Christophe Caucheteur, Occup Med Health Aff 2014, 2:3
http://dx.doi.org/10.4172/2329-6879.S1.020

OMICS Group Conferences
Accelerating Scientific Discovery

3rd International Conference and Exhibition on
Occupational Health & Safety
June 24-25, 2014 Valencia Conference Centre, Valencia, Spain

Explosive and toxic gas concentration monitoring with optical fiber grating sensors

Christophe Caucheteur
University of Mons, Belgium

An optical fiber is a 125 µm cylindrical waveguide of light made of two concentric layers of silica. It is an excellent support for miniaturized sensors, allowing remote operation in very small volumes. In potentially explosive atmospheres, sensors based on optical fibers offer a set of advantages without equivalent for well-established technologies. They are indeed immune to electromagnetic interferences and present a good resistance to high temperatures and to chemical corrosion. Their small dimensions combined with their light weight and flexibility allows embedding them directly in the structures to monitor without affecting their mechanical resistance. Last but not least, depending on the interrogation technique that is set up, optical fibers yield distributed (sensing all along the fiber length) or quasi-distributed (sensing at different points cascaded along the fiber length) measurements that can be remotely addressed. In this presentation, the focus will be made on applications in road tunnels and undercroft car parks monitoring. These closed and wide spaces present issues in terms of air quality control (CO and NO_x), fire detection and combustible gas leak detection. Classically, to insure the safety level, a sufficient number of detectors are installed to cover the entire area, which is generally expensive. Optical fibers bring an elegant solution as they ensure all functions (sensing, addressing and data transfer). After a brief introduction to the technology, this presentation will focus on optical fiber sensor solutions developed for air quality monitoring, in particular NO_2, flaming fire detection and combustible gas leak detection (methane and hydrogen).

Biography

Christophe Caucheteur received the M.S. degree in Electrical Engineering in 2003 from the Faculte Polytechnique de Mons, Belgium. He was awarded the PhD degree in Applied Sciences in 2007 from the same university for his research focusing on the realization of mechanical and chemical sensors based on the use of fiber Bragg gratings. He is co-author of 5 book chapters and more than 140 papers in international journals and conference proceedings. He is also co-author of 5 international patents regarding the development of fiber Bragg gratings sensors. He is recipient of an ERC (European Research Council) Starting Grant.

Christophe.CAUCHETEUR@umons.ac.be