Swiss-Re Seminar

Risk management measures for offshore wind farms projects in France

Gestion des risques pour les parcs éoliens offshores Français

5th June 2018
Maison des Polytechniciens, Paris
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Risk management measures for offshore wind farms projects in France

Presentation Outline

1. Introduction to LOC
2. Risk Management and role of the Marine Warranty Surveyor
3. Lessons learnt and how to use them in risk prevention
4. Post incident management and impacts
5. Key Messages
LOC Experience

Over the last 15 years LOC has provided marine advice, consultancy, technical due diligence, support, MWS and vessel survey and approval for 32 windfarms and 7 wave and tidal projects.

Our principal role has been as MWS where we have warranted and approved many load-outs and load-ins in ports around the world and installation offshore of export, array and inter-connector cables, monopile, jacket and floating foundations, Offshore Substation Platforms and WTG.

We are passionate to share our transport, transhipment and installation knowledge gained in UK and North of Europe sector into France’s emerging renewables operations.
One Partner. Worldwide Support.

Skillset
- Naval Architects
- Master Mariners
- Civil & Structural Engineers
- Marine Engineers
- Mechanical Engineers
- Geotechnical Engineers
- Metocean Engineers
- Hydrodynamicists
- Subsea, Cable & Pipeline Engineers
Track Record Summarised As….

- **Offshore Wind farms**
  - > 60 projects
  - > 9 GW
  - ~ 65%

- **14 countries**
  - UK
  - Germany
  - Sweden
  - Holland
  - France
  - Denmark
  - Norway
  - Portugal
  - Ireland
  - Belgium
  - USA
  - Taiwan
  - Korea
  - Vietnam

- **1.5MW - 8MW Turbines**
  - Siemens Gamesa
  - MHI Vestas
  - Senvion
  - GE Alstom
  - Areva
  - Adwen
  - Doosan
We Don’t Know Yet How We Can Work Together …. But …. Our Services Are:

- Marine Warranty, Analysis & Consultancy
- Technical Due Diligence & Concept Evaluation
- Turbine, Foundation & Cable T&I
- Owners Engineering & Project Management
- Support Vessel Design & Engineering
The Project’s insurance policies

- General Insurance Risks
- Delay Insurance
- Business Interruption Risks
- Third Party Liability Risks
- Marine Warranty Clause
- CAR Insurance
- Choice of surveyor
## Roles and Responsibilities between parties

<table>
<thead>
<tr>
<th>Owner/Principal</th>
<th>Insurer</th>
<th>Warranty Surveyor</th>
<th>Contractors</th>
<th>Owner's Representative</th>
</tr>
</thead>
<tbody>
<tr>
<td>▪ Procure insurance on behalf of all parties</td>
<td>▪ Take risk from balance sheet</td>
<td>▪ Advise best industry practice / standards</td>
<td>▪ Deliver on time &amp; budget</td>
<td>▪ Act in place of the owner as supervisor to contractors</td>
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<tr>
<td>▪ Pass benefit of insurance excess deductibles to contractors</td>
<td>▪ Instruct owner/MWS in scope of works</td>
<td>▪ Issuance of Certificates of Approval</td>
<td>▪ Work safely in accordance with the MWS’s issued Certificates of Approval</td>
<td>▪ Ensure there is no breach of a Certificate of Approval</td>
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</table>
The objectives of MWS

Task of the MWS - To warrant and approve the transport and installation of an offshore wind farm.

Objective of the MWS - To reduce the Transport and Installation (T&I) risks
   This benefits the Underwriter in reduced claims
   This benefits the Developer in affordable insurance and on time construction
   This benefits the Contractor in check on T&I methods and on time construction
   This benefits the Regulator in confidence that consent conditions are observed.

Effective MWS - To confirm that the T&I risks are being properly managed
   To work effectively and be credible the MWS must be independent
   The MWS is invited by the Developer to join the project
   The MWS works on a very narrow base
   The role of others
   The role of the environment
MWS comprises 3 distinct activities:

1. **Document Reviews**
2. **Suitability Surveys**
3. **Operations Approval**

- Clearly defined operation
- Which should come first?
  - Vessel selection
  - Method statement
- Wind farm key operations
  - Foundation installation
  - TP Installation
  - WTG Components
  - Cables
  - OHVS
Operational Approvals

- Operational approvals are given by the attending MWS Surveyor when all of the preparations are complete.
- Approval is confirmed with the issue of a CoA (Certificate of Approval).

Notes:
- Remember that the MWS is always reviewing the work of others.
- MWS is all about the confirmation that the risks are reduced to an acceptable level. We do this by Reviews, Suitability Survey and Attendance to issue CoA.
- Remember during the T&I operations it is the Master of the Vessel that is responsible for the safety of his vessels its crew and the project cargo.
What to Worry about

- Developers want:
  - high energy
  - high consistency

- Tidal – 5 knots +
- Waves – 1.5m Hs + Tp 8 sec +

- These are not places that Mariners go to or stay in

- Yes we can work at slack water ...
  Yes we can work on calm days ....
  BUT ....
What to Worry about

- An ROV out of control in a high and increasing tidal stream.
- Held by umbilical.
- Which snapped as tidal stream increased.
- ROV was lost.
What to Worry about

Underwriters, MWS Surveyors and Developers have:

**Fear of the unexpected** - in Europe there have been many, many more UXO (UnExploded Ordinance) discovered than had been advised or planned for.

**Fear of the unconsidered** – in the example in the pictures, the small shoe on which the nacelle rested was weak and insufficiently secured. It failed and the others sequentially failed as higher loads came on them. The result was 10 nacelles sliding around in the hatch and colliding with each other!

**Fear of the ignored** – yes there are times when this happens and it is one of the MWS’s role to point this out. The example here is of insufficient seafastenings.
Where to focus our MWS efforts

We do not know where or how the claims will materialize so have to work on the assumption it could be anywhere.

If we knew we could sharply focus - but we don’t however experience and Claims record gives us a clue:

As MWS we will apply principals required by Underwriters: Review - Survey - Witness and approve - Record with CoA

- Cables
- High cost items
- Jack-ups vs vessels
- Engineered lifts
- Interfaces
Two key areas often missed:

- **Early engagement** – achieves “Approval in Principle” and avoids “Nasty Shocks”

- Establish a **clear scope of work for MWS** – focus where most effective
Jack-ups

Jack-ups are the work horse of the renewable construction industry for foundation and WTG installation.

Working from a fixed platform is easier than from a moving vessel.

However they have a limited payload

Need to comply with both vessel and MODU codes.

Jacking to ISO19905.

Novel risks for all of us Earthquake and Typhoon.
Warnock, McMillan, Pilgrim and Shenton (2016):
Export cable failure rate is 0.07-0.5 failures/year (50km length);
Lost Production ~ £16m (300MW, 3 months) – this does not even cover the replacement/repair cost
Environment

Need to understand the environmental limits that the vessels and operations can work in.

- Wave height and wave period (Hs, and Tp)
- Wind
- Current
- Seabed
- Earthquake and Typhoon

Jack-up jacks to storm survival airgap and remains on location - quick continuation of work once the typhoon risk has passed.

All other vessels flee:
- Small vessels like the CTV to port.
- Will the larger floating crane vessels, cable lay and OSV be allowed to shelter in port?

Thus we need:
- Contingency plans and planning
- Methods designed for weather restricted operations
Focus on cables damage

Submarine power cables losses and claims

- Over 350,00 millions euro of claims (50 % of claims are cables related but equals 80% the value)
- 10 incidents annually totalling average cable downtime of 100 days
- Mainly caused by human error

Example of incidents

- Cable birdcaging
- Failure of lifting beam
- Cable cut
- Damage to cable
- Compression and MBR compromise
- Cable crush pressure exceeded
- Cable over tension

The lessons learnt for repair are:

- Crisis organisation
- Reliability of fault localisation
- Availability of spare parts
- Availability of installer/repairer tool and vessels
Conclusion

• Gestion des risques pour la construction des parcs éoliens offshores et rôle du « Marine Warranty Surveyor »
  • Opérations critiques en mer présentant un certain degré de risque → Nécessite d’avoir une assurance
  • MWS est garant du management / réduction des risques associés

• Retour d'expérience dans la prévention des risques
  • Expérience des entreprises / du personnel
  • Focus sur les risques les plus importants et les systèmes de secours
  • Gestion des interfaces et communication entre : développeurs, assurances, entrepreneurs, constructeurs, tierces parties, autorités maritimes…

• Post-incident: gestion et impacts
  • Identification des incidents le plus tôt possible
  • Cout important en perte de production dépend du dommage et du plan/réactivité de réparation

• Valeur ajoutée du MWS
  • Très bonne connaissance des risques et mesures pour les atténuer ainsi que les bonnes pratiques
  • Expériences acquises au cours de nombreuses années avec visibilité sur un certain nombre de projets
  • Garde fou lors d’un incident afin que l’objet assuré ne soit pas endommagé d’avantage
ONE PARTNER. WORLDWIDE SUPPORT.

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