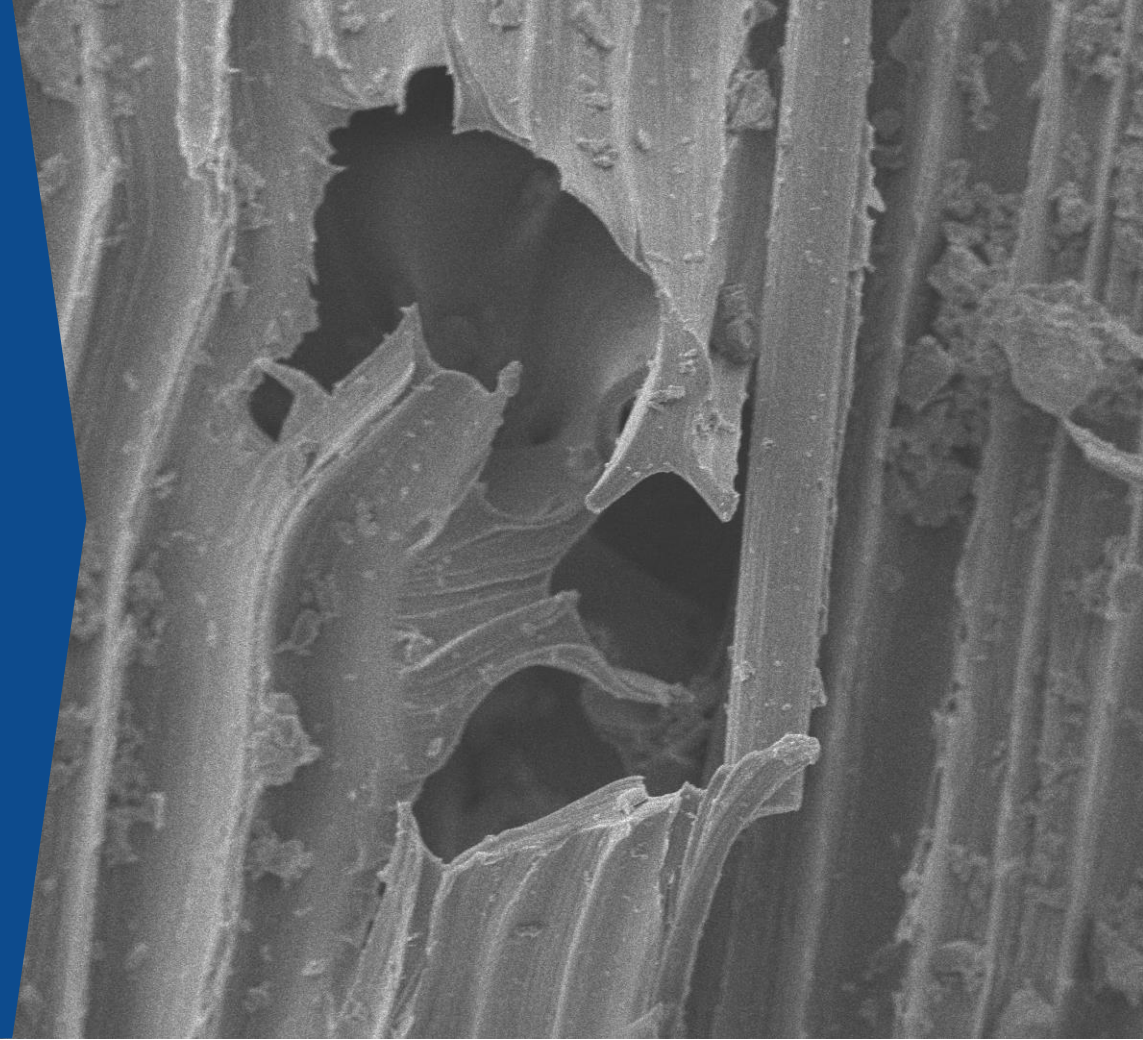


Experimental analysis of the delamination behaviour of 3D-printed unidirectional carbon fibre-reinforced polyamide laminates under mode I

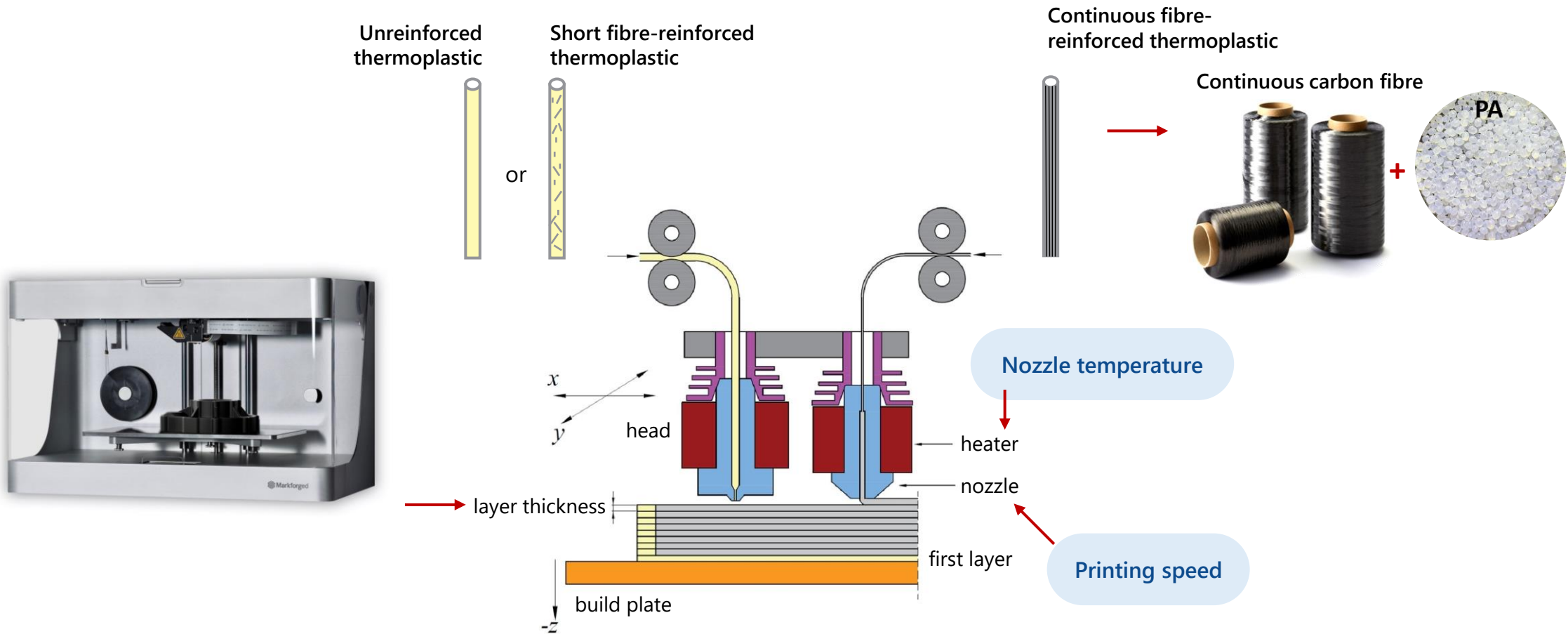
Lincy Pyl, Amalia Katalagarianakis, Efstratios Polyzos

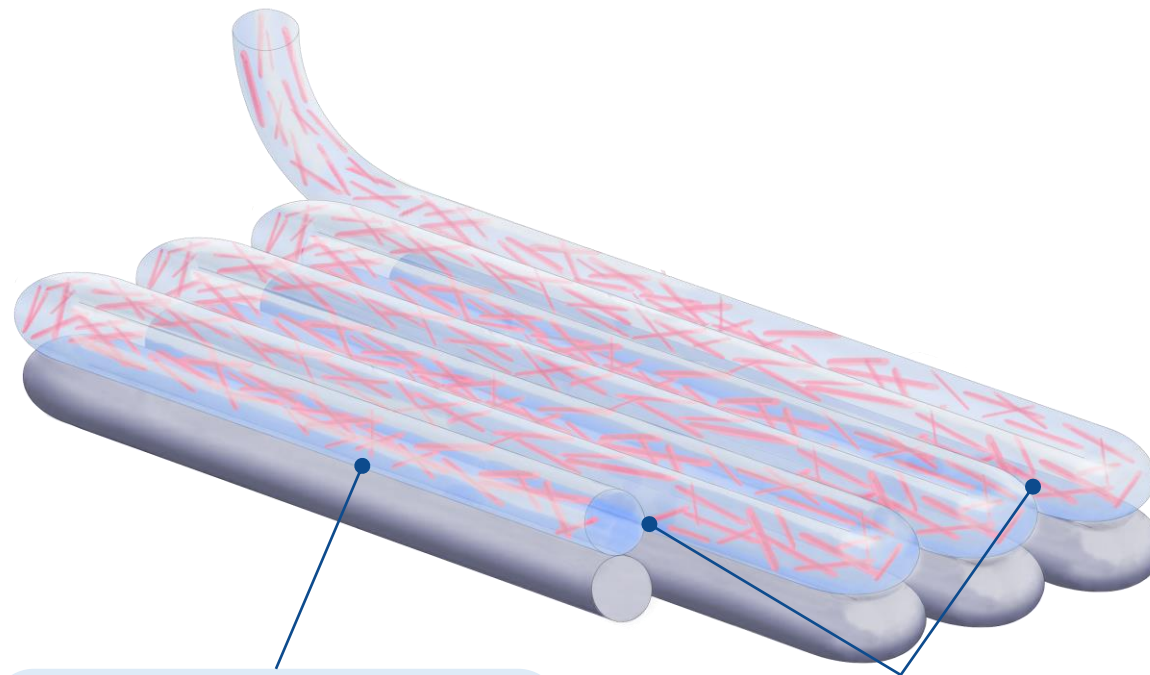
Department of Mechanics of Materials and Constructions
Vrije Universiteit Brussel (VUB)
BE-1050, Brussels
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lincy.pyl@vub.be



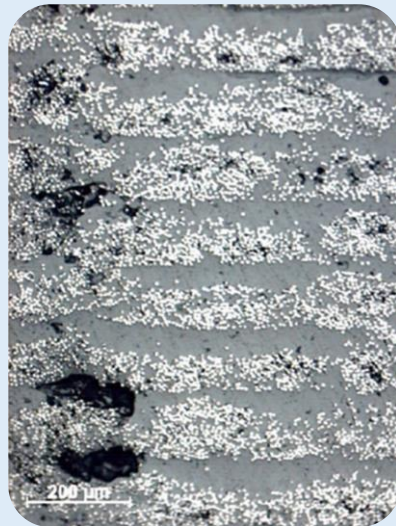
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3D printing of fibre-reinforced thermoplastics



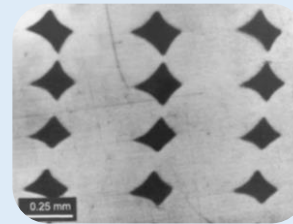


Interlaminar bonding

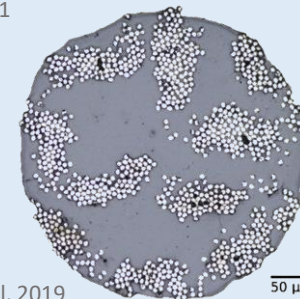


Blok et al, 2018

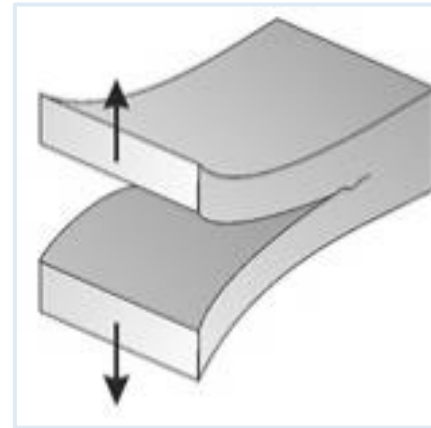
Void content



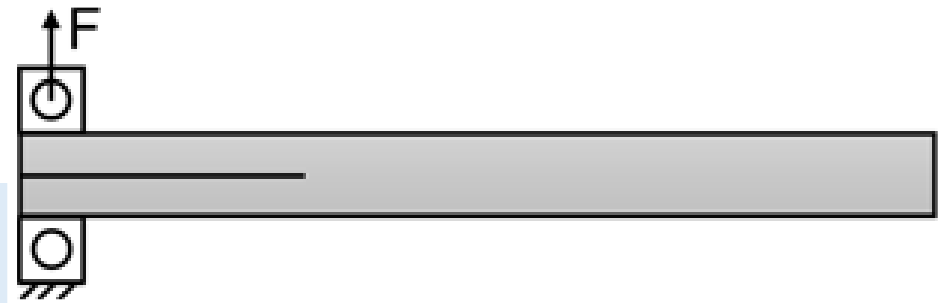
Rodriguez et al, 2011

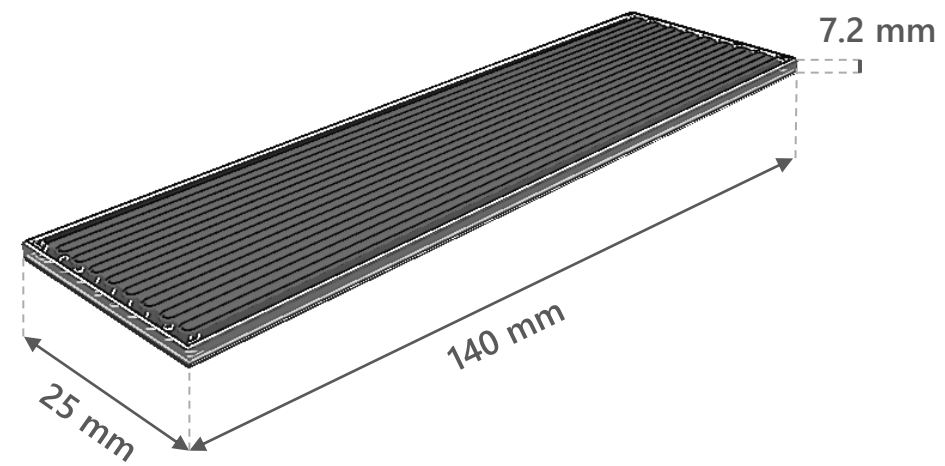
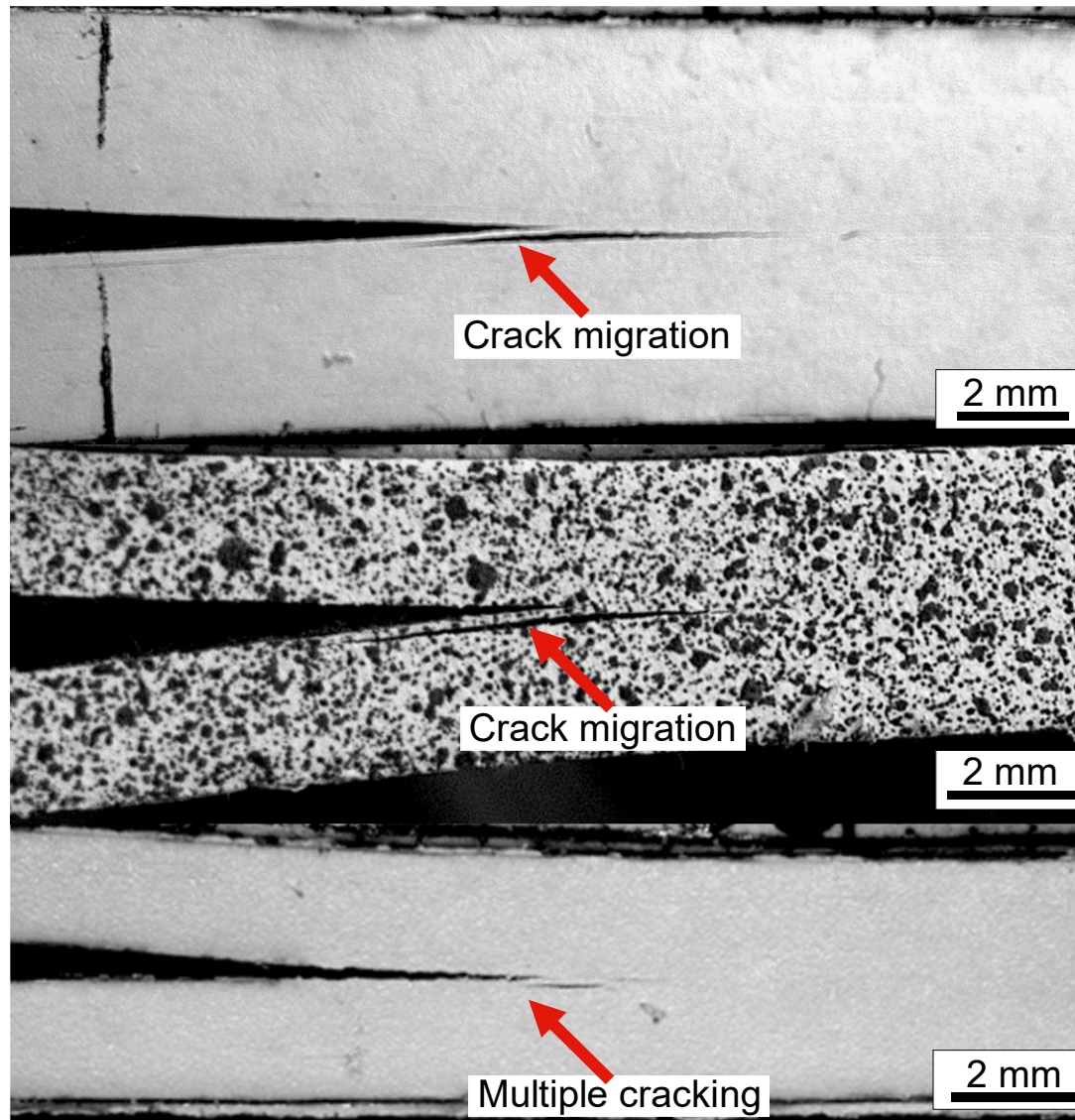
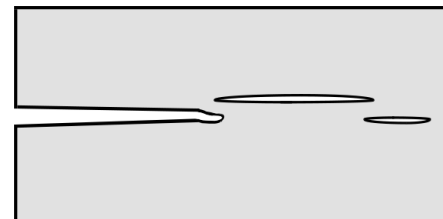


Chabaud et al, 2019



DCB
mode I





$G_{Ic,init}$ [kJ/m²]

Standards

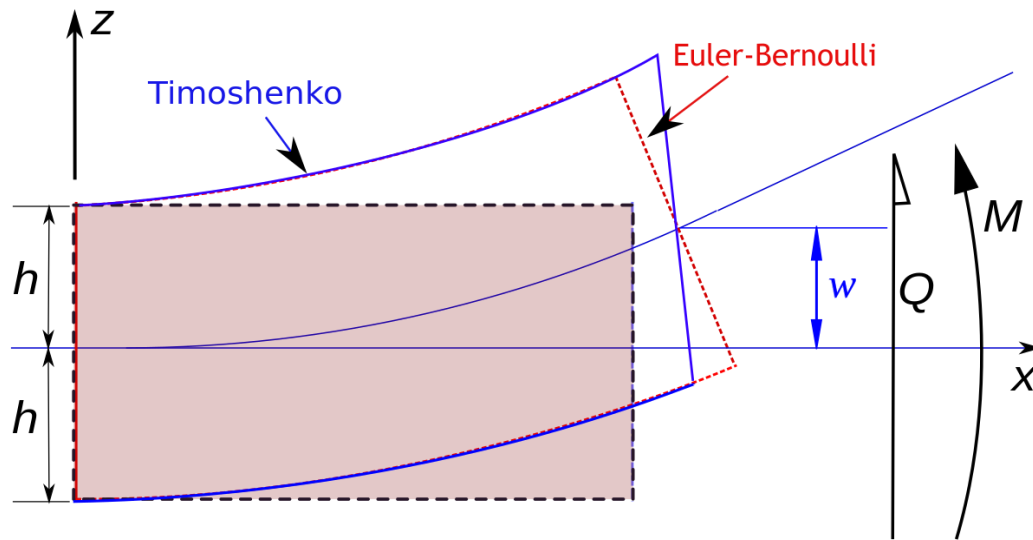
Modified Beam Theory (MBT)
 (Modified) Compliance Calibration ((M)CC)

Analytical

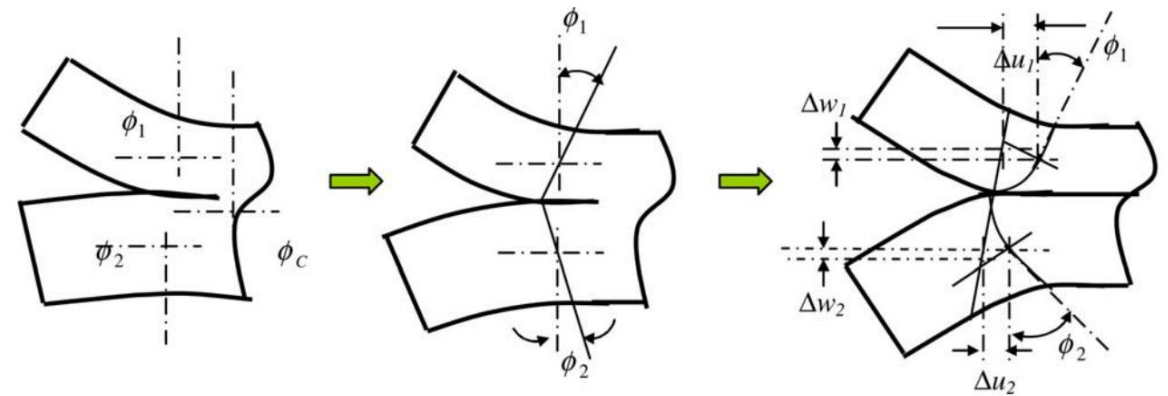
(Modified) Beam Theory ((M)BT)
 Rigid Joint Model (RJM)
 Semi-Rigid Joint Model (SRJM)
 Flexible Joint Model (FJM)

Numerical

Cohesive Zone Model (CZM)
 Virtual Crack Closure Technique (VCCT)



Qiao and Wang, 2005



Rigid joint

no rotation
 no translation
 at crack tip

Semi-rigid joint

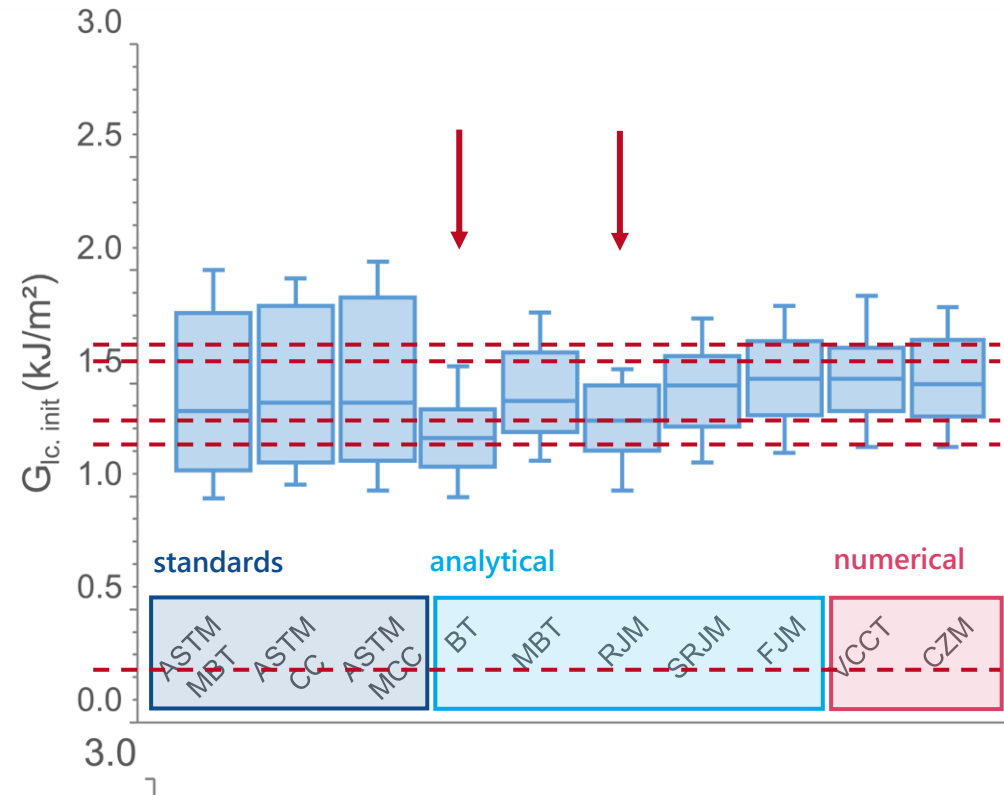
rotation
 no translation
 at crack tip

Flexible joint

rotation
 translation
 at crack tip

Iragi et al. 1.59
 Santos et al. 1.50
 Touchard et al. 1.23
 Kong et al. 1.12

He et al. 0.12



Thank you for listening.

References

Mode I, mode II and mixed mode I-II delamination of carbon fibre-reinforced polyamide composites 3D-printed by material extrusion

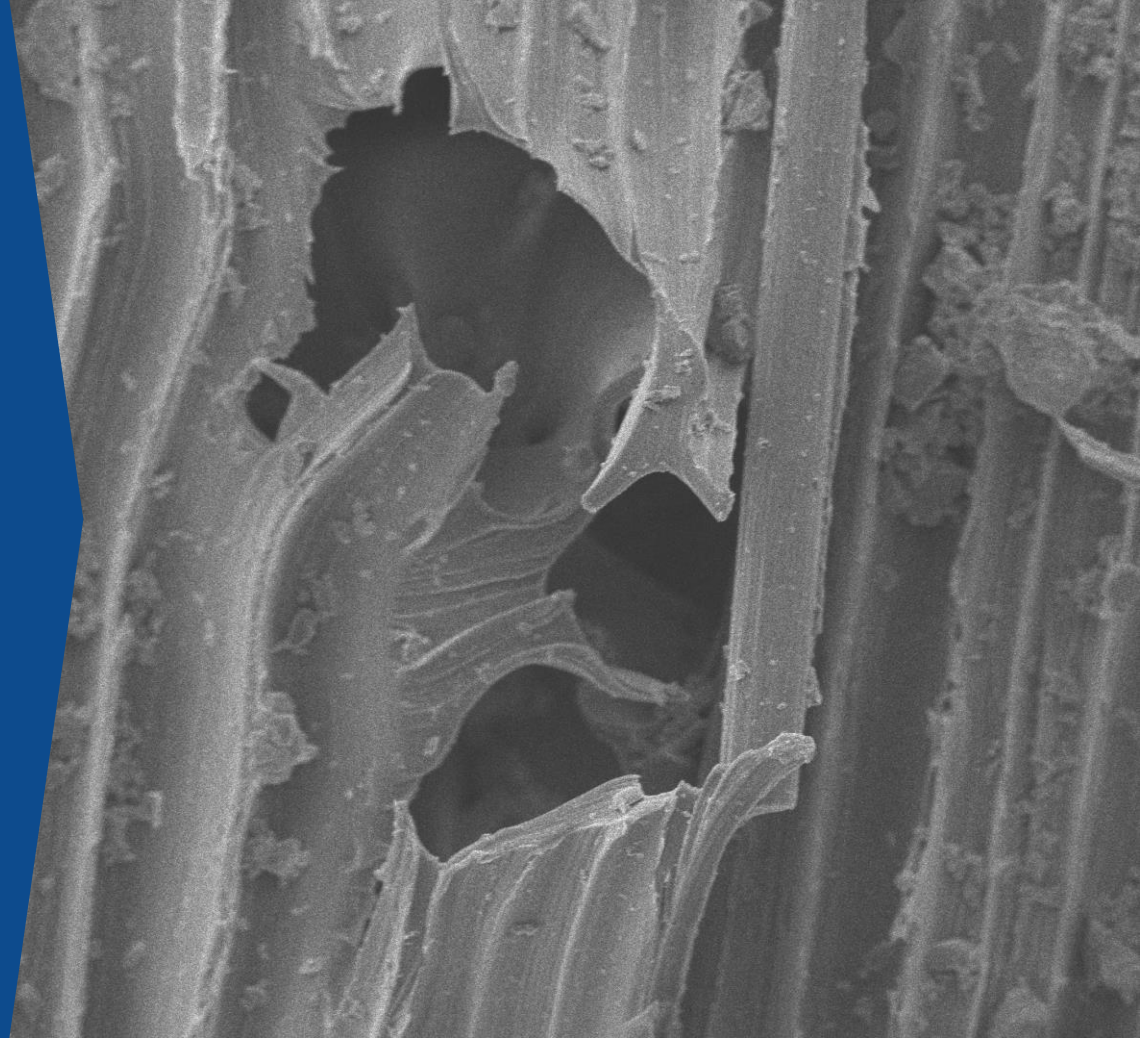
A. Katalagarianakis, E. Polyzos, D. Van Hemelrijck, L. Pyl

Composites Part A: Applied Science and Manufacturing, 107655, 2023

Delamination analysis of 3D-printed nylon reinforced with continuous carbon fibers

E. Polyzos, A. Katalagarianakis, D. Van Hemelrijck, L. Pyl

Additive Manufacturing 46, 102144, 2021



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