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DESCRIPTION MODEL OF CROSS-SECTION OF FIBRE BUNDLE SHAPE IN PREPREG COMPOSITE

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Paper deals with description of fibre bundles in cross-section of woven reinforced composite prepared by prepreg technology from carbon/carbon materials. From hierarchical model it is focused on the meso-scale on the weave structure. Here exists number of basic models describing weave in textile composites – Mosaic model, Bridging model, Crimp model etc [1, 2, 3, 4]. Here also exist models describing weave in textile branch – Pierce model, Olofson model, hyperbolic model, Fourier lines model etc [5, 6, 7]. Composite reinforcement can be described by models used for determination of woven textiles geometry after acceptance of composite structure, Figure 1.

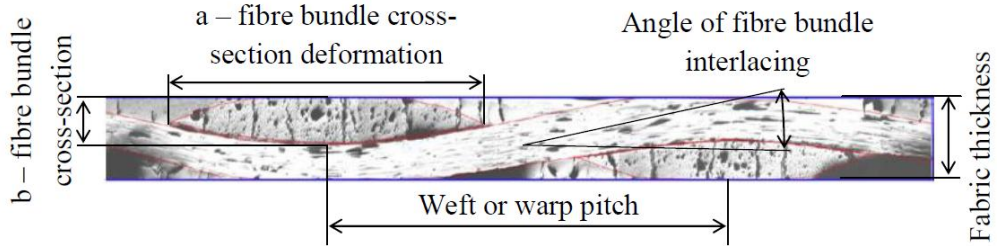

Figure 1. Description of reinforcement components in cross-section of composite

Bundles are deformed in the structure during weaving, prepreg layering, sliding of laminas during pressing, curing process and interaction between surrounding laminas. Cross-section of fibre bundle can be defined by *a* and *b* proportion values [5]. Lenticular shape was chosen as the most accurate for your purposes of research, Figure 2.

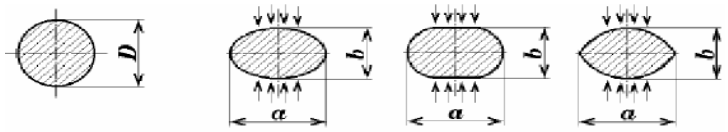

Figure 2. Deformation types of fibre bundle in cross-section [5]

It was observed number of microphotographs for creation of model based on the real structure and determination of presence of defects in the structure. On the following Figure 3 there are various configurations classified from prepreg made C/C composite. Structure, dimensions and shape, is affected by the position of surrounding components including lengthwise,

crosswise bundles and defects. Defects position is affected by waviness, prepreg production and curing. For each type of defect was observed also specific shape of surrounding fibre bundles.

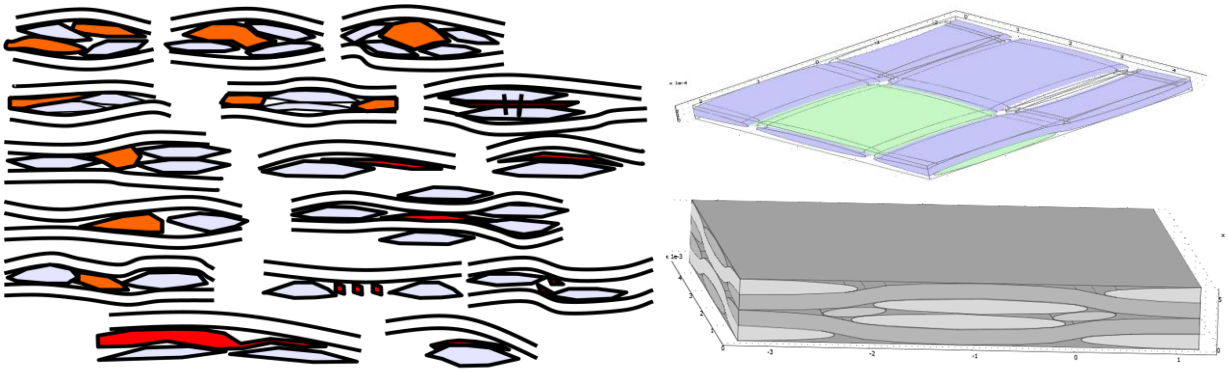

Figure 3. Components and their position [8], left; Models of meso-scale level, right [9]

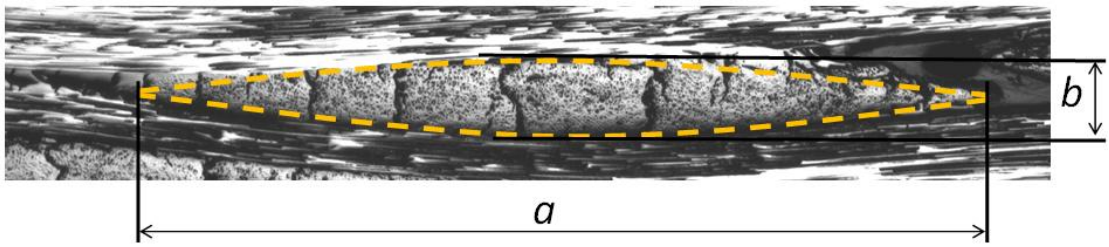

Figure 4. Dimensions of real lentil fibre bundle

It was observed number of real cross-sections of fibre bundles, example on Figure 4, for determination of statistically significant amount of values with the respect of position and surrounding types of components including defects. It was obtained dimensions of each type of fibre bundle and this result can be added into existing computation 3D models of meso-scale of composites with idealised structure so match with real composite will be higher.

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