

## Purpose

- Nondestructive identification and spatially resolved quantification of the concrete structure
- Nondestructive identification and spatially resolved quantification of different mechanisms of deterioration
- Providing accurate measurements for judicious selection and timely implementation of corrective measures for effective enhancement of the service life, efficiency and life-cycle economy of the transportation infrastructure
- Compact, lightweight, safe and easy operation

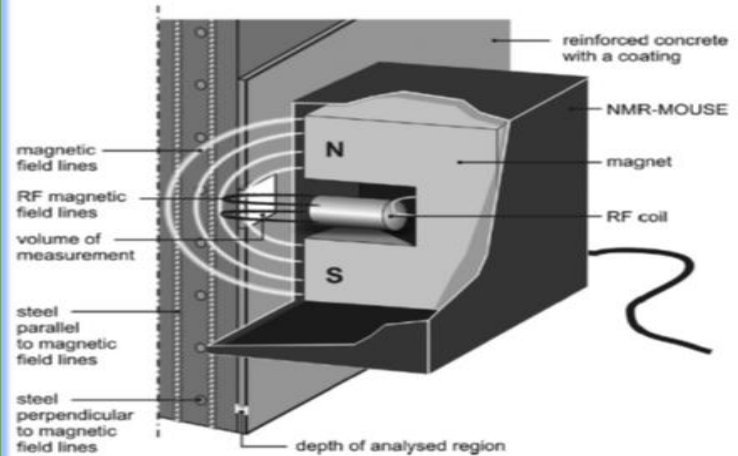
## Approach

- Development of the portable NMR system
- Identification of the NMR signatures and the quantifiable features of key concrete components
- Establishment and verification of the basic NMR manifestations and quantitative trends of concrete deterioration
- Performance of NMR of field specimens towards condition assessment of the concrete-based infrastructure

## Highlights

- The portable unilateral NMR system developed in the project to be used towards nondestructive evaluation of the structure, strength, spatially resolved moisture content and deterioration conditions of concrete
- Basic NMR manifestations and quantitative trends of ASR, sulfate attack and chloride ion diffusion to be identified, and verified using analytical chemistry methods
- The value of NMR towards nondestructive identification and quantification of the deterioration conditions of field concrete to be demonstrated through preliminary NMR and other investigations of field concrete specimens
- A preliminary assessment to be made of the variability of NMR data associated with the heterogeneous and variable structure of concrete

## Schematics of the portable NMR machine



## Measurements of the longitudinal ( $T_1$ ) and transverse ( $T_2$ ) relaxation times in concrete

