The use of numerical prediction tools inside the „TSI-Noise and vibration comprehensive management” Methodology to build „silent ships”

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Due to its impact on marine life, the abatement of the Underwater Radiated Noise (URN) by ships has become the most outstanding novelty and difficult challenge that the Shipbuilding industry has ever faced. Therefore, the industry is trying to provide new solutions in order to comply with the new directives and requirements having been recently developed and promoted by the EU, Marine Institutions and the scientific community.

In order to build this type of silent ships, noise control activities have to be present in the project from the earliest stages. According to this, and with the aim to assure the fulfilment of given noise & vibration requirements efficiently, the authors developed a methodology for the dynamic and acoustical design focused on building “Silent Ships” called “Noise & Vibration Comprehensive Management”. In the design stage of the project, the numerical tools play a role of paramount importance to detect problems in advance so modifications do not have a minor effect in the final cost. Therefore, the importance of developing tools and methodologies to perform accurate predictions in a short time is clear.

This paper will describe the methodology used to perform accurate predictions, in particular the importance of having dynamically characterized properly the foundation of the main noise sources via a numerical model or experimental tests. It will also show a correlation between specific full scale URN measurements of a fishing research ship with the prediction performed with VA-One. Along with this, it will describe how these prediction tools can be used to evaluate and optimize abatement solutions, and finally, it will detail how these tools are used inside the “Noise & Vibration Comprehensive Management” methodology.