

Lessons Learned from a 25-year-old Textured HDPE Canal Liner with Fiber-Reinforced Shotcrete Armoring Layer in the Putah South Canal in California

A.K. Maskal, Solmax Geosynthetics, Visalia, California, United States of America

ABSTRACT

As population increases and climates change, distributing limited amounts of water from watersheds to points of water use has become increasingly vital. Canals are often constructed across long expanses of alluvial watersheds that contain fingers and wide expanses of coarse deposits. Relatively impermeable earthen fill has been historically used to limit the amount of water lost to percolation, but fill availability and texture irregularities limit the effectiveness of earthen liners. Due to exceptional endurance and worldwide material and installation expertise availability, High Density Polyethylene (HDPE) geomembrane liners have been widely used to control seepage, but exposed geomembrane liners can be damaged by environmental elements such as animals, weather, and vandalism. Concrete cover has been applied over geomembranes, but traditional reinforced concrete dramatically increases the cost of projects to the point of infeasibility. In the early 1990s, the Putah Irrigation District in California developed a novel lining system consisting of a textured 2.0mm HDPE geomembrane covered by 5cm fiber-reinforced shotcrete armoring layer with expansion joints. The system was observed after 25 years in service. The longevity of the liner system in the Putah South Canal and subsequent advances in polyethylene geomembrane technology were evaluated to offer even further improvement in efficiency and cost to line canal facilities.



Figure 1: installation of the liner in 1993



Figure 2: Putah Canal, present days