The relevance of two computationally inexpensive acoustic methods is evaluated for use in modern propeller design. The acoustic models considered predict far-field harmonic noise and both originate primarily from the work of Gutin and Deming. The first model is directly based on the equations for loading and thickness noise derived by Gutin and Deming while the latter is the product of many workers including Garrick and Watkins, Arnoldi and Barry and Magliozzi. The models do not require chord-wise aerodynamic data and therefore do not need to be coupled to a grid or panel-based aerodynamic solver. Each of these analytical methods is implemented from the literature, validated, and then compared to several published acoustic experiments. The experimental data considered encapsulates a range of propeller geometries, blade numbers, microphone locations, and forward Mach speeds. Acoustic results are also produced using the Ffowcs Williams-Hawkings equation coupled to a panel method and grid-based CFD method in order to quantify the accuracy of analytical methods relative to current, more sophisticated techniques. The so-called analytical methods demonstrated good agreement with the experimental data, particularly at low forward Mach speeds, with errors ranging from ±2 dB to ±20 dB. Errors were found to be of the same order of magnitude as the FW-H equation coupled to aerodynamic solvers. The presented results suggest that the analytical acoustic methods are still a valuable resource for propeller design, particularly for optimization, where a very large number of propeller configurations need to be considered.

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