Invited presentation:
Some current geotechnical research at Trinity College Dublin, with a focus on instrumentation and monitoring

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Working Group 2 workshop: slopes monitoring data knowledge exchange
Department of Civil and Environmental Engineering, Imperial College, London
My research areas/projects:

(i) Novel ground improvement techniques
   (a) MICP (Biogrouting) and biopolymers for soil improvement;
   (b) Vacuum consolidation in peat deposits;
   (c) Reduction of long term compressibility of load-bearing peat deposits by pre-decomposition technique;
   (d) Granular columns and granular anchors

(ii) Studies on the principal of effective stress as applied to organic soils; Constitutive modelling of peat

(iii) Foundation solutions for offshore structures; soil behaviour under long-term cyclic lateral loading

(iv) Characterisation/measurement of the geotechnical properties of municipal sludges and residues

(v) Geotechnical contributions to wetland/peatland conservation
FIELD INSTRUMENTATION: Stabilisation of road and rail embankments/slopes

Example 1: rail side embankment, West Coast Mainline, UK. Instrumentation: survey pegs, inclinometers, standpipes, geophysical (ground probing radar) and level surveys of railtrack

O’Kelly et al., 2008, Stabilisation of a progressive railway embankment slip. Geomechanics and Geoengineering 3(4): 231–244

Remediation works: embedded pile wall and gabion

Post construction monitoring:
Example 2: Reinstatement of roadway at Stanton Lees, Derbyshire, UK. Instrumentation: rainfall data, survey nails, survey pegs, standpipes/piezometer buckets


leading up to November 2000 slip:

- Total rainfall for October 2000 recorded as 209% of mean for month of October
- First movement noticed (single kerbstone drops by about 100 mm)
- Valley reported as being flooded
- Road begins to crack parallel to kerbline in front of cottage
- Slip reactivated
- Several months of steady downward movement
- Locally, over 300mm of settlement along wall

Percentages relate to mean monthly rainfall figures

Vertical movements of survey points along roadway
Example 3: Vacuum consolidation field trial performed over 10x10m area at pseudo-fibrous peat deposit, 4m deep. Instrumented at different depths: vibrating-wire piezometers and settlement cells, settlement plates, standpipes. Also barometric pressure/temperature, rainfall gauge, water meter. Monitored over an 11 month period. Osorio J.P., Farrell E.R. and O’Kelly B.C., Peat improvement under vacuum preloading: A novel approach for bog roads in Ireland, Proceedings of the Joint Symposium on Bridge and Infrastructure Research in Ireland and Concrete Research in Ireland (BCRI 2010), Cork, Ireland, 2nd–3rd September, 1, 2010, pp255 - 262
• Thank you for your attention