

## **Special issue on “Wind Impact on High-Rise Structures: Load Characterization, Response Evaluation and Mitigation”**

### **Preface**

This issue of the Wind and Structures Journal is a Special Issue on Wind Impact on High-Rise Structures and their Optimal Design for Wind. In the past few decades, high-rise constructions have received a renewed interest, especially with the growing industry of construction of tall buildings which currently prevails in many metropolitan business locations, where land is scarce due to cost, sustainability, and other benefits. With the development of the construction industry, also the overall energy consumption has augmented, and consequently, wind engineers were faced with the challenge of designing other types of high-rise structures, such as, large wind turbines placed on tall and slender towers. The presence of buildings and towers of impressive heights is signaled everywhere in the world, as these are ubiquitously built in the most challenging geographical locations. Nowadays, the increased frequency of extreme windstorm events affects the balance between a resilient and a sustainable construction. Often, the first constructions to resent the lack of design guidelines are the flexible structures which are considered as the most vulnerable to wind-induced vibrations. High wind loads require more rigidity, however this is associated with the increasing cost of the primary structure and the possibility of encountering accelerations higher than the typical comfort limits especially at the top level of the structures. Accordingly, it is essential to understand the behavior of such slender and tall structures under the effect of extreme wind loads in order to set the target of developing new mitigation options, thus applying the knowledge comprised in the wind engineering field, to achieve an economic design of high-rise structures.

The papers presented in this special issue address the most significant aspects related to the characterization of the wind loads effect on high-rise buildings, as well as the mitigation methods applied to control the dynamic response of such structures. Three papers address the analysis and design of high-rise buildings, using the most recent advancements in computational techniques, with distinctive analysis of the uncertainties related to the wind load evaluation, and the wind tunnel testing procedure, while the focus on the aeroelastic testing of multi-degree-of-freedom high-rise structures is conveyed in the last paper. Additionally three papers deal with the wind load reduction by aerodynamic optimization and vibration control techniques applied for the high-rise structures for performance enhancement, and torsional response mitigation.

The idea of preparing this Special Issue was conceived during the 2014 International Conference on Advances in Wind and Structures (AWAS14) in Busan, South Korea, which took place in August 2014, where several papers on the topic were presented and discussed. A call for papers to this special issue was put forward to distinguished researchers around the world who are working on these topics. All the papers selected to be published in the special issue underwent the standard, strict protocols of peer-review as per the Wind and Structures journal editorial procedures. The Guest Editors are grateful to all the reviewers for their professional handling of the review process.

We trust that you will find this Special Issue useful and interesting.

Guest Editors:

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