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Surface strength and durability assessment of stones by using non-destructive tests, such as Schmidt hammer and Duroskop

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Wide-ranges of surface testing methods are used under laboratory conditions and on site to assess the strength and durability of construction materials. The paper brings examples of the use of two types of techniques: Schmidt hammer and Duroscope. Both techniques were firstly used for testing artificial materials. The Schmidt hammer was developed for concrete testing, while Duroskop was first applied on metal surfaces. These non-destructive techniques are now increasingly applied for stone testing at historical monuments, at construction sites or even in quarries. The paper gives an overview of four different types of Schmidt hammer from which three analogous (L-9, N-34, PT-Schmidt) and one digital (Digi-Schmidt). It compares rebound values of various stones and provides information on the relationship between these values and weathering grades. Another less commonly applied technique the Duroskop was also tested. Relationship between Schmidt and Duroskop rebound values are also given. Tested stone types included porous limestone, cemented limestone, travertine and sandstone. For comparison, basalt and andesite tuff ashlars were also measured. The use of these techniques in assessing surface strength of stones, the advantages and limitations of their applications are also discussed.