BUILDING INFORMATION MODELLING (BIM)

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Researchers from Universiti Teknologi Malaysia (UTM) collaborated with GreenRE Sdn. Bhd. on a research project titled "Computational Building Information Modelling (BIM)-based Automated Green Building Evaluation System." Funded by the Ministry of Higher Education, Malaysia (MOHE) with a grant amount of RM180,000, the research spanned from 2 August 2021 to 1 February 2024. The UTM research team is a multidisciplinary group, including researchers from the Faculty of Built Environment and Surveying, the Faculty of Computing, and the Faculty of Civil Engineering. Leading this collaborative project is Assoc. Prof. Ar. Dr. Lim Yaik Wah from the Faculty of Built Environment and Surveying, while Ir. Ashwin Thurairajah leads the GreenRE team.

The primary goal of the research is to develop a prototype for a computational BIM-based automated green building evaluation system called 'BIMGes.' Advancements in BIM technology enable the digital construction of complicated building models, featuring precise geometry and accurate information. This capability supports various project phases, including design and construction. Therefore, this research leverages BIM intelligence, integrating the computational algorithm, Non-dominated Sorting Genetic Algorithm II (NSGA-II), to streamline data management, assessment, and documentation processes for green building evaluation, referencing the GreenRE Non-residential Building (NRB) tool.

The second Prototype Testing Workshop was conducted at CIDB myBIM Centre in Kuala Lumpur on 1 Jun 2023

The project involved a series of expert reviews and prototype testing workshops with participants from GreenRE, Jabatan Kerja Raya (JKR), Construction Industry Development Board (CIDB), green building consultants, and academicians. The first prototype testing workshop took place on 29 August 2022, and the second on 1 June 2023. These sessions played a crucial role in refining and enhancing the 'BIMGes' prototype. The system functions as an add-in to Revit, automating the evaluation and optimisation of building energy performance, including aspects such as OTTV and building envelope thermal properties. Furthermore, a web-based database on building materials and products was developed to support the evaluation and optimisation process. A Memorandum of Understanding (MoU) between UTM and GreenRE was signed in March 2022 to strengthen the collaboration between the two parties in research, training, and publication. The collaboration is expected to make a significant contribution to the development of BIM and green buildings for sustainability.

OVERALL THERMAL TRANSFER VALUE (OTTV)

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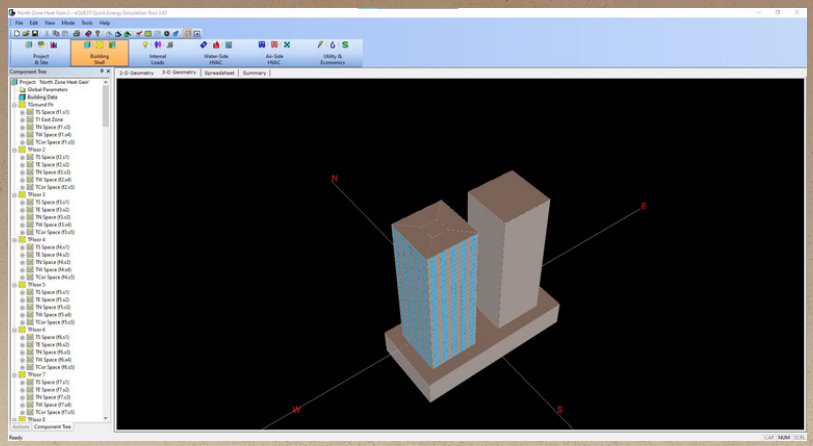
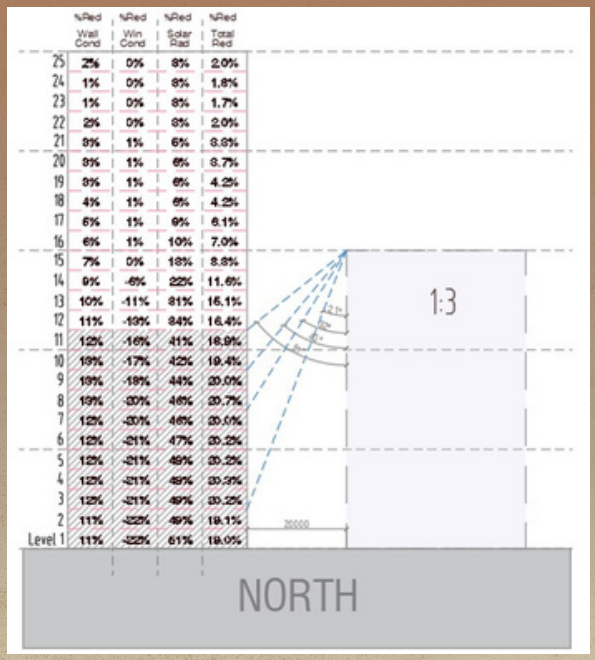
The research team at Universiti Teknologi Malaysia (UTM) has secured funding from GreenRE Sdn. Bhd. for a research project titled "Assessment of Building Envelope Thermal Transmittance under the Effect of Adjacent Shading and Natural Ventilation." The research is scheduled to take place from 15 March 2023 to 14 March 2024, and the project leader is Assoc. Prof. Ar. Dr. Lim Yaik Wah from the Faculty of Built Environment and Surveying, UTM.

The Overall Thermal Transfer Value (OTTV) is a crucial factor outlined in Malaysian Standard (MS) 1525 and is mandated by the Uniform Building By-law (UBBL) Amendment 2012. However, questions have arisen regarding the efficacy of the assumptions underpinning the assessment in contemporary scenarios. The current calculation method, while incorporating shading contributions from conventional shading devices, overlooks shading contributions from adjacent buildings. Additionally, the empirical substantiation of the relative contribution of naturally ventilated spaces to the OTTV or Residential Envelope Transmittance Value (RETV) performance is lacking, raising concerns about its exclusion from the by-law. Thus, the objective of this research is to present empirical studies and methods aimed at enhancing the assessment of OTTV or RETV in Malaysia.

The initial phase involved conducting an inventory of existing multi-block developments and buildings with both air-conditioned and naturally ventilated spaces. This information was then utilized to develop base models for experimentation. Subsequently, dynamic computer simulations were conducted using eQUEST software to assess the annual heat gain through building external envelopes, considering various building ratios. The simulation results were meticulously compared with the OTTV or RETV calculations for validation, leading to the establishment of correlation factors. The anticipated outcome of this research is to contribute valuable insights that will improve the standard OTTV or RETV calculation, specifically addressing the impact of adjacent shading in multi-block developments and naturally ventilated spaces within buildings.





Simulation of the heat gain through building envelope with the effect of adjacent shading