



Joint CMH-17-EASA-FAA Workshop on Sandwich Disbonding

Date: 9th - 12th July

Place: Technical University of Denmark (DTU), Copenhagen, Denmark

Address: Anker Engelundsvej, Building 101A, 2800 Kgs. Lyngby (main administration building)

Location: Building 101A, DTU Meeting Center, Meeting Room 1 (upper floor – follow signs at entrance)

Campus map and directions can be found here: <https://www.dtu.dk/english/About/CAMPUSES/DTU-LYNGBY-Campus>

Updated Agenda – July 3, 2019

Tuesday – July 9, 2019

- **0930:** *EASA Composite Materials Safety – Sandwich Structures* (Simon Waite)
- **0950:** *FAA Sandwich Disbond Initiative* (Larry Ilcewicz)
- **1010:** *Airbus Motivation for Sandwich Disbond Research* (Ralf Hilgers)
- **1030:** *CMH-17 Disbond Growth Team: Coordinated efforts to Address Sandwich Face Sheet/Core Disbonding* (Ronald Krueger)
- **1100:** Coffee break
- **11:15:** *A Generic Analysis and Test Procedure to Assess Disbond Damage Tolerance in Aircraft Sandwich Structures with Generalized Loading* (Christian Berggreen)
- **12:15:** Lunch
- **13:15:** *An Engineering Approach for Damage Onset and Growth Analysis of Sandwich Structures Subjected to Combined Mechanical and Pressure Loading* (W. Seneviratne, V. Saseendran)
- **14:15:** *Known Sandwich Disbond Challenges based on Industry Experience* (Larry Gintert)
- **14:45:** Coffee break
- **15:00:** *Large sandwich structure applications - Safran Nacelles experience* (Emmanuel Piel)
- **15:30:** Forum for open discussion on future sandwich disbond technology development needs - *WebEx hosted by Larry Gintert and Larry Ilcewicz*
- **17:30:** End of day 1




Wednesday – July 10, 2019

- **09:30: Focus area #1 - *Characterization test method development***
 - **Past, present & current plans. Future development based on industry needs**
 - **Standardization as ultimate goal**
 - **09:30: Required fracture toughness properties to assess disbonding** (Christian Berggreen)
 - **09:40: Mode I Single Cantilever Beam (SCB) Test** (Dan Adams)
 - **10:00: Sandwich Mixed-Mode Bending (S-MMB) Test** (Christian Berggreen)
 - **10:20: Mode II End-Notched Flexure (ENF) Test** (Leif Carlsson)
 - **10:40: Discussion**
- **11:00: Coffee break**
- **11:15: Focus area #2 - *Building block analysis and test correlations***
 - **11:15: Building block for sandwich disbond from DoSS project** (Christian Berggreen)
 - **11:35: Building block from NIAR project** (Waruna Seneviratne, Vishnu Saseendran)
 - **11:55: Expanded building block** (Larry Gintert)
 - **12:15: Discussion**
- **12:30: Lunch**
- **13:30: Focus area #3 - *Analysis and test developments for challenging structural details***
 - **Overview of challenging structural disbond problems to be investigated**
 - **13:30: Applied disbond growth analysis in a bulkhead connection detail** (Christian Berggreen)
 - **13:45: An engineering approach – design curve examples** (Patrick Enjuto)
 - **14:00 Discussion**
- **14:30: Focus area #4 - *Sensitivity studies and simplifications needed to derive a practical “engineering approach” that benefits from Focus areas (1-3)***
 - **Past sensitivity studies**
 - **Discussion about possible analysis simplifications to obtain an *engineering approach***
- **15:30: Coffee break**
- **15:45: Forum for open discussion on future sandwich disbond technology development needs - *WebEx hosted by Waruna Seneviratne and Christian Berggreen***
- **17:15: Workshop Recap/Actions/Closure**
- **17:30: End of day 2 and workshop**



Thursday – July 11, 2019

- **09:30: July 10 and 11 Workshop recap**
 - **09:45: Presentations**
 - **0945: Bill Fallon Sikorsky/LM**
 - **10:05: Discussion**
 - **10:30: Breakout sessions**
 - **Breakout session for industry needs (other participants with application thoughts)**
 - **Team available for detailed and focused discussions of problems of interest to industry participants (closed door if desired)**
 - **Breakout session for analysis tool development**
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- **10:25: Elastic Foundation Solution for the Energy Release Rate and Mode Partitioning of the Single Cantilever Beam (SCB) Specimen (George Kardomateas)**
 - **10:45: 2D Fracture mechanics solutions for sandwich fracture specimens (Roberta Massabo)**
 - **11:00: Coffee Break**
 - **11:20: High Fidelity Modeling of Face Sheet/Core Disbonding (Nelson Carvalho)**
 - **11:40 Discussion**
- **12:30: Lunch**
 - **13:30: Teams sharing outcome of the morning sessions**
 - **16:00: Forum for open discussion on future sandwich disbond technology development needs - WebEx hosted by Larry Ilcewicz and Ronald Krueger**
 - **17:30: End of day**

Friday – July 12, 2019 *(meeting will move to the Department of Mechanical Engineering – Building 404)*

- **09:30: CMH-17 working meeting and detailed road map discussion**
- **12:00: Workshop ends**