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Design using geosynthetics

Part 10: Asphalt pavements

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Foreword

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This document was prepared by Technical Committee ISO/TC 221, *Geosynthetics*.

A list of all parts in the ISO/TR 18228 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

The ISO/TR 18228 series provides guidance for designs using geosynthetics for soils and below ground structures in contact with natural soils, fills and asphalt. The series contains parts which cover designs using geosynthetics, including guidance for characterization of the materials to be used and other factors affecting the design and performance of the systems which are particular to each part, with ISO/TR 18228-1 providing general guidance relevant to the subsequent parts of the series.

The series is generally written in a limit state format and guidelines are provided in terms of partial material factors and load factors for various applications and design lives, where appropriate.

This document includes information relating to the asphalt pavements. Details of design methodology adopted in a number of regions are provided.

For more than 30 years roads have been built, maintained and operated using different types of geosynthetics used as asphalt interlayers incorporated within asphalt pavements. Amongst other benefits, these products are successful in mitigating reflective cracking in pavements, improving pavement performance, extending pavement service life, resulting in a reduced total cost of ownership and a reduced carbon footprint.

Many of these products are related to geosynthetics used in geotechnical engineering and these products have been adapted and adjusted for use as asphalt interlayers. A geosynthetic used as an asphalt interlayer is special in the sense that it is used mostly between an existing pavement and a new asphalt layer. The method of function of these products cannot be directly compared to, for example, concrete reinforcement nor to soil stabilization mechanics. Moreover, geosynthetics used as asphalt interlayers are one part of a system together with the tack or bond coat bonded in between two courses.

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Design using geosynthetics —

Part 10:
Asphalt pavements

1 Scope

This document provides general considerations to support the design guidance to geotechnical and civil engineers involved in the design of structures in which a geotextile is used to fulfil the function of an asphalt interlayer. The key potential failure mechanisms and design aspects to be considered are described, and guidance is proposed to select engineering properties.

The state of the art is however limited and does not commend any particular design method. This document can be used as a basis for further research on, for example, system selection, design, performance testing, creation of local guidelines.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
bond coat
tack coat
bituminous binder used to promote the adhesion between layers in the construction and maintenance of roads and paved areas

Note 1 to entry: In some countries a bond coat refers to a polymer modified bitumen while a tack coat refers to a regular bitumen. In this document bond coat is used synonymously also for tack coat.

3.2
flexible pavement
layers of asphalt or bituminous concrete layers overlying a base of granular material on a prepared subgrade

3.3
installation aid
product attached to a paving grid in order to support the installation process in different ways without providing any additional function (B, STR and R)

Note 1 to entry: An installation aid could consist of a light non-woven fabric, additional fibres in the apertures of the grid or a thin synthetic foil. An installation aid can improve contact of the product to the base thus achieving better adhesion during the paving process. A thin synthetic foil attached to a grid is sometimes used to decrease adhesion experienced during unrolling.

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3.4
interlayer barrier
B
function provided by paving geotextiles saturated by bitumen, which act, in conjunction with a bitumen layer, as a barrier to the ingress of water and gasses, and thus prevent or delay the deterioration of the pavement

3.5
interlayer system
geosynthetic products bonded in between two pavement layers for asphalt pavement application

Note 1 to entry: These can be paving geotextile, paving grid or paving geocomposite.

3.6
paving geocomposite
product that combines a paving geotextile and a paving grid

3.7
paving geotextile
geotextile fabric adequately saturated with bitumen providing a stress relief function (STR) and acting as an interlayer barrier (B)

3.8
paving grid
product that has tensile elements which provides a reinforcement function (R) only

3.9
reflective cracking
vertical cracking through a pavement structure caused by stresses generated in the pavement foundations resulting from movements that propagate upwards or downwards through the pavement structure

3.10
reinforcement
R
function which is provided by tensile elements of a geosynthetic used as an asphalt interlayer to delay or prevent reflective cracking by the absorption of tensile forces

Note 1 to entry: Use of the stress-strain behaviour of a paving grid can improve the long-term mechanical properties of asphalt.

3.11
rigid pavement
hydraulically bound pavement on a granular subbase

3.12
semi-rigid pavement
intermediate state between flexible and rigid pavements

Note 1 to entry: Lean cement concrete, roller compacted concrete, soil cement and lime-pozzolanic concrete construction are examples of semi-rigid pavements.

3.13
stress relief
STR
function provided by an adequately bitumen-saturated interlayer (e.g. paving geotextile or paving geocomposite) which allows for slight differential movements between the two layers and thus provides stress relief to delay or prevent reflective cracking

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