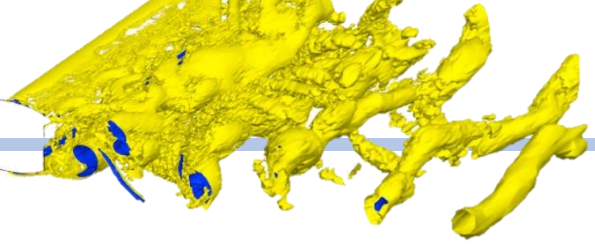

ANIV - G Live Talks

The fascinating challenges of bluff-body aerodynamics

Guido Buresti

University of Pisa, University of Genoa

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Abstract

The main objective of the lecture is trying to explain why bluff-body aerodynamics is a complex and intriguing field from both the research and engineering points of view. We start with a definition of aerodynamic and bluff bodies and a characterization of their differences as regards the type and magnitude of the aerodynamic loads to which they are subjected and the availability of methods for their prediction. The connection between perturbation energy and aerodynamic drag will be discussed, and the importance of the amount and organization of the vorticity shed in a body wake will be emphasized. Alternate vortex shedding from cylinders and its relationship with the aerodynamic loads will then be analysed and some methods to modify its features or inhibit its occurrence will be described. Subsequently, techniques for flow control, particularly as regards drag reduction, will be exemplified and discussed. The possibility of non-obvious behaviour of the flow field and of the aerodynamic loads as a function of the variation of certain geometrical parameters characterizing a given configuration will also be illustrated. Aeroelastic phenomena typical of bluff bodies, such as galloping and vortex-shedding-induced oscillations, will then be briefly considered, and some information will be given as regards the availability of methods to predict their occurrence and intensity or to avoid them. Finally, selected open research subjects will be outlined.

Short CV

Guido Buresti is an aeronautical engineer and has worked for more than 40 years at the Department of Aerospace Engineering (now Department of Civil and Industrial Engineering) of the University of Pisa, teaching different courses related to aerodynamics and fluid dynamics. His research activity was devoted to applied aerodynamics, and was mainly experimental but also theoretical and numerical, and is documented in more than 150 scientific works. Bluff-body aerodynamics, together with its applications to different engineering fields, is perhaps his main research topic. He has also given contributions to the development of experimental measurement procedures and of methods for the time-frequency analysis of signals. He has been responsible of many research contracts financed by public and private institutions, and has carried out a significant activity as associate editor and reviewer for several international scientific journals. He is the author of the textbook “Elements of Fluid Dynamics” (Imperial College Press, 2012), and has been a member of the Boards of Directors of ANIV from 1988 to 2007 and of the Von Karman Institute for Fluid Dynamics from 1995 to 2014. He is now retired but continues to be involved in research activities concerning different engineering applications of fluid dynamics; currently, he collaborates with the University of Genoa on research subjects related to the effect of thunderstorms on civil structures.