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Editorial

Advancements in Design and Analysis of Protective Structures 2019

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This ADAP 2019 Annual Issue follows and extends the ADAP Special Volume of 2018 and aims at providing a further insight into current trends and recent advancements in design and analysis, experimental testing, and modelling of protective structures.

From a structural point of view, such a definition includes multiple loading and boundary conditions that designers should properly take into account when ensuring appropriate safety levels to people. In fact, protective structures and facilities are expected to optimally perform their function under severe loads, even when associated with mostly different threats. Extreme events like earthquakes, fire accidents, explosions (even nuclear), and high-rise natural hazards are primary reasons of severe damages in constructed facilities and causalities. Impacts due to collisions of transportation means, on the other hand, should also be properly accounted for when designing bridges or containment structures in general. A key role, in all the mentioned cases, is given to design optimization and mitigation of input forces/effects. Such a result can be achieved by both reducing the magnitude of applied loads on structures, that is, via active, passive, and semiactive additional devices, and enhancing the structural resistance and capacity, that is, via efficient materials and structural components.

With a more general definition of protection and protective tools to improve security, different means are indeed accepted, being possible to achieve the final protective goal at the emergency management level rather than at the material/structural level only, thus suggesting a cooperation of multiple aspects and expertise.

The revised papers included in the final ADAP Annual Issue booklet are related to various topics, including studies at the management, material, and assembly levels, under a multitude of loads.

Blast loads and explosions still represent one of the major attractions for research studies (M. Aleyaasin; J. Yan et al.). Accurate predictive models for damage assessment of several structural typologies are mandatory for calculation, towards the fulfilment of safe design purposes. This is especially the case of strategic buildings, requiring even more conservative and reliable calculations. Also, in presence of seismic events, however, both structural systems, bridges and infrastructures (Y. Li et al.; G. Yang et al.), should be properly investigated, with a special care for soils (X. Zhang et al.; Z. Jiang and G. Zhou; T. Deb and S. K. Pal; A. Ghorbani et al.) or other geological issues (Y. Fan and F. Wu). Extreme loading conditions can also include—for certain structural typologies—deep temperature gradients to properly assess and mitigate via enhanced material properties and retrofit approaches (G. Sun et al.; S. Peng et al.; B. A. Tayeh et al.) or the potential risk of buckling phenomena to prevent via appropriate stiffeners (G. Zou et al.). As a common aspect of these major challenges, design processes should in any case maximize the well-known concepts of robustness, redundancy, and resilience under exceptional loads (F. Stochino et al.).

In conclusion, let us have some final considerations on this ADAP Annual Issue project.

All the contributing authors are warmly acknowledged for their active support. The hope is that—like for the 2018 ADAP version—the readers could renovate their interest, on the topic and find fruitful research outcomes in the published papers.

The involved peer reviewers are also gratefully acknowledged for their continuous and hard work and special efforts for ensuring the publication of high-quality scholarly articles, towards the success of the ADAP 2019 annual edition.

A final dedicated acknowledgement is also extended by the Lead Guest Editor towards the team of Guest Editors for the support they provided for the overall project.

Conflicts of Interest

The editors declare no conflicts of interest.

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