


*Is it a Waste or
Is it a Resource?*



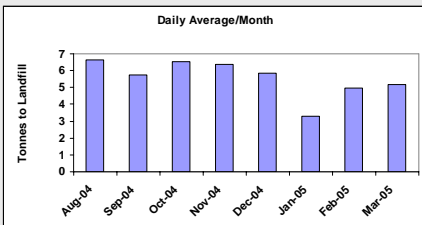
Rev:  

Typical Automotive Insulation Waste



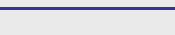

Rev:      

\$1.8 Million of Buried Treasure



Month	Tonnes to Landfill
Aug-04	6.5
Sep-04	5.5
Oct-04	6.5
Nov-04	6.5
Dec-04	5.5
Jan-05	3.5
Feb-05	5.0
Mar-05	5.0

At (say) \$1.50/kg, waste value > \$7,500/day or \$1.8 mill pa

Rev:  


*Waste to Landfill =
Buried Treasure*



Rev:  


**Textile Recycling
The Conventional Approach**


- Tear it up and use it again
 - Wipes
 - "Shoddy"
 - Paper
- Problem
 - Waste separation
 - Unsuitable for coated, bonded, and processed textile waste



Rev: 

Conventional Processes

- La Roche Rotary Cutter




Rev: 

Conventional Processes

- La Roche Exel Tearing Machine



Rev: _____



 

Conventional Processes

- La Roche Pulling Machines

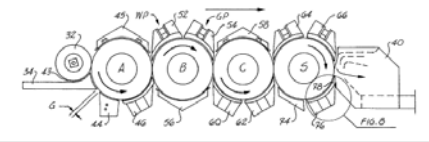



Rev: _____



 

Conventional Processes

- Hollingsworth US Patent 6061876 (1998)
- A textile fiber recycling machine for reprocessing hard thread waste, woven and nonwoven fabrics, carpets, rugs and the like



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Changing the paradigm

- There has to be a better way to get value out of post-industrial waste that cannot be recycled using conventional processes
- Coated and bonded textiles cannot be torn up into fibres
- Why focus on the fibre?
- Why not focus on the polymer?



Rev: _____

The I.N.C. Waste Strategy

- Waste in landfill is burying the treasure
- Remelting is energy intensive
- It's just not worthwhile separating mixed waste
- Recycle and reuse within the supply chain
 - Same materials
 - Improved converting efficiency from secondary processing – 70% → 100%
- Recycle and reuse within the same industry
 - Controlled (known) materials
- Selectively recycle and reuse from other industries
 - Make materials compatible

Rev: _____

Typical Automotive Waste

- Problem
 - Up to 40% of material is wasted – matrix and trimmings
 - Waste is mixed
 - Some can be torn or cut up
 - Most cannot be processed through traditional textile processes
- Solution????

Rev: _____

Automotive Insulator

- 57% yield from 1200 wide
- Step 1 minimise waste!

Rev:

Automotive Insulator

- 91% yield 2000 wide

Rev:

The Unconventional Solution

- US Provisional Patent Application # 61-119,945
 - Plastics recycling technology
 - Adapted for textiles
 - Knife mills, not rag tearers
 - Processes mixed waste
 - Produces very short fibre recyclate
 - Blend recyclate with binders, fillers, other recycled materials
 - Incorporate thermoplastic binder if not present
 - Form web
 - Fuse web

Rev:

Suitable Materials

- Textiles incorporating thermoplastic content
 - Woven
 - Knitted
 - Nonwoven
 - Bonded
 - Coated, eg PU, PVC
- Process
 - Mill to fine particle sizes, 3-10m,
 - Homogeneous mixture with very short fibres
 - Fuse the whole into a homogeneous form

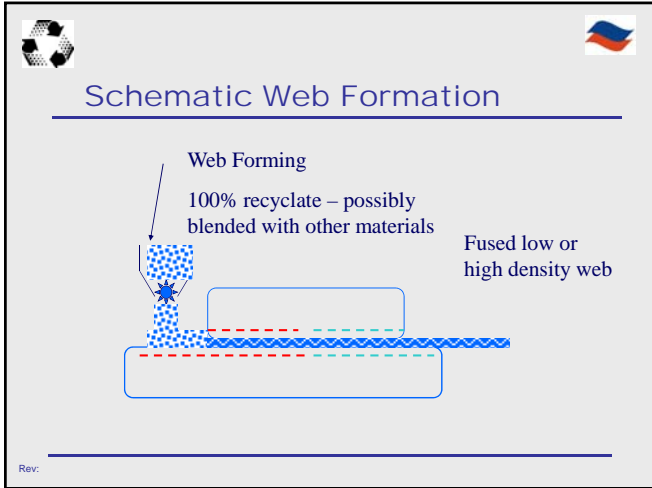
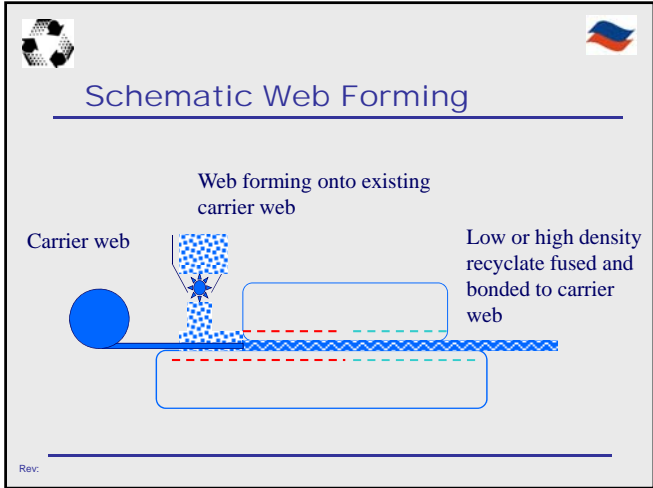
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Process

Rev:

Single Shaft Shredder

Rev:



- Samples - a total waste solution
- ⓐ A - Moulded auto component (DECI-TEX 3D)
 - ⓑ B- Self-adhesive Insulation (DECI-TEX 3D 25A)
 - ⓒ C- PE film laminate with PET nonwoven (DECI-TEX 3D 'FF')
 - ⓓ D- Moulded truck dash insulator (DECI-TEX XT)
 - ⓔ E - 100% PET nonwoven bulk insulation (DECI-TEX 3D)
 - ⓕ F - Foam laminated PET auto upholstery
 - ⓖ G - Automotive carpet - nonwoven backed
 - ⓗ H - **PVC backed carpet = Reinforced PVC???**