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Saving costs by integrated corrosion management

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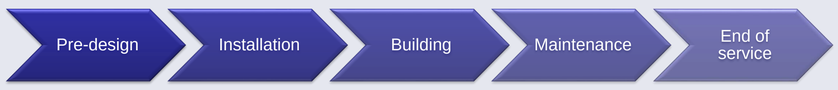
Abstract

Introduction
While in operation offshore foundations structures are subjected to dynamic loads, but equally to the hostile and corrosive marine environment. As a result: potential corrosion of the steel. All kind prevention matters are implemented to reduce the chance of corrosion problems to arise, but experience learns that corrosion never can be fully prevented. By controlling these risks, initial building costs as well as unforeseen maintenance costs of offshore structures can be reduced significantly. The present paper will as such present a novel, fully integrated approach for risk reduction related to corrosion on and around foundation structures.

Approach
By use of fit for purpose requirements for corrosion control (systems), risks can be managed and costs can be saved. The method presented is based on knowledge, experience and supported by state-of-the-art intelligent monitoring techniques. The approach proposed engages in various life stages of a wind farm. The following life stages are covered:

- (Pre) design
- Building
- Installation
- Service & Maintenance
- End of service life

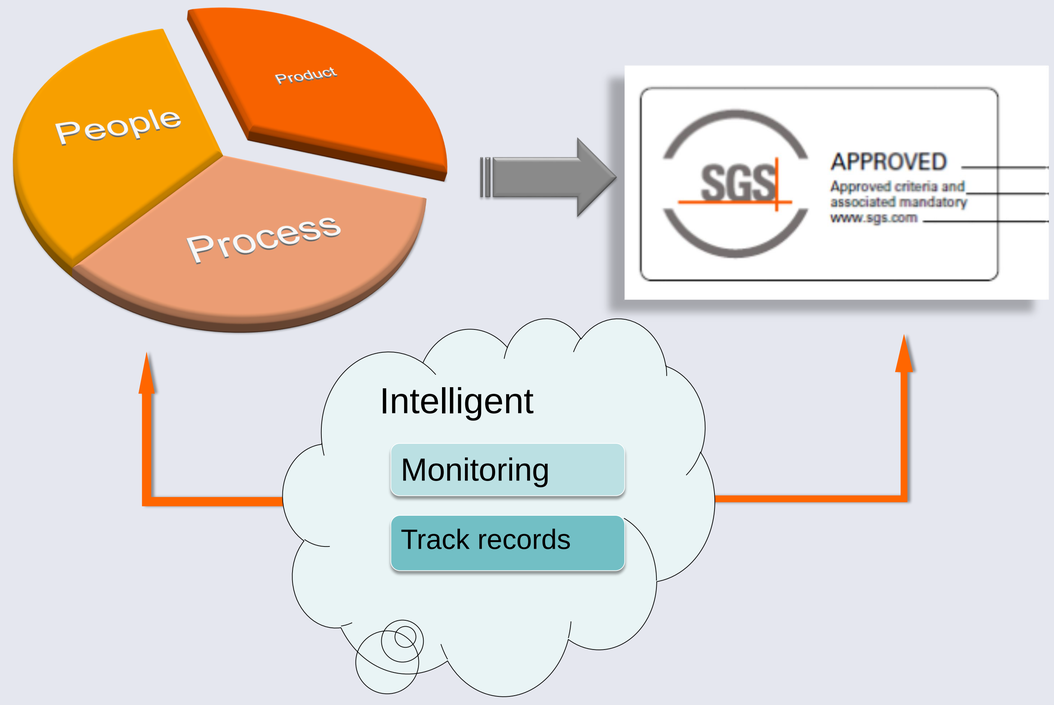


Based on fit for purpose requirements in the structural design phase, together with structural engineers, corrosion experts validate and improve design choices. Taking into account the design and the synergy of the corrosion protection systems as well as the structural design, the proposed approach will include guidance and support during the building stage. Choices of coating systems and/or cathodic protection are based on sound based knowledge and predictive models instead of poor predictive performance tests. This has an effect on initial costs such as need for additional steel for corrosion allowances and type of coating system(s).

Based on the same philosophy the installation stage is supervised. In parallel with the building stage, the approach includes a tailored intelligent monitoring concept. This concept will be based on all information gathered by the experts in the phase of structural design and on the decisions made regarding the corrosion protection measures used. Risks and potential ‘hot spots’ are identified and ranked based on their likelihood and severity. This results for the service & maintenance stage in a clear scheme of continuous (online) monitoring using sensors combined with targeted and complementary inspection schemes.

The system focuses on signs of corrosion activity related to the efficiency of the corrosion prevention matters implemented, such as cathodic protection and coatings. During the building stage the sensors and monitoring units are installed and commissioned. Once the construction is completed, the approach includes the continuous follow-up of the corrosion state of the structure.

Results



Conclusions

Conclusion
The system detects undesired corrosion issues in a very early phase. From the acquired data experts and operator extract the most appropriate approach, taking into account the detailed knowledge about the structure.
Based on the information obtained in the design as well as follow-up phase the operator will be able to propose a rapid and targeted intervention to stop or control the issue and save maintenance costs.
By combining risk reduction and specific early-stage interventions this approach leads to cost reduction from the financing phase up to the operational phase of the farm.

References

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