Adhesion capability of eco-epoxy adhesives obtained by the addition of modified tannic acid

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Beneficiary Institution: Innovation center of Faculty of Technology and Metallurgy in Belgrade, Serbia
Hosting Institution: Faculty for Aerospace Engineering, TU Delft, Netherlands
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Relevant Working Groups: WG1

Objectives / Description / Main outcomes

Research conducted within this STSM was with the aim of correlation of adhesion tests, such as Double -Cantilever Beam test (DCB) and Bell peel test (BPT), performed in TU Delft, Faculty of Aerospace Engineering (Host Institution) with already developed mathematical modelling and image analysis by using microhardness measurements to obtain a quantitative assessment of the adhesion behavior done at Innovation center of Faculty of Technology and Metallurgy in Belgrade (Home Institution). Study of reliability and limitations of the use of microhardness testing model for adhesion estimation compared to standard adhesion tests would enable its use as easy, economic and fast adhesion method for various groups of adhesives.

Main objectives were:

a) Adhesive synthesis – done in Home Institution;
b) Surface treatment and joining of different materials – done in Host Institution.
c) Experimental tests – done in both Host Institution and Home Institution;
d) Verification of visualization method – Home Institution;
e) Establishing a cooperation with Host Institution and fulfilling the expertise in the field of adhesives.

Different behavior of adhesives was noticed during the adhesion test with similar trend for both BPT and DCB. Reference epoxy adhesive showed completely adhesive failure, while adhesive A and B showed both cohesive and adhesive failure. Adhesive B showed significantly higher forces then reference and adhesive A. Preliminary results showed good correlation with mathematical model conducted in Home Institution.

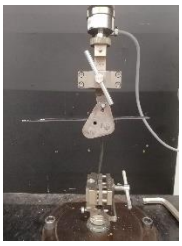
a)  b) 

Figure 1: *a) BPT and b) DCB test set-up*

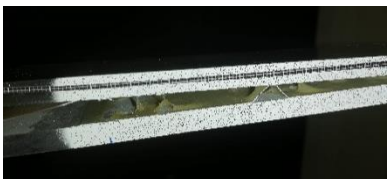


Figure 2: *Adhesive failure in DCB test*