

THE USE OF ASPHALT IN HYDRAULIC ENGINEERING FOR EROSION & SCOUR PROTECTION

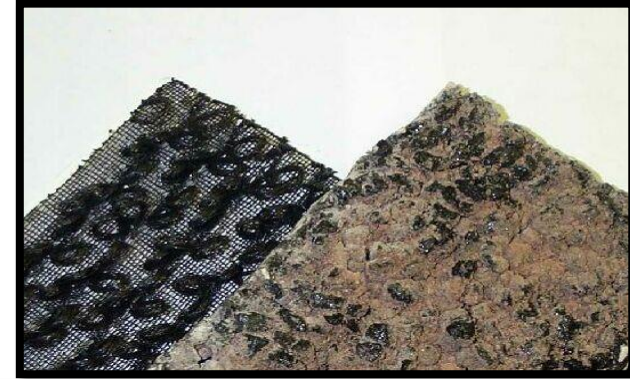
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Materials Used for Erosion Protection

- Geomat DM20
- Open Stone Asphalt (OSA)
- Bituminous Mastic
- Grouted Rock



Why use Asphalt?

Physical Properties

- Thermoplastic - Load/Temperature/Time
- Resists sudden impacts
- Follows long-term settlement
- Very good response to seismic loads



Environmental Aspects

Ecology

- Open structure good for colonisation by plants/fauna

Spatial Quality (Aesthetics)

- Black surface dulls quickly
- Surface treatments available

Water Quality

- Approval for use in drinking water reservoirs.

Embodied Energy

- Between rock & concrete



Erosion & Scour Protection

- Dams & Reservoirs
- Rivers & Flood Storage
Dams/Channels
- Estuaries & Coastal
- Ports & Harbours
- Offshore Engineering



Dam Maintenance

Dam Upstream Faces

- First project for Yorkshire Water in 1991
- Many further projects
- Designs improved/adapted
- Work with most major water companies



Dam Upstream Faces



OSA Revetments

- Typical working methods



Resisting High Water Flows

- Existing Dam Spillways
- In-line Flood Storage Reservoirs
- Seawall overtopping



Rivers - Geomat DM20

Alternative to Enkamat A20

- Increased Strength
- Bespoke sizes/details
- Choice of filter properties
- Flows up to 5m/s



Tidal Estuaries

Typical Problems

- Loose blocks
- Undermined toe
- Loose rock



Claybanks – Dovercourt, Essex

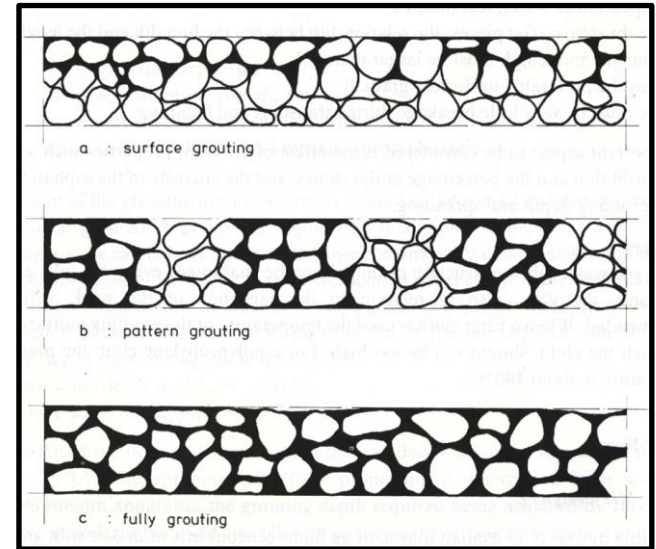
Long-term solution for exposed seawall

- Regular client with a failed seawall
- Phased upgrade to suit budget & dynamic foreshore
- Work from 1998 to 2014
- Revetment & flexible toe construction



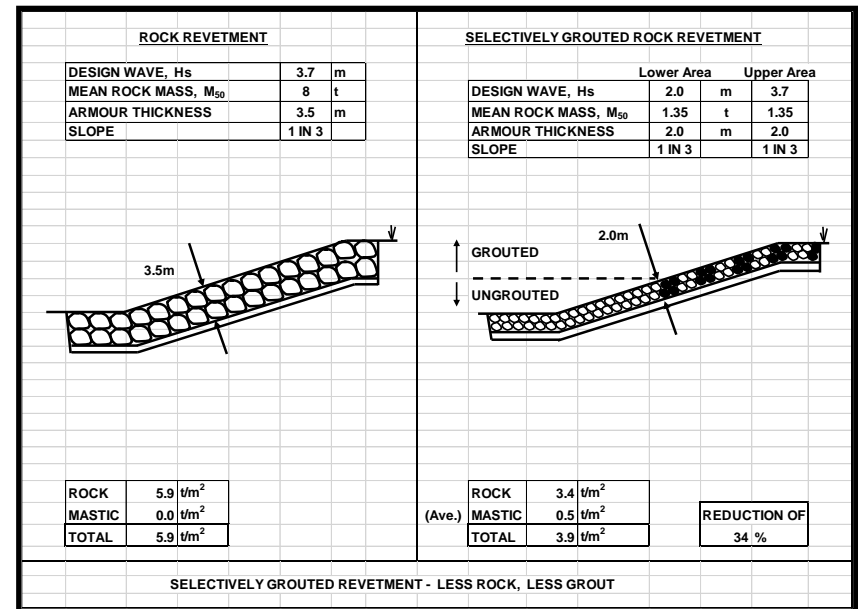
Grouted Rock

- **Very robust & flexible material**
- **Common in NL, not so much UK**
- **Above or under water**
 - Partial/Surface Grouting
 - Pattern Grouting (Effective Mass x 5-7)
 - Full Grouting



Grouted Rock

New Revetments or Upgrading Existing



Underwater Scour Protection

OSA

- Pre-fabricated mattresses
- Large mats (10m x 32m) – quick installation
- Flexible, robust, water velocities $>8.5\text{m/s}$



Grouted Rock

- Placed up to 20m deep
- Flows well underwater
- Strong joints – hot material fuses
- Efficient use of rock



Toe Scour Protection - Revetments

Bituminous Mastic or Grouted Rock

- Robust & very flexible
- Easy to add to existing structures
- Self healing & adaptable



Summary

Erosion & Scour Protection Solutions

- Large & small scale works
- Strengthening of existing revetments
- Protection of new earthworks
- Spillway & overtopping protection
- Underwater Scour protection
- Asphaltic options usually available – just ask!

