

光纤Bragg光栅传感器高速冲击试验研究

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摘要:

光纤Bragg光栅是一种性能优良的敏感元件, 光纤Bragg光栅传感器在很多领域得到了应用。通过霍普金森压杆上的冲击试验研究了光纤光栅的动态响应能力, 试验表明Bragg光栅能够正确响应不同频率的冲击信号, 解调仪能够正确并快速解调出高速动态激励信号, 同时Bragg光栅在受拉和受压时以及动态和静态灵敏度基本一致。光纤光栅传感器能够应用于武器侵彻爆炸等强冲击、恶劣环境下动态应力应变的测试。

关键词: 光纤Bragg光栅; 传感器; 解调; 霍普金森压杆

The Shock Test of Fiber Bragg Grating Sensors in SHPB

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Abstract:

The fiber Bragg grating (FBG) is an excellent sensing element and the FBG sensors have been widely applied in many fields. The dynamic response of FBG is researched by shock test in split Hopkinson pressure bar(SHPB) and the results indicate that FBG can measure the shock signal exactly and the demodulator is able to interrogate high frequency excitation signal fast and accurately. The experiments also testify that the strain sensitivity of FBG is identical in stretching and compressing and has no difference in static and dynamic test. FBG sensors can be used in the abominable environment of weapon penetrating and explosion for strain measurement.

Keywords: iber Bragg grating (FBG); sensor; demodulation; split Hopkinson pressure bar(SHPB)

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