

Potential cost savings on submarine cables

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Why Nexans is in submarine cables?



Cable with Accessories

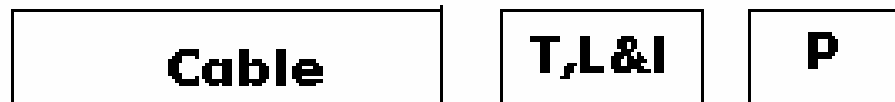
Transport, Laying and Installation

Protection

■ Turnkey project



■ "Shopping" project



■ Purchaser view

■ -10%



■ Project view

■ +5%

Interface

■ Design considerations

● Transmission capacity

- Available statistics suggest a mean production in the best months of 35-38% of installed capacity
- The yearly mean production is 28-33% of installed capacity
- Full load production periods 1-5 days
- => Do not use 100% steady state calculations
- => Transmission capacity increase/cross-section decrease
- => Low capitalized value of losses

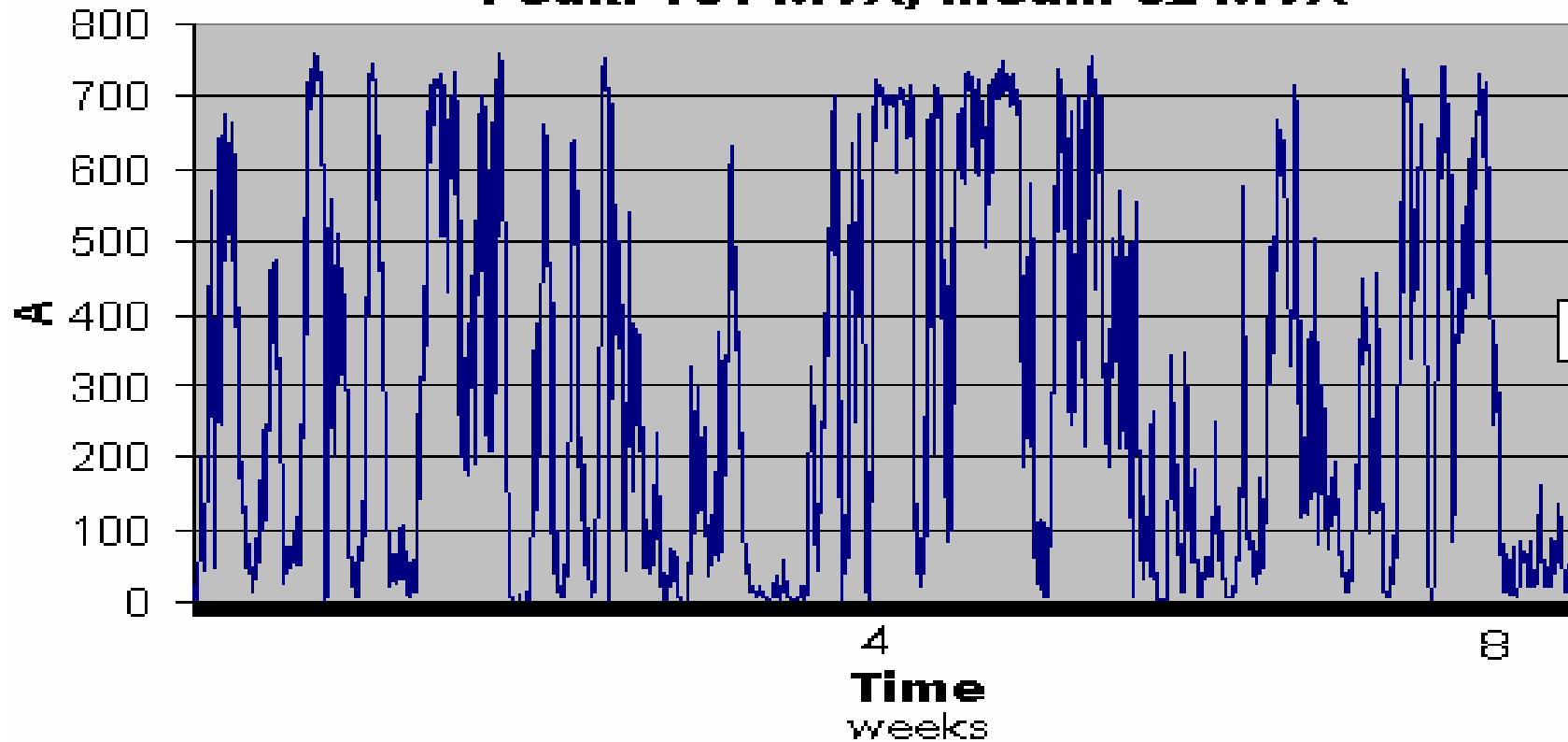
● Ambient conditions

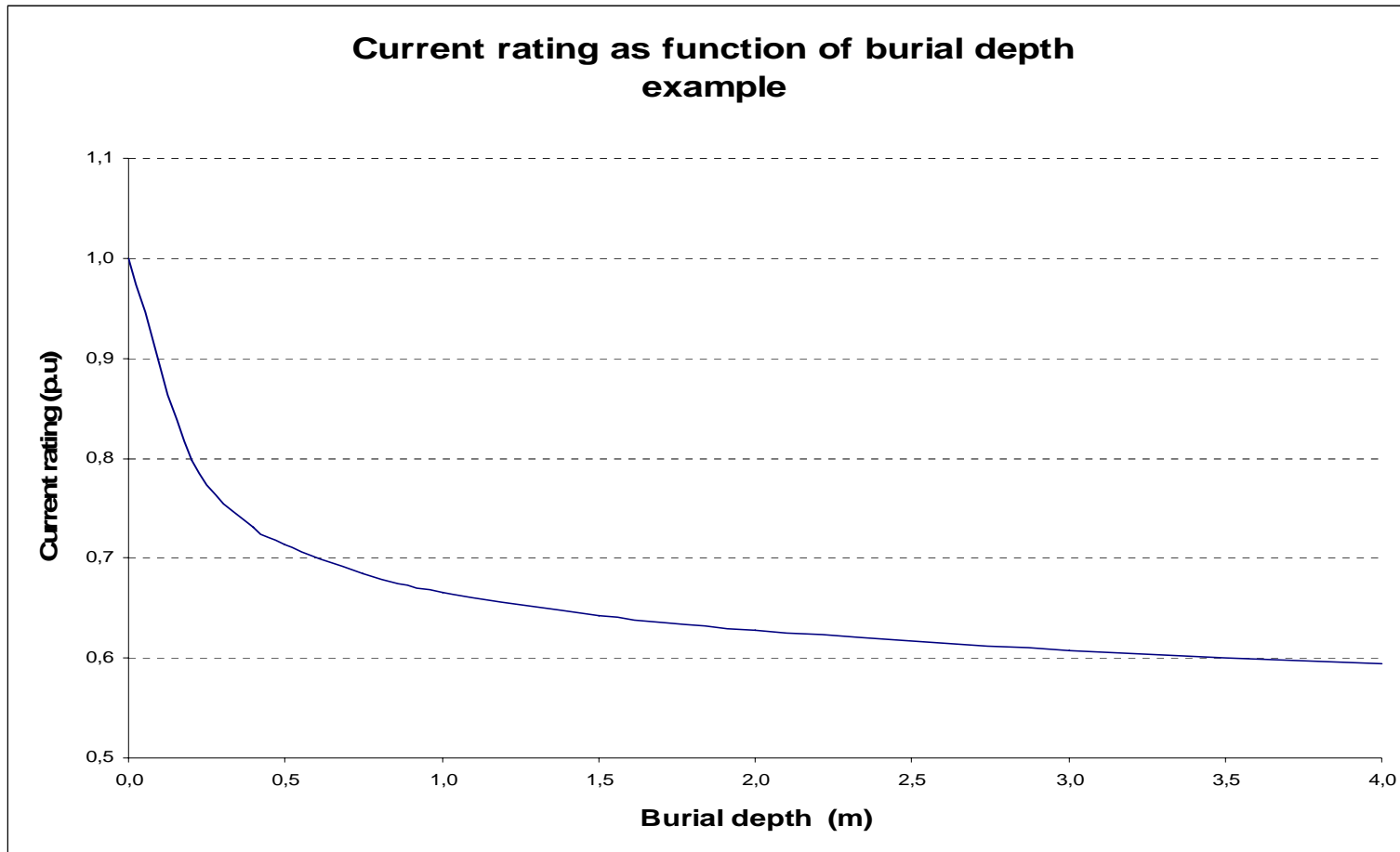
- Sectioning the route according to environmental conditions
- => If possible, use lowest cross-section

● Burial depth considerations

- Derating as the burial depth increases
- => Do not bury deeper than necessary

Production January-February
Peak: 161 MVA, mean: 62 MVA

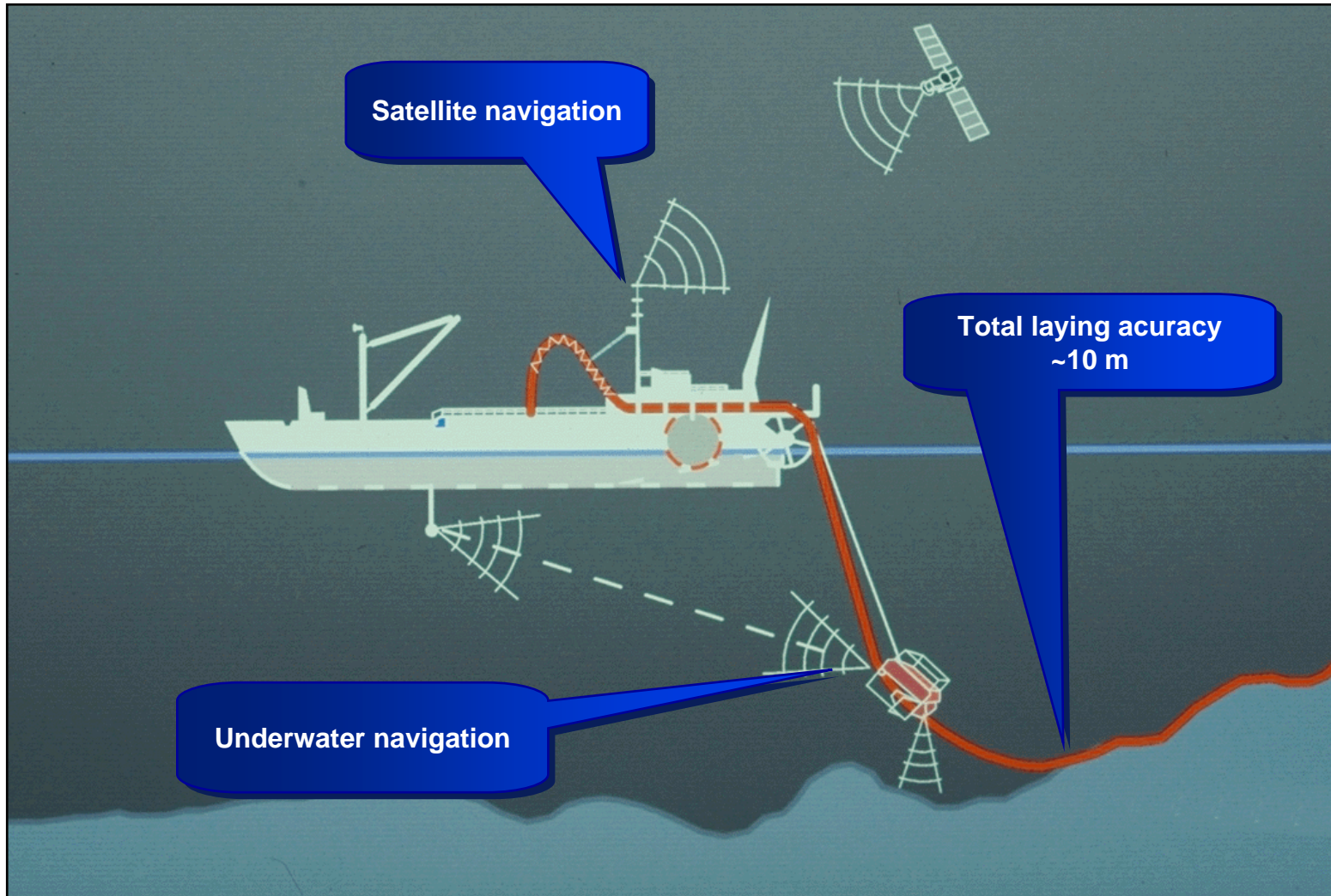




The areas to reduce the laying cost:

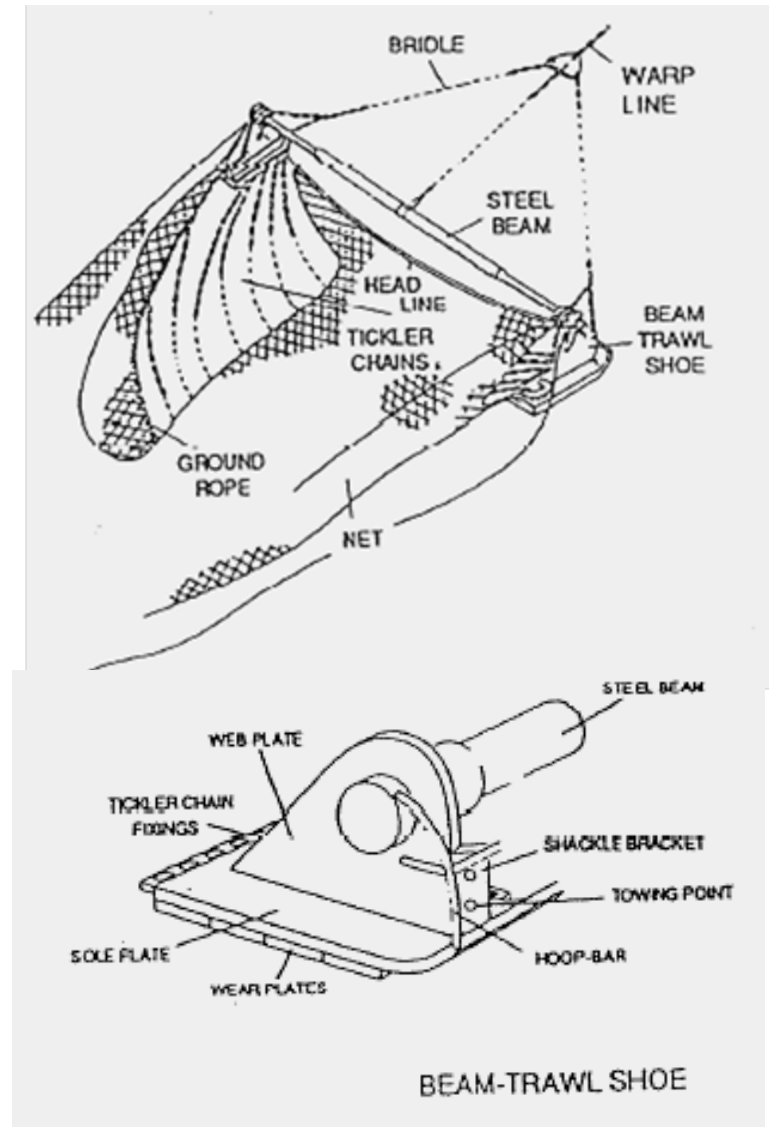
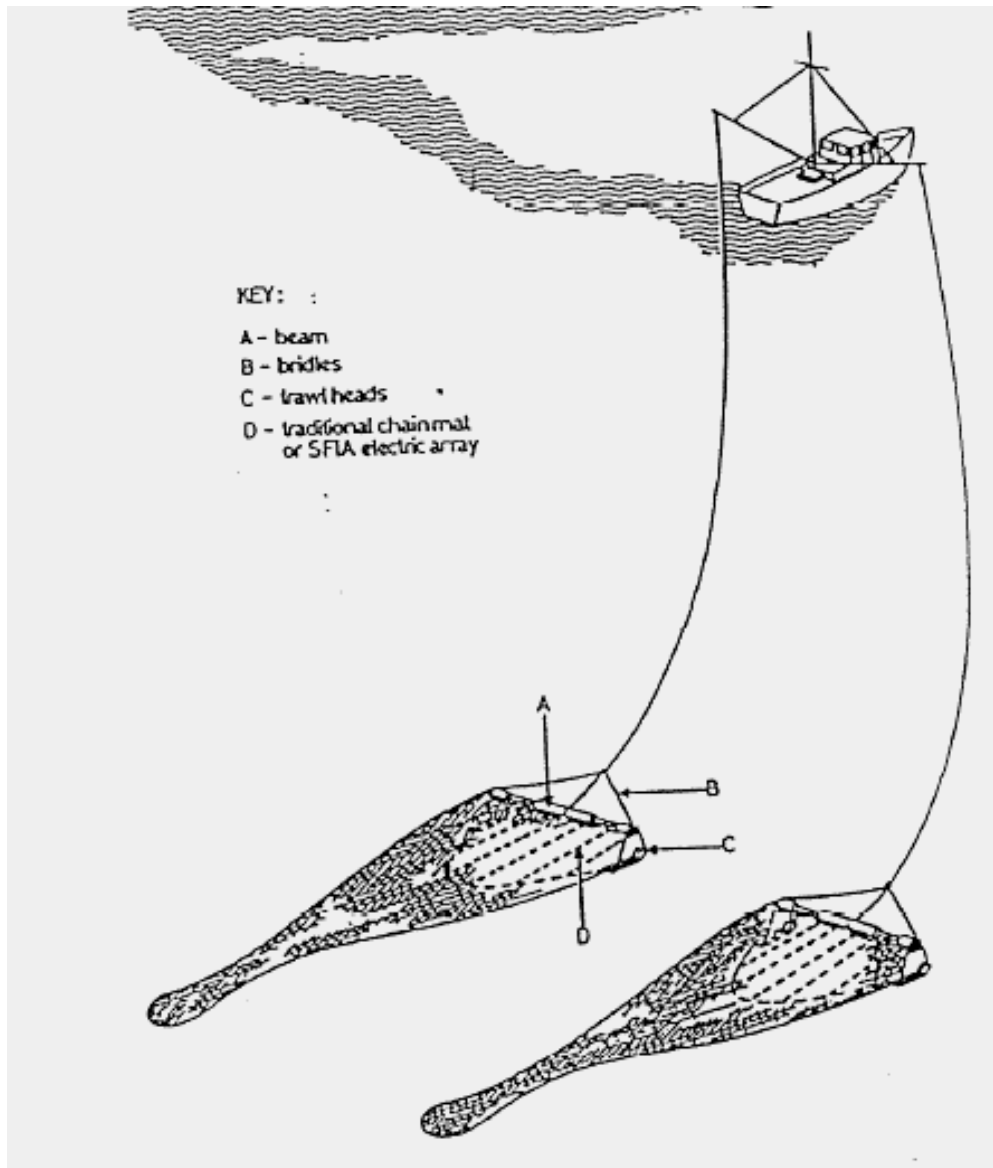
- Through cable design, if feasible, f. ex:
 - Design of armour
 - => Reduce the total weight
 - Three core cable instead of single core for AC
 - Integrated Return Conductor instead of metallic return cable for DC
 - => Reduce the number of laying and protection campaigns
- Through concurrent engineering of the laying and design
- Efficient, well engineered laying spread
 - Dynamically positionable laying vessel with transport capacity
 - Experienced and well rehearsed marine and cable laying crew

! Pre-qualification !



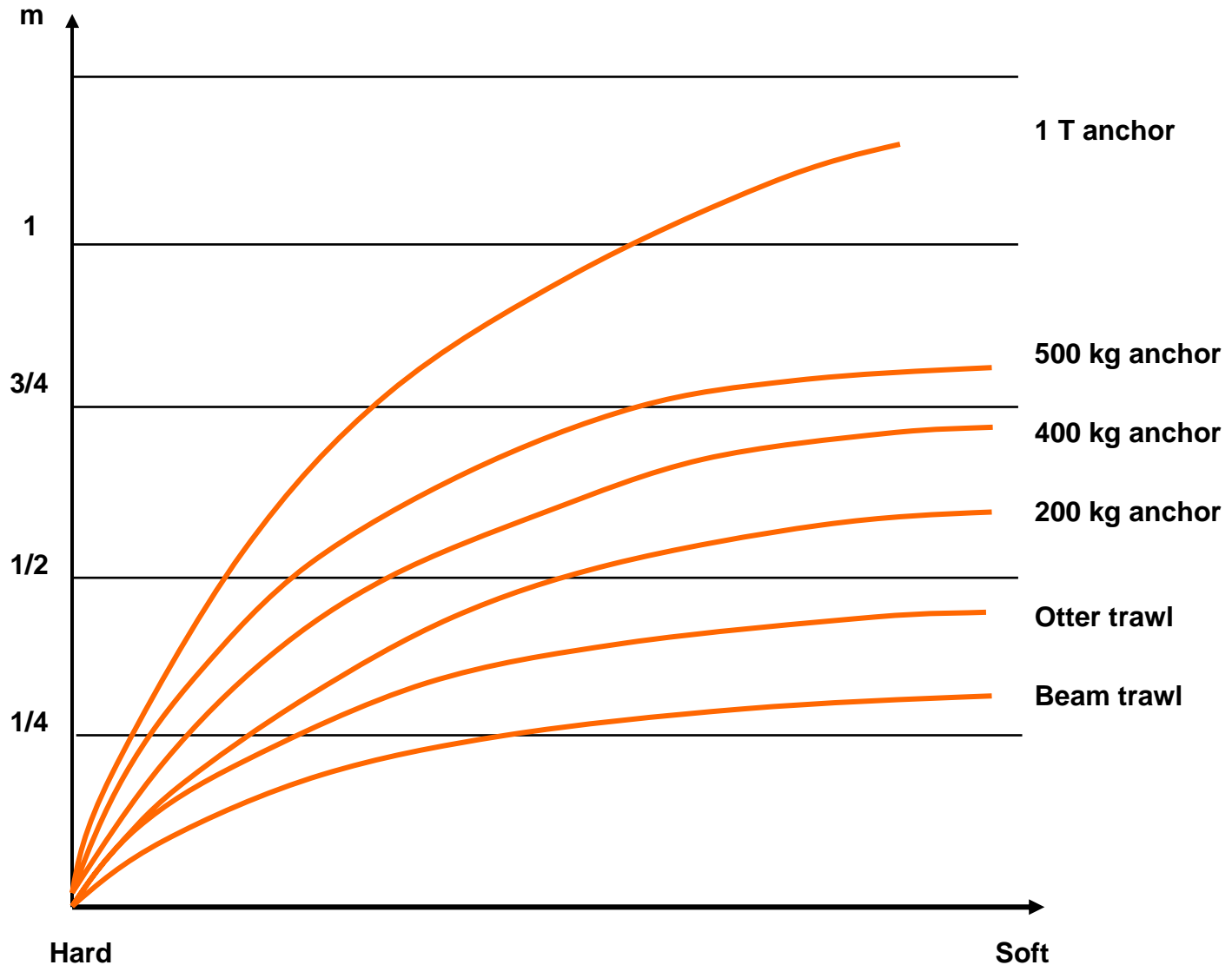
Protection

- At landing sites the cables have to be protected (0-20 m depth)
 - The marine and fishing activity along the route must be surveyed
 - The soil conditions must be documented along the route
 - Based on the above a risk and cost benefit analysis should be carried out
 - => If the analysis shows need for protection the most cost effective solution should be engineered
 - => Areas with too high shear strength, such as rock, are protected by f.ex. rock-dumping
 - => In soils with normal shear strength burial deeper than ~0,5 m is adequate for protection against fishing activities
 - Protection against large anchors are usually untenable
 - Burial deeper than 1m is usually counter productive as the cost increases and the cable is derated and an eventual repair is more costly
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- The laying should not be a hinder during protection

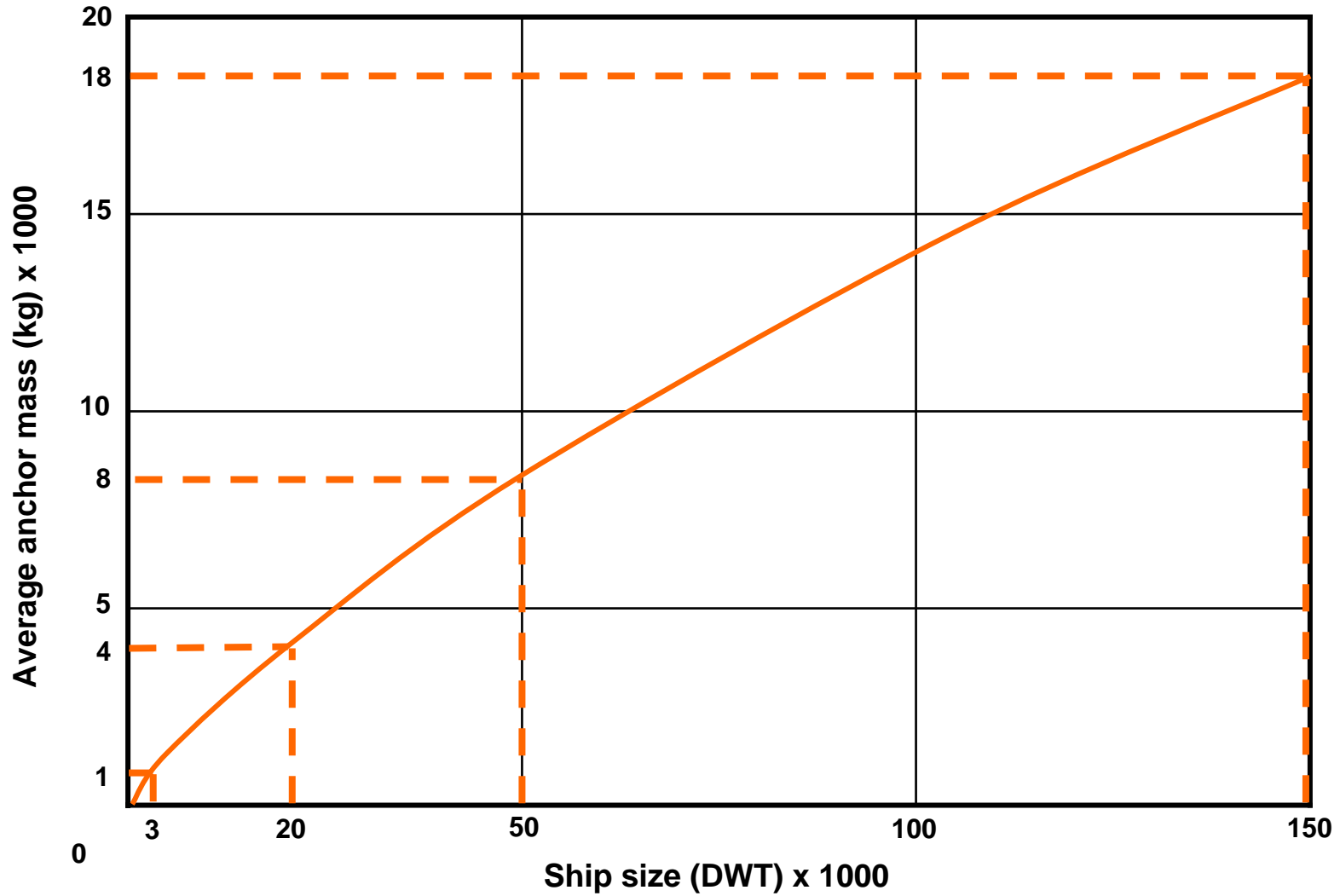


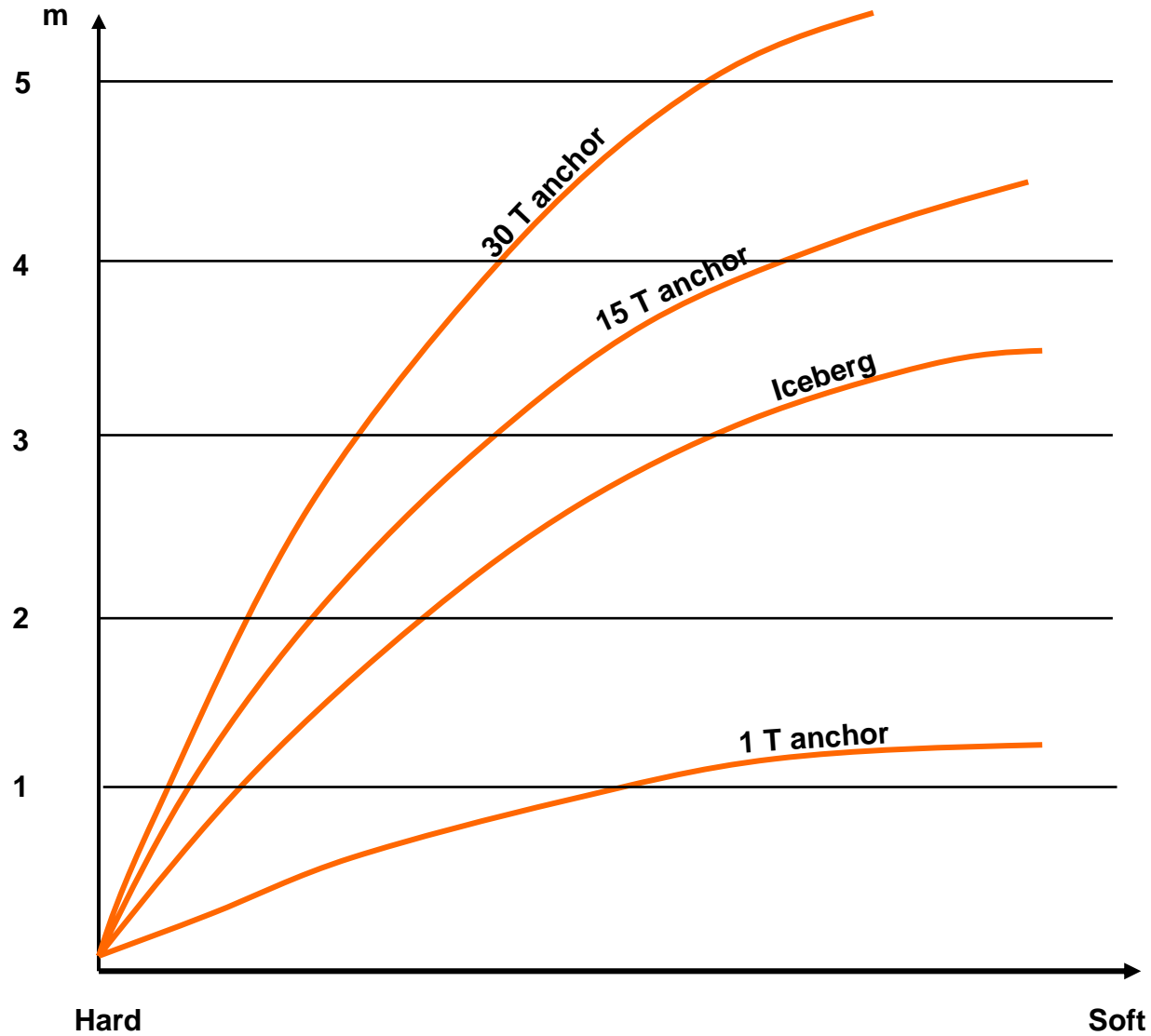
Type of gear	Gear part in contact with ground minor	Gear part in contact with ground major	Width of gear parts, (m/ship)	Towing speed (knots)	Penetration depth, (cm) Soft ground	Penetration depth, (cm) Hard ground	Area fished (km ² /100h)	Fishing area
Beam trawl, (flatfish): Outside 12 mile zone Inside 12 mile zone	- -	Trawl shoes + Tickler or Chain mats	12x2 4x2	5 5	>6 ?	6 ?	31,1 8,9	Extensive Coastal
Shrimp beam trawl (Crangon)	Ground rope with rollers	Shoes	0,2x4	4-5	?	?	0,7	Estuariane Coastal
Oter Trawl	- Ground rope	2 otter doors -	1,5x2 30	3-4 3-4	8 8-10	<5 ?	2,0 22,2	Extensive Coastal
Industrial single trawl	- Ground rope	2 otter doors -	1,5x2 25	3,5 3,5	8-10 ?	<5 ?	1,9 16,2	Extensive
Industrial pair trawl	Ground rope	-	25	3,5	?	?	16,2	Extensive
Pair trawling: Pelagic Demersal	- Ground rope	- -	- 40	3 3	- ?	- ?	- 26	Extensive Extensive
Seine	Ground rope	-	-	-	?	-	0,05	Extensive
Mussel dredge	-	Blade+belly	1,75x4	2	5-25	-	2,6	Estuariane Coastal
Cockle dredge	-	Suction head	1x2	2	25	5	0,7	Estuariane Coastal
Scallop dredge English French	- -	Tooth bar+belly	0,75x16 2x5	3 3-4	3-4 <10	2-3 NA	6,6 7,2	Coastal
French clam dredge		Blade +belly	0,7x2	3-4	<15	NA	0,8	Coastal

Penetration of smaller anchors & fishing gear vs. soil hardness



Anchor weight versus ship size x 1000 T





- Consider cables from the very beginning
- It is almost impossible/very costly to protect cables from large ship anchors
- No known fishing gear penetrates deeper than 0,25-0,30 m

- A burial even in soft soil deeper than 0,5 m gives an adequate protection against fishing gear
- A Burial Protection Index, BPI, that takes into account all relevant factors such as:
 - soil shear strength
 - fishing and maritime activities
 - cable withstand strength
 - cable reparability
 - cable ampacity

at the different parts of the route is an excellent way to determine the necessary, local, burial depth