

Special Issue on **FRP Materials and Structures for Civil Engineering Applications**

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In current practice, the design of structurally efficient and optimized constructional systems and infrastructures is of primary interest for scientists and designers. In doing so, a key role is given to the use of innovative materials as well as to the development of advanced structural solutions able to offer appropriate performances under the assigned design loads. Typical examples in modern buildings can be found in the form of FRP composites, laminates, shape-memory alloys, foams, nanomaterials, and so forth, both in new constructions and in retrofitted existing buildings, in which these advanced materials interact with traditional constructional components like concrete, masonry, steel, timber, or glass elements. The result is thus generally represented by “smart” systems able to guarantee advanced performances under quasi-static and/or dynamic conditions.

Despite the implicit structural advantages of such innovative materials and assemblies, careful consideration should be paid in their design to several aspects, including thermal and insulation performances, feasibility and cost, durability, and long-term behavior issues (compared to traditional constructional techniques), building sustainability, and biocompatibility. From a structural point of view, in particular, the accurate mechanical calibration of material components or full assemblies still requires research developments and efforts. Under extreme loading conditions (i.e., fire, seismic events, explosions, or impacts), for example, the mechanical performance of these “smart” systems should be also properly explored. A multidisciplinary approach is in fact commonly required to assess the aforementioned issues, involving civil, environmental, chemical, and material science engineers in a cross-disciplinary research.

The aim of this special issue, in this context, is to present an overview on FRP composites and structures for civil engineering applications, with careful consideration for the structural performance assessment not only at the material level but also at the component level or in terms of global behavior. The attention will be focused on the use of FRP materials in buildings and infrastructures, for retrofitting applications as well as for novel constructions. It is expected that this special issue could attract the contribution of a wide group of potential participants, including both academy and industry.

Potential topics include but are not limited to the following:

- ▶ Examples of novel applications of FRP materials and composites in civil engineering
- ▶ Advanced numerical modelling and structural analysis, at a micro and macro level, of FRP composites systems and complex assemblies
- ▶ Experimental mechanical characterization of FRP composites and structural components
- ▶ Overall performance of FRP composites and structural systems under extreme loading conditions, including fire, explosions, or seismic events
- ▶ Structural safety and redundancy of FRP systems and buildings
- ▶ Projects and case studies involving the structural application of FRP composites, including retrofitting of existing buildings or new structures

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