



NCC ADDS NEW CAPABILITY – DESIGN AND OPTIMIZATION FOR COST AND WEIGHT SAVINGS

The National Composite Center (NCC) has added a new design and optimization capability that will help manufacturers integrate composites into structural designs and harvest substantial cost and weight savings among other benefits. Genesis™ Design Optimization, a finite element analysis package, allows NCC to customize applications while designing for mass, strain, energy and other variables.

The Center is uniquely qualified for design work in the composite arena due to its hands on experience, prototype and fabrication services in the arenas of **Rapid Fiber Preforming**, Large Scale Preforming, closed molding, Litecast® and Long Fiber Reinforced Thermoplastics.

Because of the unique characteristics of composites, designing with the material takes special skills. NCC begins its design process using one of three design paths – analytical, empirical or numerical. NCC is able to customize design applications by using the appropriate combination of design paths to take the customer from concept to a manufacturable product in a timely and cost-efficient manner.

Genesis amplifies the numerical approach with its ability to change design variables and create custom

equations that allow for any optimization a customer may require. Optimizations can include cost, part thickness, part shape, fiber type or fiber angle.

With Genesis, NCC is helping manufacturers take the guess work out of using composite properties in structural designs, but the Center is also working to advance its capabilities still further. NCC recently obtained the license for AlphaStar's Genoa™ – a progressive failure analysis program. Genoa defines damage when one ply has reached its stress limit. Fracture occurs when all plies reach their stress limits. Genoa remeshes the model after each fracture.

For manufacturers, the cutting edge technology means that NCC will not only be equipped to predict when a specimen will fail, but more importantly, how it failed. This capability can help guide redesigns to improve performance.

Genoa is also able to predict how long a compound will last in a fatigue environment – an essential ingredient to evaluating part durability.

By adding these capabilities to its lineup NCC is able to offer customers a comprehensive solution that can bridge the gap between concept and production level parts without the capital equipment investments and lengthy development periods typically

required to bring new parts to market.

VECTOR COMPANY DELIVERS WILDLAND EMERGENCY RESPONSE VEHICLE

Carba Fire Technologies of Dayton, Ohio Inc., (CFT) a wholly-owned subsidiary of Vector Composites Inc., has delivered a Wildland Emergency Response Vehicle (WERV) to Fire Support Sales. Based in Harrison, Ohio, Fire Support Sales is an exclusive distributor for CFT for the regions covering Ohio and Indiana. The distributor plans to use the vehicle to demonstrate its performance capabilities to fire companies and first responders in its territory as well as non-exclusives states like Kentucky and West Virginia.



WERV unit.

"We're very anxious to show customers the unique characteristics of this vehicle and the ways in which it can enhance response time, maintain critical lines of communication, withstand extreme weather conditions and navigating difficult landscapes," said Fred Unkenholt, President of Fire Support Sales.



The off-road capability of the WERV unit makes it ideal for fire fighting and rescue missions in rough terrain. WERV also has the capability to cross bodies of water at up to four miles per hour. WERV is part of CFT's line of next generation turnkey fire equipment and off-road tactical vehicles.

"Fire Support Sales represents the approach we plan to use to sell CFT products," said John Weidner, President of Vector. "We're targeting distributor who have access to the medical emergency response and fire fighting markets. In addition to Fire Support Sales, we have a distributor for the greater New York City area but are actively seeking distributors to represent us across the country."

In addition to building a network of distributors, CFT will tap its parent company Vector to integrate composite properties into its line for military and homeland defense customers. "Composites are a natural next step in the evolution of this equipment line," Weidner said, "due to the unique advantages the technology offers."

Lighter weight means enhanced maneuverability. The introduction of composites will also help reduce overall operating costs and make the equipment more durable."

NCC HOSTS AIR FORCE NANO TECHNOLOGY WORKSHOP

NCC hosted the Air Force sponsored Vapor Grown Nanofiber

Materials and Applications Workshop on September 14 -15. Attendees gained an in-depth understanding of Vapor Grown Nanofibers (VGCF) and their applications in military, civilian aviation, and commercial markets.

Cost effective and available in commercial quantities, nanofibers can be used to improve electrical, thermal, and mechanical properties in organic matrix composites. Insights on nanomaterial real-world applications were presented by industry, academic, government researchers, engineers and technical specialists from NCC. NCC members with participating presenters included the Air Force Research Laboratory (AFRL), University of Dayton Research Institute (UDRI), University of Toledo and Boeing.

Seven panelists, including NCC representative Harry Couch, discussed both the barriers and opportunities for the use of vapor grown carbon fibers (VGCF) in military and commercial applications. Attendees toured Applied Sciences Inc. and its VGCF manufacturing facility in Cedarville, Ohio. At the conclusion of the workshop, feedback was very optimistic about the inclusion of nanofibers in composite applications.

In addition to sponsoring events like this workshop, NCC is also working to advance nano technology. As part of a project with AFRL, NCC is harnessing the advantages of

nanocomposites to improve the mechanical and physical properties of laminates. Using the ovens and molding equipment purchased with its State of Ohio Wright Capital Project Fund grant, the Center initially employed various techniques to study the infusion behavior of nanoparticles. Using assisted media flow infusion at high temperature the Center observed that the fabric acted as a filter and impeded dispersion of the nanoparticles.

To help eliminate this problem, NCC used a Channel Assisted Resin Transfer Molding (CARTM) technique licensed by Why Not Composites. CARTM infusion techniques can be used at high temperature allowing more uniform dispersion of the nanoparticles. In addition, CARTM techniques are allowing NCC to more precisely locate nanoparticles within the fabric and resin and determine whether or not the particles will remain where placed.

SEE NCC AT COMPOSITES 2004 IN OCTOBER

Visit NCC at Booth #2016 at Composites 2004 at Tampa, Florida's Tampa Convention Center Oct 6 - 8. NCC will showcase key technologies including its proprietary Litecast® and new developments in Long Fiber Thermoplastics (LFT) as well as examples of the Center's **Rapid Fiber Preforming** and closed molding expertise. NCC will also hold a demonstration involving



vacuum infusion of a truck bumper.
Composites 2004 is being sponsored by the American Composites Manufacturers Association (ACMA) and is the only convention and trade show designed to provide visitors with the tools to improve their composites knowledge as well as contribute to the ongoing advancement of the composites industry overall.

