



TryEngineering Today!

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

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Engineers Improve Vascular Grafts

Biomedical engineers at Washington University (WU), St. Louis, MO, USA, have developed new biomaterials to recruit endothelial cells to the inner surfaces of vascular grafts. These cells normally line blood vessels and actively protect against blood clotting. Blood clotting on artificial materials is currently so severe that the use of vascular grafts is limited to large diameter vessels. A team led by Donald Elbert, Ph.D., WU assistant professor of biomedical engineering, synthesized the new

materials, which are about 50% synthetic polymers and 50% protein. The polymer portion of the materials is a derivative of polyethylene glycol that was initially synthesized by WU graduate student Evan Scott. When a solution of the polymer is mixed with protein at the proper ratio, a chemical reaction leads to the formation of a water-swollen hydrogel. The materials perform a variety of functions -- limiting protein activation, providing cell adhesion cues to the endothelial cells and



Photo Credit: David Kilper/WUSTL

delivering molecules that enhance endothelial cell migration and survival. The polymer portion limits the activation of blood clotting proteins normally associated with artificial materials.

More details are at <http://biomed.wustl.edu>.

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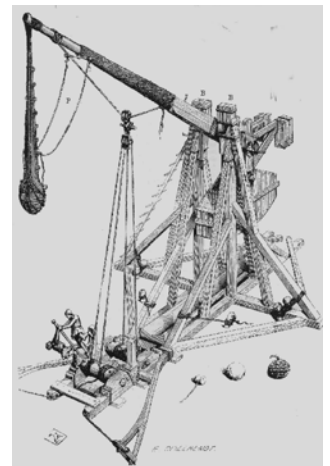
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Engineer Your Own Trebuchet

The trebuchet was one of the most devastating weapons of the Middle Ages. During medieval sieges, this destruction machine crushed castle walls. Using trial and error, medieval engineers adjusted the trebuchet to make sure its missile hit the castle wall -- and destroyed it. TryEngineering.org provides a link to a

NOVA interactive internet game that lets visitors try their hand at engineering the most effective trebuchet. "Destroy the Castle" is an interactive game where you make engineering decisions about stone ball weight, sling length, counterweight design, distance from the castle, and whether to add

wheels to the device. With some choices, your missile might land too short or fly too far. With others, your missile may hit the castle wall, but not with the force necessary to destroy it. For the links to the Destroy the Castle game and other interactive engineering activities, click on "Play Games!" at www.tryengineering.org.





Lesson Plan: Adaptive Device Design

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

The Adaptive Device Design activity explores the concept of how engineering has made possible the development of -- and ongoing improvements to -- adaptive devices that serve to help individuals with a wide range of physical challenges adapt to the world and participate fully in society. Students learn about the engineering process to solve

problems, and work in teams to improve the design of a current or proposed adaptive device. Students start with eyeglasses, disassembling, examining component design and shape, and reassembling - then re-engineer the product seeking improvements to the current product.

The lesson can be adapted for ages 8 - 18, and is aligned with education standards to allow teachers and students to apply engineering principles in the classroom.

All lessons on TryEngineering.org include teacher and student handouts and worksheets. The Adaptive Device Design lesson also includes information about the history of adaptive devices along with exploration sheets to encourage students to identify adaptive devices. Students are encouraged to understand the needs of the user when engineering improvements to devices.

Find out more at www.tryengineering.org/lesson.php.



Engineering Wheelchair Gloves

The hands of a manual wheelchair owner hold tremendous power. They are 'the engine,' 'the steering,' and 'the brakes.' But, they also take a great deal of abuse. A wheelchair owner's hands are exposed to constant friction and heat generated by pushing, stopping and turning. Active and athletic owners are particularly vulnerable to the damage and irritation caused by constant use and exposure. And, 49% of

parapalegic patients showed signs and symptoms of carpal tunnel syndrome, a potentially debilitating condition.

To meet this challenge, Med Services Europe of Zurich, Switzerland has engineered a line of gloves using different materials to help minimize hand injury. Prior gloves fell apart under intense use, so the company re-examined the challenge and came up with a new design

using unique materials. One glove incorporates gel padding to diminish impact force to the hand. Another uses a stretch neoprene backing for better traction. The company found that different materials provided unique benefits depending upon the needs of the wheelchair operator. Stretch neoprene, for example, worked well for wet weather and sports, when a sure grip is a must. More details are at www.newdisability.com.



Gel-Palm Wheelchair Gloves
Photo Courtesy of New Disability



Pumpkin Power!

The MTN Group, the GSM Association, and Ericsson have teamed up to establish biofuels as an alternative source of power for wireless networks in South Africa.

The three organizations have set up a pioneering project in Nigeria to demonstrate the potential of biofuels to replace diesel as a source of power for mobile base stations located beyond the reach of the electricity grid.

Biodiesel has several important advantages over conventional diesel as a power source for base stations. Biodiesel can be produced locally,

creating employment in rural areas, while reducing the need for transportation, related logistics and security.

Groundnuts, pumpkin seeds, jatropha and palm oil will be used in the initial pilot tests.

Biodiesel has a much lower impact on the environment than conventional diesel. The cleaner burning fuel results in fewer site visits and also extends the life of the base station generator, reducing operator costs.

"The early adoption of biofuel-powered mobile networks would place

Africa at the forefront of a new wave of innovation that is making mobile communications affordable and accessible across the developing world," said Karel Pienaar, CTIO of the MTN Group.

In a pilot project, engineers are setting up a pilot biodiesel-powered base station solution in Lagos and will later deploy biodiesel-fueled base stations in rural regions of south eastern and south western Nigeria.

Find out more at www.mtn.co.za.



Hubble Servicing Mission Announced

NASA has given the green light for a 2008 shuttle mission to repair and upgrade the permanent space-based observatory.

The history of the NASA/European Space Agency Hubble Space Telescope is dominated by the familiar sharp images and amazing discoveries that have had an amazing impact on our understanding of the

universe. Such important contributions have only been possible as a result of regular upgrades to Hubble's instrumentation.

As part of the upgrade, two new instruments will be installed: the Cosmic Origins Spectrograph and Wide Field Camera 3. Each has advanced technology sensors that will dramatically improve Hubble's potential for discovery.

Around the same time as the planned NASA mission, ESA will launch Herschel, an orbiting telescope with the largest mirror ever deployed in space.

Herschel complements Hubble in the infrared part of the spectrum and is an ESA mission with NASA participation. Find out more at www.esa.int and www.nasa.gov.



Hubble Floating Free
Photo Credit: NASA



How to Build an LNG Facility

Construtora Norberto Odebrecht (40%), Saipem (40%), and the Jan de Nul NV group (20%) were awarded by Peru LNG the contract for the construction of the Marine Export Facilities at the Pampa Melchorita LNG Facility located 200 km south of Lima, Peru.

Liquefied natural gas or LNG is natural gas that has been processed to remove either valuable components, e.g. helium, or those impurities that could cause difficulty downstream, e.g. water, and heavy hydrocarbons and then condensed into a liquid at almost atmospheric

pressure by cooling it to approximately -163 degrees Celsius. Moving natural gas by pipelines is not possible or economical, but it can be transported by LNG vessels.

The contract consists of the engineering, procurement, and construction of a 1,350 meter approach trestle, LNG ship loading facilities, an approach channel, and a 800 meter offshore breakwater.

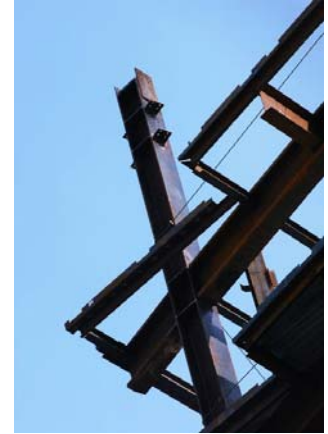
11,500 tons of piles will be installed, 6,000 tons of steel structure will be erected, more than 2.5 million tons of rock will be placed offshore and 3.6 million

cubic meters of material will be dredged during the performance of the project.

Peru LNG Company is a Peruvian registered company created for the purpose of developing a natural gas liquefaction facility utilizing the excess supply of Peru's abundant gas reserves for export to Mexico and the U.S.' West Coast.

The company is owned by Hunt Oil Company of the USA, South Korea's SK Corporation, and Spain's Repsol YPF.

Find out more at www.odebrecht.com.



TryEngineering Today!

TryEngineering.org
P.O. Box 1331
Piscataway, NJ 08854-1331 USA

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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