COLLEGE-NOW

Two Teams Challenged to Design Gorman Rupp Check Valve Tester

Fall 2008

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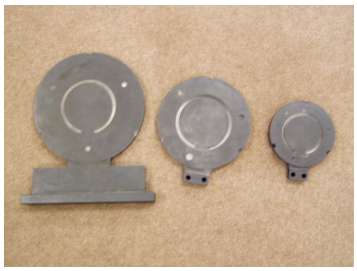
Mike Keith and Steve Reynolds from Gorman-Rupp Pumps came to talk to our College NOW class about a Problem Based Learning project (PBL). They explained how their pumps worked and how a check valve is incorporated into one of their pump systems. They showed with sketches, diagrams, and outlines that the check valves keep the water in the pump from back-tracking down the pump from gravity's pull.



The PBL they gave us is to find a way to test the check valves for quality control by finding how close their failing points are to the company's projected and estimated breaking points. We decided to use hydraulic pressure to test the breaking points. There are 8 sizes of check valves from 3 inches to 11 inches. We also decided on a design that could test each one simultaneously with them all in a row beside one another. We thought of using a pair of hydraulic pistons on each side of this row to press and seal the check valves in place, testing each one individually by a series of shut-off valves, and then opening the pistons to replace the failed check valves with new ones. The team has already started to design some of the testing mechanisms on a CAD program, and even animated some of them. The team is composed of Michael Striker (Project Manager) Brandon Peoples, Andy Gaither, Mac Buzzard, and Jerimiah Baker

GORMAN-RUPP PUMPS

Grace Gosser, Jonathan Getz, Cory Boone, and Alex Polkinghorn have also been working on a solution to Gorman Rupp's problem. Gorman Rupp needs a device to test when their check valves will break. The students have been designing different solutions on Inventor (a 3-D modeling program). Grace, as project manager, has been assigning tasks to the other three. Jonathan has been working on Inventor and making a PowerPoint to present to the class, Alex has been drawing parts on Inventor, and Cory has been looking up materials on the Internet to see which material is the strongest and will work the best. Grace has also been drawing on Inventor and monitoring the others to make sure they continue to work on the project. All of the students have been contributing ideas to come up with a workable solution to their given problem.

Inside this issue:

Congratulations!

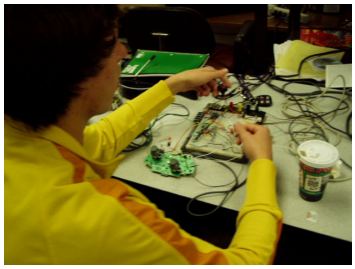
- All twenty of our juniors successfully completed "Math Boot camp" this fall.

Update: Cahara Fluid Power

In our Cahara Fluid Power problem, we have made very significant strides toward the completion of the problem. The goal of our problem is to find a way to test when the seal on a hydraulic cylinder will fail. We have obtained the cylinder that we will use to run the test, as well as the test station we will use to operate the cylinder. We still have a few problems that need to be worked on. Namely, we have to find out how to get our cylinder hooked up to the power station and get the whole operation running. This will consist of mounting the motor and setting up the hydraulic circuit that will operate our cylinder. After our circuit is in operation, we plan on making an electrical circuit with a microchip controller that will count the cycles the cylinder will go through before the seal fails. We plan on graphing the oil pressure drop in the hydraulic circuit in relation to the cycles. The slope of the graph will slowly decrease due to the nature of hydraulic circuits. When the seal starts to fail, the grade of the slope will gradually increase. We will know that the seal experiences complete failure when the graph plummets violently to near 0 PSI. Group members are Carleton Caldwell (Project Manager), Joe Hekert, TJ Guerrero, and Leland Hulme.

Update: Guitar Hero

The objective of our project was to build a robot by wiring an XBOX 360 controller to a microcontroller and program it with the computer in order to play the notes in "Through the Fire and Flames" on the Guitar Hero III video game. We soldered wires to the controller and connected them to the microcontroller. The microcontroller we used is made by Parallax and called the BASIC stamp. The BASIC stamp sends voltage to the XBOX 360 controller and activates the button as if someone were pushing it. The button sends the signal to the XBOX 360 and plays the note on the screen. Right now we are trying to wire the project to start on its own to reduce error. We will also eventually wire a counter to the project to count how many times the button is pushed.



Caleb Picou and Cameron Roe are using a microcontroller to defeat Guitar Hero.

College-Now Juniors Grace Gosser, Kathryn Reed and Stephanie Ruhl shared their expertise in Robotics at NCSC's We Are IT event.

For more information on College-Now please contact:

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General Electric

Braxton Bute, Brandon Weber, Michael Striker, Cole McKinley, Josh Roe, and Keith Richardson went on a tour of GE last week. While at GE we were briefed on a possible PBL. The problem involves finding a way to view the inside of a florescent light

bulb from the top and bottom to measure the distance of the wire shape and orientation. We have come up with an idea that involves mirrors that split the camera into two views, and using a ruler to measure the distance between the wires. We are still currently awaiting approval on the funding from GE for the PBL. In order to complete the problem we will need a camera that GE uses to check the parts of the light bulb. We are all hoping that the funding gets passed so that we can get started on the PBL that GE has asked us to complete.

imagination at work

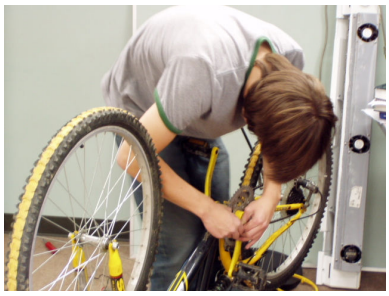
RR Donnelley

Our group is working on a project opportunity given to us by RR Donnelley in Willard. RR Donnelley recently moved all storage into a single cage called Central Stores. We were given four priorities to get started. The four priorities are to make recommendations for improvements in item placement, to find what items should be given in bulk instead of singularly, to check the response time in the cage, and to make recommendations to streamline tasks in the cage. There are some barriers to the completion of this task: the cage is still a little unorganized making it hard to find a specific part, many parts have more than one name, and even though there are catalogs they are not quick to use. In a preliminary brainstorm of our team, we came up with one main idea. We believe that the cage should be run like a type of library. This would also include a type of catalog that has the multiple names of each part and maybe a system that can scan parts and tell a computer that, that certain part was being taken. Group members are Stephanie Ruhl (Project Manager), Cody Courter, and Cory Boone.

RR DONNELLEY

Regenerative Breaking

Every time you brake in a traditional car, whether it's at a stop light or to avoid a crash, your hydraulic brakes use a non-compressible fluid to apply pressure to the brake pads which press against the brake rotor or break drum and stop the car. This causes a large amount of friction. The friction causes energy in the form of heat. This energy is then lost. A way of capturing this energy before it is lost, is through regenerative braking. The NC State electric vehicles, converted by Ken Ekegren, do not have regenerative braking. We were asked to research alternative types of braking and decide if regenerative brakes would have been beneficial in the cars. Regenerative braking comes in different forms. In an electric car, which runs using a motor, the motor can be used as a generator in order to eliminate the loss of heat and energy. This then recharges the battery. We are still researching different types of regenerative braking and whether it would be profitable to use these brakes. We also plan to modify a bicycle with regenerative breaks. Group member are Kathryn Reed (Project Manager), Jerimiah Baker, and Azia Bradley.



Jerimiah Baker works on fitting a bicycle with an electric motor.

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Welcome Class of 2010

Jerimiah Baker
Azia Bradley
Mac Buzzard
Andy Gaither
Grace Gosser
Bryant Miller
Alex Polkinghorn
Keith Richardson
Stephanie Ruhl
Micheal Striker

Cory Boone
Braxton Bute
Cody Couter
Jonathan Getz
Cole McKinley
Brandon Peoples
Kathryn Reed
Josh Roe
Canaan Spencer
Brandon Weber

College-Now is a program of concurrent enrollment developed through the collaboration of:

North Central State COLLEGE

OhioCollegeTechPrep

Pioneer CAREER & TECHNOLOGY CENTER