

Presentation of BOPACS

(Boltless Assembling of Primary Aerospace Structures)

Project

EASN

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BOPACS main objectives are:

- To reduce weight and costs of primary aerospace structures by developing bolt free adhesive bonded joining that comply with the airworthiness requirements
- To design and assess crack stopping design features limiting the maximum disbond size in adhesively bonded joints as a mean of comply (MOC) to airworthiness requirements

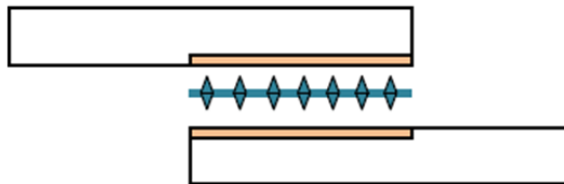
Partners

Short name	Participant organisation name	Country
NLR	Nationaal Lucht- en Ruimtevaartlaboratorium NLR	NL
CEN	Cenaero ASBL, Centre de recherches en Aéronautique	BE
UCL	Université Catholique de Louvain, Institute of Mechanics, Materials, and Civil Engineering	BE
SAB	Société Anonyme Belge de Constructions Aéronautiques SABCA S.A.	BE
VZLU	VÝZKUMNÝ A ZKUŠEBNÍ LETECKÝ ÚSTAV, A.S.	CZ
DLR	Deutschen Zentrums für Luft- und Raumfahrt	D
USTUTT	Institut für Flugzeugbau, Universität Stuttgart	D
EADS	EADS Deutschland GmbH (European Aeronautic Defence and Space Company)	D
UPAT	Laboratory of Technology & Strength of Materials, University of Patras	GR
ZHAW	Zurich university of Applied Science	CH
BAB	Bombardier Aerospace - Belfast	UK
IFAM	Fraunhofer Institut für Fertigungstechnik und angewandte Materialforschung (IFAM)	D
AD	Airbus Operations GmbH	D
FID	FIDAMC	ES

Project started September 2012 and runs until October 2016

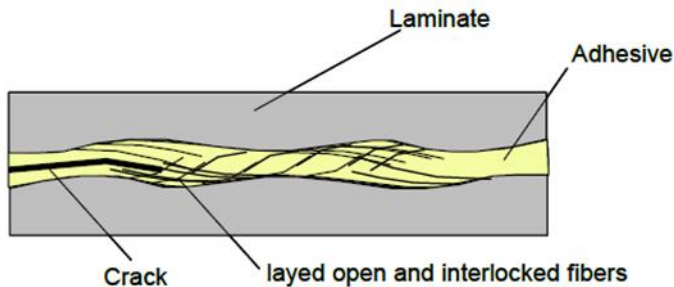
Four different crack stopping concepts are evaluated:

- Surface interfacing



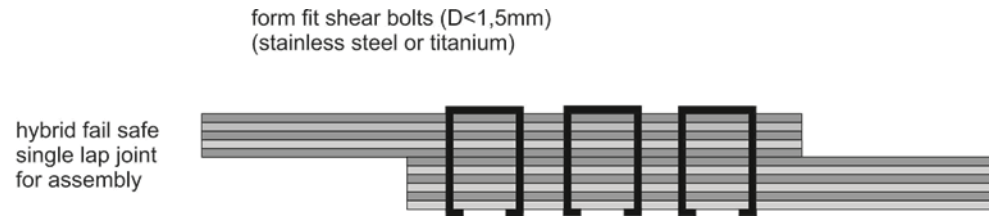
Metallic mesh interfering with Thermoplastic layers

- Surface and geometry modification



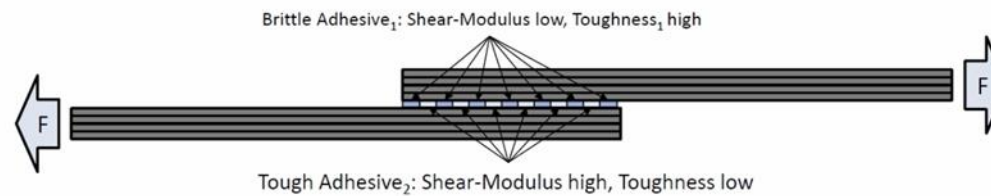
Laser stripping / etching of adherent surfaces

● Mechanical through thickness



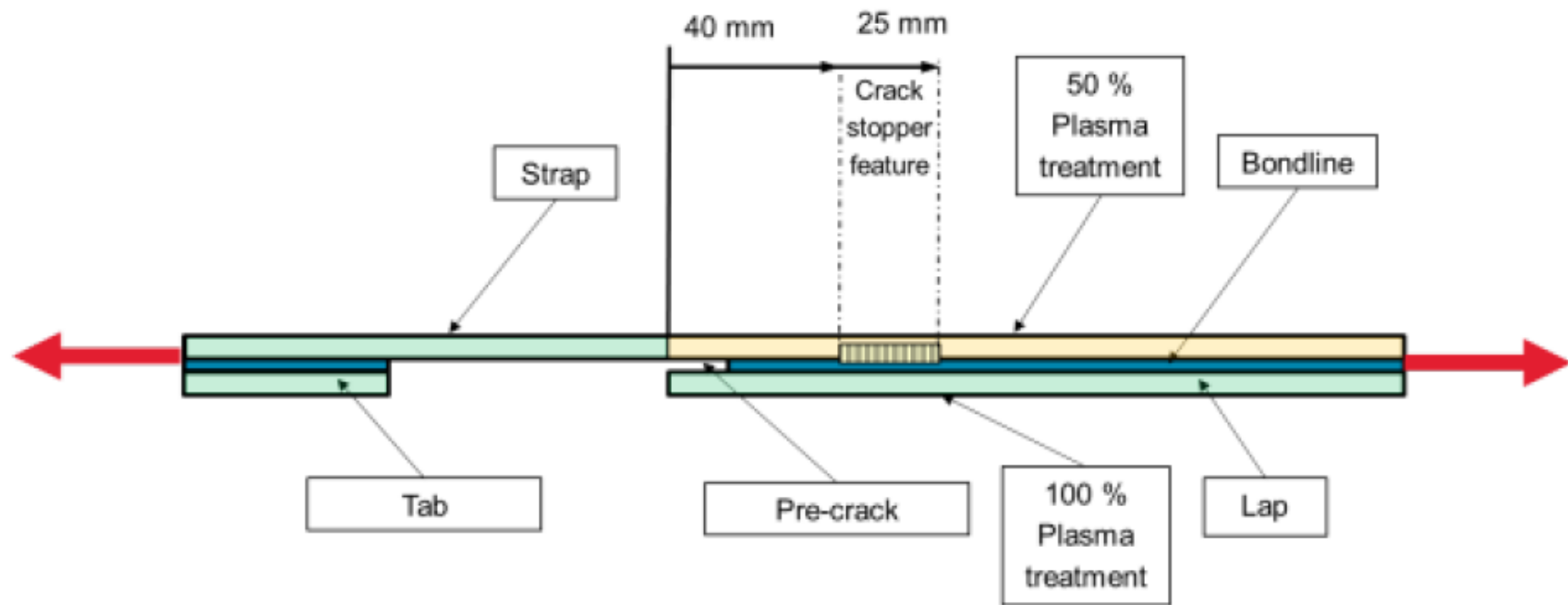
Bonded joints with staples to prevent crack propagation

● Adhesive bondline architecturing

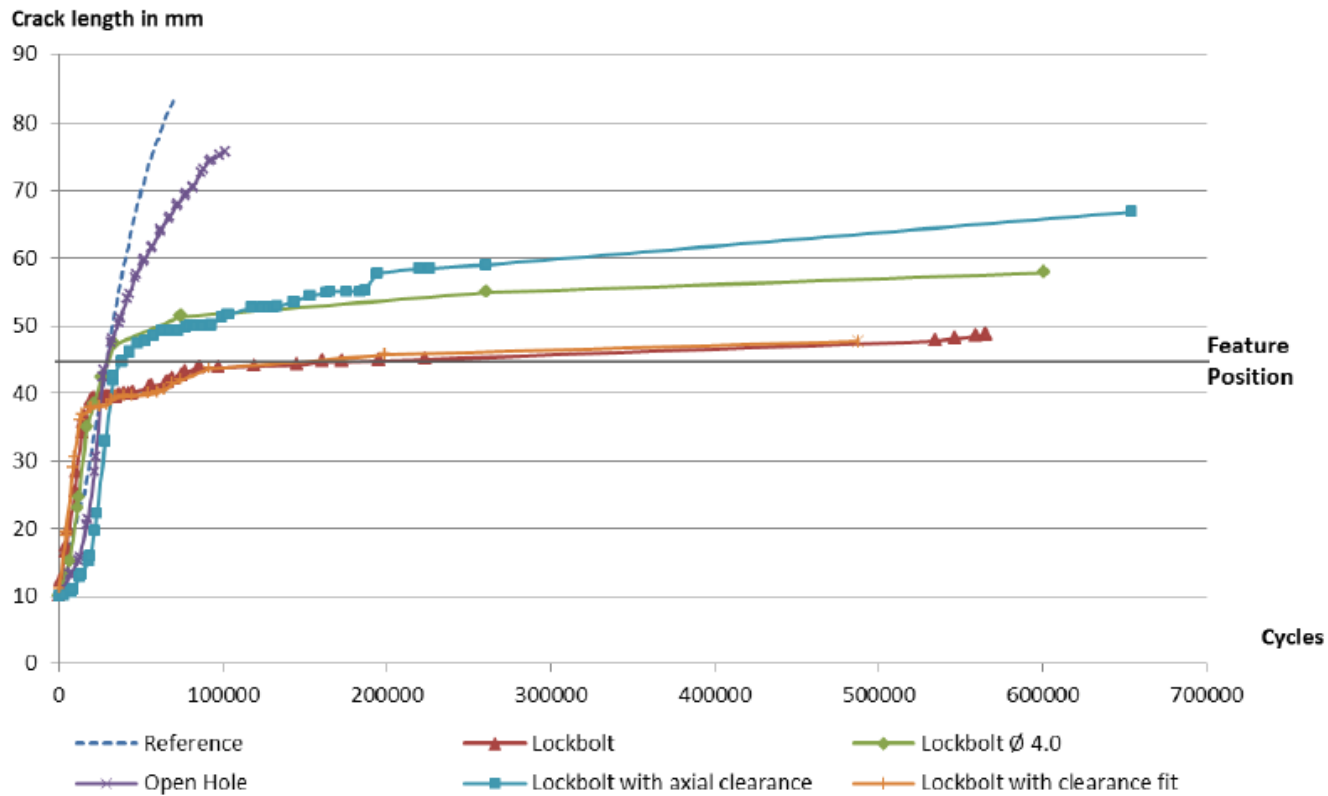


Zones with different types of adhesive (high/low toughness)

The performance of the different concepts are evaluated by tests on Crack Lap Shear (CLS) specimens



Fatigue testing of CLS specimens with different crack stoppers



- Most promising crack stopping concepts will be integrated into the bondline of an aileron and full scale tested.

