

Annex II – Short public report. STSM

Title of the STSM: Investigating the utilization of optical fiber sensors for measurements using a split Hopkinson bar setup

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Relevant Working Groups: WG5, WG6

Objectives / Description / Main outcomes (150-250 words)

The deployment of The fiber Bragg grating (FBG) sensors on the Split Hopkinson Bar setup was realized. Measurements were carried out in the compression setup on the input and output bar. The main objectives realized were:

- 1) Compare the acquired signals from the FBG sensors with strain gauges.
The sensors show similar trends, but the FBG sensors have higher sensitivity but this comes at the cost of limited sensitivity range.
- 2) Investigate deployment of FBG in different configurations namely remote, direct and self-referencing configuration were utilized.
- 3) Study the FBGs of different lengths (1mm and 10 mm) on the sensitivity, and sensing range. 1mm has lower sensitivity, higher range as compared to 10 mm sensor
- 4) Develop an analytical model of the FBG to simulate the change in the FBG spectrum when subjected to the impact loading
Model captures phenomena very well and can be utilized for further studies.

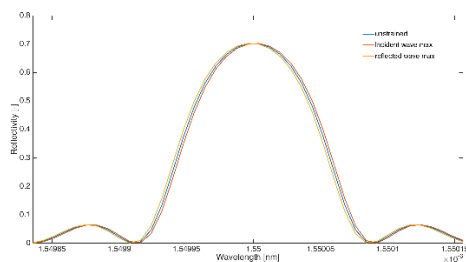


Figure 1: simulated FBG spectrum



Figure 2: Sample in SHB setup

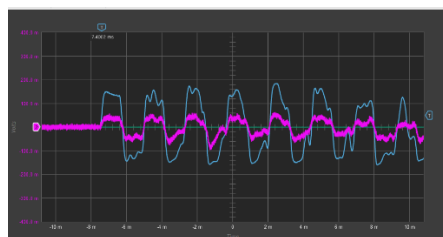


Figure 3: Loading response of 1mm (magenta) and 10mm (blue) FBG

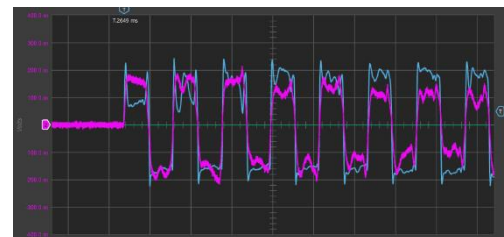


Figure 4: overranged response of 10 mm FBG while 1mm is not saturated