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Grand Challenges for Engineering A MANUFACTURING RENAISSANCE

"Because of our policies on taxes, energy, tort and trade, it is 20 percent more expensive to do business in the U.S. than it is in the countries which are our nine largest trading partners—and that is excluding the cost of labor. With 21 percent of global manufactured goods produced here, the United States is the world's largest manufacturing economy. But our own policies are threatening that leadership position. China is second at 15 percent and Japan is third at 12 percent. Federal regulation costs \$1.7 trillion annually, according to the Small Business Administration. The U.S. has the second highest corporate tax rate among the major industrial countries, trailing only Japan. 70 percent of manufacturers pay income taxes at individual rates. Therefore, any tax increase on individuals is a tax increase on manufacturers.

- > Direct tort costs total almost 2 percent of GDP in the United States—the highest level in the world.
- > Health care costs have increased an average of 12 percent over the last 10 years.
- > 95 percent of consumers live outside the U.S., making it critical for manufacturers to have access to global markets through free trade agreements.
- > Currently, there are dozens of free trade agreements being negotiated around the world, but the U.S. is a party to just one.
- > Through inaction on free trade agreements, we are ceding market share to our competitors.
- > Manufacturing supports an estimated 18.6 million jobs in the U.S.—about one in six private sector jobs. Nearly 12 million Americans (or 9 percent of the workforce) are employed directly in manufacturing.
- > In 2010, the average U.S. manufacturing worker earned \$77,186 annually, including pay and benefits. The average worker in all industries earned \$56,436.
- > The R&D credit is a jobs credit. 70 percent of credit dollars are used for salaries of high-skilled R&D workers. Some 510,000 new jobs would be created if the credit were strengthened and made permanent.
- > All of these factors and more are hurting American competitiveness. The 20 percent cost differential is caused by policies created in Washington, not in some far away capital."

Mr. Matthew Heslop has been Named the 2011-12 Wentz Pre-Engineering Program Fellow

The Fellowship, made possible by Mr. and Mrs. Howard B. Wentz, Jr. P'84, P'86, promotes professional development for Kent faculty in the field of Engineering Education.

Mr. Heslop came to Kent School from Jamaica and is a graduate of the Class 2004. He earned Bachelor of Science and Master of Science degrees, majoring in Manufacturing Engineering, from Worcester Polytechnic Institute in Worcester, Massachusetts. At WPI he received the Outstanding Student Award (2007) from the Society of Manufacturing Engineers. Mr. Heslop will be teaching the Manufacturing Engineering course in the spring term.



Optiwind: Second Pre-Engineering Field Trip of the Year

On Friday December 2nd, thirty-one students and four faculty members took a trip to Optiwind, a wind turbine company located in Torrington, CT. The generous invitation came from Mr. Russel Marvin P'15, the founder of Optiwind. After a tour of the wind turbine, the group went to the factory, where Mr. Marvin gave a thorough presentation about the origin of his company and its growth. He started Optiwind by himself in 2007. The company has grown to 30 employees. Mr. Marvin provided our group with an overview - explaining the science behind Optiwind's wind turbine. He described the full process: from the solar energy (electromagnetic) heating the earth to the wind's linear kinetic energy, which rotates the blades. A generator converts the rotating energy to electrical energy and an inverter converts the multi frequency AC generated electrical energy to DC electricity and then finally DC is converted to 60Hz AC (the type of electricity we use.) Optiwind's first tower started running in 2010.



Mr. Marvin concluded his presentation by going over the different jobs at Optiwind and what they involve. He gave the following advice to our students—his approach for being a successful entrepreneur:

- ❖ Aggressively acquire experience and knowledge
- ❖ Perfect at least one skill
- ❖ Seek out passionate people
- ❖ Be a leader
- ❖ Accept risk
- ❖ Don't fear failure
- ❖ Become a problem solver
- ❖ Get good at looking at situations differently

Nilesh Patel '12, Co-captain of the Robotics team and Pre-E certificate holder said that "it was the best field trip we ever had."

“Engineering Design” Students Design Generating Stations at the Bridge over Macedonia Brook

The final project of the Engineering Design course was to produce a working hydroelectric generating station on Macedonia Brook. Two teams were formed and had the same resources at their disposal, the same equipment, a budget for materials, regulations to meet, and reporting requirements. According to the three judges of the presentation, Mr. Benjamin, from South Kent school, Mrs. Garrity from Kent Town Hall, and Dr. Nadire from Kent School, Team 1 had simple, effective design with a “lip” holding the apparatus to the dam which was very clever and Team 2’s overall design was well conceived, but the materials selected, particularly the wood, seemed sub-optimal, although, their concentration of flow to generate an increased velocity was very clever and practical.



Presenters Team 1: George Benda '12, Morgan Lowry '14, and Xiaomeng Luo '12

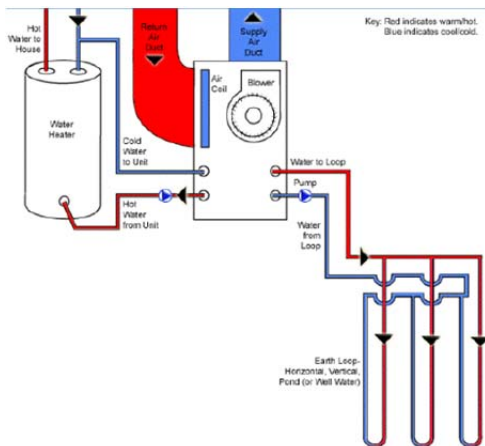


Team 2: Huanyi Zhu '13, Daniel Harvey '12, Alexander Lanzoni '12, Eric Stockwood '13, Garrett Osborne '12, and Rasheem Eccleston '12

Kent School’s New Dormitory Uses a Geothermal Heat Pump

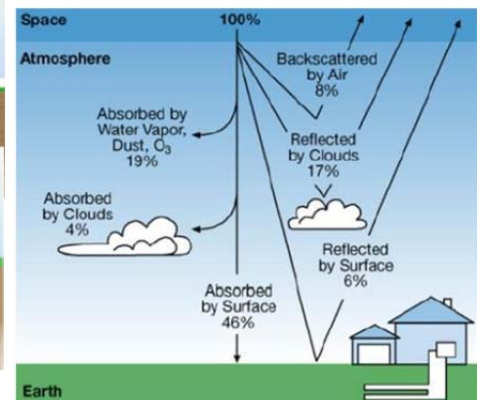
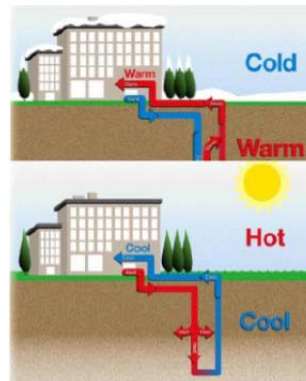


“What is a geothermal heat pump and how does it work?”



The earth works like a giant solar collector, storing the sun’s energy. A geothermal heat pump relies on the fact that the earth remains at a relatively constant temperature throughout the year.

The geothermal heat pump transfers heat stored in the earth or in ground water into a building during the winter, and transfers heat out of the building and back into the ground during the summer.



It works by moving naturally existing heat rather than by producing heat through combustion of fossil fuels. The system includes three principal components: the Earth Connection, the Heat Pump, and the Heating/Cooling Distribution System.”

Feel free to contact me if you need more information.

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