# Fibre Bragg Grating Sensing Technology based Wheel Impact Load Detector (FWILD)

Background:

Flat wheels of the trains are causing damage to the rails and also derailments. It is also very difficult to find the flat wheels when trains are stationary.

Introduction to FWILD:

FWILD is designed and developed to find flat wheels of trains to support predictive maintenance of train wheels and also avoid accidents. FWILD uses Fiber Optic Sensors and Novel Algorithms to find flat wheels. Two FWILD Systems are deployed in INDIA to monitor all Indian Railway Trains coming to Bangalore from New Delhi (Rajdhani route) and also coming to Bangalore from Chennai (Shatabdi route).
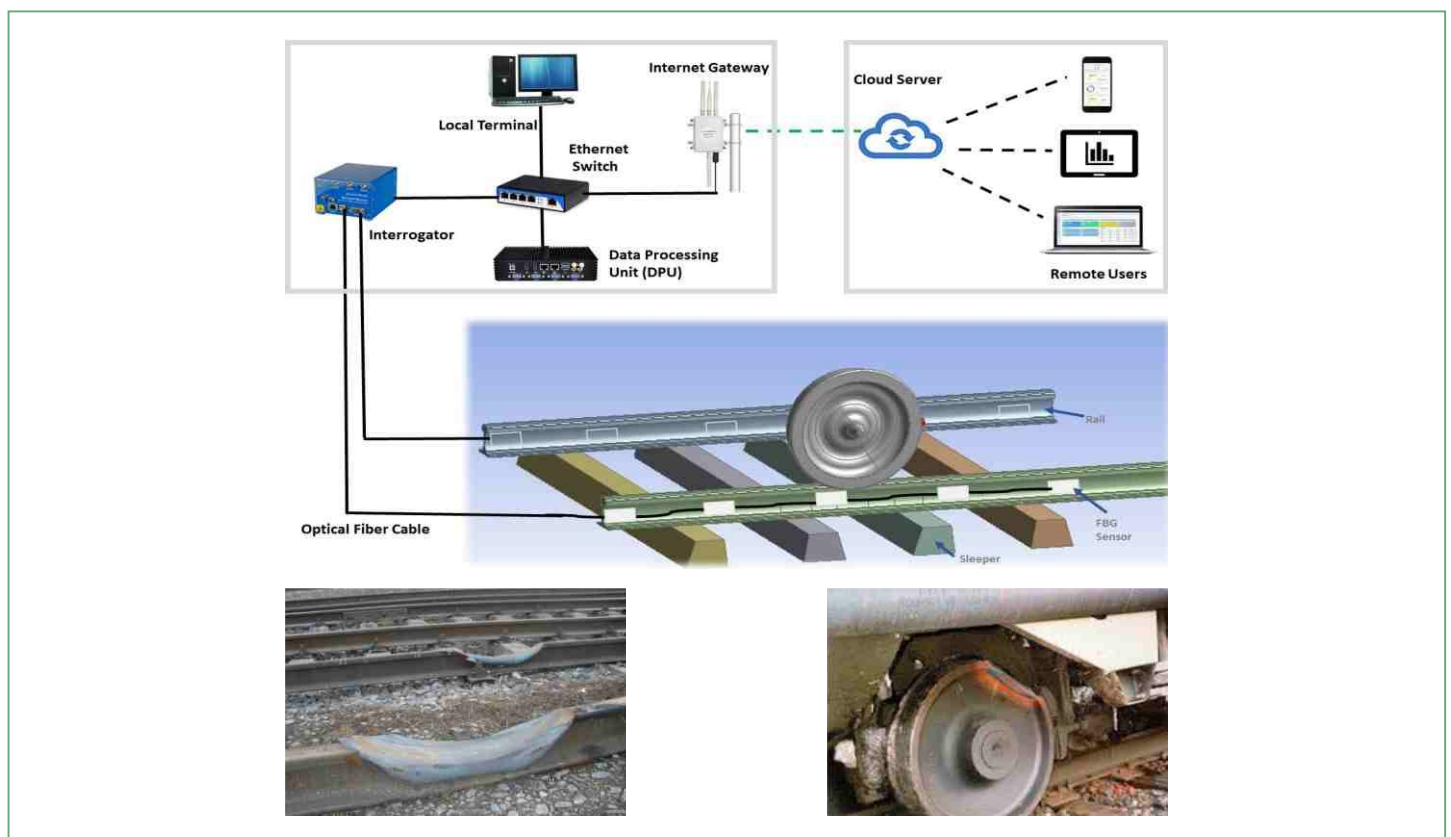

Key features of FWILD: Real Time Information, Easy to install, Sensors are immune to 25KV and lightning Expandable to multiple tracks and Bi-directional traffic.
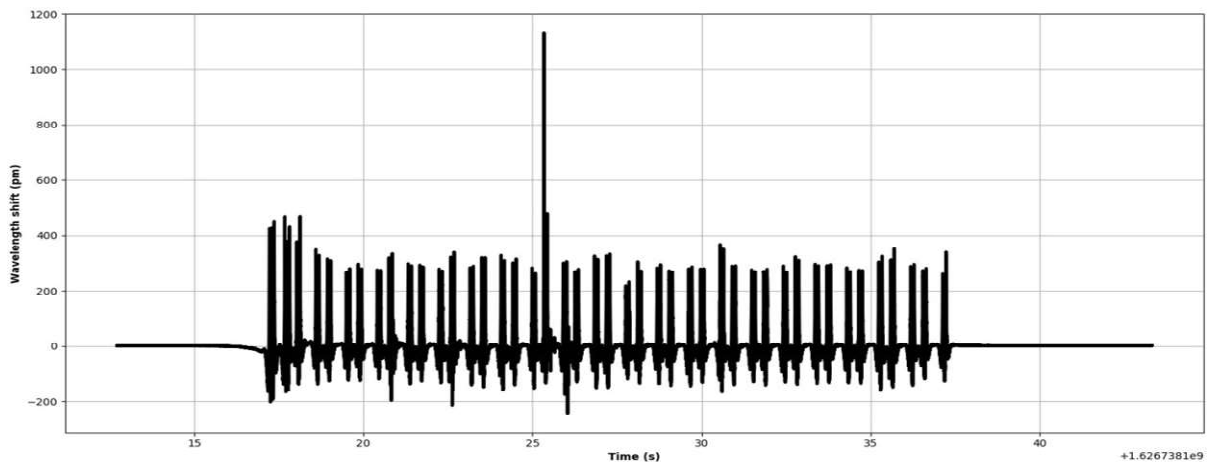
FBG Concept:

The FBG operates like an optical filter i.e. it reflects certain wavelength of light while it transmits others.

Fibre Bragg Gratings convert mechanical strain variation into an optical wavelength shift.

Strain caused on the FBG sensor would make wavelength to get shifted to detect/sense parameters.
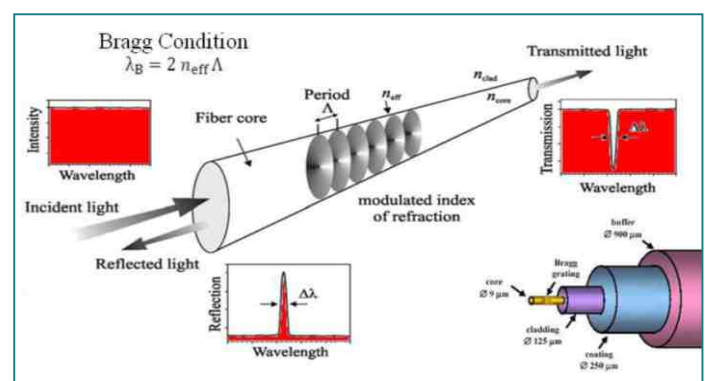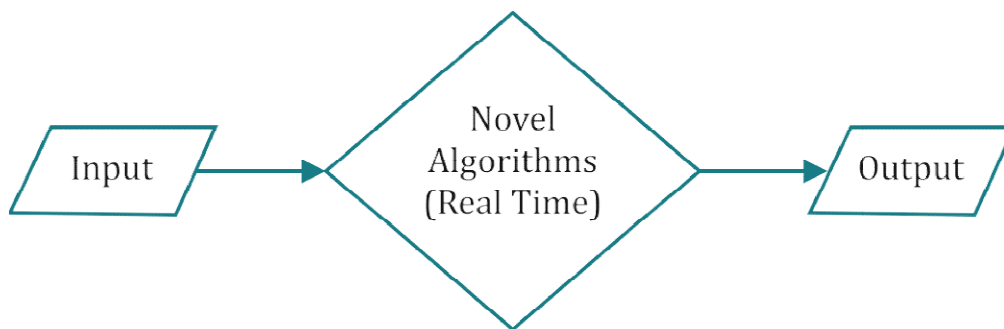
Train with one unhealthy Wheel

Plot of the train with one unhealthy wheel from the data generated by
Fibre bragg grating sensors connected to the RAIL.

Algorithm

Input → Novel Algorithms (Real Time) → Output

Features of Novel Algorithms:
- Feature extraction to detect wheels
- Estimation of train speed and determination of train direction
- Detection of unhealthy wheels for trains running
- Dynamic calibration of sensors
- Full wheel coverage of all sizes of wheels
- Classification of unhealthy wheels
- Diagnosis of sensor health
- Count the axles

About L2MRail: This Company is seed funded by Indian Institute of Science (IISc), India to innovate Next Generation Technologies to make Railways Safe and Efficient.

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