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The IEEE Business Engineering and Industrial Applications Colloquium 2013 will be held in Langkawi, Malaysia on **7 – 9 April 2013**. The colloquium is organized to invite international delegates to Langkawi Island, Malaysia to share their latest research findings besides getting to know Malaysia.

The IEEE BEIAC 2013 will be organized and sponsored by IEEE Malaysia Section, IEEE Malaysia Power Electronics, Industrial Electronics & Industrial Applications Joint Chapter.

Submission Info

Upon acceptance, authors will be required to register and present their papers. Papers will be published in the conference proceedings only if at least one of the authors is officially registered and presented. Each full registration covers a maximum of two papers. Student registration will cover a single-paper final submission and presentation. The authors **must not indicate their names and affiliations** in the body of the paper submitted. The authors only give their personal information during online submission. A double-blind peer review process will be used to evaluate all papers submitted for consideration.

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Program for *2013 IEEE Business, Engineering & Industrial Applications Colloquium*

B21: Civil Engineering & Applications 1

Chairs: Velluruzhathil John Kurian (Universiti Teknologi PETRONAS, Malaysia), Hee Min Teh (Universiti Teknologi PETRONAS, Malaysia)

08:40 ***Self-Calibration of the Leica ScanStation C10 Scanner***

Mohd Azwan Abbas (Universiti Teknologi Malaysia, Malaysia)

Similar to other surveying instruments, the observed data from terrestrial laser scanner (TLS) can be impaired with errors. Then, calibration routine is necessary for the TLS to ensure the quality of the data and also to make it applicable for surveying applications. There are two calibration approaches available: 1) component, and 2) system calibration. Due to the requirement of special laboratories and tools to perform component calibration, then this approach cannot be implemented by most of the TLS users. In contrast, system calibration that can be performed through self-calibration is more convenient and the requirements (e.g. room with targets) are easier to be provided. Self-calibration bundle adjustment is carry out using measured spherical coordinates (e.g. distance, horizontal and vertical angles) as observations. In extension to the functional model of each observation, a set of calibration parameters was used, which were determined in a self-calibration procedure. These parameters are derived from well-known error sources of geodetic instruments as constant (a0), collimation axis (b0), trunnion axis (b1) and vertical circle index (c0) errors. Self-calibration was performed for Leica ScanStation C10 at laboratory with dimension 9m x 7m x 2.6m and 130 black and white targets were fairly distributed. Data obtained from seven scan station were processed and statistical analysis (e.g. t-test) has shown that only collimation axis (77.1") and vertical circle index (-62.4") errors are significant for the calibrated scanner.

09:00 ***Bayesian Updating for Probability of Failure of Jacket Platforms in Malaysia***

Velluruzhathil John Kurian (Universiti Teknologi PETRONAS, Malaysia); Zafarullah Nizamani (Universiti Teknologi PETRONAS, Malaysia); Mohd Shahir Liew (Universiti Teknologi PETRONAS, Malaysia)

The Jacket platform codes such as API LRFD and ISO 19902 are based on probabilistic design of component and joint reliability. They consider overall structural integrity, redundancy and multiple failure paths only indirectly by using structural integrity assessment methods. In this paper, probability of failure is determined as per design requirement of 100 year extreme conditions using Monte Carlo simulation. To get information on maximum strength, maximum wave height was increased till the reserve strength ratio reached 1, using SACS pushover analysis. Stokes's 5th order theory and Morrison Equation were used for finding the environmental loads. Regression analysis was used for the load model using surface fit tool of Matlab. The wave which gave an RSR value of 1 is considered as the maximum wave, the jacket can withstand with the available resistance of material. This theory has already been applied on land based structures, such as proof loading used against existing structures to gauge the strength of structure. This new maximum wave height has been used to find the updated failure probability and compare it with failure probability of design wave. The study covers one platform, and recommendation is made whether the platform is suitable for the extension of life or not. This study can further lead to updating based on new information on material resistance of platforms.

09:20 ***Dynamic Response of Composite Footbridges under Running Pedestrian Load***

Faraz Sadeghi (Universiti Teknologi Malaysia (UTM) & MALAYSIA, Malaysia); Ahmad Kueh (Universiti Teknologi Malaysia (UTM), Malaysia); Mohammadreza Vafaei (Universiti Teknologi Malaysia (UTM), Malaysia)

In this paper, fundamental research knowledge on the vibration characteristics of slender footbridge composite structures induced by human running load is presented. The aim is to evaluate serviceability requirement of these structures against the current design standards. The footbridge vibration response is considered through an analysis in terms of critical acceleration, displacement and velocity values. The model is analyzed with linear elastic finite element method (SAP2000) and results are compared with the current design standard. The first natural frequency acquired in this investigation from the finite element model is 5.4 Hz which agree with reported value from other studies. The maximum acceleration of 0.15%g was obtained from the model analyzed due to one person running excitation load. Moreover, the maximum vertical displacement value in the mid span was obtained 0.5495mm which is very less than standard displacement limit (22.5mm). This is obviously perceivable that the model can satisfy accelerations and displacements limitations of current design codes. In the other words investigated structure can obtain human safety and comfort against vibration due to human induced running load.

09:40 ***Performance Evaluation of Arrays of Stepped-slope Floating Breakwaters***

Hee Min Teh (Universiti Teknologi PETRONAS, Malaysia)

This paper describes the performance characteristics of a stepped-slope floating breakwater used for wave protection in small ports and harbours. The test models have been tested in regular waves in a wave flume to determine their hydraulic performance in various wave conditions. The typical performance characteristics of the breakwater are quantified by the amount of wave transmission, wave reflection and energy dissipation, and are graphically presented with respect to a range of wave parameter. The experimental results showed that the triple-row stepped-slope floating breakwater is a good wave attenuator and an effective energy dissipater.