

Using Micro-Drilling as A Minimally Invasive Method in Examining the Condition of Historical Buildings

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Abstract

To estimate the strength parameters of materials such as concrete and rock, the micro-drilling technique can be used to quantitatively and qualitatively check the comparative strength of historical monuments and to qualitatively evaluate various building materials in depth and in situ. This technique can be used as a relatively minimally invasive, non-destructive, fast and reliable method in the field of restoration and treatment of historical monuments. In this method, by drilling in millimeter dimensions of the building surface and simultaneously measuring various drilling parameters such as thrust force, torque, penetration rate and bit rotation speed, it is possible to assess the deep condition of historical monuments in terms of the amount of erosion and weathering caused by various climatic and environmental factors. There is also an examination of the quality of treatment before and after treatment. However, various studies as drilling resistance in other countries, it has not been used in our country yet. Now that the construction of this type of equipment has become more capable in the country, we can also benefit from this system in the field of restoration and treatment of historical monuments. Simultaneous measurement of several drilling parameters and use of its data can provide additional relative advantages, including controlling the effect of bit wear in this technique. Therefore, we have provided this possibility by constructing and developing a device with this capability. Using this technique to measure drilling resistance is affected by bit wear. In this paper, we will introduce this technique, present a method for estimating reliable and comparable drilling resistance, and assess the principles of using the method in this regard.

Keywords: Historical Monuments, Micro-Drilling, Drilling Resistance, Bit Wear.



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