Composite structures and piping save more than 771 tonnes on Scarborough FPU

Background

Woodside Energy's Scarborough gas field development, located about 375 km (233 miles) offshore Western Australia, is one of the country's largest energy projects in recent years. At approximately 70,000 tonnes, the Scarborough floating production unit (FPU) ranks among the largest semisubmersibles ever built.

Weight reduction was central to the FPU's design, as lighter topsides directly enhance buoyancy, stability, and installation efficiency. Over the past four years, NOV's Fiber Glass Systems has designed, engineered, and delivered lightweight composite structural products and piping systems for the living quarters and topsides.

Solutions

The Scarborough FPU is the largest and most complex 3D model our expert engineering team has produced to date. Our engineering scope included full computer-aided design, computer-aided manufacturing, and product standardization to ensure accuracy and efficiency throughout fabrication. In total, we modeled more than 30,000 individual parts and spent over 3,150 engineering hours generating detailed fabrication drawings to ensure precision fit and consistent quality across our manufacturing facilities in Plymouth, UK, and Qingdao, China.

We supplied 5 km (16,353 ft) of glass-reinforced epoxy (GRE) pipe for firewater, seawater, drain, and ballast systems. At approximately 63% lighter than steel, our GRE piping systems are easier to install and handle. Their corrosion-resistant design also eliminates the need for coatings or cathodic protection, enabling long-term reliability in the harsh offshore environment.

Our scope also included fiberglass-reinforced polymer (FRP) structural products for the multi-deck modules. We provided 5.4 km (17,710 ft) of MARRS™ (Multi-Angle Rapid Railing System) offshore handrails, along with 183 FRP ladders and 188 safety gates. One-third the weight of steel, these durable structures meet offshore fire integrity standards and carry full type approval. We also supplied 13,326 m² (143,440 ft²) of robust phenolic grating to complete the access and safety package.

Case study facts

Location: Offshore Western Australia

Operator: Woodside Energy

Timeframe: 2021–2025

Products:

- 5 km of GRE pipe
  - Sizes: 1–24 in.
  - Series: 7000M, S2420C/S2425 C MOD L1
  - 4,776 fittings
- 5.4 km of MARRS™ handrails
- 13,326 m² of grating
- 188 phenolic safety gates
- 183 phenolic ladders

Results

Our FRP structural products, GRE piping systems, and advanced engineering services enabled Woodside to save 771 tonnes, helping reduce the Scarborough FPU's topsides weight to about 30,000 tonnes. These savings improved the semisubmersible's buoyancy, balance, and structural efficiency, allowing greater flexibility in the final topsides configuration.

Beyond the immediate weight reduction, our composite systems will deliver enduring benefits throughout the Scarborough project life cycle:

- Corrosion resistance: GRE and phenolic materials withstand saltwater, chemical exposure, and UV radiation without cathodic protection.
- Minimal maintenance: Composite materials rarely require repainting or surface treatment, reducing inspection frequency and long-term maintenance costs.
- Improved safety and handling: Lightweight construction reduces lifting risks during fabrication, installation, and maintenance.

Together, these advantages enhance reliability in one of the world's harshest environments. First production from the Scarborough field is expected in Q4 2026.