

Raising of the Ajaure embankment dam by extending the moraine core with a geomembrane

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SYNOPSIS. The Swedish Ajaure embankment dam, which is a high consequence dam is 46 m high dam and was constructed over the period 1964 to 1966 with commission in 1967.

During the 1980:s it was noted that the horizontal displacements in the main embankment dam didn't show any sign of diminishing over a time period. From the time of construction up to year 2001 the total displacement at the crest was in the order of 500 mm and the creep continues with a rate of approximately 8 mm per year. In order to stabilize the dam, and allow for future rising of the dam, supporting berms have been placed on the downstream side of the left embankment dam in 1989 and 1993.

In addition to the deformation problem the Ajaure Dam required to be upgraded to allow for the new design flood. After comprehensive investigations and studies it was decided to raise the crest of the dam to be able to release the design flood at a water level 5 m above the retention level. The owner Vattenfall used a risk analysis as one input in the decision process to raise the dam. M Bartsch, SwedPower presents the risk analysis is in an adjacent paper to this conference.

Different construction options were considered, and a geomembrane was finally chosen for the extension of the moraine core. A Flexible Polypropen (FPP) with a thickness of 1.5 mm was selected. Bentonite Enriched Sand (BES) was used to connect the existing core with the geomembrane. The design of the crest heightening was started in 2001 by Golder Associates, UK and continued by SwedPower with detail design and tender documents. The design and the construction, which was completed in 2002, are described.