

STUDY OF FBG (FIBER BRAGG GRATING) FOR SENSOR APPLICATIONS

HIMANSHU MONGA AND RAJAN SHARMA

Abstract

The field of communication has been revolutionized by the advent of optical fibers. Optical fibers now connect most of the world, carrying a vast amount of information through a very limited physical medium. To the materials Engineer, optical fiber technology has simulated interest in a new type of micro-sensor application, where the size, weight and the ability to integrate the sensor into a material structure plays a major role. Areas of interests currently include material characterization, cure monitoring and structural health monitoring. Fiber Bragg Grating (FBG) is such a sensor technology, creating an optical strain gauge within the core of an optical fiber through the use of a wavelength specific filter. As the FBG experiences included strain along its axis, its light signal indicates the amount of strain with great accuracy and sensitivity. In FBG applications, where loading may occur in all directions, complex changes take place in the FBG signal. As these changes impact the usefulness of the FBG as a strain sensor, we endeavors to study and demonstrate the effect of transverse load on the FBG structure A review of basics and followed by a detailed discussion of the FBGs manufacturing and operation. The crux is presented with results of experiments FBG based Liquid Level Sensor & a lab study for health monitoring of steel rope used in hoisting system in mines.(For mining operations ,it is important to apply temperature correction or use of a temperature insensitive FBG)