

*** Fracture healing and surface roughness evolution in rock salt***

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General Introduction

This dataset contains data collected during healing experiments on rock salt fractures at Delft University of Technology, which will be a part Shihao Fu's PhD Thesis project. It is being made public both to act as data for publications and the PhD thesis of Shihao Fu and in order for other researchers to use this data in their own work. The data in this data set was collected in the Rock Mechanics and Petrophysics Laboratory of the Delft University of Technology - Faculty of Civil Engineering and Geosciences, between June 2022 and December 2024. This research project was made possible by a grant from the China Scholarship Council (CSC).

Purpose of the test campaign

This study explores the recovery of shear strength and sliding behaviour of rock salt through a two-step experimental approach. Artificially fractured samples were allowed to heal under either dry or wet conditions for periods of up to one year, after which they were subjected to shear box testing. To derive a Mohr–Coulomb failure criterion, shear tests were conducted under varying normal loads of 20, 40, 80, 160, and 320 kg. The evolution of the fracture surface geometry, both prior to healing and following shear, was characterized using microcomputed tomography and digital microscopy.

Test equipment

The shear box experiments were performed using a digital direct shear apparatus complete with a lever loading assembly (ELE INTERNATIONAL). This apparatus features a shear speed range from 0.00001 to 9.99999 mm/min, a maximum normal load of 1000 kg, and a maximum shear force of 5.0 kN. Enclosed in a robustly constructed case designed for floor mounting, the apparatus comes complete with a carriage, loading hanger, and a 10:1 lever loading device.

Description of the data in this data set

The mechanical test data from shear box experiments, along with the microstructural data obtained from digital microscopy and micro-CT is provided.