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Editorial
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It is my pleasure to publish the January issue (1st issue) of Vol. 2 of the International Journal of Bridge Engineering, Management and Research. You can find detailed information about the journal in the inaugural issue of the journal in Agrawal (2024)]. In this issue of the journal, we are pleased to bring to you eight papers on innovative areas of bridge engineering.

The paper entitled "**Wood obstructions at bridge piers: geometry estimation methodology and scouring process analysis**" by Innocenti et al. is a detailed investigation of the bridge stability and increased backwater effects caused by wood obstructions at bridge piers. The paper presents a methodology for assessing the impacts of wood accumulation on bridges by the "Hydraulic Compatibility of Bridges" committee working within the Italian Group of Hydraulics. This paper aims to expand a preliminary procedure that analyzed the effects of wood obstruction at bridges by (i) including an estimate of the potentially recruited Large Wood volume and (ii) proposing a geometrical approach for the evaluation of the accumulation dimensions. The procedure is then applied to a case study to demonstrate its implementation.

In companion papers on "**Load testing application for truss bridge design verification**," authors Hag-Elsafi et al. have comprehensively investigated the application of load testing techniques for the verification of bridge design. The truss bridge being investigated is atypical to conventional design, with the top chords of the main trusses, floor beams, and stringers designed to act composite with the concrete deck. Such a design creates secondary moments in the truss main members, in addition to axial forces, which significantly complicates the analysis and the design. This inspired the need for verification of the bridge design through instrumentation, monitoring, and load-testing programs. The first of the two companion papers, entitled "**Load testing application for truss bridge design verification: Dead load monitoring**," focuses on the verification of the structural behavior of the bridge as designed under dead load. Achieving this objective required instrumentation of the main members of the erected structure and monitoring of strains in those members during concrete deck construction. For total dead load, a pseudo-analytical approach was used to incorporate load effects due to the self-weight of the structure. Five members of the downstream truss were instrumented with vibrating wire gages to record strains in those members during the first three deck pours. Finite element (FE) analysis and deck monitoring results were utilized in the pseudo-analytical approach to investigate actual axial forces and moments due to total service dead loads. The investigation indicated that measured forces and moments were within 20% of those estimated using FE analysis during the bridge design. The second paper, entitled "**Load testing application for truss bridge design verification: Live load testing**," investigated the bridge under live load through load testing. Comparing the members' actual service load axial forces and moments with those used in the design, it was concluded that axial forces were overestimated in the design by about 20% for service dead load and by about 25% for service live load. A similar comparison for moments indicated that service dead load moments were within 20% of those used in the design, and service live load moments were underestimated by about 55%. The above differences in service dead load can be attributed to the way the deck pours were accounted for in the design and the possibility of construction loads being on the structure during the deck pour monitoring. For service live load, these differences can be explained by possible discrepancies in estimating service live load from the test results and the fact that the analysis for service live load in the design was performed ignoring the contribution of the composite concrete deck. The adequacy of the structural design under actual axial forces and moments was confirmed by checking the AASHTO interaction equations for steel members under combined axial and bending loading conditions.

Discussion period open till six months from the publication date. Please submit separate discussion for each individual paper. This paper is a part of the Vol. 1 of the International Journal of Bridge Engineering, Management and Research (© BER), ISSN 3065-0569.

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In the paper entitled "**Explainable machine learning model for load-carrying capacity prediction of FRP-confined corroded RC columns**," authors Li et al. have proposed a novel explainable machine learning (ML) model to predict the axial load-carrying capacity of FRP-confined corroded RC columns utilizing the eXtreme Gradient Boosting (XGBoost) algorithm and Shapley Additive exPlanations (SHAP) technique. The XGBoost predictive model is developed based on a thorough database of experimental tests for 285 FRP-confined corroded RC columns collected from the existing studies (231 specimens) and those performed by the authors (54 specimens). SHAP technique is employed for performing the importance evaluation and interpreting the prediction performance of the XGBoost model. In addition, the feasibility and effectiveness of the developed XGBoost predictive model are assessed by using several empirical design models and other ensemble ML algorithms. The results indicate that the prediction effectiveness and feasibility of the developed XGBoost model outperform those of the existing empirical models and other ML algorithms, and the mean values of R^2, RMSE, MAE, and MAPE of the XGBoost model are 0.978, 122 kN, 703.6 kN, and 7.7%, respectively. The XGBoost model can offer an alternative approach to determine the axial load-carrying capacity of FRP-confined corroded RC columns for design practice, in addition to current mechanics-based design models.

In the paper entitled "**Performance of orthotropic steel plate under combined fire load and axial compression**," authors Xu and Agrawal presented a detailed investigation of the axial capacity of the orthotropic steel plates under fire using a sequential thermal stress analysis framework. Temperature-dependent stress–strain relationship and thermal properties of steel have been taken into consideration in finite element modeling. Different models and parameters such as fire model, material model, geometric imperfection, residual stress, and rib wall thickness have been discussed, and their effects on the axial strength of the plate have been studied and compared. Simulation results indicate that fire has significant deteriorating effects on the plate's axial capacity. Conventional simple fire models, which assume uniform surface fire loads, don't represent real fire scenarios and tend to overestimate the axial capacity of the plate compared to realistic fire scenarios. Initial imperfection and residual stress in the orthotropic steel plate have a negligible effect on the axial capacity of the orthotropic steel plate system under fire conditions. Increasing the thickness of the rib wall could improve the fire resistance of the plate.

In the manuscript entitled "**Leveraging artificial intelligence to unlock next-generation SHM software: Advanced feature extraction and damage identification**," authors Garcia-Macías et al. investigated the use of artificial intelligence-based tools in structural health monitoring software. The significant socio-economic impacts of aging infrastructure have driven the growing implementation of Structural Health Monitoring (SHM) worldwide as a key preventive maintenance strategy. However, scaling SHM systems nationwide presents significant hardware and software challenges, particularly in managing densely instrumented structures and deploying effective damage identification algorithms. This explains the circumstance that most SHM software tools are custom-built by specialized research groups, limiting technology transfer. In this context, although still in its early stages, the latest advances in Artificial Intelligence (AI) offer promising solutions to overcome these scalability issues. In this line, this work introduces the latest developments of MOVA/MOSS, a comprehensive SHM software platform developed by the authors that leverages AI to accelerate feature extraction in vibration-based systems and generate digital twins for quasi-real-time structural identification. The potential of the developed platform is demonstrated through a real-world structure, the Mendez Nuñez Bridge in Spain, highlighting AI's potential in facilitating the widespread adoption of SHM.

In 2022, the Italian Government introduced innovative regulations for evaluating and monitoring existing bridges and viaducts, tackling issues related to risk classification, safety assessment, and monitoring. These regulations employ a multilevel approach for bridge inspections, safety assessments, and monitoring procedures. The guidelines have garnered international acclaim for their forward-thinking approach. In the manuscript entitled "**Assessment and management of existing bridges following the innovative Italian guidelines: A pilot study**," authors Gara et al. proposed a comprehensive study concerning the whole process proposed in the new Italian guidelines, using a case study constituted by two prestressed RC box-girder half-joint span bridges that exhibited signs of aging several years ago. The paper deeply addresses all phases of the existing bridge safety assessment and management discussed in the guidelines from both a scientific and practical standpoint in collaboration with the National Agency for Road Administration. It starts with visual inspections conducted to support the bridge safety assessments, visual inspections conducted to support the bridge safety assessments, and concludes with the experimental testing and structural monitoring of bridges. For the first time in the scientific literature, this work provides a pilot study for proper and aware use of the innovative Italian guidelines, focusing on prestressed concrete bridges. The objective of the paper is to present advanced procedures for the classification, evaluation, and management of existing bridges to be adopted by road administrators, which may inspire international readers to upgrade the codes of their own countries.

In the last paper in this issue, entitled "**Numerical simulation of a long-span steel truss bridge subjected to blast loads**," the authors Li et al. conducted an extensive investigation on the above-deck blast loads on a long-span steel truss bridge. The nonlinear dynamic response and damage modes of reinforced concrete (RC) deck and steel truss members of the bridge under different intensity levels of blast loads are numerically studied using the Load_Blast_Enhanced (LBE) function and Multi-Material Arbitrary Lagrangian-Eulerian (MM-ALE) method in LS-DYNA, to identify a cost-efficient approach with reasonable accuracy to simulate a long-span steel truss bridge subjected to blast loads. The LBE method has proved to be more conservative and cost-efficient than the MM-ALE method for simulating blast load effects on structures. A high-fidelity finite element model of the bridge (i.e., I-35W truss bridge) in LS-DYNA based on the multi-scale modeling technique and the LBE function to simulate blast loads is developed to investigate the structural response under several blast scenarios. The effectiveness of ultra-high-performance concrete (UHPC) in protecting the steel truss members from blast load effects has also been investigated. The results provide valuable insights for bridge owners on the probable response and possible protective measures for long-span steel truss bridges against intensive blast loads.

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 four weeks of acceptance. We also are committed to completing our peer review process within 90 days of paper submission, and all manuscripts submitted by January 31, 2025, are likely to be published in our April 2025 issue of the journal if recommended by the peers for publication in the journal.