# Spotlight on Structures

Research Journal of The Institution of Structural Engineers

In this new section of *The Structural Engineer*, we shine a spotlight on papers recently published in *Structures* – the Research Journal of The Institution of Structural Engineers.

*Structures* is a collaboration between the Institution and Elsevier, publishing internationally-leading research across the full breadth of structural engineering which will benefit from wide readership by academics and practitioners.

Access to *Structures* is free to all during 2015. From 2016, Institution members will continue to receive free access as one of their membership benefits. The journal is available online at: **www.elsevier.com/locate/structures**

*Structures* officially launched in January with publication of the first issue featuring the following articles:

**Ultimate capacity of structural steel cross-sections under compression, bending and combined loading**
*Andrew Liew and Leroy Gardner*

**Thermoelastic buckling and post-buckling of weakened columns**
*Guotao Yang and Mark A. Bradford*

**High strength rubberized concrete containing silica fume for the construction of sustainable road side barriers**
*Mohamed Elchalakani*

**Characterization of concrete specimen fracture response: 2D numerical study**
*N. Trivedi, R.K. Singh and J. Chattopadhyay*

**Economical design procedures for built-up box sections subject to compression and bi-axial bending**
*Osama Bedair and P. Eng*

**Engineering stress solutions for bolted and pressurized steel structures**
*Nelli Aleksandrova*

**Using the vibration envelope as a damage-sensitive feature in composite beam structures**
*Stavros Kasinos, Alessandro Palmeri and Mariateresa Lombardo*

**Sustainable reinforced masonry walls under lateral in-plane load: Experimental behavior and code-based predictions**
*Richard P. Clarke*

In addition, corrected proofs of the following 'in-press' articles are now available online:

**Analysis of brick veneer on concrete masonry wall subjected to in-plane loads**
*Stephen A. Marziale, EIT, University of Dayton, Dayton, OH, USA*
*Elias A. Toubia, Department of Civil and Environmental Engineering and Engineering Mechanics, University of Dayton, Dayton, OH, USA*
Brick veneers are commonplace in modern building construction. Current building codes require veneers to be anchored to a structural backing in order to transfer out-of-plane loads. However, for in-plane loads building codes assign brick veneers as nonparticipating elements. This study exploits an analytical method to examine the in-plane coupling between brick veneers and concrete masonry shear walls. The amount of load transferred through wall ties depends on factors such as tie spacing, tie stiffness, reinforcement, etc. Results indicate that some degrees of composite action exist; around 12% to 37% of the applied shear load is transferred to the brick veneer. Veneers should be isolated in their own plane from the seismic-force-resisting system. An optimum location of the isolation joint is proposed to minimize the rocking behavior and limit design story drift.

**Performance assessment of steel–concrete composite bridges with subsurface deck deterioration**
*Amir Gheitasi and Devin K. Harris, Department of Civil and Environmental Engineering, University of Virginia, Charlottesville, VA, USA*
In-service composite steel girder bridges typically experience a variety of deterioration mechanisms during their service lives, ranging from cracking, spalls, and delaminations in the reinforced concrete deck to corrosion in the steel girders. In this paper, the impact of corrosion-induced subsurface deck delamination on the overall behavior and performance of steel–concrete composite bridges is investigated using finite element simulation and analysis. The accuracy and validity of the modeling approaches were assessed through a comparison to experimental data available in literature. A sensitivity study was performed to investigate the influence of deck deterioration on the system-level performance, load distribution behavior, and failure characteristics of two representative composite steel girder bridges. In addition to the bridge system behavior, the impact of rebar corrosion and subsurface delamination on the behavior of individual deck systems was investigated; while its implication on the current design methodologies for reinforced concrete decks was evaluated. Results from this investigation demonstrate that the deck deterioration has minimal impact on the overall system behavior and the path to failure of the selected structures, but may impact the failure characteristics in the form of reductions in the ultimate load-carrying capacity and system ductility.