Spotlight on Structures

Research Journal of The Institution of Structural Engineers

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

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New issue available

Editor's highlights

The latest issue of *Structures*, Volume 11 (August 2017), has recently been published. Editor-in-Chief, Professor Leroy Gardner, has selected three highlights.

The first paper, by Burgoyne and Mitchell, has also been nominated as the 'Editor's choice' and will be available free of charge to all readers for six months.

Prestressing in Coventry Cathedral

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https://doi.org/10.1016/j.istruc.2017.04.003

Abstract

Coventry Cathedral was completed in the early 1960s and has some prestressed concrete elements to resist lateral thrust from the roof. Other prestressed structures of a similar age have had corrosion problems and this has drawn attention to the fact that there is little publicly available information about the structural system at Coventry. This paper addresses that issue and is in three sections. The first summarises the four different prestressing systems in the Cathedral and estimates the amount of prestress and its purpose in each location. By placing the information in the public domain it will be useful for both historians of church architecture and engineers in future generations who may have to work on the building. Although there is no evidence of corrosion in the building at the moment, it is impossible to inspect the existing tendons, so the second section considers what might happen to the structure if corrosion of the tendons were to occur. It is concluded that very little warning of failure would be given, which would be especially important for the tendons over the baptistry window and those in the nave ties. The final section considers what could be monitored to give as much warning as possible about future problems. The effects of loss of an individual tendon, which would not by itself be sufficient to cause failure of the structure, would cause only very small strains that would be difficult to distinguish from the background strains caused by temperature change. Many of the principles discussed in the second and third sections would be applicable to many other prestressed concrete structures.

A Review on Bond and Anchorage of Confined High-strength Concrete

Muhd Fauzy Sulaiman, Chau-Khun Ma, Nazirah Mohd Apandi, Sofrie Chin, Abdullah Zawawi Awang, Shaiful Amri Mansur and Wahid Omar, Department of structure and materials, Faculty of Civil Engineering, Universiti Teknologi, Malaysia

https://doi.org/10.1016/j.istruc.2017.04.004

Highlights

- With the increase of concrete compressive strength, the bond and anchorage of reinforced concrete become higher
- The design of bond and anchorage for high-strength concrete is largely based on the experimental results of normal strength concrete
- Pull-out test is commonly used to determine bond strength of embedded reinforcement, while simply supported beam is the test used to evaluate lap splice and end anchorage behaviour
- Confinement has been reported to have increase the bond and anchorage of high-strength concrete

Plasticity Modeling of Concrete Confined With NiTiNb Shape Memory Alloy Spirals

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Full issue

The issue also includes the following papers:

Effects of confinement and concrete nonlinearity on transfer length of prestress in concrete

Kasian Warenycia, Mauricio Diaz-Arancibia and Pinar Okumus, Department of Civil, Structural, and Environmental Engineering, State University of New York at Buffalo, Buffalo, NY, USA

https://doi.org/10.1016/j.istruc.2017.04.002

Highlights

- Effects of concrete nonlinearity and confinement on transfer length were studied
- Longer transfer lengths are due to large plastic strains near less confined strands
- Confinement by strands may shorten transfer length by 42% for concentric prestress
- Confinement by No. 6 (M19) transverse rebar can shorten transfer length by 20%
- Realistic specimens are recommended for laboratory tests studying transfer length

Role of diaphragm flexibility modelling in seismic analysis of existing masonry structures

Jacob A. Kollerathu and Arun Menon, Department of Civil Engineering, Indian Institute of Technology Madras, Chennai, India
https://doi.org/10.1016/j.istruc.2017.04.001

Predicting effects of design variables on modal responses of CLT floors
Ebenezer Ussher[a], Kaveh Arjomandi[b], Jan Weckendorf[c] and Ian Smith[c]
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https://doi.org/10.1016/j.istruc.2017.04.006

Prediction of motion responses of cross-laminated-timber slabs
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https://doi.org/10.1016/j.istruc.2017.04.007

Dynamic Behaviour and Catenary Action of Axially-restrained Steel Beam Under Impact Loading
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https://doi.org/10.1016/j.istruc.2017.04.005

Experimental study on the behaviour of masonry pavilion vaults on spreading supports
M. Rossi, C. Calvo Barentin, T. Van Mele and P. Block, Institute of Technology in Architecture, ETH Zurich, Zurich, Switzerland
https://doi.org/10.1016/j.istruc.2017.04.008

Cyclic behavior of hexagonal castellated beams in steel moment-resisting frames with post-tensioned connections
Hassan Abedi Sarvestani, Faculty of Water and Environmental Engineering, Shahid Beheshti University, Tehran, Iran
https://doi.org/10.1016/j.istruc.2017.05.001

Reliability Based Design of RC Beams with Recycled Aggregate and Steel Fibres
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https://doi.org/10.1016/j.istruc.2017.05.002

Moment-Curvature-Thrust Relationships for Beam-Columns
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https://doi.org/10.1016/j.istruc.2017.05.005

Behaviour of Small Diameter Steel Tubes Under Axial Compression
Faez Alhussainy, M. Neaz Sheikh and Muhammad N.S. Hadi, School of Civil, Mining, and Environmental Engineering, University of Wollongong, Australia
https://doi.org/10.1016/j.istruc.2017.05.006

Component-Based Model Versus Stress-Resultant Plasticity Modelling of Bolted End-Plate Connection: Numerical Implementation
Anas Alhasawi, Samy Guezouli and Maël Couchaux, INSA de Rennes, LGCGM/ Structural Engineering Research Group, Rennes Cedex, France
https://doi.org/10.1016/j.istruc.2017.05.004

Lateral Torsional Buckling Behaviour of Steel Beams – On the Influence of the Structural System
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https://doi.org/10.1016/j.istruc.2017.05.007

Highlights
- Lateral torsional buckling behaviour of cantilever and two-span beams
- Effect of yielding on the failure modes
- Influence of structural system, member slenderness and cross section on decisive failure mode and LTB behaviour

Residual stiffness and strength of shear connectors in steel-concrete composite beams after being subjected to a pull-out pre-damaging: An experimental investigation
Piseth Heng[a], Mihai Bud[a], Hugues Somja[a], Mohammed Hjiaj[a] and Jean-Marc Battini[b]
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https://doi.org/10.1016/j.istruc.2017.05.003

Experimental Assessment of Retrofitted RC Frames With Different Steel Braces
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https://doi.org/10.1016/j.istruc.2017.06.003

Assessment of analytical formulations for the ULS resistance verification of structural glass elements accounting for the effects of different load durations
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https://doi.org/10.1016/j.istruc.2017.06.002

Comparative Response Assessment of Steel Frames With Different Bracing Systems under Seismic Effect
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Structural Behavior of Recycled Aggregate Concrete Beam-Column Connection in Presence of Micro Concrete at Joint Region
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