UNIVERSITI TEKNOLOGI MARA

EVALUATION OF THE INSOLATION MODEL FROM LIDAR-DERIVED TOPOGRAPHICAL SURFACE MODELS

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Thesis submitted in fulfilment of the requirements for the degree of **Master of Science**

Faculty of Architecture, Planning and Surveying

February 2017

ABSTRACT

The Sun illuminates the Earth and hence, provides the solar energy. Mankind and other forms of life use and benefits from this radiated energy in many ways towards sustainable planning and development of our nation. Earth's surface and objects differ in their types and materials. Thus, the incoming solar radiation or also known as insolation is expected to somehow change in regard to the initial solar energy due to the differing surface types and materials. Modelling the pattern of insolation of the Sun's rays as it interacts with the Earth's atmosphere, surface, and its objects is thus vital for many applications including in the context of green building technology concept. In this study, to reconstruct the surface models that represent the surface, high resolution airborne LiDAR datasets were used to produce the DTM and DSMs. The reliability of these models were verified accordingly. The derived products were further structured as TIN and topographic analysis as well as modelling was performed within ArcGIS environment. Models of irradiance were derived and distinguished based on the direct, diffuse and global irradiance. Then, the relationship of the response pattern with the topographical elements was determined and the results were discussed further in this study.

ACKNOWLEDGEMENT

Alhamdulillah praises all to Allah the Almighty for giving me an opportunity to go through this fantastic journey of research.

This thesis could not have succeeded without the love and support of my dearest family and friends. My deepest appreciation goes to my supervisor Assoc. Prof Sr.Dr Juazer Rizal Abdul Hamid for his constant support, encouragement and guidance in all these challenging years. His knowledge and teachings were essential to the success of this research. I would also like to thanks my co supervisor Assoc. Prof Sr Dr. Azman Mohd Suldi. Then, my gratitude goes to LiDAR team for giving an opportunity to venture in LiDAR Short Course as facilitators and gave great experiences in LiDAR applications.

Secondly, a lot of gratitude goes to Mr. Madzri and Mr. Suruzee from Malaysian Public Works Department (JKR) for their crucial contribution which is LiDAR dataset used in this study. Their willingness to share information and their cooperation made this research achievable.

Thirdly, this journey could not be more interesting without my beloved colleagues who stay strong to support me in any way they could. Thank you to Noraain Mohamed Saraf, Nurhidayah Hassan, Siti Hasniza Muhammad Arshad and Ahmad Norhisyam Idris for all the thought and kindness. May peace and ease be with you all in your future undertaking.

I would also like to thank my supportive parents Md Sa'ad Kasim and Zaleha Sudin and parents in law Sadari Kadeno and Sumarni Sihap for inspiration they gave in completion of this thesis. I believe my strength do come from their prayers. Last but not least thanks to love of my life Nor Azmi bin Sadari and beloved daughter Adwa Hayani for the emotional support and tolerate with my wobbly emotion during this study.

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