

## Macro-mechanical sectional modelling of ballast settlement phenomenon (refer to Prof. A. Collina and Ing. L. Bernardini)

Optimized management of railway networks, subject to increasing travelling loads and traffic, as well as ageing of track components, demands for adequate understanding of degradation phenomena. Given ballast complex behaviour, its degradation is a particularly critical aspect in the field of track maintenance management.

The objective of the thesis is to develop a macro-mechanical cross-sectional model able to reproduce ballast settlement phenomenon due to long term cyclic loading actions. The procedure already developed, combines fast dynamics (train transit) and long-term evolution (ballast settlement).

The procedure needs to be further improved and generalised, so as to include different scenarios that can be found in a real railway line. The purpose of the simulation tool is to support line maintenance management decision, by predicting possible degradation patterns as well as to help researchers to further analyse and understand ballasted track degradation evolution in presence of structural and/or geometrical singularities. The work of the thesis will use experimental data available for regional and high-speed lines.

