



Integration of a SCR filtration system

Engineering to reduce NOx emissions

MULTI.engineering's initial scope was the feasibility check for this Selective Catalytic Reduction systems (SCR) integration and the impact on the existing vessel in terms of modifications of structure, re-routing of pipes, positioning of different equipment. After successful completion of the feasibility study, MULTI.engineering started with the basic and detailed engineering for the whole SCR integration project.

As part of the project, the existing funnel was extended in length to prevent exhaust gases from affecting the main deck during operation. MULTI.engineering carried out strength calculations, buckling assessments, and natural frequency analyses to ensure the structural integrity and performance of the extended funnel.



CLIENT

DEME Group is the world leader in dredging and land reclamation, solutions for the offshore energy market, environmental and infra marine works. This Belgium based company has a fleet of about 100 vessels and around 5.000 employees.



SCOPE

Integration of a SCR filtration system into the heavy-lift vessel Orion



SERVICES PROVIDED

- Feasibility check for the SCR integration and the impact on the existing vessel
- Basic and detailed engineering for the whole SCR retrofit project
- Extension of the existing funnel



SPECIFICATIONS AND CHALLENGES

The project was very challenging considering the limited space available in the funnel and the amount of equipment that needed to be placed without impacting existing systems and layouts.



SERVICES PROVIDED

- Feasibility check for the SCR integration and the impact on the existing vessel in terms of modifications of structure, re-routing of pipes, positioning of different equipment.
- Basic and detailed engineering for the whole SCR integration project, including:
 - Update of P&ID, arrangements, etc..
 - 3D scans and integration
 - Modifications on the exhaust lines to fit the new SCR components
 - System integration in the engine room
 - Urea storage tank and pump room
 - All pipe routings and detailing them
 - Cropping access for installation of urea tank, SCR's etc.
 - Back pressure calculations
 - Heat transfer analysis
 - Class drawings and calculations for all the structural works and update of P&IDs
 - Production information for structural, outfitting and piping scopes



ADDED-VALUE MULTI.ENGINEERING

MULTI.engineering executed a feasibility study and provided a basic and detailed engineering package.



RESULT

The Selective Catalytic Reduction systems (SCR) were integrated into the heavy-lift vessel Orion to reduce the NOx emissions. The SCR filtration systems reduce the NOx from the exhaust gases by injecting urea (NH₃ – base), which leads to the chemical conversion of NOx to N₂ and H₂O. The SCR system involves several components packaged together with other parts of the emissions control system. All four main diesel engines and the two auxiliary diesel engines on the Orion were outfitted with individual SCR systems.



TOOLS

Software used:

- Steel
- Cadmatic
- Excel calculation sheets
- ANSYS



FACTS & FIGURES

- Vessel's name: Orion
- Integration of a SCR filtration system
- Owner: DEME Group

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