

## CASE STUDY: Network Rail (Northolt)

MAY 2007 – OCTOBER 2007



# Embankment monitoring on rail network

## The challenge

Earthwork stability monitoring on a historically unstable site. Soil movement in the embankment causes consequential problems with distortion of the rail geometry; lateral twist; longitudinal unevenness. This can be potentially dangerous if too severe, as well as causing ride discomfort.

The regular passage of trains will also make the problem progressively worse. The site at Northolt has long been used for investigating vegetation management, to see what the impact of trackside trees and undergrowth is to the stability of earthworks.

The aim of such monitoring is to reduce engineering maintenance and inspection costs as well as improving understanding of earthwork behaviour. Remote monitoring has the potential for reducing or replacing manual inspection regimes. Additionally seeking to correlate earth movement with weather conditions (e.g. heavy rainfall) has the potential to aid in managing predictive maintenance.

## The Senceive Solution

The installation of ~ 10 shallow tilt meters and 2 rain gauges on embankment was achieved in less than half a day, demonstrating quick and easy deployment. Moreover data collection via GPRS started the same day, with web based monitoring. Multiple measurements were taken daily, providing a much more detailed picture of the asset's behaviour than would be possible under even a daily manual inspection regime.



## Our Findings

Dynamics of embankment were resolved to a daily basis – diurnal behaviour was observed. The potential for wider deployment of 'light weight' shallow tilt meters for early indication of possible problems & landslips was shown, as was a very clear correlation of movement with rainfall. Potential was also recognised for a quick deployment track movement system, mounted directly on the rail sleepers.

