



TryEngineering Today!

The monthly newsletter of TryEngineering - find out more at www.tryengineering.org

Volume II, Issue XI 2007 - November

2010 FIFA World Cup Stadiums

Construction of South Africa's 2010 FIFA World Cup™ stadia is on track and progressing well. Ten stadia in nine World Cup host cities will be used for the tournament which runs from June 10 - July 10, 2010. The German-led Ibholo Lethu Consortium is the lead engineering consulting group for the project, and is working with local engineers on the project. Of the stadiums being built for the 2010 FIFA World Cup, Cape Town's Greenpoint Stadium promises to be one of the most scenic. Cape Town stadium

should also be quite striking as it will be nestled on the slopes of the world-famous flat-top Table Mountain. The showpiece venue of the event may be Johannesburg's Soccer City stadium, venue of the opening match and final. South African football's home will be encased with a distinctive African calabash shell and will be able to accommodate 94,700 fans when its upgrade is completed. All the 2010



Artist's impression of the 50 000-seat Nelson Mandela Stadium, to be built in Port Elizabeth, Eastern Cape for the 2010 FIFA World Cup
(Image Credit: South Africa 2010 Local Organising Committee)

World Cup stadiums are set to be completed by October 31, 2009. More details are at www.fifa.com/worldcup.

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Bi-articulated Buses

When Göteborg, Sweden, found the demand for their Bus Rapid Transit (BRT) system was more than their equipment could handle, they decided to invest in dozens of Volvo Buses' 24-meter-long bi-articulated buses. The Volvo 7500 is available in both an articulated and a bi-articulated version. The bi

-articulated bus is designed to hold up to 200 passengers. In certain markets, however, it would be fully possible to increase the capacity to 270 passengers. The Volvo 7500's floor level is low throughout the bus, making boarding and alighting quick and easy. The 9-liter, 340-HP engine is fitted at the side in the forward part of the

bus, which means that it pulls the entire unit, rather than pushing it, which results in excellent drivability and good accessibility. The chassis for the bi-articulated bus is built at Volvo Buses' plant in Borås, Sweden, and the body is produced at the body plant in Sjöflö, Sweden. Find out more at www.volvo.com.



Volvo Buses is the world's leading supplier of buses for modern Bus Rapid Transit systems. The first large system was launched in Curitiba, Brazil in the 1970s. A recent delivery was for 1,779 buses to the BRT system in Santiago, Chile.
Photo Credit: Volvo Bus Corporation



Simple Machines

Each month, TryEngineering Today! profiles one of the many lesson plans available on TryEngineering.org.

The "Simple Machines" activity explores the different types of simple machines and shows students how to identify them. They also learn that simple machines require human energy in order to function, and how some machines incorporate many simple machines in their design.

Topics examined include levers, inclined planes,

wheels and axles, and pulleys.

Students examine several everyday items to determine whether they are simple machines.

Students also have the opportunity to complete the "jumping coin" activity to find out where to push on a lever to get the best lift.

Another optional activity in the lesson is one where students build their own inclined plane.

The lesson is appropriate for students aged 8 - 11,

and provides step-by-step instructions for both educators and teachers.

All lessons on TryEngineering.org provide detailed teacher and student handouts and worksheets, many which can serve as pre-activity homework assignments.

Explore this, and other lessons online at www.tryengineering.org/lesson.php.



Solar Wind Powered Vessel

Circle Line, the historic New York City ferry operator that provides millions of visitors with trips to the both the Statue of Liberty and Ellis Island each year, has unveiled a model of the solar and wind powered hybrid vessel, which uses a "solar sail" covered in solar panels to collect energy from both the sun and wind and emits almost no noise, vibration or fumes. The solar vessel is being constructed in partnership with

Australia's Solar Sailor Holdings, Ltd. The vessel is like a hybrid car that you can "plug in" and so has the ability to recharge its batteries over night. Like the hybrid car when high speeds are required it uses fossil fuels in an efficient way.

It will not only reduce water pollution, but will reduce overall air emissions and give zero emissions at slow speeds and at the wharf. The vessel will be able to

achieve a maximum speed of 13 knots, roughly the same speed of many of Circle Line's current ferries, and will be able to seat as many as 600 passengers.

"Because of her hybrid electric system she does not emit the noxious black smoke that is so common among other ferries in the harbor," said Dr. Robert Dane, CEO of Solar Sailor.

Learn more at www.solarsailor.com.au.



Circle Line's state-of-the-art solar and wind powered hybrid electric ferry named Miss Statue of Liberty.
Photo credit: Solar Sailor

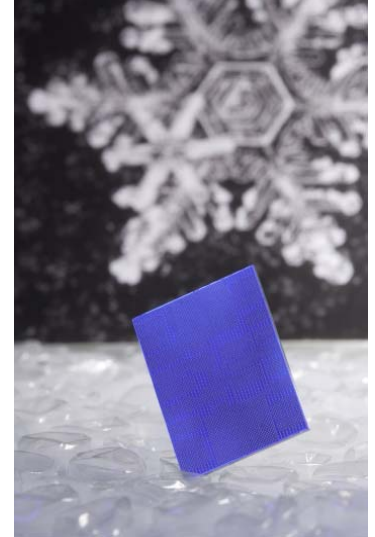


"Natural" Chip Manufacturing

IBM has announced the first-ever application of a breakthrough self-assembling nanotechnology to conventional chip manufacturing, borrowing a process from nature to build the next generation computer chips. The natural pattern-creating process that forms seashells, snowflakes, and enamel on teeth has been harnessed by IBM to form trillions of holes to create insulating vacuums around the miles of nano-scale wires packed next to each other inside each computer chip. In chips running in IBM labs using the technique, the researchers have

proven that the electrical signals on the chips can flow 35 percent faster, or the chips can consume 15 percent less energy compared to the most advanced chips using conventional techniques. The IBM patented self-assembly process moves a nanotechnology manufacturing method that had shown promise in laboratories into a commercial manufacturing environment for the first time, providing the equivalent of two generations of Moore's Law wiring performance improvements in a single step, using conventional manufacturing techniques.

This new form of insulation, commonly referred to as "airgaps" by scientists, is a misnomer, as the gaps are actually a vacuum, absent of air. The technique deployed by IBM causes a vacuum to form between the copper wires on a computer chip, allowing electrical signals to flow faster, while consuming less electrical power. The self-assembly process enables the nano-scale patterning required to form the gaps; this patterning is considerably smaller than current lithographic techniques can achieve. More details are at www.ibm.com.



IBM Airgap Microprocessor
Image Credit: IBM

Compound Machines

Compound machines are two or more simple machines working together -- most machines are actually compound machines.

TryEngineering.org links to an interactive game called "Compound Machines" that challenges users to learn about forces and simple machines that work together to make

compound machines. The game was created by Edheads.org with funding by the Martha Holden Jennings Foundation.

Through the activity, site visitors explore how fans work and how gravity impacts the operations of a machine. Site visitors also explore a variety of situations and answer questions about forces and machines. For

example, they are challenged to identify a machine that is an inclined plane wrapped around a cylinder. Site visitors would gain points in this example by identifying a screw.

For the link to "Compound Machine" and other engineering games, click on "Play Games!" at www.tryengineering.org.





Bone Building Blocks

In work that could lead to more effective diagnoses and treatments of bone diseases using only a pinhead-sized sample of a patient's bone, MIT researchers report a first-of-its-kind analysis of bone's mechanical properties. The researchers' up-close-and-personal look at bone probes its fundamental building block -- a corkscrew-shaped protein called collagen embedded with tiny nanoparticles of mineral -- at the level of tens of nanometers, or billionths of a meter. A

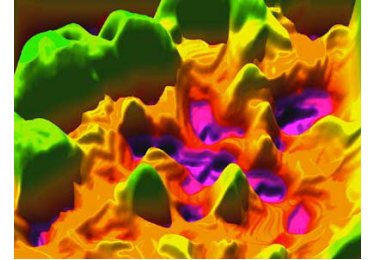
human hair, by comparison, is 80,000 nanometers in diameter.

The insights gained from the work could also lead to the creation of new, tougher materials. The study was led by Christine Ortiz, associate professor of materials science and engineering. "The structure, quality and integrity of bone change dramatically with age and disease, hence understanding the origins of the mechanical properties of this major load-bearing, structural tissue in our body is

extremely important from a medical standpoint," Ortiz said.

Using a table-top instrument called a molecular force probe, which uses an extremely small probe tip to poke out a tiny fragment of bone, Ortiz and colleagues mapped the stiffness of bovine shin bone into complex, colorful, two-dimensional contour maps similar to those used by geographers.

Find out more at www.mit.edu.



MIT researchers created this nano-scale map of the stiffness of bone.
Graphic Credit: Beryl Simon



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TryEngineering.org

is a resource for students (ages 8-18), their parents, their teachers and their school counselors. It is a portal about engineering and engineering careers, developed to help young people understand better what engineering means, and how an engineering career can be made part of their future.

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