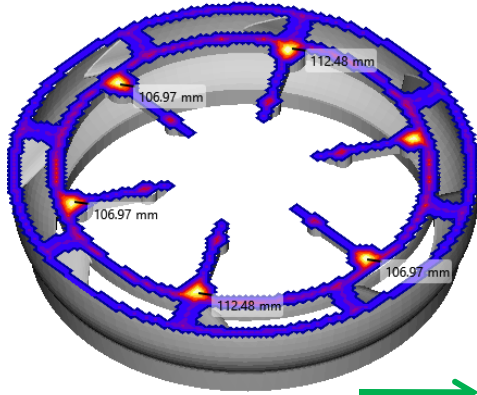
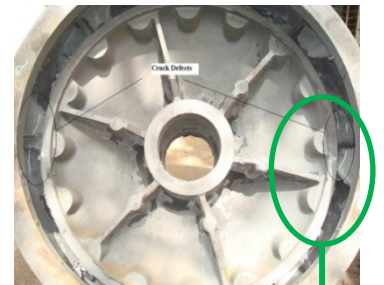
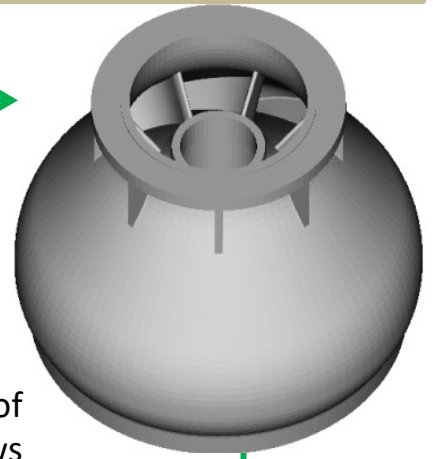
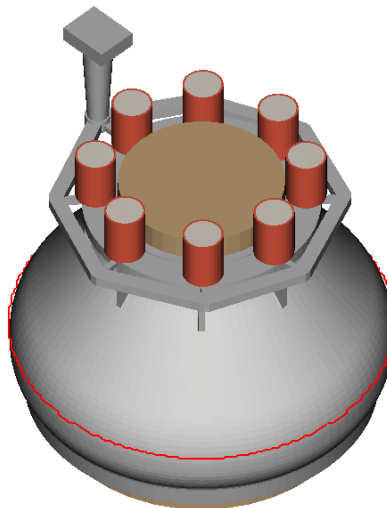


Insight: Pressure bowl is a large grey cast iron casting of overall size 1.70 m x 1.70 mm x 1.20 m weighing 3.1 ton. It was produced in a major ferrous foundry, and exhibited cracks in the bottom section.

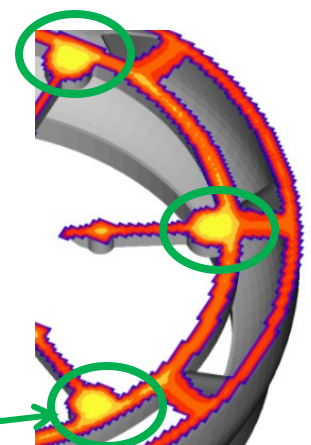
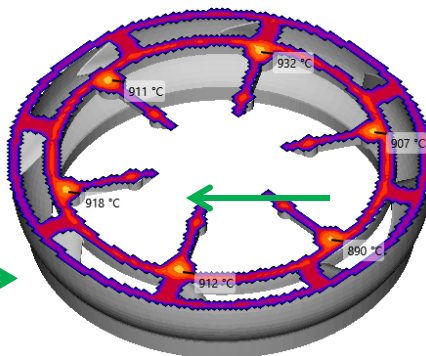


Thickness analysis of the part clearly shows T-junctions with high thickness gradient, of 113 mm size which leads to high stress concentration.

The initial methoding was consists of eight top feeders of height 250 mm , top and bottom diameter 170 mm. All feeders were placed at top flange.

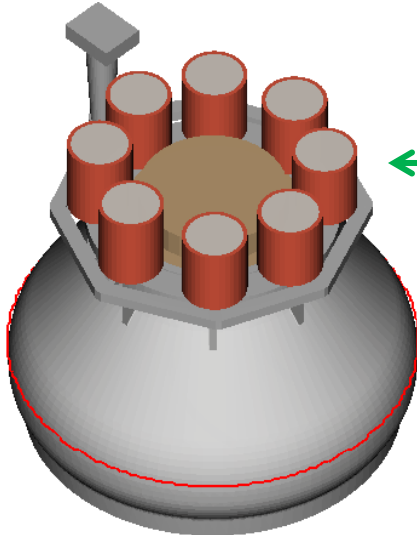
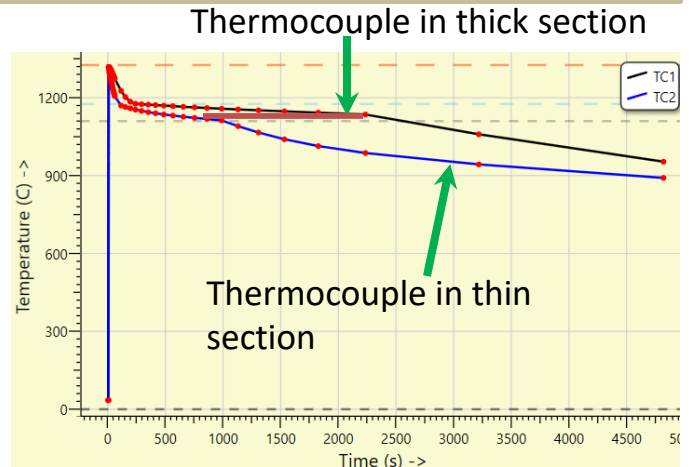


Solidification contour analysis of the casting shows high temperature gradient which in combination with high thickness gradient leads to crack formation.



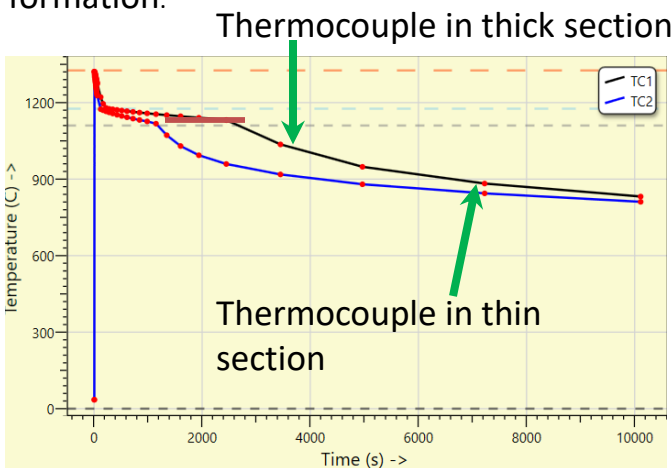
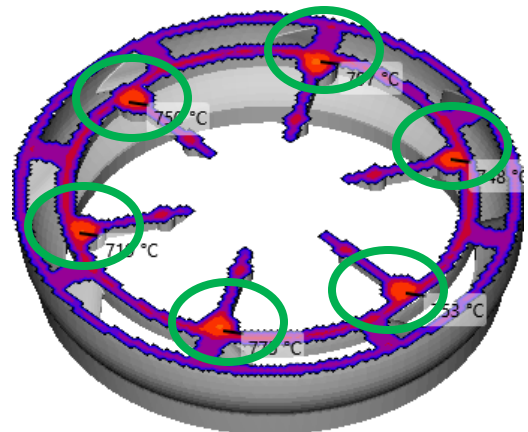
Crack region

Thermocouple analysis reveals that thermocouple in defect region i.e. thick region takes more time to solidify than the near by thin region, improper solidification rates results in stress concentration.



The initial methoding was revised by increasing size of all eight top feeders. The modified dimensions are of feeders are height 350 mm , top and bottom diameter 250 mm.

Solidification analysis of the revised methoding shows relatively smaller variation in temperature gradient, which greatly reduced the chances of crack formation.



Thermocouple analysis reveals that the difference in solidification rates of defect and near by thin regions is minimized by revised methoding. This resulted in reduced possibility of hot tear at junctions.

Summary: Revising of feeder design helps in minimizing possibility of hot tear in the casting.