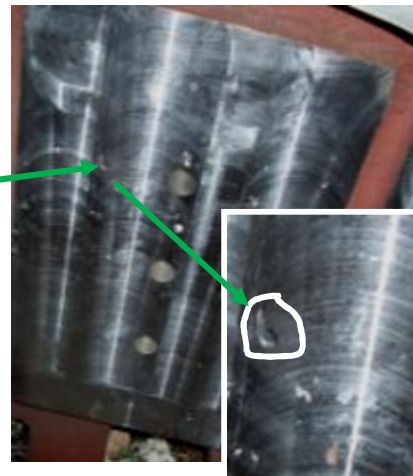
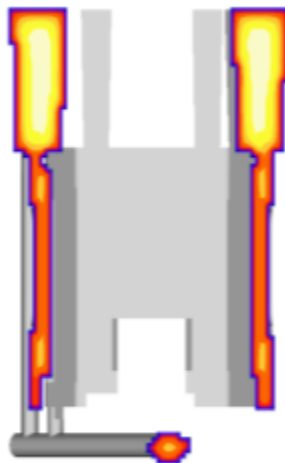
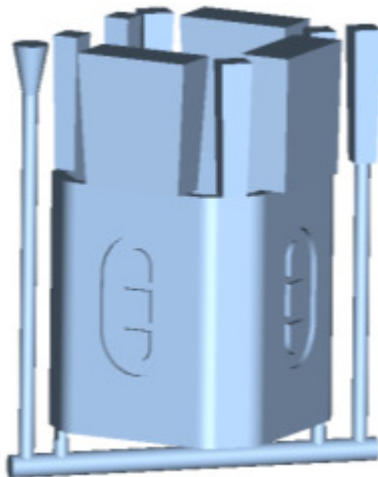




Magnet frame tube is a railways component, used to fabricate the housing for traction motor. It is 760x760x750 mm, weighing 1.3 tons, and produced with eight top feeders (yield 55%). Persistent shrinkage porosity was observed during machining the inner faces, resulting in high rework and rejections.

Simulation of the current methods design showed that the feeder size is adequate, but the feed metal is unable to reach shrinkage-prone area because of a thin neck in-between. Location of the defect matches the simulation.



Three different solutions were explored:

- Padding (thickness increase) to avoid the bottleneck below the feeder
- Tapering the vertical faces to promote directional solidification
- Adding fins to reduce the hot spot.

The first two solutions involved additional machining. Fins were preferred since they could be easily removed during fettling.

Simulation showed that fins reduced the hot spot in the shrinkage zone, allowing it to be fed from the same size feeder. This solution was finally implemented on the shop floor and resulted in defect-free casting without any loss of yield.

