

*Design and Analysis
of Composite Structures*

Damage Modeling

*Topology Optimization for
Additive Manufacturing*

*Material Characterization
and Structural Testing*

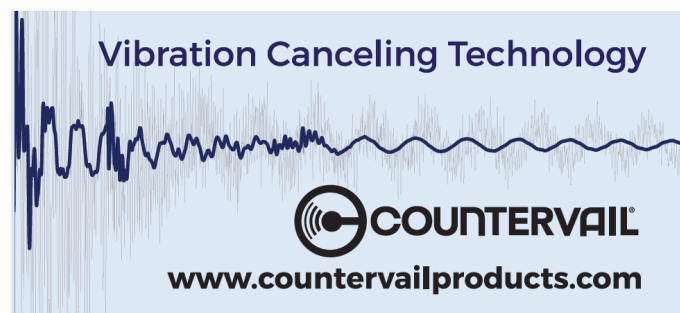
Prototype Manufacturing

Compression Molding

Injection Molding

*Specialty Textile
Engineering and Production*

*Non-Destructive Evaluation,
Quality Assurance
and Metrology*



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COMPANY CAPABILITIES



40+ years serving major
corporate and government clients



Engineering the Future of Materials

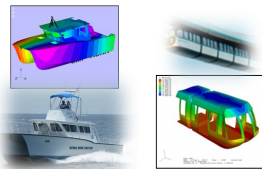
www.materials-sciences.com

COMPANY PROFILE

Materials Sciences Corporation (MSC) is a small business headquartered in southeastern Pennsylvania that has provided engineering services to the composites industry since 1970. A recognized leader in the design, analysis and testing of composite materials and structures, MSC is committed to excellence in all stages of the engineering development cycle: research, design, analysis, testing and prototype manufacturing. MSC's capabilities include composite material development and product design, analytical modeling and simulation, prototype manufacturing and testing. MSC also operates a textile and composite manufacturing facility in Greenville, South Carolina.

PRODUCT DEVELOPMENT AREAS

MSC has led the design, analysis, manufacturing and testing of advanced composite materials and structures for a broad range of product applications for both government and corporate clients. These have included marine and transportation systems, ground vehicles, aviation and missile systems, unmanned aerial systems and recreational products.



Marine and Transportation Systems



Aviation and Missile Systems



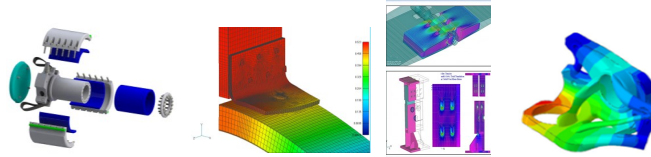
Commercial Products



Survivability

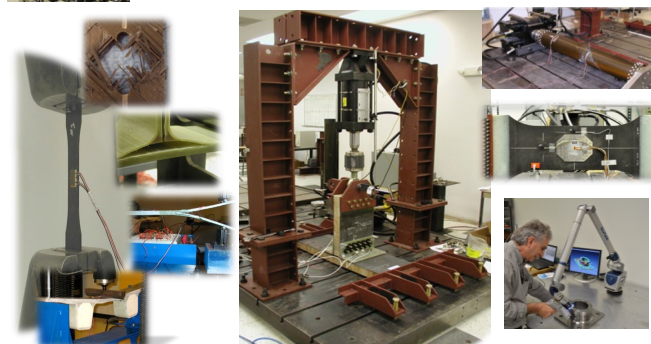
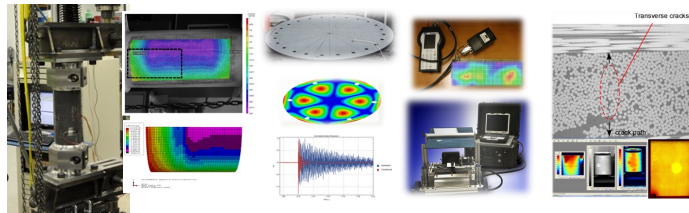
DESIGN AND ANALYSIS

- ◆ State of the art workstations
- ◆ Computer aided design and solid modeling software (Autocad, SolidWorks)
- ◆ Commercial and in-house finite element programs (ABAQUS, LS-DYNA, FEMAP)
- ◆ Proprietary materials analysis and design software
- ◆ Topology optimization for additive manufacturing



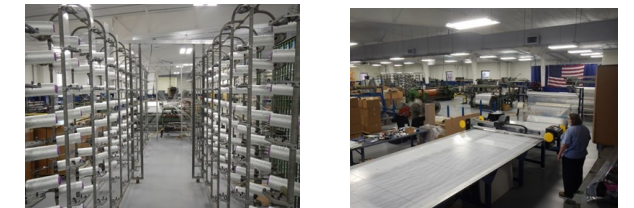
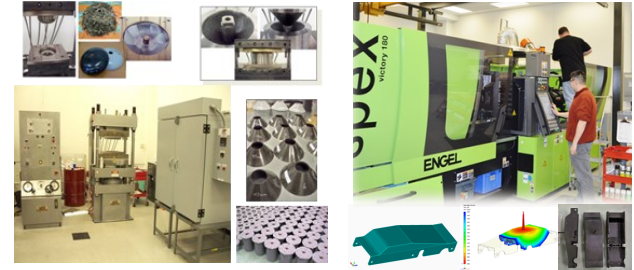
MATERIAL CHARACTERIZATION AND STRUCTURAL TESTING

- ◆ Test planning, specimen design, data reduction and analysis, material qualification
- ◆ Standard coupon (e.g., ASTM, SACMA) and large-scale specialty element/component testing
- ◆ Static and Fatigue Testing -Servohydraulic and electro-mechanical
- ◆ Dynamic— modal analysis, DMA, creep, random vibration, shock, system identification
- ◆ Environmental conditioning —moisture, temperature, UV, etc.
- ◆ Dimensional analysis/3D inspection
- ◆ Non-destructive Testing (Ultrasonic Transmission, Thermography, Acoustic Emission)



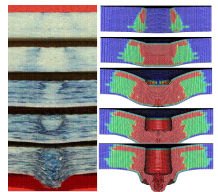
PROTOTYPE MANUFACTURING AND PRODUCTION

- ◆ Fabrication of fiber reinforced (continuous and discontinuous) thermoset and thermoplastic composite parts
- ◆ Out-of-Autoclave (OoA) Manufacturing via resin transfer molding (RTM), resin film infusion (RFI)
- ◆ Compression molding
- ◆ Injection molding
- ◆ Textile Production

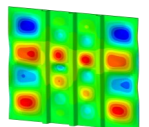


MODELS FOR EVOLVING MATERIAL RESPONSES

- ◆ **MAT 161/162**- Progressive failure model for LS-DYNA and ANSYS



- ◆ **NDBILIN**—Stress based failure modeling for ABAQUS



- ◆ **DDSHM**—Fracture-based failure modeling for ABAQUS

