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An assessment of geocomposite drain performance after long-term site use

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Abstract

The paper describes the test results for geosynthetic geocomposite drain (commercially known as Enkadrain) installed on the Edinburgh City Bypass in 1985 and removed and tested in 1995.

The durability of geosynthetic fabrics and geocomposites becomes an ever more important concern topic with their increasing availability and use. Information gained from installations undertaken some years ago have particular relevance in measuring how accurate Accelerated Laboratory Tests for Long Term Performance will be. A geocomposite drain which was installed as vertical structural drainage to a rail bridge in 1985 (as part of the A702, Edinburgh City Bypass, Sighthill Section) became available for testing in 1995 due to new roadworks (M8 Extension, Claylands to Edinburgh City Bypass). The sample which was tested after being retrieved from the site was taken from the base of an 8m high retaining wall, then compared with a sample of new unused drain composite material, manufactured to the same original standards.

The retrieved and unused drain materials were tested for water permeability, tensile strength of the filter fabric, and discharge capacity of the whole geocomposite. Also discussed are the selection of the geosynthetic and drain core and their performance given the nature of the surrounding backfill.

The original installation of the geocomposite drain was in conformity with the Department of Transport Regulations as implemented by the Scottish Development Department.

1.0 Introduction

The development and utilisation of geotextiles, geogrids, geomembranes and geocomposites in subsurface construction works have been nothing short of awesome. These products which are collectively called 'geosynthetics', have risen from a relatively minor and speciality product status to a world-wide, billion dollar industry in a short time span. No other specific items in civil engineering and related construction activities has had such a dramatic increase in such a short time span (Koerner 1990).

It is a well known fact that all geosynthetics are utilised for the five principal functions: these are reinforcement, separation, filtration, erosion control and fluid barriers (Cazzuffi et al 1995). Since they are truly international products, unified testing standards, and definitions have been attempted to be developed although some of the properties and mechanisms are still not yet fully understood. Nevertheless, the current situation is that these products are still growing at a very rapid pace and their future is very strong.

One of the most obvious uncertainties that makes designers often sceptical of their use, is their long