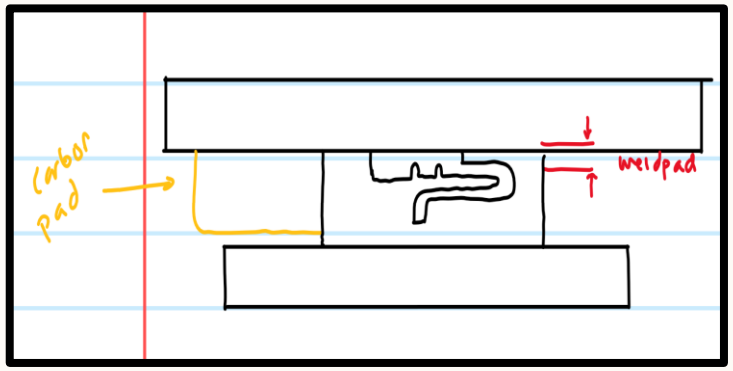
SITUATION/TASK

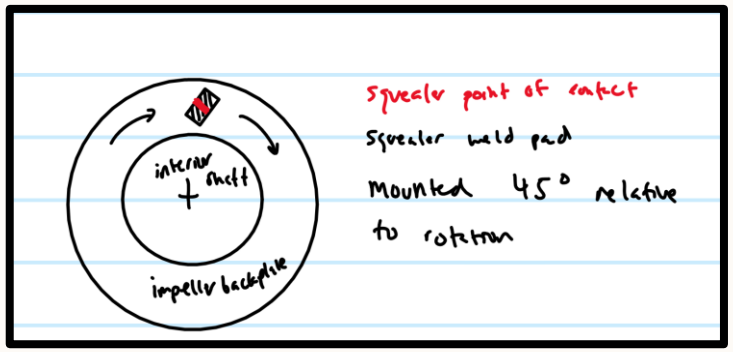
- Kairos Power Engineering Test Unit Reactor's Vertical Pump Shaft
- Goal was to Detect deflection in horizontal shaft that would result from misalignment inside housing showing in Diagram A
- Misalignment would result in friction weld of impeller and casing in the high temp. /high corrosion environment
- Used Diagram B to Determine angular displacement along z-axis. Which provided the theta to determine displacement along the y-axis at the backplate of the impeller
- After determining maximum deflection in y-axis a solution could be developed

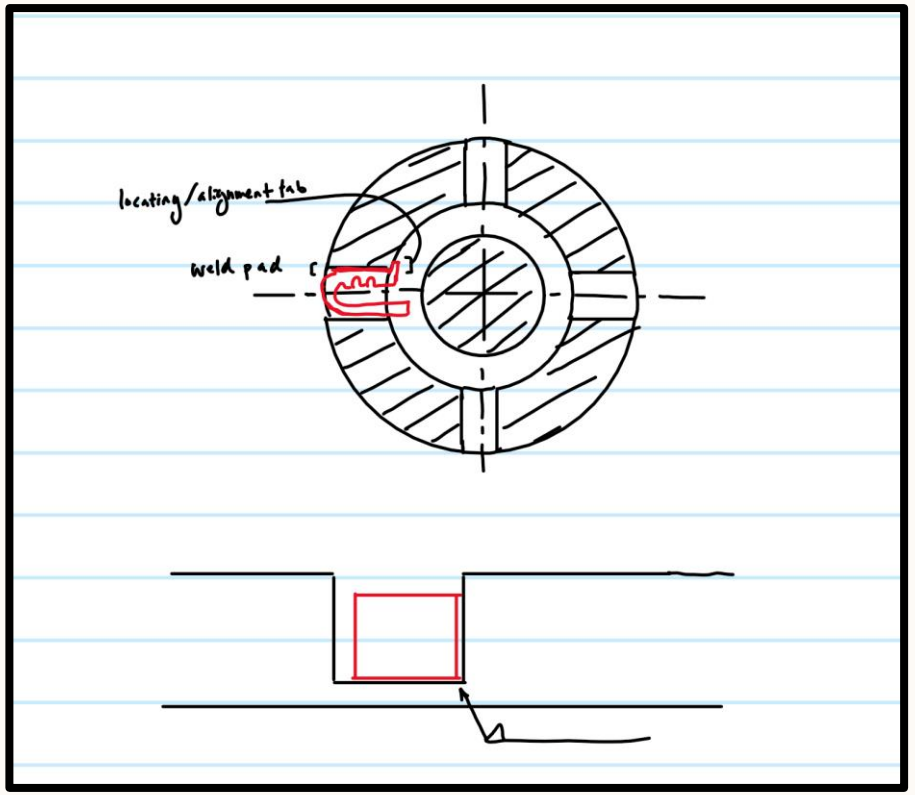


ACTIONS

- Decided brake squealer type solution would be simplest to perform desired outcome of noticing if impeller and housing were in contact
- Researched typical brake squealer design and looked into research documents of how to provide vibrations in metal parts
- Designed 2 Squealers. 1 to detect a Y-Axis displacement between backplate and impeller, 1 to detect Z-Axis displacement on interior shaft
- Determined best material to be 316 Stainless Steel over 304 Stainless Steel or other steel alloys for the high corrosion resistance
- Worked with Manufacturing Technician and other engineering to perform full reviews of designs and drawings before submitting ECO's







RESULTS

- Manufactured the squealers via Wire-EDM given the small thickness and need for precision
- Was able to have part installed during maintenance period and confirmed it created audible noise during testing when shaft was intentionally misaligned
- Ensured minimal manufacturing operations to complete 3 ECO's. 2 wire EDM's operations for squealer fabrication. 1 CNC Mill operation to make channel for second squealer
- Additionally validated Solidworks FEA simulation results that parts will likely work fine under standard service conditions
- Released final drawings and associated parts into PDM

THANK YOU