



## **Presentation Abstracts**

### **Session 1A Health and Safety (Location: P.D. Koon Conf. Rm.)**

#### **Sathyanarayanan Rajendran, “Construction Site Safety Research Topics”**

The presentation will provide an overview of a variety of construction safety topics (challenges and solutions) that are currently being studied by the author. The topics include the study of the impacts of stretch and flex exercises on construction worker safety; contract issues in safety management; integration of construction site quality and safety programs, and development of a project safety best management handbook.

#### **John Gambatese, “Construction Engineering: Designing Formwork and Concrete Structures for Safety”**

Research shows that there are many ways in which concrete structures can be designed to enhance the safety of the construction workers. Furthermore, while there is recognition that the use and re-use of concrete formwork impacts the design and the use of the formwork, and therefore the safety of those constructing the formwork, limited research has been conducted to quantify the risk and reliability of formwork re-use. This presentation will describe the construction safety impacts associated with the design of reinforced concrete structures and the design of concrete formwork, and present recent research studies designed to explore how to ensure worker safety during the construction of reinforced concrete structures.

#### **Ken-Yu Lin, “Safety Technology - LED for Temporary Lighting in Construction”**

Adequate lighting is a necessity on the construction site not just for completion of the works, but also for the work safety, worker quality and project productivity. We report the findings of a case study that involves the use of low-voltage LED temporary construction lighting on the UW Bothell Science and Academic Building project. Through the case study, we discuss the problems associated with traditional temporary lighting on a construction site. We also provide a deeper understanding of LED temporary construction lighting on its benefits and limitations, and identify best practices for project stakeholders.



## **Presentation Abstracts**

### **Session 1B BIM for FM (Location: HIT Lab)**

#### **Sheryl Staub-French, “Investigating BIM-Based Collaboration”**

This session will discuss recent research on two large public owners to better understand the scale and scope of effort involved in transitioning to BIM. This research was approached from two perspectives: (1) the organizational context in terms of processes, workflows, and requirements; and (2) the modeling context in terms of model compliance and quality. We focus on the handover phase of a project and the potential use of BIM to support maintenance activities.

#### **Steve Hutsell & Van Woods, “Is There Any Place for COBie Outside The Building?”**

Civil Information Modeling (CIM) utilizes the same principles of BIM in the context of Survey, Site, and Infrastructure projects. O&M and Asset Management data exchange standards (such as COBie) have garnered significant attention in the BIM context, whereas in the CIM context there has been less of an emphasis by vendors for tools, and by owners for the data and contract requirements. The US Army Corps of Engineers, Seattle District, (USACE) will present the vision for unifying data-rich facility and site models with a focus on contract requirements, O&M and Asset Management data requirements, and the applicability of COBie as the data exchange mechanism. The realization of this vision will provide a more complete "common operating picture" and enable interfacing with additional tools and capabilities.

#### **Yong Woo Kim, “Leadership for Lean Implementation at Capital Projects”**

The goal of this research is to investigate the relationship between leadership and Lean Construction implementation. The research uses a quantitative research in which a survey was conducted, followed by a statistical analysis to test the hypothesis. Through the statistical analysis of survey data, the research finds that there is positive relation between the level of transformational leadership and the effectiveness of lean implementation. When an organization is implementing organizational change like Lean, the relationship of the project leaders and followers must not be underestimated.



## Presentation Abstracts

### Session 2A Construction Engineering (Location: P.D. Koon Conf. Rm.)

#### **Robert Seghetti, “Accelerated Construction Techniques - Material, Equipment and Processes”**

Traditional pavement construction, repair, or replacement solutions may no longer be universally acceptable due to increasing public impatience with traffic interruption. Public works agencies must repair or replace deteriorated pavements while maintaining traffic on these structures. These types of construction are especially inappropriate in urban areas where traffic congestion is significant. Asphalt pavement has long been a popular road construction material. In areas where traffic becomes concentrated, such as urban intersections, flexible pavements may be prone to rutting over time. In areas with seasonal extremes of both hot and cold weather, such as found in the eastern Washington, the ruts can quickly become severe. Several of the flexible pavement intersections in eastern regions of Washington State have been suffering from severe rutting caused by slow moving heavy vehicles, exacerbated by high temperatures during the summer months. This session addresses these issues and ways to minimize traffic interruptions.

#### **Kamran Nemati, “Accelerated Construction of Urban Intersections with Portland Cement Concrete Pavement (PCCP).”**

The frequent maintenance required on some asphalt concrete (AC) pavement sections has made reconstruction with portland cement concrete pavement (PCCP) a more feasible alternative. However, many constructability issues need to be addressed in order to realize the full potential of this alternative. Accelerated paving encompasses two classes of activities: technological methods to accelerate the rate of strength gain and construction methods to minimize the construction time. This session covers modern accelerated construction techniques for road pavements and airfields and several accelerated construction case studies will be presented and discussed.



## **Presentation Abstracts**

### **Session 2B Construction Education (Location: HIT Lab)**

#### **Thomas Korman, “Enhancing CEM Education with Company Simulation”**

Simulations and learning games provide students with an opportunity to engage in realistic experiences. Many have been designed to meet specific learning goals, i.e. sharing case studies to demonstrate very complex situations. Managing construction involves being able to make decisions to balance time, cost, quality, resources, and identifying and solving a variety of issues. The skills required of today's construction management personnel are a combination of management skills and technical knowledge. This presentation introduces the development of the Construction Industry Simulation (COINS) gaming system designed and developed at California Polytechnic State University, San Luis Obispo to educate construction engineering and management students. COINS provides a virtual environment to engage students in active learning by posing problems and situations which require applying previously gained knowledge to engage in problem solving as well as a link in the curricula to appropriately prepare and engage students in project-based learning activities.

#### **Anne Anderson, “Global Teams in Virtual Worlds”**

Due to globalization and improved communication technologies, geographically distributed teams in the AECO industry are becoming more common, and understanding how to effectively coordinate with BIMs over distance is becoming more critical. In this presentation, a 2013 study is described in which six geographically distributed student teams coordinated design and construction activities for an assigned building project. Two different collaboration technologies were used for comparison: half of the teams met in a 3D virtual world where BIMs could be imported and explored by the team and the other half used collaboration software that allowed teams to share and discuss the building model by viewing it on a shared screen. Findings indicate that 3D environments provide quantitatively and qualitatively better outcomes than screen-sharing for the discovery of coordination issues. Specifically, a wider variety of issue discoveries were made in the 3D environment whereas the screen-sharing team discoveries were narrower in scope.

#### **David Martin, “4D Scheduling & Industry Collaboration: Filling the BIM Void”**

Construction management educators at Central Washington University have implemented BIM into the construction curriculum. The construction of the \$37,000,000, concrete frame Science Building on the campus grounds and the aid of an industry partner provided an outstanding opportunity for the students in the Construction Management (CM) program to develop their BIM knowledge. The industry partner aiding this effort is contracted to construct the building and develop a BIM for their own project management efforts. The faculty and the industry partner created a BIM workshop to arm students with the knowledge and skills to manipulate a BIM and create a 4D schedule using Navisworks. Students created both 2D and 4D schedules for the concrete forming, re-steel, placing, and finishing of the building. A lesson learned included that 4D scheduling improves the CM student's understanding of the construction process by virtually constructing the building. The teams presented their plans to the industry partner and were evaluated accordingly. Upon completion of the presentations, the industry partner presented his schedule giving students time to reflect on their respective approaches.