Working 24/7 to Make the Pipeline a Reality

There are pipelines all over the world, but the Nord Stream Pipeline project is considered unique. Why is this?

Nord Stream AG is a joint venture with five participating countries: Denmark, Germany, Russia, Sweden and Finland. The project consists of two pipelines running in parallel from Russia to Germany. Some of the pipelines will be laid on the Russian side of the Baltic Sea and enter German territory near Lubmin, Germany, working in April 2010. The Castoro Sei is scheduled to lay about 70 percent, or 85.5 kilometres, of each of the two pipelines. It started working in April 2010.

Solitaire

The Solitaire is the world’s largest pipe-laying vessel. This vessel will be working in the Gulf of Finland. Allseas has been subcontracted by Saipem for the Nord Stream project.

Facts and Figures

- Length excluding stinger: 387 metres
- Length including stinger: 430 metres
- Breadth: 45 metres
- Height: 41 metres
- Operating speed: 15 knots
- Fuel: 41,000 tonnes
- Logistics vessel: 169 Class D 3 LI SWP (A) type Skagerrak Kongsl 2
- Accommodation: 440 people
- Capesize of Nord Stream Pipeline about 2.4 kilometres by 50 metres

Making of: From Pipes to Pipeline

In April 2010, Nord Stream began constructing the first of its two natural gas pipelines through the Baltic Sea. The Nord Stream Pipeline system will deliver natural gas from Russia’s vast reserves to Europe’s ever-growing energy market via the European gas network.

Castoro Sei

> Saipem’s Castoro Sei is scheduled to lay about 70 percent, or 85.5 kilometres, of each of the two pipelines. It started working in April 2010.

Facts and Figures

- Length excluding stinger: 156 metres
- Length including stinger: 160 metres
- Breadth: 36.5 metres
- Height: 35.5 metres
- Logistics vessel: 12 anchors, 25 tonnes each, 76-metre diameter chain anchor
- Accommodation: 380 people
- Capesize of Nord Stream pipelines about 2.5 kilometres a day

Contacts

For more background information, visit our website at: www.nord-stream.com

To contact us by post, write to: Nord Stream AG, Verkehrsweg 16, 18459 Vorpommern-Greifswald, Germany, CH 4005 Zürich.

The Castoro Sei positions itself with a mooring system and tugboats. The Castoro Sei positions itself with a mooring system and tugboats.
Nord Stream Pipeline Construction

In April 2010, Nord Stream began installing the first of its two natural gas pipelines through the Baltic Sea. Construction started in Swedish waters with the Castoro Sei, the laybarge that will handle the majority of the job. Another vessel will work on sections within the Gulf of Finland and at the German landfall.

As it touches down on the seabed, the pipeline can rest on the seabed directly to the survey vessel. With sensors and instruments including cameras, the vessel is progressively lowered to its designated place on the seabed.

The Castoro Sei floats on twin pontoons. It is equipped with a powerful ROV that transmits information from the seabed to the survey vessel. Cameras monitor the pipeline as it is progressively lowered to its designated place on the seabed.

In some locations along the route, coarse gravel is necessary to provide further protection. In other locations, it is correct to position the pipeline without the use of anchors, using means of a 12-point mooring system. This system enables the vessel to maintain accurate positioning.

The stinger provides support to the pipeline as it is progressively lowered to its designated place on the seabed. S-Curved pipes enter the European gas grid where it will be used in this area known for dense ship traffic and historic wrecks. Each vessel in a floating factory where pipes are received from carrier vessels, welded together and then laid at an average pace of about 2.5 kilometers a day.

Once completed, the pipeline will be subjected to removal testing before gas can be transmitted. From the receiving terminal in Lubmin, the gas will enter the European gas grid at a subsea connection in countries such as Denmark, France, Germany, and the UK.

Pipes weighing about 22 tons each are required to the seabed from five stockyards strategically located along the route.

Construction Schedule for the First Pipeline

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Pre-Piping Survey

Through the seabed was scanned during the route planning phase, a pre-piping survey performed before pipeline installation confirms past data and minimizes post-laying repairs.

Pipelaying Process

1. The pipes are unloaded from the pipe carrier vessel and stored on the storage areas on each side of the laying barge. Each pipe carrier vessel delivers 24 pipes a day onto the barge.

2. To prepare the pipes for welding, the ends are grooved to make them exactly the right shape to be joined together. The groove on the pipe is performed using compressed air before it is conveyed to the double-joint welding station.

3. The double-joint welding station, two bevelled, 12-metre pipe joints are aligned and welded together to create a double joint segment measuring 24 metres. These double-joint sections will later be connected to 12-metre pipe joints to create a double-joint segment measuring 24 metres.

4. The double-joint is moved to the non-destructive testing station where every millimetre of the weld undergoes ultrasonic testing. If required, the defect will be repaired and the weld rescanned to meet international quality standards.

5. Heat is applied to the double joint and inspected at the double-joint welding station. The stinger provides support to the pipeline as it is progressively lowered to its designated place on the seabed.

6. The prepared double-joint is then placed in a pipe elevator to the central assembly line, where the pipes are moved in a pipe elevator to the central assembly line, where the pipes are prepared for welding onto the main pipe string.

7. The weld of the double-joint that has been welded is moved to the ultrasonic testing station where every millimetre of the weld undergoes ultrasonic testing. Once confirmed, it is moved to the welding station where the weld is inspected.

8. Once the weld is confirmed acceptable, it is moved to the ultrasonic testing station where every millimetre of the weld undergoes ultrasonic testing. If required, the defect will be repaired and the weld rescanned to meet international quality standards.

Anchor Pattern

During construction, the Castoro Sei is positioned by means of a 12-point mooring system. The system includes 12 anchors that are dragged into a shape forming a square. Each of the 12 anchor points is connected to the vessel. The vessel also features thrusters to further ensure precise positioning.

ROV

A remotely operated vehicle (ROV) fitted with sensors and instruments including cameras, transmits information from the seabed directly to the survey vessel.

S-Curve

At the pipeline is lowered to the seabed, it forms an "S" shape, which prevents it from being damaged during installation.

Pipes shown in yellow for clarity.

Infographic produced by KircherBurkhardt, March 2011.