

# **Railway Geodesy: The Benefit of Using a Multi-discipline Approach for the Assessment of Track Alignments During Construction**

**Vassilis GIKAS, Greece**

**Key words:** track alignment, geodetic surveying, versine measurement, setting out of tracks

## **SUMMARY**

In railway applications, track alignment represents the forming curvature of the running edge of the rails. During construction, alignment measurements are normally obtained with chord measuring systems. When traditional surveying methods are implemented, track alignment is taken at sparse spaced points directly from the versine measurement – i.e., the offset observed at an intermediate point from a straight line chord. In contrast, track recording vehicles either apply the chord measuring technique directly or employ a combination of an inertial/gauge sensing system.

For ballast track sections, deviations in track alignment from the projected track settlement would raise serious concerns for track buckling. This is because any deviation from the nominal geometry reduces the load needed to induce buckling. Today, modern lining systems and automated maintenance procedures are used to restore track surface and alignment. Contrary to the ballast track technique, the connection of the slab track and the underground is rigid. Consequently, adaptations to the nominal geometry after paving over are only possible with additional expenditure. As a result, positional accuracy requirements in slab track projects are very high.

This paper presents the various issues associated with the positioning of rails during the construction of slab tracks and details the observation methods used for measuring track alignment. Furthermore, it discusses the results and the analyses obtained from the implementation of traditional surveying methods and those derived by using a track surveying vehicle during the construction of the new tramway of Athens.