

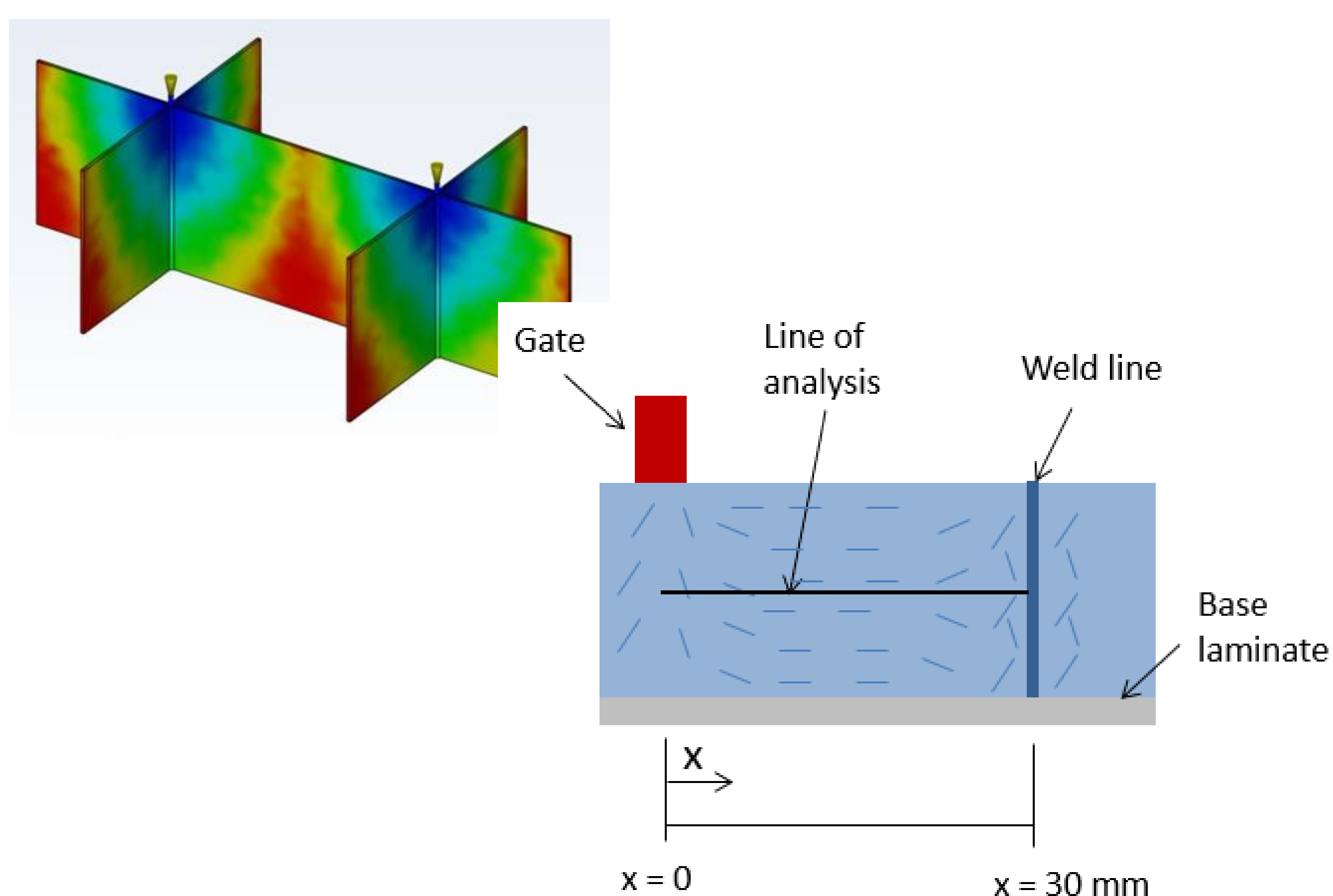
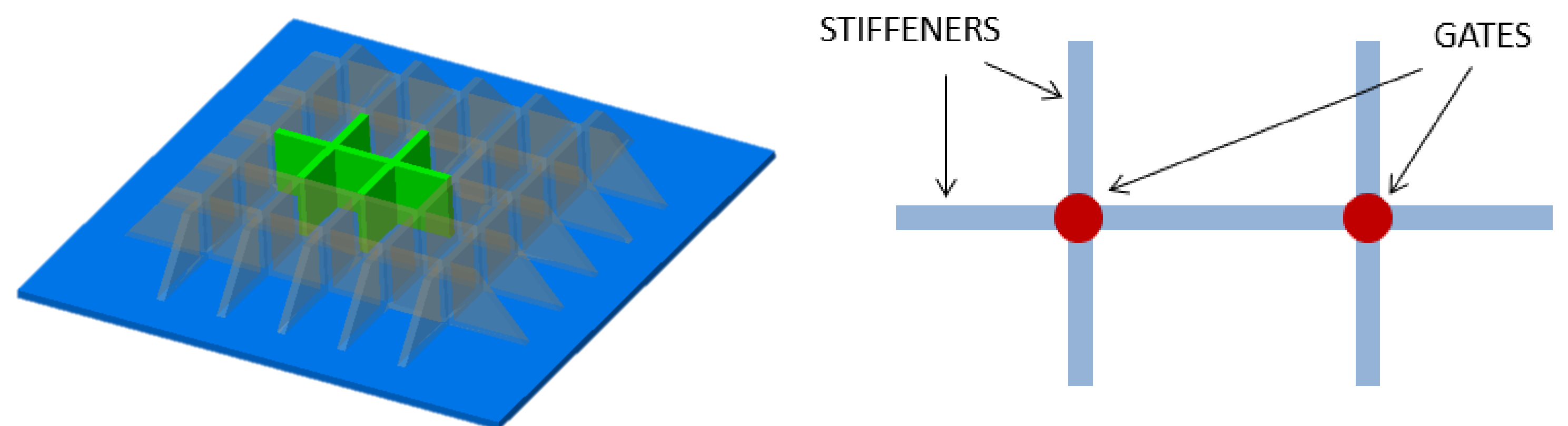
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Our work is framed on the development of thermoplastic fibre reinforced composite structures, essential for the definition of novel components providing a better strength-weight ratio, with a better productive capacity and recycling properties. Overmolded components manufacturing presents diverse critical points of analysis, intimately linked to productive process, that determine the final properties of the product [1-5]. One of the characteristics directly related with mechanical behavior is the fibre orientation of short fibre reinforced materials. This property affects in general to component stiffness, conditioning in particular the optimal directionality of the applied load [6].

OBJECTIVES

To analyze the effect of geometrical variation of the stiffener cross-section on a carbon fibre PEEK (CF-PEEK), Victrex™ 90CA30, overmolded reticular structure for its application on stiffened panels and its influence on fibre orientation during injection process.

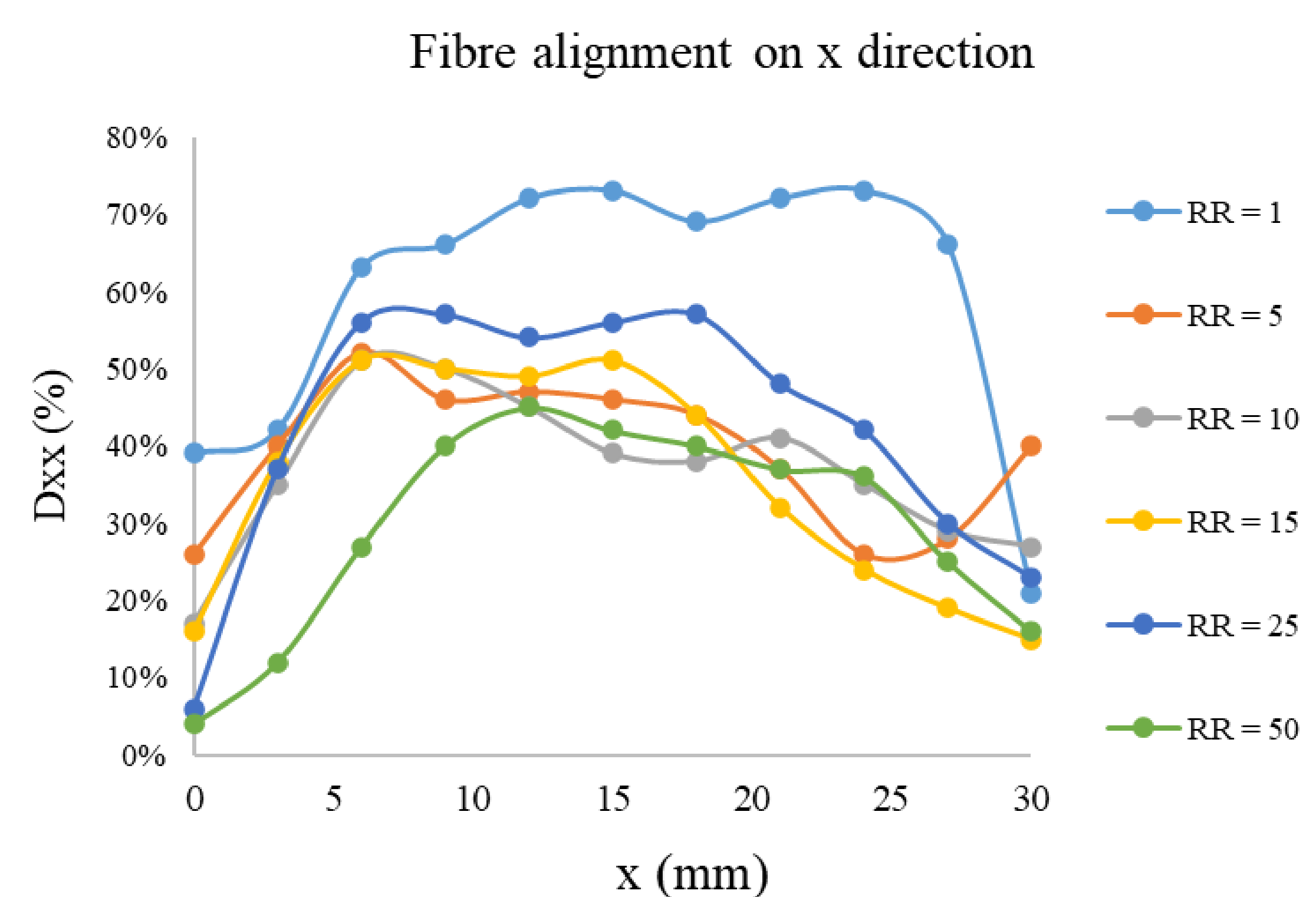


METHODOLOGY

The effect of cross-section aspect ratio of the stiffener is analyzed by FEM using Moldflow Adviser™ on a representative geometrical unit of 60mm module grid, showing a result from injection gate to the welding line considering a typical injection configuration of: 1mm of gate diameter, 2mm of gate length, symmetrical behavior between opposed gates and an injection window proposed by material manufacturer. Alignment is measured as the probability (percentage) of being the fibre aligned with stiffener direction.

RESULTS

- During filling stage, in all cases an increase of alignment along stiffener length from the gate and a decrease near the welding line is observed.
- Lower aspect ratios produce increased alignment during filling and higher values near the gate and welding line.
- Typical stiffener aspect ratios (5 to 25) produce, excluding gate and welding sections, an average alignment of 35-50 %.



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