

# Bondstrand Structural FRP Products for Topsides

## BP Clair Ridge Platform, North Sea

- **Drilling production module lifting weight – 29,220 tonnes**
- **CapEx benefits – 700+ tonnes weight saving**
- **OpEx benefits – 40 years to first major maintenance**

Structural integrity, weight and corrosion resistance are essential factors to consider in harsh offshore environments. We design and manufacture structural FRP products using high quality Fiber Reinforced Polymer (FRP) composite materials which provide the optimum solution to these challenges.

Manufactured from phenolic resins, our FRP structures provide high temperature resistance, low smoke, and low toxic fume emissions, making them the ideal material choice for offshore applications.

Our structural FRP products can be customized, and are in daily use on offshore projects worldwide, providing assurance and confidence to users and owners.

Supported by cutting-edge design and innovation, specialist fabrications capabilities and a comprehensive range of engineering services, our team of experts provide an all-inclusive solution, ranging from offshore surveys, Computer Aided Design (CAD), through to manufacture and installation.

## Our Bondstrand range of structural FRP products and services include:

- MARRS™ offshore handrails
- Ladders and gates
- Grating and flooring
- Platforms, stairs and walkways
- Protection panels
- Engineering and design

## CapEx Benefits

- Low weight, typically 2/3 weight saving over steel
- Fast installation
- High strength
- Meets offshore fire reaction requirements

## OpEx Benefits

- Minimal maintenance
- Excellent corrosion resistance
- Non-sparking, no earthing
- Proven durability
- Enhanced safety

**Where there is a corrosion or weight issue with traditional materials offshore, we can offer a structural solution.**



### **MARRS Offshore Handrail Systems**

MARRS (Multi Angle Rapid Railing System) offshore is a type approved robust and high strength FRP handrail which can be configured to meet client requirements. MARRS offshore features a round continuous top rail and meets BS EN, OSHA and NORSOK requirements. It is ideal for both new build and retrofit applications. Weighing only approximately 15kg per meter, MARRS offshore has been rigorously tested for strength, temperature, and has also been awarded a DNV type examination certificate.

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### **Ladders and Gates**

Our ladders and gates are made using the same phenolic FRP components as MARRS offshore handrails to provide high performance and durability. They can be designed to BS EN or OSHA requirements and offer full integration into the MARRS offshore handrail system. Gates include self-closing hinges and are configurable to suit project requirements.

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### **Grating and Flooring**

Our phenolic FRP grating and flooring is proven tough and robust to meet offshore demands. Available in 38 mm or 45 mm deep options, it fully meets the stringent requirements of ASTM F3059 FRP offshore grating requirements including impact and wheel load tests.

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### **Platforms, Stairs and Walkways**

Using structural phenolic FRP profiles and components, we design and supply tertiary structures such as access platforms, stairs and walkways for offshore. These provide the same high corrosion resistance and weight reduction as our other structural FRP products, while also meeting stringent fire performance requirements needed in offshore environments. These are individually designed to be independent or integrated with steel structures as required.

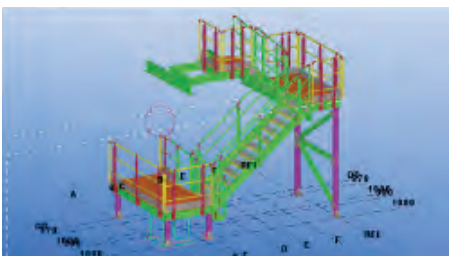
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### **Impact Protection**

Our phenolic FRP impact protection panels are designed to protect against impact from blunt and sharp objects with varying energies up to 5 kJ. These panels are ideal for dropped object protection and provide a low weight and reduced maintenance option to conventional steel products.

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### **Engineering and Design**

Our team of engineers are specialists in the design of FRP structures and we can offer a complete service including concept design, analysis and calculations, detailed design and fabrication. We use the latest 3D CAD systems so we can integrate our solutions into the clients primary CAD model, backed up with skills and expertise to ensure our FRP solution will be delivered to clients requirements.