Investigating the Strength and Condition of Rocky Coastal Platforms and Maritime Concrete

This application note describes the investigation into the role of durability on geomaterials for coastal geo-engineering and geomorphology.

Investigation

USC & ISEP conducted joint research on the geomaterials and deterioration of concrete blocks in the maritime works and assessment of rocky coastal platforms in NW Portugal and Galicia. This study is focused on the combination of geotechnical evaluation of the materials used in armour structures (based mainly on lithology, weathering grade, geomechanics properties and hardness of the geomaterials) in order to consider how material properties might influence the design of coastal protection structures. In addition, an integrative geomorphological study was applied on beach rock platforms.

Equotip is being used to measure strength of rock and concrete blocks, combined with other conventional methods such as Schmidt Hammer (types N, L), SilverSchmidt (type LR) and DigiSchmidt (type ND).

caption

Up to thirty measurements were taken along each scanline transect, in clusters of twenty-five measurements around the site of each block.

Means and standard deviations are compared to assess differences between the different type of concrete blocks (e.g. tetrapods, antifers). In addition, a comparison between the rebound values estimated by the Schmidt Hammer, SilverSchmidt and DigiSchmidt was performed.

caption

Results

With the portability of the Equotip for use in the field, the team were able to achieve accurate and repeatable results using state-of-the-art techniques on a wide range of materials and strengths.

The data from the armour layer condition evaluation were used to produce accurate recommendations for maintenance, and additional inspection to identify and assess factors that may extend the life of coastal protection structures. By doing so, it was also possible to establish a correlation between the values of hardness and rebound.

caption

The light impact of the Schmidt rebound hammer left zero damage to the concrete or rock surfaces making it suitable for fragile sites, whilst the Equotip provided highly accurate measurements for hardness correlation data.

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