Flexible Fallpipe Vessel Stornes

New addition to the Van Oord fleet

Zoetermeer, Tuesday 8 March 2011
Koos van Oord
Topics

• Equipment
• Workmethod
• Setup, engineering & building
• Ship’s particulars
• Stability and safety systems
• Propulsion and DP capability
• FFP & ROV design
• Generator set-up
• Status
Van Oord operates a fleet of specialised Subsea Rock Installation vessels (SRI), which are categorized into 2 types: Fallpipe Vessels (FPV) and Side Stone Dumping Vessels (SSDV).

Van Oord is currently the only company operating Flexible Fallpipe Vessels (FFPV), as opposed to Fallpipe Vessels, which have the advantage of being able to work in strong currents and being able to install rock material close to fixed structures (i.e. platforms).
SRI Equipment
DP Flexible Fall Pipe Vessels

- DP FFPV Tertnes 9,500 T
- DP FFPV Nordnes 23,500 T
- DP FFPV Stornes 28,000 T
SRI Equipment
DP Side Stone Dumping Vessels

- DP SSDV HAM 602  2,000 T
- DP SSDV HAM 601  1,000 T
- SSDV Frans  950 T
- SSDV Avelingen  450 T
SRI Equipment
DP Multi-Purpose Construction Vessels

DP MPCV & FFPV Jan Steen 2,000 T
Work method (movie)
Subsea Rock Installation

- State-of-the-art equipment
  - DP Flexible Fallpipe Vessels
  - DP Multi-Purpose Construction Vessels
  - DP Side Stone Dumping Vessels
- Highly accurate, even at water depths > 1200m
- Leading position worldwide
- Flexible and innovative solutions
- Close to live structures
- Investment programme ongoing – DP FFPV Stornes
Freespan correction
Pipeline stabilization
Pipeline crossings
Trench backfilling
Subsea Rock Installation
Applications Flexible Fallpipe
Subsea Rock Installation

Pre-Lay Supports & Counterfills
Subsea Rock Installation Applications
Flexible Fallpipe

Scour protection

Ballasting

Seabed preparation
**New investment for SRI**

**FFPV Stornes**

### Vessel Particulars

<table>
<thead>
<tr>
<th>Type</th>
<th>Flexible fallpipe vessel</th>
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<tbody>
<tr>
<td>Classification</td>
<td>DP Class 2, ABS</td>
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<tr>
<td>Operational</td>
<td>2011</td>
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<tr>
<td>Dimensions</td>
<td></td>
</tr>
<tr>
<td>Length</td>
<td>175m</td>
</tr>
<tr>
<td>Width</td>
<td>26m</td>
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<tr>
<td>Depth moulded</td>
<td>14.50m</td>
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<tr>
<td>Dumping depth</td>
<td>1,200m</td>
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<tr>
<td>Capacity</td>
<td>24,000m$^3$</td>
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<tr>
<td>Deadweight</td>
<td>28,000 metric tons</td>
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<tr>
<td>Max. working depth</td>
<td>1,200m</td>
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<tr>
<td>Service speed</td>
<td>14.5 knots</td>
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<tr>
<td>Accommodation</td>
<td>51 persons</td>
</tr>
</tbody>
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In March 2007 Van Oord signed the contract for the building of a new FFPV Vessel
Historic background of Stornes

• Jebsens signs a building contract in March 2006
• Contract includes an option for additional vessel
• Van Oord and Jebsens use option for FFP vessel
• Van Oord signs a building contract in March 2007
• Van Oord and Jebsens join forces to build ‘Vestnes’ and ‘Stornes’
Design phase

- Vessel design: MarCon a/s, Denmark
- FFP design: BvS, Netherlands
- DP-2 installation: Rolls Royce, Norway
- Selfunloading installation: Emstech, Canada
- Detailed design, piping and routing: China
Building location FFPV ‘Stornes’

Beijing
Yantai
Shanghai
City of Yantai

- 1.5 million people, 6.5 including all suburbs
- Famous tourist location for Chinese citizens
- Moderate climate, similar to Netherlands
- Good transportation including airport
- International trading port since 1861
Very large order book including,

- DP-3 pipelay vessels, semi subs and fso
- Yard has preference for specialized vessels
- Very large crane capacity up to 20,000 tons
Main particulars Stornes (1)

- Length overall: 175 meter
- Breadth moulded: 26 meter
- Cargo capacity: approx 27,000 tons
- Main engines: 2 x 4000 kW
- Bow thrusters: 3 x 1500 kW
- Azimuth thrusters: 2 x 2000 kW
- DP-2, ABS classification
- 51 person accommodation
- Operational working depth: >1200 meter
- Entering the fleet: summer 2011
- Building yard: Yantai Raffles, China
Newbuild rockdumper: 17% increased TDW compared to Nordnes
Stability and safety systems

Accommodation: one additional layer and purpose build

- Better view for navigation
- First Aid room on A-deck
- High fog for galley and engine room
- CO-2 for holds, tunnel and C-loop
- Special attention for escape routes accommodation
- Special attention for sound and vibration
Propulsion & DP capability

Improved Nordnes configuration

- Bow thruster configuration
- Azimuth thruster configuration
- Aft ship thruster configuration
- Generator setup
Bow thruster configuration

Nordnes: 2 x 1200 kW, 1 x 1500 kW
Stornes: 3 x 1500 kW identical thrusters
Azimuth thruster configuration

Nordnes: 2 x 1500 kW,
Located in wing tanks with very little hold volume reduction

Result: 2 x 2000 kW,
Located before engine room

Stornes has twin belt cargo holds
Aft ship thruster configuration (1)

Nordnes: 1 x 7300 kW main engine, 1 x 1000 kW stern thruster

Main propeller and rudder not designed for DP use
Stornes: 2 x 4000 kW main engine with flap rudders

Main propeller and rudder designed for DP tracking and low noise

Flap rudders create double stern thrust compared to Nordnes

High ERN number: 99, 99, 96
FFP design

Based on Nordnes design

- Designed for 1200 meter water depth
- Enhanced moonpool handling system
- Extra fallpipe storage capacity
- Additional testing and repair facilities
Bucket storage container

- Slewing container
- Storage length +10%
- Higher walkways +15 cm
- Hydraulic sea fastening
FFP maintenance and repairs

Features:
- Container locks
- Large work deck
- Bucket servicing
ROV maintenance awareness

Easy and safe access, also for wear parts
Block 301 B under construction at Yantai Raffles.

Block 301 C under construction at Yantai Raffles.
Block 301 A under construction at Yantai Raffles

Block 102 under construction at Yantai Raffles
Pictures

Bulkheads construction at Bei Fang

Overview Bei Fang
Stornes
Thank you for your kind attention
Questions?