

Haryana Canal Lining- Cost Benefit Analysis of Geocomposite System adopted for multiple functions - A case study

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Abstract

Asian countries have a strong history of being closely linked to agriculture and farming related occupation. Canal irrigation is one of the principal methods used for irrigating the crop fields. There are lined and unlined canals in use. Lining helps in minimizing seepage losses and protecting the banks and bed of canal from erosion. Smooth lining also helps in improving the efficiency of canal by increasing discharge and velocity. Reports indicate that unlined canals can loose between 35% and 50% of water they carry, depending upon the overall length of the canal, soil characteristics of the region they traverse, and the hydraulic and discharge parameters. When dry, the canals in water logged areas are subject to reverse seepage flow of water from adjacent land to canal body. In such conditions, this reverse water flow exerts uplift pressure on canal lining and hence suitable measures are needed to relieve this pressure. Traditionally, gravel filter and drainage layers are provided under the lining along with pressure release valves to release the back water into the canal. However, the aggregates used for filter and drainage layers is becoming scarce commodity in India and an alternate material is essential to replace the increasing need of aggregates for such Infrastructure projects.

With advancement of technology in the field of construction, 'Geosynthetics' has become a simple and effective replacement to various conventional solutions respecting the safety, technical and functional requirements of structure. Drainage composites are special type of geocomposites that enable rapid drainage of excess water while preventing soil particle migration. In North Indian state of Haryana, a water supply channel required a drainage system beneath the proposed lining and a three layer drainage composite comprising of non-woven geotextile filter, drainage net and geomembrane is successfully adopted as an alternative to conventional gravel filter layers. With the successful performance of three layered drainage composite solution in this project, apprehensions about technical aspects, functionality

and commercial benefits were put to rest. The project was executed in year 2009-2010 and it is successfully functioning for the past two years. The three layered drainage composite combines three distinct functions of filtration, drainage and impermeability to enhance the life of lining overlying it.

Through this paper, an attempt is made to highlight the successful implementation of solution with Geocomposites for multiple functions in Irrigation canal lining project of Haryana Irrigation department. Due to their distinct advantages of light weight, higher drainage capacity, quality consistency and ease of installation over conventional system, drainage composites are very promising cost effective alternatives to conventional solutions and shall be increasingly used in infrastructure projects.

Keyword: Drainage Composite