USA Sustainability Project

Recycling Automobiles’ Carpet Scrap

SoonYong Park (CEO)
pksy@ditgreen.com

DIT GREEN Co., LTD.
Dismantling vehicle for spare parts.

Car parts -
- Brake pads and shoes
- Windshields and glasses
- Oil filters
- Carpets

Recycling vehicles and their parts saves an estimated 85 million barrels of oil a year.

Conserves resources such as oil, steel and aluminum, the base materials for many auto accessories.
Hyundai’s Recycle Strategy in 2015
▶ **85% Recycle at End of Life**
▶ **15% Recycle Plastics for New Car**
3R concepts - REDUCE, REUSE, RECYCLE.

Product Stewardship - manufacturers to design environmentally-friendly products

Important generic elements of EPR include:

- product category or waste stream focus
- assignment of responsibility for life cycle management, including product take-back
- and phase-out of hazardous materials
- producer flexibility and accountability in program design and implementation
- transparency for the public (e.g., clear labeling of products)
- performance requirements and deadlines
- regular monitoring and reporting of progress
When Legislation (ELV) in 2000
- Minimum reuse & recovery

Why
- High landfill costs
- Restriction & Cheap recycled material

How
- Restrict use of material
- Enforce recycling facility
- Develop infrastructure

When New law by government in 2002

Why
- Availability of landfill space
- Promote use of recyclable resources

How
- Charge buyers recycling fee
- Take responsibility for ELV recycling
CHALLENGE FOR 85% RECYCLABLE

Nylon (Recyclable)
Bond (Not Recyclable)
PVC (Recyclable)

Monstrous Hybrid

Not Recyclable

Installed in Car
Landfill at End

Landfill
**OUR SCRAP RECYCLING FEASIBILITY TEST & MANUFACTURING PROCESS**

**Recycling Crushed Particles**

**Manufacturing Equipment**

**Process Diagram**

- FCS
- WEB
- Mixture
- Forming
- Press / Heating
- Fiber Sheet

**Cross section of Recycled Carpet**
Foundation : 2009. 11. 02

President : Park Soon-Yong

Business : Recycling business of FCS wastes, Eco-friendly automobile parts, Insulating and sound-absorbing materials of building, and Sleeping gear etc.

Major products : Recycling sound-absorbing and insulating felt for automobile,
Recycling sound-absorbing and insulating felt for building,
Sleeping gear(mattress etc.)

Head Office : Room No. 302, Towerkoreana Building, 385-16, Doryong-dong,
Yuseong-gu, Daejeon, 305-340, KOREA

Factory: 363, Sinwol-ri, Iwol-myon, Jincheon-gun,
Chungcheongbuk-do, 365-824, Korea

Telephone Number: +82-10-5118-9001, +82-70-7701-6763 Fax Number:+82-43-537-0065
Email Address: hitechbiz@gmail.com, pksy@ditgreen.com, woongee@ditgreen.com
2009. 11. : Establishment of DIT GREEN Co., LTD.
2009. 11. : The joint research with HYUNDAI/KIA for the eco-friendly sound-absorbing felt
2010. 02. : National project for “FLOOR CARPET SCRAP RECYCLE” (KAIST)
2010. 06. : Certification of the Venture Company in Korea
2010. 06. : Certification of the Research Institute affiliated with company in Korea
2010. 10. : Receive an award on the venture company competition (Environmental Government department)
2011. 10. : Signed Letter of Intent for the recycled sound-absorbing and insulating felt for building, (SK Chemicals)
2012. 01. : Agreement of MOU for the recycled sound-absorbing and insulating felt for building, (SK Chemicals)
2013.06. : Purchase FCSR Factory (Land: about 8,000㎡, Building: about 3,000㎡)
            363, Sinwol-ri, Iwol-myon, Jincheon-gun, Chungcheongbuk-do, 365-824, Korea
2013. 08. : Contract of purchase for FCSR’s equipment (OKAZAKI Machine co., Ltd, Japan)
2013. 12. : Contract of purchase for FCSR’s equipment (KSG co., Ltd, Korea)
2013. 12. : Purchase signed a conditional assignment to the recycled sound-absorbing and insulating felt for building,
            (SK Chemicals)
2013. 12. : Acquired comprehensive recycling business for FCS
2014. 03. : Fully Integrated Manufacturing System in Floor Carpet Scrap Recycling Factory in KOREA
## Car Parts

Thickness: T(㎜), Weight: g/㎡

<table>
<thead>
<tr>
<th>Thickness/Weight</th>
<th>Soft</th>
<th>Hard</th>
</tr>
</thead>
<tbody>
<tr>
<td>5T/600~1,000</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>20T/600~1300</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>30T</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>50T</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

## Build materials (Insulations etc.)

Thickness: T(㎜), Weight: K(㎏/㎥)

<table>
<thead>
<tr>
<th>Thickness/Weight</th>
<th>Soft</th>
<th>Middle</th>
<th>Hard</th>
</tr>
</thead>
<tbody>
<tr>
<td>5T/10~100K</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>20T/10~100K</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>30T/15~100K</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>50T/15~100K</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

## Product Image

[Image 1]

[Image 2]
Wheel Guard wheel and gives protection to the body from rust or other damage caused by soil or water as a guard of resin and felt that installed between the car body material, such as sand and gravel of the road at the same time the noise is caused by a conflict due to chipping means for car parts that serve for sound-absorbing and sound-insulating material and model, etc. prepared in various forms depending

Product Image
In spite of the insecure conditions in the world economy, the domestic factory of HYUNDAI/KIA keep the highest rate of production in this year. In USA, the rate increased as 1~3%, and also in China keep 100%. HYUNDAI/KIA has been increasing the production capacity.

3rd factory (capa. of 300,000 cars) in China, 150,000 cars in Russia, 150,000 cars in Brazil

HYUNDAI/KIA’s new factory in Mexico is in process (capa. 300,000 cars)
# HYUNDAI R&D CENTER TEST

## Combustibility : tested by HANMIN

<table>
<thead>
<tr>
<th>Samples</th>
<th>Rate (mm/min)</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. 1</td>
<td>41</td>
<td>21</td>
</tr>
<tr>
<td>No. 2</td>
<td>41</td>
<td>2</td>
</tr>
<tr>
<td>No. 3</td>
<td>46</td>
<td>13</td>
</tr>
<tr>
<td>No. 4</td>
<td>41</td>
<td>8</td>
</tr>
<tr>
<td>No. 5</td>
<td>29</td>
<td>10</td>
</tr>
</tbody>
</table>

Average: 39.6

Maximum: 46

## Heavy metal : tested by HANMIN

<table>
<thead>
<tr>
<th>Items</th>
<th>Standard</th>
<th>Sample</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pb</td>
<td>900 PPM under</td>
<td>15.7</td>
<td>Pass</td>
</tr>
<tr>
<td>Hg</td>
<td>900 PPM under</td>
<td>ND</td>
<td>Pass</td>
</tr>
<tr>
<td>Cd</td>
<td>90 PPM under</td>
<td>ND</td>
<td>Pass</td>
</tr>
<tr>
<td>Cr$^{6+}$</td>
<td>900 PPM under</td>
<td>337.1(Cr$^{3+}$)</td>
<td>Pass</td>
</tr>
</tbody>
</table>

## VOCs : tested by HANMIN

<table>
<thead>
<tr>
<th>Items</th>
<th>Conc.(ppm)</th>
<th>Criterion</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>TVOC</td>
<td>2.6</td>
<td>encourage</td>
<td>Pass (1 class)</td>
</tr>
<tr>
<td>HCHO</td>
<td>0.52</td>
<td>encourage</td>
<td></td>
</tr>
</tbody>
</table>

## Smell : tested by HANMIN

<table>
<thead>
<tr>
<th>Samples</th>
<th>Grade</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. 1(DRY)</td>
<td>3</td>
<td>Pass</td>
</tr>
<tr>
<td>No. 2(DRY)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>No. 3(DRY)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>No. 4(WET)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>No. 5(WET)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>No. 6(WET)</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>
End of Life Vehicle is a directive adopted by European Union in 2000.

Every year, end of life vehicles generate between 8 and 9 million tons of waste in EU.

Many of End Of Life Vehicles are picked up and are treated in an environmentally responsible manner, some do not receive the required treatment necessary to de-pollute the vehicle.

The directive which aims at making vehicle dismantling and recycling more environmentally friendly.

In the United States 10-11 Million vehicles reach the end of their lives and are taken off the road every year.
VALUE CHAIN IN CLOSED ROOF CYCLE

End of Life

Installing

Tooling

Rolling

Raw Material

Recycle

CO₂ Reduction

1 ton recycled scrap = 98 gallons of petroleum = 1 ton of greenhouse gas

Year 2012 (Recycling Initiative)

2400 tons of CO₂ Emission

1 ton recycled scrap = 98 gallons of petroleum = 1 ton of greenhouse gas

2400 tons of CO₂ Emission

Year 2012 (Recycling Initiative)
Automobile carpet recycle/reuse

US Manufactured carpet recycle/reuse

- Confidential Disclosure Agreement signed
- Product Evaluation Agreement signed

- Sample Product (carpet) recycling process test
- Share test results
- Future collaboration for potential usage/product after recycling
- Analysis of recycling process
- CARE’s visit to DiTGreen, KOREA
Thank you!