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Editorial
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It is my pleasure to publish the January issue (1st issue) of Vol. 3 of the International Journal of Bridge Engineering, Management and Research. In this issue of the journal, we are pleased to bring to you five papers on innovative areas of bridge engineering.

Flood-induced loading is a significant hazard for bridge infrastructure, yet most design provisions lack explicit consideration of probabilistic flood demands. The article entitled "Resiliency Analysis of Bridge Systems Concerning the Performance-based Probabilistic Flood Loading" develops a performance-based framework that integrates hydrodynamic modeling, finite element analysis (FEM), reliability assessment, and fragility analysis to evaluate bridge resiliency under various conditions. Reinforced concrete highway bridge piers are modeled under variable flood intensities, incorporating combined hydrostatic and wave-induced pressures. Nonlinear FEM simulations provide damage indices for immediate occupancy, life safety (LS), and collapse prevention, from which reliability indices and failure probabilities are derived. The main contributions are: (1) creation of benchmark bridge models coupling realistic flood hazard simulation with detailed structural response; (2) a flood-specific reliability framework calibrated to distinct limit states; (3) generation of fragility curves for piers under combined hydraulic loading; and (4) design-oriented recommendations for integrating flood hazards into load combinations. Results indicate that omitting flood effects in design leads to a significant underestimation of vulnerability. The fragility curves quantify the probability of exceeding each damage state across a range of intensities, revealing critical performance thresholds. This framework enables risk-informed, resilience-focused design and supports code development for infrastructure in flood-prone regions.

The aging of road infrastructure networks, combined with the evolution of traffic loads and the tightening of regulatory requirements, demands a critical reassessment of structural safety, particularly with regard to seismic risk. Many existing bridges, designed according to outdated standards and without consideration of modern seismic criteria, are now required to meet performance levels that are significantly higher than originally intended. In this context, material degradation, especially steel bar corrosion in reinforced concrete, emerges as a critical factor that can significantly affect structural response. The article entitled "Seismic Safety of Ageing Infrastructure: The Role of Corrosion in Vulnerability Assessment of Reinforced Concrete Bridges" explores feasible strategies for integrating material deterioration into seismic vulnerability assessments of critical infrastructure through numerical modeling. To this end, an existing Italian reinforced concrete bridge with Gerber saddles was analyzed as a representative case study. A corrosion evolution profile was developed to simulate realistic long-term deterioration. This approach allowed the evaluation of the evolution of key structural parameters, including stiffness, strength, fundamental periods, and energy dissipation capacity, as well as the resulting reduction in the global safety factor, through linear and nonlinear dynamic analyses. The findings demonstrated that the progressive advancement of degradation can severely compromise seismic safety, highlighting the importance of explicitly incorporating such effects into structural assessments to enhance seismic risk management of aging assets.

Cable-supported bridges, such as suspension bridges, cable-stayed bridges, and tied-arch bridges, play important roles in the transportation infrastructure systems. Failure of these bridges can lead to heavy casualties and significant economic losses. However, the resistance to system-level failure under specified member loss scenario(s), also called structural robustness of these types of bridges, and the key limit states for structural evaluation have not been adequately studied. In the article entitled "Key Limit States of Cable-Supported Bridges for Structural Robustness Evaluation," push down analysis is presented as a method

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to identify the key limits of cable supported bridges for structural robustness evaluation. The above analysis was conducted in LS-DYNA® on three disparate long-span cable-supported bridges, that is, a suspension bridge, a cable-stayed bridge, and a tied-arch bridge. The failure of key structural components of the bridges was monitored closely during push-down analyses, and several key limit states were identified. Bridges with single member loss were also analyzed via push-down, and their responses were compared to the behavior of the corresponding intact bridges to evaluate the effect of member loss on push-down capacity in the context of the identified limit states. The results show that the mentioned three cable-supported bridges exhibit a similar bilinear load–displacement curve during push-down analysis. Comparisons of the overall performance of the identified key limit states indicate high capacity for the design live loads. The overall performance is affected negatively by cable loss and the effects varied depending on the location of the cable loss and the pattern of live load distribution. Despite these adverse effects, the capacities of the identified key limit states of these bridges under damaged scenarios are not reduced significantly.

The overall purpose of the article entitled "Comparison between Pedestrian and Road Bridges Designed with GFRP Pultruded Trusses" was to compare the structural behavior of a pedestrian and a road bridge composed of GFRP truss beams and GFRP decks. A simple design procedure that considers limit states with long-term effects (10 years for a temporary bridge) and shear deformation contribution is developed, focusing on the choice of the best shape of truss structures and the geometry of the cross-section of constituent elements, taking into account buckling effects. Verification of connections, the bridge deck, and its connections with trusses are not considered at this stage of the research. Major findings of the research were that the design of GFRP bridges with tubular elements, having a diameter-to-thickness ratio lower than 20 and geometrical slenderness lower than 30, is not affected by local and global buckling but is governed by deflection and by the limitation of first period. The limits of 5 for road bridges and 15 for pedestrian bridges are suggested with a span 35 m, while for a bridge of 10 m span, the suggested values are 10 and 30 for road and pedestrian bridges, respectively.

Bridge risk assessment is recognized as a fundamental part of the process for guaranteeing the structural and seismic reliability of transport networks. To achieve this goal, a variety of strategies are being used around the world, and in 2020, specific guidelines were issued in Italy that provide a homogeneous, standardized multi-level and multi-hazard approach to risk classification and monitoring to be applied to existing bridges by all road managers. The first step of the approach is the preliminary screening of bridge assets based on essential typological and geometric data and periodic inspections. This allows for the continuous and up-to-date monitoring of infrastructure works, filtering out situations that require special attention and prioritizing investigations and actions at the next level. Although the effort required is lower than that required for more advanced assessment procedures, it remains considerable, as demonstrated by the field experience gained through the collaboration between FABRE and ANAS S.p.A. and reported in this study. Based on the data systematically collected in the field and organized in a specific database, the study entitled "Structural and Seismic Risk Classification of Bridges according to the Italian Guidelines: A Critical Perspective from the Jointed Experience of Fabre and ANAS" presents a statistical characterization of an inventory of 746 existing bridges, including descriptive statistics for the key classification parameters of the Italian Guidelines. Through this large sample, one of the largest among similar studies, the research first presents an in-depth analysis and characterization of the most common bridge typologies in Italy. In the next part of the research, statistical methods were applied to critically analyze the possible calibration of the structural–foundational and seismic risk classification, as the actual boundary conditions of some parameters involved in the classification logic of the Italian Guidelines vary. In particular, the parameters *Average Daily Traffic*, *Average Daily Truck Traffic*, presence of *Road alternatives*, and *Strategic importance* of the bridge were taken into account, evaluating a series of multiple independent scenarios on which the impact on the structural and seismic risk classification within the stock was analyzed. The results highlighted how boundary conditions could affect the risk classification and confirmed the role of other parameters (e.g., *Defectiveness class*) in the risk classification. Thanks to the breadth, richness of data, and representativeness of the available sample of bridges, the statistical analysis and sensitivity assessment presented can be considered a useful basis for calibrating future improvements in the Italian Guidelines calculation process.

With this editorial note, it is also my pleasure to invite you to submit your papers addressing research with new and substantial contributions in bridge engineering to the International Journal of Bridge Engineering, Management and Research. The journal is committed to a prompt peer-review process and online publication of the paper within 4 weeks of acceptance. We also are committed to completing our peer-review process within 90 days of paper submission. All accepted articles are generally published within three months of acceptance. You are invited to submit your papers for the next issue of the journal as soon as possible.