

METYX Composites®
Third Composites Summit
June 4-8, 2012 • Istanbul, Turkey



METYX®
c o m p o s i t e s

STRENGTH. SUPPORT. SOLUTIONS.

METYX Composites
Orhanli Beldesi, Palamut Sokak No: 1
Tuzla, 34956 Istanbul/Turkey

Tel.: +90 216 394 32 60
Fax: +90 216 394 32 58
Email: info@metyx.com
Web: www.metyx.com



METYX Composites is a rapidly growing division of Telateks A.S., which has been producing high quality textiles for more than 70 years in Istanbul, Turkey. The METYX Composites vision is driven by customer needs. Recognizing the desire for stronger, lighter structures and more competitive end products in various industries, METYX Composites was founded to provide the composites arena with the high-performance technical textiles and custom solutions needed to achieve a leading edge in today's challenging marketplace. Among the industries that METYX Composites serves are: marine, automotive, transportation, wind energy, construction and architectural applications, infrastructure, and sports and leisure.

METYX Composites manufactures a wide range of high-performance technical textiles, including multiaxial reinforcements, carbon reinforcements, RTM reinforcements, woven reinforcements, and vacuum-bagging products. All METYX Composites products are manufactured at its two state-of-the-art facilities totaling 24,000 square meters in Istanbul and Manisa, Turkey. The company also provides tooling services, core material and fabric kitting, and consulting services.

As an extension of its technical textiles and composites-related products and services, METYX Composites is also committed to disseminating composites expertise in the form of formal and hands-on training both in Turkey and abroad.



Istanbul Factory



The METYX Team at JEC Europe 2011



Exterior View of the New Manisa Facility

METYX Third Composites Summit is brought to you by METYX Composites, in conjunction with our event sponsors:



Aksa

Aksa Karbon Elyaf Sanayi A.S. is a wholly owned subsidiary of Aksa Akriklik Sanayi A.S., the world's leading producer of acrylic fiber. Aksa has also been producing carbon fiber since 2008.

Aksa and The Dow Chemical Company have an agreement to form a joint venture to manufacture and commercialize carbon fiber and derivatives. The joint venture will develop and globally market a broad range of products and technical service support in growth industries such as wind energy, construction, transportation, and infrastructure.



Duratek

Duratek has specialized in polymer chemistry for more than 30 years. Duratek designs, produces, and markets mainly epoxy, polyurethane, and acrylic-based materials. Duratek produces certified epoxy-based lamination resins for composite structures (hand lamination, vacuum bagging, vacuum infusion, RTM, and L-RTM), certified wood lamination systems, and high strength structural adhesives.



Reinforced Plastics Magazine

Reinforced Plastics informs designers, manufacturers, and users of composite parts worldwide of the business opportunities and technology advances driving the industry. Through the magazine, website, and associated products, we report on all industrial applications for glass and carbon fiber reinforced plastics – aerospace, automotive, construction, marine, wind energy, and more. www.reinforcedplastics.com



Scott Bader

Scott Bader is a leading global supplier of resin and adhesive products to the composites and assembly in-

dustries. A composites industry pioneer for 60 years, Scott Bader now employs 600 people with factories in five locations on three continents and operates as an employee-owned company, enabling long-term stability and planning.



The Turkish Carbon Society

Karbon Dernegi, "The Turkish Carbon Society," was established in 2012. The objectives of The Turkish Carbon Society are: to promote interdisciplinary research and technology in the field of carbon science, to encourage cooperation between organizations with similar interests (both nationally and internationally), and to hold meetings of members either independently or jointly with other organizations.



Turkish Composites Manufacturers Association

Turkish Composites Manufacturers Association (TCMA) was established May 18, 2005. Objectives of the Association are: to foster the use of GRP in every aspect of life; to conduct activities regarding its introduction, information sharing, standardization and development for the benefit of governmental and local authorities, users, manufacturers and scientific institutions; to conduct studies necessary to base the production and usage of GRP on scientific grounds; and to create synergy by gathering relevant manufacturers and scientific institutions under one roof.

TCMA is also a member of ACMA (American Composites Manufacturers Association).



Umeco

Umeco is a name synonymous with innovation and service. As an international provider of advanced composite and process materials, we work primarily with organizations and individuals across aerospace and defense, wind energy, recreation and automotive industries. We think of it as global knowledge, locally served.

About the Summit

In today's challenging environment it has become a necessity to learn the latest composites industry techniques. METYX Composites Summit was born out of the belief that ongoing formal training and real world experience are what make it possible to turn ideas into successful end products.

Today, the Composites Summit is the most comprehensive event for high-performance composites in Turkey. It amasses industry leaders and attendees from around the world.

METYX Third Composites Summit, the most prolific yet, includes a two-day composites conference followed by a three-day RTM school. Both parts were designed to provide the maximum amount of targeted content, including theory and practice. Our goal is to teach, challenge, and inspire all attendees.

This year's presenters represent world renowned companies and institutions, including:

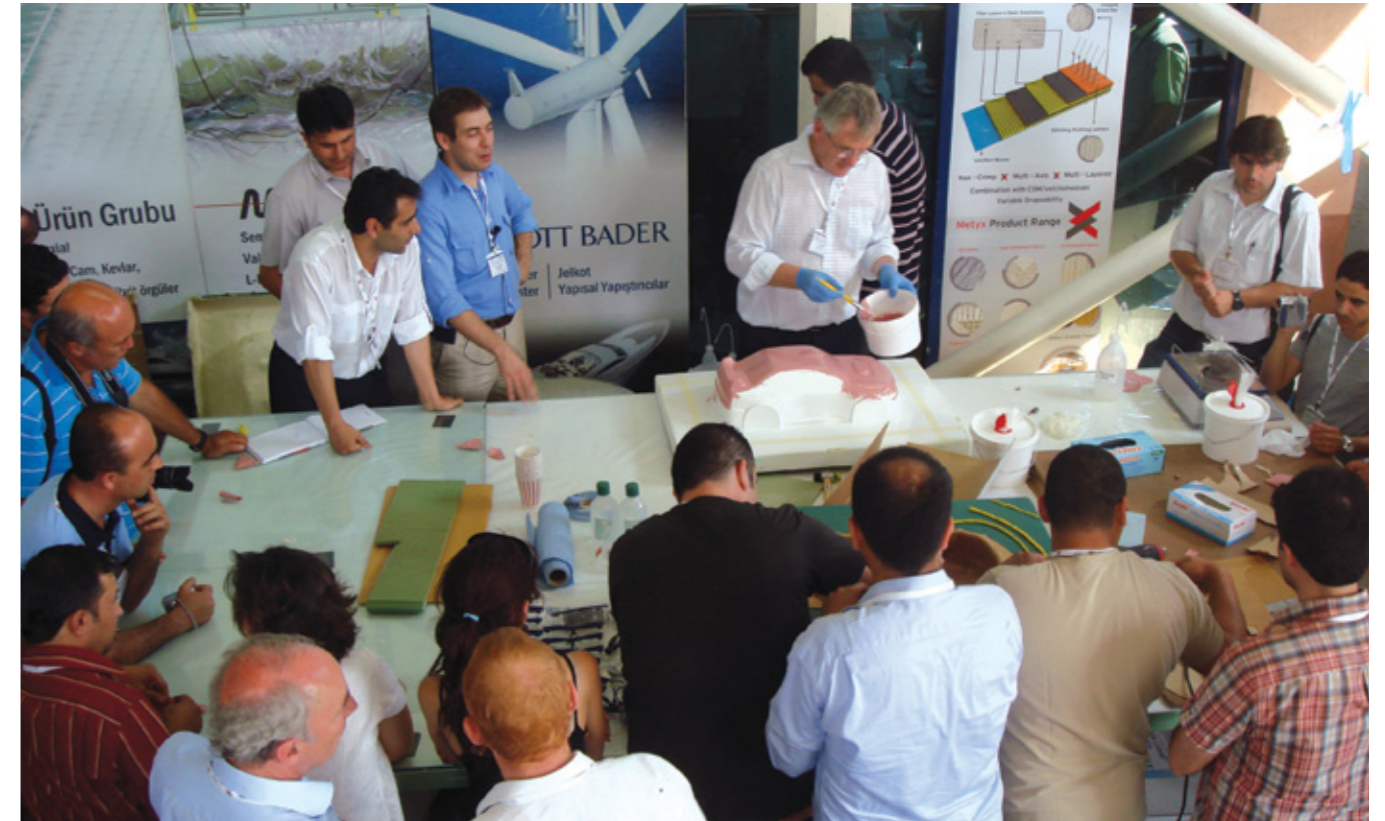
- AR Engineers (Germany)
- Areva (France)
- Composite Integration (U.K.)
- Kreysler & Associates, Inc. (U.S.A.)
- METYX Composites (Turkey)
- METYX Composites Tooling Center (Turkey)
- MVC Solutions in Plastics (Brazil)
- Polin (Turkey)
- Scott Bader (U.K.)
- STRUCTeam (U.K.)
- TAI – Turkish Aerospace Industries Inc. (Turkey)
- TCMA – Turkish Composites Manufacturers Association (Turkey)
- TPI Composites (U.S.A.)
- Yonca-Onuk JV (Turkey)



2009 Summit seminars



2009 Summit infusion demo by Aerovac



2007 Summit Moldguard® demo

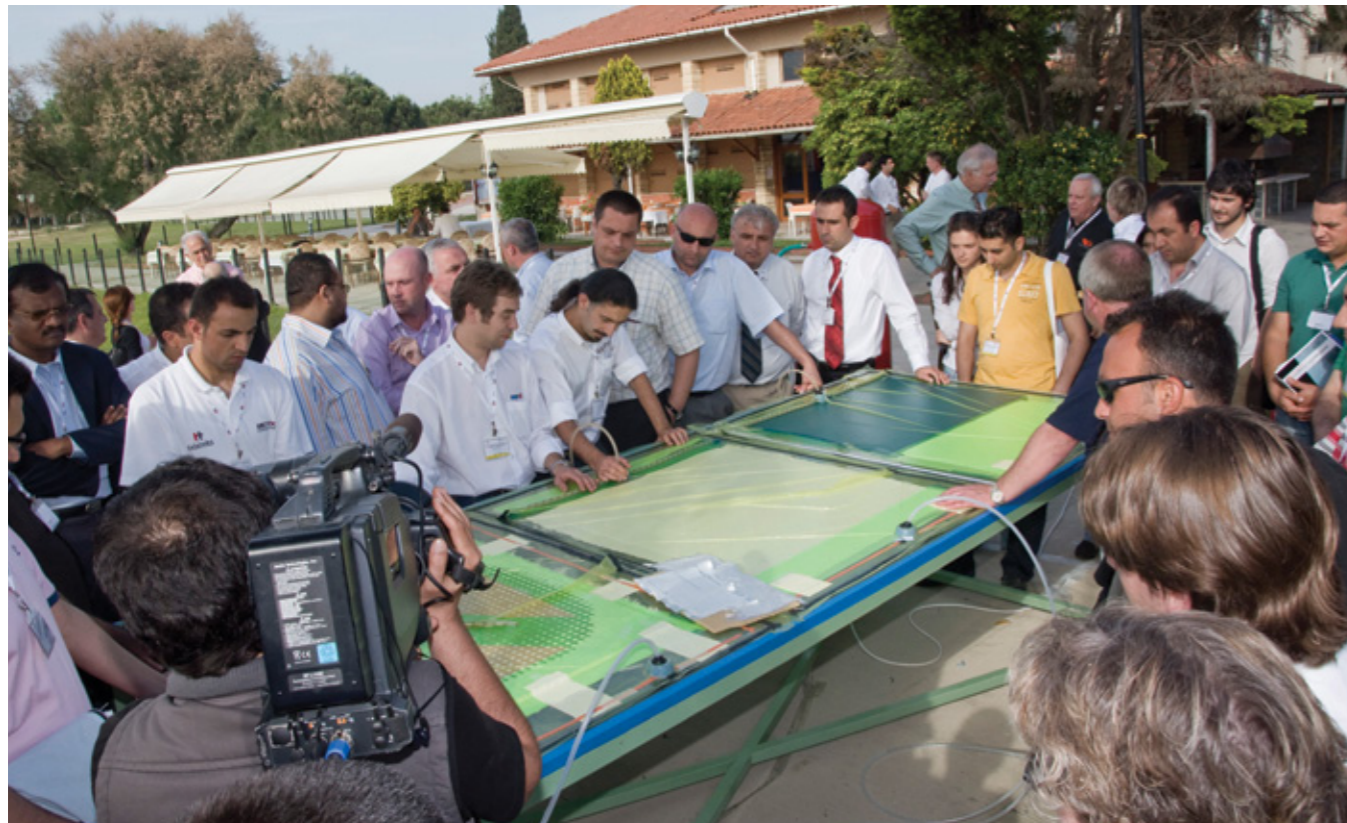
Summit Highlights

Composites Conference • June 4-5, 2012

Learn about the latest developments in production techniques for the composites industry. Experts from various industries present case studies and best practices.

Event Highlights:

- Design and failure analysis on high-end composites
- Development on carbon reinforced blade design, production, and test methods
- Process control and best practices in vacuum assisted infusion
- Composites in architectural applications
- Developments in carbon reinforcements
- Cycle time reduction through the use of material kits
- State-of-the-art plug and mold production
- Developments in RTM and use in transportation and agriculture
- Benefits of RTM in the production of large components for outdoor applications
- Developments in resin, adhesive, and gelcoat products
- Structural engineering for composites
- Use of high-end composites in aeronautical applications
- Use of high-performance composites in sea vessels
- Design and manufacture of wind blades



2009 Summit infusion demo by Aerovac

RTM School • June 6-8, 2012

Get the latest in RTM technology to enable a quick start for newcomers and advanced techniques for those with experience.

Event Highlights:

- Theoretical training on L-RTM technologies
- Mold construction and the benefits of closed molding
- Case studies detailing industrial applications of the technology
- Pattern design and preparation
- VRTM and RTM mold building
- Mold building materials (resins, gelcoats, core materials, etc.)



L-RTM demo injection by Composite Integration



Manufacture of upper mold for L-RTM by Composite Integration

Composites Conference • June 4-5, 2012

Monday, June 4, 2012

9:00 - 9:15 AM

Opening Speech by METYX Composites

9:15 - 9:45 AM



Areva Blades
Multinational Industrial Conglomerate Focusing on Wind Energy. (France)
www.aveva.com

Jörg Bäcker, Head of Research and Development

Characteristics and Experiences in the Production of CFRP UD Laminates of Thickness Greater Than 50mm

With the need for longer blades, the interests in thick laminates manufactured with carbon fiber is increasing. With the M5000-116 from AREVA Wind, rotor blades with a pure unidirectional CRP spar cap with up to 66mm thickness and hybrid 3Ax CRP and GRP up to 100mm thickness had been produced until 2003. In this presentation, we will cover the new and innovative production methods we have used since that time. Roving pulling, prepreg, and vacuum infusion are used these days, and they all have their benefits and disadvantages. We will also go into the process safety and the risk in the production. Finally, our experience with ultra-sonic scans will also be shown.

9:50 - 10:20 AM



MVC Solutions in Plastics
Manufacturer of Thermoplastics and Thermosets (Brazil)
www.mvcplasticos.com.br

Gilmar Lima, Director

The Evolution of RTM for the Automotive Market

This presentation will examine the transition of a business rooted 100 percent in manual processes (spray and hand lay-up) in composites to RTM. It will take a close look at the transition process and all its variables, focusing on the automotive market. This presentation will also discuss the demand level in the automotive market with regard to RTM, as well as the main trends and challenges of the RTM process, projecting forward for the next ten years. Case studies and success stories will be used to exemplify learnings.

10:20 - 10:45 AM

Coffee break

10:50 - 11:20 AM



Polin Waterparks & Pool Systems
Manufacturer of Waterparks and Pool Systems (Turkey)
www.polin.com.tr

Kutsal Erdogan, Manager of Quality and Innovation

The Benefits of RTM Technology for the Production of Waterslides

This presentation will examine the benefits of RTM technology in the production of waterslides through Polin's learnings as the first European waterslide manufacturer to utilize RTM technology. Polin is currently the world's largest manufacturer of

waterslide components and uses RTM technology due, in large part, to its significant benefits. Using RTM, Polin developed Natural Light Effect (NLE) technology, Special Pattern Effects (SPE), and translucent waterslides. Two of the major advantages of RTM over conventional methods are uniform thickness and smooth, shiny surface finishes (internal and external) that make cleaning easy. Additionally, RTM technology offers cleaner environmental conditions than conventional manufacturing methods.

11:20 AM - 12:00 PM

Exhibit Area and Free Time

12:00 - 1:10 PM

Lunch Break

1:15 - 1:45 PM



AR Engineers
Design and Analysis Engineering Focused on Composite Structures (Germany)
www.ar-engineers.de

Axel Reinsch, Founder and Managing Director

Examples From Realization of Loaded Composite Joints

Over the last few decades, the composite industry has grown from a niche sector to a highly evolved industry using cutting-edge technologies for efficient product development. Since composite products have to increasingly withstand international price pressure, it is critical to understand the behavior of designed parts early in order to avoid process errors in later stages. This presentation describes the capabilities and advantages of the early adoption of composite displacement or failure investigation using the latest advancements in CAD and FEA simulation. These important procedures verify the geometry and/or material design to ensure an efficient and economical product development process.

1:50 - 2:20 PM



METYX Composites
Composites Reinforcements, Distribution, and Consulting (Turkey)
www.metyx.com

Senior Technical Advisor, METYX Composites - Tooling Business Unit

State of the Art Tool Production and Benefits of Closed Molding and Infusion

This presentation will take a general look at tool making with a five axis CNC machine. Advantages of closed molding and vacuum infusion will also be discussed. A third focus will be on case studies in the marine and automotive sectors where RTM and infusion methods are successfully applied to obtain high output and superior quality.

2:20 - 2:45 PM

Coffee Break

2:50 - 3:20 PM



Turkish Composites Manufacturers Association (Turkey)
www.kompozit.org.tr

Ismail Hakki Hacialioglu, Chairman of the Association

Composites Materials

This presentation will discuss the future and prospects of composites materials in the Turkish market and the Middle East, including the market shares of composites applications.

3:25 - 4:30 PM



Scott Bader Co. Ltd.
Manufacturer of High-Performance Resins, Gelcoats, and Adhesives (U.K.)
www.scottbader.com

Trevor Osborne, Technical Support and Development Manager

Advanced Composite Developments

This presentation will examine recent developments in a number of composite materials, including structural adhesives, novel resins for use with carbon fiber, and high performance gelcoats. The composite industry - as well as other markets - is progressively moving towards the use of structural adhesives. Scott Bader has launched a range of Crestabond Methacrylate-based adhesives for these sectors. The properties, features, and benefits of these adhesives will be discussed. Carbon fiber is being used more regularly in composites. The properties and performance of a novel Crestapol resin for use in these laminates will be highlighted and compared with epoxy and vinyl ester resin alternatives. Finally, to address the ever-increasing requirements for high performance gelcoats, the superior weathering properties of the new Permabright gelcoats based on new polyester resin chemistry will be covered.

Tuesday, June 5, 2012

9:15 - 9:45 AM



Composite Integration
RTM Technology, Tooling, and Equipment (U.K.)
www.composite-integration.co.uk

Stephen Williams, Composite Integration

Resin Infusion Process Control

Composite Integration Ltd. is one of the only companies worldwide to develop systems that bring mechanization and automation to the resin infusion process. Large scale infusion is often a labor-intensive, messy, and wasteful process, and when compared to current RTM technology, proper process control is often minimal or completely lacking. Based on extensive experience of closed mold RTM processing across a range of industries, Composite Integration has developed equipment and a practical control methodology that is being used to produce some of the largest infused marine structures in the world today. This presentation will explain the need for process control and how best practices in RTM are applicable to the infusion process across industries.

9:50 - 10:20 AM



Kreysler & Associates, Inc.
Composites Manufacturer (U.S.A.)
www.kreysler.com

William Kreysler, President

Composites – A Rising Star in 21st Century Architecture

As architects continue to increase their ability to manage and define complex building shapes through the use of 3-D computer modeling, composite materials will be one of the few materials able to efficiently and economically form these shapes. Also, by creating buildings with 3-D computer programs, the architect is able to provide electronic data useful in controlling CNC routers and mills. The combination of these complex and often compound curves found in new buildings, and the computer data that defines them, has led to the rapidly increasing use of reinforced plastics in construction. Bill Kreysler will discuss the opportunities and challenges that face the composite fabricator who chooses to venture into this new and fast-growing market.

10:20 - 10:45 AM

Coffee Break

10:50 - 11:20 AM



METYX Composites
Composites Reinforcements, Distribution, and Consulting (Turkey)
www.metyx.com

Ugur Ustunel and Tunc Ustunel, Co-Directors

METYX Composites: Our Past and Our Future

The first half of this presentation will highlight some of the milestones in METYX Composites' history, with a focus on high-end composites and developments in composite reinforcements. Today carbon composites reinforcements enable structural engineers to design end-products that fulfill complex requirements. This presentation will highlight some of the technological breakthroughs in composites and the benefits to customers in various industries using best-in class case studies.

The second half of the presentation will talk about METYX Composites newly formed business units housed within the company's new state-of-the-art facility in the Manisa Industrial Zone. These new business units benefit industrial customers by delivering increased workshop efficiency and reduced cycle times.

11:20 AM - 12:00 PM

Exhibit Area and Free Time

12:00 - 1:10 PM

Lunch Break

1:15 - 1:45 PM



STRUCTeam Ltd.
Structural Engineering For Advanced Materials (U.K.)
www.structeam-ltd.com

Radek Michalik, Technical Director

Design Efficiency and Creativity Through Integration: What It Takes to Get There

The successful project involving composite materials and structural engineering is based on the integration of efficient design, lean manufacturing, and appropriate material choice. The key element of this success is the design process, which influences all aspects of the composite structure creation. Design is about creativity and innovation, and the ability to focus on what is really an important and efficient tool set.

Have you ever thought that designing composite structure could be an efficient and fully-integrated process that you or your team could drive? We always believed this is that way it should be, and now we have the STRUCTeam composite design platform.

This presentation will walk the audience through the common pitfalls of engineering methods and processes used in designing composite structures. It will also present the way STRUCTeam addresses these problems by developing an integrated composite design environment.

1:50 - 2:20 PM



TAI
Turkish Aerospace Ind. Inc. (Turkey)
www.tai.com.tr

Hürriyet Egilmez, Manufacturing Technologies Manager

A New Generation of Products and Techniques for Cost-Effective Production of Composite Structures

This presentation will explore composites from an aeronautical point of view, as seen through the lense of TAI, a leading aerospace industry company in Turkey. High-performance, pre-impregnated (prepreg), advanced fiber reinforced composite materials are widely used by major aerospace companies for components and structures.

A new generation of film and liquid resin products aimed at the cost-efficient production of aerospace structures using vacuum bag, press molding, and both in-and Out-of-Autoclave (OoA) processing techniques will be discussed. Also covered will be Out-of-Autoclave systems that allow designers to laminate with greater efficiency in a non-autoclave environment. These techniques and others will be examined as ways to achieve improved manufacturing flexibility, lower tooling costs, and improved energy savings. Findings apply to the automotive, marine, aerospace, wind energy industries, as well as other sectors.

2:20 - 2:45 PM

Coffee Break

2:50 - 3:20 PM



Yonca-Onuk JV
Builder of Kaan class ONUK MRTP Fast Patrol Boats (Turkey)
www.onuk.com

Ekber I.N. Onuk, Vice Chairman

The Changing Use of High-Performance Composites in Sea Security

This presentation will outline the activities of world-renowned Yonca Onuk Shipyard, with a focus on high-performance composites and their use on sea vessels with high speeds and maneuverability. As world security policies shift toward a greater emphasis on the protection of coastlines, marine design platforms are also changing to address new requirements for speed, security, and stealth. Innovative strategies to solve these technical challenges will also be discussed.

3:25 - 4:00 PM



TPI Composites
Manufacturer of Wind Blades (U.S.A.)
www.tpicomposites.com

David Heredero, Director of Manufacturing

Design for Manufacturing of Wind Blades

TPI Composites is a U.S. based global provider of wind turbine blades and other advanced structural composites products. We deliver high-quality, cost-effective composite solutions through long-term partnerships with the industry's leading manufacturers. Our competitive advantage relies in our capacity to provide cost-efficient and reliable manufacturing solutions to the leading OEM's. Participation from the design stage gives us the opportunity to influence and propose new ways to achieve high performance and cost efficient blades. TPI's main target is to focus on reducing the final cost of energy by integrating the best operational practices and industry standards into the blade manufacturing process.



2007 Summit infusion demo by Aerovac



2009 Summit seminar Q&A session

RTM School • June 6-8, 2012

The RTM School will be led by Composite Integration, a METYX Composites partner. Composite Integration Ltd. provides practical technical support and consultancy in all aspects of closed mold processing.

Richard Bland and Stephen Williams, Co-directors of Composite Integration, will conduct all the training.



Richard Bland and Stephen Williams

RTM demo mold

Vacuum RTM Mold Construction:

The training course will consist of a mixture of theoretical and practical work and is designed to give a practical basis for mold builders, an understanding of the design requirements for the composite component designer, as well as detailed knowledge of the molding process in general.

The course covers the following areas:

- **Component design for process** - An overview of various molding projects with case studies to highlight particular aspects of the process.
- **Pattern design and preparation** - Materials for pattern construction, supporting structure, flange design, surface treatment, release agents and dimensional tolerances.
- **Mold construction** - Complete and practical breakdown of each stage of the mold-building process.
- **Mold building materials** - Specification of tooling resins, gelcoats, core materials, etc. Epoxy, vinyl ester, polyester, low-profile and hybrid tooling systems.
- **Calibration Wax** - Building an accurate molding cavity between the mold surfaces using sheet wax. Alternative calibration materials. Surface treatments. Release agents.
- **Vacuum** - The use of vacuum to maintain accuracy during the mold-building stages. Vacuum equipment and its application.
- **Mold sealing systems** - The specification and application of various mold-sealing systems. Alternative seal types (inflatable seals etc). Flange design to accommodate different seal types.
- **Injection / vent insert application** - Optimum insert positioning for effective fill and minimum wastage. Types of injection port and injection valves.
- **Molded inserts** - Threaded inclusions within the laminate. Conventional threaded insert carriers, magnetic insert carriers. Molding around cores. Specifying core materials - wood, foam, metal etc.
- **Injection materials** - Specification of injection resins, accelerator, and catalyst systems. Injection resins designed for optimum surface finish (low-profile). Fiber types including surface veils. The use of woven and nonwoven directional fibers.
- **Release agent** - Specification and use of release agents for different resin systems. Internal release agents.
- **Injection strategies** - Mold lay-out and design for optimum performance. Injection and vent strategies for complex mold geometry.
- **Vacuum** - The use of vacuum for injection and clamping purposes. Requirements for different vacuum levels and methods of achieving this.
- **Injection equipment** - A comprehensive overview of different types of injection equipment. The application and use of injection equipment. The importance of pressure / flow control. Trouble shooting and machine maintenance.

A full training manual and all relevant information covering any of the materials/components used will be provided.

Wednesday, June 6, 2012

8:30 AM - 12:30 PM

Theoretic Presentations: Introduction to Composite Integration and the RTM School; Description of First Mold Half Structure; Introduction to Waxing

12:30 - 1:30 PM

Lunch

1:30 - 4:30 PM

Workshops: Waxing Demo Molds (with facility to show waxing presentation at same time); Complete Waxing; PVA Applications; Injection Demo - Glass Mold

Theoretic Presentation: Review of the Day's Activities

Thursday, June 7, 2012



Ciject One Resin Injection Machine

8:30 AM - 12:30 PM

Workshop: Position Mold Inserts (using presentations); Gelcoat Application

Theoretic Presentation: Review of Waxing; Second Mold Half Presentation

Workshop: Surface Veil Laminating; Laminating Continued

12:30 - 1:30 PM

Lunch

1:30 - 4:30 PM

Workshops: Laminating; Injection Demo; Mastercore Flanges; Laminating Final Layers; Frame Application

Theoretic Presentation: Review of the Day's Activities

Friday, June 8, 2012

8:30 AM - 12:30 PM

Workshops: Open New Molds; Removing Wax and Cleaning; Polishing

Theoretic Presentations: Mold Completion

12:30 - 1:30 PM

Lunch

1:30 - 4:30 PM

Workshops: Injection Demo; Release Agent Application; Seal Installation, Commissioning of New Mold(s)

Theoretic Presentations: Inserts, Cores, and Mold Design; Final Summary; Q&A Session