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New Geotechnical Tests in the Bucharest Metropolitan Area

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According to the plan of the NATO SFP 981882 project (2006-2008) ten boreholes with a depth of 50 m were drilled and geotechnically analysed in the metropolitan area of Bucharest. The goal is to obtain the necessary input data for a new and modern map with site effects related to earthquake wave amplification. The boreholes are placed near URS stations (URban Seismology project 2003/2004, Ritter et al., SRL, 2005) or K2 stations (a strong-motion recording network) of the National Institute for Earth Physics, Bucharest (NIEP) to allow a direct comparison and calibration of borehole data with actual seismic measurements. The positions of the ten boreholes were also chosen in order to fill information gaps in the metropolitan area of Bucharest.

Four boreholes were drilled in 2006 and six were done in 2007 by a third party (Technical University of Civil Engineering Bucharest). The laboratory tests on core samples were performed in 2006 (on four sites) and 2007 (on six sites). A number of approximately 270 samples were gathered from the 10 drilling sites in the Department of Engineering Seismology, National Institute of R-D for Earth Physics. These samples were partly not disturbed (sampling as it was recovered in the tube of the drilling machine) and partly disturbed (sample had no consistency). A database was created with these samples which contains the following parameters: drilling location, GPS coordinates, date of drilling, date of arrival in the laboratory, short geotechnical characterisation of each sample.

After a thorough examination of the database, samples from representative layers were

chosen for further testing. The following tests were performed: 1) resonant column test. One sample from the soil layers was chosen. For this test the Drnevich resonant column is used. This apparatus is used for the experimental determination of the dynamic soil response at harmonic oscillations through soliciting a cylinder sample with harmonic stationary vibrations in torsional resonance mode. 2)dynamic triaxial tests for the determination of the deformability properties of the samples from the boreholes was done in accordance with international specifications, but also with the restrictive Japanese norm (JGS 0542-2000). 3) CU triaxial test (for soft and granular materials), 4) specific gravity, 5) natural humidity, 6) granulometric composition (fractions), 7) material identification due to international standards (ternary diagram), 8) appreciated value of the mineral skeleton density, 9) solid particle percentage with the dimension less than 2 μm, 10) plastic limit determination (soil cylinders and cup method), 11) tests of compression - settling (edometric compressibility for soft and granular materials), 12) angle of response. Detailed results of all these tests, together with the equipment used to perform them, will be presented.