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Topic of the Speech:
Electrostatic Spray Coating Technology for Thermoplastic Composites

Professor Apurba Das
Department of Textile & Fibre Engineering
Indian Institute of Technology Delhi
India

Professor Apurba Das is Professor in the Department of Textile and Fibre Engineering and Institute Chair Professor, Indian Institute of Technology, New Delhi, India.

He has guided many Ph.D., M. Tech., B. Tech. students and presently guiding several students.

He has published more than 300 research papers and edited/written several books/monographs and written many chapters in books.

He has successfully completed more than 50 research projects from government funding agencies and carried out many consultancy projects from industries. He has developed several instruments for characterization of textile materials and filed 12 patent applications.

His main areas of teaching and research interest are fibre reinforced composites, clothing comfort, sports textiles, nonwovens and technical textiles, protective textiles, etc.

He is the recipient of Teaching Excellence Award.

He has international research collaborations with universities from different countries like, Germany, Poland, Hungary, Slovenia, Italy, Portugal, China, South Korea, UK, Hong Kong, Croatia etc.

ABSTRACT SUBMISSION
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Electrostatic Spray Coating Technology for Thermoplastic Composites

Apurba Das*, Vijay Goud, Alagirusamy R. , Dinesh Kalyanasundaram
Indian Institute of Technology Delhi, Hauz Khas, New Delhi 110016, India
*Presenter's email: apurbadas65@gmail.com

ABSTRACT:

Electrostatic spray coating technology for manufacturing composites using thermoplastic matrix has been developed and demonstrated. Different parameters affecting the electrostatic coating performance have been studied. To warrant the comprehensive impregnation of substantially viscous thermoplastics into the carbon reinforcement, hybrid yarn production techniques of friction (DREF-II) spinning and electrostatic spray coating were used. 2D and 3D (angle inter-lock and orthogonal weave) woven fabrics were developed from the produced hybrid yarns, which were later consolidated to 2D and 3D composites. In the tensile tests and flexural tests, 2D composites were observed to be better than the 3D composites. However, superior notch impact properties were observed for 3D orthogonal woven composites. The superior notch impact properties of 3D orthogonal composites were attributed to the presence of the closer wrapping of binder warp ends that holds the filler and stuffer warp ends. From micro-CT scans, porosity was a common feature of DREF spun hybrid yarn composites. Also, composites made from powder coated towpregs presented better integrity and enabled in overcoming the disadvantages of the type of the weave. Also, the carbon composites produced contribute ergonomically as a result of its lower specific weight and lower carbon foot print generation when used in the production of automotive components.

Keywords: DREF spun hybrid yarn, Powder coating, 2D-3D woven fabrics,