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Poster n°2

Cable failures analysis in subsea cables

A statistical model to detect past failures using cable-repair vessels AIS locations

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Why study past cable failures on wind export cables ?

The offshore wind export cable market is still recent, with limited operational feedback. However, DNV reports that 80% of insurance claims in the offshore wind sector are related to cable failures. Understanding these past issues is essential for:

- Insurance risk assessments
- EPCI contractors and wind farm developers now covering O&M responsibilities

➨ Reliable failure analysis tools are critical for stakeholders to build a more predictable and mature O&M market.

Spinergie's methodology

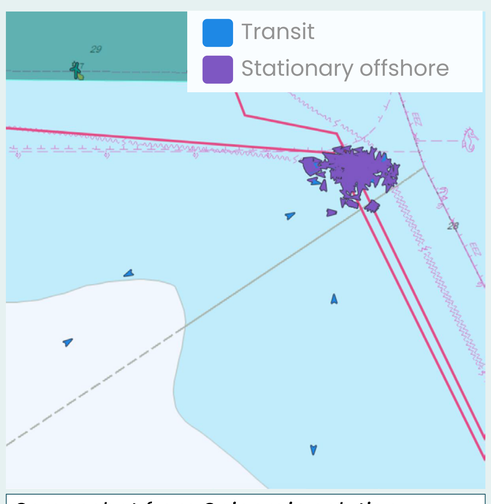
1 Cable-Repair Fleet Identification

- ☑ Cable-layers (CLVs)
- ☑ Construction vessels
- ☑ Multipurpose vessels
- ☑ Telecom CLVs
- ☑ AHTS*

Extracted from vessel specs or historical data. Spinergie gathers data on 14,000 offshore vessels worldwide.

*Anchor Handling Tug Supply

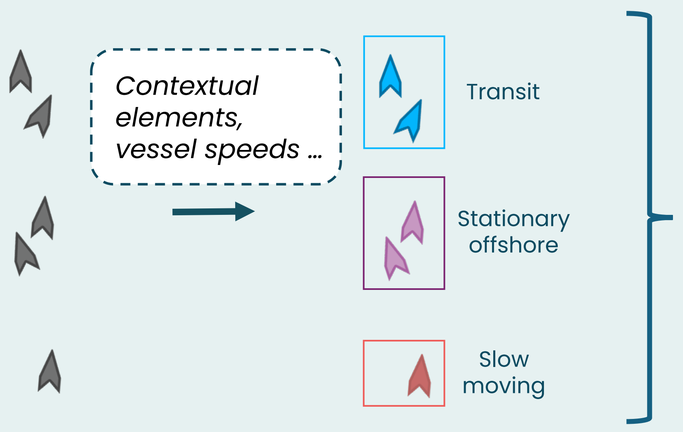
2 Potential Past Repair Operations Detection



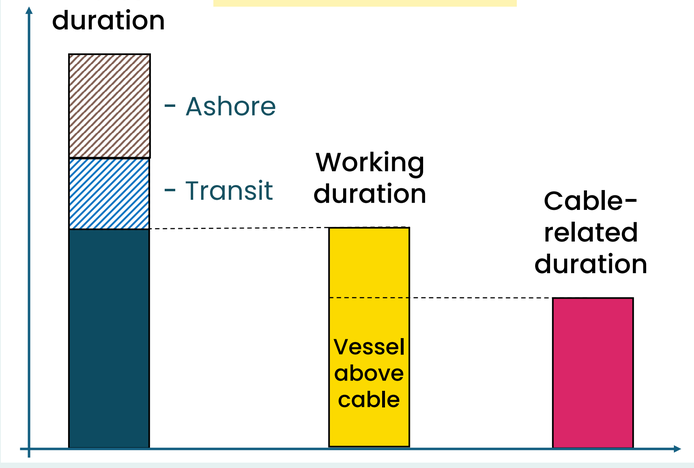
Screenshot from Spinergie solution
Gemini OWF (NL) export cables – 09/2024

Historical AIS positions

Vessel activities



Potential repair interventions



3 Repair Classification Model – Temporal criteria

Temporal analysis of potential repair interventions using the Z-score statistical method to identify outliers.

Distributions of total duration by cable-related activity ratios

2 criteria:

➨ Total duration

➨ Cable-related activitity ratio

Cable-related activity ratio
=
Cable-related duration
—————————
Working duration

4 Repair Classification Model – Spatial criteria

Addition of a spatial criterion to distinguish a repair from preventive maintenance activity.

Frequency of cable length ratio

Hypothesis: Cable repairs take place in a very specific, localized area of the cable.

Cable length ratio
=
Total vessel path along cable
—————————
Total cable length

Cable length ratio > 100% when the vessel makes back-and-forth movements over the cable.

Results

From the compiled list of past repair campaigns, key metrics were extracted:

- **Failure rate** accross various dimensions (water depth, cable specs…)
- **Lead time**
- **Average repair duration**

Conclusion

The model is based on 9 years of historical data covering to date 1,193 vessels and 147 offshore wind export cables. It can also be applied to subsea interconnectors. When combined with cable length forecasts, this model enables estimation of vessel demand in repair days, supporting more accurate O&M planning.

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