Use of Geogrids in Wexford

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March 2019
Aim

To give an insight, based on Wexford County Council’s experience, into some of the practical pavement applications of geogrids from a local authority point of view.
Content

- Brief Overview of Geosynthetics
  - Main types used for road construction applications.
  - Historical applications in WCC

- Case study
  - N25 Primary Road Overlay
  - Site selection
  - Design
  - Works
Types of Geosynthetics

- Geotextiles
- Geogrids
- Geonets
- Geomembranes
- Geosynthetic Clay Liners
- Geofoam
- Geocells
- Geocomposites
Geosynthetic Functions & Examples

- Separation
- Drainage / Filtration
- Asphalt Reinforcement
- Reinforcement

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Geogrids and Road Construction

Two main Types.

- Unbound Sub base reinforcement.
- Asphalt/surface course course reinforcement.
Different Types of Reinforcement

Geosynthetics for Sub-base Reinforcement

- Reduces deformations in the sub-base.
- Provides soil separation (With a backing Geotextile)
- Mitigation of settlements => extension of road service life.
- Reduces the need for large depths of construction.
Different Types of Reinforcement

Geosynthetics for Asphalt Reinforcement.

- Retardation of reflection cracking.
- Extends rehabilitation intervals.
- Extends the service life of road.
- Economic solution to add strength to a road.
- Reduces maintenance costs.
Typical Pavement Crack (Without Reinforcement)
Dynamic Fatigue Tests

Crack

N=79,884
Typical Pavement Crack (With Reinforcement)
Dynamic Fatigue tests

Asphalt Reinforcement

N=503,832
Wexford Co. Co. Experience
Sub-Base Reinforcement Application

R702 Rehabilitation/ Water Main Rehabilitation
Wexford Co. Co. Experience
Asphalt Reinforcement Application

2009
R730 Wexford Quay

2019
Case study

N25 Ballynabola to Raheenvarren Pavement Scheme
N25 Site Specific Information

- National Primary Road
- Single Carriageway with hard shoulders
- AADT = 8000
- %HGV = 7.8
- Pavement Deteriorating (2014/2015)
Existing Pavement Condition: Rutting in wheel Track
Existing Pavement Condition: Cracking
Existing Hard Shoulder Failure
TII Pavement Management System

  Wheel track rutting
  Cracking
  Loss of skid resistance

- Identified the condition of the carriageway as Fair / Poor

- Local Authority survey work / interventions also backed up survey results.

- TII recommended that preliminary investigations be carried out, with a view to demonstrating the need for a proposed pavement scheme.
Design of Bituminous Mixtures, Surface Treatments, and Miscellaneous Products and Processes

DN-PAV-03074
June 2017
Recommended Solution

• Main Carriageway
  • Sectional repair of compromised pavement to a depth of 200mm
  • Overlay existing pavement with 55mm Binder Course & 45mm HRA
  • Install Asphalt Reinforcement to upper Layers to prevent future cracking & extend the life of the pavement

• Hard Shoulder
  • Cold mill Hard Shoulder to Sub-base level & install geo-composite reinforcement (Geogrid + Geotextile)
Cross Section

Asphalt Reinforcement

Sub base reinforcement
Reinforcement

• Sub-Base Reinforcement
  • Reinforcement, filtration, separation (All in one)
  • Easy to install
  • Good resistance against installation damage

• Asphalt Reinforcement
  • Flexible and easy to install
  • Bitumen coated polyester (suitable for fine milled surface)
  • Good resistance against installation damage
Extent of the Works

• Total length of works 3.6 km
• Application of Asphalt Reinforcement over affected area
• Application of Unbound Reinforcement in Hard Shoulder
• Contract awarded to Roadstone Ltd.
• Contract value - €2 million.

Works Programme Summer 2017

1. Sectional repair of main carriageway
2. Excavate and repair WBHS. Including unbound reinforcement.
3. Pavement overlay Main Carriageway. Install Asphalt reinforcement on affected sections.

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Hard shoulder Rehabilitation.
Asphalt Reinforcement – Bond Coating
Asphalt Reinforcement – Laying Process
Asphalt Reinforcement – Rolling

- Ultra light Weight nonwoven Backing
- Tensile Strength 50 Kn/m
- Bitumen content of Coating > 60%

Combination of bitumen coating grid & bond coat emulsion provided an extremely strong bond between the asphalt layers & geogrid
Asphalt Reinforcement – Paving
Completed Scheme
Completed Scheme

Figure 2: SCI Plots
Thank You

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