Growth and Development of Recycling in Pavement Construction

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Presentation

- Background
- Need to recycle
- Barriers to recycling
- Overcoming the barriers
- Client education / benefits
- Legislation
- Economics
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- Conclusions
- The way forward

Background

Johannesburg summit on sustainable development

“fundamental changes in the way societies produce and consume are indispensable for achieving global sustainable development. All countries should promote sustainable consumption and production patterns, with the developed countries taking the lead and with all countries benefiting from the process…”.

What does this mean for pavements:

Recycling Pavements – that is the recycling of pavement materials back into pavements either into the same pavement or another pavement; and

Recycling Alternative Materials into Pavements – recycling into pavements material available from sources other than pavements. (by-products, environmental risk).

C4.3 WG2 Committee objectives

Encourage recycling

- How?

Survey PIARC members experience

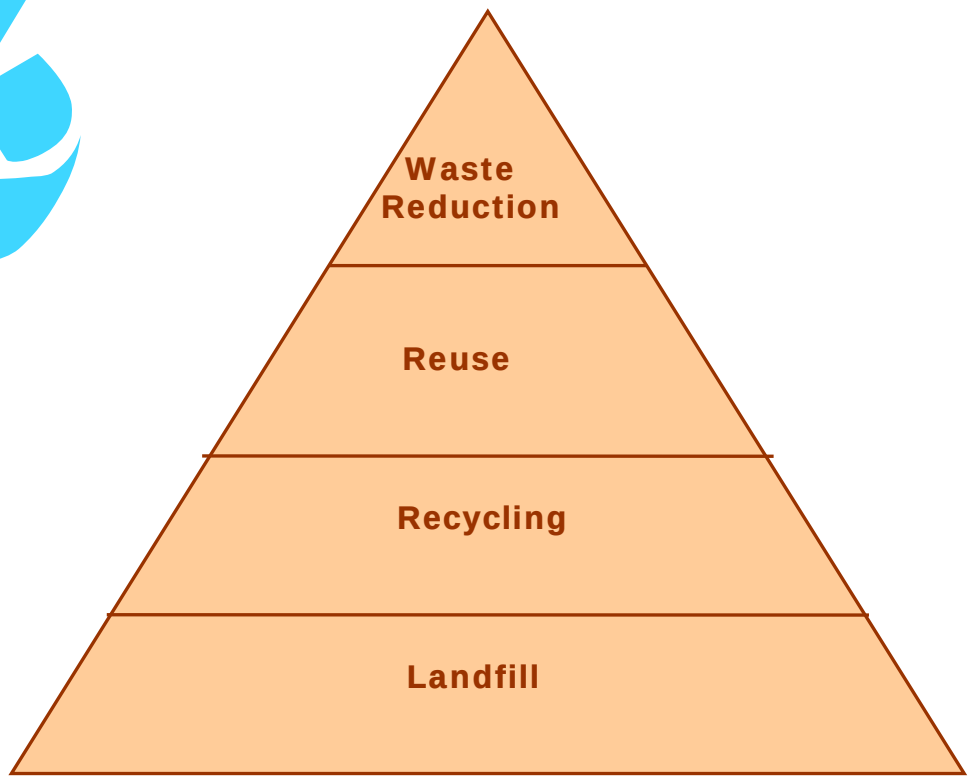
- Discovering the barriers
- How these barriers can be overcome

PIARC survey

A1.8 Overcoming the Barriers to Recycling in Italy, July 2005

Issue	Description	Available Guidance	Recommended Action Required
Specifications	Some materials and methods are excluded from existing specifications in particular for maintenance works of bituminous layers (1)	A number of guidelines for alternative materials and methods are available, *mainly from highways maintenance experiences*	Create a technical protocol of already done experiences. Update and *disseminate* existing guidelines to accommodate new developments more quickly.
Test methods	Some existing test methods developed for *new* materials, typically based on prescription standards, are not suitable for alternative ones such as recovered materials	A number of tests, assessed for new material have been extended to alternative materials. *Any material recovered and properly recycled is expected to be comparable with a new one.*	Move to performance-based test methods and Specifications
Reliability and Quality Control	Alternative materials perceived as highly variable and of low quality, *(especially discards from building demolition)*	Utilise or adapt existing quality control systems to produce a consistent, fit-for-purpose material	Adopt quality control procedures during the all process of recovering materials, as indicated by UNI EN ISO14000: develop new demolition methods and upgrade existing processing plants
Environmental Concerns	Potential long term leaching of contaminants into controlled waters; dust and noise during construction	*Forecast* behaviour using leaching tests and existing models (where necessary according with D.M. 5/03/97 n. 22 for Reclaimed Asphalt Pavement).	Major efforts from legislator to simplify actual legislation and research faster and easier leaching tests. Stronger cooperation with material producers.
Legal Frameworks	EU Construction Products Directive	Directive is available to guide suppliers	Adhere to directive where appropriate.
Waste Regulation including Waste Management Licensing and PPC Regime	Unclear whether materials are waste or not. Provide instruments to supervise on waste processing. Long time scenario is necessary for regional strategy on waste management licensing.	Each region should write its own waste regulation system, balancing local needs with national indications. One regulation system is in progress.	Approach environmental regulators for advice at early stage of design. Focus the attention of Minister for Public Works on the importance of reviewing waste regulation, to simplify it and to improve the use of wasted materials.
Conditions of Contract	Some forms of contract create an environment where there is no incentive for innovation. In particular the reclaimed materials are paid much less than new material, while reclaimed materials (i.e. recycled paper) costs more than new one.	Use appropriate forms of contract and adopt partnering	Review standard conditions of contract to rectify any clauses discriminating against innovative materials or methods
Planning	Make a short/medium term plan for treatment and recycling centres or plant	Guidance (for planners and applicants) has not been produced, *even if national regulation requires a better planning of resources.*	Ensure an adequate supply of recycling centres is available
Supply and Demand	Difficulty in matching supply and demand for some alternative materials	Plan in advance and organize the stockpiling of materials	Develop long term partnering agreements to enable better prediction of material requirements

Waste hierarchy – road pavements



Barriers

- Legislation and waste regulation
- Economics
- Client education / lack of awareness
- Supply and demand
- Planning
- Specifications and standards
- Test methods
- Contract conditions
- Reliability and quality control
- Environmental concerns

Legislation and waste regulation

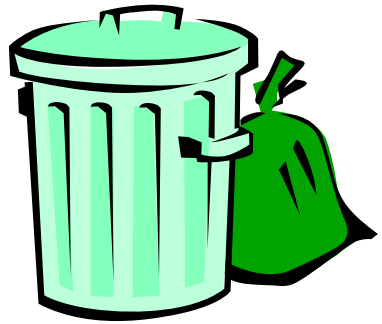
Clear guidelines are needed to classify materials as waste or provide exemptions to make the material recyclable. Waste licensing arrangements can be costly and make recycling uneconomic

EU construction products directive – useful guide to suppliers

Tighter controls on the disposal of construction materials to landfill

Economics

Perception that recycled are more expensive / or performance not as good



Price of secondary / recycled materials are often (but not always) uneconomic without government intervention

Implementation of aggregates levies and landfill charges can redress economic balance and create a level playing field

Supply and demand

Regional and national databases of sources of alternative materials to provide information on quantities and types of materials available

Co-ordination between parties is important to match supply and demand

Client Education

Important to disseminate information on recycled and secondary materials in an organised manner (Roadshows, Reports, Websites …)

In Japan, importance of recycling is generally understood and it has been enshrined in law (Change from a “throw away” to “recycling based” society)

Good co-operation between government and private industry are essential in achieving recycling targets (Netherlands)

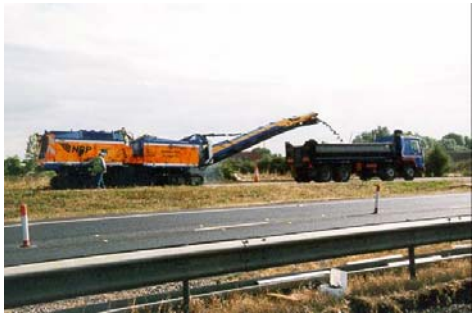
Can encourage competition between rehabilitation techniques (Canada-Quebec)

Planning

Adequate supply of recycling centres

With adequate supply of recycled aggregates and secondary materials

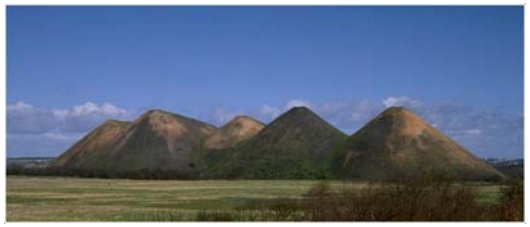
Examples of recycled and secondary materials



Asphalt planings

PFA / FBA

China clay sand



Spent oil shale

Slate Waste

Colliery spoil

Processed Construction,
Demolition & Excavation Waste:
Recycled Aggregate

Recycled Glass

Slag

Specification and Standards

Some countries only permit a limited range of recycled materials for use in construction, excluding others from use

CEN TC154 Aggregates from secondary sources. Examines how these can be incorporated into specifications

Performance based specifications allow the use of a broad range of alternatives. HD26/06 allows general use up to 30 msa (UK, Design Manual for Roads and Bridges)

The PIARC report contains useful links to sources of information from around the world:

- PAVEMENT RECYCLING DESIGN STANDARDS
- GOVERNMENT POLICIES AND INFORMATION ON RECYCLING AND SUSTAINABILITY

Conditions of contract

Some forms of contract can create an environment where there is no incentive to be innovative

Forms of contract that promote recycling are to be encouraged

Future contracts are likely to require minimum levels of recycling.

- ➔ Two recent surfacing contracts in the UK have required 25 % RAP from existing surfacing to be incorporated into the new surfacing.

Environmental concerns

It is important that potential leaching of contaminants from alternative materials are assessed prior to approving their use

Lessons learnt

South Africa has many years experience of stabilising layers using deep in situ cold process techniques. Field experience has indicated that designs can be conservative.

Similar experience in Australia with in situ recycling with savings often made compared with conventional techniques.

Use of ex situ recycling provides better control

Performance based specifications which allow and encourage innovation. Increasing confidence will lead to more wide spread use at increasing levels of traffic

Feed mechanisms into hot-mix asphalt plants are key to increasing levels of recycling RAP into high value applications.

The experience in the Netherlands where policies developed between Government and Suppliers developed over 20 years have made recycling the norm rather than the exception.

Recycling techniques - Cold

Cold in situ 1954

Recycling techniques - Hot

Conclusions and Recommendations

Provide legislative framework and contractual conditions to promote and provide incentives to recycling. Provide an economic level playing field

Decision makers demand minimum levels of recycling

Pro-active dissemination of information to the construction industry

Area wide co-ordination of recycling activities – use where materials are available

Development of performance based designs to encourage innovation

The published committee report will provide further detailed information (to be published shortly)

Way Forward

Need to change from a “throw away” to “recycling based” societies.

Recycling considered as the first option

THANK YOU FOR YOUR ATTENTION