Engineering Services – Marine, Offshore & Subsea

3D laser scan from Chevron Captain FPSO ballast survey

Our engineering services department provide expert technical services and design consultancy for Bondstrand™ glass reinforced epoxy (GRE) piping systems, composite pressure vessels, and fiber reinforced polymer (FRP) composite structures. The unique combination of cutting-edge design and advanced manufacturing provides our clients with an all-encompassing solution whilst maximising safety, efficiency and structural integrity.

Experienced and skilled, our engineers are dedicated to providing sustainable and optimised solutions, solving the most complex of projects in a multimedia environment across many applications.

The team are trained in diverse materials and manufacturing expertise; from bi-material products to FRP resin infusion and pultrusion techniques, and use a number of industry standards, third party verification, and bespoke software packages to deliver competitive solutions.

We provide a flexible framework; from engineering advice/support to fully engineered solutions, and from concept design to manufacture, testing and installation, for worldwide offshore and onshore locations. Our engineers can also be available to work directly within client's own design offices (national or international).

Our Engineering Services Include:

- 3D laser surveys and dimensional control
- Piping design assistance and verification - including support design and isometric production
- CAESAR II piping stress analysis - including transient, seismic and dynamic loads
- Composite pressure vessel design
- Computational fluid dynamics (CFD)
- Structural engineering
- Finite element analysis (FEA) – includes static and dynamic analysis
- Innovation research and development - including 3D printing and prototyping

Learn more about our engineering capabilities **here**

Bondstrand Marine and Offshore Products Include:

- GRE piping systems
- Composite pressure vessels
- MARRS™ offshore handrails
- Ladders and gates
- Grating and flooring
- Platforms, stairs and walkways

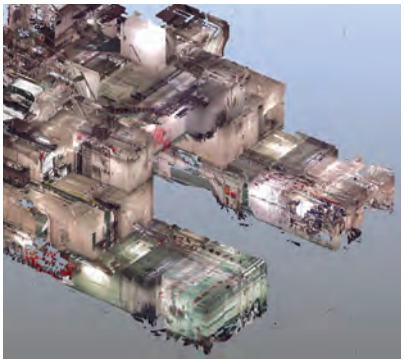
Bondstrand Subsea Products Include:

- Impact protection covers
- Production tree protection – Cocoon and Shroud™
- Manifolds and jacket mudmats
- Pipeline mudmats
- Custom original equipment manufacturer (OEM) solutions

Key Advantages:

- Long service life
- Low life-cycle cost
- Fast to install
- Lightweight
- Retrofit solution
- Corrosion resistant

Project Case Studies



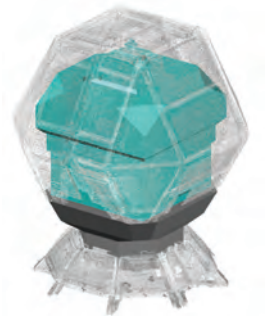
Subsea 7, Diving Support Vessel Pipe System – 3D Laser Surveys

We designed, fabricated and installed approximately 200 m Bondstrand GRE pipe and fittings on one of the world's largest diving support vessels: The Seven Atlantic. The existing galvanized metallic pipe had corroded beyond repair, which lead to problems with fouling and blockages that had a detrimental effect to the heating and cooling of the seawater supply to divers' suits. Our engineers conducted a 3D laser survey onboard the 145 m long vessel. In total, 98 separate scans captured the route of the corroded pipeline that spanned across 6 decks. The scans were amalgamated into one model and the piping isometrics were produced in-house.

We worked closely with the client to produce and finalise a collaborative Lloyds Register Quality Assurance (LRQA) design.

Hummingbird Spirit FPSO Foam Monitor Platform – Design and build

We designed, supplied and fabricated an FRP platform and MARRS™ offshore FRP handrails for the Hummingbird Spirit FPSO located in the Chestnut Field, North Sea. The FRP platform provides access to a foam monitor and replaced a metallic platform that had corroded beyond repair. The platform is positioned within a wave zone so was designed by our engineering services department to withstand storm loadings up to 100kN/m^2.



Cocoon and Shroud Subsea Protection System

The Cocoon and Shroud is an innovative one-of-a-kind FRP structure designed, developed, and built in-house to protect oil field subsea wellhead and production systems from the harsh marine environment and dropped objects during drilling or fishing trawler net incidents. We conducted a comprehensive subsea ageing test program to quantify the degree of mechanical degradation for our PE and VE FRP materials immersed long term in a subsea environment. We used the data from these FRP ageing tests to derive suitable partial factors to offset this long term degradation which provided the required confidence that our FRP structures are fit for use beyond the original 25 years design life. This was a joint industry project with Shell.

Shah Deniz Phase 2 - ASME X Pressure Vessels

We designed and fabricated 6 GRE pressure vessels in general accordance with ASME X Class II requirements for phase 2 of the Shah Deniz offshore development. Three vessel types were requested for the offshore development; Carbon filters, Re-hardening filters and Sand filters.

Our GRE pressure vessels offer a lightweight, corrosion resistant and cost-effective solution in comparison to traditional metallic vessels, providing desirable extended service life, reduced through life service cost and a certified quality product. All three vessel types were hydrostatically pressure tested and underwent acoustic emissions evaluation. Our knowledge of Resin Transfer Moulding (RTM), mould design and closed mould infusion processes were used to produce product to the strict ASME X standard as requested by the client. Detailed design activities were supported by FEA and material testing.