Experiencias en mezclas asfálticas con residuos plásticos.

CET-CEDEX

Rafael Jiménez

Director de laboratorio

Oscar Gutiérrez-Bolívar








Polipropileno

Poliestireno

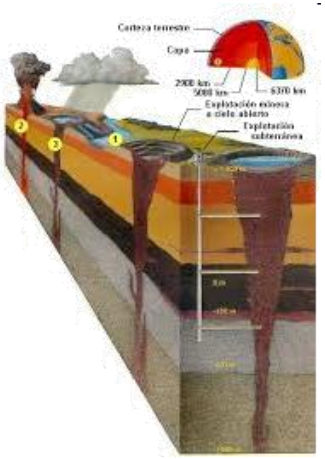
Caucho

Polietileno

Los «Polis»

Los plásticos

...pero ¿hay vida sin plásticos?



Naturaleza

Hombre

- Ecología
- Respeto al medio
- Preocupación por
  - Emisiones
  - Calentamiento global
  - Contaminación

Creaciones del hombre

Capacidad para corregir

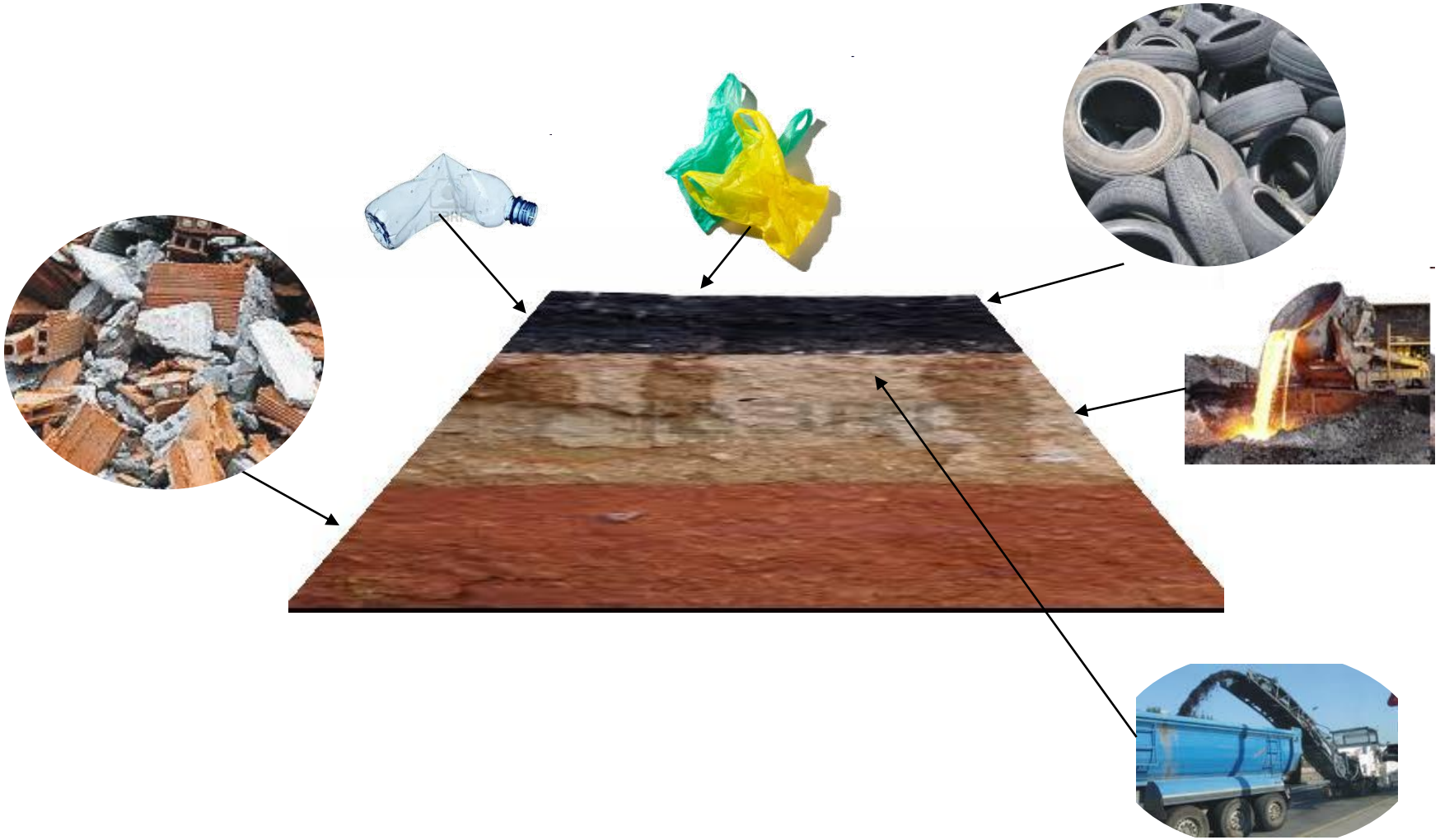
- Errores
- Abusos

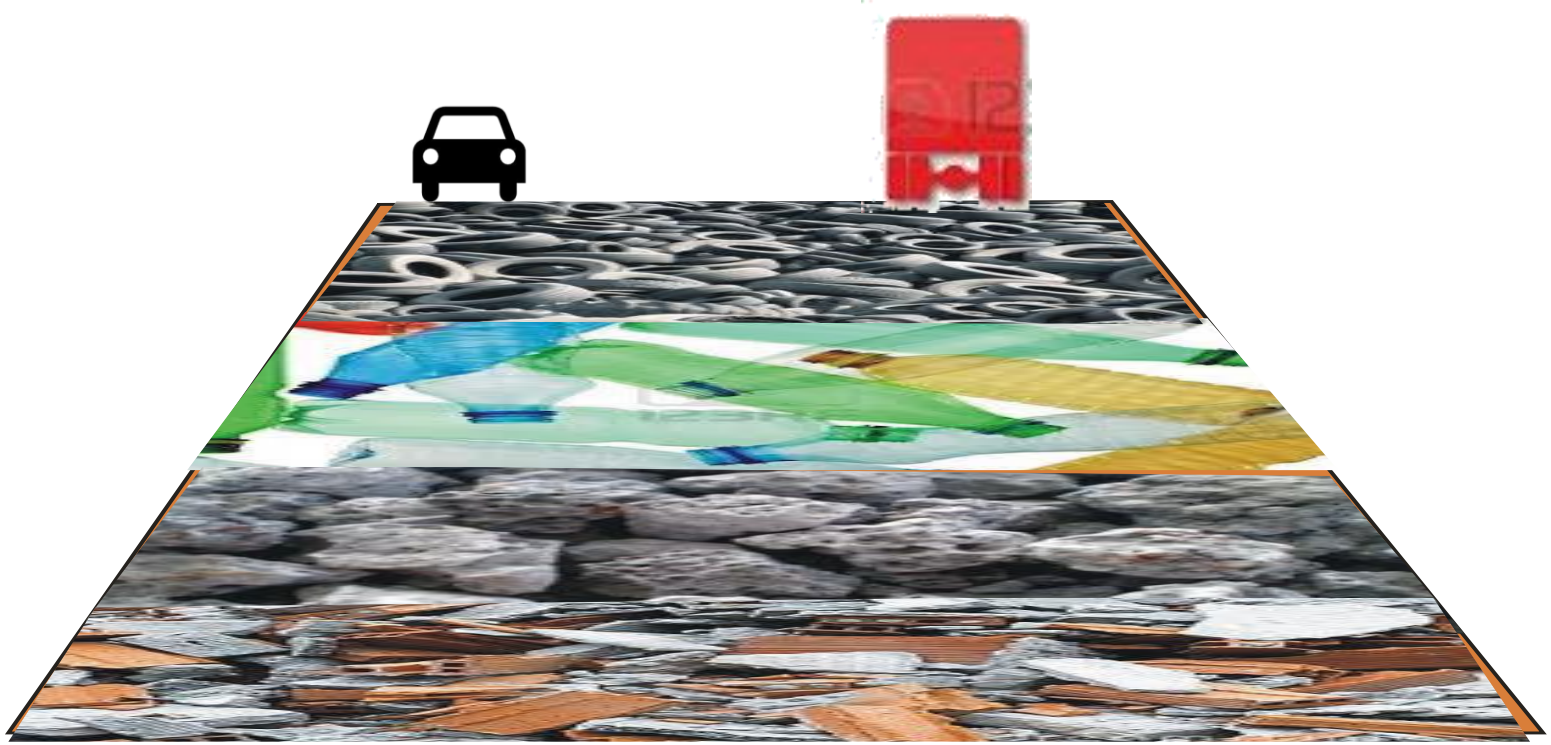
La carretera como vertedero ¿?

Sí

No

¿por qué No?





Materiales secundarios (residuos)

Ocupación de terreno
Concentración
Molestias

Materiales nuevos

Extracción
Agresión al paisaje
Impactos
Recursos escasos


Prestaciones
Reutilización

FICHA TÉCNICA	CLAVE: 4.5	Mes: DICIEMBRE Año: 2010

RESIDUOS PLÁSTICOS URBANOS

Nombre en inglés: Urban plastic waste

RESIDUOS PLÁSTICOS URBANOS

1.- ORIGEN

Los Residuos Plásticos Urbanos (RPU) empleados para obtener el material plástico reciclado pueden proceder de diferentes aplicaciones, no obstante, la procedencia de los mismos está basada en dos grandes fuentes [1] [2]:

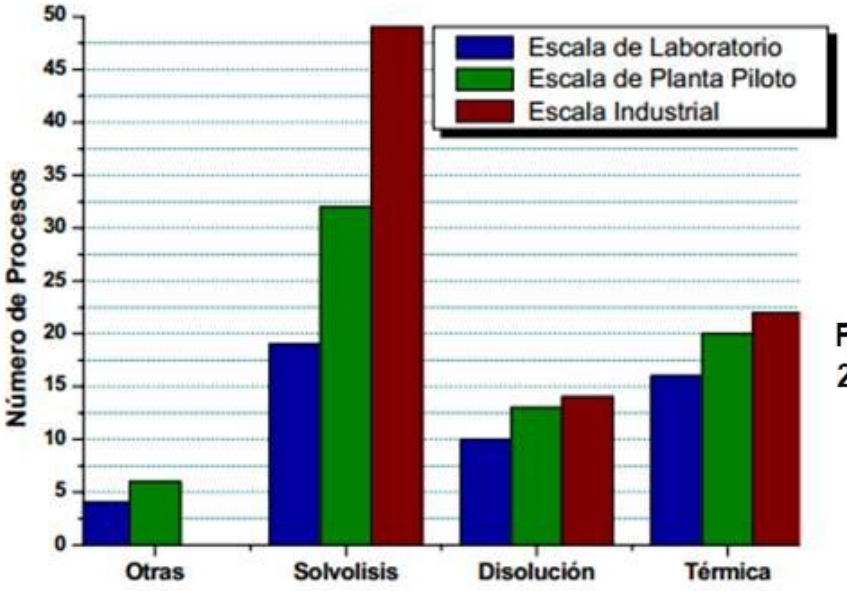
- Residuos procedentes de los procesos de fabricación, es decir, residuos que quedan al pie de la máquina, tanto en la industria petroquímica como en la transformadora.
- Residuos procedentes de la masa de residuos sólidos urbanos (RSU). Éstos se dividen a su vez en tres clases:

  - Residuos plásticos de tipo simple, los cuales se clasifican y separan en distintas clases.

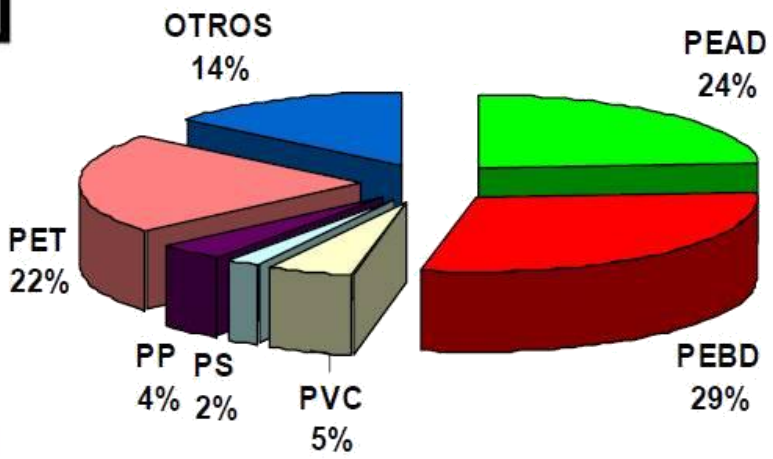
  - Residuos mixtos, se definen como la mezcla de diferentes tipos de plásticos.

  - Residuos plásticos mixtos combinados con otros residuos tales como papel, cartón, metales.

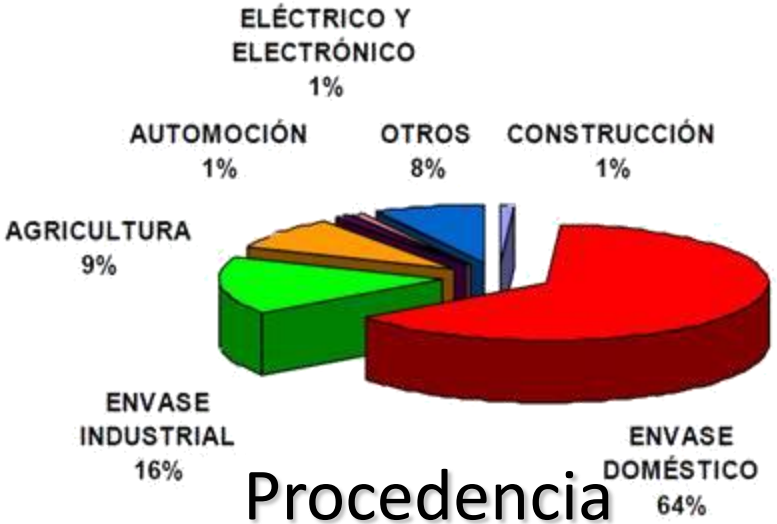
Proceso



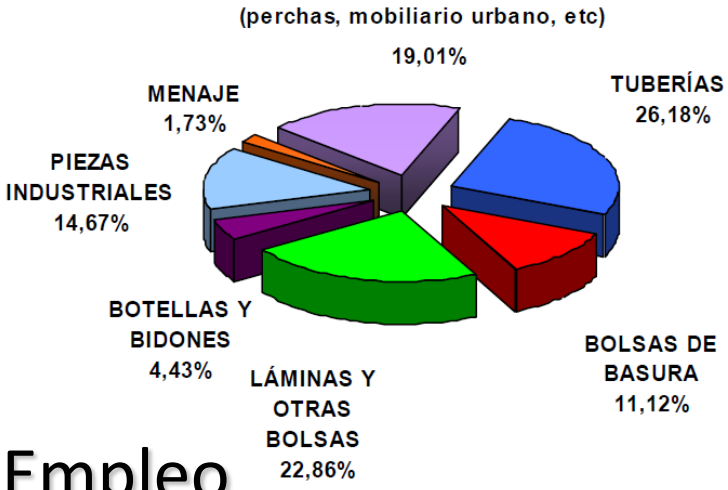
Tipos



Procedencia



Empleo



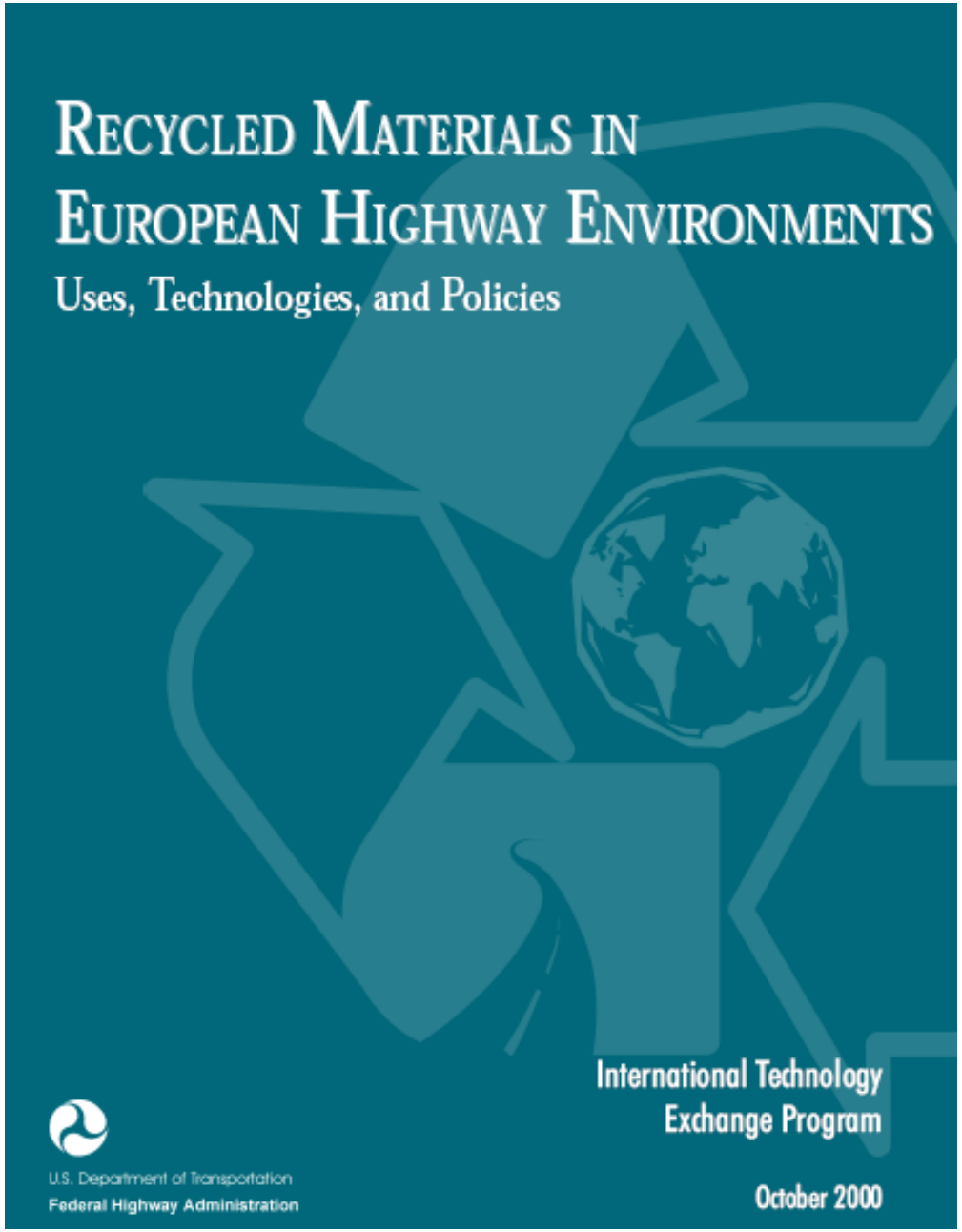
USA

- Polietileno de baja densidad
- Polietileno de alta densidad
- Poliestireno
- PVC
- Polipropileno

Novophalt©
Polyphalt ©

Mejor resistencia a Roderas { Nievelt (Austria), TRRL (UK)

Georgia, Canadá
SMA


RECYCLED MATERIALS IN
EUROPEAN HIGHWAY ENVIRONMENTS
Uses, Technologies, and Policies
International Technology
Exchange Program
U.S. Department of Transportation
Federal Highway Administration
October 2000

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Materials Letters 58 (2004) 267–271

MATERIALS LETTERS

www.elsevier.com/locate/matlet

Use of waste high density polyethylene as bitumen modifier in asphalt concrete mix

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Received 31 March 2003; accepted 28 May 2003

Vía Húmeda ⟶ Roderas

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Resources, Conservation and Recycling 52 (2007) 58–73
Resources Conservation & Recycling
www.elsevier.com/locate/resconrec

UK

A review of the use of recycled solid waste materials in asphalt pavements

Yue Huang *, Roger N. Bird [1], Oliver Heidrich [2]

School of Civil Engineering and Geosciences, Newcastle University, UK Cassie Building, Claremont Road, Newcastle upon Tyne NE1 7RU, UK

Received 16 December 2006; accepted 20 February 2007
Available online 6 April 2007

'Plastiphalt'

Vía seca → Estabilidad Marshall
Roderas
Rigidez

Contents lists available at SciVerse ScienceDirect

Construction and Building Materials

journal homepage: www.elsevier.com/locate/conbuildmat

Dynamic properties of stone mastic asphalt mixtures containing waste plastic bottles

Taher Baghaee Moghaddam *, Mohamed Rehan Karim, Tamalkhani Syammaun

Center for Transportation Research, University of Malaya, 50603 Kuala Lumpur, Malaysia

Vía seca ⟶ Módulo (1%)
Fatiga

(PTE en SMA)

Francia

Via seca

10-20% (0,16-0,245mm)

Roderas
Estabilidad Marshall

Vía húmeda 3% (Polietileno)del ligante

Deformaciones
Humedad

Mem. Fac. Eng., Osaka City Univ., Vol. 43, pp. 111－118 (2002)

Japón

UTILIZATION OF WASTE PLASTICS IN ASPHALT MIXTURES

Osamu KAMADA* and Masaru YAMADA**
(Received September 30, 2002)

Synopsis

Vía seca 10%

Mezclas densas.

- **Polietileno**
  - **Roderas** 
  - **Fatiga**
  - **Adherencia a rodillo** 
- **Polipropileno**
  - **Roderas** 

Drenantes

- **Polietileno (roderas+fatiga)** 
- **(pequeño evita adherencia)**

Canadá

Where the Streets Are Paved with Plastic

Throughout ancient history, one of the best indicators of whether or not a civilization had its act together was the quality and condition of its road system. The Book of Revelation in the Bible takes this notion to its extreme in its description of heaven, where "the street of the city was pure gold." * Today, contemporary cities would be ridiculed (and bankrupt) if they tried to meet those heavenly expectations. As Kristine Lofgren explains in **Inhabit** (Nov. 25, 2012), Vancouver, British Columbia is experimenting with a road material that makes a whole lot of sense considering how much there is to deal with: recycled plastic. The city has teamed up with Toronto-based GreenMantra, which produces hybrid asphalt that uses recycled plastic as a binder. The plastic allows the asphalt to flow at a much lower temperature than regular asphalt, requires about 20 percent less fuel to produce than regular asphalt, and also reduces the vapors emitted during the street-paving process. Altogether, Vancouver city officials are hoping to reduce greenhouse gases by 300 tons per year through the new process alone.

WWW.METAPHORICALPLAYPUS.COM / WWW.FLICKR.COM/PHOTOS/29638108@N06/

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Materials Letters 58 (2004) 267–271
MATERIALS LETTERS
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Turquía

Use of waste high density polyethylene as bitumen modifier in asphalt concrete mix

Sinan Hınıslıoğlu[a,*], Emine Ağar[b]
[a] Civil Engineering Department, Engineering Faculty, Atatürk University, 25240 Erzurum, Turkey
[b] Civil Engineering Faculty, İstanbul Technical University, Maslak/İstanbul, Turkey

Received 31 March 2003; accepted 28 May 2003

Pyrolysed Wax From Recycled Crosslinked Polyethylene as a Warm-Mix Asphalt (WMA) Additive for Crumb-Rubber-Modified Asphalt

L. Shang and S. Wang*
Research Institute of Polymer Materials, Shanghai Jiao Tong University, 200240, China

China

Received: 5 July 2010, Accepted: 1 November 2010

Egipto

Effect of Low-Density Polyethylene on Fracture Toughness of Asphalt Concrete Mixtures

Ayman M. Othman[1]

American Journal of Applied Sciences 4 (6): 390-396, 2007
ISSN 1546-9239

Jordania

The Use of Polyethylene in Hot Asphalt Mixtures

Mohammad T. Awwad and Lina Shbeeb
Department of Civil Engineering, Faculty of Engineering Technology
Marka, P. O. Box. (15008) Amman 11134 Jordan

Rubber-polyethylene Modified Bitumens

Irán

A... ...sefi*
Department of Plastics Engineering and Processing, Iran Polymer and Petrochemical Institute,
P.O. Box: 14965/115, Tehran, I.R. Iran

Received 30 April 2003; accepted 8 December 2003

ABSTRACT

Technical Paper

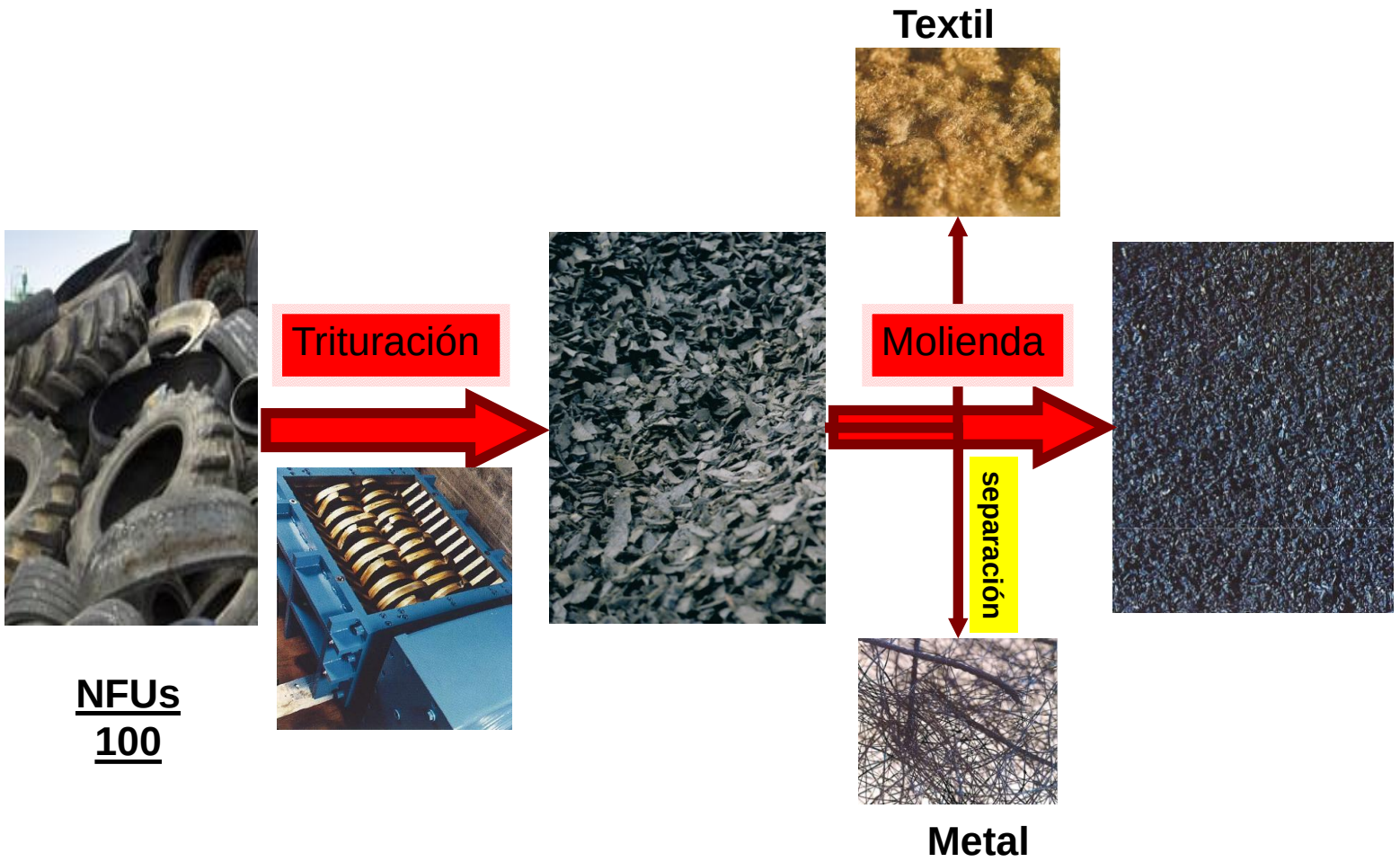
Portugal

ISSN 1996-6814 Int. J. Pavement Res. Technol. 6(4):457-464

Incorporation of Waste Plastic in Asphalt Binders to Improve their Performance in the Pavement

Liliana M.B. Costa[1], Hugo M.R.D. Silva[2*], Joel R.M. Oliveira[2], and Sara R.M. Fernandes[1]

Neumáticos...



Objetivos

- Desconcentrar
- Reutilización
- Preservar recursos
- Mejoras

Balance

Muchas gracias

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