ARTIFICIAL SNOW WATER RESERVOIR IN SELVA DI VAL GARDENA

Mapeplan T WT membrane was used for waterproofing

Summer 2012 saw work undertaken to waterproof the man-made Piz Seteur reservoir in the Piz Sella - Plan De Gralba ski resort in the municipality of Selva di Val Gardena (province of Bolzano, in Northern Italy), located at an altitude of roughly 2,000 m asl.
This is a reservoir built into the earth containing about 70,000 m^3 of water with a water level of around 10 m, that will allow numerous km of ski slopes to be covered with artificial snow through a complex system of snow cannons. The reservoir and the underground service building were waterproofed with a 2.3 mm-thick TPO/FPO (Thermoplastic Olefyn/ Flexible Polyolefin) liner called MAPEPLAN T WT, manufactured by Polyglass, a Mapei Group's subsidiary.

Requirements of the Waterproofing System

The waterproof lining of a snow-making water reservoir built into the earth is a complex undertaking that must take into account various factors and basic requirements, such as:

- risk of differential settling of the substrate
- harsh weather and environmental conditions
- high mechanical strength

Below. View of the completed reservoir during the water filling phase.
Photo 1. Digging and leveling the reservoir.
Photo 2. Laying the Mapeplan T WT waterproofing membrane.

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- quick installation
- critical operating conditions, such as ice formation, fast draining
- easy maintenance
- setting in surroundings of great environmental and natural value
- feasibility of testing and monitoring the lining system
- long service life
- ease of repair

In this specific case, the project also had to meet the rules and requirements laid down by local laws regarding the construction of reservoirs and dams, which call for waterproof lining systems able to provide:

- dimensional stability
- a waterproof barrier to water under pressure
- resistance to mechanical wear
- resistance to UV rays and harsh weather conditions
- resistance to plants, roots and microorganisms
- resistance to heat and freezing temperatures
- resistance to the ageing of the material
- non-toxicity
- field testing of the installed lining system
- installation of the layered lining system by a professional company.

The MAPEPLAN T WT Solution

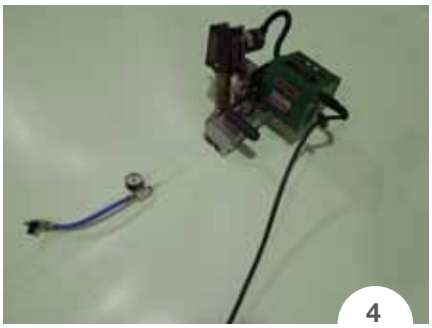
To comply with the rules and meet the official requirements, Polyglass supplied a waterproof lining system comprising a TPO/FPO flexible polyolefin synthetic liner called MAPEPLAN T WT, as described below.

The soil was prepared by compacting the bed and sides with a roller and shaping the banks with the aid of heavy equipment. The trench for anchoring the layered waterproof lining system was dug into the top of the banks. The banks were shaped with a berm at about t a 1/3 of the way up to provide a base for the rock covering to be laid over the upper part of the banks.

A cuspated material drainage geocomposite laminated with a filter geotextile was applied as an underlay on the banks to act as drainage system and levelling layer.

This drainage layer allows the waterproofing system to be monitored continually as a network of finely slotted HDPE (High-Density Polyethylene) drainage pipes has been produced at the base of the banks running into inspection chambers outside the reservoir.

The bed has been covered with an 800 g/m^2



non-woven geotextile material to act as a levelling and puncture-resistant layer.
The bed monitoring system, under the liner, has been produced by laying a layer of dry drainage material embedded with a network of finely slotted HDPE drainage pipes running into inspection chambers outside the reservoir. The MAPEPLAN T WT liner was loose-laid with the sheets overlapping by about 10-15 cm; the overlaps were thermally welded with hot air using specific welding equipment. More specifically, in this case, two weld tracks were produced with an unbonded channel between them for testing purposes. This particular weld design allows the seam to be tested for leaks by pumping the channel full of air. Testing is carried out with an average pressure of 2.0-2.5 bar (which is equivalent to a water level of 20-25 m). This weld testing offers the utmost reliability and ensure that the waterproof system is free of leaks.
The MAPEPLAN T WT liner was protected by an 800 g/m^2 non-woven geotextile material on the upper part of the sides only, on top of which the rock covering was laid. The waterproofing liner was left completely exposed on the rest of the lined surfaces. Connections between the waterproofing liner and the drainage pipes and bed inlets, which were under water pressure, were produced with specific elements provided with stainless steel flanges and counter-flanges. An ice-prevention system referred to as "bullage" was installed on the reservoir bed consisting of HDPE piping fitted with air-blowing nozzles designed to keep the surface of the water moving constantly, thus preventing it from icing over. The reservoir was completed with safety fencing erected around the entire perimeter.

Photo 3. The trench for anchoring the lining system was dug into the top of the banks.
Photo 4. The liners were welded using specific welding equipment.
Photo 5. Detail view of the ice-prevention system called "bullage".
Above. View of the waterproofed reservoir.

TECHNICAL DATA

Piz Seteur water storage reservoir for artificial snow-making, Selva di Val Gardena (Italy)
Year of Construction: 2012

Year of the Intervention: 2012
Intervention: supplying products for the waterproof lining of the reservoir
Clients: Sciovie del Sella SpA and Sciovie Piz Sella SpA
Client's Technical Consultant: Monica Borsatto, Bressanone (Italy)
Designer/Project Manager: Studio d'ingegneria Erwin Gasser, Brunico (Italy)
Main Contractor: Karl Wieser snc, Molini di Tures (Italy)
MAPEPLAN Qualified Installer: Isoledil srl, Collebeato (Italy)

POLYGLASS PRODUCTS
Waterproofing the reservoir and the underground service building: Mapeplan T WT (N.B. The product is manufactured by Polyglass SpA, a Mapei Group's subsidiary).
See www.polyglass.com website for the technical data sheet.