ANNEX B

ABSTRACT SUBMISSION FORM

AVT-266: ***Use of Bonded Joints in Military Applications***

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TITLE OF PAPER:

The Adhesive Zone Mix Disbond Arrest Feature – Results (EU-FP7 Project BOPACS)

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Abstract:

The Adhesive Zone Mix Disbond Arrest Feature – Results (EU-FP7 Project BOPACS)

Nowadays bonded joints are state of the art in the assembly of composite aircraft structures. Due to current civil aerospace regulations, the implementation of secondary bonded joints is limited. However, current regulations and means of compliance provided by the authorities offer four possibilities to attain certification of safety critical structures: a fail-safe joint design, full proof testing, non-destructive testing of the joint strength, and a secured maximum disbond by design features assuring a limit load capacity of the remaining joint. The last approach has been investigated thoroughly in the European 7th Framework research project BoPACs (Boltless Assembly of Primary Aircraft Structures). The presented paper summarizes the activities and results of the German Aerospace Center within the BoPACs project. In particular, this paper focuses on the so called Adhesive Zone Mix Disbond Arrest Feature developed by DLR. The feature efficiently combines an adhesively bonded and a thermoplastic welded joint. The thermoplastic weld stops growing cracks due to its high toughness while the conventional adhesively bonded joint carries the major operational loads. The paper outlines the smart manufacturing process enabling an easy to use and cost efficient Disbond Stopping Feature. The mechanical effectiveness is validated on coupon level with fatigue testing of cracked lap shear (CLS) samples. Experimental and analysis results are summarized. Conclusions from tests and a further improvement of the feature, the so called Surface Toughening Feature, are presented.

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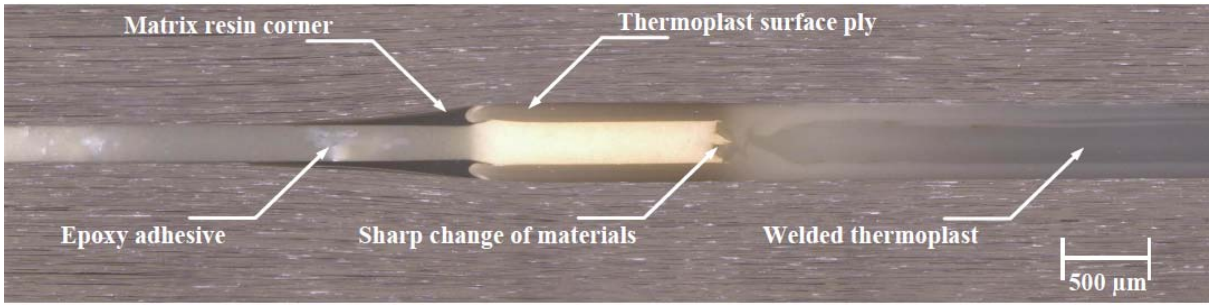

Figure 1: Micro section of the Adhesive Zone Mix Disbond Arrest Feature