A Review of Current Micromechanics of the Fibre Assembly

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The mechanical properties of textile materials have been intensively since the 1930's. Many important physical and aesthetic attributes of textile products have now been explained by mechanical models of fabrics and yarns. However, as understanding and methods of analysis have improved, the early semi-empirical models have been replaced by more formal methods of analysis. This trend has in turn focused attention on the tack of describing assemblies of fibres as if they were normal solid materials. Although the methods of analysis now employed are the same as those used in many branches of engineering and physics, the material properties remain a uniquely "textile " feature.

The emphasis in this paper has been centered on the advantages and limitations of the existing models. All of these models, including the most recent, present a grossly simplified abstraction of the real situation which attends the deformation of an assembly of fibres. Therefore all of the models contain dilemmas, inconsistencies and errors which merit further discussion before any new approach which might overcome some of these problems should be considered