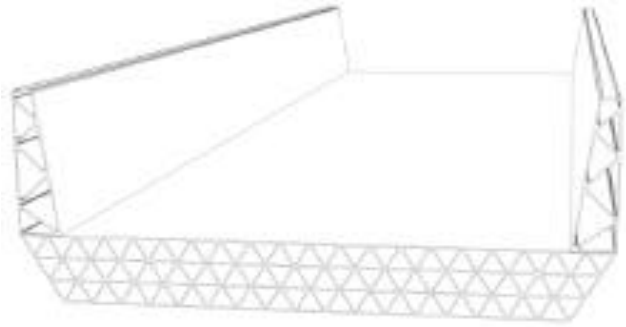


### Will Norway get the biggest Composite Bridge in the World? Looking for Partners in the development.

Beet Systems of Norway is currently involved in the development of an rather unique project, the bridge design and engineering for the construction and building of the largest FRP bridge in the world. The bridge design is measuring: length 1237 meters and width 42 meters and the towers is going to be 254 meter high. The reason for such an ambitious project is the everlasting problem of corrosion along the Norwegian Coastline, where most bridges are situated. For this reason the Norwegian Ministry of Roads has commissioned the development of an all composite bridge, where carbon fibres are the main constituents.



Beet Systems has developed for this purpose a completely new production technology which combined:

- Bi-directional woven strand technology,
- Pultrusion technology
- Continues production of linear fireproof honeycomb core inside a FRP panel,
- All this join together in a new RTM continues process.

Beet systems is keen to get in contact with potential partners to develop this technology further. This could be research institutes or Engineering firms with similar interest or ongoing developments.

#### BEET BUILDING SYSTEM

Jan Holm Hansen AS

Bugaardsveien 8 B, N-3214 Sandefjord, Norway

E-mail: [beet@c2l.net](mailto:beet@c2l.net) Phone: (+47) 916 64 854

Fax.: (+47) 334 77 811 Internet: [www.beet.no](http://www.beet.no)

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07 Jun 2006 - United Kingdom

### 2012 Olympics offers new opportunities for composites in construction



Composites continue to find effective use in a wide variety of construction applications ranging from new build structures to refurbishment and restoration projects.

Their use is set to increase further over the coming decade as major opportunities arise including the 2012 Olympics, the current housing crisis and an ever-aging infrastructure. Key properties such as light weight, excellent long-term durability, flexibility in design, prefabrication and fast construction process on-site will enable innovative cost-efficient structures to be developed using composite materials in both a pure form and also working synergistically with other materials to give improved performance. In order to meet these new challenges, NGCC (Network Group for Composites in Construction) is realigning the way in which it operates and in doing so is looking to expand and increase its membership.

NGCC aims to bridge the interface between the composites industry and the construction community, providing guidance, technical support and advice where needed. In order to achieve this, core activities such as networking, CPD seminars, conferences and site visits will continue; but to improve technology and information transfer, a new interactive website ([www.ngcc.org.uk](http://www.ngcc.org.uk)) has been launched as well as a redesigned newsletter targeted at the wider construction community. NGCC will also be working closely with the National Composites Network (NCN) to produce a 'road map' for the composites in construction industry in order to facilitate the step changes required to meet the new opportunities.

[ngcc@netcomposites.com](mailto:ngcc@netcomposites.com)  
[www.ngcc.org.uk](http://www.ngcc.org.uk)

Source: JEC Composites

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### [Future Pipe Industries Qatar Bags \\$172 Million Deal](#)

Tuesday, May 23, 2006

Future Pipe Industries Qatar, a member of the Future Pipe Group and a leading global supplier of pipe system solutions, has been selected to supply the Common Cooling Water Project for Phase II, in Ras Laffan for Qatar Petroleum amounting to QR627 million (\$172 million) of fiberglass pipes and fittings. The total project was awarded to Dodsai, and together with the Future Pipe Group, they will service the area of Ras Laffan in this critical phase of the industrial zone. The Future Pipe Group is proud to see its newest member, Future Pipe Industries Qatar, beginning its operations servicing one of the largest and most prestigious projects in its class. The project currently entails seven packages for a total of 20km of diameter 2450mm, 47km of diameter 3500mm and 1Km of 4000mm diameter to be installed both above and below ground. The magnitude and complexity encompassed in a project of this unique nature has lead the Future Pipe Group, to develop a new division encompassing all aspects of its core competencies, manufacturing, engineering, R&D, product development and design, to service these very type of projects. Within this new division, a fully dedicated team has been established to service QP's needs. Future Pipe Industries Qatar and the Future Pipe Group are dedicated to continue its customer-centric philosophy and continuous innovation drive, to continue to meet the ever-demanding needs of these mega projects, which are driving the region as a whole. The reference of this type of unprecedented project will position the Future Pipe Group at the forefront of the industry in being the preferred provider of pipe systems solutions.

Source: E-Composites

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### [Resin Systems Receives Utility Pole Order](#)

Tuesday, May 23, 2006

RS Technologies has received a large purchase order for RStandard modular composite poles from Northwest Tel Inc. Northwest Tel Inc., RS's first RStandard customer, began using RStandard poles in early 2004 and this new order is for the expansion of their utility line near Hay River, NWT. The order is in excess of 1,000 poles and will be shipped over several months starting the beginning of June. "Repeat business such as this reinforces the market acceptance of our RStandard product line," said Greg Pendura, Chairman, President and CEO of RS. "This shows our poles are meeting and exceeding expectations in the field."

Source: E-Composites

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### [Composites Bridge Installed in 5 days](#)

Monday, March 06, 2006

Using FRP bridge decks, contractors in Springfield, Mo., have just subjected a decaying, 70-year-old bridge to a makeover that was as quick as it was dramatic. Instead of snarling traffic for two to three weeks while they repaired the crumbling deck, girders and guardrails by conventional methods--laying plywood, tying steel rebar and pouring concrete--the workers used pre-fabricated plates and cages developed by a National Science Foundation (NSF)-supported university-industry partnership to finish the job in a mere five days. The NSF's Repair of Buildings and Bridges with Composites Industry-University Cooperative Research Center is based at the University of Missouri at Rolla and North Carolina State University. The Missouri researchers joined with their industry partners and

colleagues at the University of Wisconsin at Madison to develop the new construction solution. The target of the makeover, an old bridge on Farm Road 148 near Springfield, was one of as many as 156,000 U.S. bridges in need of repair. In fact, it was posted, meaning that local officials had imposed a vehicle weight limit due to the dangerous bridge conditions. Now, however, a fresh layer of concrete conceals the technology responsible for the rapid replacement of the bridge's crumbling deck and guardrails. The bridge, renovated with a grant from the U.S. Department of Transportation, was rededicated on Feb. 22, 2006.

Source: E-Composites

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### **PhD Position at the CCLab. Structural adhesives in bridge construction: characterization and durability**

Many possibilities exist in bridge construction for the application of structural or semi-structural adhesive connections, such as the connection of bridge decks to main girders, the application of strengthening elements, the fixation of crash barriers, parapets or expansion joints. The connection of different materials is simplified and complicated anchoring of new elements in existing concrete can be prevented.

Within this project funded by the Swiss Federal Roads Authority, the short and long-term material behavior of adhesives is investigated using experimental and analytical methods. The following results are expected:

- 1) Knowledge about the short and long term behavior of brittle and ductile structural adhesives in bridge construction.
- 2) Basic information for the design of adhesive connections: determination of design values, specification of material safety factors and reduction factors according to classes of exposure.
- 3) Recommendations regarding possible applications of adhesive connections, choice of adhesive types, constructive detailing, required protection measures and application.

#### **Your profile**

- MS degree in mechanical or structural engineering
- Outstanding professional qualification
- Good communication skills and ability to work in a young and international research team
- Flexibility, enthusiasm, willingness to learn and creativity

#### **Our offer**

- Excellent work conditions and competitive remuneration
- A multi-cultural, multilingual and stimulating scientific environment
- Place of work on the Lake Geneva, one of the most beautiful regions in Europe
- Starting date as soon as possible, project duration 3 years

Your application contains: résumé (CV), letter of motivation, and two letters of recommendation

Please send your application to

Prof. Dr. Thomas Keller / Swiss Federal Institute of Technology Lausanne / CCLab - BP Ecublens / Station 16 / CH-1015 Lausanne / Switzerland

For further information please contact Prof. Dr. Thomas Keller: [thomas.keller@epfl.ch](mailto:thomas.keller@epfl.ch)

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## New fasteners from Fulcrum outperform traditional composites



Fulcrum Composites has been selected by the readers and editors of Fastener International Magazine for one of their Top Ten New Products of the Year. Chris Edwards of fulcrum Composites said: "Our focus always lies in the creation of new composite markets so it is particularly rewarding to receive this kind of accolade from such a respected publication which deals primarily with metal fasteners" Fulcrum Threaded Rod offers low weight, excellent corrosion resistance, electrical insulation, electromagnetic transparency and low thermal conductivity. Typical applications include joints in composite structures in chemical plants, water treatment, air pollution control, radar and electronic towers, cryogenic equipment, marine, transportation and infrastructure. It is available directly from Fulcrum Composites Inc in North America and from Topglass SpA in Europe. The threaded rod is produced in a proprietary process, which combines sequential operations of thermoplastic pultrusion, extrusion, and molding/forming to optimize tensile strength, thread strength and torque resistance. The patent pending process does not involve cutting the fibers as in existing processes used for thermoset threaded rod. As a result the threads are significantly stronger and have better chemical resistance, as the fiber ends are no longer exposed to chemical attack.

Source: Fulcrum

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## Joint-Venture to Manufacture Composite Railroad Ties

Wednesday, March 15, 2006

Steel Dynamics, Inc. has formed a joint venture, Dynamic Composites, LLC, which it will substantially own and control, for the purpose of manufacturing high-strength, long-life composite railroad ties. The joint venture plans to invest about \$5 million, which will be provided by Steel Dynamics, to equip and start up a facility at a site to be determined that will have the capacity initially to produce 250,000 ties per year. Using automated manufacturing processes, the plant is expected to employ about 20 people. Start-up of the plant is expected by the end of 2006. Composite ties will be manufactured under exclusive license from Primix Corporation, Atwood, Indiana, which previously developed and introduced the product under the "Primix" label. The composite tie consists of a formed steel core, which is filled with concrete for stability and mass, and recycled synthetic inserts for spike retention. Both the core and the inserts are encapsulated by a synthetic material primarily made from recycled rubber and plastic. The steel used in the cores will be supplied by SDI's Flat Roll Division. Steel Dynamics considers the composite tie business to be a natural complement to its rail business, offering specific product benefits to customers. Both products will share the same customer base, which is primarily North America's Class I railroads. North American demand for railroad ties is estimated to range from 15 to 19 million ties per year, a \$700 to \$800 million market. Currently, wood ties comprise an estimated 95% of the market, the remainder being concrete, steel, and composite ties. SDI believes there is excellent potential for composite ties to gain a substantial share of this market because of the new product's perceived longer life, operational benefits, and cost-effectiveness.

Source: E-Composites

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## Over 4,000 at SAMPE '06

SAMPE '06, the materials and processing (M & P) industry conference and exhibition, ended last week at the Long Beach Convention Center in Long Beach, CA. Nearly 4,300 material and processing industry professionals attended the 12 tutorials, and 250 papers presented in sessions or participated in the exhibition featuring over 230 exhibitors. The exhibitors, including a large number of first time exhibiting companies, were particularly pleased with the floor traffic and many commenting on the high quality of the exhibition visitors. Large crowds were present for the 9th annual Super Lightweight Composite Bridge Building Contest and the 2nd annual Composite Wing Contest. 51 teams of students competed in the bridge contest and 18 teams entered the wing competition. Participation was strong for the exhibit floor technical demonstration presentations. The "Meet the Expert" roundtable discussions featured key industry leaders from around the world. The Dan Guerney All American race car, lightning strike panels and Samsonite X'lite luggage, all products made from composites, were also a hit. SAMPE '06 drew delegates from 48 US states, the District of Columbia and 33 countries including China, Pakistan, India, Malaysia, Czech Republic, Hungary and New Zealand. On Monday, May 1, SAMPE inducted five new SAMPE Fellows. Dr. Ever J. Barbero, Dr. Lawrence T. Drzal, Dr. John C. Halpin, Dr. Ray L. Hauser and Dr. Keith T. Kedward were recognized for their leadership, passion and vision in the field of material and process engineering. SAMPE '07 will be sponsored by SAMPE's Baltimore / Washington Chapter. The conference dates are June 3 - 7, 2007 and the exhibition dates are June 5 - 7, 2007. The program will be held at the Baltimore Convention Center. And, SAMPE '07 will also mark the 25th anniversary of SAMPE's Fellows Program. "Long Beach is a great location for SAMPE," said Gregg Balko, CAE, and SAMPE's Executive Director. "At the same time, we are excited about next year's event in Baltimore. The high concentration of M & P activity on the Eastern seaboard and Baltimore's proximity to many key decision-makers in the Washington, D.C. area make this a logical destination for SAMPE '07. As of yesterday, over 100 companies have reserved their exhibit space for Baltimore, a record number of pre-bookings for any SAMPE exhibition."

Source: SAMPE

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## Researchers develop new fiberglass decking material

SPRINGFIELD, Mo. - Researchers with the National Science Foundation's Repair of Buildings and Bridges with Composites Industry-University Cooperative Research Center have developed a fiberglass-polymer decking material that can be used to replace decaying steel bridge decks quickly. Contractors in Springfield, Mo. have installed the first system on the 70-year-old Farm Road 148 bridge.

The deck replacement project was completed in just five days, and was funded by a grant from the U.S. Department of Transportation. According to the research team - which, includes faculty and students from the University of Missouri at Rolla and the University of Wisconsin at Madison - the fiberglass-polymer composites are strong enough to endure several decades of traffic, and unlike steel, will resist the ravages of salt and other corrosive de-icers for just as long.

"A key to tackling the challenge of making thousands of deficient bridges in the nation fully operational and safe again is the development of convenient solutions for the rapid construction of long-lasting bridges," said Fabio Matta, a Ph.D. candidate in structural engineering who helped develop the new construction system.

Source: Bridges Magazine May - June

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## Composite & Plastic Lumber Demand to Reach \$3.5 Billion in 2009

Demand for wood-plastic composite and plastic lumber in the US is forecast to expand eleven percent per annum through 2009 to \$3.5 billion.

Advances will result from increasing market penetration of these alternative building materials, particularly in decking applications, which are expected to account for almost 40 percent of value demand in 2009. Gains for these materials in decking will be attributable to performance characteristics, such as high durability and low maintenance requirements. Advances for composite decking will also be driven by increasing consumer and contractor familiarity, a widening distribution network, and product improvements that enhance appearance. These and other trends including market share, market leaders and company profiles are presented in "Composite & Plastic Lumber," a new study from The Freedonia Group, Inc., the Cleveland-based industry market research firm.

Plastic lumber will benefit from growing use in fencing installations, while wood-plastic composites will achieve rising penetration in newer applications, such as fencing, window and door components, and railroad ties. Demand for both composite and plastic lumber will be aided by consumer efforts to reduce maintenance associated with construction materials.

Moulding and trim was the largest end-use for composite and plastic lumber in 2004, at 46 percent of the total. Through 2009, demand for composite and plastic lumber in moulding and trim applications is forecast to rise more than six percent per year to \$1.3 billion, almost all of which will be plastic lumber. Gains will be slower than for most composites and plastic lumber applications, a result of the relative maturity of the overall moulding and trim market, but will be significantly faster than those for wood moulding and trim materials.

Among the major product categories, window and door applications, although rising from a small base, are anticipated to post the fastest gains through 2009, with demand expected to exceed \$200 million. As with other applications, composite window and door components are making inroads against wood, metal and plastic materials because of their lower maintenance requirements and similarities to wood. Other applications, such as playground equipment, site and leisure furniture, hot tub cladding, porches and railroad ties, will see above-average gains through 2009 as well, albeit from small bases.

WWW Link: <http://www.freedoniagroup.com>

Source: Netcomposites

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#### ROHACELL joins technology pool for lightweight CRP structures

Tuesday, April 04, 2006

The Airbus Group's Center of Excellence (COE) in Stade is the largest European manufacturing facility for lightweight CRP structures. The attraction that this Center holds for companies and for research, development and production experts in CRP technology is boosted by a further motor of innovation: CFK-Valley Stade e.V. This is a competence network consisting of some 50 well-known companies and research institutions involved in lightweight CRP technology. Since August 2004, Degussa's subsidiary Röhm GmbH & Co. KG. has been a member of this technology pool near Hamburg, in the person of Uwe Lang. The aim is to implement new sandwich applications with ROHACELL both in the Airbus programs and in the numerous projects pursued by CFK-Valley.

Source: E-Composites

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#### Material Technologies' (MATECH) Bridge Engineering Comments on Recent Reports of Cracking in Two Important Bridges

Two reports of cracks in two important bridges were issued in 2005. The bridges: the Throgs Neck Bridge, which connects the Bronx to Queens in New York City and Battersea Bridge in London, England, are heavily traveled and carry significant commercial, commuter and private traffic.

The reported cracks in the Throgs Neck Bridge were caused by the constant passage of heavy commercial trucks. The existence of such a large number of cracks took engineers by surprise since the bridge is only 40 years old and has been carefully monitored under federal inspection guidelines. The Battersea Bridge, struck by a passing barge, had a much smaller number but much longer cracks that posed both short-term strength and long-term crack growth concerns. It is scheduled to remain closed until next June.



"Engineers will certainly have a difficult task developing repair and remediation methods for these bridges. It is clear from the reports that engineers would prefer to simply repair the problems in-place rather than completely replace the damaged portions of the bridges. Prudently, however, they have expressed concerns about knowing the effectiveness of such repairs. Certainly, strengthening with CFRP composites is an option that should be assessed as soon as possible.

The MATECH Electrochemical Fatigue Sensor (EFS) system has the ability to give engineers the confidence they need to verify the effectiveness of any implemented solution," said Dr. Brent Phares, PE, Director of Marketing for Material Technologies, Inc. and an experienced bridge engineer.



MATECH's patented EFS inspection system is capable of locating actively growing cracks, including below the surface, in metal structures. It can determine if a crack in a metal structure is growing or not. The EFS system can be used to validate the effectiveness of repairs by verifying that a crack which was growing is no longer growing following its remediation, with near hundred per cent accuracy. It is the only known nondestructive evaluation system currently available to engineers that can provide such insight.

MATECH is engaged in the research and development of metal fatigue detection, measurement, and monitoring technologies. As such, the Company has developed a suite of devices for the non-destructive testing [NDT] of metal fatigue and monitoring of structural integrity. These technologies can be applied in virtually any industry in which metal is a significant structural component e.g. bridges, aerospace, turbine engines, oil and gas, construction, shipping, etc.

Contact: Robert M. Bernstein, CEO  
Material Technologies, Inc.,  
T: +1 (310) 208-5589

Web: <http://www.matechcorp.com/>

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#### California Bridges Remain Quake Risk

Caltrans has upgraded most of its state-owned spans, but cities and counties are struggling to find funds to fix theirs. Experts fear results are years away. (But the earthquake threat could be today, next week, next month, or years away... and almost anywhere in the state) Although California has made great strides in protecting its own bridges from earthquakes, hundreds of bridges maintained by cities and counties across California remain unfixed. A Los Angeles Times review of state and county records reported on March 12 found that nearly 600 bridges and overpasses that officials identified as being at the highest risk for collapse in a major temblor have yet to be reinforced. They include several landmark spans in Los Angeles, such as the Hyperion bridge in Silver Lake and the Art Deco 6<sup>th</sup> Street bridge across the Los Angeles River downtown. The California Department of Transportation has done much better: Of the roughly 2,200 quake-vulnerable bridges maintained by the agency, all but 11 have been retrofitted. To achieve this, the state has spent \$2.4 billion since 1989, when the Loma Prieta earthquake collapsed an elevated freeway in Oakland, killing 43 people. (Ed. Note - this seems like a mission for the GFRP, CFRP and AFRP composites solutions, which protect the aesthetics, plus install in far less time and can't corrode versus the typical steel rebar and steel shell jacketing strategies)

For more on the story: <http://www.latimes.com/news/local/la-me-bridges-12mar12,0,4777211.story?coll=la-home-local>

Source: Advanced Materials & Composites News

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#### Composites Building Materials Form Finalist in Queensland Awards

A Toowoomba (Queensland, Australia) company which developed a new material stronger than hardwood and up to six times stronger than steel or concrete has been nominated as a finalist for a Queensland Government award.

Fibre Composite Design and Development and Coredev Pty Ltd have developed fibre reinforced polymer composite building materials that use less than half the energy to produce structure and less to maintain compared to traditional materials like hardwood, steel and concrete.

The new material production process creates one-fifth of the volume of polluted water and about one-third of the air pollution than that of the traditional materials noted above.

The company has been selected as one of 24 nominees for the Queensland Environmental Protection Agency's (EPA) Sustainable Industries Awards.

Fibre Composite Design and Development Professor Gerard van Erp says the approach to composites in civil infrastructure has created a range of new opportunities for efficient and environmentally friendly structures.

Web: <http://www.fcdd.com.au>  
[www.fcdd.com.au/Projects%20&%20or%20Products/Trusses/Trusses.htm](http://www.fcdd.com.au/Projects%20&%20or%20Products/Trusses/Trusses.htm)

Source: Advanced Materials & Composites News

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### International Award for Innovative GRP Footbridge

An advanced pedestrian footbridge spanning the Madrid-Barcelona high-speed rail link has won international acclaim in the form of "Footbridge Award 2005." Situated close to the Spanish city of Lleida and formally opened in 2004, the bridge is made of high-tech glassfiber-reinforced plastic (GRP).



The bridge was designed by the Spanish engineering consultants Pedelta and built using structural components supplied by Fiberline Composites A/S, Denmark.

The award, in the category "technology" for medium span (30- to 75-meter) bridges, was presented by an international panel of judges. Speaking on behalf of the panel of experts, Helena Russell, editor of the journal Bridge Design & Engineering, described the bridge as "a world first, opening up a complete new field of structural design possibilities. The bridge makes excellent use of new technology to solve a number of specific problems. It combines the advantages of minimum maintenance and light weight, making it easy to transport and to erect."



As the bridge would cross a major rail link, minimizing disruption to services was a key priority for the Spanish railway authorities. Accordingly, the bridge was assembled at the line side and then craned into place, resulting in a railway possession time of only three hours for the complete erection," Dr. Juan Sobrino said.

GRP does not conduct electricity, which is also very important as it means there is no magnetic interference with the electrified railway," Sobrino said.

The three-meter-wide bridge boasts a 38-meter span, one of the longest in Europe for a GRP footbridge. A major challenge in the project was the construction of the two arches, which each lean approximately 10 degrees inward. The bridge therefore has no simple perpendicular components but is composed of short straight sections. The final result is a triumph both technologically and in design terms.



The design team comprised Juan Sobrino, Javier Jordin and Dolores G. Pulido.

Pedelta chose Denmark's Fiberline Composites A/S, which specializes in GRP profiles, to develop and fabricate the structural components. The nine-meter-long components were shipped to Spain for on-site assembly and erection.

Web: [www.fiberline.com](http://www.fiberline.com)

Source: Composites News International

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### Digital hydraulics helps to position Railway Bridge

*Local conditions sometimes make it impossible to build a bridge on-site. In those cases the bridge must be built up on an adjacent site or bank and then be moved to the final position. This also happened in the Brussels Schaerbeke, where a steel railway bridge with a length of 140 metres and a weight of over 1600 tons had to be slid across a number of already existing tracks. Enerpac was asked to hydraulically monitor the movement and the forces that occurred during the movement with its digital 'Synchronous Lifting System' and to make corrections if necessary.*

The new Railway Bridge in Brussels was built by order of the Belgian railways by Victor Buyck Steel Construction, a large internationally operating Belgian steel construction company. The bridge was supplied in parts and assembled on one side of the newly built railway viaduct. The bridge was ready to be moved to its place by the end of October. Because of the intensive use of the railways over which the bridge had to be placed and the fact that the railway traffic had to be stopped during the movement, the builder was given only 48 hours time to move the bridge to its proper place.

### Complex combined action of forces

A steel construction may be called rigid and inflexible, but this is absolutely not true. Especially not in case of a steel railway bridge with a length of 140 metres and a weight of over 1600 tons. Enormous forces are developed during the movement. Under the influence of these forces the steel construction and in particular the superstructure are subject to high, changing tensions and will certainly bend.

In order to have the combined action of forces develop evenly during the movement of the railway bridge and to prevent these tensions from becoming too high, the occurring pulling and pushing forces had to be measured and reduced if required. Additionally, the vertical position of the bridge had to be monitored, of course.

Manual monitoring and correction of the movement is too inaccurate in these cases. Too much variation at the different points of support results in unacceptable tensions that may affect the construction. Besides, manual monitoring and correction takes very much time and the builders did not have much time. Therefore Enerpac was asked to guide the movement of the railway bridge with its 'Synchronous Lifting System' that had proven itself all over the world in the meantime.

### Platform wagons and strand-jacks (cable-lift cylinders)

For the first phase of the movement a series of hydraulically controlled, multi-axle platform wagons (supertransporters) were used on both sides beneath the bridge as rearmost support points. For the second phase – the wagons could only reach a certain point – use was made of a hydraulic pulling system with 'Strand-Jacks', cable strands that pull the bridge metre by metre over the remaining distance. Apart from that a hydraulic retracting and braking system was provided, because the Railway Bridge had to be launched under a downward slope with a level difference of 2 metres. Eight temporary steel pillars were built to support the viaduct parts during the movement. Each pillar had been provided with a so-called 'draw beam', a pivoting steel cross with heavy springs to compensate the force, the angular displacement and the bending of the lower beam of the bridge. Beneath each 'draw beam' two hydraulic cylinders were mounted. The primary function of these cylinders was to keep the construction at the correct height. In order to reduce the resistance as much as possible during the movement Teflon gliding plates were applied between the 'draw beam' and the lower beam. Additionally, a launching nose (beak) was provided on the front side of the bridge for a safer distribution of the forces and to limit the bends and tensions during the movement.





#### Forces under control

Victor Buyck Steel Construction accurately calculated the forces and tensions that could occur at each support point during the movement beforehand. In order to be able to control this complex combination of forces and to correct it if necessary, Enerpac installed a monitoring system especially built for this. This system consisted of a total of 32 measuring points (28 of which were used) on an equal number of hydraulic cylinders, a central pump unit with a pressure of 700 bar, plc-control and a computer system showing all movements and forces. Project leader J.P. Vrombaut of Victor Buyck Steel Construction was very satisfied during the implementation already. "Also thanks to Enerpac things are going much faster than we expected", he said.

Both the hydraulics and the electronics of the system were designed and developed by a team of experts in the 'Enerpac Centre of Excellence' in Spain. Enerpac itself hired out the equipment to the client, in accordance with the policy pursued with respect to such large projects. The installation and implementation were taken care of by the so-called Hevilifts Team, experienced Enerpac experts from Great Britain. The total project period – installation phase, test phase, implementation and completion - covered two weeks.

#### Synchronous Lifting System: Digital hydraulics

The integrated and automatic 'Synchronous Lifting System' of Enerpac is a combination of hydraulics with digital monitoring and control. No matter whether a bridge or a large building is concerned, this system offers an extremely effective method for both vertical and horizontal movement and positioning.

The total system is built in such a way, that the different measuring points and cylinders are stable and do not influence each other and it checks the measuring way and force. For this the control system receives electronic signals from the movement sensors and the pressure in the cylinders is also electronically transmitted through sensors.

The computer continuously calculates the force on each cylinder using pressure sensors. The system checks the position and movements of the individual cylinders and controls pump and valves if necessary to keep the forces at the correct value. In this way each point of the object is moved automatically and fully synchronically and positioned with millimetre accuracy.

When the force is outside a set value, the pressure is 'adjusted'. Here the speed of the computer is used to quickly send short pulses to the hydraulic valves. The result of this is that the individual cylinder movements can be many times smaller than with manual operation. At the moment that a cylinder movement is outside the tolerance, a warning signal is sent and the entire movement is stopped manually or automatically.

## NEW ANNOUNCED EVENTS



EUROPEAN CONFERENCE AND EXHIBITION June 29-30, 2006.

<http://www.briskevents.nl/bestanden/bridgeneering/homebridge.html>

Papers will be presented in the following sessions:

- Taking Bridge Engineering to the Limits
- Environmental Aspects of Bridge Design
- Design of Bridges
- Bridges Boat Dinner Tour (special tour viewing several bridges from the water)
- COBRAE SESSION: New Materials - FRP Composite Innovations
- New Materials - Steel Innovations
- Bridge Maintenance

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IABSE (International Association for Bridge and Structural Engineering) Symposium 2006

13-15 September 2006, Budapest, Hungary

[www.iabse.hu](http://www.iabse.hu)

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FRPRCS - 8th International Symposium on Fiber Reinforced Polymer Reinforcement for Concrete Structures

July 16-18, 2007, Patras, Greece

[www.frprcs8.upatras.gr](http://www.frprcs8.upatras.gr)

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EVACES '07 - Experimental Vibration Analysis of Civil Engineering Structures

October 24-26, 2007, Porto, Portugal

[www.fe.up.pt/evaces07](http://www.fe.up.pt/evaces07)

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COBRAE AGENDA 2006-2007

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BRIDGEENGINEERING BRIDGE TECHNOLOGY CONFERENCE and EXHIBITION

Rotterdam, June 29-30, 2006

MSR, Rotterdam, the Netherlands

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COBRAE MEMBERS MEETING AND SITE VISIT

*(exact date and venue to be announced)*

Eindhoven, Netherlands, End 2006

Technical University Eindhoven, the Netherlands.

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3<sup>RD</sup> WORLD COMPOSITE BRIDGE CONFERENCE

Stuttgart, Germany, March 29-30, 2007

University of Stuttgart

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## OTHER COMPOSITE STRUCTURES & COMPOSITE BRIDGES EVENTS

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### Swiss Bonding 06 - 20 Years SWISSBONDING

May 16 - 18, 2006, HSR Rapperswil am Zürichsee, Switzerland  
[www.swissbonding.ch](http://www.swissbonding.ch)

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### Second FIB Congress 2006, 05-08

Contact: [fib2006@unina.it](mailto:fib2006@unina.it), <http://www.naples2006.com>

June 5-8, 2006, Naples, Italy

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### International Bridge Conference, Pittsburg, PA, USA

#### 23rd Annual International Bridge Conference

June 12-14, 2006 Hilton Pittsburgh USA

The Conference annually attracts over 1,200 bridge owners and engineers, senior policy makers, government officials, bridge designers, construction executives, and suppliers from throughout the US and abroad. In 2005 participants came from 47 States and 15 countries. Other events include: **EXPO '06** - the IBC exhibit hall which is open throughout the Conference. Over 120 exhibitors representing consulting firms, software, design & construction . . . **Seminars** - 4 hour intensive courses scheduled for Tuesday and Wednesday during the Conference. The **Bridge Awards Luncheon**. Two **Student Awards** are presented for winning submissions from both Undergraduate and Graduate students in the field. Submissions are still being accepted, please review the program at the **Call for Papers** section. **Future Dates** 2007 June 11-13 For more information:

[www.eswp.com](http://www.eswp.com)

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### IABSE (International Association for Bridge and Structural Engineering) Symposium 2006

13-15 September 2006, Budapest, Hungary

contact: [zswu@mx.ibaraki.ac.jp](mailto:zswu@mx.ibaraki.ac.jp)

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### FRPRCS - 8th International Symposium on Fiber Reinforced Polymer Reinforcement for Concrete Structures.

July 16-18, 2007, Patras, Greece

Correspondence and Inquiries [FRPRCS-8 Secretariat](mailto:FRPRCS-8_Secretariat) c/o Prof. Thanasis Triantafillou

Department of Civil Engineering, University of Patras, Patras GR-26500 GREECE

Telephone: +30 2610 997764 Facsimile: +30 2610 996155

Email: [frprcs8@upatras.gr](mailto:frprcs8@upatras.gr)

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### EVACES '07 - Experimental Vibration Analysis of Civil Engineering Structures

October 24-26, 2007, Porto, Portugal

[www.fe.up.pt/evaces07](http://www.fe.up.pt/evaces07)

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*N.B. COBRAE TAKES NO RESPONSIBILITY FOR THE CORRECTNESS OF THE ABOVE LISTED INFORMATION*



**COmposite BRidge Alliance Europe**

**REGISTRATION FORM FOR FOUNDING MEMBERS**

We wish to participate in the COBRAE group as one of the founding members.

We pay Euro 950, - for the year 2006. COBRAE will be an unincorporated association, which will be run by Ketel Consulting Agents B.V. in the Netherlands. The Euro 950, - is made up out of Euro 450, - for annual membership and Euro 500, - for a one time joining fee. Payment can be made after receipt of invoice. Members will receive 20% discount on all COBRAE activities.

*COBRAE's mission is to promote the research, development and application of fibre reinforced polymer composites in rehabilitation, upgrade and new build bridge constructions and infrastructure.*

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**COBRAE**                    Please return this registration form by fax to the COBRAE office.  
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