

The influence of mineralogy on the durability of shale

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Abstract: The assessment of the durability of shale is very important and it has value for many applications, such as for using shale as a construction material or as a foundation material. Some shales slake almost immediately in moist air, while others can withstand many cycles of wetting and drying: they take years of exposure before showing any signs of deterioration, and are roughly as durable as sandstone or limestone. Because of this problem, durability of shales is a major concern in engineering construction and has been the focus of shale research.

To investigate the slake durability of the shale, many tests were performed on samples from Queenston shale from Canada, Ashfield shale from Australia and UK Coal Measures shale. The highest value of slake durability was measured for siltshale and the lowest for clayshale.

The slake durability results of this study also show that there is no single parameter that can be used to predict the durability of shales. It seems that durability in the Coal Measures shales is closely related to the quantity of clay minerals. Therefore, it can be concluded that variation in durability within the Coal Measures shales (sample from the same geological formation) is controlled predominantly by mineralogy. A decrease in the slake durability of Coal Measures shales was associated with an increase in clay content. Queenston shale shows lower durability in comparison with other shales. It seems that other geological parameter such as fabric also affected durability