



Raimundo Delgado
(Project PI)

Full Professor at the Structural Division, Dept. of Civil Eng., FEUP; Head of the research group in structural and earthquake engineering; Main research areas: Numerical analysis of dynamic behavior of structures, Earthquake Engineering and Experimental & numerical evaluation of dynamic effects on HSR

Development of Tools for High Speed Railway (HSR) Lifecycle Costs Estimation for Track Design and Maintenance Management System

Research team: Rui Calçada, A. Cristina, C. Vale, B. Berawi (FEUP); P. Teixeira, P. Ferreira, R. Santos (IST); Luis de Picado Santos, A. Ferreira, D. Leal (FCTUC)



MASSACHUSETTS INSTITUTE OF TECHNOLOGY

Objectives

- To develop new and Innovative Life Cycle Cost (LCC) Models for HSR
- To develop behavior models and performance requirements for HSR Infrastructure
- To achieve a Maintenance Management System (MMS) that should be supported by a permanent and appropriated monitoring system
- Applications of the Life Cycle Cost models to the analysis of design/maintenance strategies

Work plan

- WP1 – Define the specific goals and the interaction within the project.
- WP2 – Establishment of the necessary requirements and a general methodology for specific LCC Analysis for HSR networks, focusing on the major technical and economical boundary condition.
- WP3 – Define global degradation models and infrastructure indicators to better characterize the quality of the railway system from the structural safety, track safety and comfort point of views.
- WP4 – Development of a MMS adapted to HSR and integrating the information from track state, from behavior models developed for the LCA, from the impact of using or not the HS railway to allocate freight transport & from the organization as an active part of the whole process.
- WP5 – Assessed the impact on LCC of different design and maintenance strategies. Recommendation on both track design & maintenance.

Results

- WP2 – A preliminary life cycle cost model is being developed for rail and ballast, as well as a maintenance works prediction model for HSR.
- WP3 – Definition of performance indicators for the railway system that may be considered at design and maintenance level. A database with measurement made on the track Porto-Lisboa railway line is being analyzed and systematized
- WP4 – Development of a fleet model tool, capable of generating scenarios to support strategic options on HSR line, namely the effectiveness of allowing goods traffic and its implications on the line Lisbon-Madrid.

