

Editor's Note

Thomas Kang*

The guest editor would like to thank all the authors and reviewers contributing to this Special Edition of International Journal of Concrete Structures and Materials (IJCSM). The subject of the Special Edition advertised in the Call for Papers was "Performance of Concrete Structures with Unique Materials, Reinforcement or Geometry." Papers were solicited and invited by the guest editor, and a total of 7 papers are published in this Special Edition. Indeed, all the accepted papers are well in line with this theme. Three papers are on the subject of fiber-reinforced polymers (FRP) in conjunction with concrete structures; one paper is about the development of a cold-formed steel–concrete composite system; two papers are on the behavior of concrete with recycled concrete aggregates and prestressed high-strength concrete structures; and one paper is regarding the issue of transverse deck cracking and crack sealant materials.

The guest editor was keen to solicit papers on the following topics: (1) state of the art review of prior research on concrete and concrete structures with unique materials, reinforcement or geometry; (2) state of the practice on structural design, construction, rehabilitation and repair of relevant structures; (3) large-scale and smaller scale experimental research; (4) analytical and numerical research; and (5) field monitoring and observation. Ideally, this Special Edition includes all of these components. Of seven, three papers deal with emerging and novel systems/materials for new construction and four papers are intended for the repair, rehabilitation, and maintenance of existing structures. In terms of the specific methodology used, the following approach has been taken: (1) experimental techniques (University of Houston, Missouri University of Science and Technology, and South Dakota State University); (2) a combined experimental and analytical technique (University of Massachusetts Amherst); (3) combined studies incorporating field investigation, experimental testing and analytical modeling (University of North Florida with Ohio Northern University); and (4) literature reviews (University of Oklahoma with Seoul National University and Missouri University of Science and Technology).

It should be noted that the paper written by the guest editor and his formal student was handled by Prof. Hyun Do Yun, at Chungnam National University, as an associate editor (Prof. Kang, Guest Editor of IJCSM, was not involved in the review or decision to publish this article).

Prof. Sergio Brena and Mr. Geoffrey McQuirk, both with the University of Massachusetts Amherst, carried out experimental and finite element modeling simulations of FRP anchored systems. This system includes use of FRP anchors embedded into the concrete substrate and forming part of the composite strengthening system. The experimental data are of great use to the profession, as one of the reviewers commented.

Mr. Stephen Grelle with Wiss, Janney, Elstner Associates and Prof. Lesley Sneed with Missouri University of Science and Technology conducted a thorough review of anchorage systems for FRP laminates. The review characterizes different FRP anchorage devices based on their purpose and behavior, which function in different ways and thus serve different purposes. Most of the previously tested FRP anchorage systems have been discussed, with each system's advantages and disadvantages detailed.

Ms. Ruili He with Missouri University of Science and Technology, Prof. Lesley Sneed with Missouri University of Science and Technology, and Prof. Abdeldjelil Belarbi with the University of Houston conducted an experimental study on post-damage FRP repair of reinforced concrete columns with different damage conditions. Such a rapid repair is needed to enable reopening of damaged bridges after an earthquake occurs. There are very limited studies on this topic and the material presented is relevant and new, as the reviewers indicated.

Prof. Nadim Wehbe with South Dakota State University, Mr. Pouria Bahmani with Colorado State University, and Mr. Alexander Wehbe with Kiewit Engineering Co. conducted full-scale testing of cold-formed steel–concrete composite systems, which provides a feasible solution to replacing heavy hot-rolled steel elements such as steel angles or hollow structural section tubes without compromising the structural performance. The results are promising, as one of the reviewers commented, such that this system can be considered by the engineering community.

Ms. Katrina McNeil with the University of Oklahoma and Prof. Thomas Kang with Seoul National University comprehensively reviewed prior research on mechanical properties of concrete with recycled concrete aggregates (RCA)

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and structural performance of RCA concrete structures, as well as existing guidelines regarding the RCA all over the globe. As one of the reviewers pointed out, because the application of RCA has been primarily limited to non-structural purposes such as pavement, this paper provides a timely review for readers about the potential of using RCA for structural members.

Mr. Emad Labib, Prof. Y. L. Mo, and Prof. Thomas T. C. Hsu, all with the University of Houston, experimentally investigated shear cracking of prestressed girders with high-strength concrete. In this paper, a group of shear tests on prestressed concrete girders were clearly described and discussed, as one of the reviewers commented. It is found that the existing design method for normal-strength concrete members is also suitable for prestressed members made of high-strength concrete ranging up to 117 MPa.

Prof. Adel ElSafty with the University of North Florida and Prof. Ahmed Abdel-Mohti with Ohio Northern University have undertaken a research study to investigate the effect of several parameters on the development of concrete deck cracking and the effect of various sealant materials on the performance of crack sealing and repair. Field monitoring, multi-scale testing and finite element modeling techniques were all used to enhance the current knowledge of the issue of transverse deck cracking. As one of the reviewers indicated, bridge deck cracking is and will probably always be an issue.

Overall, the Special Edition of IJCSM is full of interesting, original and in-depth research contents. We hope that this contribution advances the current state of the art and practice in concrete structures and materials.