Prediction of noise in ships by the application of “statistical energy analysis.”

If it will be possible effectively to reduce the noise level in the accommodation on board ships, by introducing appropriate noise abatement measures already at an early design stage, it is quite essential that sufficiently accurate prediction methods are available for the naval architects. In general, the structure-borne noise contribution from the various noise sources may be precalculated with a reasonable accuracy using empirically based calculation models. The prediction very often fails, however, when the empirically based calculation model is applied for an untypical structure or for a special noise abatement measure, e.g., increased structural damping. The paper discusses whether it might be possible to derive an alternative calculation model based on the "statistical energy analysis" approach (SEA). By considering the hull of a ship to be constructed from plate elements connected by combination of L junctions, T junctions, and cross junctions, a SEA-calculation model has been derived. Examples on application of the SEA model for prediction of the structure-borne sound transmission are given, partly through simple two-element structures consisting of stiffened and unstiffened plate panels, partly through a hull section consisting of several stiffened plate sections. The results of the SEA calculations are compared with corresponding results of vibration measurements on the structures. ©1979 Acoustical Society of America