

Methodology of Preliminary Design and Performance of a Axial-Flow Fan through CFD

Authors : Ramiro Gustavo Ramirez Camacho, Waldir De Oliveira, Eraldo Cruz Dos Santos, Edna Raimunda Da Silva, Tania Marie Arispe Angulo, Carlos Eduardo Alves Da Costa, Tânia Cristina Alves Dos Reis

Abstract : It presents a preliminary design methodology of an axial fan based on the lift wing theory and the potential vortex hypothesis. The literature considers a study of acoustic and engineering expertise to model a fan with low noise. Axial fans with inadequate intake geometry, often suffer poor condition of the flow at the entrance, varying from velocity profiles spatially asymmetric to swirl floating with respect to time, this produces random forces acting on the blades. This produces broadband gust noise which in most cases triggers the tonal noise. The analysis of the axial flow fan will be conducted for the solution of the Navier-Stokes equations and models of turbulence in steady and transitory (RANS - URANS) 3-D, in order to find an efficient aerodynamic design, with low noise and suitable for industrial installation. Therefore, the process will require the use of computational optimization methods, aerodynamic design methodologies, and numerical methods as CFD- Computational Fluid Dynamics. The objective is the development of the methodology of the construction axial fan, provide of design the geometry of the blade, and evaluate aerodynamic performance

Keywords : Axial fan design, CFD, Preliminary Design, Optimization

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