

An Overview of CFD Applications in Industrial Aerodynamics

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Abstract

An overview of CFD applications to practical situations created by industrial aerodynamics and environmental problems that are dealt with by ADAI team is presented. In the general case CFD is used in parallel with experimental methods to study problems that are formulated by the industry; experimental results are used to validate the numerical model and then the model is used to analyze other situations that cannot be covered easily by the experimental program. Examples of case studies related to some applications that were developed recently or that are under development at ADAI are presented.

Wind engineering: wind shelter of a rowing track; wind flow around buildings; wind modeling over complex topography. Industrial aerodynamics: transport of particles by a flow; flow in a discharge valve. Car aerodynamics: flow modeling around a car. Climate and comfort: efficiency of an air curtain to preserve isothermal conditions in a compartment; characterizing and optimizing the behavior of hygroscopic wheels.

Forest fires: modeling of fire propagation to improve safety and to support decision making process. The methodology employed combining CFD and experimental methods has proven to be robust and reliable to provide solutions to several applications created by industry and environment protection in the deadlines requested.

¹Given the nature of its contents this paper was prepared in collaboration with several colleagues from ADAI. Their names will be given in the full presentation