Design and development of an optical sensor system to measure visibility of air

S. Nurulain[1*], RM Ramli,[1] H. **Manap**[1*]

[1]Faculty of Engineering Technology, Universiti Malaysia Pahang, 26300 Gambang, Pahang, Malaysia

*Email: ainnadhirah93@gmail.com , hadi@ump.edu.my

Phone: +6095492692

ABSTRACT

Visibility is a measure of the distance at which an object or light can be clearly recognized. Visibility for a medium depends on the visible light transmission (VLT). This paper describes the development of VLT measurement system to measure the visibility of air. In recent years, there are many types of devices that can measure VLT. The air VLT measurement system for a wide area and open space are already exist such as using a Laser Absorption Spectrometry (LAS) technique. However, it has a gigantic set up and it is very costly. There is also a device called Lux meter and it is used to measure intensity or brightness of an area. However, Lux meter can only be used in a small area or point measurement. It is not suitable to be used in an open wide area such to measure visibility at the airport. The other VLT measurement system such as a photography technique fails to function well at night and cannot perform real time measurement. This is because of the low light condition and it faces a several errors especially in rainy, foggy and smoky conditions. Therefore, this research will focus on how to measure the visibility by using optical method. The experimental setup for VLT measurement in this research consists of a laser pointer as a light source and spectrometer as a detector. The amount of light that passes through a few series of known-VLT thin films is measured and the values are set as a measurement base. Since smoke is a major factor that can affect the visibility, an experiment to measure VLT for a smoke in a chamber is carried out. This new proposed technique is believed to cater the problem mentioned above as the experimental setup is simple and small in size.

KEYWORDS

Visibility; Optical; Visible Light Transmission.

ACKNOWLEDGEMENTS

The author would like to thank the staff of Electrical Department, Faculty of Engineering Technology who contribute their time, energy and idea to complete this project. The author's sincere appreciation is also extended to Dr. Roshahliza and Dr. Hadi Manap for their help and guidance. Also the authors would like to acknowledge the support of the PNI, University of Malaysia, Pahang (UMP) in providing a research fund RDU180342 for this project.