MARINE Safety Forum

SEPLA & FEPLA

Universal Plate Anchor Solutions Across All Soil Conditions

Today’s Agenda

- Intermoor Company Description
- Offshore Mooring Anchors & Limitations
- Introduction to SEPLA
- Introduction to FEPLA
- FEPLA Installation Sequence
- Cost Benefits
- Status Update

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01

Chapter 01: Intermoor Company Description

Intermoor: End-to-End Mooring Solutions

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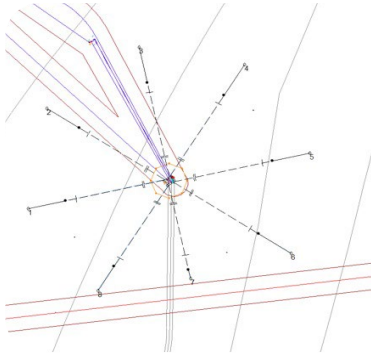
Mooring specialist – providing mooring system design, supply storage and management of mooring equipment and marine services for installation, maintenance and decommissioning.



Design engineering

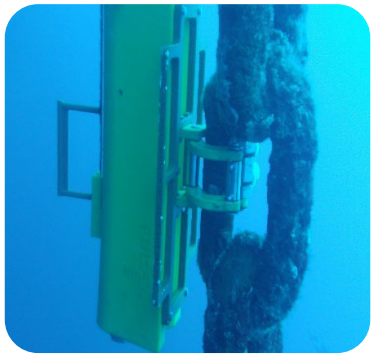
- Pre-FEED concept engineering
- Design engineering

Products and procurement

- Anchors, wire rope, synthetic rope, mooring jewellery
- Suction pile design & fabrication

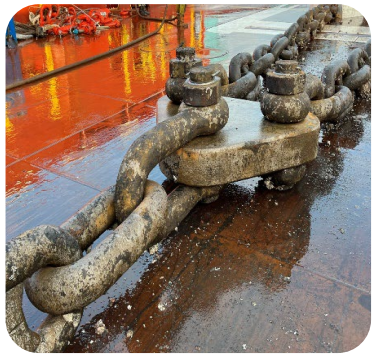
Offshore installation including all assets

- PM&E
- Procurement
- Installation assets & technology
- Logistics
- Vessels
- Offshore construction management and execution



Asset integrity management

- Monitoring
- Inspection
- Data management
- Data diagnosis



Intervention and decommissioning

- Mooring repair & change-out
- Decommissioning

Intermoor: Global Reach And Track Record

80+
RENEWABLE PROJECTS

2500+
WIND TURBINE GENERATOR FOUNDATIONS

500+
MOORINGS

800+
DRILLING CAMPAIGNS

300+
DECOMMISSIONING PROJECTS

100+
LOCATIONS

Countries with localised workforce

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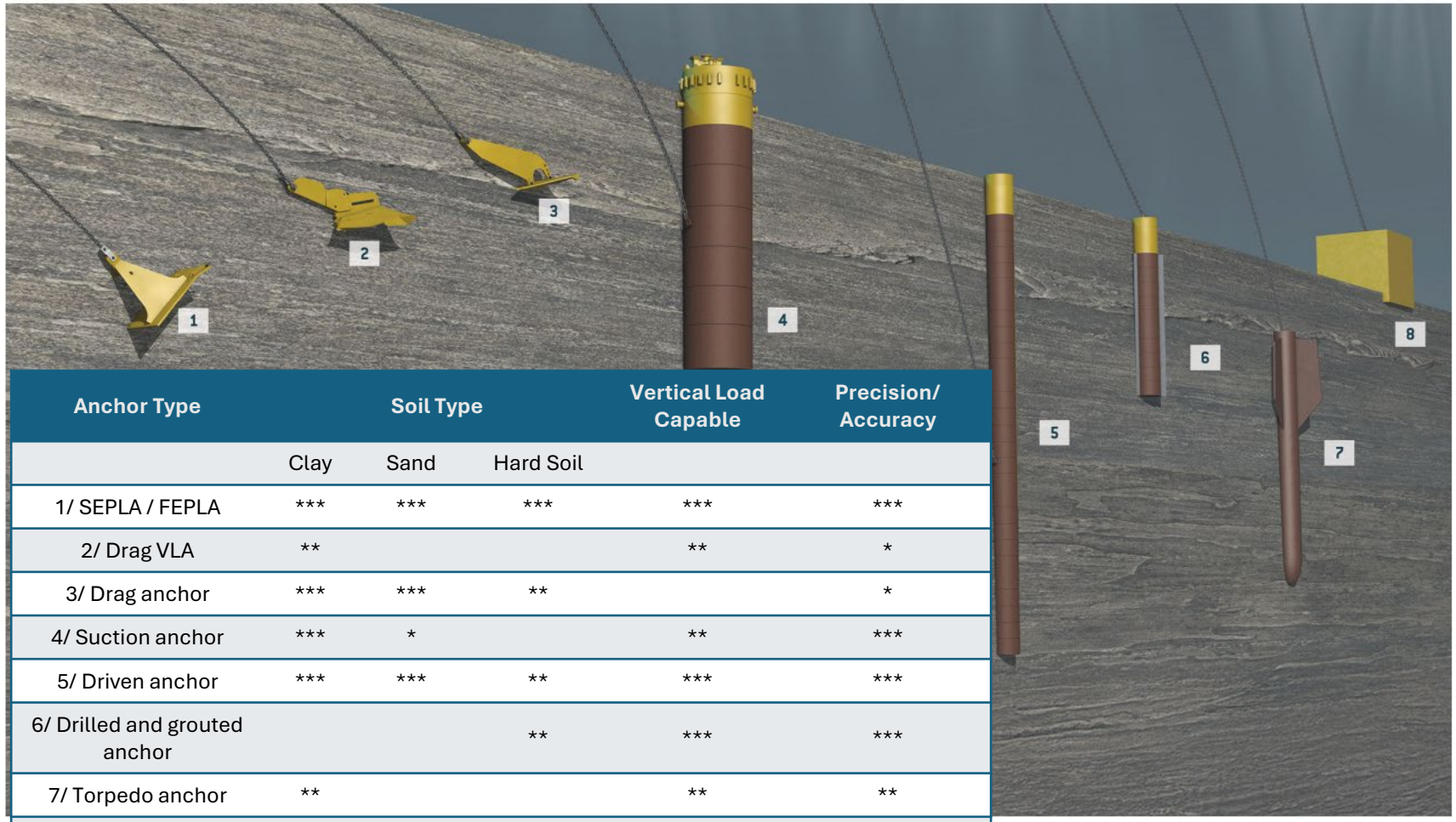
02

Chapter 02: Offshore Mooring Anchors & Limitations

Anchor types for floating energy facilities

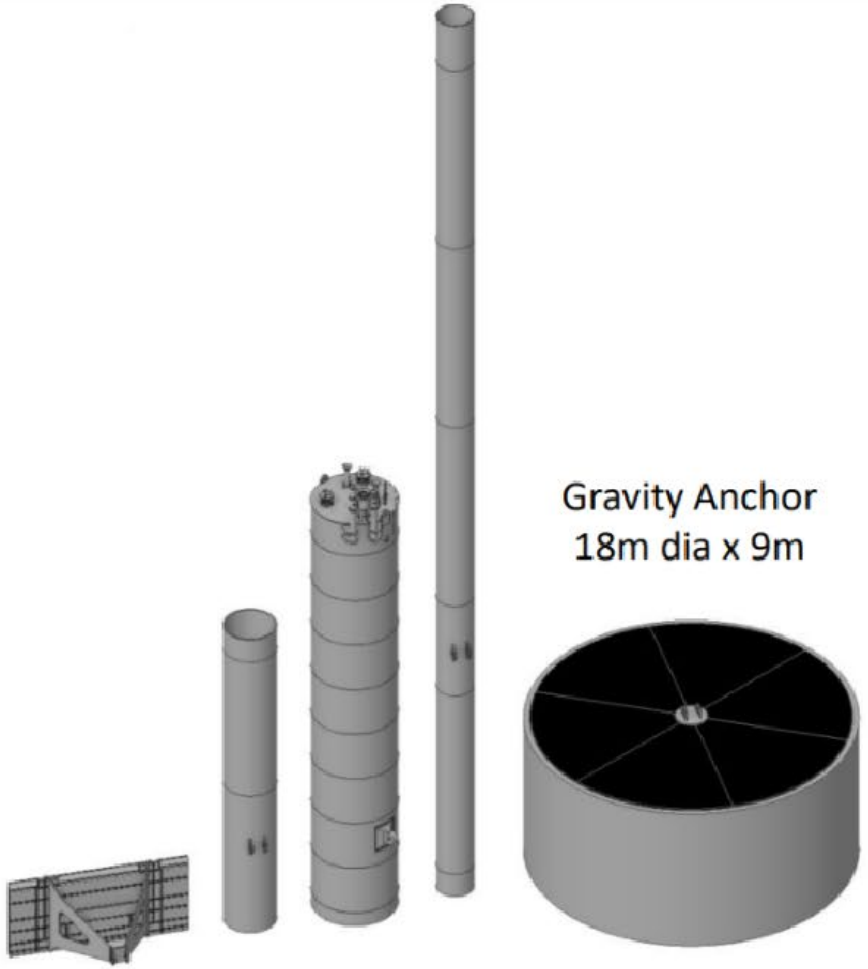


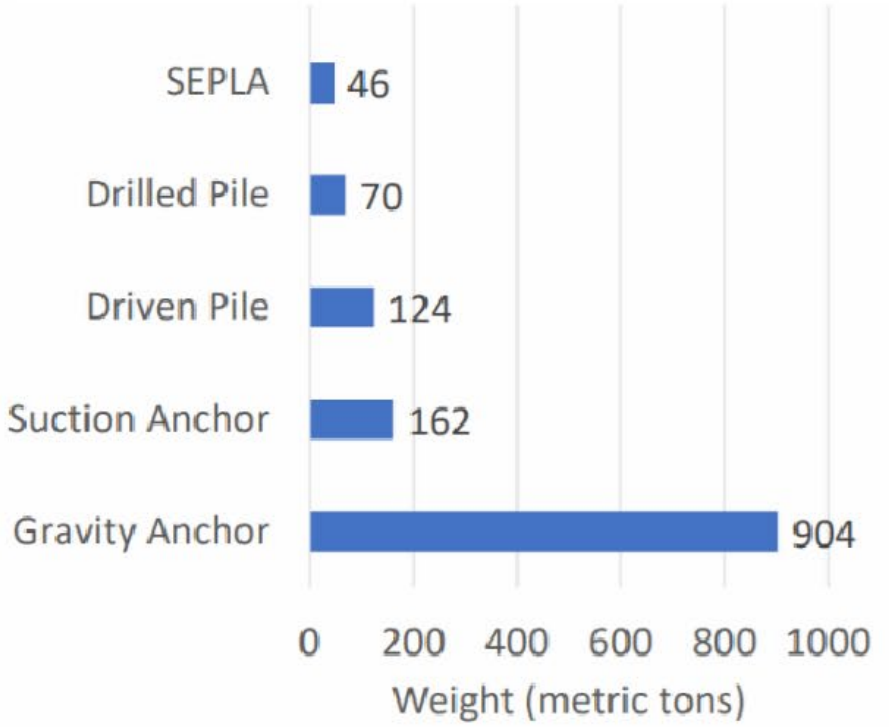
Anchor Type	Soil Type			Vertical Load Capable	Precision/ Accuracy
	Clay	Sand	Hard Soil		
1/ SEPLA / FEPLA	***	***	***	***	***
2/ Drag VLA	**			**	*
3/ Drag anchor	***	***	**		*
4/ Suction anchor	***	*		**	***
5/ Driven anchor	***	***	**	***	***
6/ Drilled and grouted anchor			**	***	***
7/ Torpedo anchor	**			**	**
8/ Gravity (clump weight)	*	*	*	*	***

* = Limited, ** = Moderate, *** = Good

- Deadweight anchors – Very large and inefficient → high cost
- Suction / torpedo anchors – Limited to soft soils
- Driven piles – High cost and complex installation
- Drag anchors – Limited uplift performance
- No single solution meets all requirements → drives the need for high-efficiency plate anchors

Anchor Size and Weight Comparison





Anchor sizes are estimated for 1000t mooring load

03

Chapter 03: SEPLA

SEPLA: Proven Solution & Installation in Practice

The most efficient anchor (capacity/mass)

US Navy has installed small plate anchors since the early 1980s

Intermoor SEPLA™

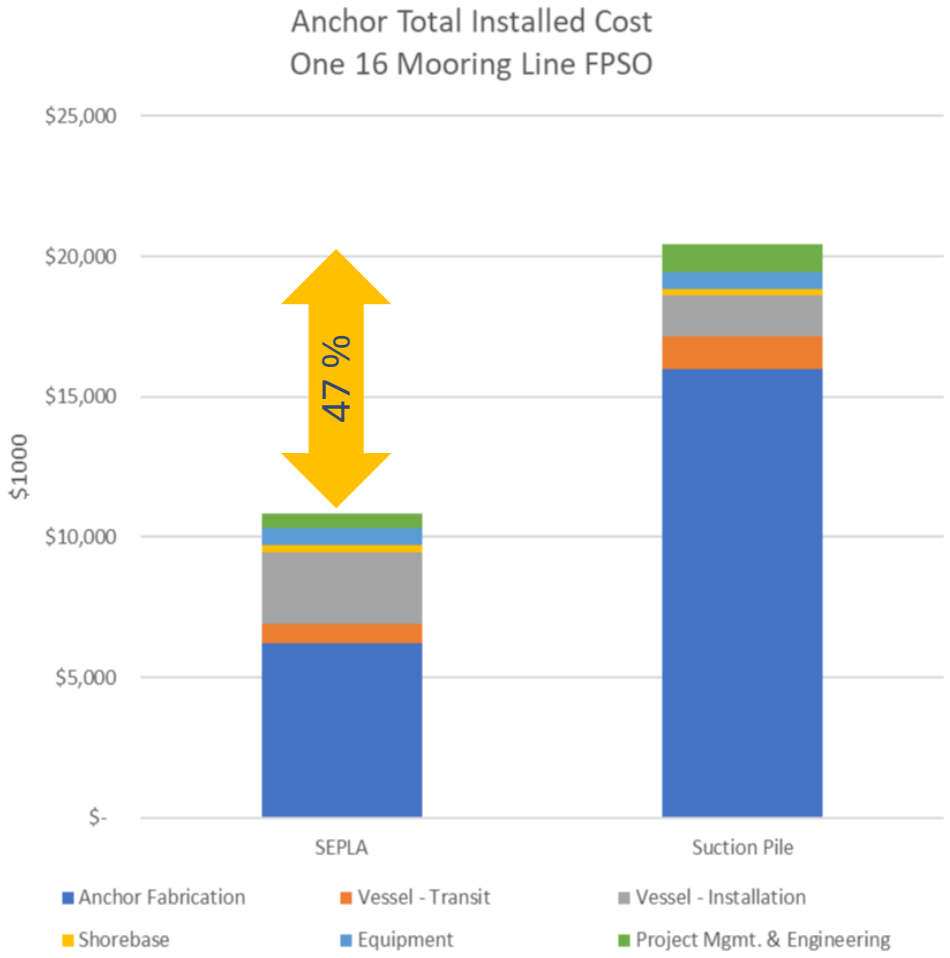
- Suction Embedded Plate Anchor
- Over 180 installations since the 1990s
- 6 permanent mooring projects
- Accepted by ABS and DNV

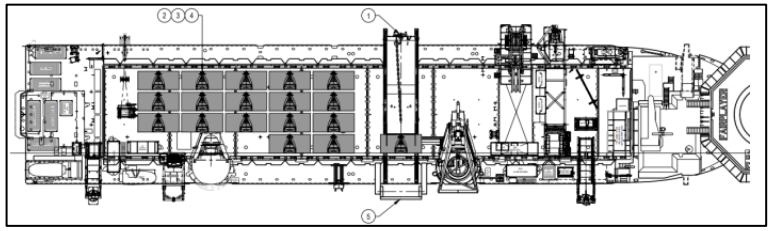
Half the cost, Same performance

Key Cost Drivers Reduced with SEPLA:

- Lower steel tonnage → reduced fabrication cost
- Smaller and lighter components → more anchors per vessel trip
- Reduced vessel time → faster offshore installation
- Simplified logistics → fewer lifts and handling constraints
- Less dependency on large heavy-lift vessels

*** Based on InterMoor–Jumbo Maritime alliance, enabling optimized logistics and high-efficiency installation using shared heavy-lift vessel capability.**





Jumbo Fairplayer with 18 SEPLAs

Jumbo Fairplayer with Upending Frame

SEPLA Keying & Trenching Hypothesis

The holding capacity of SEPLAs should be less affected by trenching than suction piles due to the deep mode limit state.

Video Courtesy: University of Western Australia Centre for Offshore Foundations

Suction Limitations Driving New Solutions

Suction embedment works best in deepwater with normally consolidated clays.

Challenges:

- Pump cavitation in shallow water
- Sands, stiff clays
- Long installation times (hours)

Need for next-generation anchoring solutions such as FEPLA

- Increasing deployment in complex soil conditions (sands, stiff clays, layered soils)
- Growing demand for uplift-capable anchors to optimise mooring systems
- Strong push towards cost reduction, lower material use, and reduced vessel time
- Decarbonization and local content driving need for lightweight, deployable solutions

04

Chapter 04: Introduction to FEPLA

The FEPLA System

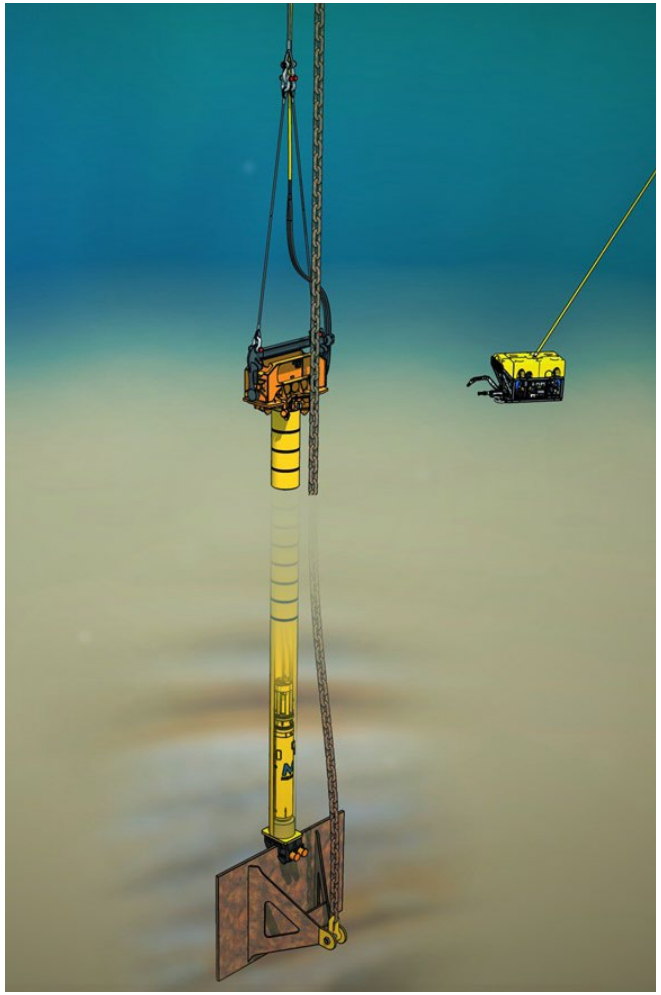
Flexibly Embedded Plate Anchor

Anchors configured for:

- Clay and/or sand – depending on final layer
- Quick connection and disconnection with follower – on deck, subsea and embedded in soil
- Minimal translation during extreme loading – no need to proof load

New, multi-function follower:

- Mechanized anchor retainment and release
- Dual drive modes:
  - Impact hammer
  - Vibro-hammer



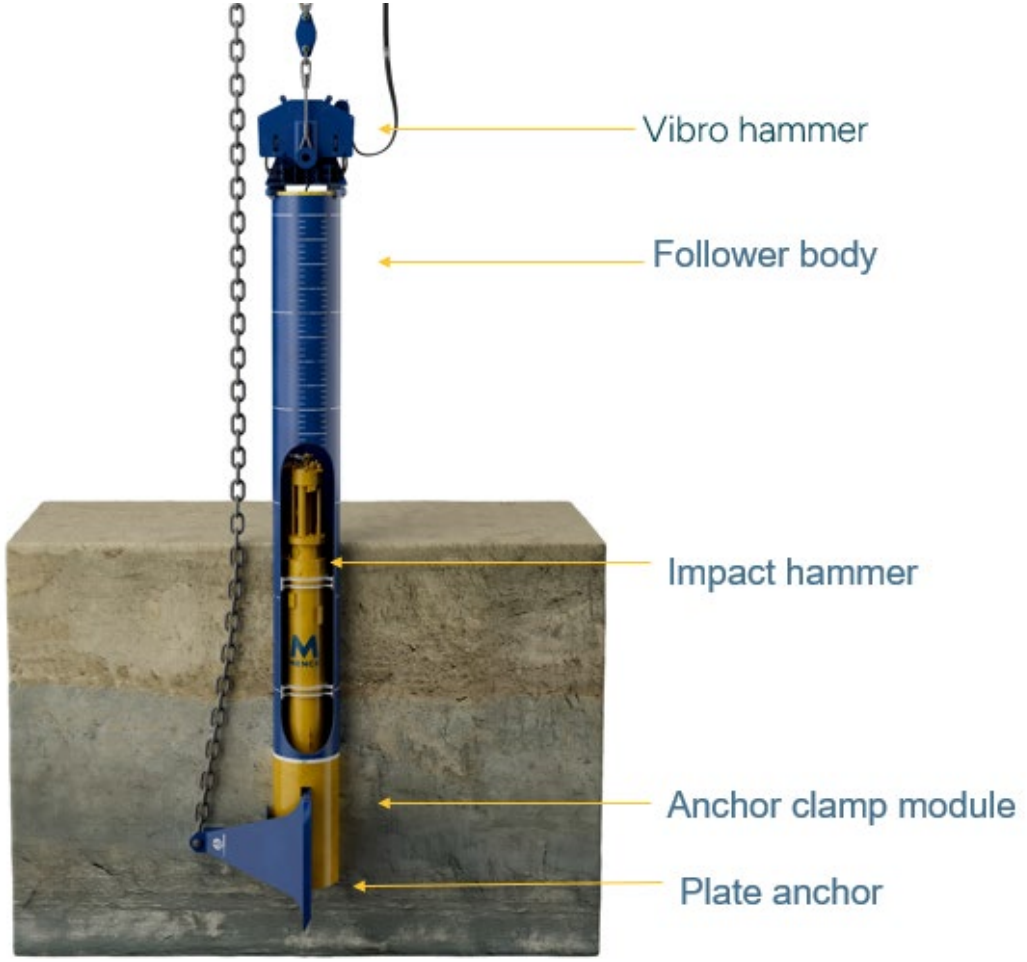
FEPLA Follower

The FEPLA installation tool combines proven technologies:

- Developed in collaboration with ACTEON group sister company 2H and MENK

- **Drivability Study completed by 2H**
  - Drive times: As low as 20 min
  - 320 kg-m vibro hammer
  - 270 kJ impact hammer
  - Follower body 48” OD x 15-30m long (depending on anchor depth requirement)
  - Estimated weight less than 150t

- **MENCK-supplied vibro and impact hammers**



FEPLA Size Estimates

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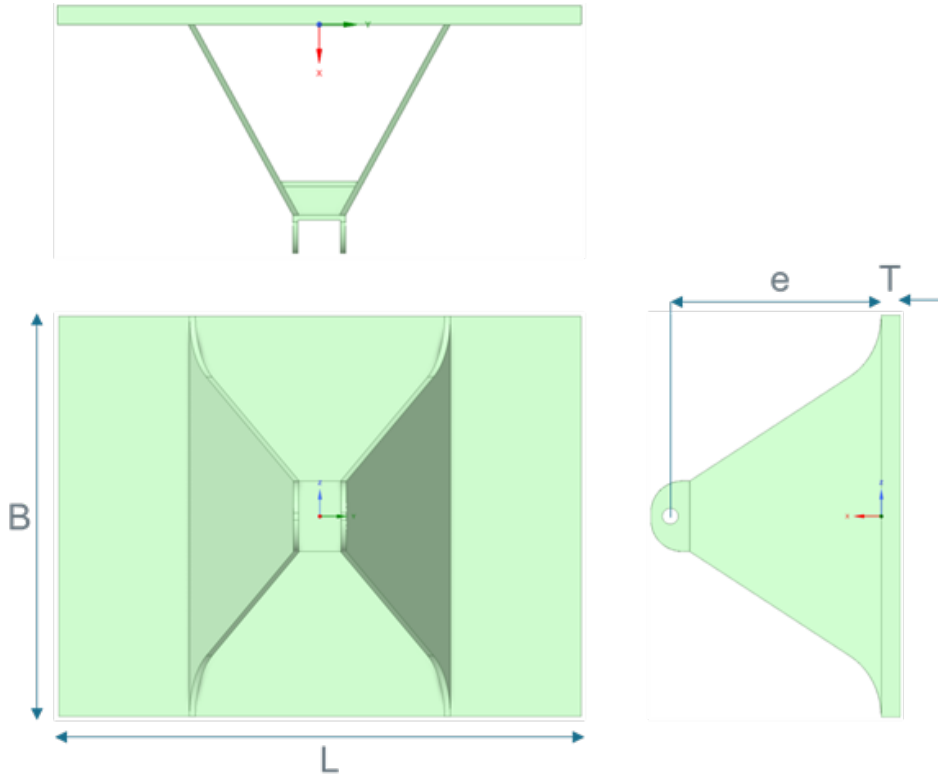
1000t tension at seabed

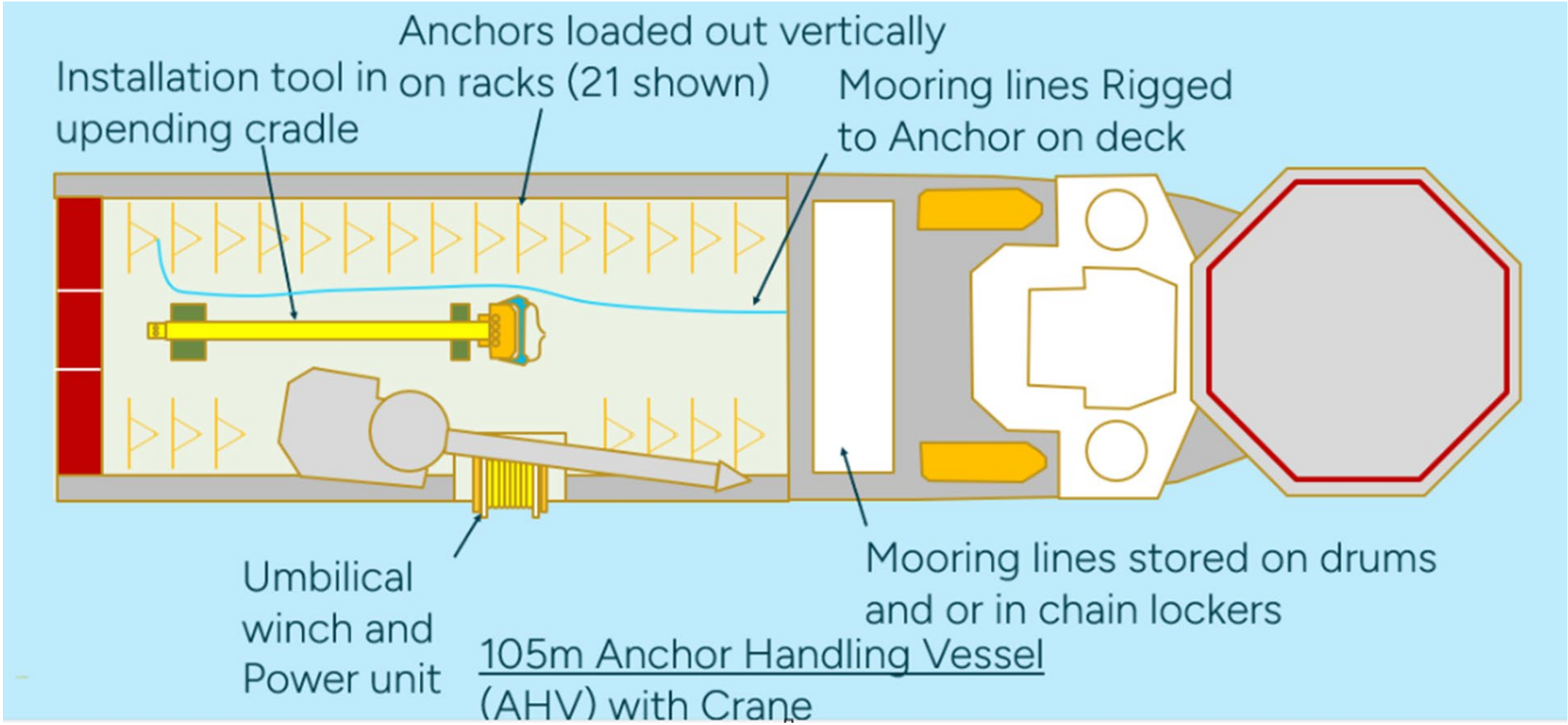
	Normal Clay	Stiff Clay	Med. Sand	Layered Sand over Clay
Fluke Area, m2	60.1	40.8	12.5	27.5
Est. Weight, t	45	32	13	23
Weight of equivalent pile, t	130	110	71	78



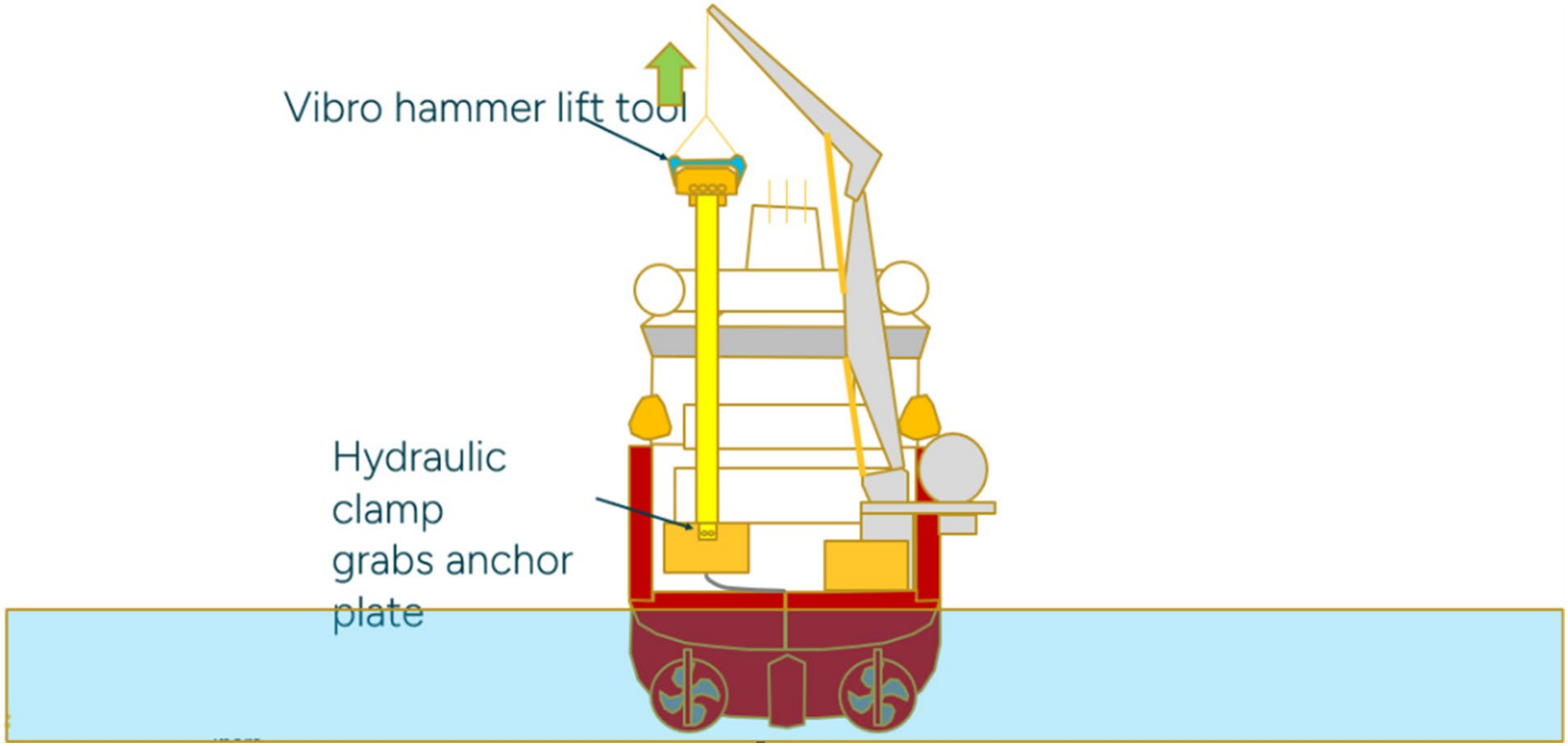
05

Chapter 05: Installation Sequence

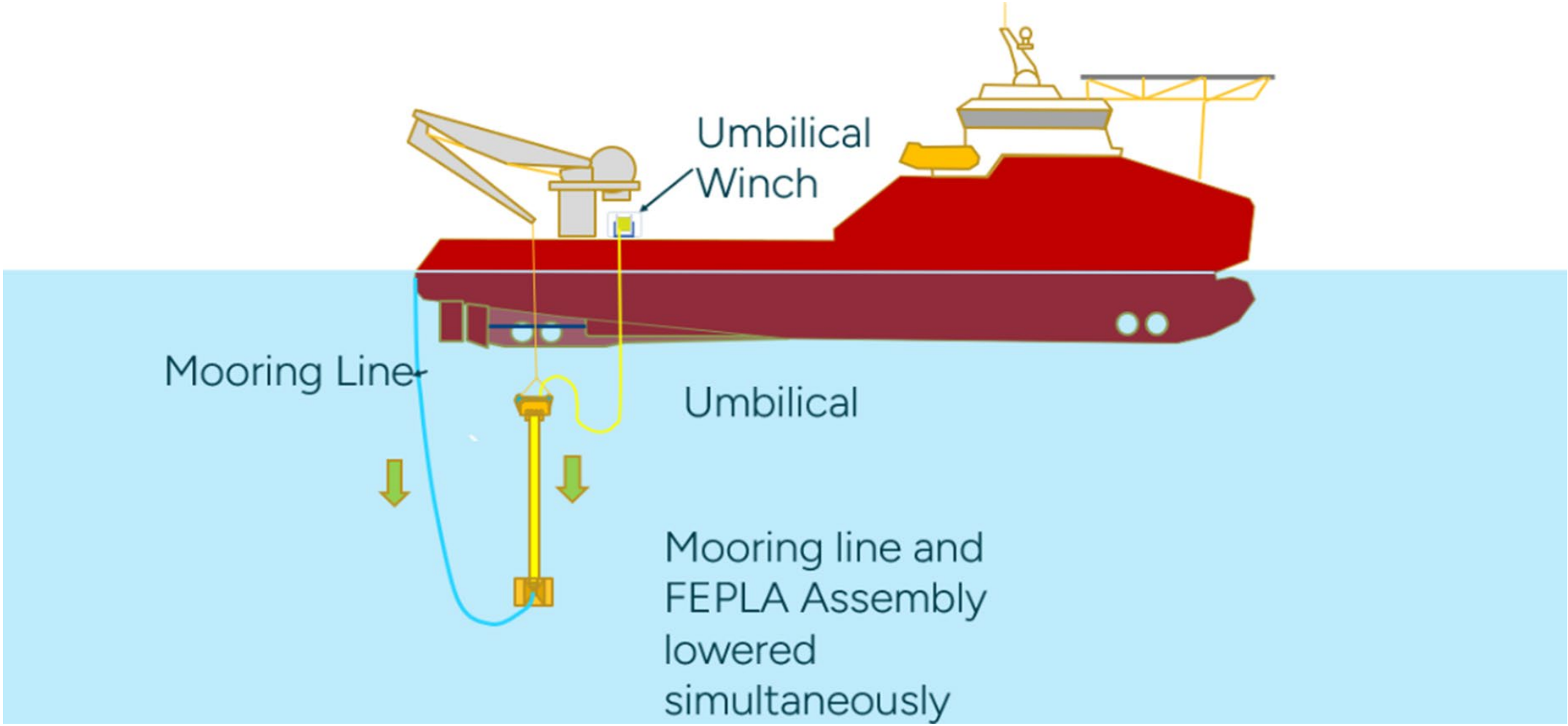
Loadout


Anchors loaded out vertically
on racks (21 shown)
Installation tool in
upending cradle
Mooring lines Rigged
to Anchor on deck
Umbilical
winch and
Power unit
Mooring lines stored on drums
and or in chain lockers
105m Anchor Handling Vessel
(AHV) with Crane

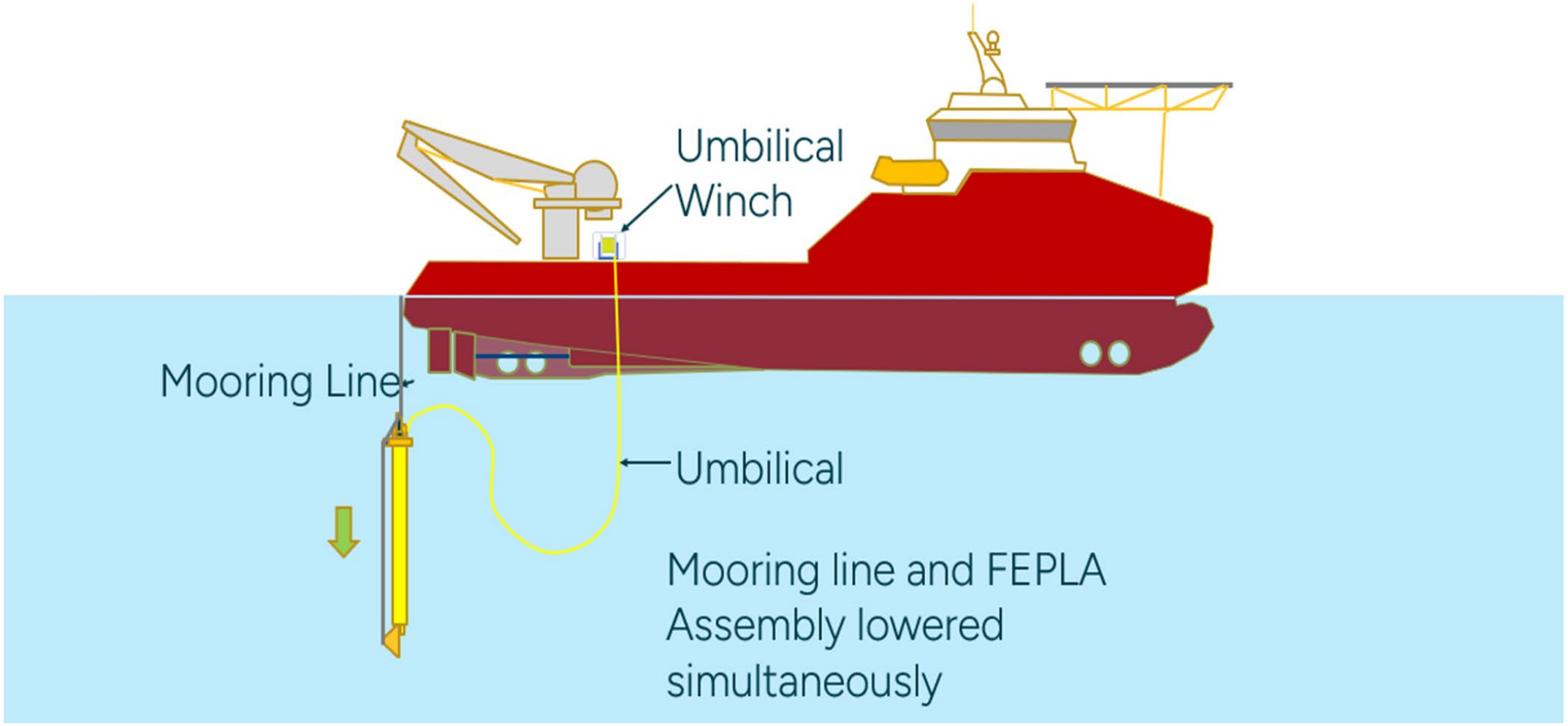
Load Anchor into Tool and Lift



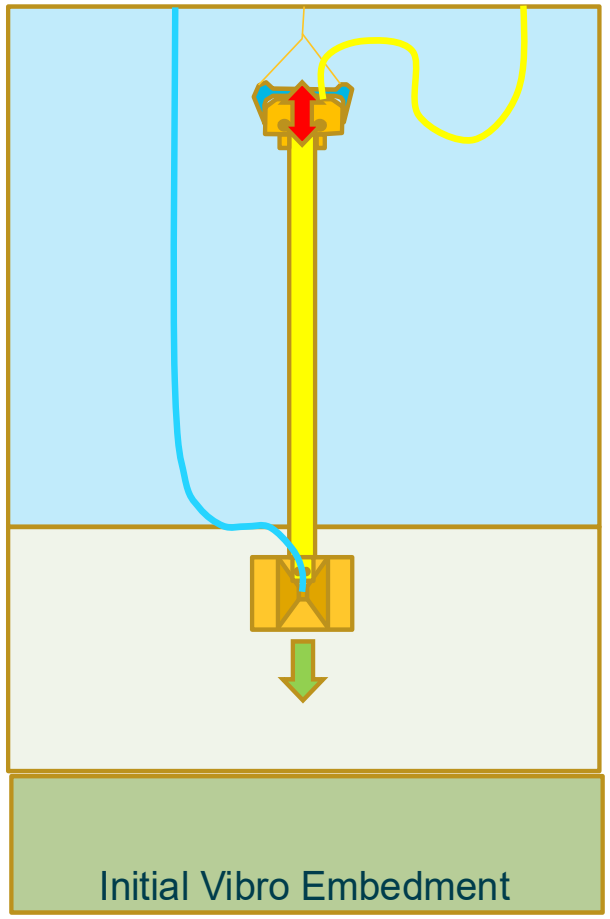
Lower to Seabed – Crane Method

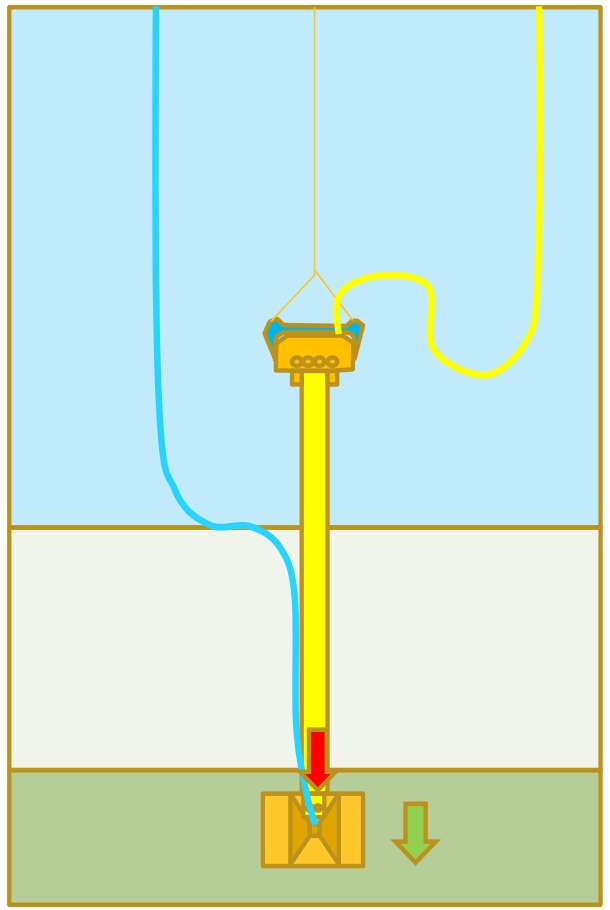


Lower to Seabed – Stern Roller Method

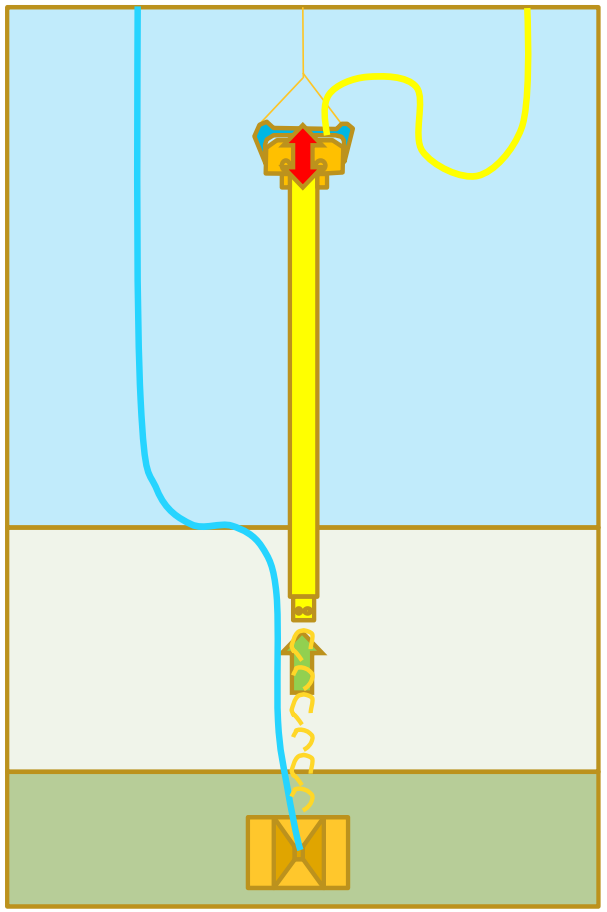


Embed Anchor and Recover Tool



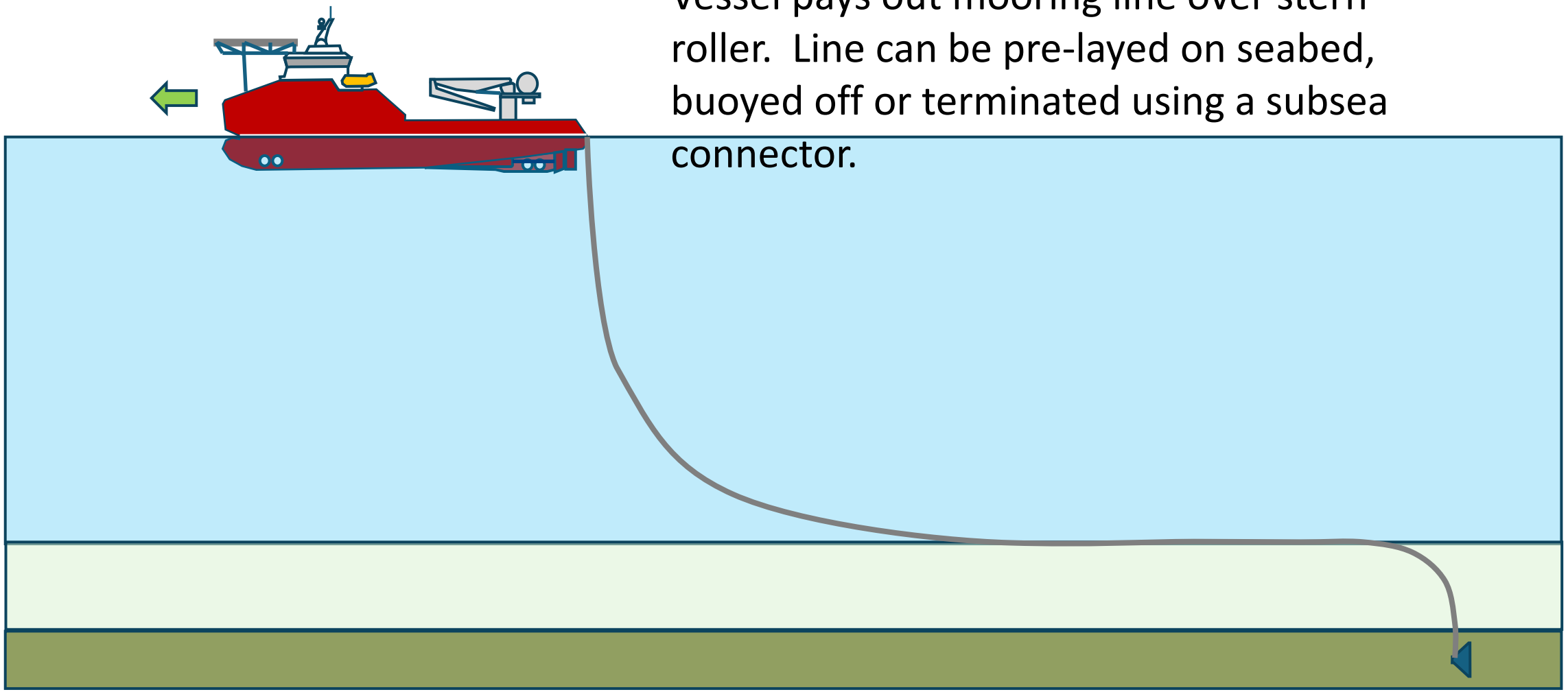


Optional Impact Hammer in Stiff Soils



Vibro Recovery of Tool

Deploy Mooring Line

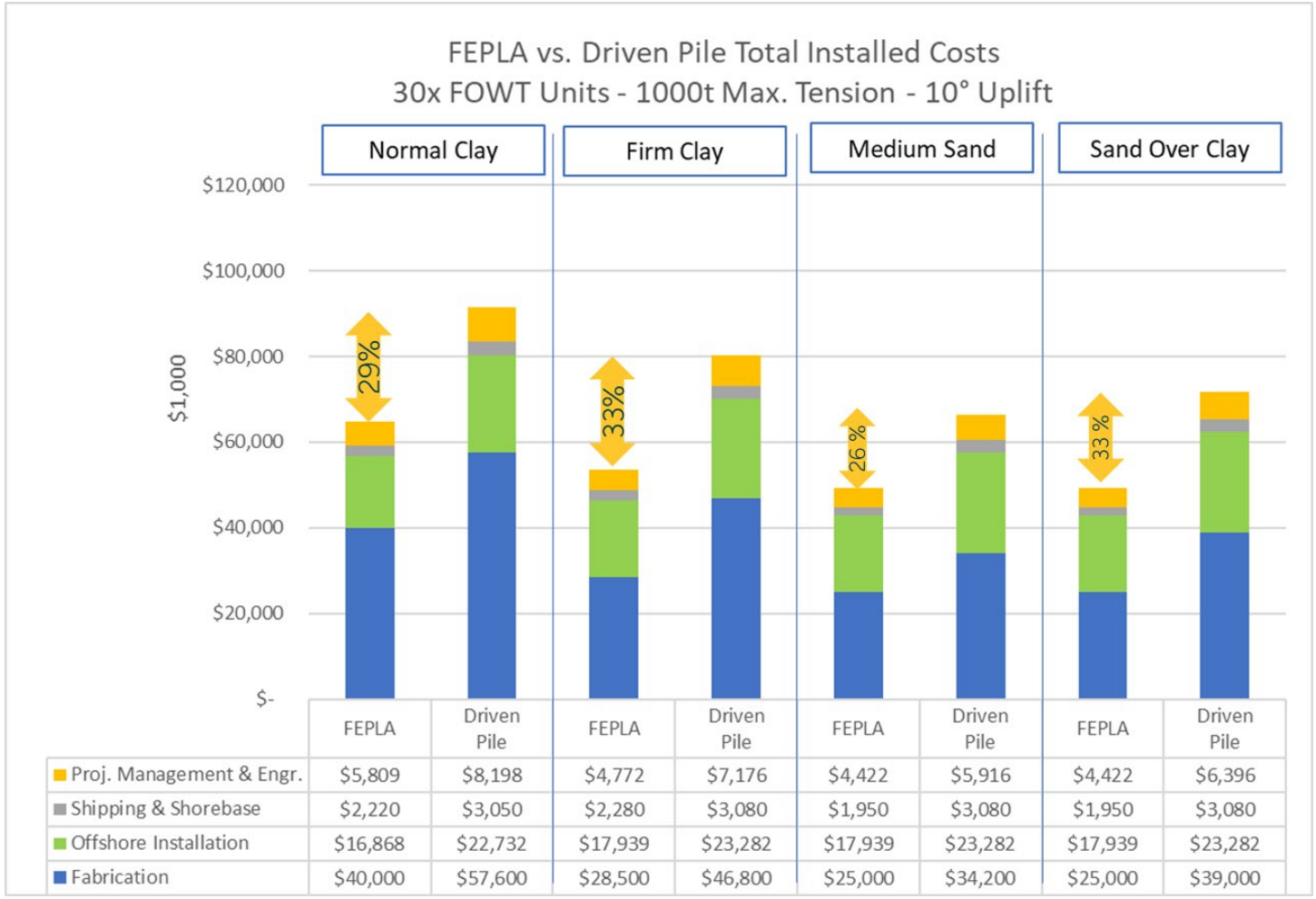


Vessel pays out mooring line over stern roller. Line can be pre-layed on seabed, buoyed off or terminated using a subsea connector.

06

Chapter 06: Cost Benefits

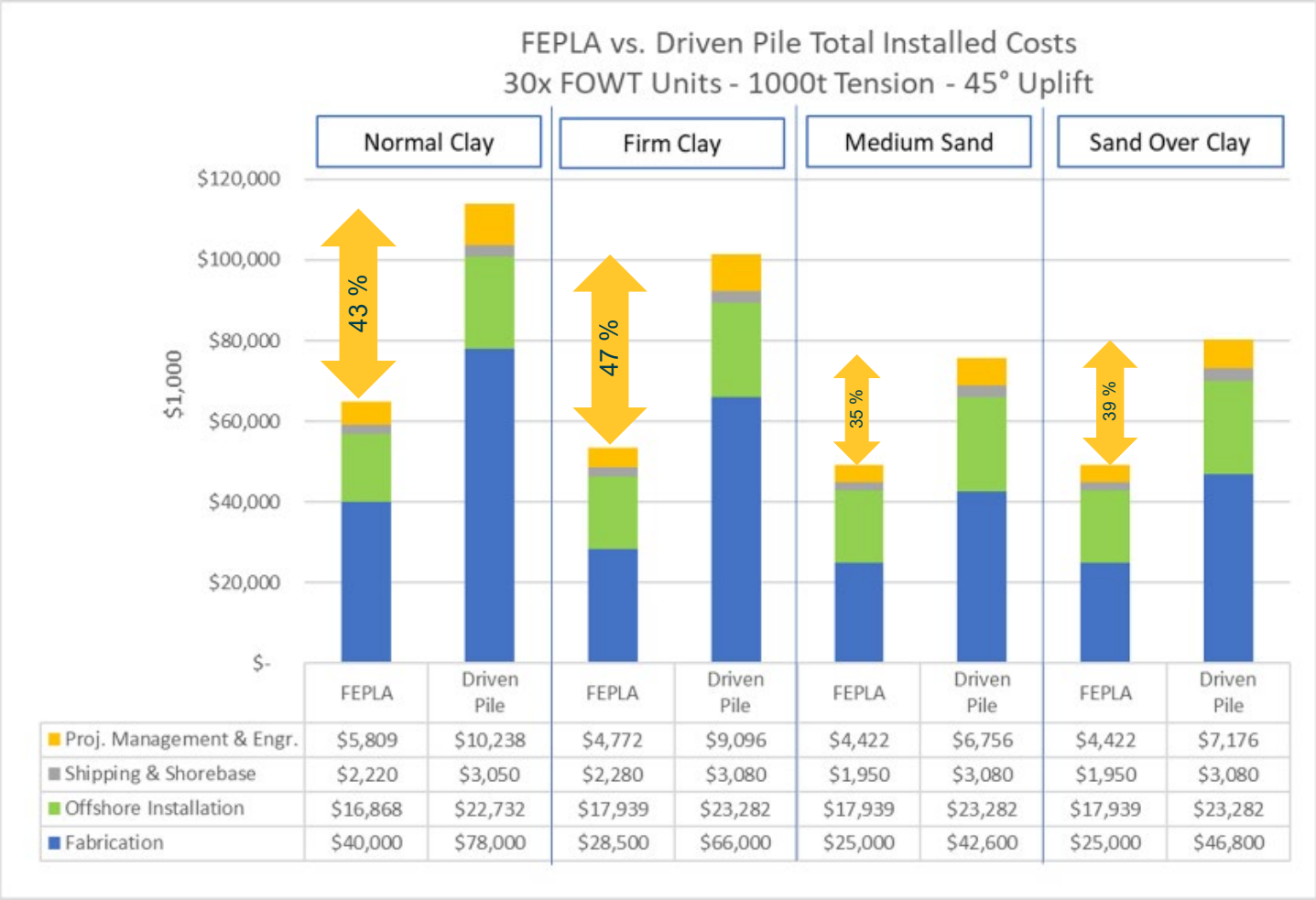
FEPLA vs. Driven Pile – Low Uplift



	FEPLA	Driven Pile	FEPLA	Driven Pile	FEPLA	Driven Pile	FEPLA	Driven Pile
Proj. Management & Engr.	$5,809	$8,198	$4,772	$7,176	$4,422	$5,916	$4,422	$6,396
Shipping & Shorebase	$2,220	$3,050	$2,280	$3,080	$1,950	$3,080	$1,950	$3,080
Offshore Installation	$16,868	$22,732	$17,939	$23,282	$17,939	$23,282	$17,939	$23,282
Fabrication	$40,000	$57,600	$28,500	$46,800	$25,000	$34,200	$25,000	$39,000

- Simplified fabrication enables a broader supplier base, reducing both cost and lead time.

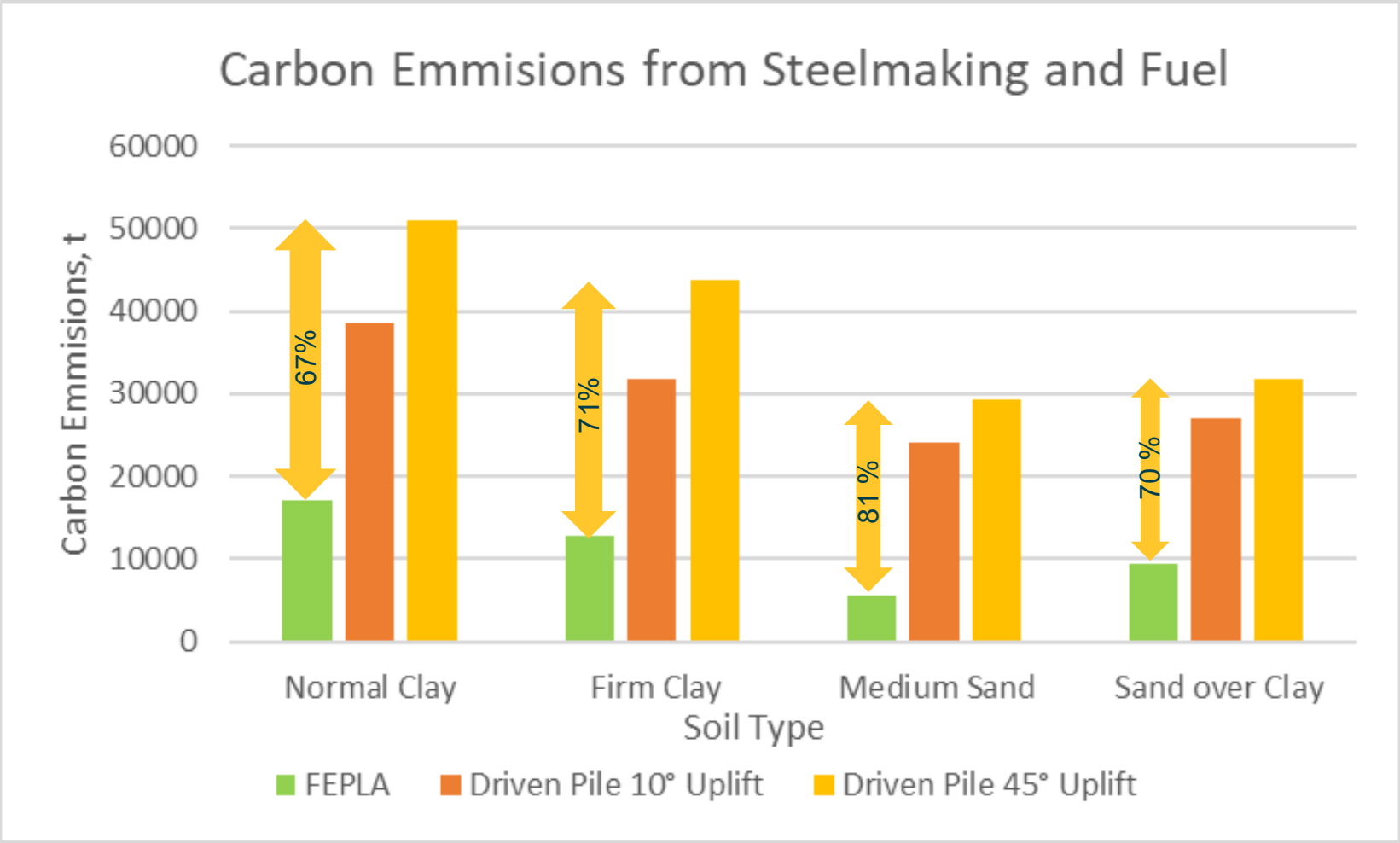
FEPLA vs. Driven Pile – High Uplift



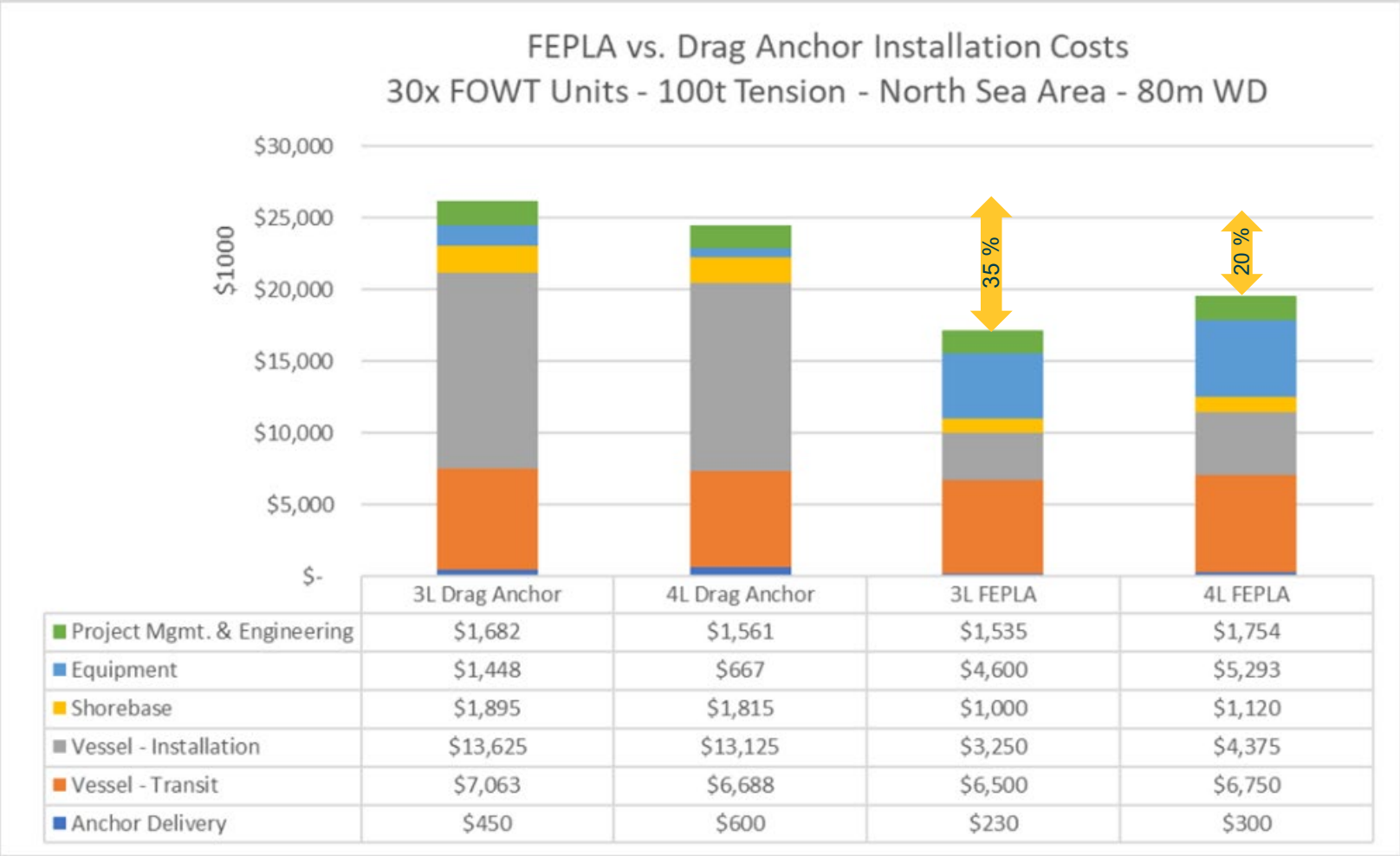
	Normal Clay		Firm Clay		Medium Sand		Sand Over Clay	
	FEPLA	Driven Pile	FEPLA	Driven Pile	FEPLA	Driven Pile	FEPLA	Driven Pile
Proj. Management & Engr.	$5,809	$10,238	$4,772	$9,096	$4,422	$6,756	$4,422	$7,176
Shipping & Shorebase	$2,220	$3,050	$2,280	$3,080	$1,950	$3,080	$1,950	$3,080
Offshore Installation	$16,868	$22,732	$17,939	$23,282	$17,939	$23,282	$17,939	$23,282
Fabrication	$40,000	$78,000	$28,500	$66,000	$25,000	$42,600	$25,000	$46,800

- Simplified fabrication enables a broader supplier base, reducing both cost and lead time.

Significant Carbon Emission Savings



FEPLA vs. Drag Anchors



	3L Drag Anchor	4L Drag Anchor	3L FEPLA	4L FEPLA
Project Mgmt. & Engineering	$1,682	$1,561	$1,535	$1,754
Equipment	$1,448	$667	$4,600	$5,293
Shorebase	$1,895	$1,815	$1,000	$1,120
Vessel - Installation	$13,625	$13,125	$3,250	$4,375
Vessel - Transit	$7,063	$6,688	$6,500	$6,750
Anchor Delivery	$450	$600	$230	$300

* 3L / 4L = 3-line / 4-line mooring configuration per unit

Client value: Plate Anchor vs. Suction Pile

- 60 hulls, 240 anchors, California
- Soil: Normally consolidated clay
- Load: 500mt tension at seafloor, 23 deg. uplift
- Plate size: 31m^2, 29mt
- Pile Size: 5m dia. x 15m long, 120mt

Findings:

- Less fabrication cost for plates (less material)
- Less transit costs for plate (more anchors per trip)
- 1/3 the carbon emissions (steelmaking dominates)

Cost Estimate	240 x Suction Piles	240 x SEPLAs
Anchor Fabrication	$ 129,600	$ 57,600
Anchor Delivery	$ -	$ -
Vessel - Transit	$ 10,875	$ 4,250
Vessel - Installation	$ 17,500	$ 20,000
Shorebase	$ 2,600	$ 2,230
Equipment	$ 2,000	$ 6,100
Project Mgmt. & Engineering	$ 16,258	$ 9,018
TOTAL INSTALLED COST, $1000	**$ 178,833**	**$ 99,198**
CARBON EMISSIONS, t	57960	15471

$80m savings

~45%

07

Chapter 07: Status Update

Recent & Ongoing Activities

Developed in collaboration with partners 2H and MENCK (ACTEON Group Partners)

- Acteon internally funded “Pre-FEED”
  - 2H drivability analysis (ISFOG 2025)
  - 1g sandbox testing at University of Dundee
  - Anchor to follower clamp concept study
- Australian Research Council (ARC) Linkage Project “Anchoring Australia's future in floating offshore wind“
- C-CORE Centrifuge Tests – looked at pullout capacity of plate anchors in sand.
- Initial prototype scheduled for deployment by Q4 2027.

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Thank You

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