

CASE STUDY CONSTRUCTION



CompAir's TurboScrew compressors are the driving force behind marine protection

CompAir's TurboScrew compressors have helped hydraulic engineering firm, **Hydrotechnik Lubeck GmbH (Hydrotechnik)** to minimise its impact on the marine environment, in two separate applications in the North and Baltic Seas.

Both projects involved using the compressors to create a protective curtain of air bubbles around the site to absorb and reflect sound waves created during engineering work.

TurboScrew used in Pile Driving Application

In the first application, nine portable compressors, including C210TS-12 and C190TS-12 models were hired from CompAir distributor, Peter Gay in Bremen and have ensured that a project to construct the foundations for Germany's third marine research platform in the North Sea was completed on time. Called FIN03, the research platform is being constructed for the research and development centre of Kiel University of Applied Sciences, just off the North Sea coast of Schleswig-Holstein in northern Germany.

Overview

- ▶ **Client**
Hydrotechnik Lükbeck GmbH
- ▶ **Location**
North and Baltic Seas
- ▶ **Application**
Bubble curtain technology to absorb and reflect sound waves
- ▶ **Products**
CompAir TurboScrew compressors
- ▶ **Customer Benefit**
On-time project completion/2000 litre fuel savings

Underwater pile driving produces sound waves that are transmitted at a speed of around 1500 metres per second, which can have a harmful affect on fish and marine mammals, even some distance away. However, using the bubble curtain technique, the research institute was able to reduce noise emissions more than originally anticipated, reducing the effect on marine life significantly.

To create the bubble curtain, pipes fitted with specially-designed nozzles were laid in a 70 metre radius around the foundation position and the compressors optimised to produce a volume flow of around 180m³/min. It was important to

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create such a large radius because of the effect of potential strong North Sea currents, to ensure that the bubble curtain continued to function effectively throughout the entire pile driving operation; from the seabed at a depth of 23 m up to the water's surface. "It was a real challenge to complete a project of this scale in the time available," says Cay Grunau from Hydrotechnik. "It took over six hours to drive the 315-tonne, 55-metre-long monopile around 30 metres down into the seabed. This meant that the CompAir compressors ran continuously for around 20 hours, but, because of their high fuel efficiency, we were still able to save about 2000 litres of fuel on this particular project compared with similar compressors."

TurboScrews used During Bomb Disposal in the Baltic Sea

In the second application, Hydrotechnik hired a C210-TS NA TurboScrew compressor to create a bubble curtain during detonation of up to 100 large munitions off waters southeast of the Kiel Fjord in the Baltic Sea. Peter Gay hired out the portable, TurboScrew compressor which proved to be ideal for the application, reducing the shock and sound waves from the detonation of a 250 kg munition by a factor of 20. In addition, the unit offered best-in-class fuel consumption; using up to 30% less diesel than all other comparable compressors on the market, to deliver a high standard of energy efficiency and low operating costs for Hydrotechnik. To achieve optimum results from the test, perforated plastic pipes are laid on the seabed in a circle around the munition, the compressor is started up and air is blown into the system. In the space of minutes a curtain of air bubbles forms around the detonation site, rising from the seabed to the surface. Detonation is

Benefits at a glance

- ▶ **Best-in-class fuel consumption - saving around 2,000 litres of diesel compared with similar compressors**
- ▶ **Lightweight and rugged machine - ideal for the remote, marine environment**
- ▶ **12 bar operating pressure - helping to reduce noise emissions significantly, to protect marine life**
- ▶ **CompAir technical expertise - ensuring all compressor parameters are set up correctly, for on-time project completion**

triggered and the energy from the explosion takes the path of least resistance – inside the bubble curtain towards the water's surface. The result is a 'soft' explosion that minimises harm to marine life in the Baltic Sea. However, creating an effective bubble curtain requires a thorough understanding of how compressed air bubbles form and behave in water and also a great deal of experience. Klaus Wreth, who is responsible for this type of application at CompAir concludes, "Companies like Hydrotechnik and CompAir have the necessary technical equipment and the know-how to set all the parameters correctly – the air pressure of the compressor, the number of nozzles per metre of pipe, the shape of the nozzles in the pipe, the alignment of the nozzles, the volume flow of the compressed air, the nozzle diameter and the bubble diameter."

About CompAir's TurboScrew Compressor

The technology used in CompAir's TurboScrew series offers a unique standard of energy efficiency and reliability, thanks to the QSB 6.7 motor, developed by CompAir in collaboration with Cummins. Using bi-turbo technology, CompAir TurboScrew drive units offer best-in-class fuel consumption.

This is due partly to the use of a second exhaust gas turbocharger that pre-compresses the intake air for the screw compressor stage. The patented machine concept increases the efficiency of the compressor system significantly, especially in day-to-day part-load operations. A CompAir compressor uses up to 30% less diesel fuel to achieve the same reduction in volume flow than all other comparable compressors on the market. This technology also makes the machines the lightest in their class.

