

**The use of an improved technique to reduce the variability of output voltage in real-time Fibre Bragg Grating based monitoring system**

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Fibre Bragg Grating (FBG) sensors have been widely utilized in the structural health monitoring (SHM) of structures. However, one of the main challenges of FBGs is the existence of inconsistency in output voltage during wavelength intensity demodulation utilizing photodetector (PD) to convert the light signal into digital voltage readings. Thus, the designation of this experimental work is to develop a robust FBG real-time monitoring system with the benefit of MATLAB graphical user interface (GUI) and voltage normalization algorithm to scale down the voltage inconsistency. Low-cost edge filter interrogation system has been practiced in the experimentation and splitter optical component is make use to reduce the intensity of the high power light source that leads to the formation of noise due to unwanted reflected wavelengths. The results revealed that with the advancement of the proposed monitoring system, the sensitivity of the FBG has been increased from 2.4 mV/N to 3.8 mV/N across the range of 50 N. The redundancy in output voltage variation data points has been reduced from 26 data/minute to 17 data/minute. The accuracy of the FBG in detecting the load induced falls in the acceptable range of total average error which is 1.38 %.