

January 25th 2011

PRESS RELEASE

JEC INNOVATION AWARDS PROGRAMME 2011 14 COMPANIES REWARDED FOR THEIR COMPOSITE INNOVATIONS

JEC Composites is announcing the new winners of the JEC Innovation Awards Programme 2011.

*“The composites industry is moving fast,” says Mrs Frédérique Mutel, JEC President and CEO. She comments: “Innovation is strong in four sectors. First, in environmental-friendly fully recyclable materials. Then, in advanced mould tooling. The third sector is civil engineering with a large number of new infrastructures especially in Asia or South America. Finally in automotive, with the increasing use of composites due to the need for lightness in new cars to compensate for the increased weight of electronic equipment or batteries“. She adds: “As we received numerous entries on these subjects, we had to create four additional categories that were not existing last year: **Thermoplastics, Equipment, Civil Engineering and Automotive** “.*

This year, 14 companies and their partners will receive awards at the JEC Composites Show (March 29-31, 2011). The programme was created in 1998 with the goal of promoting innovation. Each year, a jury of renowned international experts chooses the best composite innovations, based on their technical interest, market potential, partnership, financial impact and originality. Read through the trade description to discover the fourteen winners. **The 2011 JEC Awards ceremony will take place on Tuesday March 29th at 5:00 pm on the JEC Show and will be open to all visitors.**

The 2011 Innovation Awards competition is supported actively by UMECO Composites (Official Partner) and Huntsman Advanced Materials (Platinum sponsor). This year stands out for the increase in the number of applications (63 applications and 45 finalists) and the worldwide participation (20 different countries in Europe, North and South America, and the Asia-Pacific region). Trends and observations worth taking note of in the 2011 Innovation program are the following:

MAIN 2011 TRENDS FOR JEC PARIS INNOVATION AWARDS

Lighter, cheaper, safer and environment-friendly

On the materials side, we see **more and more Eco-solutions** due to their environmental benefits such as safe and eco-friendly intumescent resin and gelcoat meeting the highest fire rating standard, corrosion-resistant vinylester resin with European approvals suitable for food contact and drinking water treatment applications.

Complex and 100% recyclable thermoplastic structures are gaining ground in the composite market while the bio-based materials keep on penetrating the automotive, construction, sports and leisure industries combining excellent thermal and mechanical properties.

Integrated composites structures, designed and manufactured in a shot process

In aerospace, you will discover the next generation of **integrated composites aero-structures**: doors with advanced stitched preforms, one-shot fuselage/airframe barrels for helicopters, and main landing gear fittings with ultra thick laminates. In **Construction**, the manufacture of sheeting lengths up to 22 meters with almost invisible joints coupled with the inherent qualities and finish of the composite materials significantly helped reducing costs and construction times.

Fast production, fast installation, automation and mass production...

Increased production rates, for Aerospace, Automotive and Wind Energy is pressuring manufacturers to **automate 100% of their processes**: You will read about a revolutionary and 100 % fully-automated solution for blades production, a fully-automatic continuous process to produce stable curved preforms, a new direct compounding technology for producing semi-finished SMC parts, cost-effective means for processing lightweight thermoplastic advanced composite components and also a fully automated braiding-based RTM process and new fibre-patch performing.

Combining multiple processes in a **single step** to produce continuous-fibre-reinforced thermoplastic composites is also an energy-efficient, highly-automated manufacturing process that provides real economic advantages to manufacturers.

Finally, the potential of composites materials for tooling is enormous. The global market is £1,238 million, of which 10 to 30% maximum is carbon or glass. Taking the 787 Dreamliner aircraft as an example, 1,000 very large tools (over 7 m²) are required. A new innovation combines a hard, durable metallic coating with a lightweight composite mould tool to deliver a durable and cost effective solution.



14 COMPANIES REWARDED FOR JEC PARIS 2011 INNOVATION AWARDS

- **Category: Materials - Winner: Cray Valley (France)**
Intumescent resin and gelcoat meeting the highest fire railway standard
- **Category: Bio- based Materials - Winner: Innobat (France)**
A bio-sourced composite material for window frames
- **Category: Thermoplastics - Winner: Cutting Dynamics, Inc. (CDI) (USA)**
Thermoplastic seatbacks for the aerospace industry
- **Category: Equipment - Winner: Advanced Composites Group Ltd. (UK)**
Carbovar technology for composite mould tools
- **Category: Automation - Winner: Brötje-Automation GmbH (Germany)**
A fully-automatic machine to produce curved preforms in aircraft structures
- **Category: Process - Winner: Sigmatex (UK)**
A novel offset weaving method to create a 3D woven generic nodal structure
- **Category: Applications/ Aeronautics - Winner: Latécoère (France)**
An innovative aircraft structure with advanced stitched preforms using an RTM process
- **Category: Applications/ Automotive - Winner: Jacob Plastics GmbH (Germany)**
FIT Hybrid: a process for the production of composites hollow structures
- **Category: Construction - Winner: 3B Fibreglass (Belgium)**
Inner lining for the covering surface for the new Sheraton Hotel at the Milan Malpensa Airport
- **Category: Civil Engineering - Winner: Acciona Infraestructuras S.A (Spain)**
A composite bridge beam
- **Category: Applications/ Sports and Leisure - Winner: NRG Wheels Ltd (UK)**
New carbon/ magnesium wheels for and high-performance vehicles
- **Category: Transportation - Winner: Roelofs Kipperbouw BV (Netherlands)**
A Composite tipper
- **Category: Wind Energy - Winner: GAMESA Innovation & Technology (Spain)**
A new blade technology with a revolutionary, 100%-automated manufacturing process
- **Category: Special JEC Magazine Price - Winner: MVC Componentes Plasticos LTDA (Brazil)**
Inner lining for the covering surface of the new passenger terminal at the Carrasco International Airport in Montevideo, Uruguay

Category: Materials

Intumescent resin and gelcoat meeting the highest fire railway standard

Winner: Cray Valley (France)

Partners: Mariskone (Spain), Disenö e innovacion S.L. (Spain) and Crepim (France)

The innovation is a bus toilet module made of intumescent resin and gelcoat meeting **the highest fire rating in the EN 45545 standard**. Following a life cycle analysis, **this solution received the “TOTAL Ecosolutions” label** due to its environmental benefits (lower CO2 emissions and energy consumption thanks to a lower density than standard fire-retardant polyester resins) and to the absence of halogen and CMR (carcinogen, mutagen, reprotoxic) substances.

This patented resin can be used in hand lay-up, spray-up, RTM, BMC and pultrusion processes. This **wide range of processing technologies** makes this solution unique compared with existing intumescent resins, whose viscosity is too high to be used in all these processes. The fact that this innovation can be moulded with **RTM technology opens a wide range of applications** with functional integration. **This technology can be used with carbon fibre to save additional weight. It can also include up to 14% bio-resin content for greater environmental benefits.**

The use of composite materials in mass transit results in weight savings, thus lowering energy consumption and CO2 emissions. Moreover, they provide more design freedom, making bus and train interior parts more user friendly (color, shape, warm touch). Finally, composites are a cost-effective solution for small-run production due to the lower tooling costs. Currently, composites only account for a small percentage of bus and railway vehicles by weight, compared with 20-50% for aircraft. The market potential for this innovation is therefore divided into several thousand metric tons of composite parts for bus and rolling stock in Europe and a greater volume related to metal substitution in the mass transit industry.

Other finalists in the Materials category:

- A damping composite skin presented by **Conseil & Technique (France)** with its partners Ateca (France), BTS Industrie (France) and SKF AF (France).
- Atlac® 5200 FC, the first corrosion-resistant vinylester resin with European approvals suitable for food contact and drinking water treatment applications, presented by **DSM (Switzerland)**.
- Innovative, patented structural panels for the home construction industry presented by **OCV Reinforcements (France)** with its partner AS Composite (Canada).

Category: Bio- based Materials

A bio-sourced composite material for window frames

Winner: Innobat (France)

Partners: Amroy Europe Oy (Finland), Safilin SA (France) and Top Glass – Kemrock Group (France and Italy and India)

The bio-based material (bio-based epoxy resin reinforced with flax fibre) combines very **good thermal and mechanical properties** while offering the required properties for window frames. Based on these criteria, it can **compete with traditional raw materials such as PVC and aluminum**. This composite has a particularly **low environmental footprint** due to the use of bio-based components.

The bio-composite was developed for the production of window frames. **The European market amounts to about 70 million windows**, 700,000 metric tons of composites and €7 billion a year. The objective is to **capture 3% of this market over 5 years**.

PVC offers very good thermal insulation but a low modulus of elasticity, requiring PVC window profiles to be reinforced with steel components. Aluminum has a very good modulus of elasticity but very poor thermal insulation properties, which means that aluminum window profiles need to integrate polyamide strips to ensure a thermal break. Both PVC and aluminum have a poor environmental footprint, mainly due to their production process.

Other finalists in the Bio-based Materials category:

- A bio-based, rigid structural foam presented by **Bioresin (Brazil)** with its partner University of Southampton (UK).
- Moulded brick for modular passive house walls made of bio-based materials presented by **Biotores Architecture & Design (France)** with its partners Groupe Depestele – Teillage Vandecandelaere (France) and Université du Havre (LOMC) (France).
- iPad cover made of bio-sourced materials presented by **FiberShell (France)** with its partners Novation Spa (Italy), RocTool (France) and Schappe Techniques (France).
- The first-ever open-sea racing boat integrating up to 50% renewable fibres (flax), presented by **Renards des Mers (France)** with its partners Huntsman Advanced Materials GmbH (Switzerland), Cipalin (France), Lineo&Libeco Lagae (Belgium), IDB Marine (France) and IFTH (France).

Category: Thermoplastics

Thermoplastic seatbacks for the aerospace industry

Winner: Cutting Dynamics, Inc. (CDI) (USA)

Partners: Ticona (USA), Tencate (USA) and A&P Technology, Inc. (USA)



Cutting Dynamics, Inc. (CDI), has **developed the most cost-effective means for processing lightweight thermoplastic advanced composite components for seatbacks used by the aerospace industry.** CDI uses a unique **high-speed moulding process** to produce a complex-geometry hollow structure for seatbacks from **braided thermoplastic slit tape.**

The development phase at A&P began in early 2009. **The market potential for CDI is approximately 400,000 thermoplastic seatbacks per year.**

The key benefits are weight savings (critical for the future development of aircraft parts), compliance with FST requirements, increased mechanical performance, low cost due to the quick throughput and repeatability of the manufacturing process provided by the braided perform, **non-toxic manufacturing process** and longer material lifespan. Thermoplastic materials are also recyclable, which is not the case with thermosets.

Other finalists in the Thermoplastic category:

- An hot water boiler presented by **OCV Reinforcements (France)** with its partner Covess (Belgium).
- A bike saddle and new production method for this product presented by **Selle Royal S.p.A.** (Italy) with its partners Absolute Style srl (Italy), Bond Laminates GmbH (Germany), Caretta Giuseppe snc (Italy), Design&Develop srl (Italy), Dual Press srl (Italy), Engineering Team srl (Italy), Forgialluminio3 srl (Italy), Fra Val srl (Italy), Intercomm (Italy), Riva Plast Italia srl (Italy) and Vermetal srl (Italy).

Carbovar technology for composite mould tools

Winner: Advanced Composites Group Ltd. (UK)

Partner: Integran Technologies Inc. (Canada)

The innovation combines the hardness, durability and damage tolerance of the metallic coating with the lightweight, low thermal mass and low cost of a carbon fibre composite mould tool to deliver a durable and cost effective solution. The Nanovate surface is an ultra-hard, nanocrystalline **nickel/iron alloy coating that has a low coefficient of thermal expansion (CTE) matching the CTE of the composite mould tool.**



The Nanovate surface **increases the longevity of the mould**, becoming comparable to that of a conventional metallic mould tool. Composite tooling saves the energy required for the heat-up and cool-down phases, and the energy required to lift, rotate and manoeuvre them within the working environment and during the lay-up process (faster material deposition rates).

The successful development of this metal/composite hybrid mould technology is the result of **a 5-year joint collaborative research and development programme** between the Advanced Composites Group Ltd. (ACG) and Integran Technologies Inc. (Integran). The technology was recently commercially launched during a number of top-level visits to major European and US aerospace composite companies.

At an average cost of **£250,000 per tool for the Dreamliner**, this gives a market potential value of £250 million over a 4-year period. Converting just 10% of these “safe” metallic mould tools to Nanovarsurfaced composite mould tools could equate to a **potential saving of over £5 million.**

Other finalists in the Equipment category:

- Heating fluid circuit to optimize the thermal response of composite moulds presented by **Techni-modul Engineering (France)** with its partner Isojet Equipments (France).
- A new benzoxazine resin-based tooling material presented by **Henkel AG & Co. KGaA (Germany)** with its partners Airtech Europe (Luxemburg) and GKN Aerospace Deutschland GmbH (Germany).

Category: Automation

A fully-automatic machine to produce curved preforms in aircraft structures

Winner: Brötje-Automation GmbH (Germany)

Partners: Faserinstitut Bremen e.V.(Germany), Composite Technology Center Stade GmbH .(Germany) and Airbus Operations GmbH (Germany)

CFRP profiles for aircrafts are currently produced manually, resulting in high costs and time consumption. This new process is the **first real continuous process for curved profiles used in aircraft applications**; curvatures of radii range from **1,500 mm to endless** (i.e. straight profiles). It is possible to produce changing curvatures, as well as complex lay-ups with different fibre orientations in **45°, 0° and 90° layers** in one profile (in profile web and flanges).

The process has been validated under mass production conditions for complex cross sections like the LCF integral frame, which are **40% lighter and 50% cheaper** than differential frame-clip-skin connections. This frame requires **80% fewer rivets** than a traditional construction.

The innovation was developed under the Lokost R&D project, partially funded by the German aeronautics programme (LuFo). **Airbus and their partners are currently working to apply this technology to the CFRP fuselage of future aircraft like the A350-1000 or A30X.** Other possible applications can be found in the **automotive sector**. Initial discussions with OEM car manufacturers have started.

Other finalists in the Automation category:

- Innovative, braiding-based RTM process for the automated, fully-controlled production of high-performance carbon composite tubes for high-end racing bike frames, presented by **BMC Trading AG (Switzerland)** with its partners Formtec AG (Switzerland), ASIC AG (Switzerland), Huntsman Advanced Materials GmbH (Switzerland), RWTH Aachen University (Germany), August Herzog Maschinenfabrik GmbH & Co.KG (Germany), Nose Design Intelligence AG (Switzerland), Dycon AG; ZEC AG (Switzerland) and ZEC AG (Switzerland).
- A new fibre-patch preforming (FPP) technology presented by **EADS Innovation Works (Germany)** with its partners Manz Automation Tübingen GmbH (Germany) and Oxeon AB (Sweden).

Category: Process

A novel offset weaving method to create a 3D woven generic nodal structure

Winner: Sigmatex (UK)

Partners: Bentley (UK), NP Aerospace (UK), QinetiQ (UK), Composites Integration (UK), Network Rail Infrastructure (UK), Tony Gee & Partners (UK), Pipex Structural Composites (UK), Oxford Brookes University (UK), University of Nottingham (UK)



Novel weave styles and processes have been used to overcome specific manufacturing problems. The node is near net shape with additional functionality from interweaving carbon fibre threads. The specific process of offset weaving can be used in other common designs where **stiffness is a primary requirement**. In conjunction with the weaving of the 3D structure, tooling design was also completed and **infusion techniques developed for infusing the component**.

Multiple units can be manufactured in a repeatable fashion using weaving technology. Lay-up times to manufacture truss structures are reduced by weaving features and multiple layers at once. Other features can be woven into the truss to improve strength and conformability. **Other materials can be interwoven throughout the structure for Structural Health Monitoring purposes**.

The product has been developed as part of a consortium over the past 2 years.

There are thousands of **railway, foot and canal bridges** throughout Europe which are coming to the end of their life. The requirement for **high-strength, corrosion-free structures** that could benefit from this technology is vast and potentially worth millions of euros. The technology can also be used in other automotive and aerospace applications, increasing the market potential significantly.

Other finalists in the Process category:

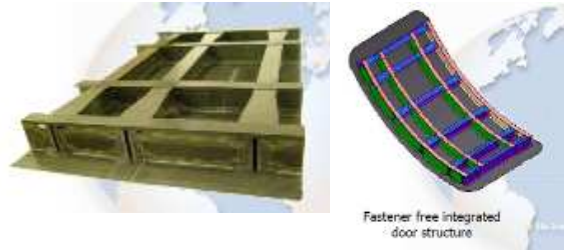
- A new direct compounding technology for producing semi-finished SMC parts presented by **Dieffenbacher GmbH+Co.KG (Germany)** with its partners Fraunhofer – Institut Chemische Technologie ICT (Germany) and DSM Composite Resins (Germany).
- A versatile heating technology for the production of complex composites presented by **Faserinstitut Bremen FIBRE (Germany)** with its partners Airbus Operations (Germany), ThyssenKrupp Systems Engineering (Germany), Haindl Kunststoffverarbeitung (Germany) and Aero Consultants AG (Switzerland).

Category: Applications/ Aeronautics

An innovative aircraft structure with advanced stitched preforms using an RTM process

Winner: Latécoère (France)

Partners: Hexcel (France), Schappe Technics (France), Omega Dms (France), KSL (Germany), Qinetiq (UK), Compose Tools (UK) and PPE (France)



Latécoère and all its European partners have developed a **fully integrated** composite architecture for fastener-free pressurized aircraft structures. Large and complex **3D dry preforms (non-compacting) have been assembled by non-structural and structural stitching technologies. An innovative tooling for large preforms stitching and injection processes (RTM) has been designed and manufactured.**

There has been an extensive use of aeronautical-qualified materials (dry fabrics and tape, resin, bronze mesh, fiberglass fabric, threads). Manufacturing processes have been simulated: RTM and injection of 3D, curved, two-directional self-stiffened stitched preforms with different permeability levels, thicknesses and fibre volume contents. Ultrasonic and dimensional inspection methods have been developed and validated. Large-scale automation have been used. Assembly times were reduced by 10 to 15 % with the **reduced number of assembly tools and faster assembly.** Weight and cost savings are also 10 to 15% vs. current composite door structures. Corrosion is reduced and there is a lower maintenance.

This project launched mid-2007 and completed mid-2011 involved the management of European partners and suppliers for development and manufacturing activities. This innovative composite door structure **can be used on commercial and business aircrafts.**

Other finalists in the Aeronautics category

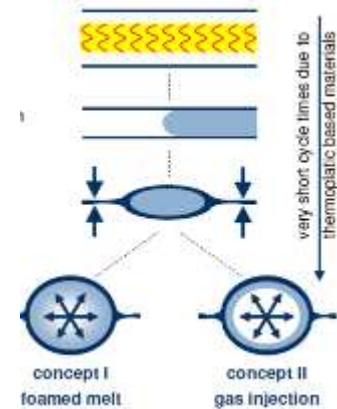
- Pre-stressed composite rod with very high mechanical characteristics presented by **Conseil & Technique (France)** with its partners Ateca (France), BTS Industrie (France) and SKF Aerospace (France).
- Ultra-thick laminates to develop and manufacture the so-called side stay fitting (SS/F) presented by **EADS Innovation Works (Germany)** with its partners Airbus Operations Ltd. (UK), EADS Deutschland GmbH (Germany) and Universität der Bundeswehr München (Germany).
- A one-shot fuselage/airframe barrels for helicopters presented by **Eurocopter Deutschland GmbH (Germany)** with its partners Premium Aerotec GmbH (Germany), EADS Innovation Works (Germany) and Airbus (Germany).

Category: Applications/ Automotive

FIT Hybrid: a process for the production of composites hollow structures

Winner: Jacob Plastics GmbH (Germany)

Partners: Lehrstuhl für Kunststofftechnik Friedrich-Alexander-University in Erlangen-Nuremberg (Germany), Neue Materialien Fuerth GmbH (Germany), Schaumform GmbH (Germany), Audi AG (Germany) and Christian Karl Siebenwurst GmbH & Co. KG (Germany)



In conventional manufacturing processes, lightweight hybrid composite structures are formed in multistage – and thus costly – processes and joined by additional processing steps such as gluing or welding.

The FIT (**Fluid-Injection-Technology**) Hybrid process uses reinforced thermoplastic composites and a fluid injection technology to manufacture lightweight, high-performance composite structures from hollow elements in a single cycle with one mould. It combines **moulding, forming and joining processes in a single step thus** reducing costs, saving on energy and is suitable for mass production.

The excellent formability of thermoplastic composite materials combined with a tried-and-tested injection moulding technology result in a high degree of design freedom, thus permitting the integration of multi-various functions in compact designs.

The research and development stage lasted three years and the prototyping stage is in process.

The FIT hybrid technology is an energy-efficient, highly-automated manufacturing process that provides real economic advantages to manufacturers. The innovation can be used in many market segments such as automotive, medical technology, sport and leisure, aerospace, and lightweight construction.

Other finalist in the Automotive category:

- The New Stratos, a contemporary interpretation of the Lancia Stratos from the 70s presented by **Eligiore Fraschini S.p.A. (Italy)** with its partners Pininfarina S.p.A. (Italy) and Hexcel (France).

Category: Construction

**Ventilated facade for the new Sheraton Hotel
at the Milan Malpensa Airport**

Winner: 3B Fibreglass (Belgium)

Partners: P.C.R. SRL and architects King (Italy) and Roselli, Architetti of Rome (Italy)



The concept is based **on a large folding skin wrapped around the modules containing the rooms**. This outer skin is **made of glass-fibre-reinforced composite material**. The final solution uses a damp-proof reinforced membrane finished in white for the flat roof, combined with a pultruded glass-reinforced plastic sheeting on a metal sub-structure for the curves and the down-stands of the skin.

The material was produced in **22-metre-long, 1.40-metre-wide** strips that are extremely light and can easily be handled on a busy construction site. It was a great challenge to avoid showing joints for such a large surface, which must not “move” when subjected to extreme temperatures and weather changes. The surface was also shaped to form bidirectional curves on the top of the roof, against the front line of the hotel, which is 420 meters wide and 14 m high.

Though rarely used in building so far, this technology has the advantages of being light and precise, making it possible to manufacture sheeting lengths up to 22 meters with almost invisible joints. Reduced costs and construction times coupled with the inherent qualities and finish of the material were decisive in achieving the desired result. Overall, the cost of the installed cladding is very competitive.

Other finalist in the Construction category:

- A single-piece house presented by **Escola da Cidade (Brazil)** with its partner Brazilian Composite Materials Association (ABMACO).

Category: Civil Engineering

A composite bridge beam

Winner: Acciona Infraestructuras S.A (Spain)

Partners: Saertex GmbH&Co.KG (Germany), Huntsman Advanced Materials GmbH (Switzerland), Glascraft Iberica S.L (Spain), Universidad de Sevilla (Spain) and Universidad Politecnica de Madrid (Spain)



Acciona Infraestructuras S.A and its partners have designed and manufactured a composite bridge beam made from a single piece (40 m long) and weighing only **25 t, which is half the weight of a concrete or steel bridge (minimum 50 metric tons)**. The beam required a “slenderness ratio” (ratio of depth to the length of the beam) of less than 1.2/40, combined with a maximum cross sectional thickness of 50 mm and a depth of 1,200 mm.

The entire project took about 1 year to complete. **Two more bridges will be delivered to Spain by the end of this year.** Talks are in process with African countries to manufacture and install 10 composite bridges over the next two years.

These composite bridges offer more design freedom. **No joints or assembly are necessary** as the beam is made from a single piece. Compared with a concrete beam, which requires **28 days just for curing**, the composite beam was ready for **shipping in 15 days. No painting required.** They are **easy to transport, quick and easy to install on sites** where high-capability cranes are not available. They provide **better corrosion resistance** than concrete and steel in coastal areas, and require less maintenance.

Other finalists in the Civil Engineering category:

- A high-performance carbon fibre composite hydraulic for deep-sea use presented by **Automated Dynamics (USA)** with its partners Union College (USA) and Cameron (USA).
- Protective composite wall for strengthening a railway zone presented by **ApATeCh (Russia)** with its partners Lightweight Structures B.V. (Netherlands), Moscow State University of Railway (Russia) and Engineering (Russia)

Category: Applications/ Sports and Leisure

New carbon/ magnesium wheels for and high-performance vehicles

Winner: NRG Wheels Ltd (UK)

Partners: Huntsman Advanced Materials GmbH, Cristex (UK) and The University of Bristol Ltd. (UK)



The wheels are made of a **forged magnesium/ aluminium alloy hub**.

Specially-coated titanium fasteners, working within specially-bonded bushes, fasten the hub to an epoxy carbon fibre rim. The carbon rim is made through a special injection process.

Carbon/ light alloy wheels reduce the gyroscope effect and moment of inertia of the wheel, resulting in improved acceleration and braking with reduced stopping distance. Lighter, sharper steering gives better feel and more responsive handling. Tyre temperatures and pressures are more stable. Even compared with magnesium wheels, weight reductions were obvious right from the start, with a minimum of **40% less weight per wheel**. Fuel consumption (3 to 8%) and engine CO₂ emissions are reduced. Tests with Porsche showed the power saving on a 300 bhp car to be about 43 bhp associated with fuel savings of about 10%.

Carbon wheels not only have an impact resistance more than twice that of metal wheels, but they also respond well to deformation, recovering their round shape. Cracks do not propagate as they would with metal, which would retain its bent shape and lose air pressure.

The overall market potential for carbon composite wheels is very large, but specific. The wheels are suited to all higher-value and high-performance vehicles. The reduced moment of inertia makes the wheel suitable for **delivery vehicles and buses where stop-start motion is normal**. Use in military applications for improved vehicle performance and blast/ballistic response is obvious.

Other finalists in the Sports and Leisure category:

- The first Callaway Golf driver featuring an aft body made with a carbon-fibre-reinforced moulding compound and a compression moulding process, presented by **Callaway Golf Company (USA)**.
- A Carbon fibre exercise bike presented by **Lamiflex-Ciclote (Italy)** with its partners Studio-2 (Italy), Huntsman Advanced Materials GmbH (Switzerland), Luca SCheippati (Italy) and TAIT srl (Italy).

Category: Transportation

A Composite tipper

Winner: Roelofs Kipperbouw BV (Netherlands)

Partners: Norma MPM (Netherlands), Composite Technology Centre (Netherlands), TenCate Advanced Composites (Netherlands), STODT Toekomsttechniek (Netherlands), University Twente (Netherlands) Oost NV (Netherlands)

Conventional tippers have been made of steel or aluminium for decades. The combined efforts of a consortium of companies from different disciplines made it possible to develop an innovative composite tipper through “out-of-the-box” thinking.



The prototype was made with well-known technologies used in the aerospace and defence industries:

prepregs, structural foams, pultruded beams, high-temperature adhesives, insulating materials and vacuum/oven processes. To cope with the industry’s price requirements, it was essential to (semi-)automate the production step.

This tipper is designed to **transport asphalt** through a multilayer concept. The outer layers need to carry the different loads, whereas the inner layers should **withstand a temperature of 180°C**.

This pioneering project did not go unnoticed in the transportation industry. The main advantage for the carrier is the capability to carry higher payloads and thus do the job with fewer rides. Not to mention, significantly lower weight (2,000 kg instead of 4,200 kg in steel); reduced fuel consumption and thus reduced pollution (CO₂, NO_x and soot particles) and very high insulating properties.

A market potential is several **hundred units a year**.

Other finalists in the Transportation category:

- Composite lightweight, crashworthy train cab presented by **NewRail (UK)** with its partners Bombardier Transportation (UK) and Anthony, Patrick and Murta Exporta (Portugal).
- Lightweight composite compressed natural gas (CNG) cylinder used as a storage tank in natural gas and/or bio-gas fuelled vehicles presented by **Gastank Sweden AB (Sweden)** with its partners Greenes Group (Netherlands) and 3B - the fibreglass company (Belgium).

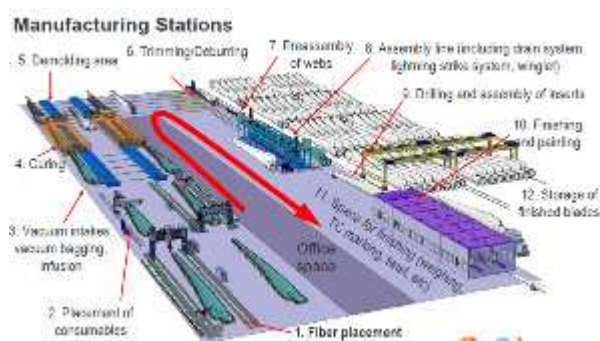
Category: Wind Energy

**A new blade technology with a revolutionary,
100%-automated manufacturing process**

Winner: GAMESA Innovation & Technology (Spain)

Partner: Grupo M. Torres (Spain)

Gamesa and M. Torres have developed a new blade technology with a revolutionary, 100%-automated manufacturing process. The project focused on the following critical aspects: Blade design, structure and materials adapted to the automated process, introduction of innovative tip and root solutions that will improve the aerodynamic performance of the blade (higher production capacity of the wind turbine), automatic lamination of dry glass fibre tape (tape developed by Gamesa and M. Torres).



World first for an industrial application, development of moulds with moving parts for the automated lamination of the entire blade, automation of the infusion process, fully-automated assembly jig (including application of adhesive beads by robots, also a first in the wind industry) and fully-automated finishing and painting.

The project has been **under development for the past 3 years. The solution will have a tremendous impact in the market.** Gamesa will be the first blade manufacturer to introduce a fully-automated solution. Automated manufacturing should greatly **increase the reliability of the manufacturing process**, reducing non-quality costs and increasing the lifespan of blades. **The reduced manual workload, together with the savings resulting from the new materials developed, will significantly reduce the overall cost of blades. The cycle time to manufacture a blade will be reduced to 1/3 of the manual process.**

Other finalists in the Wind Energy category:

- Novel approach to the blade repair market presented by **Gurit (UK)** with its partners Renewable Advice (UK), Johnson and Allen (UK) and Sadechaf and Clearstone (Belgium).
- Affordable Innovative Rapid Production of Offshore Wind Energy Rotor blades presented by the **University of Nottingham (UK)** with its partners Moog Insensys Ltd. (UK), Gamesa Innovation & Technology (Spain), Hexcel Composites Ltd. (UK), BAe Systems (UK), GE Aviation Systems Ltd. (UK), Solent Composites Ltd. (UK), Magnum Venus Plastech Ltd. (UK), NaRec Development Services Ltd. (UK), BCS-UK (UK) and Technology Strategy Board (UK).

Category: Special JEC Magazine Price

**Inner lining for the covering surface
of the new passenger terminal at the Carrasco International Airport
in Montevideo, Uruguay**

Winner: MVC Componentes Plasticos LTDA (Brazil)

Partners: Puerta Del Sur (Uruguay), Lord Industrial Ltda (Brazil), Owens Corning (Brazil), Elekeiroz (Brazil)

MVC has provided 24,000 m² of inner lining for the project. The product developed by MVC met all mechanical, thermal and acoustic insulation requirements while eliminating the paint finishing step after assembly, resulting in very fast deployment and very low maintenance costs. Due to the reduced weight of the panels, the load borne by the building's main structure is much lower than with the solution originally specified by the designer.



Sandwich panels made of composite plates pressed onto a core of thermo-acoustic insulating materials fitted to a structural system made of steel sections combined with aluminium shapes. The panels are composed of composite layers reinforced with glass fibre, manufactured by a continuous lamination process and combined with a choice of structural cores in low-pressure presses. The final product, called Wall System, was approved by recognized research centres and universities in Brazil such as the IPT (Technological Research Institute), the Federal University of Santa Maria, the Federal University of Minas Gerais and the Federal University of Ouro Preto. These institutions tested the fire safety, structural performance, water (rain) resistance, durability, and acoustic and thermal insulation of the product.

The development and deployment of the project took about eight months with the new passenger terminal being inaugurated in 2009.

There is a large potential market in the construction and renovation of airports, gymnasiums and sports stadiums for the Olympics and Soccer World Cup events.

Pictures of the winners available on request to Apocope

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