

CASE STUDY

A European refinery discovered a crack in one of its major compressors, which had more than 40 years of service.

Ensure safe and reliable operation by modernization of the compressor

Compressor manufacturer: NUOVO PIGNONE

Type	2HE/2AP	Gas	CO ₂
Power	565 kW (768 hp)	Suction pressure	1.2 bar (17 psi)
Speed	296 rpm	Discharge pressure	21 bar (305 psi)
Lubrication	no		



Cylinder damaged beyond repair

Facts in Brief

- After 40 years of operation the second-stage cylinder cracked
- No spares available from compressor manufacturer

Customer requirements

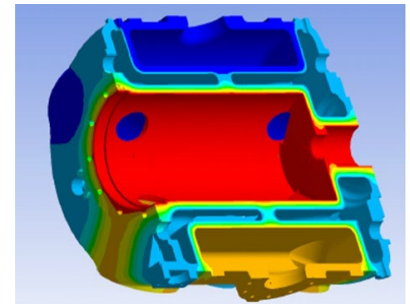
- Improve the original design
- Replace damaged parts quickly

Solution applied

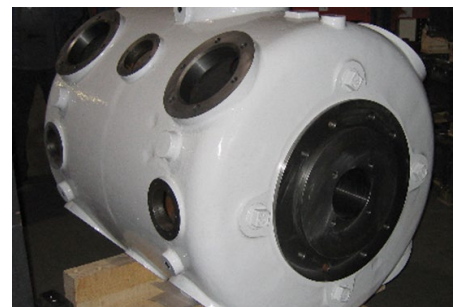
- Audit compressor and analyse damage
- Design a new and improved cylinder and use finite element analysis to verify strength
- Create drawings for production
- Cast a new cylinder from nodular iron and machine it to specification (turning, milling, honing)
- Final checks (ultrasonic and magnetic particle inspection, pressure and leak tests, material test)
- Painting and packaging
- Project management and documentation

Results

- Replacement cylinder designed, cast and machined in less than 4 months
- New cylinder fitted exactly and provided the required flow and pressure
- Rebuilt compressor operating reliably since 2007



FEM thermal modeling for new cylinder design



New cylinder as manufactured