

## **Editorial Notes**

### **Welcome to International Journal of Technology**

**Theme: Optimizing Product/Project Performance towards Sustainable Development**

This season, we are pleased to present the third edition of International Journal of Technology (IJTech), an international peer-reviewed journal dedicated to systematic and empirical research in the areas of engineering design and technology. The theme for this issue is chosen to describe rigorous processes and methods in various engineering fields with the intention to create innovative solutions, optimise resources, and enhance product value.

The complexity of a project/product requires effective and efficient process to reduce uncertainties associated with financial losses, wasted time, and low quality. The role of effective, efficient, and high quality design in various industries is generally argued to be one of the most important key in creating and developing concepts and specifications in order to optimize the function, value, and performance of projects/products. Moreover, design process will offer new information gained through synthesis, analysis, and innovative work undertaken as a part of an integrated value-adding process. Based on the journal submission and selected papers from the 12<sup>th</sup> International Conference on Quality in Research (QiR 2011) in Bali, Indonesia, the third edition of IJTech presents ten selected papers to discuss various processes in improving projects, processes, and products's performance toward effectiveness, efficiency, and high quality, which is intended to result in creating better value.

The first paper, written by K. Kuriyama, Y. Kaba, H. Saitoh, Bannu, N. Manago, Y. Harayama, K. Osa, M. Yamamoto, and H. Kuze, emphasizes on visible and near-infrared differential optical absorption spectroscopy (DOAS) for the measurement of nitrogen dioxide, carbon dioxide, and water vapor. The measurements are conducted with artificial light sources and direct/scattered solar radiation. The measured spectra generates an information on the absorption features of atmospheric gases, such as nitrogen dioxide ( $\text{NO}_2$ ), carbon dioxide ( $\text{CO}_2$ ), and water vapor, as well as aerosol optical properties in the atmosphere.

Furthermore, P. Leviäkangas and R. Hautala discuss mobility pricing concepts from ecological target and sustainable development point of view. The paper presents various policy-oriented strategies in selecting the pricing regime and components of benefits and costs in different contexts. As a result, they argue that the price of environment and ecology should be set high enough to reflect the future expectation and synergy between pricing regime and investment appraisal. In addition, excellent information management followed by technology enablers should be optimally utilized.

The third paper, written by G.M. Lawalata and H.R. Agah, evaluates the application of traffic conflict techniques as road safety diagnosis for urban road facility at intersection. The research shows that the high numbers of conflict types are mostly caused by crossing action, overtaking action and pedestrian crossing action. Various countermeasures for each conflict types are then proposed, such as: installing sign or traffic light, or redesigning cycle time for turning flow, constructing more directional line marking or separator, and providing pedestrian crossing facility.

The fourth paper, written by E. Muslim, B. Nurtjahyo and R. Ardi, presents an evaluation on the ergonomics aspects of folding bike prototype in a virtual environment. Posture Evaluation Index (PEI) is used as an analysis approach that integrates the results of three methods: Low Back Analysis (LBA), Ovako Working Posture Analysis (OWAS), and Rapid Upper Limb Assessment (RULA). The result shows that the optimal design configuration of a folding bicycle is obtained when the height of handlebar is 32 cm and the height of saddle is 83 cm.

The fifth paper, written by M. Hamasaki, M. Obara, K. Obara, and H. Manaka, evaluates a quantum dynamic approach to the condensation process of zinc atoms by inner-core excitation due to ion-recombination. The researchers argue that the quantum dynamical condensation process by inner-core excitation arise due to ion-recombination between the vapor phase and the solid phase. The X-ray diffraction of the condensed structure of zinc film is resulted in two different types depending on the excitation of the ionic species. From the comparison between these two series of experimental data, a model for excitation of ions, in which the excitation of  $\text{Zn}^+$  in the gas phase induces a strong diffuse scattering while excitation of  $\text{Zn}^-$  in the surface phase induces a strong Bragg reflection, is proposed.

The sixth paper, written by K.I Choi and J.T Oh, presents the experimental results from investigation on two-phase flow boiling heat transfer of R-410A and R-134A in horizontal small tubes. The pressure drop and local heat transfer coefficients are obtained over heat flux range of 5 to 40 kW/m<sup>2</sup>, mass flux range of 70 to 600 kg/m<sup>2</sup>s, saturation temperature range of 2 to 12°C, and heat transfer quality up to 1.0 in test section with inner tube diameters of 3.0 and 0.5mm, and lengths of 2000 and 330mm, respectively. The experimental results are then compared against several existing correlations. As a result, a new boiling heat transfer coefficient correlation based on the superposition model for refrigerants in small tubes is proposed.

The next paper, written by S. Kartohardjono, Yulusman and D.S. Budhie, examines the effectiveness of natural solvent from Noni fruit for CO<sub>2</sub> gas absorption from its mixture via hollow fiber membrane gas-liquid contactor. The solvent, which is made of 100 gram Noni fruit per liter of water, is flowed to the shell side of the contactor while the gas mixture is flowed to the lumen fiber. The experimental result shows that mass transfer coefficient in the contactor increases with increasing liquid flow rate and decreasing number of fibers in the contactors. Mass transfer correlation indicates that mass transfer in the contactors is dominated by turbulent flow. Hydrodynamics analysis of the contactors shows that at the same Reynolds number pressure drop increases with increasing packing density due to friction between fibers and water.

The eighth paper, written by M. Miao, R. Xu, Y. Jin, and C. Nguyen, presents the design of CMOS RFIC UWB carrier-less and carrier-based transmitters. The carrier-based transmitter is designed by using a 0.18-μm CMOS process adopting a double-stage switching to enhance RF-power efficiency and reduce dc-power consumption and circuit complexity. Measurement result shows that the generated UWB signal has variable 10-dB signal bandwidths from 0.5 to 4 GHz and tunable central frequency covering the entire UWB frequency is ranging from 3.1 to 10.6 GHz. The carrier-less transmitter designed by using a 0.25-μm CMOS process can generate and transmit both monocycle pulses from 140 to 350 ps and impulses from 100 to 300 ps.

The ninth paper, written by Jovanio Jr., R. Marcos, C. Tenório, A. Mateus, and C. Egoavil, presents the Real-Time Mapping of electric field on a transmission line using Charge Simulation Method combined with an embedded system. The modulus of the electric field is calculated at 1 meter height for all the right-of-way. The mapping is performed for a space between towers and considers that the arrow of the conductors occurs in the middle of this distance that provides a computational result. A series of detectors are used to obtain voltage data which subsequently captured by a microcontroller, and then transmitted to the operational center.

The last paper, written by P. Smith, presents some early outputs from a study considering Papua's economic development options. Initial cost-benefit feasibility is presented for each option prior to making some observations on their economic, social, and environmental impact. Resolving electricity shortages with large scale carbon-based electricity generation is likely to reinforce the current economic development. The development of new industries creating more value added and equality may be stimulated by community-based clean energy production and distribution.

I hope this edition of IJTech conveys some new insights in the way we conduct our research. I am pleased to accept and respond to any comment and enquiry you may have on the direction and content of IJTech and I invite you to join us in this venture by sending your work for consideration.

With warmest regards from editorial desk,



Dr. Mohammed Ali Berawi  
**Editor-in-Chief**  
International Journal of Technology