

Project Quick Facts

Client:	Thang Long Joint Operating Company (TLJOC)
Location:	130km East-southeast Vung Tau, offshore Vietnam
Contractor:	Neptune Subsea Stabilisation / Lam Hong Diving
Delivered:	August 2017
Classification:	Structural Repairs
Scope of Works:	Engineering, supply and installation of ultra-high performance grout material for restoration of subsea jacket members to HST Platform
Specification:	ce200™-140G Grout
Characteristics:	140MPa at 28-days
Quantity of Material:	45MT
Third-Party Approval:	ABS Consulting (witnessed and verified)



Client Inspecting ce200™-140G



Offshore Mixing Equipment

Project Overview

ceEntek were involved with the project at various stages from inception through to final delivery and reporting, as summarised:

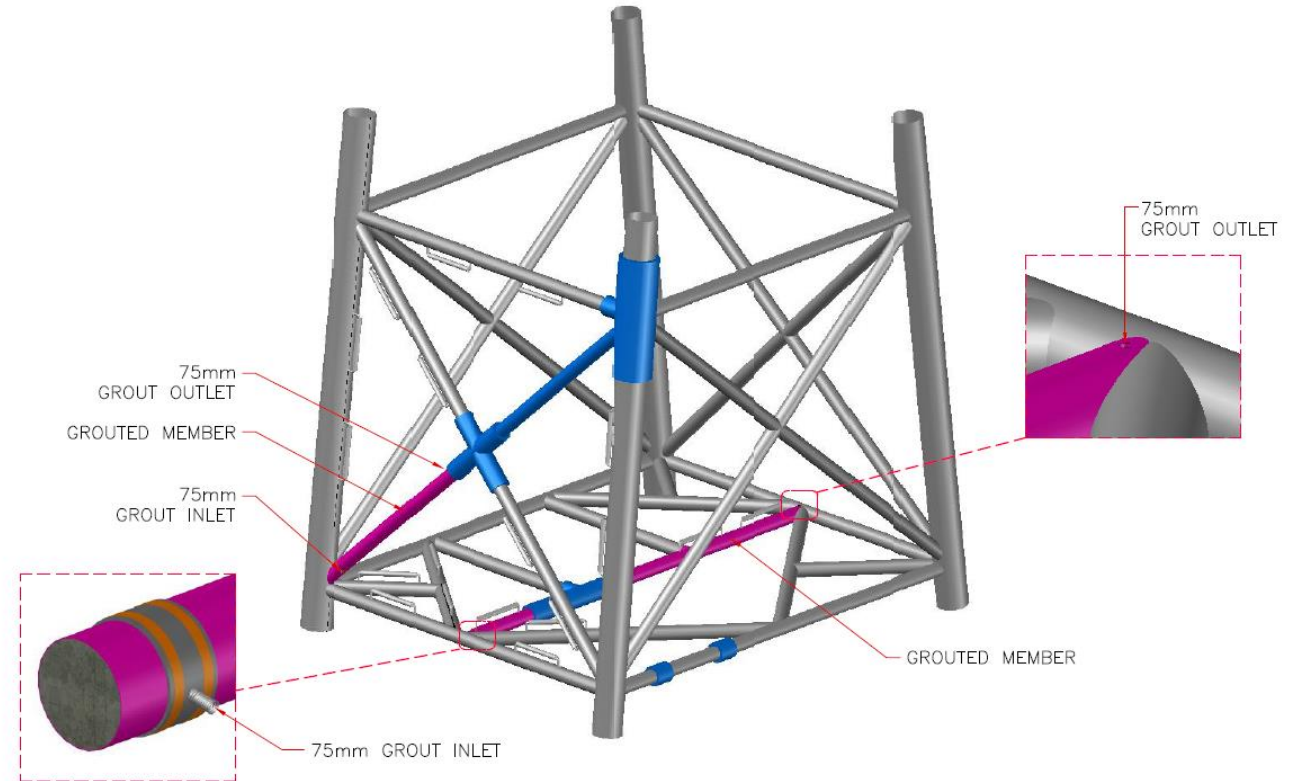
- 1. Design & Engineering** – providing engineering support on the material specification and performance characteristics to achieve project requirements;
- 2. Onshore Trials** – conducting laboratory and full scale material trials on-shore, witnessed and endorsed by ABS Consulting, to confirm material performance, pumpability and to generate offshore procedures;
- 3. Material Preparation and Production** – upon confirmation of quantity, procurement of raw materials, blending and batching, packaging and dispatching for offshore operations;
- 4. Offshore Installation Support** – assisting Neptune Subsea Stabilisation with installation procedures and offshore technical queries with correct material handling;
- 5. Testing & Reporting** – managing post-installation testing and reporting of samples to confirm consistency with the project requirements.

Further details are provided on our design and engineering considerations and offshore installation methodology.

Design & Engineering

Engineering and structural modelling of the HST Platform following an inspection and survey during 2016 determined a requirement for an UHPC grout to be deployed to various members of the subsea jacket.

Material:	ce200™-140G
Description:	CNF UHPC Grout
Strength:	Compressive = 140MPa Flexural = 18MPa
Shrinkage:	< 0.01%
Elasticity:	50GPa



Installation Methodology

A high-level work methodology is provided below for reference:



Step 1 :
Subsea drilling into member using pneumatic and hydraulic drilling equipment by divers



Step 2:
Flushing of member using die materials to ensure continuity through section for grouting operations



Step 3:
Installation of grout valve and pumping of ce200™-140G UHPC grout material to fill member



Step 4:
Mechanical lock-off at member upon completion of grout installation to complete works

Report no. 17-34636-SG	Project no. 3923375	Report date: 17.08.2017	Office: Singapore
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2.0 Details:

Index No.	Description	Loading Rate	MPa
1.	50*50*50 mm Cube Sample 1 Curing Duration: 1 day	60 kN / min	85.96
2.	50*50*50 mm Cube Sample 2 Curing Duration: 1 day	60 kN / min	89.16
3.	50*50*50 mm Cube Sample 3 Curing Duration: 1 day	60 kN / min	71.48
4.	50*50*50 mm Cube Sample 4 Curing Duration: 1 day	60 kN / min	86.44
5.	50*50*50 mm Cube Sample 5 Curing Duration: 1 day	60 kN / min	83.28
6.	50*50*50 mm Cube Sample 6 Curing Duration: 1 day	60 kN / min	86.12

Report no. 17-34672-SG	Project no. 3923375	Report date: 23.08.2017	Office: Singapore
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2.0 Details:

Index No.	Description	Loading Rate	MPa
1.	50*50*50 mm Cube Sample 1 Curing Duration: 7 days	60 kN / min	123.92
2.	50*50*50 mm Cube Sample 2 Curing Duration: 7 days	60 kN / min	128.44
3.	50*50*50 mm Cube Sample 3 Curing Duration: 7 days	60 kN / min	109.68
4.	50*50*50 mm Cube Sample 4 Curing Duration: 7 days	60 kN / min	132.24
5.	50*50*50 mm Cube Sample 5 Curing Duration: 7 days	60 kN / min	130.32
6.	50*50*50 mm Cube Sample 6 Curing Duration: 7 days	60 kN / min	133.92

Project Achievements

The following project achievements are noted:

- **One Stop** – we provided a turn-key solution through our network of offices & strategic partners;
- **Responsive** – the job was delivered within 6-weeks from start to finish, reacting quickly without compromising quality;
- **Cost Effective** – our smart system and optimised batching and pumping regime presented significant operational savings.

For further details, please contact:

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Offshore Vessel at HST Platform



Offshore Delivery Team