TBIS

Topic of the Speech:
Multifunctional 3D textile materials

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Dr. Rajesh Mishra is an associate professor at the Technical University of Liberec, Czech Republic. His research areas are textile structural composites, green composites, nanocomposites, biomechanical engineering of fibrous structures, thermo-mechanical characterization of materials etc.

He has about 150 publications in international journals and about 200 presentations in international conferences. His teaching activities include subjects based on structural mechanics of fibrous structures in general and woven structures in particular, textile quality characterization, engineering of textile structures, biomechanics of apparel textiles etc. He is responsible for internationals students education and research at the faculty of textile engineering at TU Liberec.

ABSTRACT SUBMISSION

-For invited speaker only

Multifunctional 3D textile materials

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ABSTRACT (NO MORE THAN 500 WORDS:)

3D textile structures and materials are gaining higher importance in recent times. They can be produced by several technological methods involving weaving, knitting, advanced nonwovens, braiding etc. Such materials are used in many technical application especially in reinforcing composites as well as functional necessities in automotives, buildings etc. 3D woven fabrics are mostly used in light weight energy absorbant composites. Multi-functional properties of 3-dimensional knitted fabrics can be used to replace the existing cushion materials in the mattress, pillows, in-sole, car seat and back supports. Investigations are carried out on intra-ply shear properties of 3D knitted spacer fabrics using picture frame shear fixture. The nonlinear behavior of shear stress versus shear angle and the deformation mechanism are reported. Compression and recovery is excellent in such textiles. 3D nonwovens can be developed by using the patented STRUTO and ROTIS techniques. Such corrugated 3D nonwovens are efficient sound absorbants in noisy environment. They are also used in extreme environment for efficient thermal insulation. The advantages of such structures and the future potentials are discussed.