

City of Cape Town

**Presentation to the Construction
and Demolition Waste Workshop.**

**Challenges in specifying,
selecting, managing and using
recycled material in road works.**



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Recycled Material in Roadworks

Scope of presentation

- Setting the scene
- Current situation and specifications
- Reduce, re use and recycle
- Common recycled materials
- Additional materials in the market place
- Current experiences with recycled material
- Way forward

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This car's fuel costs R2.00 per litre.

Interested ?

Contact me on my cell.

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On the opposite side of the scale the following note has recently been released.

Diesel fuel quality advisory note

Issued by NAAMSA

25th October 2007.

50ppm grade fuel has been specifically introduced to to accommodate the new technology diesel vehicles.

This fuel is now being marketed along side the standard(500ppm) grade however it remains a concern that many filling stations do not display the legally prescribed labelling to indicate the maximum sulphur level of the diesel fuel on sale.



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Other uses of recycled material

- Polywood from discarded plastics
- Geofabrics from used plastic bottles
- Recycled paper
- Glass bottles from bottle banks
- Steel reinforcing rods from scrap steel

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Current specifications

- COLTO - S A National Roads Agency and Provincial road authorities
- SABS 1200 – local authorities and developers
- Red Book – Department of Provincial and Local Government and provincial Departments of Local Government and Housing
- Local authorities own specifications
- Guidelines documents – TRH and TMH series
- SA National Standards – SABS, SANS
- Parastatals – Eskom, Transnet, Telkom, etc
- Other – Private developments – gated communities, golf estates, etc.

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Reduce, re-use & recycle

- Optimise material use and ensure that it can be reused at end of its original economic life
- Recycling is an accepted process of re-using equipment or material in an additional or alternative situation.
- One man's waste is another man's treasure
- As we all know we already use a number of materials that are the waste product or residue of a previous process such as mine dump rock, blast furnace slag and fly ash.
- Excavated material from foundations of new developments is used as fill material
- A key indicator in waste tip management is the amount of airspace saved – this has positive spinoffs along the complete waste management process

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Accepted recycled material in road works

- Recycled asphalt pavements - RAP
- Recycled concrete pavements
- Ground granulated blast furnace slag - GGBFS
- Flyash

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Additional materials in the market place

- As a result of the current upswing in development many older buildings are being either demolished or extensively renovated. This process has generated a large volume of material of variable quality requiring removal and disposal.
- Resurfacing, rehabilitation and reconstruction of roads produces surplus material such as RAP, base, subbase and CTSB. The quality of this road material is of a less variable nature and some of it may be suitable for ETB, foam bitumen base or else downgraded for reuse in the lower layers of road construction.

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Some examples of recycled material in the Western Cape – you can even decide on the colour, shape and patterns of the material.



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Results for masonry from Natal Command under lightly trafficked
Permeable Paving

Results indicate that it would not be suitable for traffic but could be used
under sidewalks.

The voids in the screened coarse fraction were 40-45%



Recycled Material in Roadworks

10% FACT

91 KN Dry
67 Wet

Swell is
variable
sometimes
up to 1%
But all the
material is
NP

Thanks to
UKZN
Prof Phil
Everitt

Dry Density Vs CBR Ratio For 37mm Sample

Dry Density (Kg/m ³)	CBR Ratio	CBR/Dry Density %
1822	27.0	95
1848	28.2	97
1928	38.1	>100

Dry Density Vs CBR Ratio For 70mm Sample

Dry Density (Kg/m ³)	CBR Ratio	CBR/Dry Density %
1473	27.7	84
1581	36.4	90
1735	68.6	98

Dry Density Vs CBR Ratio For Blend

Dry Density (Kg/m ³)	CBR Ratio	CBR/Dry Density %
1773	19.6	98.9
1787	24.9	100
1679	18.8	94

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Some conclusions from UKZN:

- Need to decide on single source or general CD material
- Initial sorting should be as comprehensive as possible
- Mixing is essential to ensure uniformity
- Testing needs to be adjusted for source
- We need to rethink the classification criteria (eg swell)
- Durability may not be as serious a problem with masonry as sometimes thought but further work in this respect is needed
- Blending concrete with the masonry can give substantially better results but this decision depends largely on material available
- This material could be used to fill a niche gap in certain areas – G5 and thus optimum uses could vary in different locations.
- The aggregates will absorb water which is not then available for lubrication during compaction or for hydration reactions.
- There is a need to define sources in advance and develop a protocol for optimal deconstruction, storage, crushing and distribution to preserve what we must now accept as a resource.

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Way forward

- Establish work group to identify types/classes of recycled material that could be suitable for road works.
- Carry out testing as per TMH 1 on these types/classes of material.
- Determine sorting and selection requirement prior to crushing and screening process.
- Determine post screening stockpile management process.
- Set up alternative specification and measurement items in relation to the alternative material.
- Establish long term testing programme to monitor different recycled material.
- Include recycling industry in the aggregate supply industry.

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Thank you.