

Railways are one of the prime modes of transportation in European Union and as they are closely associated with intensive passenger and cargo transportation, they own high risk in terms of potential loss of human life and damage/destruction of assets. New technologies and stringent safety standards are constantly being introduced, to reduce risks associated with derailments and collisions. A detailed assessment of the defects which emerge both in the rolling stock and the rail infrastructure is essential to apply the correct maintenance strategy. At the same time large span or segmental bridges and tunnels, which are important parts of rail systems are particularly susceptible to deterioration with increasing risk of failure due to often-harsh and aggressive environments, in combination with aging and increasing traffic load. Evidently, efficient maintenance strategies of complex rail systems, which are based on fast and reliable inspection methods, can reduce significantly potential risks and cost. The overall aim of the project is to develop an integrated system of state-of-the-art NDT methodologies to improve risk assessment and failure prediction concerning the integrity and functionality of rail systems, in favour of the participating SMEs. In particular precise Visual and Magnetic ac-Susceptibility methods, for fast and reliable assessment of track failure and damage will be combined with state-of-the-art Acoustic, and Nuclear Magnetic Resonance (NMR) portable devices appropriate for examining the performance of concrete structures, in order to gain critical information concerning the performance, damage risk, and condition monitoring of rail and subway systems. In parallel an innovative chemical tool kit will be developed for in-situ chemical analysis measurements, which in combination with modern established analytical techniques will be used to characterize in-situ materials.