1. Record Nr. UNINA9910795476303321

Autore	Block Tim Berend
Titolo	Analysis of the mechanical response of impact loaded composite sandwich structures with focus foam core shear failure / / Tim Berend Block
Pubbl/distr/stampa	Berlin : , : Logos Verlag Berlin, , [2014] ©2014
ISBN	3-8325-9534-1
Descrizione fisica	1 online resource (238 pages)
Collana	Science-Report aus dem Faserinstitut Bremen
Disciplina	620.110287
Soggetti	Materials - Testing
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	PublicationDate: 20141220
Sommario/riassunto	Long description: Sandwich structures are an economically and structurally efficient way of designing large integral composite parts. In the aerospace industry pre-impregnated face sheets and honeycomb core structures can be considered as industry standard while e.g. naval structures and wind turbine blades typically use vacuum infusion technology with polymer foam cores. Application of the less costly infusion technology in the aeronautical industry requires a thorough understanding of the damage tolerance including low velocity impact as a frequent source of damaging events. At low impact energies damage in composite foam core sandwich structures is limited to core crushing and local face sheet delaminations. Higher impact energies may initiate the competing failure modes face sheet rupture and core shear failure depending on impact, geometric and material parameters. Face sheet rupture leads to severe local damage with typically good visibility, while core shear failure leads to cracks and rear face sheet debonding of the foam core with less visibility. This work investigates the low velocity impact response of sandwich structures with carbon fiber reinforced plastic (CFRP) face sheets and a polymeric foam core using experiments at room temperature and at -55 Grad Celsius. An analytically derived failure mode map is presented as a simple tool for design guidelines

while the explicit finite element method is applied for a more detailed description of the sandwich impact process. Both models are used to analyze the impact response and describe relevant sensitivity parameters of sandwich structures.