

# 11<sup>Th</sup> Khwarizmi International Award

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## Iranian residing aboard Laureate



**Researcher:** Farrokh Nadim

**Research Title:** Evaluation of clay shear strength under earthquake loading

**Field:** Civil Engineering

**Country:** Norway

### Abstract:

A special laboratory testing program to establish the undrained shear strength for the stability evaluation of clay slopes is described. Effects of rapid rate of loading, permanent shear stress on the potential failure surface, and cyclic loading induced by earthquake ground motion are established by DSS -tests. Creep deformations induced by the earthquake and the post-cyclic static shear strength are also evaluated.

The key question regarding the stability of a submarine slope under a strong earthquake is whether the soil will keep its shear strength after being exposed to the high cyclic shear stresses induced by the ground motion, or whether it will completely lose its strength and develop into a slide. The latter situation would be the case if, for example, liquefaction takes place. To establish the relevant soil strength parameters for submarine clay slopes, a special laboratory testing program in the DSS apparatus was described. The tests performed on clay samples from two fjords in western Norway showed that, due to rapid rate of loading, the cyclic shear strength under earthquake loading was significantly (30 - 80%) greater than the static shear strength. However, if the soil experienced large cyclic shear strains during the earthquake, it could undergo further creep displacement after the earthquake and experience a significant reduction of static shear strength.

*Dr Farrokh Nadim is Technical Director at NGI, former Director of the Centre of Excellence, the International Centre for Geohazards (ICG), and adjunct professor at both the Norwegian University of Science and Technology (NTNU) and University of Oslo (UiO). Dr Nadim received his BSc in Structural Engineering from Sharif University of Technology in Iran, and his MSc and ScD in Civil Engineering from MIT, before joining the Norwegian Geotechnical Institute in 1982. His major fields of work are related to risk and reliability analysis, geohazards (landslides, earthquakes and tsunamis), geotechnical earthquake engineering, and offshore foundation engineering. He is the author or co-author of over 150 scientific publications*