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Editorial

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This issue contains one briefing article and four papers that present insights on and research into a range of topics, including corporate integrated reporting (IR), sustainable infrastructure company, dwellings temperature simulation, heat pump system simulation and the 'carbon footprint' (CF) of sewer pipes.

Siew (2015) from the University of New South Wales presents the challenges of IR to corporate sustainability in the construction industry. The briefing article introduces the concept and contents of IR being developed globally since 2011, and highlights its difference from the corporate sustainability reporting (GRI, 2013), which has turned out a fast adoption in the global construction industry (Brown *et al.*, 2009; KPMG, 2013). The article further discusses gaps and barriers to adopt IR in the construction industry with a clear vision on the value of IR with regards to corporate sustainability. As an example of IR adoption, The Crown Estate (2013) published its first integrated annual report in 2014, and showed an important step in the journey of corporate sustainability in the construction industry.

Whitehead (2015) from Balfour Beatty describes a systematic approach to sustainable infrastructure company based on its progress on corporate sustainability. This paper provides a unique opportunity for readers to learn in detail about the practical theory of corporate sustainability and the best practice of Balfour Beatty, a global leader in sustainable infrastructure business. The paper describes a series of tools and techniques, including the matrix of sustainability blueprint, the technical roadmap to sustainability governance, the strategic map of corporate sustainability, a group strategic framework, the matrix of stakeholder engagement, and the maturity model of corporate sustainability. The entire frame of sustainability theory developed by Balfour Beatty can help infrastructure companies to establish strategic vision on corporate sustainability, and to perform the strategy through sustainability governance, performance assessment, stakeholder engagement, and sustainability reporting to shape their own sustainable future.

Amoako-Attah and B-Jahromi (2015) from the University of West London introduces the use of the Bland–Altman method on comparison analysis as a simulation validation tool to statistically evaluate the agreement between monitored temperatures and thermal simulation analysis results of detached dwellings in UK. The methods adopted for this study includes 3D modelling and simulation through the thermal analysis simulation software, temperature monitoring, and the Bland–Altman method. Based on data collected from a 1995 three-bedroom detached house located at Bracknell in England and CIBSE weather data, the experiment indicated that there is a very strong agreement between the monitored temperatures and the thermal simulation analysis results, and demonstrated an effective approach to validating thermal simulation programs for buildings.

Varney and Vahdati (2015) from the University of Reading present a series of simulations of a photovoltaic (PV)-thermal ground source heat pump (GSHP) system in a test house in Oxfordshire, England. The study focused on the performance of a GSHP system assisted by an array of PV-thermal modules. For the experimental study, the paper firstly illustrates the heating system at the test house and its TRNSYS model with five variant systems, and then presents results of simulation over a 12-month period by showing total system heat load, GSHP energy inputs and outputs, sources of heat and seasonal performance factors. The paper also provides discussions on the differences identified in the study based on a comparison of test house data logs with TRNSYS model. The TRNSYS simulations conducted in this experiment indicated that extracting heat from PV-thermal modules can be a useful way of improving the performance of a GSHP with a short ground circuit. The research was funded by *Engineering and Physical Sciences Research Council*.

Elhag (2015) from British Precast Concrete Federation presents an assessment based on scenarios about the problem and its impact on the reliability of embodied carbon dioxide emissions data for large diameter sewer pipes. The paper provide an overall literature review on IRCF assessment and factors influencing the CFs of sewer pipeline systems to justify the need for a further assessment of CF values of large scale sewerage pipes. For the assessment based on 15 scenarios upon a number of methodological rules and assumptions associated with data accuracy, functional unit, technology and geographic coverage, the paper describes six tests covering the consideration of functional unit, the scope of greenhouse gas emissions, the effects of materials composition and mix, the impact of sourcing of raw materials, the impact of pipes' travel distance to site and the impact of methodology through a generic process flow

diagram for a cradle-to-gate carbon CF of products study for concrete pipeline products. In response to a significant variance found between industry 'default' CF values for sewer pipes and values based on alternative scenarios, the paper offered guidance on how secondary data should be handled and what methodological questions should be addressed prior to data use.

I hope you find these papers stimulating and informative, and would be pleased to receive comments on this issue.

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