

## A natural material choice

Automakers are tapping additional interior zones to employ natural fiber composites, and for the 2005 model year one vehicle maker's crossover product will use the fully recyclable material that is processed via a one-step forming method.

The all-new 2005 **Ford Freestyle** will use **FlexForm's** natural fiber composite as a seat backing. "The FlexForm non-woven was chosen because it's a blended material that addressed a noise issue that was occurring with a wood stock-based material," said Gregg Baumbaugh, CEO of FlexForm Technologies. "In addition to solving the noise issue, the natural fiber composite seatback debut reflects an application that does have some load-bearing requirements. In the future, the intent is to have our product utilized as a load floor material, based on formulations that will give the material additional strength."

A different vehicle maker will use FlexForm Technologies' natural fiber composites for front and rear door panel substrates on select 2005 vehicles. The natural fiber composite door panel differs from the standard injection-molded process—which usually uses filled polypropylene or glass-reinforced urethane resins—by requiring post-molding finishing steps such as trimming, bonding of the cover stock, and clip assemblies. In addition, a sport utility vehicle will have front and rear door beltline bolsters and armrests manufactured from FlexForm material.

Natural fiber composites are getting interior application consideration based on the material's advantages. "The strength-to-weight ratio and final cost to produce the finished product are key advantages of using this type of composite," said Garry Balthes, President of Research and Development for FlexForm, adding, "One-step processing allows for the elimination of costly adhesives and labor that is typically associated with the secondary operations for adhering cover materials and/or backside attachments."

FlexForm produces the natural fiber composite by using a carding system to vary natural and synthetic fiber formulations. The fibers, mixed at various transi-



*The all-new Ford Freestyle, powered by a 3.0-L V6, has three rows of fold-flat passenger seats.*



*FlexForm's natural fiber composite is used on the backside of the second row, three-person bench in the Ford Freestyle SEL.*

tion points along FlexForm's line, have a total web weight of 80 g/m<sup>2</sup> (0.16 lb/ft<sup>2</sup>). "This web is then cross lapped to build the final composite weight required, prior to entering the needle loam, which compresses and mechanically entangles the fibers into the final product," Balthes explained. Laminates to the primary composite can be added, or a heat-set mat can be added to form a semi-rigid, low-density board.

"To date, each material composition in use has been developed around the end application and has its own set of performance data. By varying the composition, manufacturing setups, and press densities, natural fiber composites can be produced with an almost unlimited set of specifications," said Balthes.

From a manufacturing perspective, FlexForm natural fiber composites are produced in one of three ways: basic mat material, which is heated in a dual platen contact oven; heat-processed and semi-compressed low-density board for forced, hot air heating; and a pre-compressed board that can be processed using either infrared or convection heating.

FlexForm's natural fiber composites have been used in vehicle areas such as rear package trays, A-, B-, and C-pillar covers, center consoles, door panel inserts, and headliners for heavy-duty trucks. FlexForm expects to see future applications for load floors and non-commercial aircraft interior trim panels.

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