

How soon could car seats enter the 3-D comfort zone?

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New 3D textiles made of recyclable polyester fibres could contribute help cars be easier to recycle. But recycling technology has yet to progress in separating seat material from other car components.

Vehicles seats are normally made of polyurethane foam, a thick material that is expensive to recycle and ends up in dumping sites or being incinerated. Scientists working under the umbrella of the <u>GREENUP</u> project are now working on substituting polyurethane foam with a 3D fabric. This type of textile is normally used in applications such as backpacks' nets and padding. For cars seats, it is combined to leather



butts recovered from seat covers and produced through a 100% <u>heavy</u> <u>metals</u> free tanning process, giving it a more sustainable fate than being buried in landfills.

This novel textile is made of 100% recycled polyester yarn produced from the waste generated during different production steps of automotive and other transportation industries. "At the end of life the polyester could perfectly return to the company that made the yarn and be processed to produce new yarn," explains project co-ordinator Javier Jiménez, head of the textile technologies division at the Technology Centre Leitat, in Terrassa, Spain. "The leather could instead be recovered for products that do not require a high-quality material such as grinded leather used to make shoes interior soles," he adds.

Experts welcome this initiative. "Using pure <u>recycling</u> polyester in new fibres is not state-of-the-art and is a good idea for this kind of application [too]", says Thomas Stegmaier, researcher in technical textiles at the German Institute for Textile and Fibre Research Denkendorf (DITF), located near Stuttgart.

Substituting foams with 3D textile seems likely to bring several advantages. It has a higher recyclability, transpirability, permeability and is more rot-proof. However, it offers some inconvenience too. It has a higher raw material cost, longer processing due to the need to assemble different layers and requires new investment in machinery capable to produce the new material. However these downsides may be counterbalanced by the fact that "the process has no greenhouse gases emissions and works at low temperatures," says Jiménez.

The strongest incentive for recycling car components stems from an EU Directive dubbed <u>End-of-Life Vehicles</u> (ELV) designed to enhance the sustainability of the car industry. It requires, by January 2015, the reuse and recovery for all ELV to be increased to a minimum of 95 % of the



average weight of each vehicle, per year. It also requires the reuse and recycling of a minimum of 85% of each vehicle. This is designed to counter the huge waste, leading to between 8 and 9 million tonnes of waste created, each year, by cars disposal in the European Union.

Some recycling industry advocacy representatives point to the added value of this approach in terms of sustainability. "Any initiative to increase recycling is good for Europe's resource efficiency," comments Antonino Furfari, recycling and advocacy manager at European Plastic Converters in Brussels, Belgium. But, seats constitute a relatively small fraction of the total car weight, estimated to be up to 5% of the car weight. So he does not believe this technology will contribute significantly in ensuring compliance with the Directive.

What is more, there are further problems before the Directive can be implemented adequately. "The recycling of materials from old cars has been in discussion for years but textiles are still not recycled because they end up being very dirty due to the usage and it is very expensive to wash them," Stegmaier says. He thinks a possible solution could be in developing special fibres with self-cleaning effect, such as nanostructured polyester fibres. It is "something we are working on now", he adds.

Realistically, separation technology may need to be developed further before this type of recycling is taken up. "I don't think the problem lies there but in the fact that today the whole ELV is put into a large shredder," Furfari tells youris.com. Instead, the real problem appears to be that it is very expensive to separate the various components. "Most of the plastics are black and the current optical [separation technology] is not able to detect them, so they are not separated. Once a [technology] able to separate them were established, if there were enough tons of PET, then someone could invest in recycling it, otherwise it would keep going to landfill or incinerator," Furfari tells youris.com.



To facilitate a potential market introduction, project partners are exploring the possibility of developing mixed structure combining polyester and polyurethane. They are also focusing on the railway sector, for which they are now developing a prototype of a train seat.

Provided by Youris.com

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