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ORCMT - Technology Resource for the 21st Century Nonwovens Industry

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ORCMT - Technology Resource
for the 21st Century Nonwovens Industry

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Abstract

As American textile and nonwovens companies participate in an increasingly competitive world market, technology is playing an ever-growing role in production of new, improved, and more cost competitive products and processes. But the same competitive pressures which drive the need for advanced manufacturing technology also reduce the resources available for necessary research and development activities. Technology resources and manufacturing expertise, unmatched in the world, are available to American industry at the Oak Ridge Centers for Manufacturing Technology (ORCMT). Bottom-line benefits from ORCMT technology solutions are already in the hundreds of millions of dollars. This presentation will describe a sampling of the technologies and expertise available, present examples of previous solutions, and explain how your company can benefit from the wealth of resources available.

Introduction

Although manufacturing has been a shrinking part of the U.S. economy over the past 20 years, it is still vitally important to our national well being. Surveys in recent years indicate that manufacturing still accounts for more than 18% of the U.S. gross domestic product. Although manufacturing is still a mainstay of the economy, competitive pressures from abroad are becoming greater. One way that American business can compete is by increasing the efficiency of manufacturing by use of advanced technologies. However, much of American industry's capability for manufacturing technology development has disappeared because of tight budgets. This is where ORCMT enters; ORCMT's business is to help businesses with manufacturing technology development.

For more than 50 years the U.S. Department of Energy's (DOE) facilities in Oak Ridge, Tennessee have played a central role in technology development for defense and other key national missions. The Oak Ridge facilities - the Y-12 Plant (Y-12), the Oak Ridge National Laboratory (ORNL), and the East Tennessee Technology Park (ETTP) - are managed for the DOE by the Lockheed Martin Corporation. ORCMT was created to be an interface between American industry and the technologies and expertise at the Oak Ridge facilities. It had at least part of its genesis in the National Competitiveness Technology Transfer Act of 1989 which encouraged the U.S. Department of Energy's defense facilities to seek out and work with the private sector. President George Bush's 1992 announcement that the United States would not build any new nuclear weapons brought an abrupt change in the defense mission of the Oak Ridge facilities. Y-12 went from nuclear weapons production to using those manufacturing technologies and expertise to enhance the nation's industrial
competitiveness while maintaining and enhancing its capabilities and expertise in support of the defense mission.

ORCMT focuses special attention on major segments of U.S. industry of which the integrated textile industry, including nonwovens, is one.

A National Resource

ORCMT's mission is to solve tough manufacturing problems for national and economic security. To carry out that mission we provide three services:

- Solving manufacturing problems
- Creating prototypes and manufacturing processes based on emerging technologies
- Training workers for advanced manufacturing environments

The resources amassed in the Oak Ridge complex and available to U.S. industry through ORCMT are staggering and are organized into four core competency areas:

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Technologists in the different core areas easily combine their efforts, working as a "virtual center" of expertise to solve a problem. Once the problem is solved, technologists turn to problems in other,
potentially unrelated areas. This enables ORCMT to be very flexible in meeting customers’ needs. Some of the sophisticated analytical, design, and processing facilities can be accessed by customers as user centers. Additionally, the Centers provide hands-on training and experience with advanced machine tools and testing equipment through the ORCMT Skills Campus.

Impact

A few examples will serve to demonstrate the breadth and versatility of ORCMT solutions for textile applications:

- Wear resistant coatings can extend the life of spinnerets and yarn-spinning components. Newly developed methods can apply “designer coatings” to components to enhance life, wear, strength, etc.
- Solvent replacement and use minimization strategies have been designed for a major sports wear manufacturer.
- Analytical tools have been used to identify process contaminants and monofilament yarn defects enabling process corrections to be made.
- A high efficiency, direct drive sewing machine motor and controller were developed. This development constitutes a paradigm shift for the sewing machine industry.
- Shop floor wireless technology implementations are making factory maintenance personnel more capable and efficient.

AMTEX

Oak Ridge technologies are making a big impact as part of the AMTEX Partnership. AMTEX, short for American Textile Partnership, is a partnership of DOE laboratories, industry consortia, and major universities which has the dual goals of making the American integrated textile industry more competitive and preserving defense-related technological expertise. AMTEX is currently having three funded projects: CAFE, DAMA, and TReC.

The Computer-Aided Fabric Evaluation, or CAFE, project incorporates sensors for flaw detection into high speed looms and knitting machines. The sensors will detect flaws and fabric inconsistencies when they occur facilitating process corrections and drastically reducing production of off-quality goods.

The Demand-Activated Manufacturing Architecture, or DAMA, project is providing Internet-accessed business tracking tools. The tools will enable the entire supply chain to know what products are selling so that inventories and costs can be managed more effectively.

The Textile Resource Conservation, or TReC, project encompasses a suite of projects which are aimed at reducing the negative effects of textiles processing on the environment. One is developing a new washing process which will remove process-related chemicals from fabric using only a fraction of the wash water currently used. The second project is developing sensors for
monitoring air emissions with the resulting data being used to optimize processes to minimize the emissions. The final project is developing Internet-based decision-making tools which access standardized environmental and manufacturing data. The tools will enable assessment of the environmental side effects of various manufacturing process and materials selection decisions.

Oak Ridge technologists are heavily involved in the CAFE and DAMA projects which are in various stages of commercialization.

Working With ORCMT

In addition to developing and migrating technology solutions to the factory floor, ORCMT is well suited to providing other services. We act as non-biased technology evaluators and consultants. Partnership integration can be performed for projects of different sizes. Dedicated support teams can be established to provide ongoing, focused support. We can perform industry interface and support functions and provide regional vendor support.

ORCMT works with manufacturers of all sizes, from the “Mom and Pop” operation to the multinational corporation. Typically, we assess customer needs and match them with unique Oak Ridge capabilities. Our goals are to meet near-term challenges quickly while building long-term relationships. We seek to provide quick turnaround for today’s problems and sustained partnerships for future challenges.

Conclusion

ORCMT makes available to American industry a combination of capabilities and facilities unmatched in the world. These resources are being used to help meet the challenges of increasing our nation’s industrial competitiveness as they already have been meeting the challenges of producing and conserving energy, protecting the environment, and providing for the nation’s defense. Oak Ridge personnel are bridging basic and applied scientific research with manufacturing technology and experience to benefit U.S. industry while maintaining and enhancing DOE capabilities.

At ORCMT our motto is: “We solve tough manufacturing problems” because that is what we are uniquely qualified to do.
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