

CIBSE
ENGINEERING PRACTICE REPORT



JANUARY 2017

INTRODUCTION

██████████ has over twenty (20) years of wide range academic and industrial experience. He is currently a lecturer and Building Energy Performance researcher in Civil Engineering and Built Environment Department at the School of Computing and Engineering, ██████████. He holds a PhD in Built Environment and Postgraduate Certificate of Research from ██████████, a merit in MSc Civil Engineering from ██████████, MBA from ██████████ and BSc Mechanical Engineering (Hons) from ██████████. ██████████ joined University ██████████ in 2011 after working as a critical safety officer (██████████ ██████████) for ██████████ and ██████████ and as a specialist - staff engineer/manager for ██████████.

██████████ began his research career at the ██████████ by investigating the impact of climate change on newly detached residential buildings in the UK and analysing various passive mitigation and adaptation strategies. His work also considers all aspects of building energy performance; modelling, simulation and optimization including the impact of varying climatic patterns on building performance, building energy efficiency measures and thermal comfort analysis.

██████████ has undertaken varying engineering research, with strong analytical and numerical methods. His current research interests also include the impact of current and future climatic variability on buildings in area of primary energy consumption and carbon emissions in relation to hotels energy demands using a Computational Fluid Dynamics (CDF) simulation and optimization tool and the current CIBSE weather data set morphed from the current UK Climate Projection weather information. The work entails the simulation and optimization of multi-story hotel building to predict its energy performance and impact of climate change on its future energy consumption and carbon foot print. As part of existing hotel retrofit strategy, this will results in the optimization of thermal comfort, low emission strategies, minimization of life cycle cost and reduction of energy use.

██████████ has exhibited outstanding knowledge and understanding of engineering principles and applications which was adaptable and published in peer reviewed journals including Proceedings of the ICE - Engineering Sustainability, Journal of Sustainability and An International Journal of interdisciplinary research in environmental science, technology, and management.

██████████ has currently disseminated his research in the following Journal publications and conference papers:

- ██████████. (2016) ██████████
██████████
██████████
██████████ Journal of Sustainability, ██████████ ██████████
██████████

- [REDACTED], (2016) [REDACTED] Proceedings of the Institution of Civil Engineers journal Engineering Sustainability. [REDACTED]
- [REDACTED], (2015) [REDACTED] Proceedings of the Institution of Civil Engineers journal Engineering Sustainability. [REDACTED]
- [REDACTED], (2014) [REDACTED]. Advances in Environmental Research (AER): An International Journal of interdisciplinary research in environmental science, technology, and management, Techno-Press. [REDACTED]
- [REDACTED] (2013) [REDACTED] Advances in Environmental Research (AER): An International Journal of interdisciplinary research in environmental science, technology, and management, [REDACTED].
- [REDACTED], (2014). A [REDACTED] 2014 International Conference on Computing in Civil and Building Engineering, [REDACTED]
- [REDACTED] [REDACTED] 14th International Conference on Construction Applications of Virtual Reality. [REDACTED]

Career Episodes:

<i>Date</i>	<i>Role</i>	<i>Organisation</i>
2011 – 2015	PhD and Research Associate	Department of Civil Engineering and Built Environment, [REDACTED]
2012 – Present	Lecturer and Research Associate	Department of Civil Engineering and Built Environment, [REDACTED]
2010 – 2014	[REDACTED] Site Person in Charge/Critical	[REDACTED] (Contractors) Ltd
2006 – 2010	Safety Officer	[REDACTED]
1994 – 2005	Specialist - Staff Engineer/Manager	[REDACTED] Company Ltd

Career Episode 1 PhD and Research Associate (2011 – 2015)	CIBSE Competence Criteria (MCIBSE)
<p>Scholarship in Research: My PhD research is titled “Impact of Climate Change on Newly Detached Residential Buildings in the UK - Passive Mitigation and Adaptation Strategies.” The research was underpinned by the global increase in demand for dwelling energy and implications of changing climatic conditions on buildings, driving the need to build sustainable dwellings. The research was to apply passive mitigation and adaptation design strategies to newly detached residential buildings in the UK with the view to identify the key building envelop and systems parameters to secure the right balance of energy consumption and thermal comfort in dwellings. This work enhanced my knowledge of engineering codes, standards and specifications.</p> <p>The research contributed knowledge in the utilization of appropriate mitigation strategies to enhance thermal comfort and the reduction of the environmental implications to the built environment in order to facilitate the drive towards the attainment of future sustainability requirements. The work further considered making buildings more sustainable in analysing the integrated passive mitigation strategies of varying future climatic conditions, variable occupant behaviour, building orientation, adequate provision of thermal mass, advance glazing, appropriate ventilation and sufficient level of external shading which influence the potential thermal performance of dwellings and a methodology that combines thermal analysis modelling and simulation using EDSL TAS software coupled with the application of CIBSE TM52 adaptive overheating criteria to investigate the thermal comfort and energy balance of dwellings and habitable conservatories.</p> <p>In addition, my PhD work helped me to identified new areas for development and research. For example, I applied Bland-Altman’s method of comparison as a validation technique in validating space temperatures in building simulation application. This is a newly developed knowledge in civil and construction engineering and built environment research in validating thermal analysis simulation, when a critical comparison of my work is done with existing literature. The relevance of this approach is due to the emergent understanding that the goodness of fit measures used in current building simulation model validation are inadequate coupled with that fact that the current simulation software validation is geared toward energy consumption.</p>	<p>B1</p> <p>A1, B2</p> <p>B2</p> <p>A1</p> <p>B2</p> <p>A2</p>

<p>The research methodology, review of current literature from various civil engineering and built environment technical journals via paper and electronic media, analyses underpinned by innovate sustainable solutions to the building industry and reduction of carbon emissions and the key findings from this work have been published in peer reviewed journals and conference papers, as detailed in the list of publication in the introduction section above. I have also attended several climate change and building performance conferences and seminars.</p>	<p>A1, B1, B2</p>
<p>Knowledge Transfer Partnerships - Hilton Worldwide As part of collaborative projects, I contribute to Hilton Worldwide knowledge transfer partnerships (KTP) (a government scheme to encourage the transfer of expertise between Higher Educational Institutes and research organisations, businesses, charities and other organisations) activities with the Department of Civil Engineering of School of Computing and Engineering. I work with [REDACTED], [REDACTED], to establish collaborative research objectives with Hilton Worldwide. The current work - Energy Forecasting and Consumption Reduction Project Hilton [REDACTED] – investigates the use of computational fluid dynamic (CFD) simulation software combined with the latest climate change projection (the UKCP09 projection) weathering data and thermal imaging, to predict the energy consumption of existing and proposed lighting for London Tower Bridge Hotel, to predict the energy consumption by enhancing the thermal properties of the South Facing Windows with the introduction of Sun Control Window Films, and to predict the energy consumption for [REDACTED] Hotel with the combination of proposed lighting and Sun Control Window Films. To begin this project, I made several site visits to [REDACTED] Hotel to secure the hotel building architectural drawings, utility information (invoices), Carbon Dioxide emission data, occupancy levels, building elements, types of HVAC and lighting.</p>	<p>A2, B1, B2, B3</p> <p>B3</p>
<p>Whilst working on the Hilton project, I employed PRINCE2 project management principles, processes and controls including risk, cost and quality management strategies. In so doing I judiciously managed and maintained an overview of the entire project while continuing to manage and prioritise a varied workload to reflect project and delivery deadlines. I also prepared the project report and made PowerPoint presentation of the findings to the top management of Hilton Worldwide.</p>	<p>B2, D1, D2, D3</p> <p>C1</p>
<p>I was able to predict the energy consumption and CO₂ emission of the building for its life time when comparing the existing and proposed lighting system and also to ascertain the impact on energy savings with</p>	<p>B3, C2</p>

<p>the introduction of solar films to the south facing windows of the hotel building.</p> <p>As part of my scholarship in research, I could secure funding toward the Hilton project and applied project planning techniques in managing the successful completion of the initial phase of the Hilton project. This has provided Hilton Worldwide with a judicious and pragmatic approach to its retrofitting strategy to effectively minimise energy consumption and CO₂ emission in its operations. This pilot project will be extended to other Hilton facilities in due course, as the outcomes from this work should provide indicators for best practice when retrofitting existing hotel buildings.</p> <p>Other research works</p> <p>I have done extensive research work in the development of predictive modules in the Aluminium and the United Kingdom construction industries. My postgraduate research work (MSc Civil Engineering) in the [REDACTED] led to the development of predictive modules in assessing the performance of companies in the United Kingdom construction industry. The research focused on the use of strategic parameters in the construction industry, and by using the analytical approaches of multivariant discriminant analysis and logistical regression analysis gave rise to predictive modules with high classification power and accurate predictive capabilities. During my graduate studies (BSc Mechanical Engineering) in the [REDACTED], I designed, fabricated and successfully tested a roofing tile machine.</p>	<p>A1, A2, B2, B3</p> <p>B1</p> <p>A1</p> <p>B2</p>
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Career Episode 2 Lectureship: (2012 - Present)	CIBSE Competence Criteria (MCIBSE)
<p>Scholarship in Teaching:</p> <p>Since 2012, I have continuously contributed to the development of innovative learning, preparing, reviewing, delivering of teaching, giving tutorials, offering practical sessions, invigilating and marking examinations of Sustainable Civil Engineering (Level 5), Environmental Protection Engineering (Level 6), Fluid Mechanics (Level 5), Design in Structural Elements (Level 5), Structural Mechanics (Level 4), Commercial Management (Level 6), Construction Laboratory (Level 4), Engineering Mathematics (Level 4) and Construction Project Management (Level 7) modules to meet the [REDACTED] expectations and in compliance with the University's and professional bodies' quality standards. In this, I always comply with</p>	<p>E1</p>

the rules and code of conduct of the university. I further manage the construction laboratory activity independently.

The content of some of these taught modules in relations to building services engineering are outlined below:

Sustainable Civil Engineering:

The module stresses the fact that whilst sustainability in civil engineering and built environment projects has not in the past been a major consideration – it is now a key objective. The module provides insight as to how the economy, society and the environment can grow, develop and succeed together. It further stresses the utilisation of regulation and policy and the needed skills to integrate sustainability into projects when considering technological and ecological solutions to design, construction and maintenance. The module also considers the introduction to the sustainable engineering by using CEEQUAL and BREEAM documents and allows students to critically analyse the application of sustainable principles including energy saving techniques and reduction of carbon emissions in civil engineering and the built environment.

E1

Construction Technology

The module aims to introduce the main types/methods of construction technologies used in the production of modern buildings (domestic, small industrial, medium rise and commercial buildings. It also provides information for site investigation methods (desk study/ reconnaissance /soil investigation) and state the range of health and safety legislation/regulations including knowledge in 'The Construction (Design and Management) Regulations' (CDM 2015) that affect designers and managers in charge the application of safe system of work in the construction process.

E2

Fluid Mechanics:

The module provides an introduction and understanding of the physical principles and fundamental laws of fluid mechanics. It helps students to apply these principles and laws to the solution of simple problems of flow measurement, elementary flow in pipes and open channel flow. In addition, students are taught the basic understanding of hydraulic machines.

Structural Mechanics:

This module leads to an understanding of the fundamental principles governing the analysis of structures; by analysing the forces and stresses that are induced in the elements of structures in their state of equilibrium. The module starts with the analysis of statically determinate structures and concludes with simple techniques that can be used to analyse statically indeterminate structures. The aim is to

<p>provide students with a fundamental knowledge and understanding of structural mechanics which is based on principles of the elastic analysis. This in turn provides foundation for the design of structural elements in concrete, steel, masonry and timber.</p> <p><i>Design in Structural Elements:</i> This module consolidates and extends the understanding of the concepts of structural mechanics to the design of structural elements in reinforced concrete. This is achieved by developing an understanding of the relevant Euro codes and their application in design. This course aims to provide introduction to Eurocode 0 (Basis), Eurocode 1(actions) and Eurocode 2(concrete). The emphasis is on buildings and the provisions of the Part 1.1: General rules and rules for buildings of EN 1992.</p> <p><i>Commercial Management:</i> This module is designed to enable students to study and critically analyse the commercial factors that apply to project delivery and the maintenance of buildings. The module facilitates in-depth analyses routes of best practice from the early stages of procurement, quality management, risk analysis, value management and whole life cycle methods that incorporate building service engineering to achieve the best value for money from construction projects. The module thus provides students with in-depth analysis of the use of project related commercial risk registers and their implementation. In addition, it critically evaluates financial control, through measurement of value of work and forecasting, within projects and programmes of work.</p> <p><i>Construction Laboratory:</i> This module is designed to enable students to critically investigate and examine various materials and structural properties, to comprehend the construction and use of the built environment. This will be completed in a series of experiments, which the students undertake. The results and observations from these experiments will be used to produce a series of reports related to material properties. Enable students to critically investigate the properties of various materials and comprehend their usage in buildings while examining factors affecting human comfort and their relation to the build design. Investigate the properties and structural behaviour of various construction materials. Assess factors affecting human comfort levels in buildings. Use scientific experimental methodology to draw valid conclusions from observed behaviour of building elements.</p> <p><i>Construction Project Management:</i> This module aims to present the concepts and tools which can be used to critically analyse the running of construction and civil engineering projects, review procurement methods and associated contracts that</p>	<p>E1</p> <p>B3</p> <p>B2</p>
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<p>are used, identify and evaluate the project planning tools utilized, examine value engineering and risk management techniques and other associated management tools. It further considers the role of Project Managers in terms of their technical competence and business acumen, the required leadership skills, motivational/soft skills and risk management expertise. The module also enables students to synthesise project information and management of the integration and flow of design information to inform the preparation of design and construction programmes/schedules and CPM networks.</p>	B3
<p>I demonstrate managerial and leadership skills during various key activities at [REDACTED]. As part of my role, I organize and supervise students to embark on team work and produce reports through planning, delivering and assessment of the modules. Moreover, I employ effective team leadership as responsible for monitoring and evaluating students' performance and internal procedures, to identify opportunities for development and training. In this I regularly participate in Course Committee meetings where formal module evaluation is considered. I utilised the shared information at these meetings to improve the content of my modules.</p>	C3
<p>In addition, I supervise final year undergraduate students' dissertation across a spectrum of civil engineering research and serve as a marker on MSc Civil Engineering research method module. I also assist PhD students in their research work by offering training in EDSL TAS modelling and simulation software.</p>	D3
<p>I demonstrate effective communication and interpersonal skills to ensure appropriate liaison with department members. Work harmoniously with my supervisors and people from other disciplines. I also use a variety of communication methods including e-mails and telephone calls to communicate effectively.</p>	D3
<p>I employ pastoral care skills to empathetically listen to and deal with sensitive issues concerning students and refer them as appropriate to the university specialist services when further assistance is needed. I also contribute to students' retention and progression in the university through annual module evaluation in relationship to the University's learning, teaching and assessment strategy, and to the Graduate Attributes Framework. I also contribute to School of Computing and Engineering JBM full accreditation and support the university open day events. In addition, I always seek to provide sufficient understanding of equal opportunities issues as outlined in the university code of conduct, in the areas of academic content, teaching delivery and assisting students in the writing and evaluating their Continuing Professional Development (CPD).</p>	E5 D3 E5 E4

<p>My aim in teaching is to help my students to develop qualities that are so highly sought after by employers; qualities that will give them the edge in their future career. My approach to teaching thus reflects more of student-centred approach of an inquiry-based approach to learning. In addition, I have proven ability to deliver high quality research informed teaching to students with diverse learning needs.</p> <p>I blend these with the direct approach to learning; because of the university curriculum with its end goal of testing and assessment. Thus, I combine traditional lectures with acting as a facilitator for group discussions and group solving problems.</p> <p>The inquiry based approach to learning helps me to really connect with my students and offer them all the support they need to play an active and participatory role in their own learning process; become independent and self-motivated learners. I'm prepared to challenge and be challenged by my student. I devote hours and hours a day to prepare for each class. I try to think of every possible detail so that I can give my students a unique learning experience in each class. During the lectures, I always introduce the subject by showing its practical essence.</p> <p>After providing the theoretical background to the subject, I lead the students in problem solving, directing their attention to problem solving techniques. Then, in order to check students understanding I will give them problems in class giving them ample room for reflection on the steps taken to carry out the activity at the individual or group levels. I strongly believe that giving and receiving feedback to and from each student is an essential component of a successful teaching experience. I always give feedback on students' assignments through the blackboard (VLE). In this I always encourage critical thinking and application of knowledge to Civil and Building Service Engineering Practice. I do my best to help them not only with my classes but also with their education and professional development in general encouraging them to be student members of engineering institution; reading and participating in the activities of the institutions.</p>	<p>D2</p> <p>C3</p> <p>D2</p> <p>E4</p> <p>E1</p>
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Career Episode ██████████ Site Person in Charge/Critical Safety Officer (2006 - 2014)	CIBSE Competence Criteria (MCIBSE)
<p>My duties as a Critical Safety Officer and Site Person in Charge at ██████████ (Contractors) Ltd. between 2010 and 2014 included the overseeing of the safety aspect of ██████████ Civil Engineering works on ██████████ Bridge Construction Project in relation to ██████████, assisting in Temporal Protection Shield inspection and</p>	

<p>surveying at ██████████ to verify its structural integrity during demolishing, ground works and bridge construction. Also, included in the safety and health aspects of my role were the setting up of safe system of work and ensuring that safety arrangements are applied, including the adherence to method statements and timely provision and judicious utilization of tools and material. I daily offered health and safety briefing on the dangers associated with the areas of work, the severity of the risk and the potential consequences. I always secured permit to work within specific areas in order avoid the risk of electrocution.</p>	E2
<p>My role as a Safety Officer and Site Person in Charge at ██████████ Contract Services between 2006 and 2010 included the overseeing of safety critical aspect of workers on rail track/facility and tunnels. In this I held safety briefings at the beginning of each shift. I protected my team of workers safely from train movement and train tracks high voltage. This was achieved through the setting up of safe system of work, effective hazard perception, securing appropriate work permit, adherence to method statements and meeting deadlines.</p>	D1, D3, E2

Career Episode Staff Engineer/Manager (1994 - 2005)	CIBSE Competence Criteria (MCIBSE)
<p><i>Specialist - Staff Engineer (1994-2001)</i> In ██████████ Company Ltd ██████████, I worked as a Specialist - Staff Engineer/Manager. My role entailed liaising between the production department and the engineering department in managing major and capital projects. I was part of the project management team responsible for the installation of a de-segregation chute and improve the airslide porous brick material in the alumina dome of 55,000 metric tonnes capacity. This project outcome was led to the prevention of segregated alumina to the periphery of the dome storage facility resulting in energy savings of the use of the blower to move alumina (material) from the dome's side walls to the feeders at the centre. I was also involved in the re-roofing of the dome and silos (other storage facilities) of combined total capacity of 103,180 metric tonnes. This project led to the replacement of 10% of the corrugated aluminium roofing sheets with translucent sheets. This maximized the use of daylighting in the storage facilities and reduced the energy consumption due to lighting when working in these storage facilities. As a specialist – staff engineer, I was also involved in the construction of warefare facilities for unionised employees, the retrofitting of various dust collectors, belt conveyors structures, replacement of compressors and installation of vent fans in vacuum unloaders and the re-surfacing of the dock floor.</p>	<p>A2</p> <p>A1, B3, E3</p>

<p>In these projects, I developed competencies in setting up and managing projects through the application of project management principles and processes. Whilst employing project strategies in maintaining an overview of entire projects while continuing to manage and prioritise a varied workload to reflect project and delivery deadlines I applied project management principles in working in project teams.</p>	C1
<p>I have developed my ability to be innovative in the maintenance of department office buildings and storage facilities. I have been creative in identifying areas for continuous improvement through quality management. In addition, I have practical experience in preparing maintenance project management plans and to identify and control risks and issues throughout a project. I also have good understanding of budget control and management of deployed resources, and further developed my ability to move within roles to provide technical and commercial management. As part of my ability in managing capital and major maintenance projects I possess excellent presentation and interpersonal skills, with good ability to drive meetings as required and ability to communicate effectively with stakeholders.</p>	C2 A2
<p>When I worked as a Staff Engineer at ██████████ Company Limited, I coordinated the writing and publishing of the Department Business Plan, prepared yearly budgets for all sections of the Department and co-ordinated department cost reduction plans. I also liaised with Engineering Department in the preparation of Department Annual Engineering projects plan and co-ordinated for adherence and quality. I developed the excellent capabilities of preparing and applying contractual arrangements with external stakeholders, where I constantly took cognizance of cost reduction strategy meetings to ensure optimum and continuous operation. In this, I prepared meetings' agenda and minutes, electronically circulated them, and followed up on the action plans implementation. This assisted me to move within various roles to provide technical and commercial management. My role as a Staff Engineer helped me to acquire good understanding of budget control and management of deployed resources coupled with excellent presentation and interpersonal skills, with good ability to drive meetings as required and to communicate effectively with stakeholders.</p>	B1 C2 D1
<p>As part of my role as a specialist- staff engineer, I coordinated and managed Plant Safety Process in the department through the writing of department yearly Safety Plan, Training and Auditing plant safety policies. I trained department members on quality assurance procedures to meet key performance indicators (KPIs) in the Plant/Department annual plan and ISO standards. I led the department to achieve the department Zero Injury Goal and managed the</p>	C4

<p>department safety processes to attain a profile rating of 4.9 (95%) in the Plant/Corporate Safety and Health Leadership Process Measurement Audit. I was formally recognized for the contribution to working in a zero-injury environment in the organisation in 2003. I also coordinated the writing of department quality assurance procedures and monitored quality processes to meet ISO 9002 standards. As a specialist-staff engineer, I also served as ISO internal auditor and Plant safety internal auditor during Plant auditing periods. As part of my achievement in the department ISO processes, I coordinated the ISO 9002 process in the department whereby the department continuously maintained its certification during Plant surveillance audits by external auditors.</p>	<p>C2, C3 C4</p>
<p>Manager (2001 – 2005) As a manager in ██████, I operated the material handling facilities (consisting of conveying systems of belt conveyors, dust collectors, blowers and loadouts) for receiving, storing and reclaiming of all Plant raw materials (alumina, delayed coke, pitch etc.) and subsequent timely distribution to all production areas. As part of my role, I monitored and maintained the Plant raw material storage facilities (consisting of dome and silos of total capacity of 103,180mt) for daily dependable raw material supply to all Production areas and attaining optimum inventory levels. As part of my overseeing material handling facilities for timely and dependable supply of raw materials, I also performed equipment condition surveys for maintenance, upgrade and ensured reliability. In addition, I identified, organised and used resources effectively to complete tasks, with consideration for cost, quality, safety and environmental impact.</p>	<p>C4</p>
<p>Moreover, I also provided effective team leadership through use of role description, task setting, monitory and review, performance evaluation and potential assessment of subordinates and awarded differential. This assisted me in identifying opportunities for development and training on safety, maintenance, operational procedures and quality standards. I also cross-trained subordinates in various roles in the section and exhibited excellent communication skills to ensure appropriate liaison with internal and external colleagues to promote smooth succession planning. I developed database for the production areas of the department to help in the analysis of production performance. I acted for the department director (Executive Position) on two occasions whilst he was on vacation.</p>	<p>C3</p>