

RECARO

the seat of innovation

Certification By Analysis @ RECARO AS

CBA Meeting 07. – 08.08.2012

Wichita KS

Ashwin Sheshadri /Jürgen Kammerer



Certification by analysis @ RECARO



Agenda

- Use of Analysis in our design
- CBA in our Certification process
- What has prevented us from using CBA in our Certification process?
- What is missing in the AC 20-146/ARP 5765 documents that you would need to properly propose CBA?
- Validation examples

Use of Analysis in our Design

- Static seat simulation
- Abuse load simulation
- Fatigue simulation
- Crash simulation
- Optimization (Part and Assembly)

Certification by analysis @ RECARO



CBA in our Certification process

- Several worst case selections or minor change acceptances
 - Minor changes by Simulation after Certification testing
 - Worst case selection, e.g. Choose between Yaw or Opp Yaw
 - ...

- Possible Way forward for the use of CBA @ RECARO AS
 - Worst case seat selection (Static, 14g, 16g)
 - 14g dwn load case
 - 16g fwd load case
 - Static tests
 - HIC load case

CBA in our Certification process

- What are we doing to improve our simulation:
 - Optimization of the material models (Triaxiality failure material models)
 - Development of the CPU capacity (Increase the number of CPU's)
 - Development of a model validation process (e.g. Which test load case to validate (benchmark) first during a new project..)
 - Incorporate detailed modeling into the seat assembly (e.g. Fittings, Seat track, Pitch and Roll fixture)
 - Detailing of the seat model (finer meshes, improvement of the element quality e.g. fully integrated elements)
 - ...

What has prevented us from using CBA in our Certification process?

- Acceptability by TC-holder (Airbus, Boeing), Internal Certification department
- Confidence in Simulation from other departments
- What changes are allowed to validate the model (e.g. Contact thickness, Position of the ATD, Seatbelt thickness change, Material, Geometry etc.)
- Additional effort for the testing and certification department during the initial phase of CBA
- ...

What is missing in the documents that you would need to properly propose CBA?

- Regulation – AC 20-146 needs to be revised to be more detailed on the requirements or ARP 5765 needs to be referenced in the document. This will help us to officially Certify by analysis
- Description of PASS/FAIL criteria for the simulation (sharp edges, Failure, C/B)
- Accreditation of the FE-Software/Dummy by the authorities or the TC/STC-holders

RECARO

thank you for your attention

the seat of innovation



COPYRIGHT: ALL RIGHTS RESERVED - PROPERTY OF RECARO Aircraft Seating – CONFIDENTIAL
Any reproduction disclosure or use in whole or in part is prohibited without prior written consent of RECARO Aircraft Seating
RECARO Aircraft Seating also reserves all rights worldwide with respect to any contained industrial or intellectual property rights