Strain analysis using Fiber Bragg Grating sensors

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Abstract

A Fiber Bragg Grating (FBG) based Weigh-in-Motion (WIM) sensing system is designed by using single FBG, attached at the central span portion of the girder between two piers of a bridge model. Experiments were conducted to study the response of designed WIM system by varying loads of the vehicle. The temporal response of the FBG in terms of shift in wavelength is recorded using interrogator of resolution 1pm. The wavelength shift of the FBG illustrated two peaks and one dip which represent the position of the vehicle at that point of the FBG over the bridge. From the response of the FBG, the strain applied on the bridge has been calculated. The experimental strain results were verified using MATLAB software by taking a simple beam-concentrated load at any point on the beam under various static loads.