

Performance assessment of FBGs sensors in strain monitoring in concrete specimens

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In structural health monitoring (SHM), optical fiber sensors are applied to structures to locate and quantify the severity of the damage, such as cracks in concrete. Among optical fiber sensors, fiber Bragg gratings (FBGs) sensors are generated by a periodic modulation in the refractive index of the optical fiber core and present high linearity to the strain parameter. In this work, we compare FBG and electronic strain gauge (ESG) sensors in strain measurement applied to a concrete specimen in a compression test. The results show that FBG sensors can be applied to several concrete structural elements, and compared with ESG sensors, the optical sensor can provide accurate measurements and information with more detail when submitted to environment with high electrical noise.

Utilizing a fiber Bragg grating (FBG)-based accelerometer for mobility assessment and fall risk in the elderly

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This study investigated the use of an optical accelerometer to analyze mobility and fall risk in the elderly, using the Timed Up and Go test (TUG) as the assessment protocol. The aim was to automate the measurement of gait cadence (steps per minute) of participants during the TUG test. A fiber Bragg grating (FBG)-based accelerometer was attached to the lower back (L4, L5) of participants to collect motion data. The results showed that compared to the TUG test, the cadence in the cognitive TUG test increased by 5.192%, while in the motor TUG test, it decreased by 17.456%. It is concluded that by performing the TUG test with different activities, it is possible to determine in which activity the elderly person has a higher risk of falls, providing valuable information for the planning of preventive interventions.