



Vryhof leader in mooring of renewable energy devices

Khalid Errabih 01-03-2017



Introduction:



-
- Vryhof Anchors is a mooring and anchoring company founded in 1972, headquartered near Rotterdam, The Netherlands. www.vryhof.com
 - Since then invented designs like; Stevin® , Stevpris® , Stevshark® , Stevmanta® , Stevtensioner® , Stevtrack® , etc.
 - Vryhof has supplied more than 10500 anchors to the offshore industry....
 - Vryhof has also supplied full mooring system and installation services to many projects worldwide
 - A selection of floating renewable energy projects and activity areas in other sectors are presented next

Vryhof is heavily involved in Floating Renewable Energy Systems (FRES)



We have supplied to the following projects in the world

- | | |
|---------------------------------|------------|
| Hywind - Statoil | - Norway |
| Windfloat - Principal Power | - Portugal |
| University of Maine - VolturnUS | - USA |
| Fukushima Kizuna – IHI/JMU | - Japan |
| Fukushima Mirai – Mitsui | - Japan |
| Fukushima Shimpuu – Mitsubishi | - Japan |
| SKWID – Modec | - Japan |
| Wave and current devices | - World |



And many other projects to be deployed in near future !!

Vryhof is heavily involved in Japan Floating Renewable Energy Systems (FRES)



**Fukushima Forward – JMU (former IHI)
Fukushima Kizuna**



Substation

WD: 120 m

Soil:

- Soft rock, mudstone/siltstone
- Catenary all chain
- 4 x 22.5mT Vryhof St0evshark® with 8.8 mT ballast with special cutter points

Installation:

- AHV and construction barge with chain tensioner
- Installed in: July 2013

**Fukushima Forward – MITSUI
Fukushima Mirai**



Turbine: 2 MW

WD: 122-123 m

Soil:

- Soft rock, mudstone/siltstone
- Catenary all chain
- 6 x 25mT Vryhof Stevshark Mk5® with 9.8 mT ballast with special cutter points

Installation:

- AHV and construction barge with chain tensioner
- Installed in: November 2013

**Fukushima Forward – Mitsubishi
Fukushima Shimpuu**



Turbine: 7 MW

WD: 125 m

Soil:

- Soft rock, mudstone/siltstone
- Catenary all chain
- 8 x 29.5mT Vryhof Stevshark Mk5® with 11.5 mT ballast with special cutter points

Installation:

- AHV and construction barge with chain tensioner
- Anchors installed in: July 2014
- Hook-up in July 2015

Vryhof Technology and Engineering Services



- Supply of complete mooring systems and installation support
 - Drag Embedment Anchors
 - Anchor analysis
 - Requirements analysis and site investigation specifications for offshore moorings
 - Geotechnical design, Technical evaluations and feasibility studies
 - Soil analysis and anchor advice
 - Analyses and selection of components
 - Design, engineering and fabrication of custom tools e.g. chain adjusters, stevlink, etc.
 - Anchor handling and installation procedures – offshore supervision
 - Installation tools; Stevtensioner rental and supervision

