



NCC RECEIVED \$1 MILLION FROM GOVERNOR TAFT

Governor Bob Taft presented The National Composite Center (NCC) with a \$1 million Wright Capital Project Fund award that will help NCC develop high-strength, low mass thermoplastics parts for the automotive and mass transit industries. NCC will use the funding to create a prototype production line and develop cost effective manufacturing processes for the new parts.

The project is expected to produce up to 200 new jobs and competitively position Ohio in the transportation market. NCC will collaborate on the project with the University of Akron, the University of Alabama at Birmingham and Fiber Form Inc. Delphi Corporation will also provide support as an industry expert. As a composite leader, NCC's broad range of preform and molding capabilities allows the center to bring a unique set of skills and value added services to the transportation industry.

Having produced and delivered composite pick-up boxes in unit quantities of hundreds, NCC successfully completed Focal Project II for the Automotive Composites Consortium (ACC) and is currently exploring carbon fiber uses as an application for a heavily stressed support piece between the front and rear doors on a four-door sedan under Focal Project III. In

2001 NCC took composite spring technology that no longer fit Delphi's corporate profile, negotiated its purchase, helped launch a new business and attract the attention of world-class distributor ArvinMeritor.

This year ArvinMeritor's Commercial Vehicle Systems Worldwide Suspension Systems business announced a joint agreement with Liteflex LLC, an authorized licensee of the National Composite Center for the manufacture of the composite springs. The agreement names ArvinMeritor as sole distributor of current Liteflex truck and trailer mechanical composite leaf springs on a global basis. NCC has also teamed with Liteflex LLC to develop its Litecast™ suspension link assemblies. The patented process produces a stronger yet lighter weight product for the medium to heavy-duty truck markets.

Equally important are the critical skills and services brought to the project by its team members. Fiberform, based in Newark, Ohio, will supply the raw materials, equipment and the material technology that will serve as the building block for this project.

The University of Akron will provide material development and processing expertise. Their unique virtual laboratory has the capability to reach across distances to provide the unifying connection that will help team members work together more effectively. The

University of Alabama at Birmingham will provide modeling capabilities that will simulate manufacturing processes and parts. These capabilities will become part of the expertise of Ohio organizations.

The Federal Transit Administration, Army Research Laboratory, and the Department Of Energy's Oakridge Laboratory will provide matching funds for the project, demonstrating this technology's broad appeal.

According to Chuck Worner, Business Line Manager for Delphi's Advanced Structural Composites business and a member of NCC's Board of Directors, "This award allows NCC to advance into the field of thermo-plastic structural composites supporting not just Ohio in the creation of jobs, but helping the US industry to catch up with European firms that have already been working in this field for many years. This project places NCC, project collaborators and the state of Ohio on the leading edge of this important industry."

NCC RACKS UP JOB CREATION SUCCESSES

Aside from NCC's efforts to expand the region's industrial base through the retention and addition of jobs, the Center's expertise in a full range of composite preform and molding technology is continuing to attract new business, scientists and other experts to this community. Aside from retaining and creating jobs through the commercialization



of composites, NCC is also committed to the ongoing exploration of advanced manufacturing technologies that will provide industry and consumers alike with high performance materials that last longer and cost less.

In the infrastructure industry NCC kicked off C4I in August 2001 when the Center signed an agreement with Martin Marietta Composites (MMC) of Raleigh, North Carolina for the fabrication of six new composite bridge decks. The first composite bridge deck was installed in April 2002 on Fairgrounds Road in Greene County, Ohio.

With three spans totaling 7,074 square feet, the new deck marked the largest to date to be successfully installed by NCC and MMC under the C4I initiative. NCC is in the midst of installing five more bridges in 2002 – 03 and is working with other Ohio bridge owners to install additional decks.

NCC first entered the infrastructure arena in 2000 with Project 100, a state-backed initiative designed to capitalize on the anticipated growth of FRP composites for bridge decks and other infrastructure applications. Project 100 was also a state of Ohio initiative to accelerate commercial development of FRP composite bridge decks. NCC completed Phase 1 of Project 100 on June 30, 2001 with Hardcore Composites, LLC. Hardcore designed and

manufactured the first eight Project 100 composite bridge decks installed in Ohio.

Sandwich constructions were molded using the vacuum infusion process and all wearing surfaces were asphalt. Under Project 100, Hardcore added 15 jobs at NCC through its partner WebCore Technologies Inc., and invested \$100,000 in NCC's manufacturing facilities. These new jobs produce an economic impact of \$4.2 million annually for the Greater Dayton region.

WebCore became part of NCC's infrastructure team in 2001 when the company worked with Hardcore to develop lower cost composite preforms for Project 100.

WebCore also supplied a ninth bridge deck for Phase 1, which was fully manufactured by the company at NCC's state-of-the-art facility. When lack of state funding made it impossible for Project 100 to continue subsidizing FRP decks, NCC used its experience and innovation to create and launch C4I to continue facilitating FRP bridge deck installations without state subsidy.

NCC's contributions to the transportation industry, as highlighted in the previous article, have helped retain a key technology in Ohio, generated 54 jobs through Liteflex LLC and are helping to strategically position Ohio on the advancing edge of an important market.

In another example of commercialization, NCC teamed with Lion Apparel for new development and pilot production of composite shells for Lion Apparel's fire helmet product line. Valued at nearly \$1 million, the agreement included development work NCC conducted over a six-month period using a new manufacturing technique. In 2001, NCC was selected by Lion Apparel to perform additional molding operations for the company's newly acquired Paul Conway Helmets. The expanded work has also added jobs to the Dayton area

Lion Apparel relocated presses and mold finishing equipment from the Paul Conway plant to space selected at NCC's facility to access the key competitive advantages offered by the Center's knowledge and technical expertise. NCC has taken strides to improve the process through its advanced technologies and delivered improved production rates and delivery times for Lion Apparel.

In the aerospace and defense arena, NCC has produced aircraft fairings, complex shapes and other secondary structures at a fraction of the cost of traditional methods. Examples include an access door for a fighter aircraft that generated a cost savings of 46 percent and a nine percent reduction in weight when compared to other composite parts.

A tailcone for a jet transport netted a cost savings of 80 percent with a

two percent increase in weight when compared to composite assembly products. NCC's expertise in this arena led to Boeing Phantom Works donation of a Gantry System for a robotic fiber placement machine valued at \$3 million. The equipment is the centerpiece of NCC's plans to create an aerospace preform composite parts company for the Dayton area.

In June NCC received a \$2 million Wright Capital Project Fund award to advance the manufacturing process of large-scale polymer parts and complete this manufacturing cell. NCC has already made significant progress on the process and was able to update Governor Taft during his

most recent visit for the presentation of the Long Fiber Thermoplastics award. These examples highlight some of NCC's successes to further jobs, revenue and technology advances. The accompanying chart shows the number of jobs created by NCC since 2000. The total of 138 jobs as represented on the chart below, has an annual economic impact of over \$40,000,000 - far exceeding the investment made by the State of Ohio in NCC.

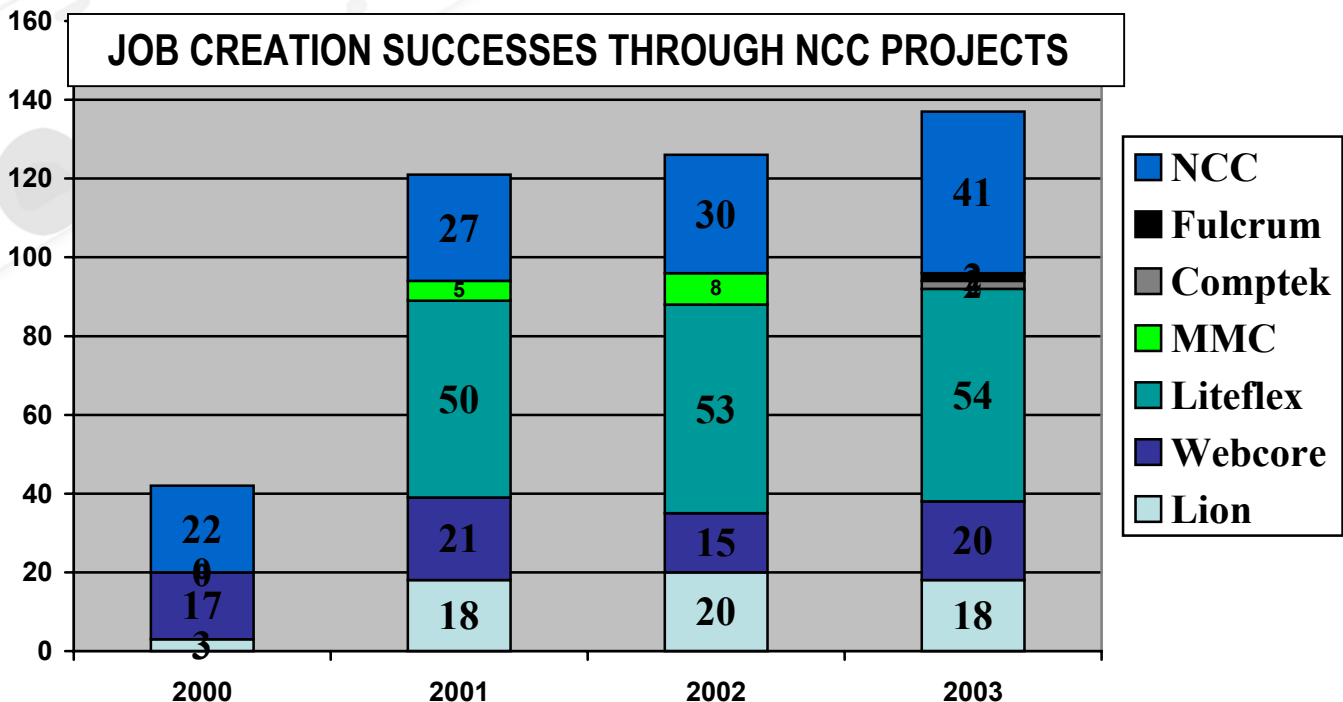


NCC Technology Making Jobs Happen

R. BYRON PIPES AND CHUCK WORNER NAMED TO NCC'S TECHNICAL OVERSIGHT COMMITTEE

Two key industry experts, R. Byron Pipes, NAE and Chuck Worner, have been appointed to NCC's Technical Oversight Committee (TOC). Dr. Pipes is a Goodyear Endowed Professor of Polymer Engineering at the University of Akron in Akron, Ohio. Mr. Worner is the business line manager of composites for the Delphi Corporation's Saginaw Steering Systems in Saginaw, Michigan.

NCC created the Technical Oversight Committee in 2000 by tapping the academic and business communities to help aid its





technology commercialization process. Committee members are tasked to examine promising new technology and look at ways existing industry knowledge might fit other markets. The committee then evaluates recommendations submitted by NCC staff and NCC member companies and selects those projects they feel have the potential to produce the next commercial breakthroughs and have broad member company appeal.

Prior to his appointment at the University of Akron in 2001, Dr. Pipes served as a Distinguished Visiting Scholar at the College of William and Mary during 1999-2001 where he pursued research at the NASA Langley Research Center in the field of carbon nanotechnology. He also served as President of Rensselaer Polytechnic Institute 1993-98 and held key positions with the University of Delaware's College of Engineering and Center for Composite Materials.

Elected to the National Academy of Engineering in 1987 and the Royal Swedish Academy of Engineering in 1993, Dr. Pipes was appointed Robert L. Spencer of Engineering in 1986 for his outstanding work in the field of polymer composite materials. A published author with numerous articles and four books to his credit, Dr. Pipes is a recognized leader in building partnerships for university research with private sector, government and academia.

Dr. Pipes holds a doctoral degree in mechanical engineering from the University of Texas and the MSE from Princeton University and is the recipient of several academic awards. He holds Fellow rank in ASC, ASME and SAMPE.

Mr. Worner, in his role for Delphi, is responsible for leading, managing and growing the company's new Advanced Structural Composites Business including production and logistics. He began his career in 1985 at General Motors' Milford Proving Grounds as a vehicle dynamics project engineer. There he specialized in simulation and objective testing of vehicle chassis systems as well as the effect of steering system properties on vehicle dynamics and vehicle handling characteristics. Mr. Worner joined Delphi in 1994 as project manager of the advanced engineering staff.

Holding several key positions for Delphi, Mr. Worner was named global customer manager for the Toyota account in 1999 and then global customer manager for Asian customers. He was named to his current position in 2002. Mr. Worner holds both a bachelor's and master's degree in agricultural engineering from the University of Illinois.

He is a member of the Society of Plastic Engineers and the Society of Automotive Engineers as well as a Board of Trustees Member of the National Composite Center.

NCC A STRONG PRESENCE AT COMPOSITES 2003 TRADE SHOW IN CALIFORNIA

NCC exhibited at Composites 2003 held Oct. 1 – 3 in Anaheim, California, participated in technical presentations and hosted a special seminar. The American Composites Manufacturers Association (ACMA), formerly known as the Composites Fabrication Association (CFA), sponsored the show.

The Center exhibited its signature Rapid Fiber Preform (RFP) process, advanced closed molding techniques and Litecast™ metal-to-composite joining technology. NCC's seminar, Bringing New Technology to Market: How To Successfully Navigate The Trail To Commercialization, included segments by Susan Ward, President & CEO of ITECS and consultant in industrial business development to NCC; Jim Groninger, President of Design Tanks Inc.; Max Lake of Applied Sciences and NCC's Dave Richard.

In addition to the seminar, Dave Richard presented NCC's Litecast and Andy Loff showcased the Center's advanced closed molding techniques. These technical presentations produced high booth traffic and interest in NCC's mission from national and international visitors. Discussions were also opened with representatives from the Cidade Universitaria of Rio de regarding the potential for a partnership relationship with NCC.