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Design of railway obstacle detection prototype

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ABSTRACT:

Locomotives are at risk to collisions and derailment due to obstacles on the track. Trains do not have the ability to steer around obstacles, they are confined to the track and depend on stopping to avoid hazards. These accidents often result in loss of life and revenue. Due to the great momentum of the locomotives stopping distance required exceeds the operator's sight distance. The Mechatronics and Micro-Manufacturing (MMM) division of CSIR have researched, designed and developed a rail Survey Inspection Device (SID) test prototype platform to serve as an early warning system for locomotives and was to travel 2km ahead of a locomotive in order to inspect the railway for possible obstacles such as human beings, livestock and collisions between the locomotives and was semi-autonomously controlled to maintain the appropriate headway in front of the train. Testing was performed by placing simulated obstacles on a test track facility in Pyramid South and data received from a simulated environment is processed on board and transmitted from SID to the train operator. System engineering principles were implemented to integrate and streamline the platform subsystems such as driving system, sensor control system and body design. The results indicate that the introduction of SID to the railway industry has the potential to significantly reduce accidents, loss of lives and revenue.