

Design and Execution of a Giant Offshore Pipeline



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Today, gas can be transported economically over ever greater distances



Some examples

Engineering I Construction





Gas Supplies to Europe by Pipeline













Gas Throughput Capacity: 5.3 bscfd (55 b m³/a) Approx. 10% of EU 27 current gas consumption



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The Nord Stream Project









A huge project with gigantic volumes and weights

The largest and heaviest trunkline in the world

Overall pipeline

- 199,755 elements per line
- Total weight 5,000,000 t

Tube element

Diameter 48" (1.4 m)
Length 40 ft (12.2 m)
Weight ~ 24 t



saipem

7,000 t

Record performance

- Laying on the average 1.8 ÷ 2.2 miles, 6 ÷ 8000 t per day
- Almost 2.8 miles on record days
- Continuing operation 24/7 for over a year, no interruptions







Snamprogetti (now Saipem), previous and independent design contract with Nord Stream

Laying of the entire pipeline system

Many offshore and onshore services, in Russia and in Germany

Management of an armada of over 40 ships involved











Castoro 6 passing Storebelt bridge >







First line inaugurated on 8 November 2011









Logistics for just-in-time tubes supply



New coating and storages facilities along the pipeline path

Shipping distance to pipelay barge less than 100 nautical miles on the entire route

- > Two new concrete coating plants and marshalling yards: Mukran (DE) and Kotka (FI)
- > Three additional marshalling yards: Hanko (FI), Slite and Karlskrona (SE)

Benefits:

- > Direct pipe supplies, ensuring sufficient pipe supplies for the pipelay barge
- > Reduced handlings, making delays less likely
- > Short shipping distances and lower fuel consumption







Pipelaying never farther away than 1 hour flight by helicoener saipem







Utmost attention to the environment









Castoro 6 passing the Storebelt bridge



on the way back home in spring 2012







Beyond Castoro 6



The new Castorone

THE PRESENT AND THE FUTURE - CASTORO SEI AND CASTORONE COMPARISON

	CASTORO SEI	CASTORONE
Vessel Length	152 m	330 m
Vessel Width	78 m	39 m
Pipe Size	60 inch	60 inch
Storage Capacity	3,000 t	20,000 t
Tensioner Capacity	390 t total	750 t total
Station Keeping	#12 mooring lines	Dynamic Positioning DP3 - Thruster Output = 56 MW
Water Depth	up to 1,000 m	up to 3,000 m
Working Stations	#6 stations double joint	#7 stations triple joint
Firing Line	142 m	309 m







How big is the Castorone?









Castorone – The Next Performance Frontier



- Much higher productivities in S-lay and J-lay modes
 - Lower overall project cost
 - 25% productivity increase in Nord Stream- type situation
 - Better use of seasonal windows
 - Limited weather standby
- Much broader application range with significantly improved flexibility
 - From ultra-deep to shallow waters, also in S-lay, by simply adapting stinger configuration
 - Advanced weather capabilities
 - Fast moving dynamic positioning capability
 - On-board switch from S- to J-lay to suit route and depth one vessel only for the entire project
 - In line installation of large/heavy structures





First Projects with Castorone All in high productivity S-lay mode

Castoro lay barge, Saipem's first offshore construction vessel, a converted oil tanker (1966)





Walker Ridge Export Pipeline, GoM (Chevron) Max 7,000 ft w.d.

Big Foot Oil Export Lateral Pipeline, GoM (Enbridge) Max 5,600 ft w.d.

Gas Export Pipeline for Ichthys LNG Project, Australia (Inpex) 550 miles 42"







Let's see how it was done