Axle Counter Plus

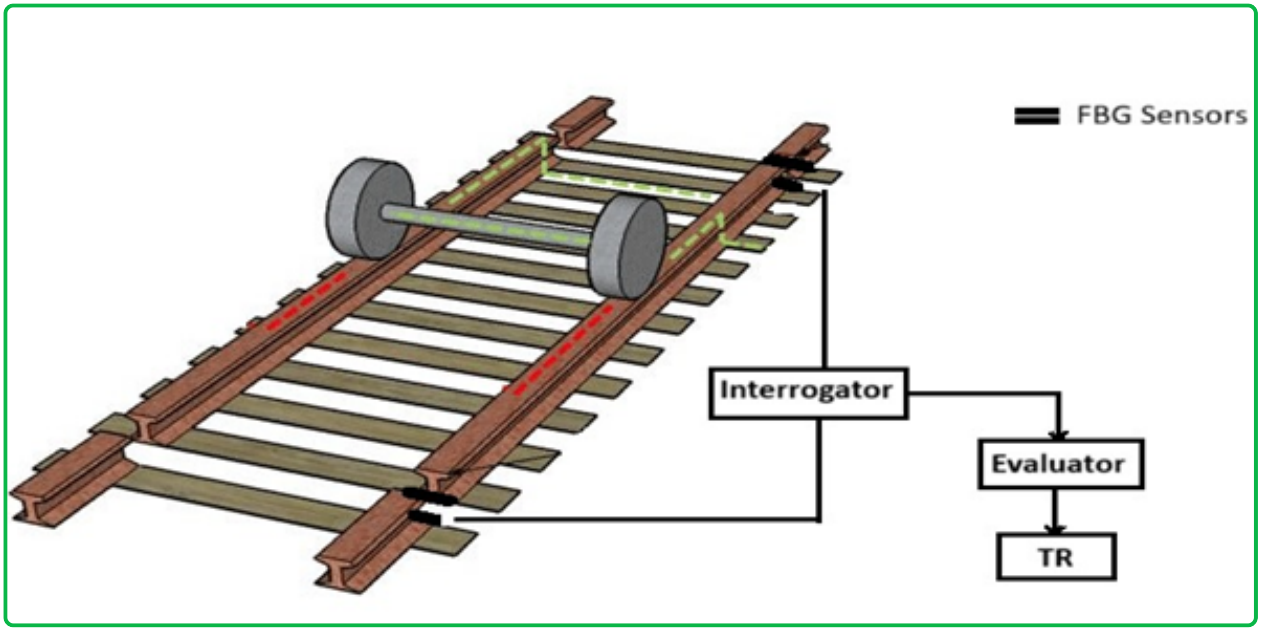
Fiber Bragg Grating - Based Axle Counter Plus (FBG-ACP)

Background: Accurate and reliable train detection plays a crucial role in ensuring both the safety and efficiency of railway operations. For over a century, time-tested methods like Track Circuits and Electromagnetic (EM) Sensor-based Axle Counters have been the backbone of train detection systems, providing a dependable foundation for rail transport. However, with the rapid advancement of technology, modern solutions are now emerging that offer far superior performance, enhanced accuracy, and greater operational flexibility.

Introduction: The FBG-ACP system has been engineered using cutting-edge Fibre Bragg Grating (FBG) Sensors, known for delivering exceptional reliability and accuracy. FBGs are optical sensors that offer high stability and are particularly well-suited for operation in harsh environments, making them ideal for demanding applications in modern railway systems Interrogators can be connected in one of the way as mentioned in the below block diagrams to optimize as per the application.

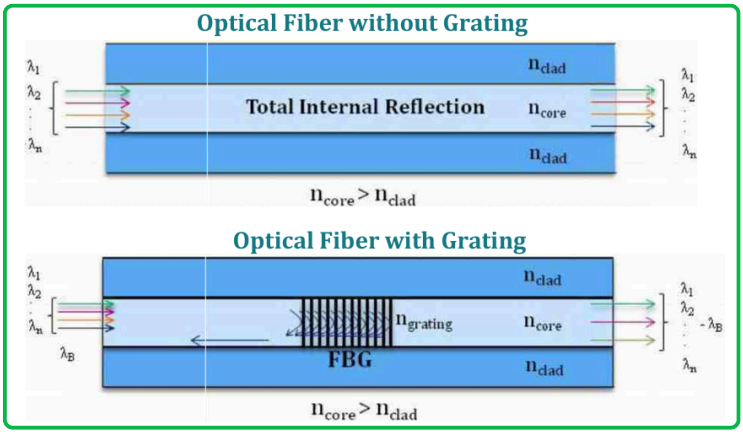
Key features of FBG-ACP

- FBG sensors are immune to electromagnetic interference
- Require no external power supply, making them highly efficient.
- Compact size and ease of deployment
- Highly suitable for modern railway detection systems
- Seamless integration into existing infrastructure.



FBG Concept

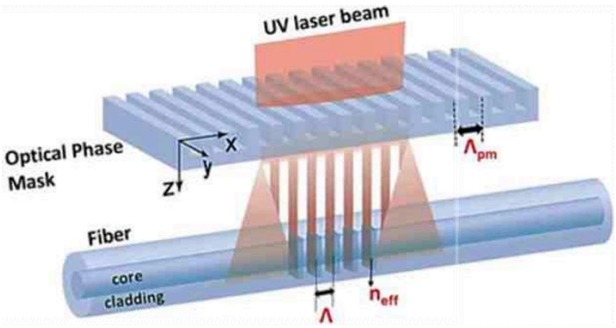
FBG sensors function as optical filters, reflecting a specific wavelength of light while allowing others to pass through. They convert physical or thermal disturbances into a shift in optical wavelength, which is then monitored by a device called an "Interrogator." This combination of FBG sensors and an Interrogator forms a versatile sensing system, capable of delivering precise and reliable measurements in a variety of conditions



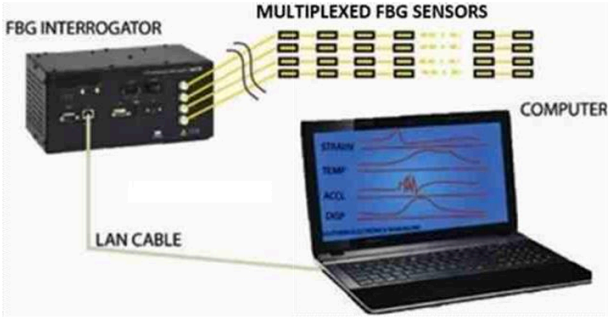
Advantages of FBG Sensing Technology

- Multifunctionality Long term stability
- Miniature size and Multiplexing
- No power supply required
- Overloading and uneven loading detection
- Tolerant of harsh environment Ease of installation
- Immune to electromagnetic interference
- High accuracy, sensitivity, linearity and resolution

Fiber Bragg Grating Fabrication



Interrogation Technique



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