

FREYSSINET POST-TENSIONING SYSTEM FOR OFFSHORE STRUCTURES



DESIGN, BUILD, MAINTAIN



FREYSSINET
SUSTAINABLE TECHNOLOGY



Hibernia, Canada

► PRESTRESSED CONCRETE FOR OIL AND GAS OFFSHORE PLATFORMS

The growing demand on energy has led to the increase in term of quantity, size and production capacity of onshore and offshore oil and gas facilities all over the world.

Prestressed concrete has been employed on a number of important offshore projects and remains a very efficient technology for fixed platforms and for floating structures used for the drilling, extraction, production or storage of crude oil or natural gas.

Prestressing technology consists in applying permanent compressive stresses induced by high-strength steel tendons stressed in the concrete in order to strengthen the structure and ensure the liquid tightness.

The advantageous characteristics of prestressed concrete perfectly match the stringent requirements of offshore constructions :

Durable, safe and easy to maintain in aggressive marine environment :

- excellent fatigue behaviour
- good resistance to abrasion
- limited crack propagation
- slow chloride migration
- watertight
- good resistance in case of fire or ice
- very good resistance to impacts (icebergs and boats) or earthquakes
- less inspections for a better service availability and a reduction of the strains on the structure due to the warm up and cool down operations

Structural advantages :

- low centre of gravity reducing motions and giving better station keeping characteristics
- No size limitation of the structures

Cost effective construction :

- local materials procurement
- local labour employment
- optimised construction schedule thanks to efficient construction methods

Efficient behaviour for specific cryogenic applications :

- good isolating properties for the storage of LNG or LPG
- excellent resistance in the event of a leakage since prestressing tendons remain ductile while concrete becomes stronger at low temperatures : the prestressed concrete is not embrittled and can continue to contain the cryogenic liquid



Ninian, Scotland



Ninian, Scotland



Adriatic, Italy

► FREYSSINET OFFSHORE PRESTRESSING: INNOVATION AND EXPERTISE TO REACH THE BEST

As a world leader in post-tensioning, Freyssinet has been involved in offshore projects for more than thirty years and has developed the Freyssinet Offshore Prestressing in order to meet the specific requirements of these specialized construction works.

The most optimised design of the structure, the best quality of the materials and the strongest experience in construction are mandatory to reach the highest performance and longest durability of the prestressed concrete structure.

Freyssinet, Inventor of the prestressed concrete, proposes a complete range of innovative products and efficient processes designed for the aggressive environment and hard work conditions of offshore projects.

The performance of the Freyssinet Offshore Prestressing, resulting of continuous research and development work of more than seventy years, makes it the solution of excellence for the building of oil and gas offshore structures.

Freyssinet system complies with the European Technical Agreement Guideline (ETAG 013) known as one of the most stringent international standard for post-tensioning kits.

Freyssinet is the holder of the ETA n°06/0226, covering the application under cryogenic conditions, and of the CE marking certificate n°1683 - CPD-0004.



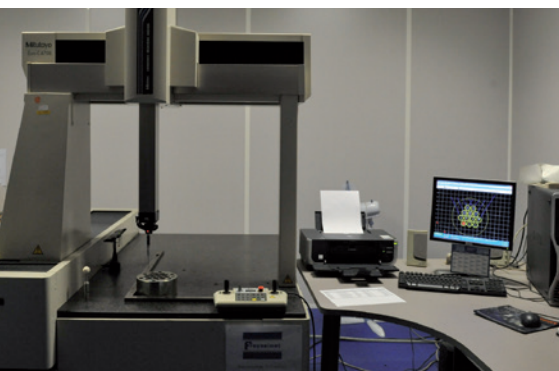
ETAG 013 - "European Technical Approval" and the associated "CE Declaration of Conformity"

Freyssinet integrated offer: from studies to construction

- Design, engineering and testing
- Construction methods
- Materials and equipments supply
- Works implementation, technical assistance
- Maintenance



Freyssinet C-system anchorage



Production control in Freyssinet factory in France

Such engineering contractor culture makes Freyssinet the ideal partner for specialized construction projects in the respect of the highest quality and safety requirements. The Freyssinet expertise goes hand-in-hand with the professionalism of its teams, located all over the world and trained within the Freyssinet PT Academy.

REFERENCE LIST OF MAJOR OFFSHORE PLATFORMS WITH FREYSSINET POST-TENSIONING SYSTEM

Field	Operator	General Contractor	Country	Concrete structure designer	Water depth	Strands quantity	Year installed
ADRIATIC	ExonMobil/Qatar Petr./Edison	Aker Kvaerner	Italy	Aker Kvaerner	29 m	3 860 tons	2008
HIBERNIA	Mobil	Hmdc	Canada	Doris	60 m	8 000 tons	1997
FRIGG TCP 2	Elf	Condeep Group	Norway	Groner	104 m	600 tons	1977
NINIAN	Chevron	Howard/Doris	Scotland	Howard/Doris	139 m	4 000 tons	1977
BRAZIL	Petrobras	Campenon Bernard	El Salvador	Campenon Bernard	15 m	300 tons	1977
FRIGG MP2	Total	Howard/Doris	Sweden	Howard/Doris	94 m	2 600 tons	1976
DUNLIN	Shell	Andoc	Holland	Andoc	152 m	2 200 tons	1976
FRIGG CDP 1	Total	Howard/Doris	Norway	EEG	96 m	2 600 tons	1975
BERYL	Mobil	Condeep Group	Norway	Dr. Olav Olsen	120 m	820 tons	1975
BRENT	Shell	Condeep Group	Norway	Dr. Olav Olsen	140 m	1 270 tons	1975
EKOFISK 1	Phillips	CG Doris	Norway	EEG for Doris	70 m	3 300 tons	1973

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