Benchmark on the Aerodynamics of a Rectangular Cylinder
BARC
July 2008
url: http://www.aniv-iawe.org/barc
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Preface

The aim of this Benchmark is to provide a contribution to the analysis of the turbulent, separated flow around a fixed rectangular cylinder with chord-to-depth ratio equal to 5. In spite of the simple geometry, it is believed that the problem is of interest not only for the purpose of fundamental research, but also to provide useful information on the aerodynamics of a wide range of bluff bodies of interest in Civil Engineering (e.g. long span bridges decks, high-rise buildings, and so on) and for other Engineering applications. Given the possible interest of Research Institutions and Industries operating in different fields of Engineering, using both computational and experimental tools, the benchmark addresses both the numerical and the experimental approach.

Introduction and Benchmark Scope

The aims of the Benchmark are the following:

- to deeply investigate one specific problem in the aerodynamics of bluff bodies, with contributions coming from as many researchers as possible worldwide;
- to assess the consistency of wind tunnel measurements carried out in different facilities;
- to assess the consistency of computational results obtained through different flow models and numerical approaches;
- to compare experimental and computational results;
- to assess the possibility of developing integrated procedures relying on both experimental and computational outcomes;
- to develop Best Practices for experiments and computations.

In addition, the results provided by the participants will create a database to be made available to the Scientific and Technical communities for future reference.

Problem statement

The Benchmark addresses the high Reynolds number, external, unsteady flow around and past a stationary, sharp-edged rectangular cylinder, and the associated aerodynamic actions. The breadth (B) to depth (D) ratio is set equal to 5.
Participants are invited to submit their original contributions following the specified formats. These can include both results already available to the participants and results specifically obtained for the purpose of participation in the Benchmark. In addition, participants are invited to share with the Scientific and Technical communities the literature and the published results available to them.

Output for tests and simulations

For participation in the Benchmark, information concerning the setup and a minimum set of output data must be provided by the participants, through upload on the Benchmark web page. These data will be available to all participants for download. This is to allow researchers to compare the results obtained by other researchers.
Both setup information and output data are classified as “required” (i.e. data that participants are requested to provide) and “encouraged” (i.e. additional data that participants are encouraged to provide). Any further data can be provided by the participant, as “additional”.
Documents containing the requests for for wind tunnel tests and numerical simulations will be made available to the participants.

Organisation and time frame

The Benchmark problem is promoted by the Organising Committee, with the support of the Italian National Association for Wind Engineering (ANIV), under the umbrella of the International Association for Wind Engineering (IAWE) and in cooperation with the European Research Community On Flow, Turbulence And Combustion (ERCOFTAC). The activities will be carried out under supervision of the International Advisory Board.
The activities will be scheduled with the following time frame:

- July 2008

  The Benchmark is announced during the VI Colloquium on Bluff Body Aerodynamics and Applications (BBAA VI), July 20-24, 2008 in Milano (Italy).

- Fall 2008

  The Benchmark is announced through publication in scientific journals.

- Summer 2009

  A workshop and/or a thematic session will be organised within the 5th European and African Conference on Wind Engineering (EACWE) in Florence (Italy) to summarise the results obtained by the contributors during the first year of activity.

- Summer 2010

  A workshop and/or a thematic session will be organised within the 5th International Symposium on Computational Wind Engineering (CWE) in Chapel Hill, North Carolina (USA) to summarise the results obtained by the contributors during the second year of activity.

- Summer 2011

  A workshop and/or a thematic session will be organised within the 13th International Conference on Wind Engineering (ICWE) in Amsterdam (The Netherlands) for final discussion of the results obtained in the three years of activity and for closure of the Benchmark.

Organising Committee

Gianni BARTOLI	University of Firenze
Luca BRUNO	Politecnico di Torino
Guido BURESTI	University of Pisa
Francesco RICCIARDELLI	University of Reggio Calabria
Maria Vittoria SALVETTI	University of Pisa
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Further Information

For further and updated information, please refer to the web page:
http://www.aniv-iawe.org/barc

or contact the organizing committee:
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International Association for Wind Engineering

Associazione Nazionale per l'Ingegneria del Vento

ERCOFTAC

First Announcement

July 2008