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Study of Performance of Hybrid Fiber (Hemp/ Polypropylene/ Glass) Woven Reinforcements

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With increased strain on petroleum resources textiles are replacing traditional materials in various industries. Textile fibers and fabrics are increasingly being used to create fiber-reinforced plastic composites that have the fabric structure and surface density suitable for the future use of the particular composite and in which fiber materials are compatible with the matrix.

Woven composites are superior to conventional materials due to their stiffness, strength, stability, weight, cost, manufacturing, corrosion resistance, insulation purposes, taking shape, etc...The main factors to evaluate when deciding whether to use a textile composite or a conventional tape laminate are mechanical properties and the ease and cost of manufacture [1]. Textile-reinforced thermoplastic composites have huge application potential in rapid manufacturing of components with versatile possibilities of integrating functions. In structural applications, textile composites are usually used as reinforcement due to the possibility to tailor the load bearing capacity through the fibre architecture. As a result of their growing potential for lightweight applications, textile-reinforced thermoplastic composites are becoming of greater interest for the industry. Thermoplastic composites show a number of advantages compared to classical composites based on thermoset matrices, among which the possibility of low-cost, rapid production has to be mentioned first [2].

The aim of the research is to look for a rapid manufacturing of components with versatile possibilities of integrating functions. The hemp fibers and polypropylene fibers were used for reinforcement production. To ensure better mechanical properties of reinforcement, 25% or 50% of glass roving in warp direction was added. The performance of woven reinforcements was tested.

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