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# NORTHERN EXPOSURE

Drillers brave winter conditions  
to improve Shetlands ferry routes

Ground improvement

## WET 'N WILD



A drilling team braved everything the weather could throw at them last winter in an important project to improve Shetland's ferry and fishery infrastructure. **Neil Jaques** reports.

Just off the shore of Whalsay, Shetland's sixth largest island, a drilling crew is jostling for space atop a bright orange jack-up barge. It is early December, and a vicious wind is roaring through the air, cruelly accentuating the sub-zero temperature and slamming bullets of rain against the fluorescent-suited bodies. The notoriously truculent North Sea swells and laps leadenly and ominously at the edges of the 12m by 10m barge, but the drillers imperviously push on.

Between last October and this January, under some of the worst winter weather conditions for decades, drilling contractor Structural Soils worked on a vast over-water drilling programme to help Shetland Islands Council enhance the ferry route between Whalsay and the mainland. Sodden and wind-pummelled after one 12-hour shift, project engineer Grant Davis runs through the prerequisites for basic comfort: "I'm wearing a thermal T-shirt, an ordinary T-shirt, a jump-

er, a fleece, a waterproof jacket and trousers, and selection of mad hats," he shivers. On occasions temperatures plummeted as low as -8°C and the winds reached gale force 9.

Howard Marine, the company that supplied the jack-up barge and its associated facilities and personnel (a barge master plus assistant) is experienced in over-water drilling expeditions worldwide, but was under no illusions as to the challenge presented by the north of Scotland in winter.

"In the Shetlands, you've got some of the most severe weather conditions in this part of the hemi-

sphere," says Howard Marine founder John Howard. "You really know you're up against the elements here – the wind and the rain is in your face the minute you get out of the car and you know if you fall in the water your life expectancy is only a matter of minutes.

"I've been up there working in the summer and we've still encountered extreme conditions," he adds.

Extensive over-water drilling projects are a tricky proposition at the best of times, let alone in the midst of last winter's cold snap, but the project's pressing urgency forced the issue. The Whalsay ferry's infra-

structure dates to the 1970s and in recent years has started to incur serious maintenance burdens from ever-increasing ferry sizes.

To remedy the situation, and to improve the lives and businesses on Whalsay and the wider Shetland community, Shetland Islands Council aims to complete a £25M project to build two new ferry terminals on Shetland (one for back-up in case of bad weather) and another on Whalsay itself. The entire project is set to be completed within the next four to five years, with the first terminal finished in 2012.

"It is unusual that we're working at this time of year, and we have considered at various points whether it was wise to continue or better to delay works," says Shetland Islands Council contract manager Trevor Smith. "But there is an urgency to obtain the geological data we need to progress the design phase."

Structural Soils, which is part of the RSK group, drilled more than 30 boreholes up to 20m deep, using

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**Jon Bassett,**  
**Structural Soils**

cable percussion to drill through overburden and rotary coring for the underlying schist. All core samples were sent to the company’s in-house laboratory in Castleford, Yorkshire, where the data is being collated into a report that will inform the design of the ferry terminals’ foundations.

Once the work was complete at the prospective terminal locations, the equipment was packed up and taken to Wails on the west coast of Shetland to ascertain ground conditions for a fishery-related pier extension that falls under the same contract.

Howard Marine and Structural Soils have worked together on this type of project for almost 20 years, and on paper it should have been routine. But Shetland’s remote and climatically unforgiving environs made it more of a challenge. Simply getting to site was tricky: equipment was driven on eight low-load flat-bed lorries from Castleford (Structural Soils) and Plymouth (Howard

Marine) to Aberdeen, ferried overnight to Lerwick, Shetland, and driven across the island to another ferry, which could only accommodate one lorry at a time.

Following assembly by mobile crane, the equipment was put to sea to drill at proposed ferry terminal locations at Laxo and Vidlin on Shetland’s mainland, and Symbister and North Voe on Whalsay. Moving between site locations was slow, as it involved a tugboat pulling the barge around the unpredictable headland waters.

“You need a good window of opportunity and good weather to make a move,” Davis explains. “Otherwise you’ve got to break the barge up and transport it on flat-bed lorries across land, which is a different proposition altogether. It’s a part of the job that is hard to predict in terms of cost and safety implications and needs to be judged very carefully.”

Mobile phone reception was a luxurious rarity, making it difficult

for the drilling team to troubleshoot with the rest of Structural Soils’ project team in Glasgow, and if equipment broke down replacements could take up to three days to arrive, so the work had to be meticulously planned and carried out with a near-obsessive eye for detail.

“It really puts the onus on the engineer to get things absolutely right,” says Structural Soils’ project manager Jon Bassett, who has an intimate understanding of the terrain having worked for Fugro on preliminary site investigations at Laxo, Vidlin and North Voe in 2001.

Although fraught with unpredictable risk and unknown variables, particularly those of the meteorological variety, Bassett emphasises that Structural Soils and Howard Marine have the collective experience to get the job done safely and economically. “The secret to safety at sea is that you don’t chance your luck beyond a certain point, and we all know exactly what is required of us,” he says.

Awareness of the project’s inher-

ent risks enabled Structural Soils to offer Shetland Islands Council an investigation option that involved using a smaller barge than usual, bringing considerable mobility and cost benefits.

“A lot of people are afraid of jobs like this or think that the answer is ‘let’s have the biggest thing [barge] we can get’, because the theory is that it should be the safest. But that’s not always the case,” says Howard, a man who is well versed in the notion of calculated risk, having worked as a lion tamer in a former life.

He equates the company’s chosen method to the Battle of Trafalgar: nimble English fighting ships outmanoeuvring Napoleon’s lumbering fleet.

“We looked at the situation and said, ‘yes, it’s challenging, but it’s going to be challenging whatever you use’, and our method has proven very successful,” he says. “Ultimately, this kind of work is all about working together to make every operational moment count positively.”



The jack up barge with drilling gear in Symbister harbour



Conditions on board the barge were tough at times

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**Structural Soils offices:** Bristol (Tel: +44 (0)117 947 1000), Castleford (Tel: +44 (0)1977 552255), Glasgow (Tel: +44 (0)141 332 8440), Hemel Hempstead (Tel +44 (0)1442 437500)

For further information, visit us at [www.soils.co.uk](http://www.soils.co.uk) or contact: **John Lawrence:** john.lawrence@soils.co.uk (Tel: +44 (0)1977 552255), **Adrian Barby-Moule:** adrian.barby-moule@soils.co.uk or **Jon Bassett:** jon.bassett@soils.co.uk (Tel: +44 (0)141 332 8440)

