Symposium Speaker	
Full Name	Il-Bum Kwon
Affiliation	Korea Research Institute of Standards Science
Presentation Title	Assignment of measurement position of fiber optic BOCDA sensor by phase code time difference between pump and probe light

Biography

Il-Bum Kwon received the Ph. D degree in Aerospace Engineering from Korea Advanced Institute of Science and Technology (KAIST) in 1997. His research topic in KAIST was Strain measurement and failure detection of composite beams using fiber optic sensors. He has been employed by Research Institute of Industrial Science and Technology (RIST/POSCO) since February 1989 and has conducted research in a rolling research laboratory since August 1992. He moved to Center for Safety Measurement in Korea Research Institute of Standards and Science (KRISS), Korea where he worked on developing Structural Health Monitoring using optical fiber sensors. In recent works, a tip-deflection measurement technique of wind-turbine blade was shown by using FBG sensors in 2010. Subsidence monitoring of bridge pier using FBG sensor network was demonstrated by 4 span model bridge in 2011. The impact damages of composite materials were firstly detected by BOCDA sensor with aluminum coating optical fiber in 2012. He has about 150 presentations including 40 international SCI papers and about 20 related patents. His research area includes smart structures, and structural health monitoring using fiber optic sensors. Dr. Kwon is a member of SPIE and Optical Society of America.

200 words abstract

Distributed fiber optic sensors measure parameters by dividing the entire length of the sensing fiber into segments. However, until now, when the distributed fiber optic sensor was operated, it operated mainly by measuring all the segments that divided the length of the sensing fiber. This operation has the disadvantage of lengthening the measurement time and also measuring the segments which are not necessary to measure. In order to solve these drawbacks, we propose a method of modulating the phase of pump and probe light when using optical fiber BOCDA sensor. In order to clearly select the measurement position in the sensing optical fiber with the BOCDA sensor, it is just necessary to set the time difference of phase modulation between pump and probe with PRBS (Pseudo Random Bit Sequence) code. This sensor system was constructed using two phase modulators and a PPG(pulse pattern generator) having 2 channel outputs with 5 GHz. This PPG made two codes having the time difference to modulate the pump and probe lights. This time difference could accurately assign the measurement position in the sensing fiber. In the future, we will need to study in more detail what limitations are in assigning measurement positions.