

Furmanite Composites



Advanced composites technology combines structural strength and permanent repairs without disrupting production

Case Study Shell Mossmorran gas processing plant

On-line Repairs. Permanent Results.

The very latest composites material technology was successfully applied at the Shell Mossmorran gas processing plant when Furmanite was called in to repair a butane tank vapour return.

A planned inspection identified external corrosion on an 18-inch flange and the connection between the 18-inch line and 26-inch butane tank nozzle. Shell wanted a repair option that could be carried out online without increasing the possibility of a leak.

Fast, flexible and permanent

The answer was a composites-based solution. It would be a strong permanent repair. And because it can be tailored on-site with no pre-fabrication, it's fast and cost-effective. There are minimal life maintenance requirements.

The repair was carried out at pressures of up to 1.8 bar g and temperatures of 40°C. Composites can be used typically up to 50 bar g and at temperatures from -50°C to +100°C and, with due design consideration, are not limited to these parameters.

The result is self-evident. A sound, permanent repair that uses the latest composites technology to minimise cost.

Strong, lightweight, and non-corroding. The benefits of Furmanite Composites technology are significant.

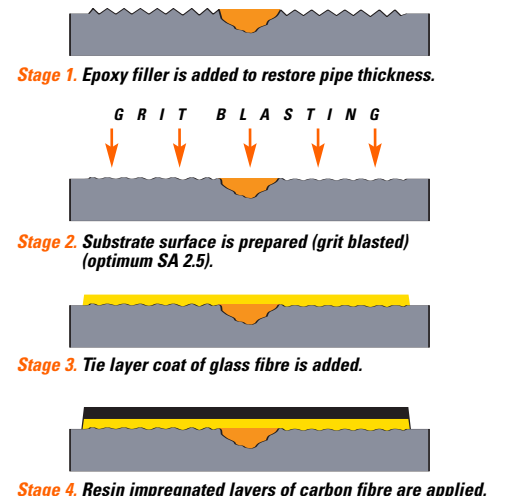
Furmanite has broadened its on-site and on-line services to include composites material, for highly effective permanent repairs.

Furmanite offers the very latest composites material technology available. Typically based on carbon fibre and epoxy resin, the materials are up to ten times as strong and twice as stiff as steel, have 20-25% the density of steel, and do not corrode. What's more, they're easy to handle, require minimal access for installation, and are flexible so they can cope with tees, elbows, reducers, bends and other complex geometries.

Most importantly, composites technology from Furmanite will restore pressure containment and provide multi-directional structural strength, including axial load, providing the next generation of on-line repair and structural strengthening solutions for pipes, pipelines and vessels.

Effective. Flexible. Versatile.

A typical repair can incorporate the following stages:



Resulting in a strong, effective, permanent repair, restoring pipe integrity and structural strength.

FURMANITE™

MAXIMISING ASSET UPTIME

Case Study

Carbon fibre keeps the oil flowing

When an NDT inspection revealed significant external corrosion over an extensive section of pipework on the Shell Expro Dunlin Alpha platform, it seemed shutdown and replacement was the only option. The composites on-line repair solution from Furmanite's composites division, however, avoided this, saving up to three weeks' lost production and significant costs.

Over 50 metres of strengthening was carried out using composites (in most cases to a thickness of just 5mm) on two 24-inch steel service water lines and a 12-inch fire water line as they passed through the corrosive environment of a chemical module. Numerous flanges, valves and tee-sections were also overwrapped using composites. Much of the damage was in severely restricted access areas, so that traditional repair methods such as conventional sealing clamps were not viable. The result was an overall structural strengthening of the pipeline, restoring full design pressure containment capability, yet without adding significant weight.

A temporary steel clamp over a weld defect on a 16-inch hydrocarbon line provided a particular challenge. This was faired in to give a smooth profile, and composites-wrapped to a thickness of 33mm, restoring full design pressure and containing a 1mm crack around the circumference of the pipe.

Five technicians working over a period of 33 days (including mobilisation time) carried out the repair with no disruption to production.

Shell UK Exploration and Production (Shell Expro) is the operator in the UK sector of the North Sea on behalf of Shell, Esso and other co-venturers

Shell Expro Dunlin pipework



Versatile. On-line. Permanent

These are the terms that best describe the application of composites – providing a new generation of structural repairs. The range of situations in which composites can be used is constantly growing; as one of the leaders in the field, Furmanite's composites repair division is well placed to advise on the suitability of the materials for particular circumstances.

Permanent Pipe Repair

Restoring both axial strength and hoop strength to damaged pipelines, composites provide a rapid-response solution.

Pipe Rehabilitation

Being lightweight, composites impose very little additional loading on pipes. This makes them ideal for extensive rehabilitation projects – where corrosion has set in, for example.

Caisson Rehabilitation

Avoiding the need for costly and disruptive hotwork, composites offer a cost-effective and long-lasting method of caisson rehabilitation.

Flare Line Repair and Strengthening

Furmanite has engineers with every necessary skill – including abseiling, enabling even complex repairs to be undertaken with very little disruption.



Repairs to seawater cooling system

Complex Geometry

Flexibility and the ability to form a repair in-situ – the two properties that make composites ideal for use on complex installations. They can be easily wrapped around T-pieces, K-pieces, elbows and flanges without the need for expensive pre-fabrication.

Small-bore Pipe Repairs

Small-bore pipes often do not possess the structural integrity of larger pipelines.

Conventional steel clamp solutions may be too heavy. Again, composites' lightweight properties provide a viable alternative.

Nozzle Repair

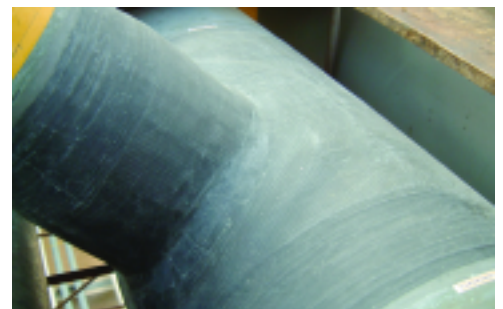
Repairs using composites are specially designed to ignore the original strength contribution of the existing structure. Thus although the repair becomes a part of the structure, its strength is independent of it. For potentially weak points, therefore, such as a nozzle junction, composites are ideal.

A strong heritage

Composites are ideally suited to strengthening and permanent repair work. Originally used in the aerospace industry, they have now been widely applied in the marine, civil and offshore engineering sectors. More than 200 civil structures including bridges, buildings and tunnels as well as more than 20 offshore structures have been strengthened using composite materials.

Quality assurance with Furmanite's trained technicians.

Furmanite's unrivalled highly trained technicians are fully certified and externally accredited and work within the ISO 9000 remit to ensure that customers achieve maximum process efficiency and effective asset management – by avoiding unscheduled shutdown.



12" branch on a 24" Gas Line, Algeria

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Furmanite East Asia Ltd.

Units A & B, 18/F, Nathan Tower,
518-520 Nathan Road, Kowloon, Hong Kong
Tel: +852 2388 3366
Fax: +852 2388 5023
E-mail: sales@furmanite.com.hk

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MAXIMISING ASSET UPTIME

www.furmanitehk.com