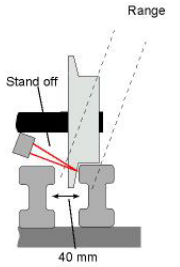
OMC Project Description – Railway line-side structure monitoring



The rail infrastructure requires regular inspection to ensure that it is within acceptable boundaries. For example track camber, position of overhead lines, and gantry support locations may all need to be measured.

Overview

The client in this project required the measurement of a number of line-side structure elements such as the position of the overhead lines and the gantry post locations with respect to the track. The normal technique was for manual measurement using tape. The manual technique was time consuming and inefficient so an improved scheme was sought to perform the same functions. To establish a track datum the distance of the inspection vehicle from the track was required, to compensate for track camber the inclination of the vehicle had to be measured. The location of the line side structures and the overhead lines had to performed by a non-contact method.

Industrial partners

A major rail infrastructure management company

Project duration

Approximately 1 year.

Project value

Approximately £ 15k

Intended beneficiaries

The management company

Current status

The technology was handed over to the client for integration within an inspection company by a third party company.

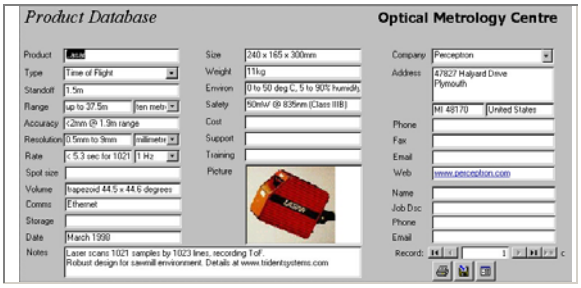
Project Highlights

- Successful selection of appropriate techniques and laboratory testing
- Successful field testing on a test site and during a rail possession

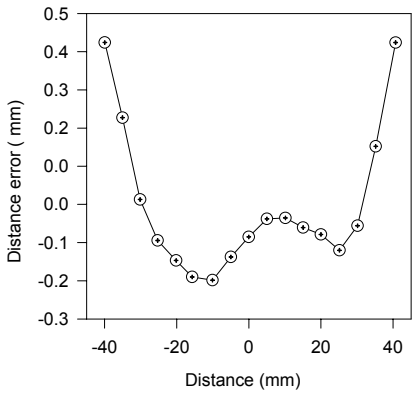
Background

Railway infrastructure is regularly monitored for a variety of reasons. OMC have been involved in railway tunnel profiling and this project was a natural extension to that work. The project aimed to use techniques that would operate at up to 20 kilometers per hour from a moving vehicle. As a consequence, the selection of products required careful consideration. One of the most challenging aspects was to measure the location of upright posts. Given the speed requirements it was not possible to use conventional time of flight sensors so a number of high-speed systems were considered and the best selected and tested. The project progressed to the stage where the client was able to take over the project and pass it on to its regular system integration partner.

Pictorial highlights

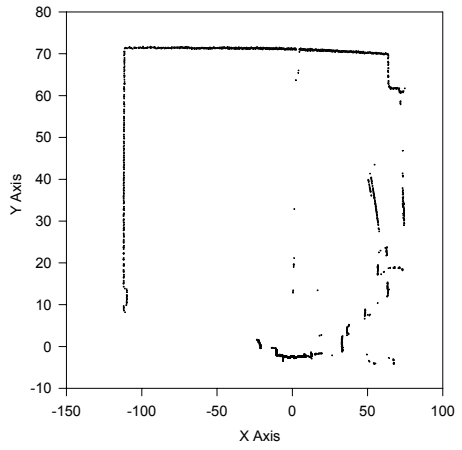


OMC have a product database of more than 160 different measurement products. The requirements of the project were used to select the most appropriate technique and then identify a manufacturer for the equipment.



Laboratory testing of each selected instrument revealed characteristics that were not obvious from the manufacturers literature. In the example in the graph, where the accuracy of an optical triangulation sensor was being tested, the sensor showed some consistent systematic errors. In the case of another instrument a highly serious error was found where spurious measurements were given under some circumstances.

	The tested instruments were taken on site where practical tests were conducted to assess performance in realistic conditions where temperature, sunlight or other factors such as vibration might affect the measurement process.
	Further field trials were conducted using a modified Land Rover vehicle where all of the sensors were integrated together to measure camber, rail offset and distance to line side structures.
	A night possession of a railway line was used to conduct a final test the system before commercial development was handed over to another company.



Scanning profiles of structures was another aspect of the project that was investigated. This graph illustrates the measurement of a room during a test.