

WP4 New Materials

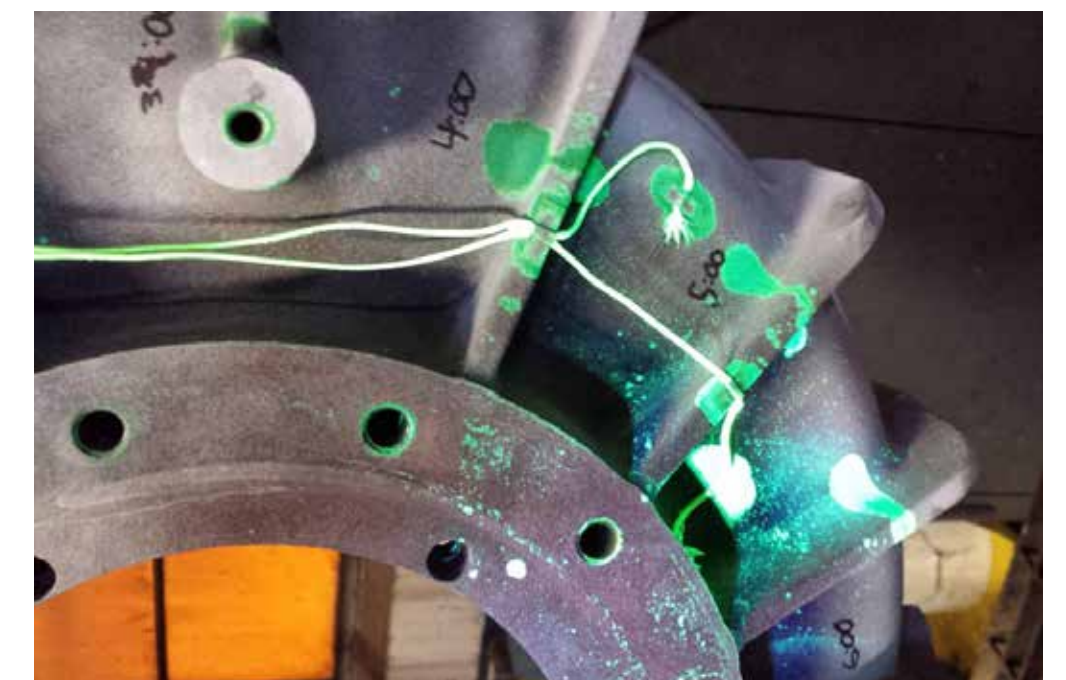


WP OBJECTIVES

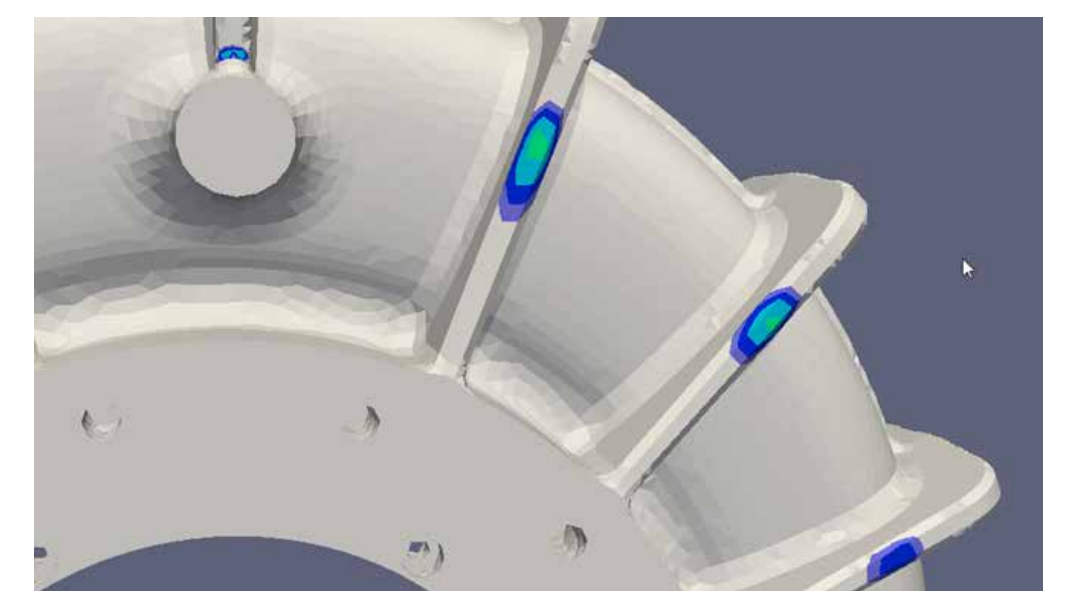
- The majority of concepts for emission reduction in internal combustion engines is followed by higher component temperatures and mechanical loads. Thus, the thermo mechanic fatigue (TMF) of engine components comes more into focus. The objective of this Work Package is to develop the use of appropriate material for optimized combustion engines focusing on the cylinder head and the turbocharger turbine casting
- Improvement of thermo mechanical cycle resistance of factor 2 under increased temperature of 50 K
- Decreased weight of cylinder head of 20%
- Improvement of thermo mechanical cycle resistance under increased temperature of 70 K under corrosion environment.

EXPECTED OUTCOME

- Quantification of the TMF characteristics of cylinder head and the turbocharger turbine casting materials
- TMF material model for the lifetime computation of turbine casting and of cylinder head
- Design and construction of test rig for cylinder head equivalent specimen component and simulation of thermal boundary condition
- Verification of TMF material model with test results.



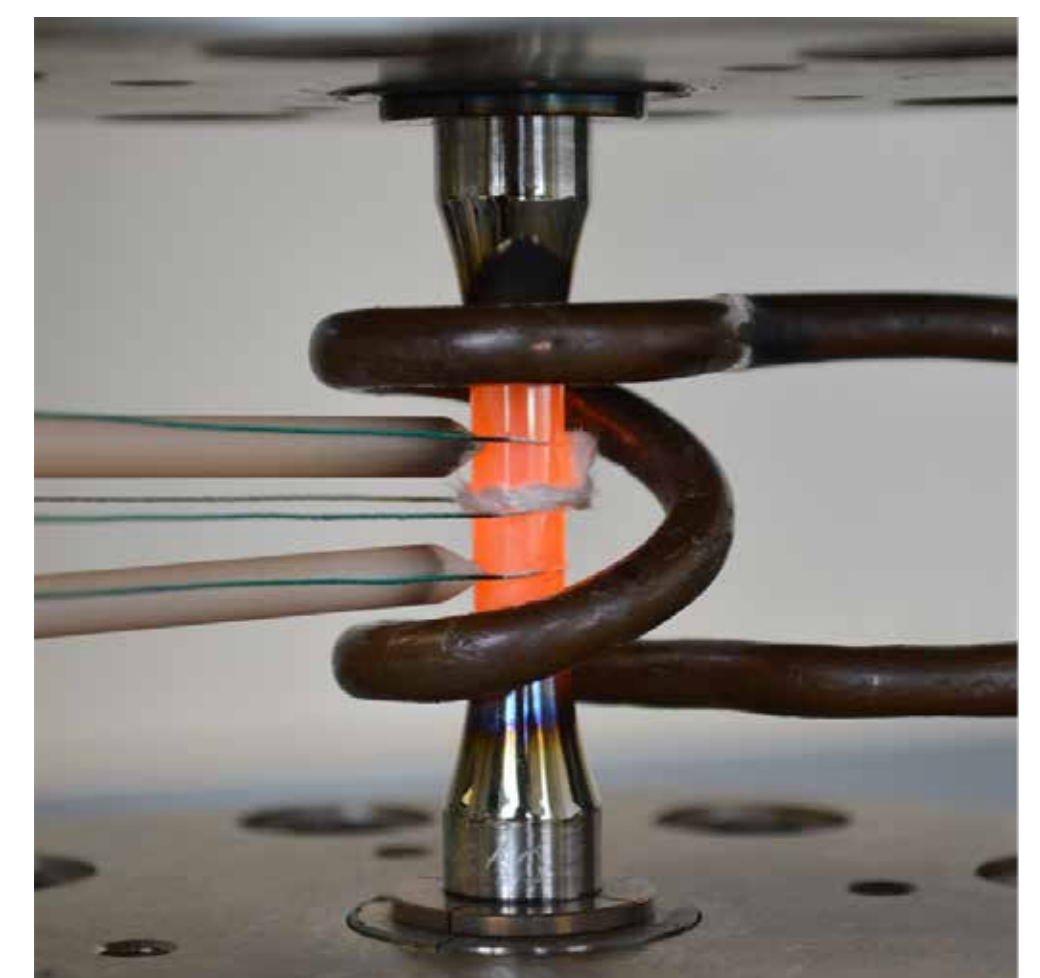
Cracks after initiating at burner rig test of turbocharger turbine casing



Computed crack locations of turbocharger turbine casing

PROGRESS AND PLANS

- Technological material tests
- Thermo Mechanic Fatigue test rig for component
- Material model for turbine casting assessment
- Thermo Mechanic Fatigue model for new cylinder head
- Cylinder head optimization.



TMF material test

WP PARTICIPANTS

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