Project 2: Risk Assessment and Management for High-Speed Rail Systems (RISK)

Duration: (November 2007 – October 2010)

Description: High-Speed Rail system's construction and operation is a complicated management subject involving environmental issues, train schedules, safety, rolling stock and infrastructure reliability (transport infrastructures are critical and vulnerable). The design and safety/performance assessment of transportation facilities should include an understanding of the physical environment and also take into account various other dimensions of risk. In a global framework, technical risks as well as natural hazards risks must be considered, in both assessment and management perspectives. This project aims at incorporating environmental risks (e.g. hydrologic, geotechnical and seismic), technical risks (e.g. excessive vibrations) and robust measures into decision models for proactive risk management.

Objectives/Deliverables: The project is organized around the following specific objectives:

   * Characterizing hydrologic risk (rainfall and flood hazards) along the high-speed rail line
   * Characterizing geotechnical and seismic risks and establishing mitigation strategies
   * Developing, validating, and applying advanced methodologies for the analysis and assessment of the effects of mitigation measures to the risk of excessive vibrations (or deformations) in the railway track induced by the circulation of trains at high speeds
   * Developing Decision Analysis Tools for HSR construction along with the associated optimization approaches for the allocation of resources
   * Developing, validating, and applying advanced methodologies for the assessment of earthquake effects on the infrastructures of high-speed railway systems, and developing a methodology for the implementation of an integrated monitoring system for railway systems

Industry Involvement: Interactions with the railway industry and research laboratories will take place through the comparison of results from the Decision Analysis Tools and through the definition of scenarios for the optimization models.

PT Faculty: José Neves (IST), Paulo Coelho (Coimbra), Maria Conceição Cunha (Coimbra), João Lima (Coimbra), M. Isabel P. de Lima (Coimbra), Luís Simões de Silva (Coimbra),
MIT Faculty: Herbert Einstein, Daniele Veneziano

Financial Resources: TBD