

INFLUENCE OF SHEARING RATE ON INTERFACIAL FRICTION BETWEEN SAND AND STEEL

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ABSTRACT

Direct shear tests were conducted to investigate the influence of shearing rate on interface friction angle between sand and steel. A total of forty-five shear tests were carried out using the conventional direct shear test apparatus. The tests were performed under three values of normal stress on smooth and rough steel surfaces. Samples were sheared at five different rates. In addition, uplift model pile tests were conducted using the same materials and under the same loading rates used in the direct shear tests. Experimental results showed that both the internal friction angle (ϕ) of the sand and the interface friction angle (δ) increase with increasing the shearing rate. The relationship between angles ϕ and δ and the shearing rate can be represented by a straight line on a semilogarithmic plot. The values of the interface friction angles were back-calculated from the measured uplift capacity in the model pile tests and compared with the corresponding interface friction angles obtained from direct shear tests.

Keywords: Direct shear, sand, internal friction angle, interface friction angle, model pile.