Dam of Delcevo in Macedonia

This project is situated in the north east of Macedonia and should serve as drinking water storage. The earth dam closes a small valley and is constructed without water tight core.
The plan was to execute waterproofing with a synthetic barrier on the upper side of the dam.
The total of the waterproofed surface covers approximately 10.000 m²

Characteristics of the Dam:

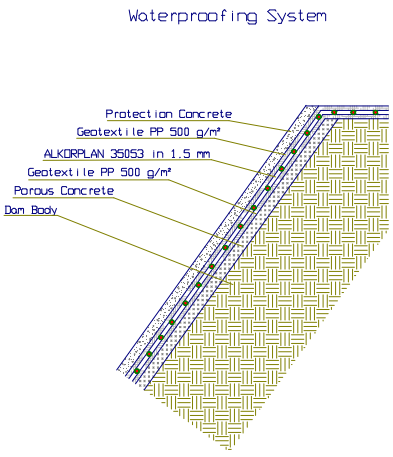
- Compacted earth Body with 20 cm of porous concrete as sub grade on upper side of dam
- Slope 1:2,5
- Length of Crest: approximate 180 m
- Height: approximate 50 m

Choice of the Geomembrane:

The upper side of the dam should receive a waterproofing in drinking quality as the collected water is used as drinking water for the surrounding infrastructure. The geomembrane will be protected with a layer of concrete therefore the choice of geomembrane was ALKORPLAN 35053 without UV-stabilisation in a thickness of 1,5mm homogeneous.

1. The applied System

- Earth body
- Porous concrete as support for the waterproofing system on the upper side of the dam
- Geotextile 500 g/m² Polypropylene
- PVC Geomembrane ALKORPLAN 35053 in 1,5 mm
- Geotextile 500 g/m² Polypropylene
- Protection Concrete 10 cm with slight reinforcement



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2. Underground

The body of the dam was built up in compacted layers of earth. The subgrade for the waterproofing was realised with a porous concrete. This porous concrete represents a perfect underground for the waterproofing system and also works as drainage layer under it.

Porous concrete as support of the Waterproofing system

3. Application:

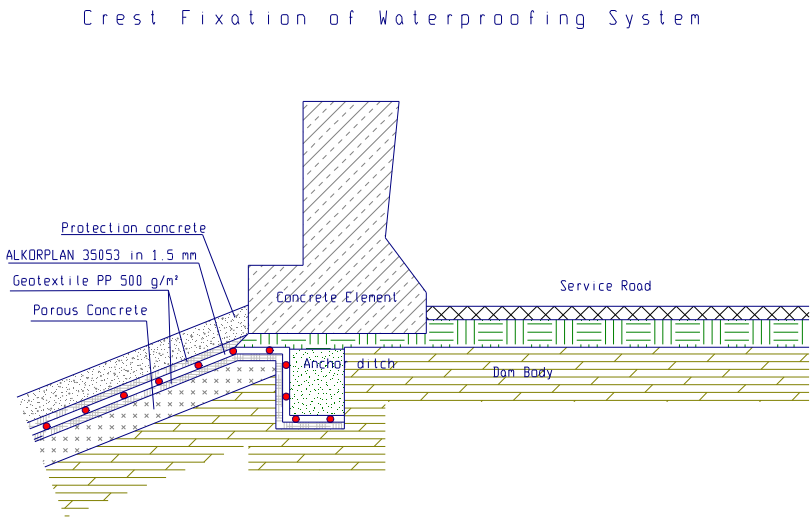
The different layers (2 Geotextiles and 1 Geomembrane) were placed separately to the dam by unrolling layer by layer form the tom to the bottom. The whole system was anchored in an anchor ditch on top of the dam and with a linear watertight fixation on a prepared concrete surface on the bottom.

The seaming of the geomembrane was executed by a welding automate creating a proofable double welding. Each welding was tested following international prescriptions for welding.

Application of 1st geotextile and ALKORPLAN 35053

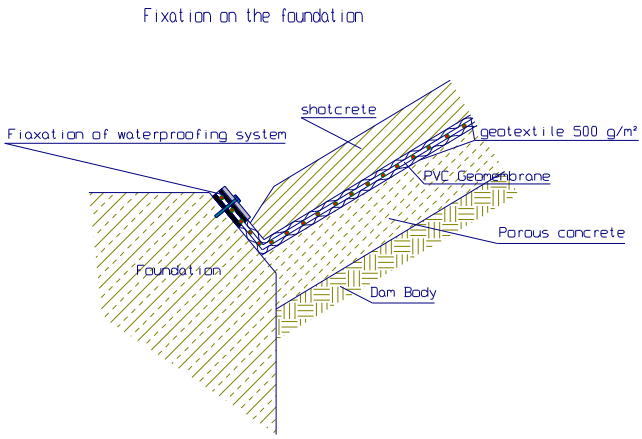
4. Crest Fixation

The waterproofing system was anchored in an anchor ditch and on top of it ditch a prefabricated concrete element was placed. A service road aside allows driving along the crest of the dam.



5. Fixation along the bottom of the dam

As this fixation has to be watertight the concrete had to be prepared with mortar to guarantee a smooth surface for the fixation. A vertical concrete structure should avoid the passage of water under the earth dam.



The waterproofing works were executed in summer 2002 without any difficulties. Due to the good weather conditions the installation lasted one week. After that the protection concrete was applied onto the waterproofing system from the bottom to the crest of the dam.

For further information:

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