Durability of geomembranes in water transport applications

Eric Blond[1*]

[1]Eric Blond Consultant Inc., Montreal, Quebec, Canada
Chairman, Technical Committee on Hydraulics of the IGS

Abstract

A question frequently asked by engineers exposed for the first time to geosynthetics is: "how long do they last". In this presentation, the author gives an overview of the service life of geosynthetics. Service life is analysed versus the design life and the carbon footprint associated to the construction of a structure.

Factors affecting the performance of a geosynthetic used for sealing a canal are presented. A distinction is made between failures occurring because the product did not survive its installation, i.e., survivability-related; failures caused by an inadequate design of the product or the structure considering its environment of service, i.e., performance-related; or premature loss of function despite both installation and design were adequate, due to the inadequate choice or inadequate formulation of the material, i.e., durability-related.

The various materials commonly used to waterproof a structure are reviewed, and it is shown that geomembranes are indeed the material of choice for waterproofing a geotechnical structure, such as a canal.

Methods available to assess the service life which can be reasonably expected from various geosynthetics for a waterproofing function, such as in a canal or a dam. Field experiences are described, where some geosynthetics are still performing well after more than 60 years. Well-accepted predictive methods show that geosynthetics can last well-over a century in water-transport or water storage applications, especially when covered by soil or concrete to avoid UV exposure, to control their temperature, and to avoid accidental damage.

* Corresponding author: eric@ericblond.com