



Overview

Composite Jet Fire and Blast protection enclosure for a gas turbine calorimeter

Location

Edvard Grieg field development in the central Norwegian North Sea

Description

A Large composite jet fire and blast protection enclosure which houses an entire calorimeter and ancillary equipment

Client

Union Instruments / Dresser Rand / Lundin Norge

Date of Project

2013 to 2015

Where FRP Composites are used and why

The project was developed and delivered for a new build platform, where weight was a critical consideration for a number of new equipment items being installed on a highly loaded deck area. As well as protecting the equipment against demanding explosion and hydrocarbon jet fire loads, the project was also seeking a way of minimising the additional weight and space of the protection enclosure, whilst allowing rapid installation due to single point lift with only 4 bolted connections to the platform structure.

Specific design details

The Lightweight enclosure incorporated ProTek® structural composite panels for the walls and roof, and a ProTek® lightweight composite personnel door to suit access requirements. ProTek-Dek® lightweight structural composite deck panels were used for a non-slip floor, all components were then bolted to a high strength stainless steel frame designed with single point lift for the combined weight of the equipment and protection structure. The ProTek® protection structure weighed no more than 3 tonnes and provided a total weight saving of 5.5 tonnes when compared to a traditional metallic structure.

3D models were developed to ensure good fit up and determine routing of hydraulic and electrical services and Finite Element Analysis techniques were used to verify structural performance of in excess of 30 separate load cases required to meet NORSOK regulatory requirements.

Insulation properties of ProTek® panels and proprietary ventilation details were used to control equipment temperature within acceptable operating limits.

Type of composite

Hot press moulded epoxy glass/carbon sandwich panels

Performance in Service

The project was designed and engineered to provide an enclosure of the required dimensions to protect against a maximum explosion overpressure of 0.5 barg (equivalent to 5 tonnes / m²) and a 60 minutes hydrocarbon jet fire, as well as a 100 year wave slam load; all of this with an enclosure weight not exceeding 3 tonnes.

In addition to the fire and blast requirements, there were a number of different load cases to be considered in order to comply with NORSOK N-001 and N-003 standards as well as ensuring a 30 year maintenance free life.

Project Partners

Design, Engineering and Manufacture carried out by Solent Composite Systems Ltd
Calorimeter equipment supplied by Union Instruments GmbH
Engineering support and project management by Dresser-Rand AS

Website: www.solentcomposites.com