

## **Abstract**

This diploma thesis deals with swelling of clayey materials, which could be used as backfilling materials in deep geological repositories of radioactive waste.

The literature review summarizes the information about the clay minerals, about their interaction with water and about their swelling. It also summarizes current knowledge about clayey soils and bentonites and about their applications. It shows that the problematics of swelling has its rules already at the microscopic scale, and that it is possible to use it in various aspects of human activity.

The experimental part of the thesis deals with measuring of swelling pressures with restrained deformation. The materials that were used are bentonite from locality Stránce, montmorillonite of the Stránce bentonite, milled bentonite from locality Rokle and milled activated bentonite from Rokle. The method of zero deformation was applied, load frame for triaxial chamber we used for measurements.

The curve of dry density depending on the initial moisture content was determined for the bentonite of Stránce and a dependence of swelling pressures on the initial dry density was established for both bentonite and montmorillonite of Stránce locality. The suction was measured for both of these materials.

For the milled activated bentonite material from Rokle locality, which is supposed to be a part of engineering backfilling barriers in the deep geological repositories of radioactive waste, the relative values of swelling pressures were determined. According to expectation, the rising tendency with increasing initial dry density was observed.