

# WP 3 Intermetallics and adv. materials for marine engines



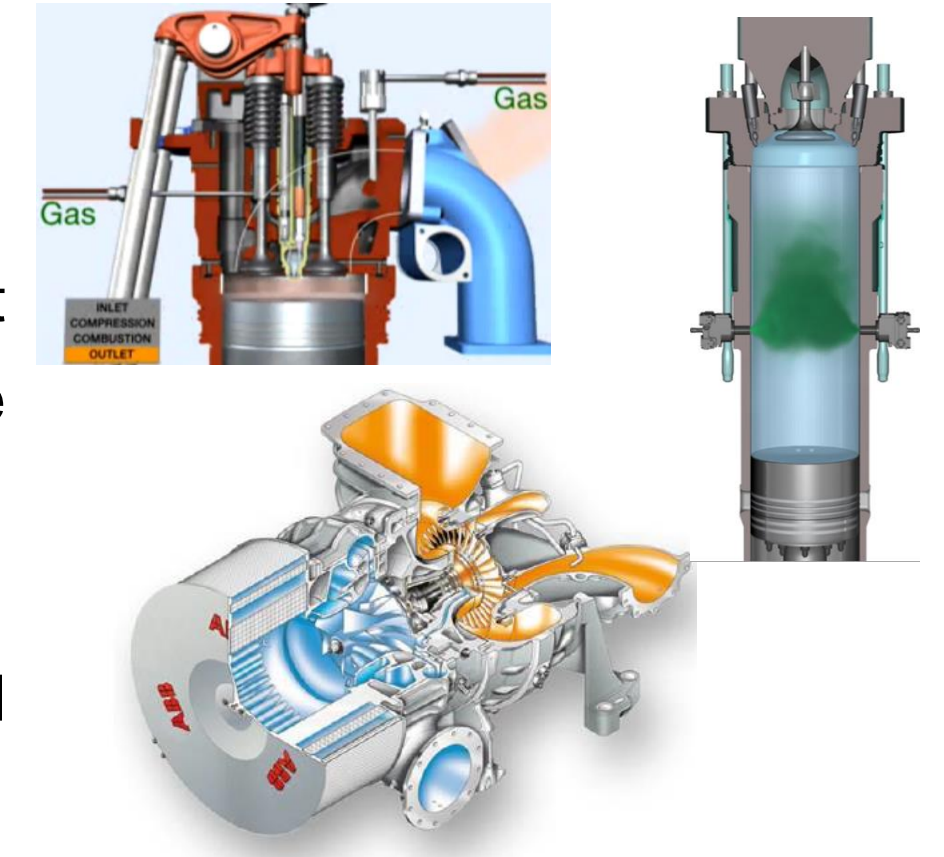
## WP OBJECTIVES

### Subproject 3.1: Novel materials for engine applications

Examine possibilities of using novel materials in engines to facilitate the development of components that enable higher engine loads, hereby increasing efficiency and lower emissions. Ensure proper lifetime performance and durability.

### Subproject 3.2: Novel materials for turbine casing

Material of turbine casing is reviewed in respect of material and design in order to meet requirements needed for higher exhaust gas temperatures.



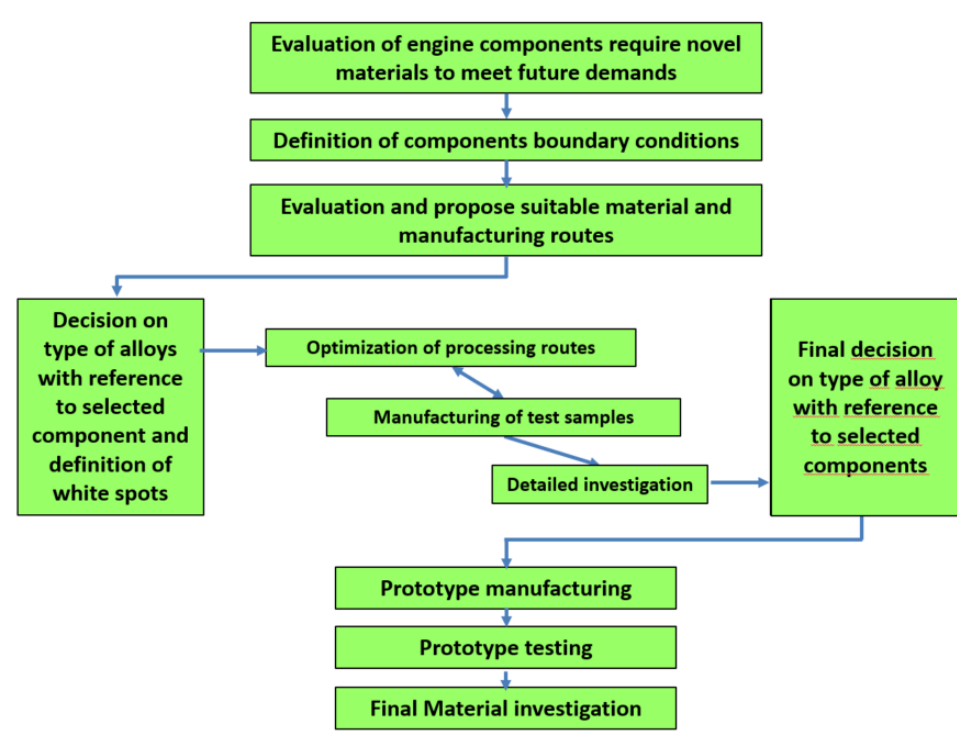
## EXPECTED OUTCOME

**Subproject 3.1:** Suitable new materials can be identified for at least two components for higher load operations and longer life time.

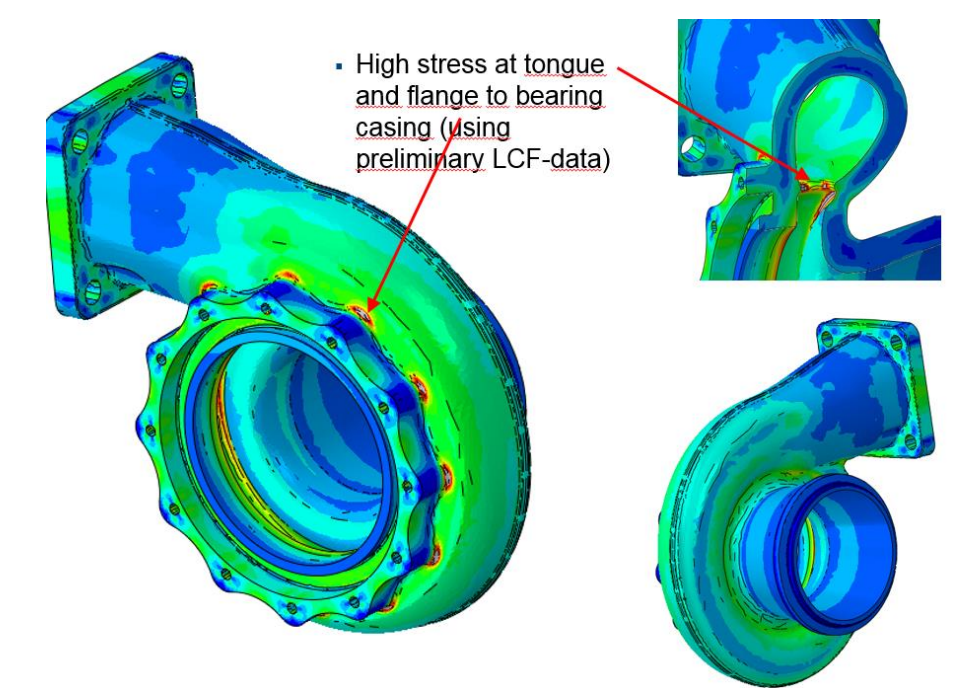
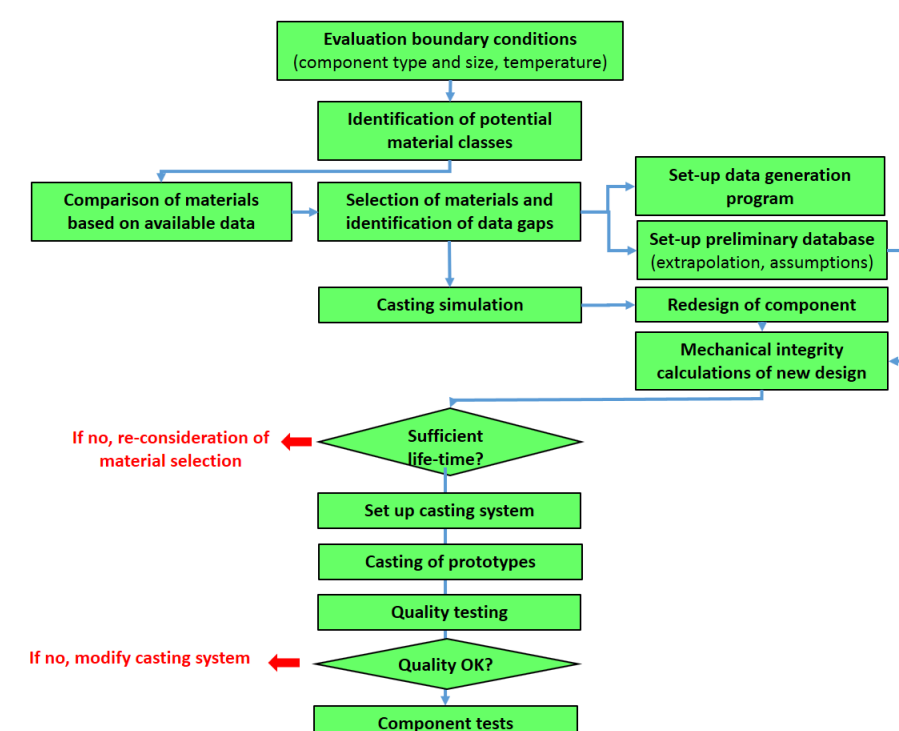
**Subproject 3.2:** Performance is improved through material / design optimization.

## PROGRESS AND PLANS

### Subproject 3.1



### Subproject 3.2



### Subproject 3.1 Results & Achievements :



Definition of boundary condition and selecting of materials/processing routes  
 Detailed material characterisation of samples produced via different routes  
 Manufacturing of prototypes and rig testing

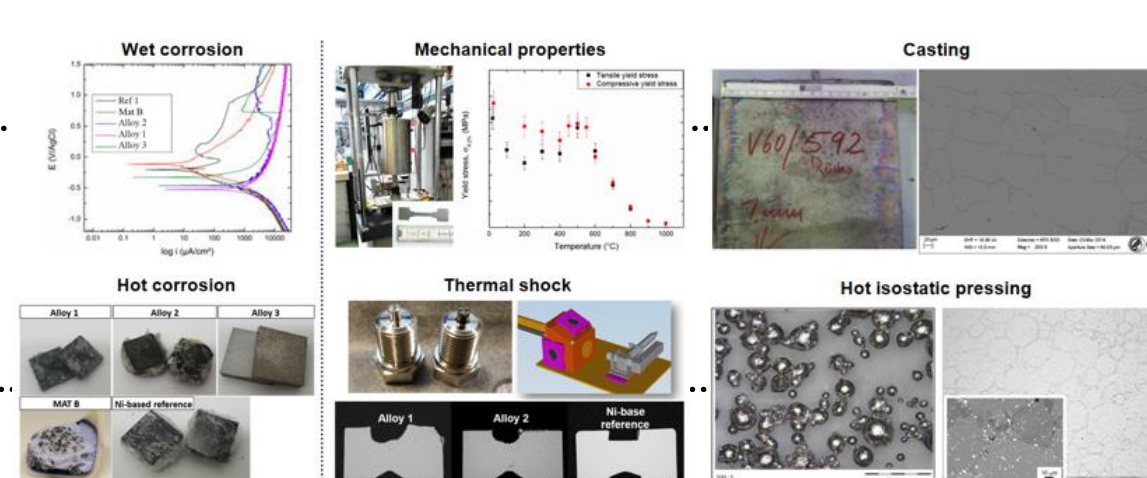


Investment casting can produce near net shape components  
 Alloy 2 exhibits sufficient hot corrosion resistance and for 2-stroke application mechanical properties seems sufficient  
 opportunities for enabling higher bearing loads identified

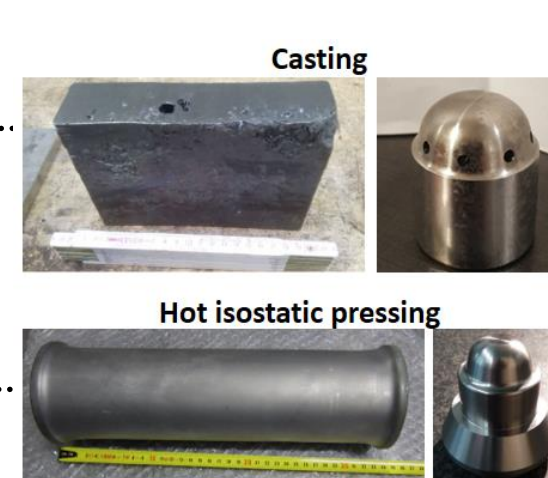
#### Testing of advanced bearing materials



#### Material Characterisation & Processing Selection



#### Prototype Manufacturing



#### Rig Testing



### Subproject 3.2 Results & Achievements :



Decided casting type & manufacturing method  
 Preliminary material database setup  
 Casting simulation & parametrisation of CAD-model  
 Definition of load profile  
 Elimination of stress hot-spots



Turbine casing made of heat resistant cast steel is possible  
 Lifetime analysis shows which improvements are needed for serial production  
 Material data generated highly beneficial for ABB Turbo Systems  
 Prototype made, next step would be field testing

## WP PARTICIPANTS

WP lead: WinGD WP deputy: Wärtsilä.

