# Simulation of Grout Flow in Tortuous Rock Fracture

**XIAO Fei*, ZHAO Zhiye†**

*†Civil and Environmental Engineering
Nanyang Technological University
50 Nanyang Avenue, 639798, Singapore
e-mail: fxiao005@e.ntu.edu.sg (XIAO Fei) / e-mail: CZZHAO@ntu.edu.sg (ZHAO Zhiye)

## ABSTRACT

Grout flow in tortuous fracture channel is studied. Grouting simulation is an effective way to optimize the grouting process if it is conducted more practically. Hence, it is necessary and important to derive a grouting model, considering more practical factors, such as tortuosity and roughness. Normally, fractured rock masses are composed of fractures with tortuous configuration, where the fracture surfaces are non-parallel. Nevertheless, equivalent aperture, derived from hydraulic tests or mean aperture, is generally used to represent the aperture of practical fracture. Since the characteristics of grout flow is greatly influenced by the configuration of fracture channels, errors can be caused due to unreasonable simplification of practical fracture into an equivalent parallel channel. Meanwhile, high injection pressure can transfer parallel channel into wedge shaped channels. Therefore, characteristics of grout flow in different tortuous channels are studied; the grouting processes in channels with uneven fracture surfaces are compared with that in the corresponding "equivalent channel". It is found that the characteristics of grout flow in simple wedge shaped channel are very sensitive to the shapes of channel; a complex tortuous channel can be represented by a parallel channel with an "equivalent aperture", only if the degree of tortuosity of the channel is low; the grouting processes in complex tortuous channels with an "equivalent aperture" can be remarkably different, when the degree of tortuosity of the corresponding channel is high.

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