Cable Pro®

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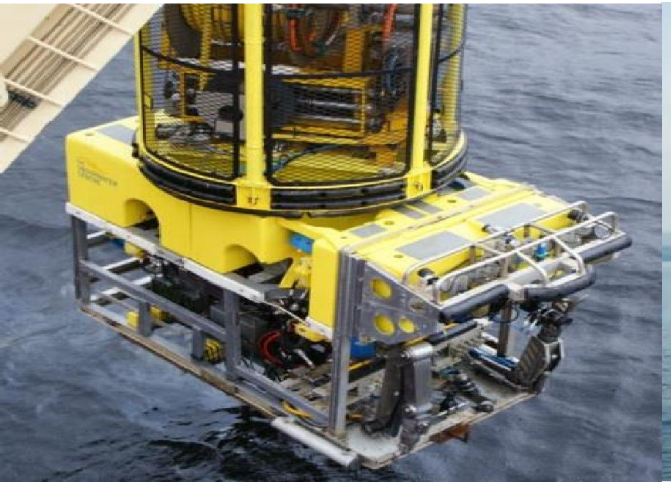


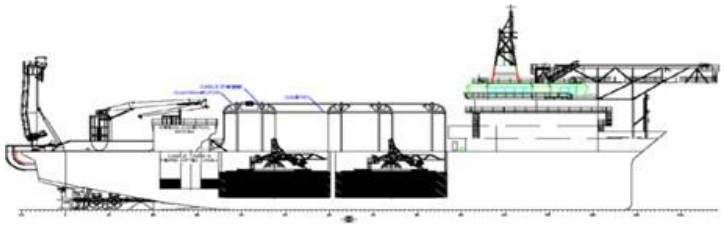
G8 SUBSEA CablePro Engineering Services

YOUR LEADING PARTNER FOR TURNKEY SUBSEA CABLE CONSTRUCTION

Excellence in Engineering- CABLE INSTALLATION & SHORE END SERVICES

G8-Energy.com

CablePro Solutions connects Offshore Wind Power and Subsea Networks



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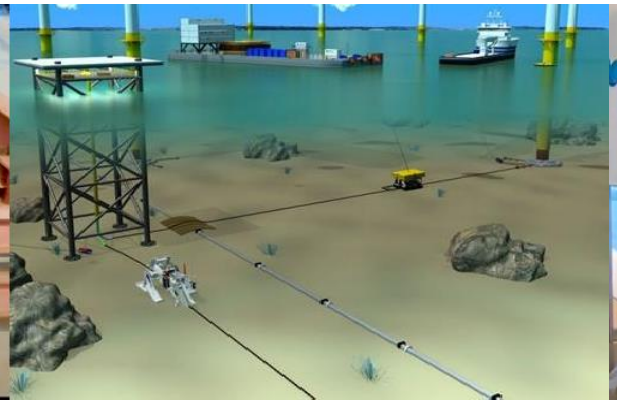
INTRODUCTION – EXCELLENCE IN SUBSEA CABLE INSTALLATION



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.

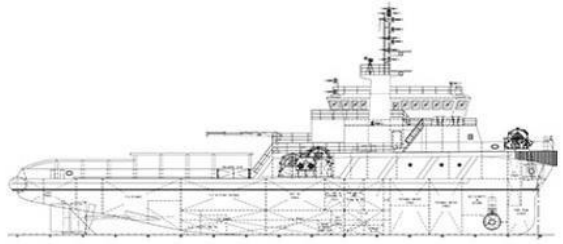
G8 CABLE Pro Presentation

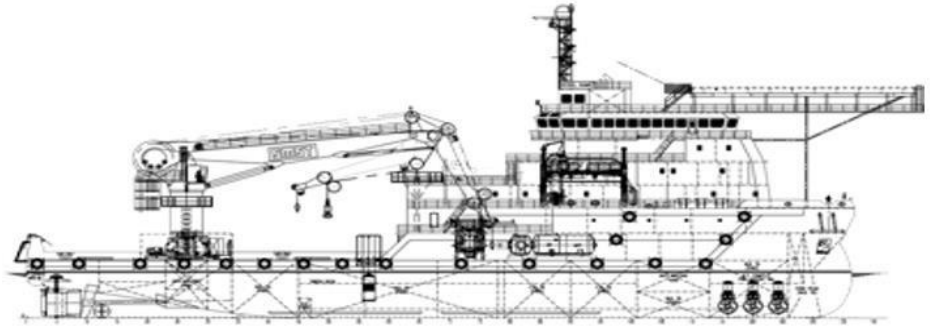
CONTENTS

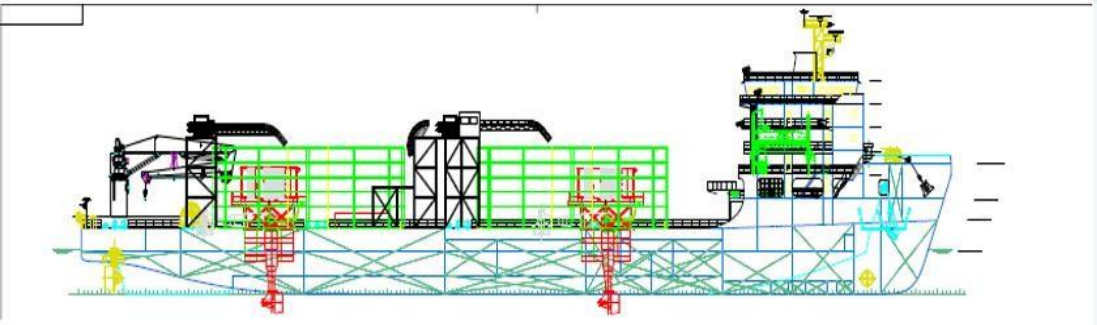
Regional Project Coverage and Support Services

G8 Cable Pro®

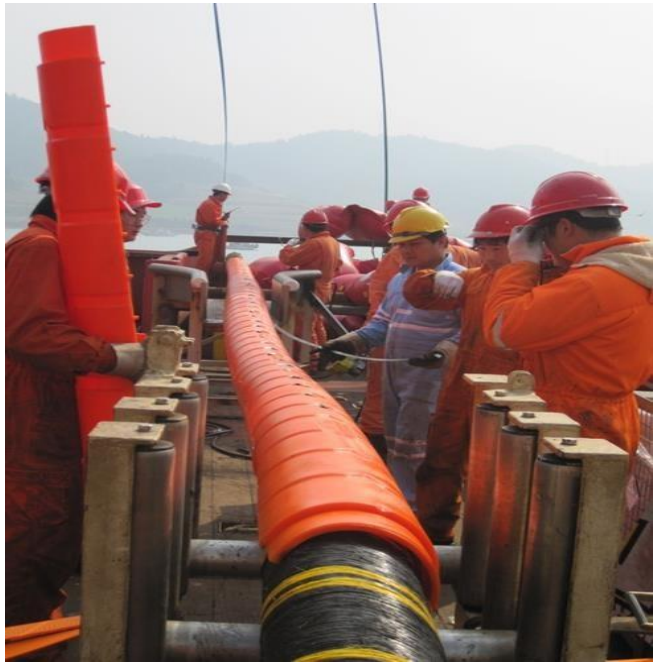
Cable Installation Vessels & Subsea Installation Systems in Asia





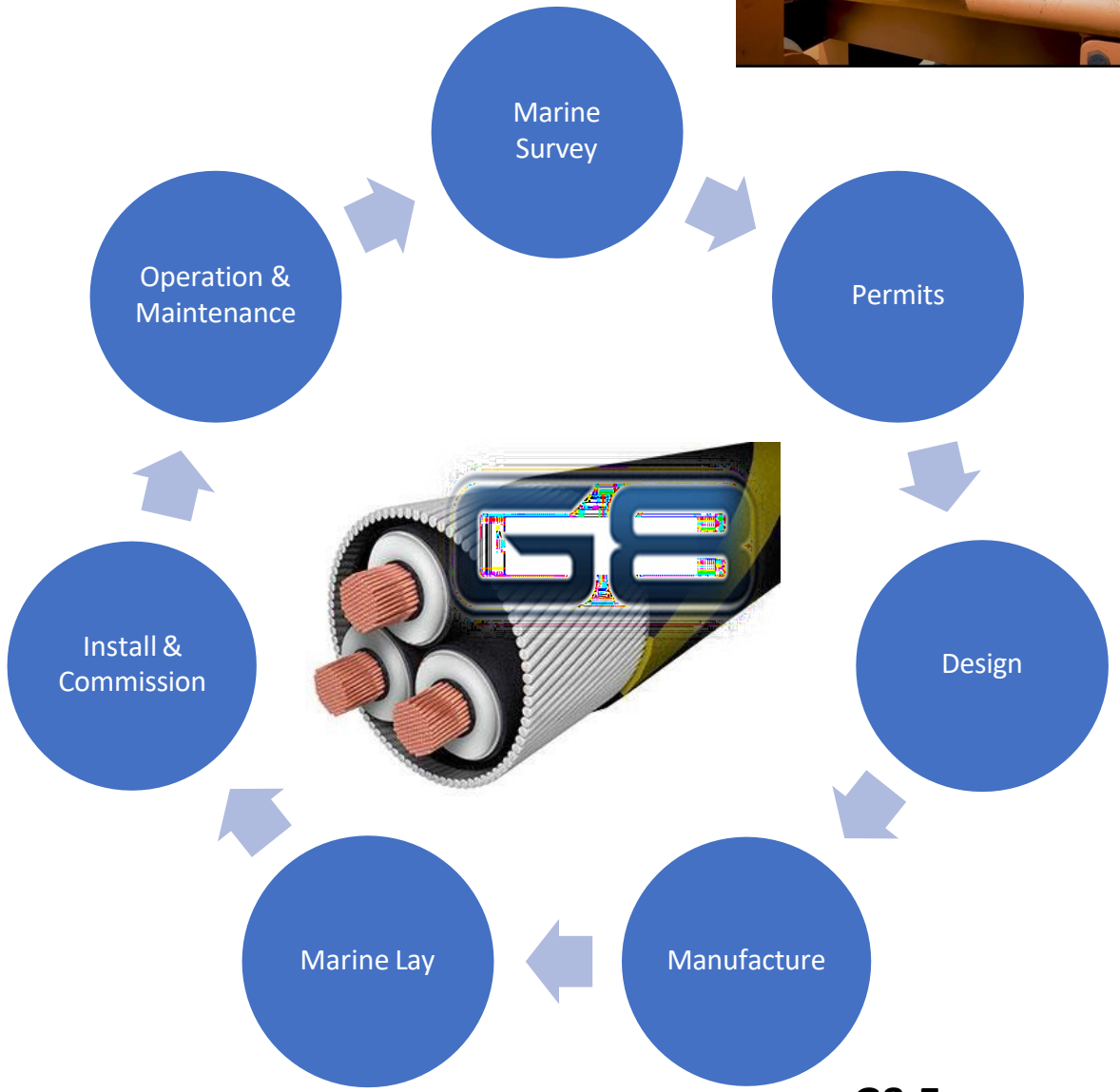


Crest ONYX 6000BHP	Cable Route Survey, PLGR Cable Route Clearance, Shallow water support
DP2 Crest Odyssey	<u>Inter Array Cable Lay.</u> ROV Trencher support, Post Lay Burial & Inspection
Crest Angelica 1700m2 7000tonnes Cable Load	<u>Export Cable</u> Transporter/Installer. HV Cable Installer



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

Cable Pro®

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

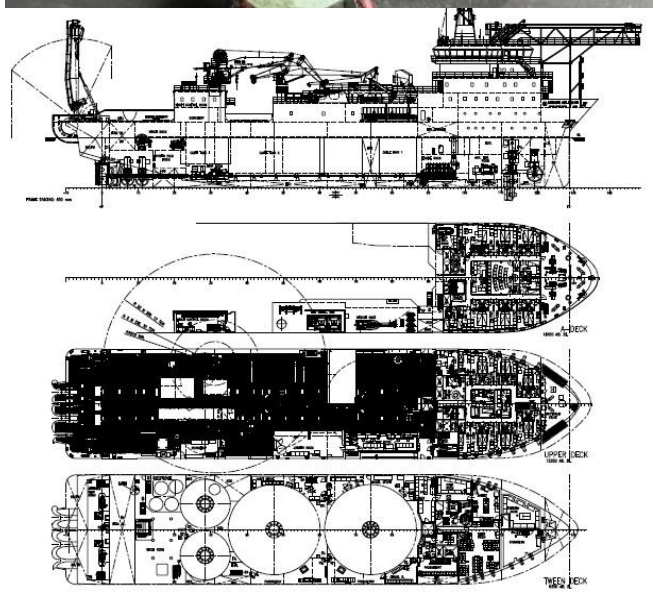
Marine Assets

Cable Pro®

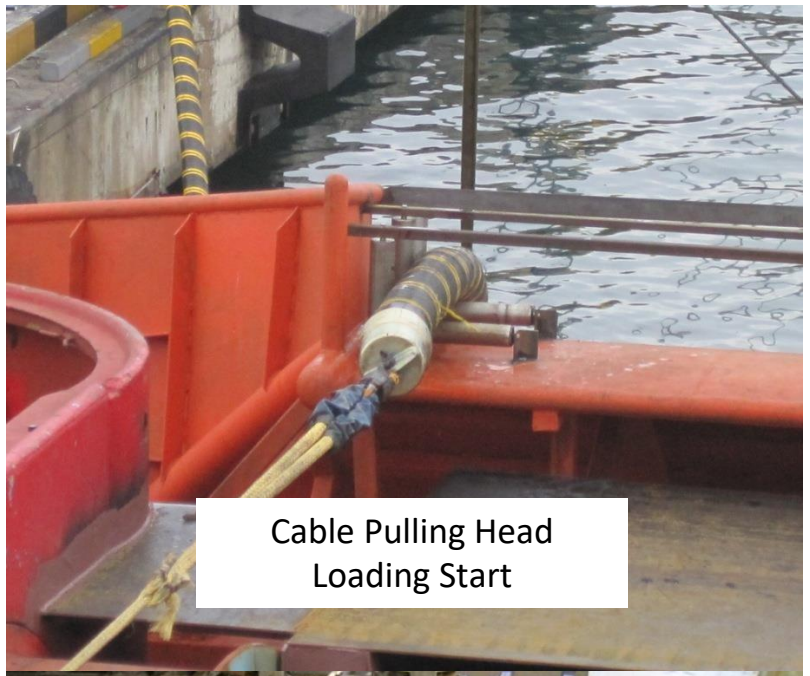
- Survey Ships
- PLGR Vessels
- PLIB / ROV Vessel
- IRM/ROV Vessel
- GeoTechnical Vessel
- Cable Lay Vessel
- PLSE Vessels
- Underwater Trenchers

DP 2 Vessels

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

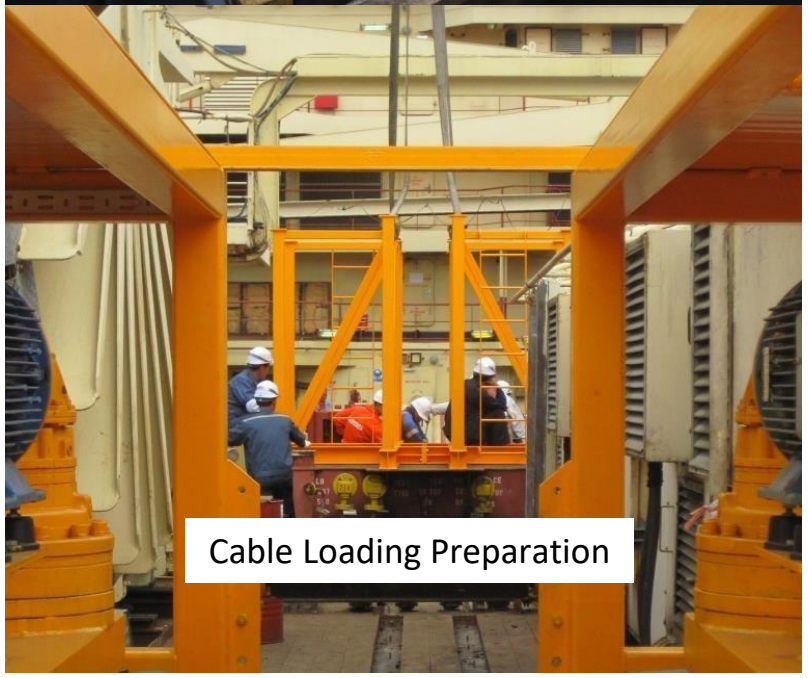


Cable Vessel Alongside Loading Preparation

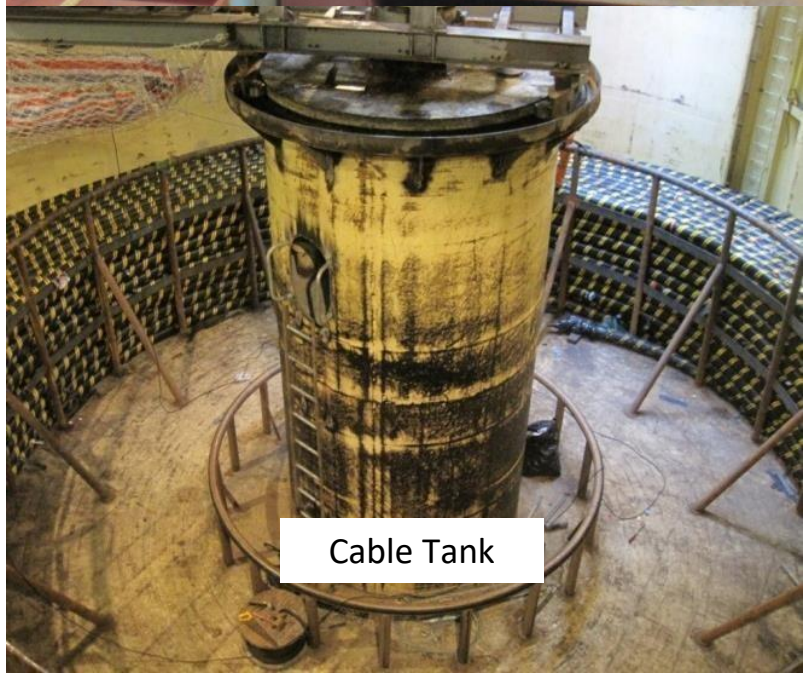


Cable Pulling Head Loading Start

Tensioner Trackway Loading in Progress



Cable Loading Preparation



Cable Tank

Cable Inspection & Testing

G8 Shallow Water Services & Shore End Cable Landings

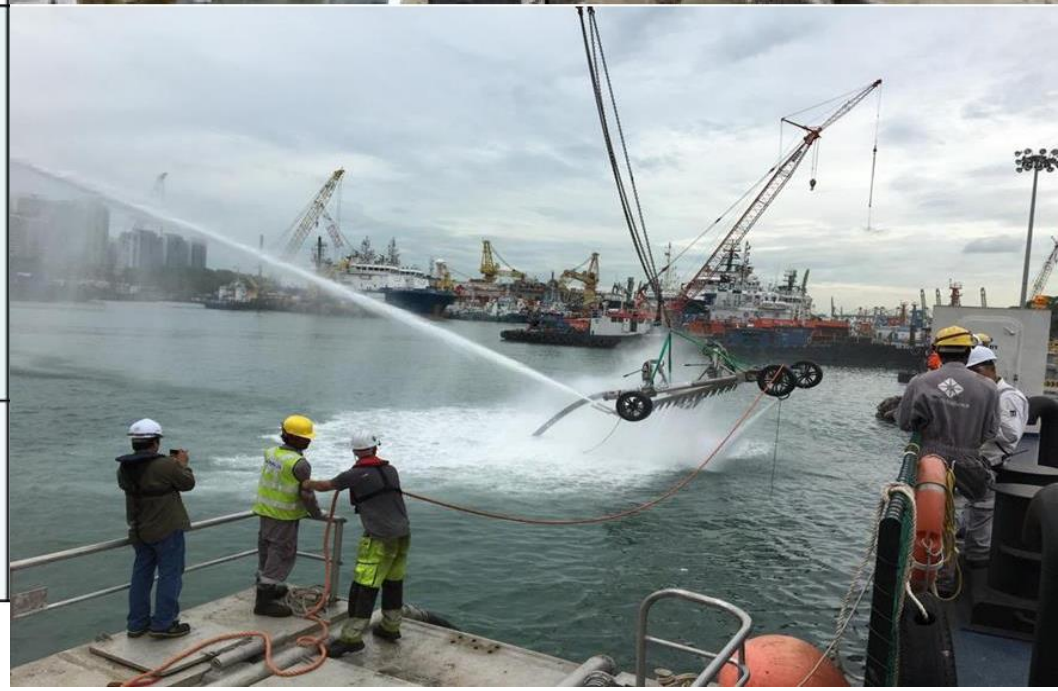
G8 Cable Protection Systems & Deep Burial Injector

10m Deep Burial Cable Injector with Twin Lay System

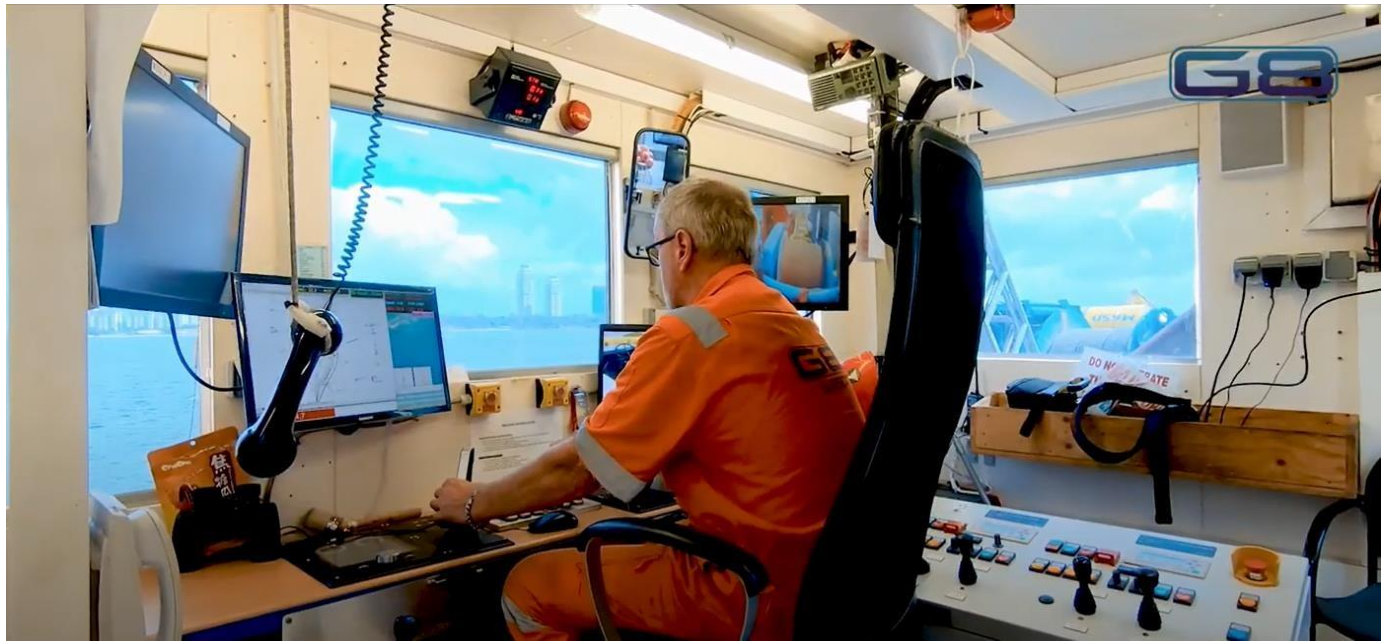
Cable Pro®

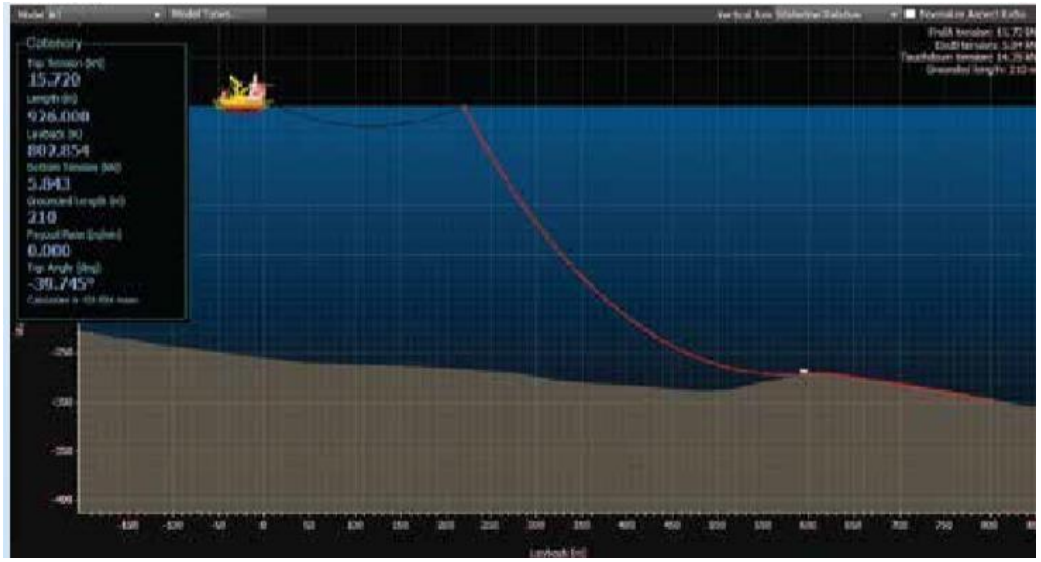
Shallow Water & Shore End Cable Burial Systems

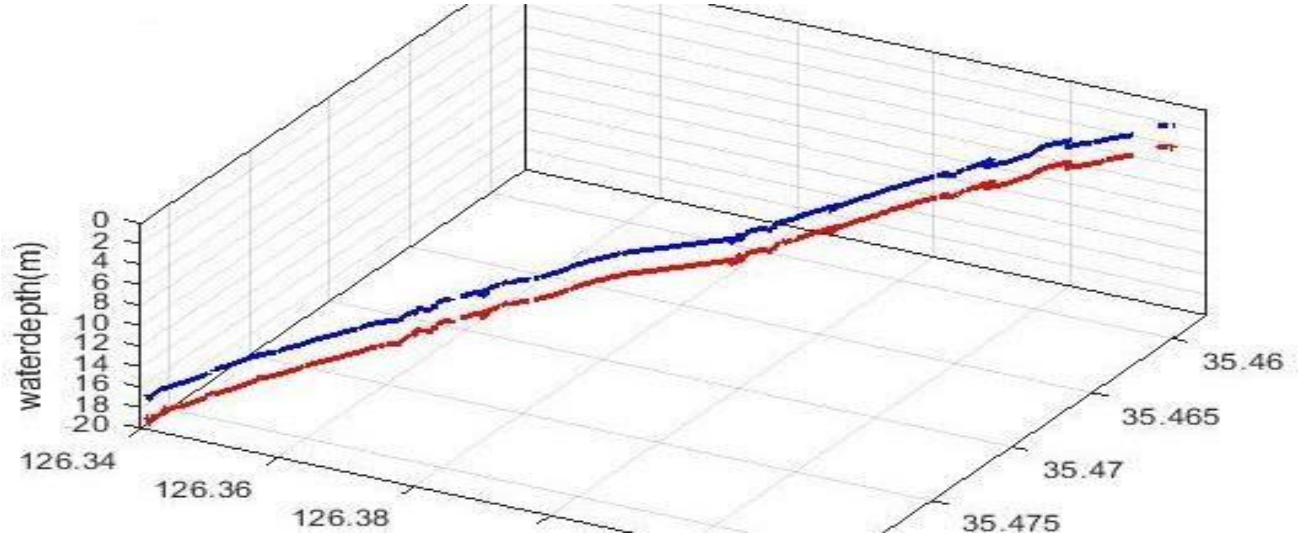
Cable Trenching Machine Series 1 A high velocity jetting trencher designed with no moving parts during trenching engagement designed to avoid stress and damage to cable and pipelines.	• Product: Cable, Umbilical and Pipelines up to 1,000mm • Soil strength: up to 250KPa • Seabed type: Sand, silt, gravel 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

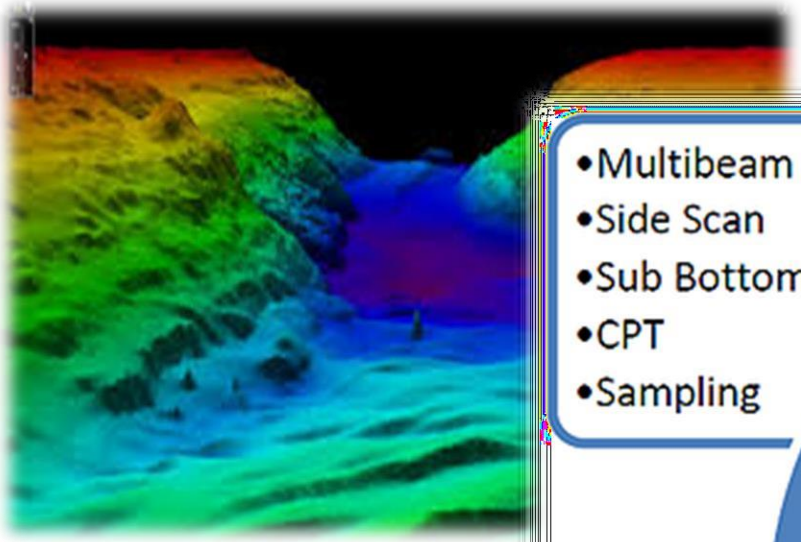


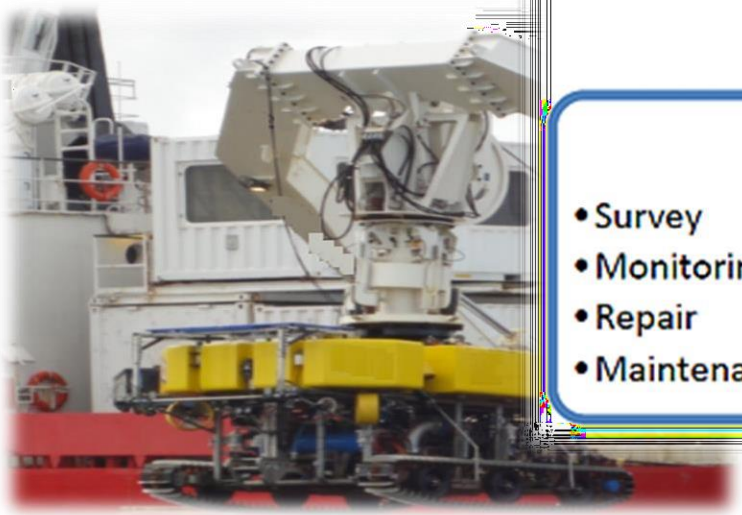




CABLE DESKTOP ENGINEERING STUDY - DTS

Cable Pro®





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

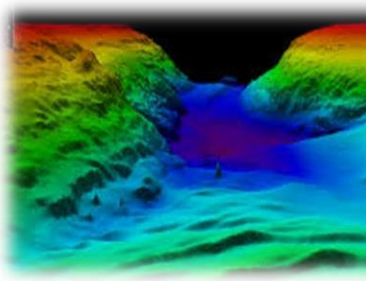
Cable Lay
- Route Selection
- PLGR
- Cable Lay
- Trenching
- Burial Protection

Post Lay
- Survey
- Monitoring
- Repair
- Maintenance

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

G8 DTS - CABLE DESKTOP ENGINEERING STUDY

Cable Pro®



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

Right Route Faster Destination & Better Economics

G8 Cable Pro®

Data Collection

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

Desk Top Studies

Data Validation, Risk Assessment, Suitability, Feasibility

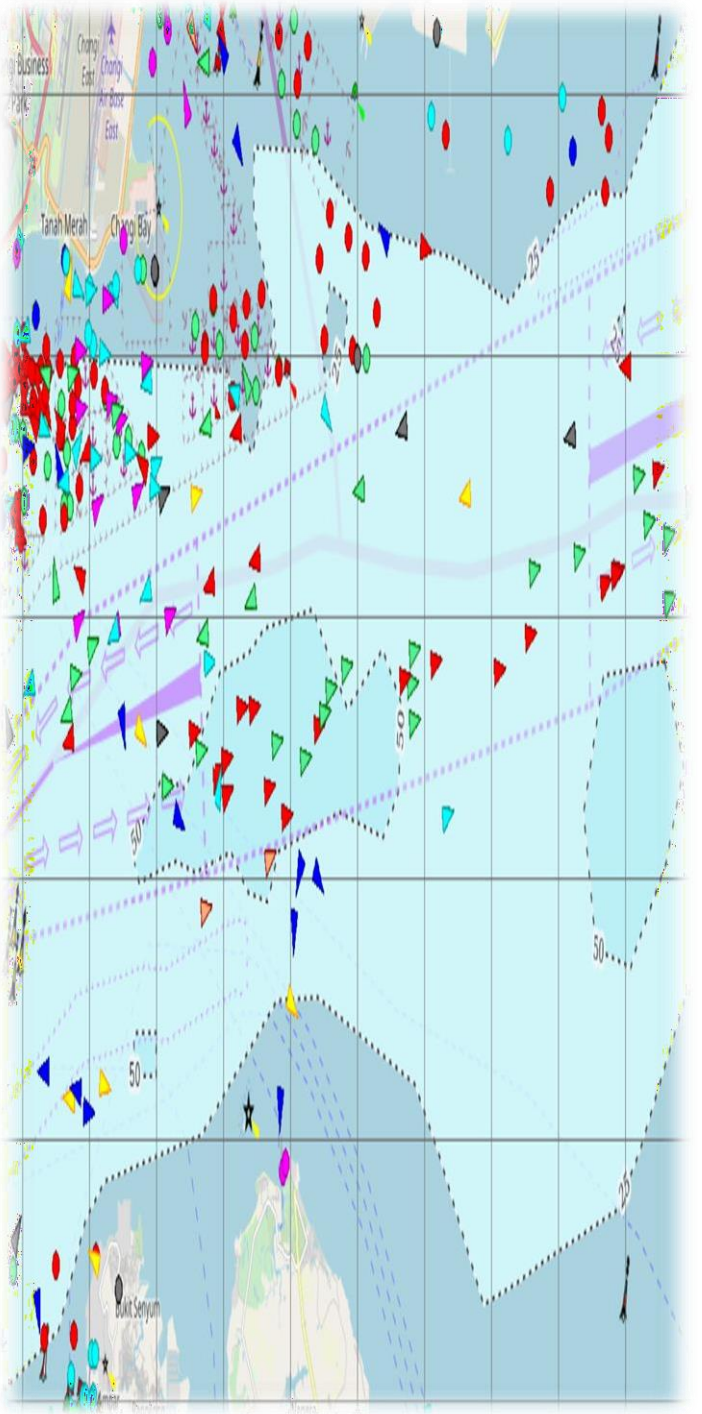
Risk Register

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



Objectives of G8 Cable DTS – Desktop Engineering Study

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

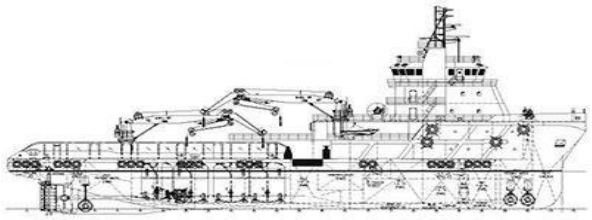
- ✓ Avoiding or minimising conflicts with other seabed users
- ✓ Minimising exposure to natural and manmade risks
- ✓ Optimising Cable Engineering and Protection
- ✓ System Maintainability
- ✓ Following ICPC Protocols and Recommendations
- ✓ Accelerating the Construction work

DTS Result

Pre survey RPL & SLD Development

Pre survey cable type selection

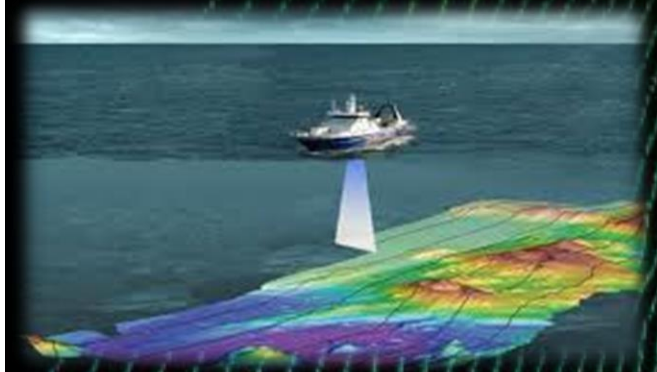
G8 Cable Pro®

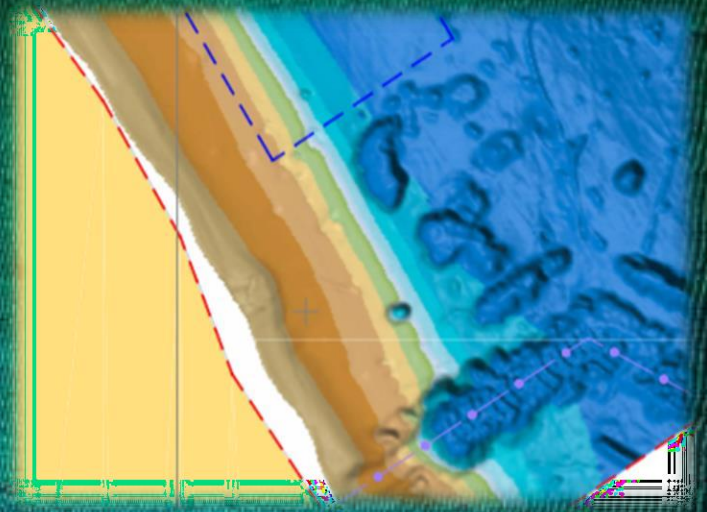


Cable Route Survey Solutions

- 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.

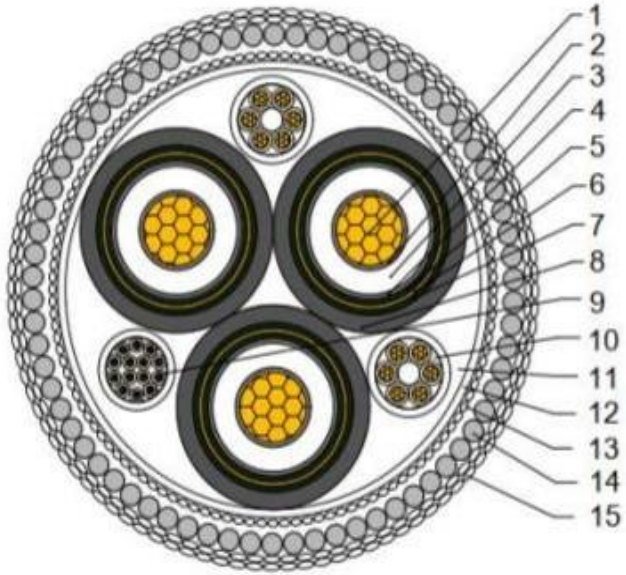
Service Extended to
Malaysia, Indonesia, India, South Korea, Taiwan. Thailand and HK

Cable Pro®

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

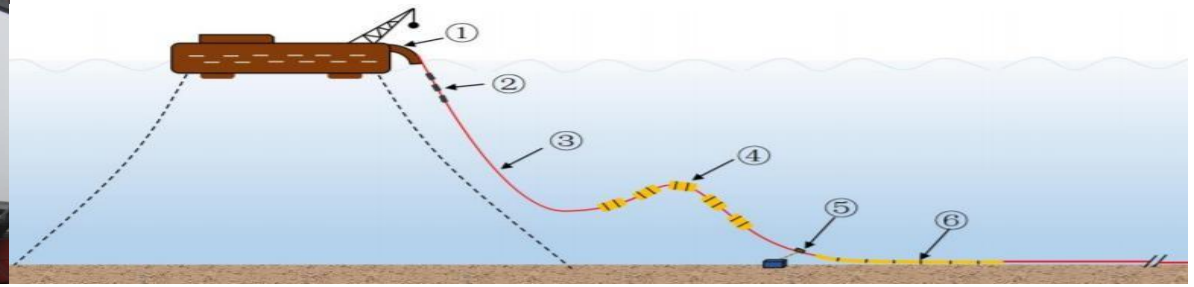
5.CABLE STRUCTURE & DATA SHEET

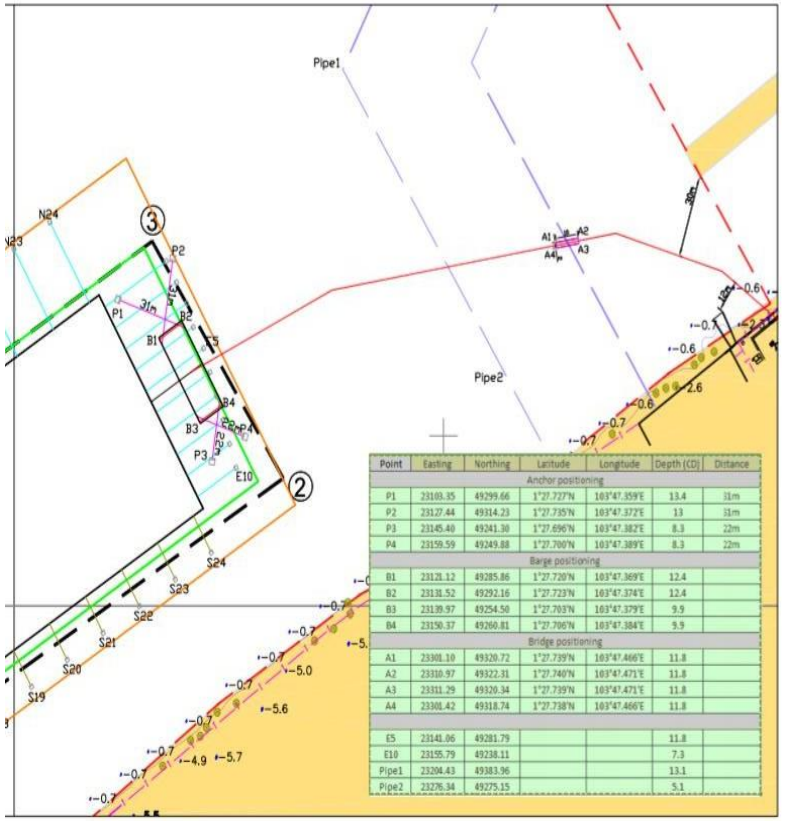
5.1 Static Cable Structure & Data Sheet



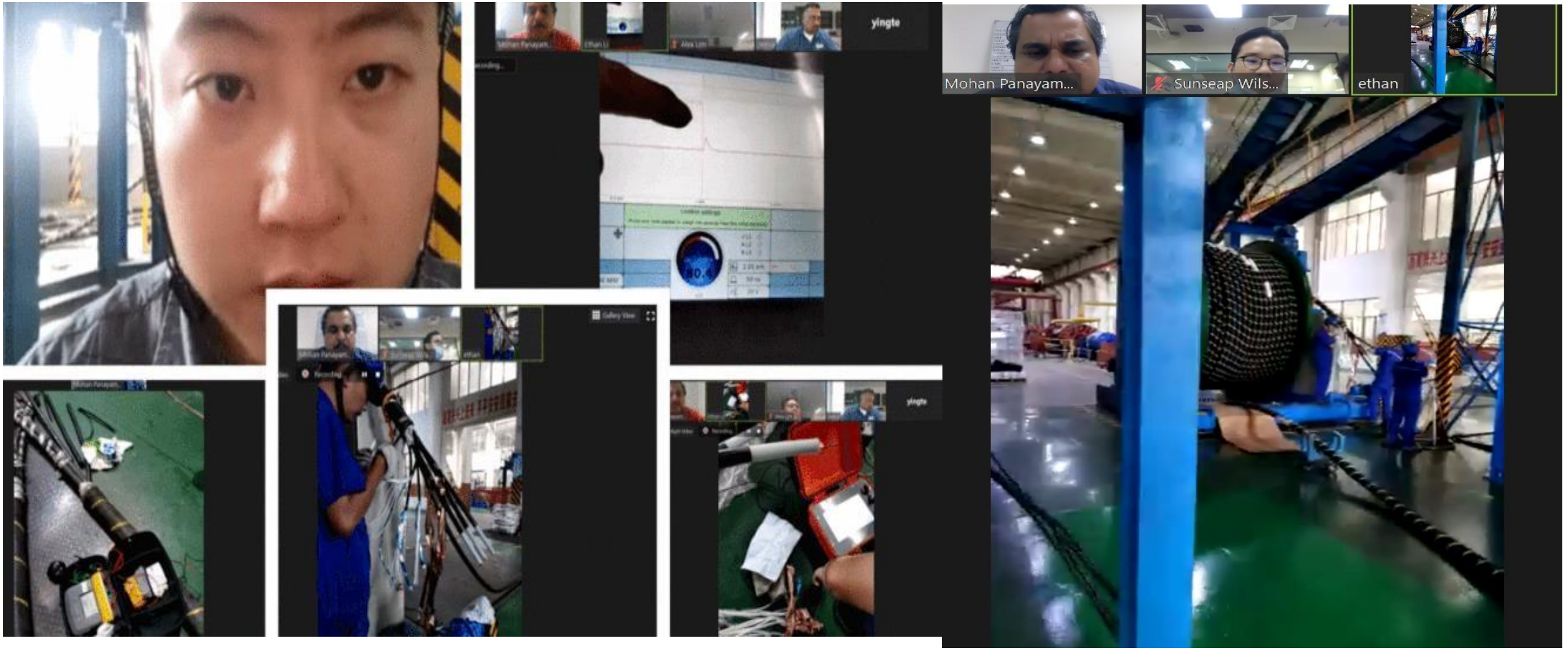
HYJYF41 12.7/22(24) 3×185+14×1.5+6×6+6×6

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	





FACTORY ACCEPTANCE TEST
Submarine Power Cable



Cable Pro®

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

Cable Pro®

Track Record (Recent Projects)

References Subsea Engineering Services:

Year	Client	Location/project	Scope of work
Sep 2019	SUNSEAP	Offshore Floating 5MW PV Farm, Singapore	Subsea Mooring design and installation
July 2017	PT LIMIN MARINE/ GLOBAL MARINE	ST200 Trenching ROVCare Inspection - Indonesia	Cable Ship ROV Care O&M technical assessment
June 2017	TE SUBCOM	International System Project Management – China /Taiwan HK	Installation Vessel Coordination & Project Management
April 2017	SES VENDOR FOR PETRONAS	Provision of WC ROV XL150 project mobilization - Singapore	Preparation for 600km pipeline inspection
Dec 2016	PT LIMIN MARINE	Cable Installation Ship Inspection and Survey - Indonesia	Technical Assessment

References Power Cables:

Year	Client	Location/project	Cable Size OD, mm	Burial Depth of Lowering, m TOC	Scope of work
2024	QATAR ENERGY	Middle East	300mm	-	Cable Installation Vessel, Mobilization & Technical Preparation
2023	PACIFIC LIGHTS POWER (MEDCO)	Indonesia/Singapore	300mm	-	Technical Assessment. Export power cable (230kV / 80km) landing site assessment and survey.
2019	SINGAPORE POWER / LS CABLE	Singapore/Malaysia	190mm	10m	Installation of 230kv power and auxiliary cable from Singapore to Malaysia
2019	SUNSEAP	Singapore	100mm	1m	Installation of export power cable 22Kv from floating substation to shore
2018	KOCECO	Korean Windfarm	180mm	2.0m	Installation 3 x 800m Interray Cable
2018	HAECHUN	Korean Windfarm	250mm	2.0m	10km 154kV and cable protection system
2017	MCDERMOTT	India / Vashista & S1	245mm (incl Uraduct)	2.0m	Subsea Pipeline and Cable Installation & Burial
2016	MORATELINDO	Indonesia	20mm	2.0m	Batam to Jakarta Telecom cable system Shore End Scope
2015	GLOBAL MARINE	Indonesia	20mm	1.5m	B2JCS Cable System

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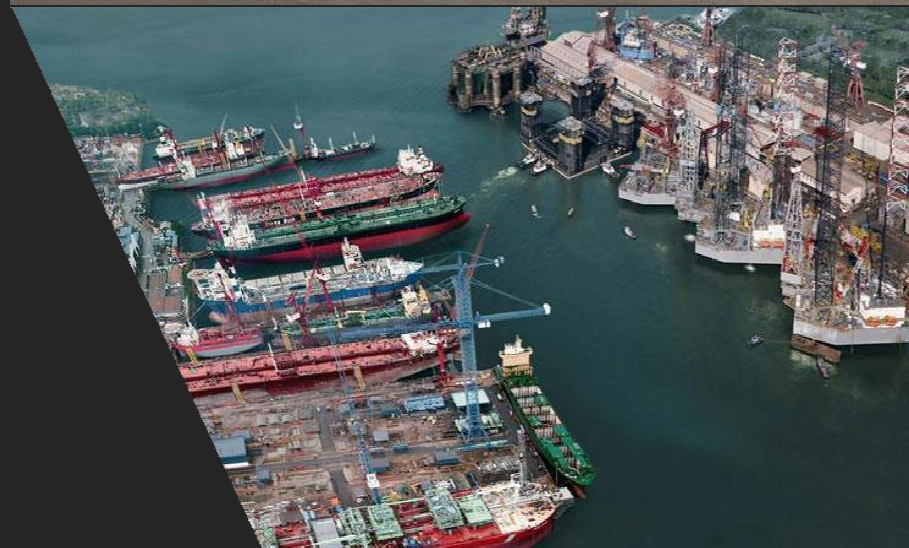

Centre of Excellence for Submarine Cable System