

**Key Characteristics:** The cant is one of the most important design parameters on railway and tram lines. It is defined as the amount by which one running rail is raised above the other running rail [1]. On curves with cant it is possible to achieve higher speeds than in curves without cant with the same radius but without cant due to the fact that when the train passes through the curved track with cant, the value of centrifugal acceleration (perceived by the passengers) decreases. Also the wear of rails on curves with cant is lower, due to the symmetry of axial loads •

## How to use your smartphone to measure cant on the curves of tram tracks?

**In recent years, the modern measuring methods used in inventory of railway track have been developing intensively.**

Since 2009, the interdisciplinary research team of Gdansk University of Technology, the Naval Academy in Gdynia and Gdynia Maritime Academy have been conducting research into the use of Mobile Satellite Measurements to define the track axis coordinates.

The method described is a comprehensive measurement and design system utilising modern satellite positioning techniques and the author's computer-aided design application. A vehicle with dual-frequency GNSS receiver mounted over the track axis is used in measurements. Based on the coordinates of the track axis, the elements and values of the geometrical layout of the track in both planes can be recre-

ated. During the measuring conducted on straight tracks and on curves without cant, the coordinates were appointed above the track axis. But in the case of curves with cant, the measured coordinates were displaced by a vector perpendicular to the track axis. The length of this vector depends on the value of the cant and the antenna setting height.

This project presents the procedure of continuous measurement of the cant in a moving vehicle with the use of accelerometers. During the tests, a smartphone equipped with accelerometer was used. The combination of satellite and smartphone measurements enabled the value of cant at any point of the railroad to be calculated. As a result, the coordinates of the track axis in both planes were updated with the use of calculated correction •

