

Editorial

About This Issue

The ongoing impact of COVID-19 pandemic has brought many challenges to many people and activities in the past year. With the unexpected constraints, the Editorial Subcommittee has continued to plan and review the work for the Journal. We could sustain this publication Volume 43 Number 2, including seven (7) research/ technical articles. The relevance and usefulness of respective articles are summarised below.

O. Kamiyo, “Airflow and Heat Transfer Analysis within Flat-top Roofs Heated from Below”, investigated natural convection in attic of non-conventional rooftops. In this study, a finite-volume numerical investigation of laminar fluid dynamics and heat transfer of air within the attic of a flat-top roof structure has been predicted for bottom isothermal heating at varying pitch angle. The heat transfer between the walls results in multiple thermal plumes and multi-cellular flow structure with the number, size and strength of the counter-rotating cells reducing with increasing pitch angle. The results show that the peculiar shape of the roof has significant effect on the fluid flow and heat transfer. Particularly, the truncated triangular architecture of the roof prevents the formation of large, dominating and upper-row cells at the midsection of the attic. At low pitch, the intensity of the vortices results in thorough mixing of air and, hence, uniform temperature distribution within the attic. In modern pitched-roof buildings, heat loss to the attic is minimised when the roof pitch is relatively high due to the peculiarity of the flat-top roof structure.

In the article, “Improving the Lighting Project Executions with Light-Emitting Diodes (LED) in Trinidad and Tobago: A Value Engineering Approach”, **M. Ramrose** and **K.F. Pun**, explored the current issues and challenges faced with adopting LED lighting in projects and provide a value-based solution in Trinidad and Tobago (T&T). The study identified the factors affecting LED adoption in lighting projects and acquired empirical data via interviews and a survey with industry practitioners in T&T. 60% of practitioners agreed that they lacked the knowledge of adopting LED lighting. The collation of findings was used to develop 2-phase LED adoption approach incorporating the principles and tools of value engineering (VE). These two phases are constituted to overcome the barriers and challenges currently being faced in lighting projects. A post-evaluation survey was undertaken focusing on acquiring practitioners’ views on the applicability of the proposed approach in lighting project executions in T&T. Future work would include testing of the VE-LED approach on a wider scale using lighting projects in the public- and private-sectors separately and collectively in T&T to decrease the current issues and challenges faced with adopting LED lighting across the country.

R. Ramjattan, D. Ramsook and **P. Hosein**, “Cybersecurity Threat Analysis for an Energy Rich, Small Island Developing State”, determined the level of threats and the source of such threats for educational and industrial web sites for one such country. The authors deployed a network honeypot with File Transfer Protocol (FTP), Secure Shell (SSH), Hypertext Transfer Protocol (HTTP) and Industrial Control System (ICS) on a fake educational institution server. Besides, a network honeypot with server message block (SMB), FTP, HTTP, and ICS was set up in a fake oil company server. Honeypot events were recorded and locations of the potential intruders were determined using source IP addresses. It was found that the oil company site’s SMB server had the most honeypot events and the highest repeat attacker rate. This information can be used to better detect potential attacks and defend against them.

L. Wright J-M. Tangwell, and **A. Dick**, “Public Transportation in the Caribbean: Dominance of Paratransit Modes”, presented the types of modes in the public transportation system in five Caribbean countries; Jamaica, St. Lucia, Barbados, Guyana, Trinidad and Tobago. The paratransit systems have developed similarly in each country and share identical cultures around these modes. In some countries, the paratransit modes are the only form of public transportation available. These modes are more reliable than government-owned buses and more frequently used. This paper focused on the paratransit modes of six Caribbean countries, and provided some factual analysis of the current public transportation system. This study would contribute to provide a foundation to future studies aiming to establish a general methodology framework that could assist in solving some of the transportation issues the Caribbean faces, through a system using paratransit modes and policy development.

In the fifth article, “Supply Chain Evaluation for the Plant Extracts Industry in the Eastern Caribbean”, **D.R. McGaw** and **S. Maharaj** investigated the potential of the expansion of the industry using an in-depth evaluation of the 5 stages of the complex supply chain in the small island states. The potential for introducing new products has identified the additional crops which could be considered for commercial exploitation: root crops (turmeric, vetiver), shrubs (basil, hot peppers), trees (ylang ylang). The authors recommended based on the analysis that management of agricultural production is key to the success of the operation. Besides, steam distillation extraction can only produce essential oils, whereas supercritical fluid extraction can extract both essential oils and oleoresins, but at a rather higher capital cost. There would be a move towards major production and distribution of commercial products after the new businesses are established. These new businesses would contribute to the fulfillment of a sustainable supply of

crops to the process plant.

R. Bachoo and **J. Bridge**, “Flow Induced Vibrations of for Oil and Gas Piping Systems: Wall Pressure Fluctuations and Fatigue Life Assessment”, developed a procedure for incorporating the underlying wall pressure fluctuations in a finite element model for the purpose of determining the fatigue life of a piping system. Numerical simulations were used to determine the fatigue life for a flowline transporting natural gas at three different flow velocities; 65 m/s, 130 m/s and 170 m/s. The authors also experimentally investigated the wall pressure fluctuations associated with single phase flow in a geometrically complex manifold. Extensive wall pressure fluctuation measurements associated with water flowing at 1.6 m/s and air flowing at 3 m/s were investigated. It was found that the pressure fluctuations associated with a fully developed turbulent flow are significantly greater than that observed at an undisturbed position, owing to the dramatic changes in geometry. Unlike the simple 90° elbow or mitre bend, the fluctuations within the manifold remain pronounced with no decay in amplitude.

The seventh paper, “Hydraulic Model Study of Arena Dam Spillway Works, Trinidad”, by **H.O Phelps (late)**, **H. Md. Azamathulla**, and **G.S. Shrivastava**, is a special paper. The work was carried out by the late Professor Phelps (1929-2018) - in the Fluid Mechanics Laboratory of the Department of Civil and Environmental Engineering at The University of the West Indies at St. Augustine in 1975. This physical model study was not published in the lifetime of Professor Phelps. For the sake of preserving the integrity of original work, it is essentially unaltered for publication. The publication would add to the history of landmark hydraulic engineering structures built in Trinidad, and indeed in the Commonwealth Caribbean, and equally to Professor Phelps’ legacy investigated.

On behalf of the Editorial Office, we gratefully acknowledge all authors who have made this special issue possible with their research work. We greatly appreciate the voluntary contributions and unfailing support that our reviewers give to the Journal.

Our reviewer panel is composed of academia, scientists, and practising engineers and professionals from industry and other organisations as listed below:

- **Dr. Carmen Riverol**; The University of the West Indies (UWI), Trinidad and Tobago (T&T)

- **Dr. Daniel White**; The University of Trinidad and Tobago (UTT), T&T
- **Dr. David Prevatt**; University of Florida, Florida, USA
- **Dr. Debbie Mohammed**; University of Toronto, Canada
- **Dr. Donnie Boodlal**; UTT, Brechin Castle, T&T
- **Professor Fumihiko Nakamura**; Yokohama National University, Yokohama, Japan
- **Dr. Hafez Jafari**; Université Libre de Bruxelles, Brussels, Belgium
- **Dr. Haider I. Alyasari**; The University of Karbala, Karbala, Iraq
- **Dr. Indra Haraksingh**; UWI, T&T
- **Professor Kit Fai Pun**, UWI, T&T
- **Dr. Julio César Cuenca Tinitana**; Universidad Nacional de Loja, Ecuador
- **Dr. Kimberly Tam**; University of Plymouth, Plymouth, UK
- **Mr. Lacey Williams**; Caritrans Limited, T&T
- **Ms Man Yin Rebecca Yiu**, UWI, T&T
- **Dr. Marcia Nathai-Balkissoon**; UWI, T&T
- **Dr. Maria Koliou**; Texas A&M University, College Station, TX, USA
- **Professor Michael Taylor**; UWI, Jamaica
- **Professor Neela Badrie**; UWI, T&T
- **Dr. Philbert Morris**; SoftCom Ltd., T&T
- **Dr. Rae J. Furlonge**; L F Systems Ltd, T&T
- **Professor Reynold Stone**; UWI, T&T
- **Dr. Ron Mahabir**; George Mason University, Fairfax, VA USA
- **Dr. Saheeda Mujaffar**; UWI, T&T
- **Dr. Solange Kelly**; UTT, T&T
- **Emeritus Professor Vukan R. Vuchic**; University of Pennsylvania, St. Philadelphia, PA, USA
- **Professor Zbigniew Zapalowicz**; West Pomeranian University of Technology, Szczecin, Poland

The views expressed in articles are those of the authors to whom they are credited. This does not necessarily reflect the opinions or policy of the Journal.

KIT FAI PUN, *Editor-in-Chief*

Faculty of Engineering,
The University of the West Indies,
St Augustine, Trinidad and Tobago, West Indies

February 2021