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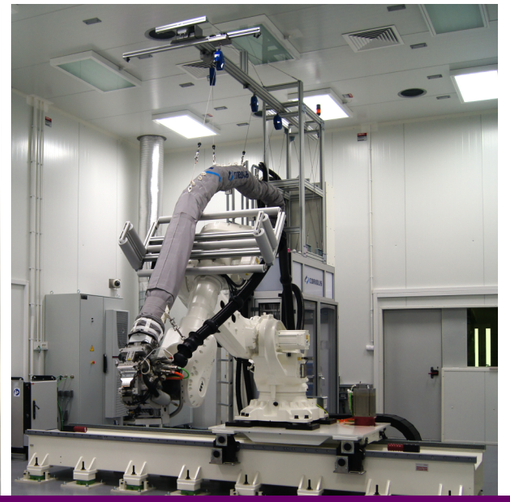
CCT
Center for Composite Technologies

institute of aviation
warsaw, since 1926

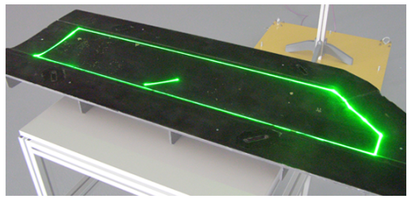


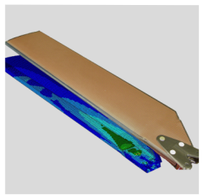
CENTER FOR COMPOSITE TECHNOLOGIES

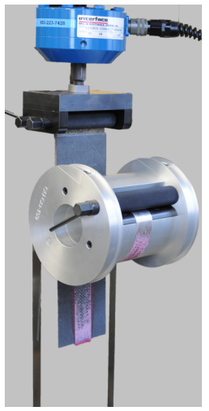
The mission of the Centre for Composite Technologies is to provide advanced technological solutions and to carry out research studies in the field of composite materials for the aerospace industry.

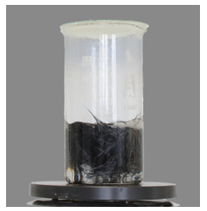
The Centre comprehensively carries out research in the field of high-performance composite materials:

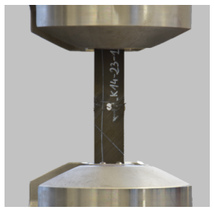
- Development of manufacturing technologies
- Design and analysis of composite structures
- Screening tests
- Qualification and certification tests of composite materials
- Element level testing including damage tolerance evaluation

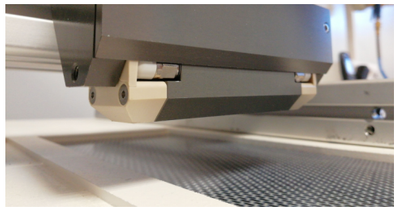


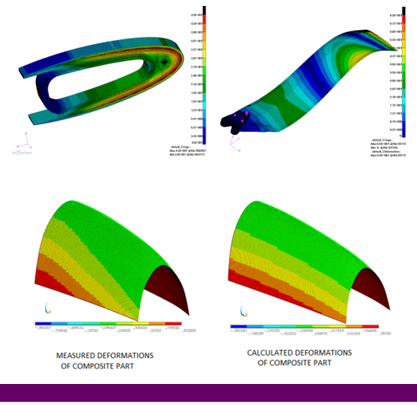


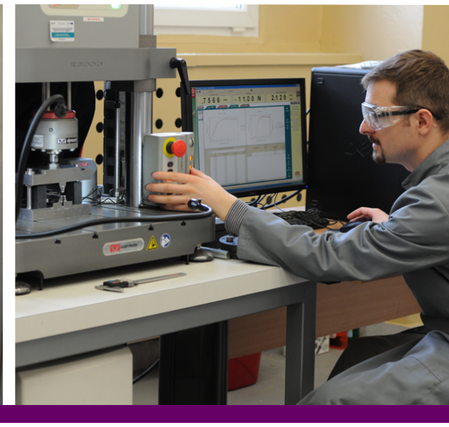












MANUFACTURING TECHNOLOGIES FOR COMPOSITE STRUCTURES

THERMOSET MATERIAL TECHNOLOGIES

- curing process development
- composite parts manufacturing in Autoclave and Out-of-Autoclave processes
- manufacturing of composite parts using Automated Fiber Placement technology
- manufacturing of composite parts using resin infusion process
- tooling design and development
- repairs of composite structures

THERMOPLASTIC MATERIALS TECHNOLOGIES

- development of consolidation processes
- manufacturing of composite parts using PEEK/PAEK-based thermoplastic prepregs and hydraulic press
- tooling design and development
- ultrasonic and resistance welding of thermoplastic composite materials

QUALITY ASSURANCE

- development of quality control process
- non-destructive testing
- dimension inspection with 3D laser scanner

NUMERICAL ANALYSES

- structural analysis with usage of Nastran, Patran, and Hyperworks software,
- numerical simulations of rubber dies applied in thermoplastic composites forming process.

TESTS OF COMPOSITE MATERIALS

- static and fatigue tests,
- maximum load up to 250 kN,
- test temperature from -130°C to 310°C,
- digital image correlation,
- measurements of strain by means of strain gauges and extensometers,
- test fixtures compliant with applicable standards and designed purposefully for customer needs,
- range of impact energy from 0.59J to 1800J,
- comprehensive preparation of test samples,
- conditioning of samples until the saturation state,
- analysis of thermal properties demonstrated by composite materials.

PCA
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MECHANICAL TESTS

LAMINA TESTING

Tensile	ASTM 3039
Compression	ASTM D3410, ASTM D6641
Shear	ASTM D3518, ASTM D5379, ASTM D7078
Interlaminar shear	ASTM D2344
Three-point bending	ASTM D790
Mode I, Mode II and Mixed Mode Fracture Toughness	ASTM D5528, ASTM D6115; ASTM D7905; ASTM D6671

LAMINATE TESTING

Open Hole Compression	ASTM D6484
Open Hole Tensile	ASTM D5766
Compression after impact	ASTM D7136, ASTM D7137

BOLTED JOINTS

Bearing Response	ASTM D5961
Pull-Through	ASTM D7332

ADHESIVE TESTING

Shear tests	ASTM D1002, ASTM D5656, ASTM D3528
Peel resistance	ASTM D3167, ASTM D1781

CORE MATERIALS AND SANDWICH STRUCTURES

Compression	ASTM C365
Core shear	ASTM C393, ASTM C273
Flatwise Tensile	ASTM C297
Long Beam Flexure	ASTM D7249

PHYSICAL AND CHEMICAL TESTS

Tests of uncured prepregs (gel time, resin flow, resin content)	
Fibre volume	ASTM D3171
Glass transition temperature	ASTM E1640, ASTM D7028
Enthalpy and crystallization	ASTM D3418
Thermogravimetric tests	ASTM E1131

NON-DESTRUCTIVE TESTS, MICROSCOPIC ANALYSES

Ultrasonic tests of laminated materials, Visual analyses, Microscopic measurements of porosity.