

บทความที่น่าสนใจประจำเดือนกุมภาพันธ์ 2557
สาขาวิทยาศาสตร์และเทคโนโลยี

1	<p>Title: Markerless Vision-Based Augmented Reality for Urban Planning</p> <p>Author: Carozza, L., Tingdahl, D., Bosché, F. and van Gool, L.</p> <p>Journal: Computer-Aided Civil and Infrastructure Engineering, Volume 29, Issue 1, pages 2-17, January 2014</p> <p>Abstract: Augmented Reality (AR) is a rapidly developing field with numerous potential applications. For example, building developers, public authorities, and other construction industry stakeholders need to visually assess potential new developments with regard to aesthetics, health and safety, and other criteria. Current state-of-the-art visualization technologies are mainly fully virtual, while AR has the potential to enhance those visualizations by observing proposed designs directly within the real environment.</p> <p>A novel AR system is presented, that is most appropriate for urban applications. It is based on monocular vision, is markerless, and does not rely on beacon-based localization technologies (like GPS) or inertial sensors. Additionally, the system automatically calculates occlusions of the built environment on the augmenting virtual objects.</p> <p>Three datasets from real environments presenting different levels of complexity (geometrical complexity, textures, occlusions) are used to demonstrate the performance of the proposed system. Videos augmented with our system are shown to provide realistic and valuable visualizations of proposed changes of the urban environment. Limitations are also discussed with suggestions for future work.</p>
2	<p>Title: Visualization of the Modeled Degradation of Building Flooring Systems in Building Maintenance</p> <p>Author: Khosrowshahi, F., Ghodous, P. and Sarshar, M.</p> <p>Journal: Computer-Aided Civil and Infrastructure Engineering, Volume 29, Issue 1, pages 18–30, January 2014</p> <p>Abstract: The development of a maintenance program for construction projects is a highly complex and data-intensive undertaking. This exercise is characterized by the lack of relevant data on the one hand and the overwhelming amount of extraneous data on the other. The uncertainties and complexities have resulted in increased conservatism in the development of life-cycle evaluation of building maintenance programming, subsequently, these programs tend to display the symptoms of either the maintenance actions being uneconomical or fall short of providing the appropriate service to the users of the building. The current research project is based on the premise that the visual approach will facilitate a just-in-time solution to maintenance scheduling, hence, the use of virtual simulation of the building is proposed. The broader aim of this research is to develop a complete building</p>

maintenance program through visualization of buildings as they degrade over time. Here, the focus is on the flooring system and the manner they degrade over time. This requires a better understanding of their pattern and rate of usage. To this end, anthroposophy and anthropocentric descriptions of human movement pattern have been used to describe the behavior of “subjects” and subsequently represent the pattern and density of the degradation of flooring systems. The mathematics representing this behavior has been developed which enables it to be embedded into the proposed overall visual building maintenance model.

3	Title:	Development and Implementation of an Industry Foundation Classes-Based Graphic Information Model for Virtual Construction
	Author:	Zhang, J., Yu, F., Li, D. and Hu, Z.
	Journal:	Computer-Aided Civil and Infrastructure Engineering, Volume 29, Issue 1, pages 60–74, January 2014
	Abstract:	Virtual Construction (VC) applications encounter difficulty in sharing and exchanging information with one another due to the long periods of interoperability limitation. To address these issues, an Industrial Foundation Classes-based graphic information model (IFC-GIM) is developed according to the exchange requirement of VC, and using the representations of three models in the IFC schema and its extension by defining the dynamic property set and properties for animation. The three models include the physical object model, the construction information model, and the realistic model. An OpenGL-based VC platform is developed and applied to a 440-m-high building to implement the IFC-GIM. The results demonstrate that the proposed IFC-GIM lays the foundation for data sharing and exchange among VC systems and other IFC-compliant applications, which, in turn, significantly reduces the modeling effort for VC and increases the value of VC results. Furthermore, animation is applied to simulate construction activities by the VC platform in addition to color and transparency, enhancing realistic feelings in 4D applications.

4	Title:	Effect of temperature on the corrosion behaviour of low-nickel duplex stainless steel bars in concrete
	Author:	Matteo Gastaldi, Luca Bertolini
	Journal:	Cement and Concrete Research, Volume 56, February 2014, Pages 52–60

Abstract:	Stainless steel reinforcing bars can be a means for prolonging the service life of reinforced concrete structures exposed to tropical climates. To select a suitable grade of stainless steel according to exposure conditions and design service life, the definition of the chloride threshold for pitting corrosion initiation is required. This paper investigates the effect of temperature in the range 20–60 °C on the resistance to chloride-induced corrosion of low-nickel duplex stainless steel rebars and, for comparison, of traditional austenitic stainless steel rebars. Tests in concrete and in solutions simulating the concrete pore liquid were performed and an attempt to evaluate the chloride threshold levels for corrosion initiation was carried out. Results showed lower corrosion resistance and higher sensitivity to increase in temperature for low-nickel duplex stainless steel bars compared to traditional austenitic stainless steels.
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5	Title:	Self-healing concrete by use of microencapsulated bacterial spores
	Author:	J.Y. Wang, H. Soens, W. Verstraete, N. De Belie
	Journal:	Cement and Concrete Research, Volume 56, February 2014, Pages 139–152
	Abstract:	Microcapsules were applied to encapsulate bacterial spores for self-healing concrete. The viability of encapsulated spores and the influence of microcapsules on mortar specimens were investigated first. Breakage of the microcapsules upon cracking was verified by Scanning Electron Microscopy. Self-healing capacity was evaluated by crack healing ratio and the water permeability. The results indicated that the healing ratio in the specimens with bio-microcapsules was higher (48%–80%) than in those without bacteria (18%–50%). The maximum crack width healed in the specimens of the bacteria series was 970 μm , about 4 times that of the non-bacteria series (max 250 μm). The overall water permeability in the bacteria series was about 10 times lower than that in non-bacteria series. Wet-dry cycles were found to stimulate self-healing in mortar specimens with encapsulated bacteria. No self-healing was observed in all specimens stored at 95%RH, indicating that the presence of liquid water is an essential component for self-healing.

6	Title:	Effect of phosphoric acid on the properties of magnesium oxychloride cement as a biomaterial
	Author:	Yanni Tan, Yong Liu, Liam Grover
	Journal:	Cement and Concrete Research, Volume 56, February 2014, Pages 69–74

Abstract:	<p>Magnesium oxychloride cement (MOC) has been used in civil engineering for more than 100 years, but its application has been limited by its poor water resistance. This property, however, could be exploited in the formulation of a resorbable orthopaedic biomaterial. In this study, H₃PO₄ was added to control the degradation process of MOC to provide a predictable and clinically appropriate resorption time. The effects of H₃PO₄ on the phases, microstructures, mechanical properties, hydration and degradation of MOC have been evaluated. The results revealed that the crystalline phases in MOC before and after adding H₃PO₄ were the same, but that the needle-like phase 5 (5 Mg(OH)₂·MgCl₂·8H₂O) crystals were formed more extensively in MOC with H₃PO₄ than that in MOC without H₃PO₄. Furthermore, the addition of H₃PO₄ was shown to retard the hydration process. H₃PO₄ did significantly improve the water resistance of MOC though its addition resulting in a reduction in compressive strength.</p>
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7	Title:	An empirical model of air displacement by revolving doors
	Author:	Lin Du, Radu Zmeureanu, Ted Stathopoulos
	Journal:	Energy and Buildings, Volume 70, February 2014, Pages 127–134
	Abstract:	<p>This paper presents an experimental study on a reduced scale model to quantify the air displacement due to the revolution of revolving doors. The results show that the air displaced by revolving doors increases only slightly with the rotation speed, and is about two orders of magnitude less than values currently used in the calculation of air infiltration rate, for the same conditions. The correlation-based models developed in this study from experimental data are proposed to be used for the estimation of the air infiltration rates of existing revolving doors that are installed in large commercial or institutional buildings.</p>

8	Title:	Methods for assessing energy savings in hospitals using various control techniques
	Author:	Velimir Čongradac, Bogdan Prebiračević, Nebojša Petrovački
	Journal:	Energy and Buildings, Volume 69, February 2014, Pages 85–92
	Abstract:	<p>As a part of ICT Policy Support Programme,¹ the task of this work is the assessment of possibilities for increasing energy efficiency in hospitals using various control techniques that are available today. To present the opportunities for energy savings, it is necessary to define the ways in which savings can be achieved (control strategies), and then determine the equations by which each method can be described separately, i.e. to calculate the amount of energy that can be saved. At the same time, it is important to take into account the mutual dependence of various methods and provide the maximum support in selecting the preferred methods for achieving the highest efficiency. In this paper a specific set of management methods is presented and their implementations are shown by utilizing the previously introduced tool for energy demand calculation.</p>

9	Title:	Impact of admixtures on the plastic shrinkage cracking of self-compacting concrete
	Author:	Andreas Leemann, Peter Nygaard, Pietro Lura
	Journal:	Cement and Concrete Composites, Volume 46, February 2014, Pages 1–7
	Abstract:	<p>Cracks accelerate the ingress of harmful fluids, impairing the durability of reinforced concrete structures. Plastic shrinkage cracking poses a problem in particular for concrete components such as slabs, in which a high percentage of the surface area is exposed to drying.</p> <p>In this study, the impact of different admixtures on the occurrence and on the extent of plastic shrinkage cracking of SCC was investigated. Plastic shrinkage cracking was measured according to ASTM C1579-06 in a climate chamber at a temperature of 30 °C and relative humidity of 60%.</p> <p>Starting directly after casting, the settlement, the capillary pressure and the mass loss were recorded. At the end of the test, the crack-width distribution was analyzed.</p> <p>A shrinkage reducing admixture and a paraffin-based curing compound were effective in preventing cracking. Based on the observed evaporation, settlement, capillary pressure and cracking behavior, the mechanisms for crack prevention were identified.</p>

10	Title:	Near-to-surface properties affecting bond strength in concrete repair
	Author:	Luc Courard, Tomasz Piotrowski, Andrzej Garbacz
	Journal:	Cement and Concrete Composites, Volume 46, February 2014, Pages 73–80
	Abstract:	<p>One of the main processes for repairing concrete structures is patch repair. Efficiency and durability of a repaired system depends on the bond between concrete substrate and repair material. By increasing the surface roughness, the surface treatment of concrete substrate can promote mechanical interlocking that is one of the basic mechanisms of adhesion. Nevertheless, some problems may arise from “co-lateral” effects of the treatment, especially due to the development of microcracks inside the substrate. In the presented paper, the effect of concrete substrate surface preparation has been characterized by roughness measurement, description of microcracking in the near-to-surface layer and a pull-off cohesion test. After repair, pull-off bond strength has been evaluated. It is concluded that selection of a suitable surface treatment technique should be preceded by the analysis of its aggressiveness in relation to the concrete substrate strength. A procedure for bond strength estimation using multiple regression approach, based on parameters describing surface quality really generated from various roughening techniques, is then proposed.</p>