

ACOUSTICS2008/1357 Prediction of blade trailing-edge noise of an axial flow fan

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Broadband noise is a major part of the noise radiated by low-speed fans such as industrial and domestic fans. One of the main mechanisms of broadband noise is blade trailing-edge noise, which is due to the convection of the turbulent flow of the boundary layer past the blade trailing edge. The objective of this work is to predict trailing-edge noise of an axial flow-fan with an analytical model adapted from Amiet's formulation. The input data of the model are the spectra and correlation length scales of the wall pressure fluctuations on the blade suction side close to the trailing edge. These data are measured with small pressure transducers flush mounted on the blade suction side. A first study was performed on a 800-mm axial fan without shroud. The comparison between the predicted and measured far-field sound pressure spectra proved quite good, which validated the model in this impeller configuration. The next stage in progress is to insert a shroud on the same impeller and validate the noise prediction in this case for different fan operating points. The importance of additional broadband noise sources, such as blade tip noise, could also be assessed on this fan configuration.