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Winner "Process"

>> Design and process development of non axi-symmetric four-axis integral filament winding of double-'D'-shaped, all-composite road tankers

Modern Engineering Plastics Pvt, Ltd MEPPL (India)

Partners: NGN Composites (India), CNC Technics Pvt Ltd (India), Crescent Consultants (United Kingdom) and TIFAC Govt. of India.

Road tankers are used all over the world for transportation of water, edible oil, milk, chemicals and petroleum products. Traditionally, road tankers have a steel or aluminium body, with or without rubber lining inside. Metallic tankers are heavier with 12 to 15% of the liquid they carry and the rubber lining requires frequent repair and relining every four years. Unlike pressure vessels, road tankers for transportation of liquids under gravity are made of double-'D'-shaped cross-sectional profiles in order to keep the overall centre of gravity low for better stability and vehicle road holding. No winding process for such non axi-symmetric profiles with integral-end dome winding has been developed so far. This innovation is intended for the filament winding of such tankers.

These composite tankers are more resistant to water and many chemicals. Their high strength-to-weight ratio and stiffness-to-weight ratio make them lighter and long lasting. They offer 45% weight saving over a steel tanker. The jointless winding of shell in an automated machine makes production faster and the product stronger. Two tankers can be made in a day vs. several days for steel. A factor of safety of six or above is guaranteed without any resin leakage.

In September 2008, the AMC approved the launching of the tanker for field application. Negotiations are in process with a major truck manufacturer in India for marketing the product with annual initial sales of 500 tankers. ■

Finalists

• Hassan Associates Co., Ltd – Japan
Name of Product or Process: A radius composite materials with innovative heat-directed properties.
Partners:
Japan Aerospace Exploration Agency (JAXA) (Japan) and Kyoto Institute of Technology (KIT) (Japan).

• Qingdao Longtech Machinery Co., Ltd - China
Name of Product or Process:
A new kind of continuous-filament-winding machine for pipe production.
Partner: Qingdao Deyili Pipe Co, Ltd (China).

• Tianjin Polytechnical University Textile Institute - China
Name of Product or Process:
Use of a new textile technology to produce fabrics with curved or annular structure in accordance with the shape requirements of composite products.

Winner "Raw Materials"

>> A ground-breaking material endowing composites with high fire-resistant properties

Regina Glass Fibre Pty Ltd (Australia)

Partners: CRC-ACS (Australia) and Ampelite (Australia)

FireShield® is a chemically loaded surface tissue that can be added to any composite laminate during manufacture to provide fire-resistance. Using this product as a normal surface tissue, the manufacturer produces a fire-resistant laminate. When FireShield® is used as the exterior ply in a composite laminate, the halogen-free fire-retardant chemical is placed just beneath the surface, where it is most needed. This approach to providing fire resistance does not require any special fire-retardant resins, and thus allows standard laminating resins to be used to manufacture composites that meet international fire standards. When exposed to flame, FireShield® produces a well-bonded charred layer on the surface of the product.

This insulates the product and inhibits the passage of oxygen, thereby smothering the flame. Furthermore, the environmental problems caused by the use of halogenated systems are avoided. The use of standard resins means that laminate manufacture is straightforward, material costs are lower, and there is no