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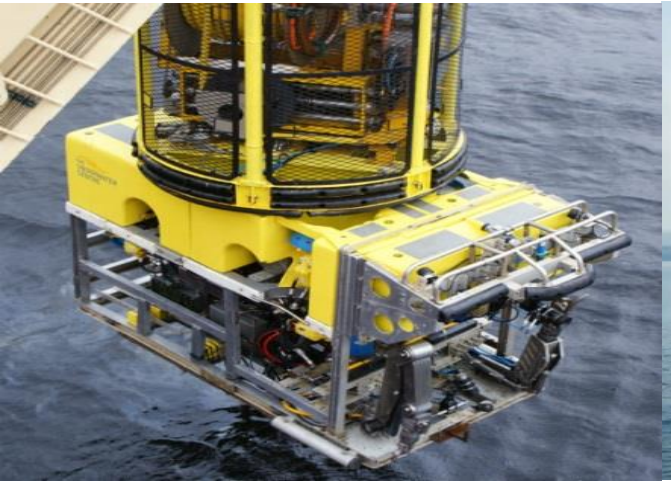

G8 SUBSEA CablePro Engineering Services

YOUR LEADING PARTNER FOR TURNKEY SUBSEA CABLE CONSTRUCTION

Excellence in Engineering- CABLE INSTALLATION & SHORE END SERVICES

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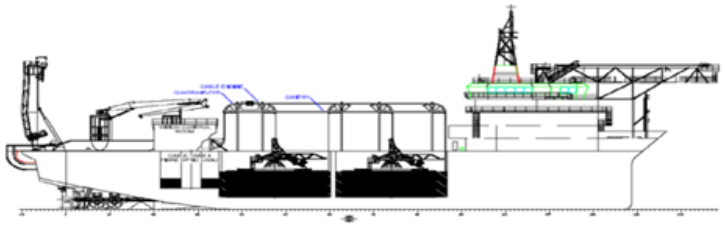
CablePro Solutions connects Offshore Wind Power and Subsea Networks



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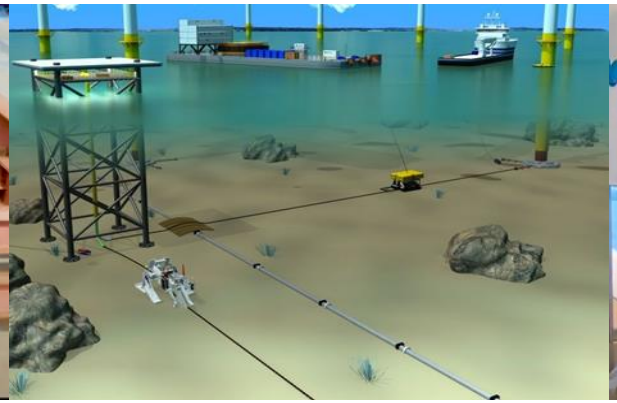
INTRODUCTION – EXCELLENCE IN SUBSEA CABLE INSTALLATION



G8 SUBSEA is Asia's leading subsea engineering company specializing in the engineering of construction for power and telcom submarine cable systems. The company serves leading EPC and project developers with our extensive experience in cable system constructions with established track records that include successfully completed projects throughout in Asia under its **CABLE Pro** engineering services. This is backed by an extensive fleet of Installation vessels and cable installation equipment to provide turnkey solutions to power utilities and telecom developers.

In 2020, G8 had successfully installed 15 HV cables & 29 Cable landings including 230kV High Voltage cables with a recorded 10m burial protection to leading Power Utility Companies. G8 works closely with EPC companies and project developer is highly experienced in both shallow water and deep water operations to construction and the details of the extensive project references. We cover Desktop Engineering Services (DTS), Route Survey, Cable Installation and Shallow Water Services.

G8 CABLE Pro Presentation

CONTENTS

Regional Project Coverage and Support Services

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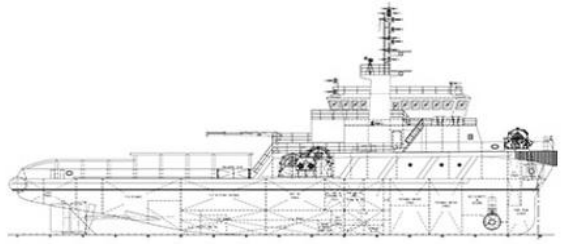
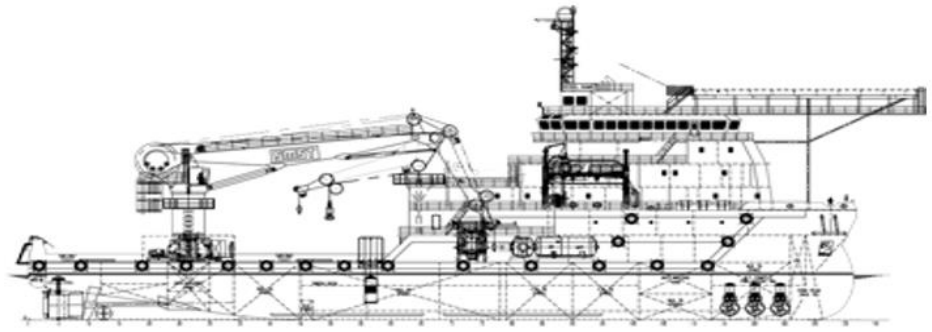
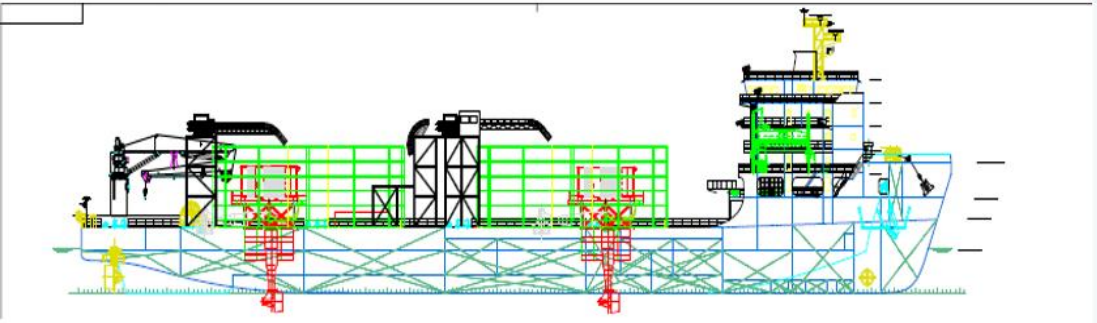
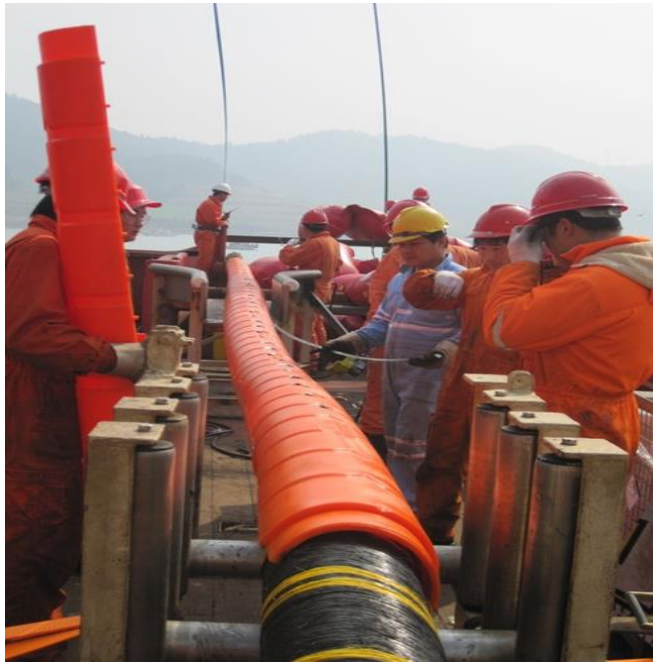
Cable Installation Vessels & Subsea Installation Systems in Asia







Crest ONYX 6000BHP	Cable Route Survey, PLGR Cable Route Clearance, Shallow water support
DP2 Crest Odyssey	<u>Inter Array Cable Lay.</u> ROV Trencher support, Post Lay Burial & Inspection
Crest Angelica 1700m2 7000tonnes Cable Load	<u>Export Cable</u> Transporter/Installer. HV Cable Installer



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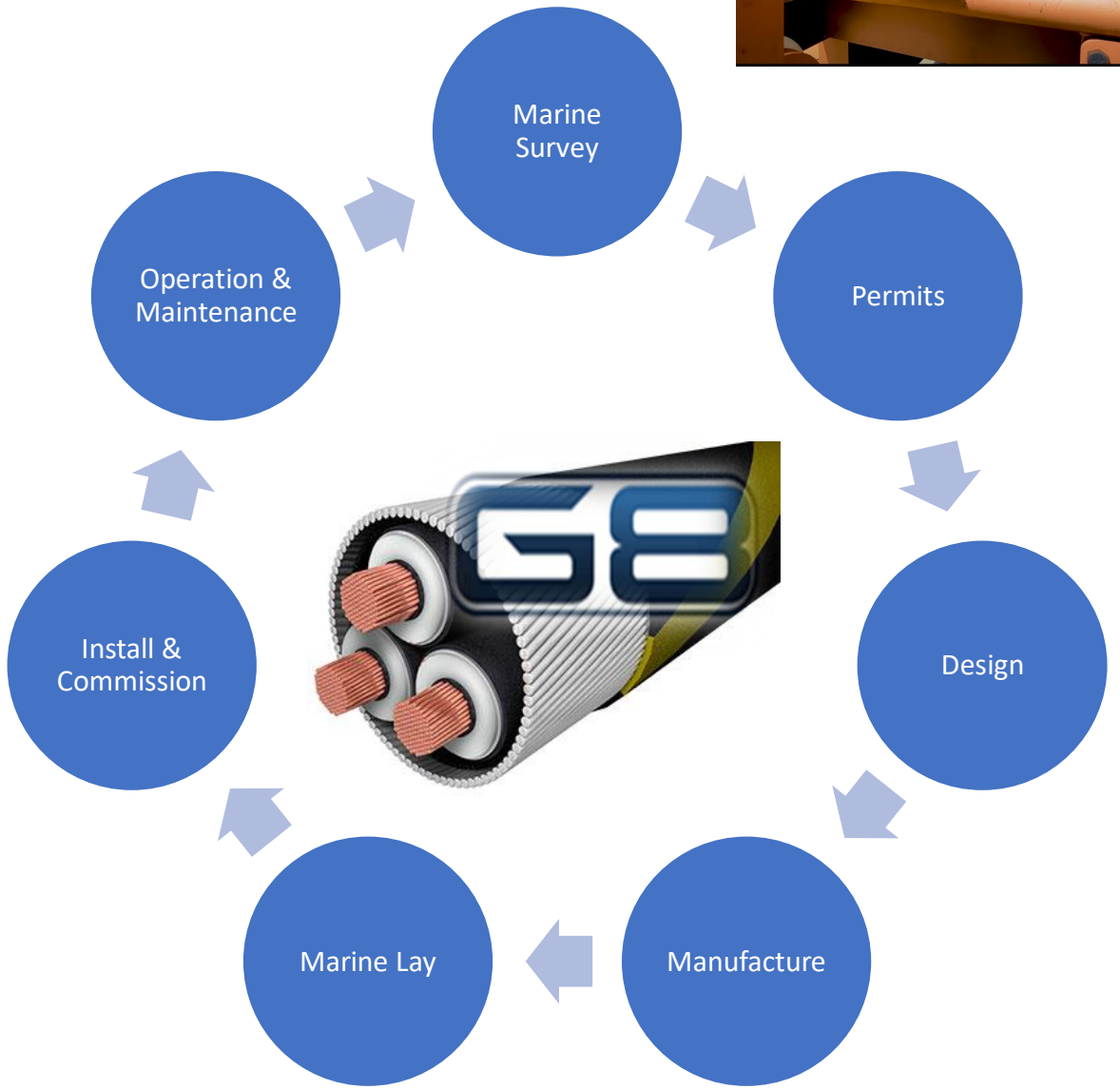
G8 Cable System Implementation Phases

- Preliminary Studies & Consultation
- Permitting & Relevant Authorities
- Desktop Engineering Studies, Survey and Final Selection
- Design Cable System, Cable Laying & Protection
- Operation & Maintenance



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Delivering the Marine Scope of Works

MARINE PROJECT MANAGEMENT	CABLE INSTALLATION	INSPECTION
Permitting & Documentation	Cable Loading Route Clearance	ROV Inspection
Desktop Study	Main Lay	AUV Survey & Inspection
Cable Route Survey	Pre-Laid Shore End	Diver Inspection
Marine Liaison Fisheries	Direct Landing	
Safety, Health & Environment	Burial & Protection	
MARINE ASSETS	**TRENCHING TOOLS**	**TERMINAL INSTALLATION**
Cable Lay Vessel	ROV Trenching	Cable Testing
ROV /PLIB Vessels	High Pressure Water Jetting	BMH Design
PLGR /AHTS Vessel	Ploughing	BMH Construction Supervisory
GeoTechnical Vessel	Diver	Ocean Ground Works

CLS--BMH--PLSE--Main Lay..Direct Landing..BMH--CLS

CablePro®

CABLE Pro Engineered Solutions Installation & Protection Of Subsea Cabling

We provide

- **Survey Vessels**
- **Shallow Water Support Spreads**
- **Cable Storage**
- **Pre Lay Grapnel Run (PLGR)**
- **Cable Transport & Lay**
- **Cable Trenching Machines**
- **Post Lay Inspection & Burial (PLIB)**

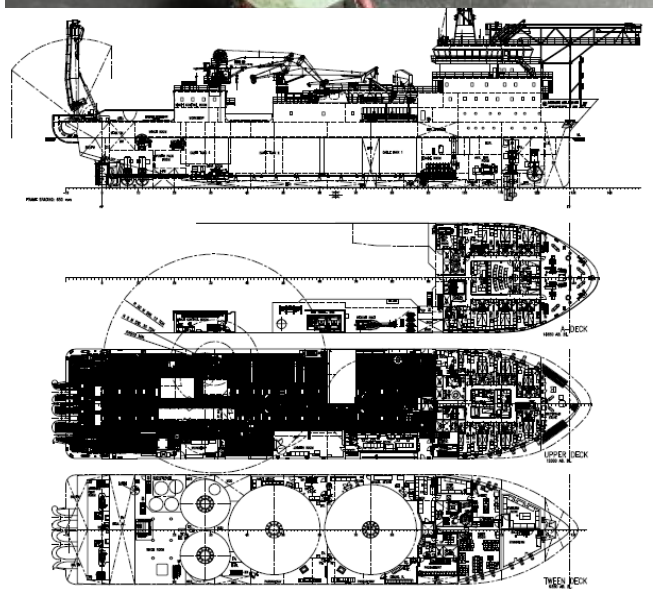
We package and mobilize complete spreads for various cable installation operations that include CLVs, ROVs, Trenching Systems and G8 PowerDrive Cable Turntable together with Shore End Equipment

Marine Assets

- Survey Ships
- PLGR Vessels
- PLIB / ROV Vessel
- IRM/ROV Vessel
- GeoTechnical Vessel
- Cable Lay Vessel
- PLSE Vessels
- Underwater Trenchers

DP 2 Vessels

Cable Loading, Transport & Testing - Cable Factory Trackway to Port



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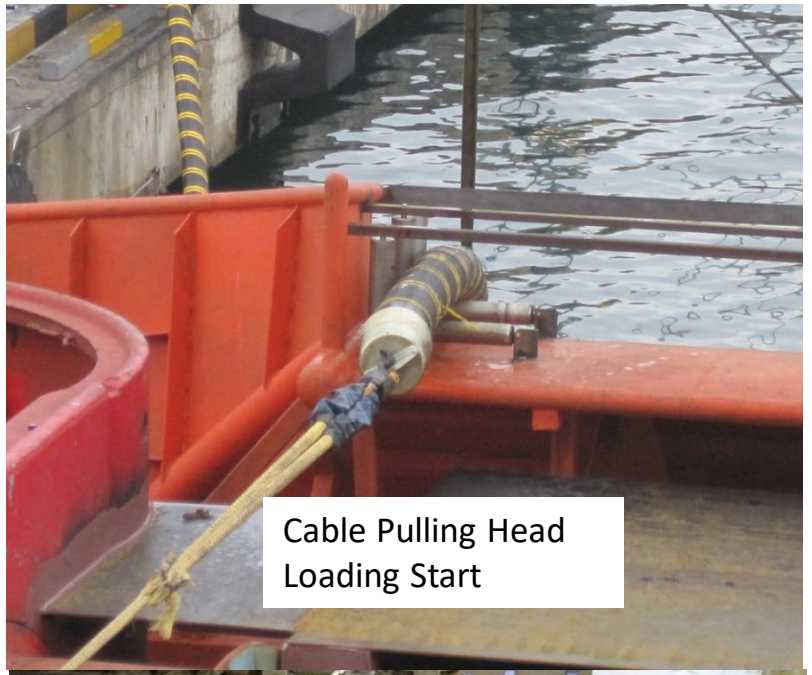
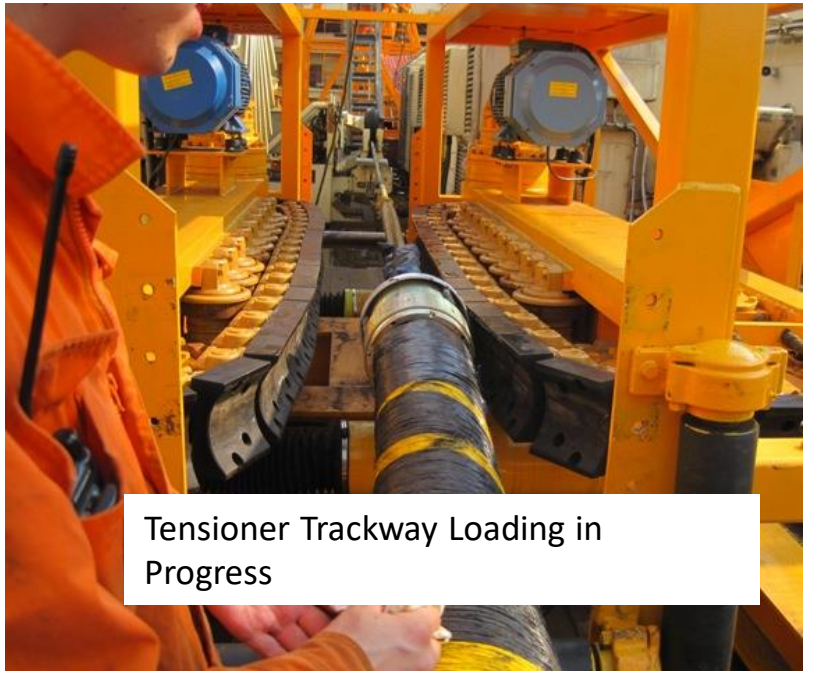
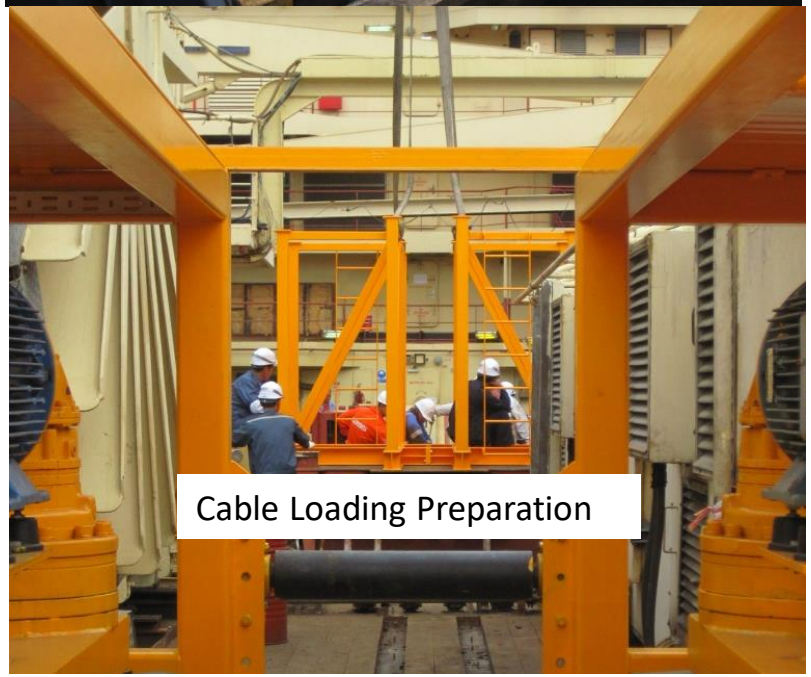
Cable Vessel Alongside Loading Preparation



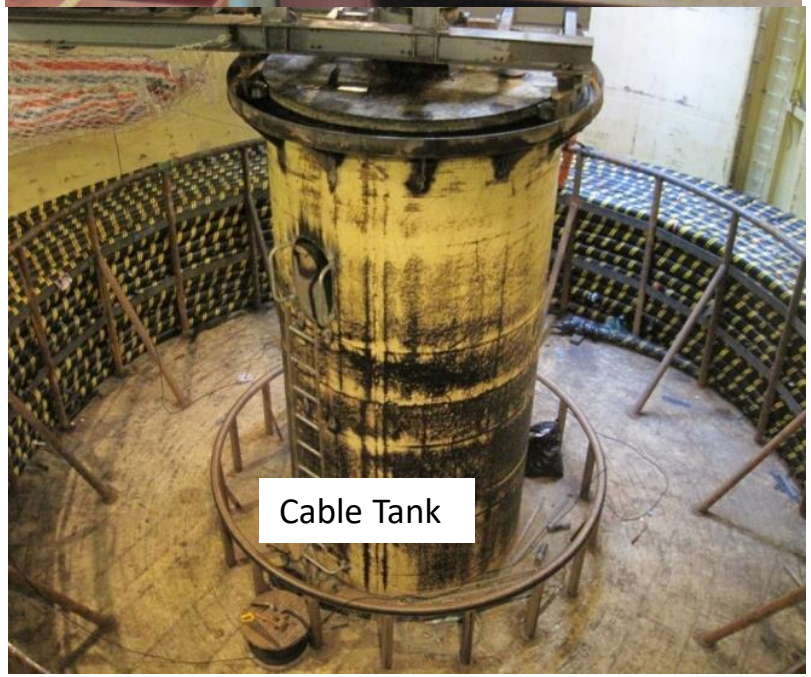
Cable Pulling Head Loading Start



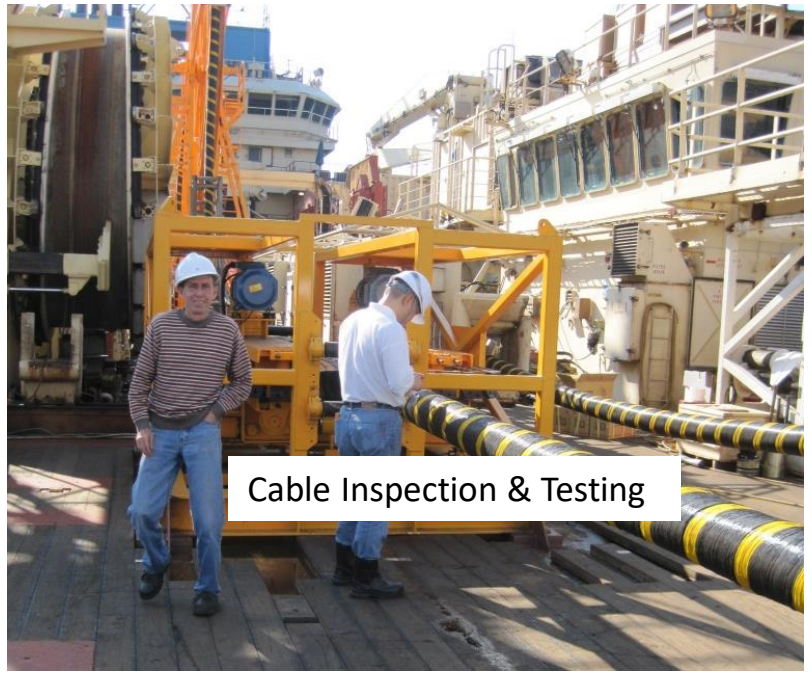
Tensioner Trackway Loading in Progress



Cable Loading Preparation



Cable Tank



Cable Inspection & Testing

G8 Shallow Water Services & Shore End Cable Landings

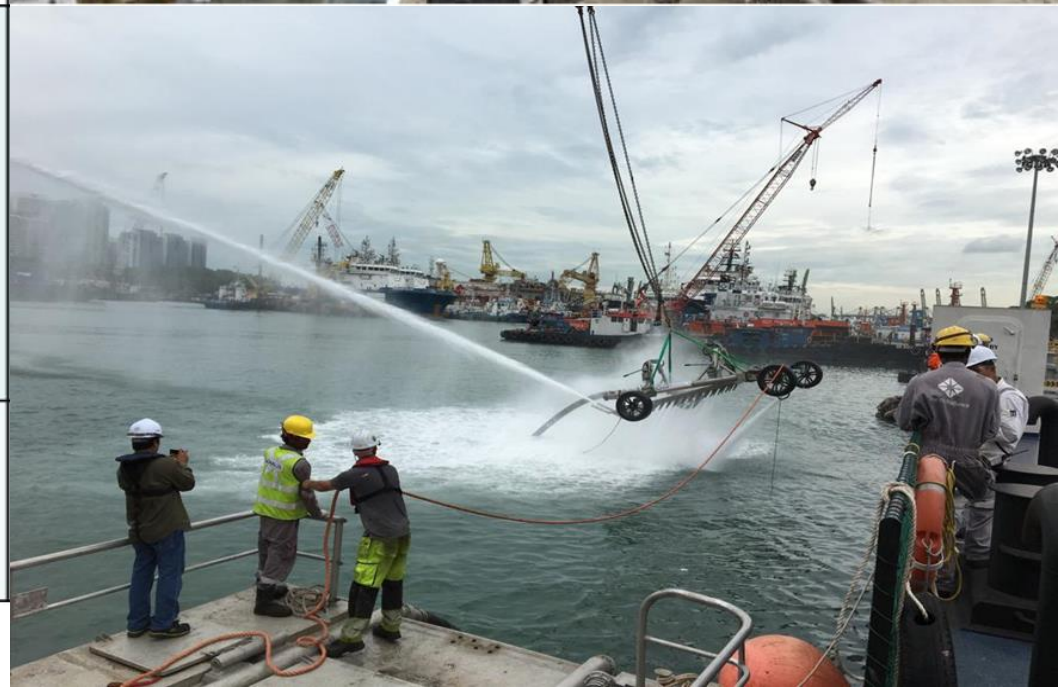
G8 Cable Protection Systems & Deep Burial Injector

10m Deep Burial Cable Injector with Twin Lay System

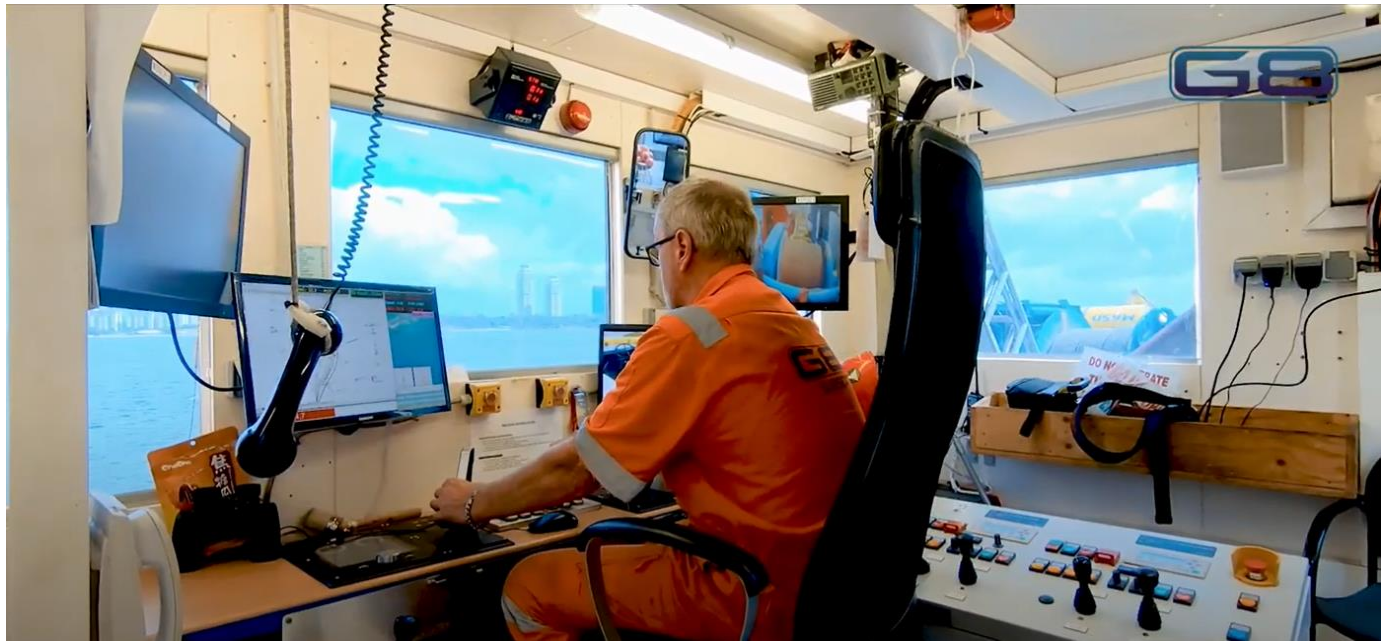
G8 Cable Pro®

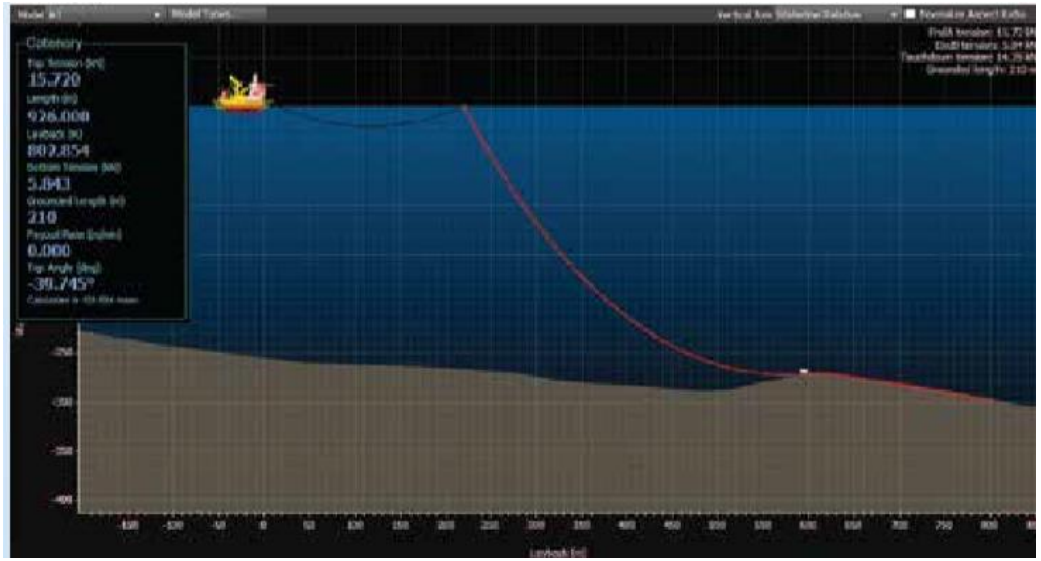
Shallow Water & Shore End Cable Burial Systems

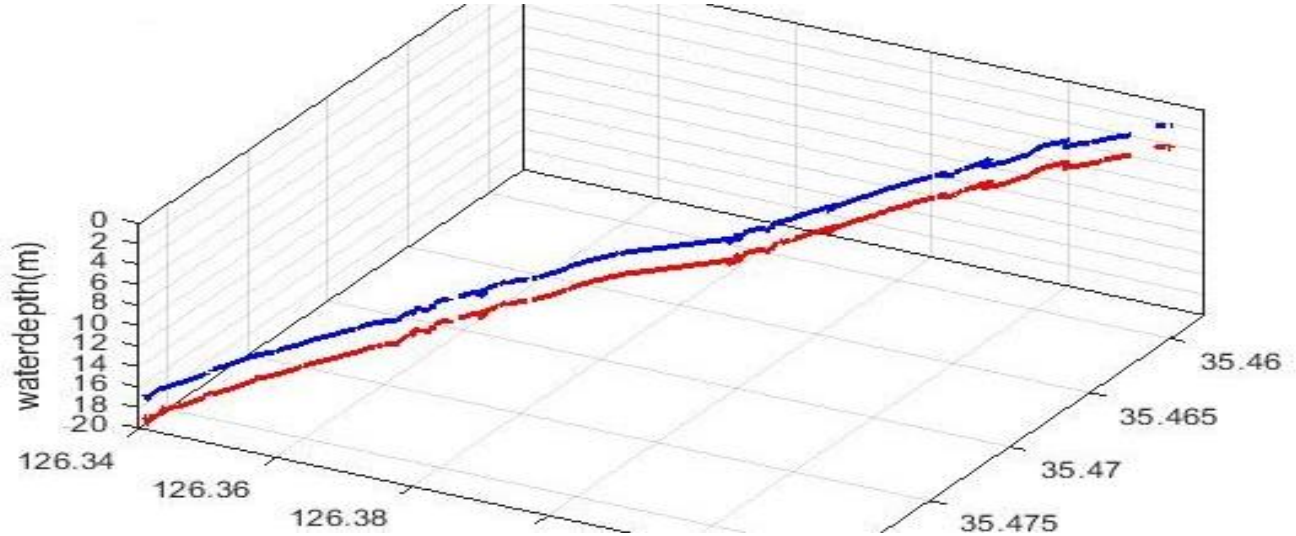
Cable Trenching Machine Series 1 A high velocity jetting trencher designed with no moving parts during trenching engagement designed to avoid stress and damage to cable and pipelines.	• Product: Cable, Umbilical and Pipelines up to 1,000mm • Soil strength: up to 250KPa • Seabed type: Sand, silt, gravel and clay • Trenching method: Jetting • Max Burial Depth: 3m • Power: Top fed from pumping barge • Operational Water Depth: 60m • Weight in air: 850kg • LxWxH (m): 4.5 x 3.7 x 1.0
Cable Trenching Machine Series 2 A high velocity jetting trencher designed with no moving parts during trenching engagement designed to avoid stress and damage to cable and pipelines.	• Product: Cable, Umbilical and Pipelines up to 920mm • Soil strength: up to 250KPa • Seabed type: Sand, silt, gravel and clay • Trenching method: Jetting • Max Burial Depth: 3m • Power: Top fed from pumping barge • Operational Water Depth: 60m • Weight in air: 1,300kg
Ultra Shallow Water Pump Pontoon Independent, small built, lightweight, and complete pumping unit for the trenching machines	• Config: Container based pontoon • Pumps: 2 x 750m3/hour • Propulsion: Volvo Penta • LxWxH (m): 10 x 4 x 1 • Operational Water Depth: 0.5m min



CABLE Positioning & Installation Monitoring System







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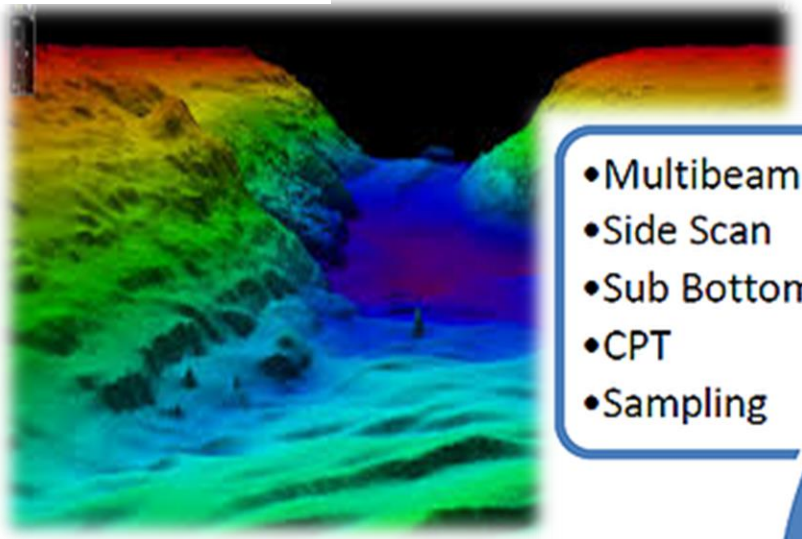
CABLE DESKTOP ENGINEERING STUDY - DTS



- Multibeam
- Side Scan
- Sub Bottom
- CPT
- Sampling

Survey

Cable Lay

- Route Selection
- PLGR
- Cable Lay
- Trenching
- Burial Protection

Post Lay

- Survey
- Monitoring
- Repair
- Maintenance

HSE & Support

- Risk Assessment
- O&M
- Marine Consultancy
- Project Management

G8 DTS - CABLE DESKTOP ENGINEERING STUDY

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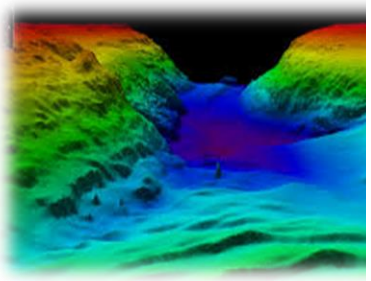

G8 DTS

Commence Study

Data Collection

Site base date gathering

Desk based data gathering

Route Selection

Refine route /Refine mitigation measures

Cable Route G8-DTS

Study Compilation

Route Selection

Risk Analysis

Deliverable Publish Report

Risk Summary
System
Recommendations
Cable Quantities
Responded route

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Right Route Faster Destination & Better Economics

Data Collection

Geotechnical, Geophysical, Chart, GIS, Shipping, fishing, Cable specification, Routing data, UXOs, Previous studies

Desk Top Studies

Data Validation, Risk Assessment, Suitability, Feasibility

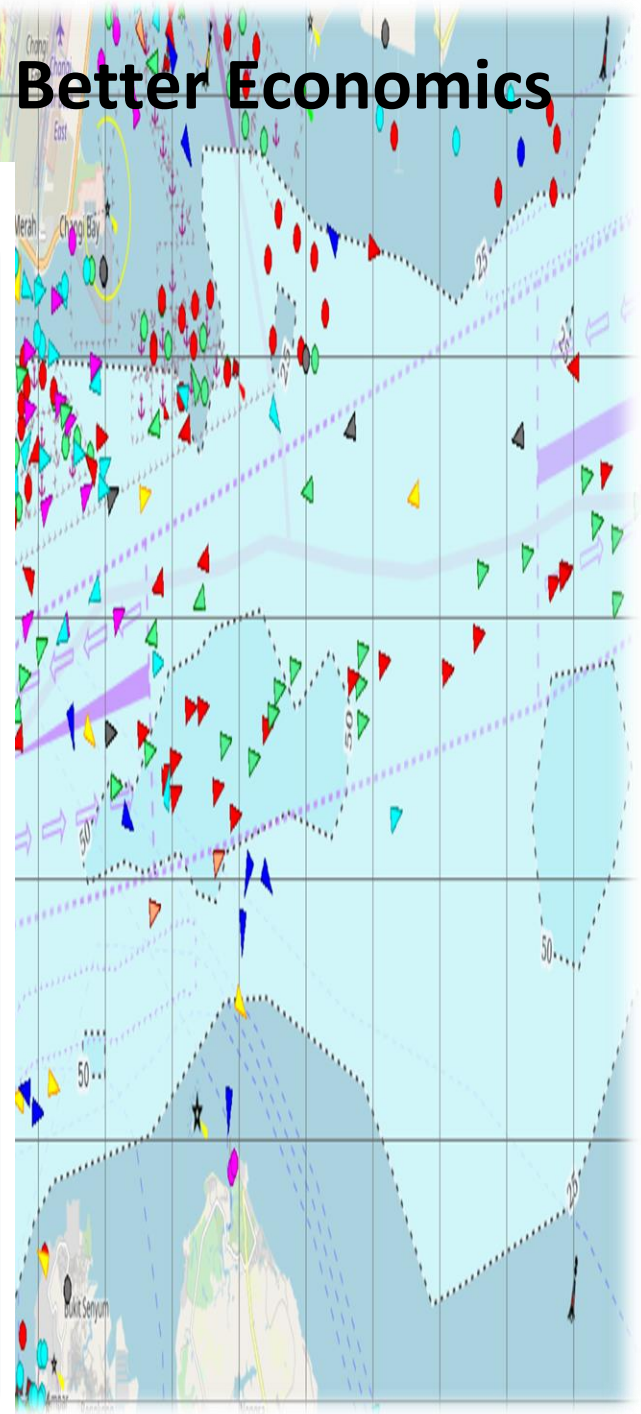
Risk Register

Natural Hazards, Anthropogenic Hazards, Risk Management, GAP Analysis

Design Review

Route Break Down Studies, Seabed Assessment, Route Adjustments, Trenching Depth, Lowering Depth, Burial Protection

Route Survey & Selection



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Objectives of G8 Cable DTS – Desktop Engineering Study

To develop Optimised routing between two or multiple landing station that meets economic and technical viability.

- ✓ Avoiding or minimising conflicts with other seabed users
- ✓ Minimising exposure to natural and manmade risks
- ✓ Optimising Cable Engineering and Protection
- ✓ System Maintainability
- ✓ Following ICPC Protocols and Recommendations
- ✓ Accelerating the Construction work

DTS Result

Pre survey RPL & SLD Development

Pre survey cable type selection

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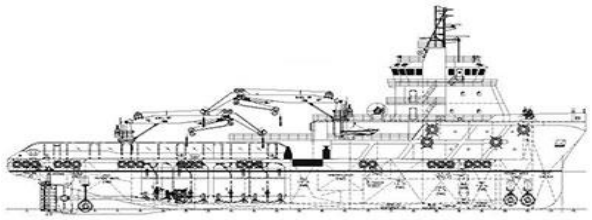
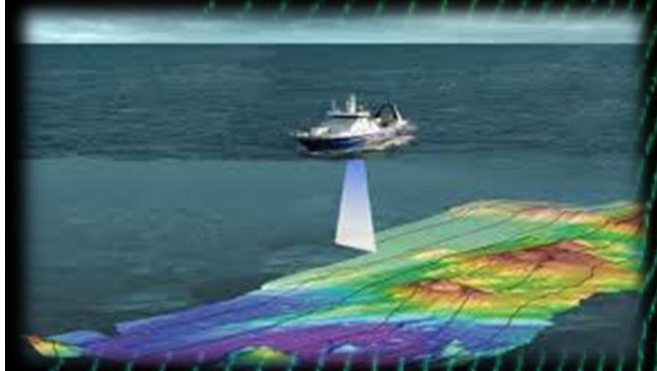


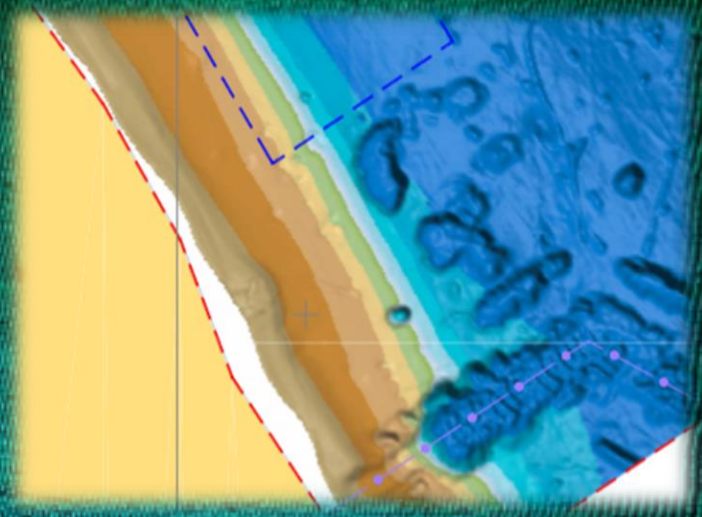
Cable Route Survey Solutions

- Sub Bottom Profiler Survey
- Multi Beam Bathymetric Survey
- Side Scan Sonar Survey
- Land Topography Survey
- Cone Penetrometer Testing

Application

- Cable Route Survey
- Inspection & Maintenance
- Pre-Lay/Post Lay Survey





Permitting & Regulatory Requirement Management

Long Process – Various Territory – Different Government Agencies – Political – Security – Military Approval

- Landing License Approval
- Proprietary Permits
- Regulatory Permits
- Operational Permits
- Submission of Relevant Notifications
- Marine Liaison / 3 Party Stake holder Approval

Submarine Cable Deployment in Singapore

Info-Comm Media Development Authority Facilitates

- **FBO Licence Application to IMDA**
- **Consultation with MPA on the Proposal**
- **URA for Land Use, Planning and Development Control Approvals**
- **COMET – Submarine Cable Corridor and Installation Approval**
- **SLA for Wayleave and Temporary Occupational License**
- **Subjected to EIA of Submarine Cable System**

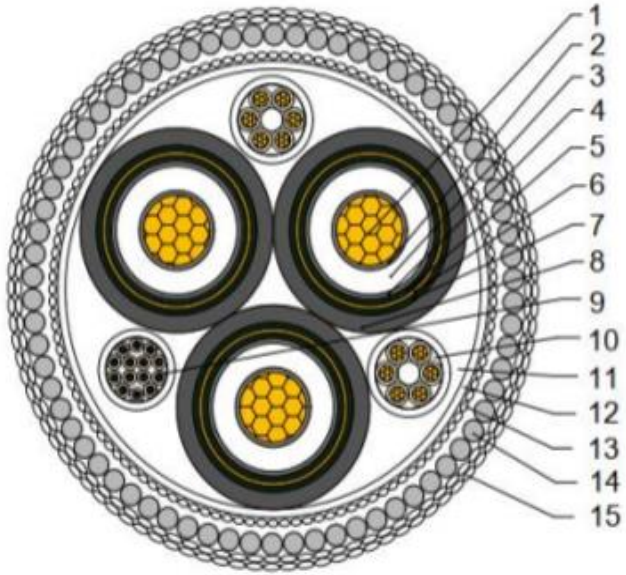
G8 being the centre for excellence, we assure the client the permitting processes are done in due diligence for a faster and successful outcome.

Service Extended to
Malaysia, Indonesia, India, South Korea, Taiwan. Thailand and HK

CABLE SELECTION & SPECIFICATION ANALYSIS
Installed with Manufacturer's Cable Handling Parameters

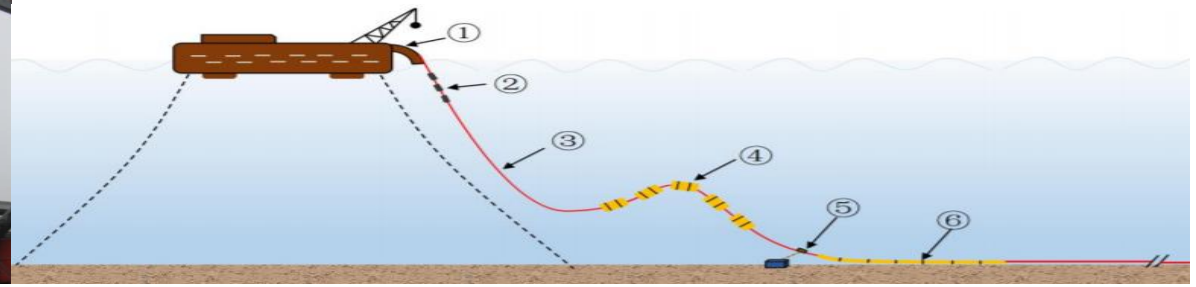
5.CABLE STRUCTURE & DATA SHEET

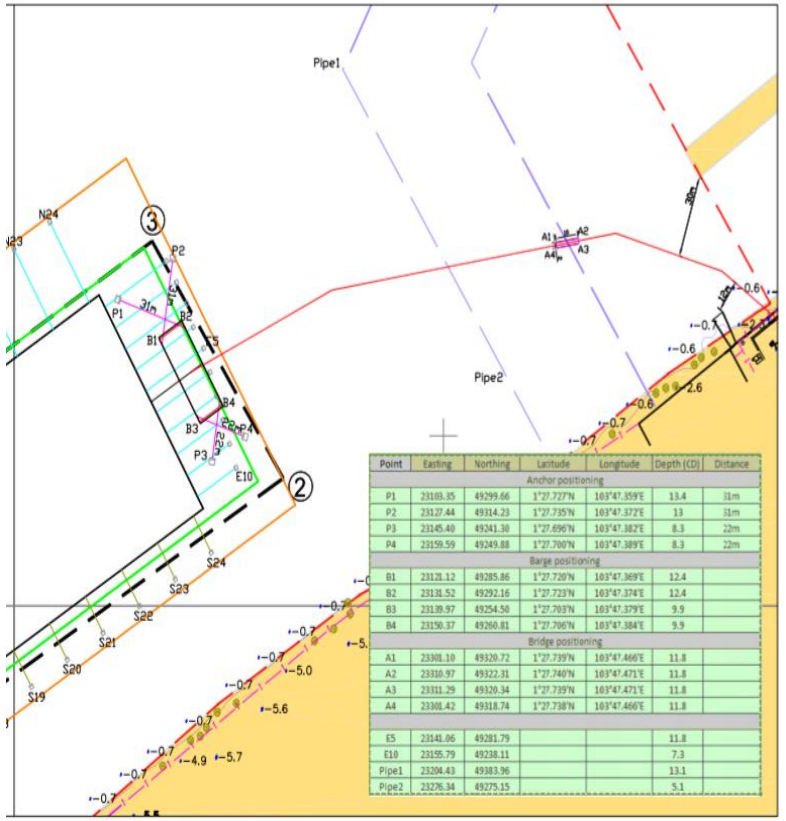
5.1 Static Cable Structure & Data Sheet



HYJYF41 12.7/22(24) 3×185+14×1.5+6×6+6×6

No.	Description	Nom. Thickness (mm)	Approx. O.D (mm)
1	Conductor(plain annealed copper)	Cross section: 185mm²	16.2
2	Conductor screen	0.8(min.0.50)	17.8
3	Insulation (XLPE)	5.5(min.4.85)	28.8
4	Insulation screen	0.8(min.0.50)	30.4
5	Semi-conducting water blocking tape	0.3	31.0
6	Metallic screen (copper tape)	0.12	31.4
7	Semi-conducting water blocking tape	0.3	32.0
8	Semi-conducting core sheath	2.5	37.0
9	control cable 1	Cross section: 1.5mm²	15.6
10	control cable 2	Cross section: 6mm²	16.6
11	Filler (PP strings)	/	/
	Assembly	/	79.5
12	Binder	0.1	79.8
13	Armor bedding (PP yarns)	Φ2.0	82.4
14	Armor (Galvanized steel wire + bitumen)	(50±2)×Φ5.0	92.8
15	Outer serving (PP yarns)	2×Φ2.0	98.8±4
	Cable weight (approx.) in air in water	 19.6kg/m 12.9kg/m	





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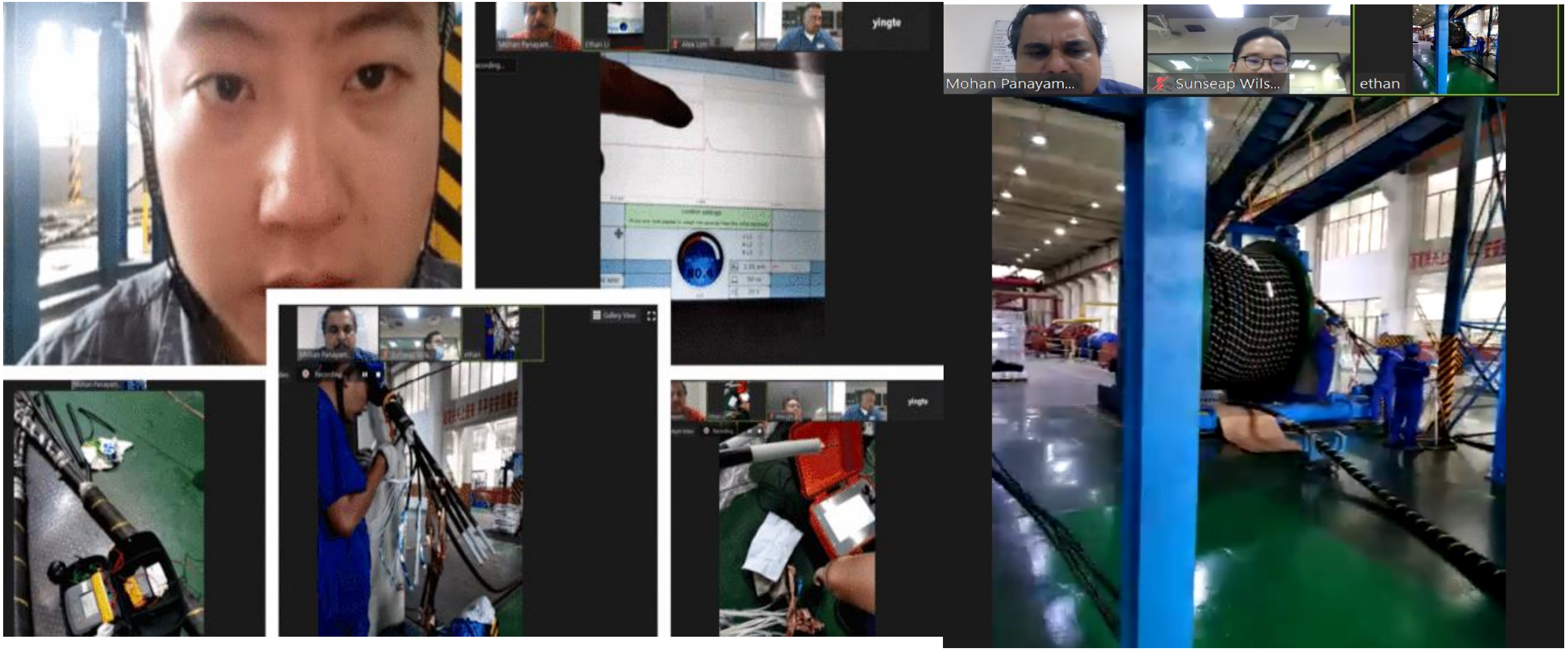
FACTORY ACCEPTANCE TEST
Submarine Power Cable



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SUBSEA CABLE DESIGN PROCESS

Cross Section Area (CSA)

1. Transmission Capacity
2. Voltage Level
3. Power Factor
4. Soil Temperature
5. Soil Thermal Resistivity
6. Burial Depth

Metallic Sheath

1. Short Circuit Current
2. Water-Proof Level

Armor

1. Installation Method
2. Water Depth


G8
WIND Pro® - Offshore Wind Energy

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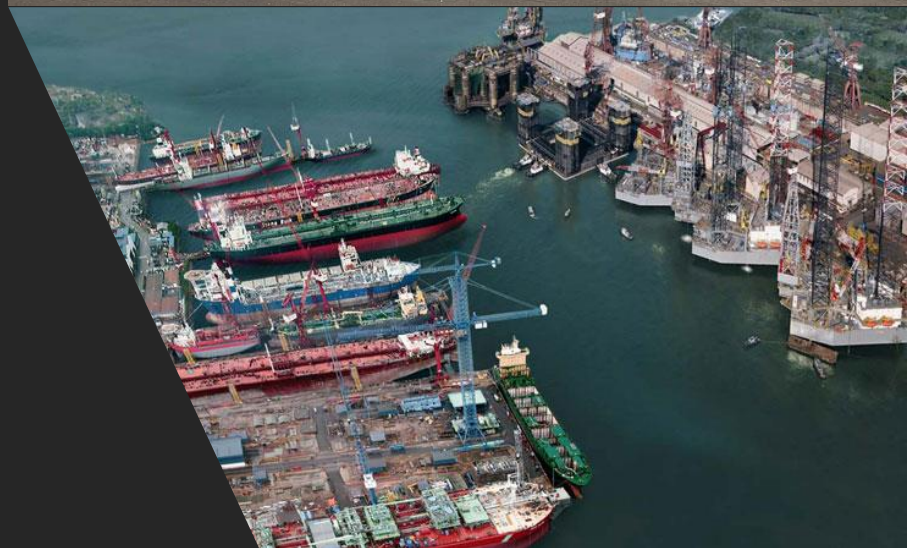

Centre of Excellence for Submarine Cable System