



EMSS-2012

Abstracts



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Conceptual Analysis of UEP and ELFE in the Context of CP systems

Abstract

Based on non-linear polarization curves, we simulate “Underwater Electric Potential” (UEP) signatures and “Extremely Low Frequency Electric fields” (ELFE) in the context of maritime corrosion protection (CP) systems (SACP and ICCP). In addition to the numerical simulations (using FEM) also analytic calculations of simplified scenarios are carried out to accomplish conceptual analysis. In our talk we present an overview of our research approaches on the following topics:

- Optimized ICCP settings for silent running.
- ELFE by means of shaft vibrations in the context of “Shaft Grounding” (SG) and “Active Shaft Grounding” (ASG).
- Near-field modulation due to propeller revolution and the “smoothing effect” of polarization resistance at sharp edges.
- Principle influence of dipole-orientation on the associated UEP signature in shallow waters.
- Inverse modeling of UEP signatures via multipole arrangements including a “destructive interference” approach.
- Simulation of corrosion related magnetic fields based on UEP simulations, considering the electric currents flowing back through the electron conductor (foremost the hull).
- Influence of the polarization curves – with respect to their non-linearity – on the UEP signature in the specific context of scaled models.

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