

Rock Mechanical Design of Gas Storage Caverns for Seasonal Storage and Cyclic Operations

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Abstract

From rock mechanical point of view the question of treating new operation modes of gas storage caverns becomes more important. Until a couple of years ago the usual operation mode – the so-called seasonal storage – was characterized by one cycle per year.

Nowadays new operation modes set the priorities not only for obtaining large working gas volumes but also for optimizing high speed gas withdrawals within more than one cycle per year. For rock mechanical calculations the requirement arises that the change of gas temperatures during operation and the consequences of these temperature changes on the stressing of the salt rock mass cannot be neglected any more, i.e. thermo-mechanical coupled calculations are necessary.

Within the paper the differences and consequences for the rock mechanical recommendations are discussed. Seasonal storage and cyclic operation are compared considering the stressing of the rock mass in the vicinity of the storage caverns.

As a result it can be concluded that recommendations with respect to minimum operation pressure as well as for maximum withdrawal rates have to be answered only in connection with the respective time intervals.

Keywords: *rock mechanics, gas cavern design, numerical analysis, cyclic loading*