Power Systems Display

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Outline

• Project Description
• Our Visit to Eaton
• Original Proposed Solutions
• Water Circuit Design
• Electrical Circuit Representation
• Materials
• Professional Awareness
• Timeline
Project Description

• Background
  • Eaton’s Power Systems Experience Center located in Pittsburgh

• Goal
  • Create an water system to replicate how an electric circuit works including current, voltage, parallel resistance, series resistance, reactive power and ground.

• Need
  • A demonstration capable of training students and executives alike the concept of electrical properties: resistance, capacitance etc.

• Importance
  • Electricity is not a widely known topic across all ages and its important to teach people how to use it properly and be safe

Our Visit to Eaton
Proposed Solutions

Comparing a DC Circuit to the Flow of Water

R₁ = R₂ = R₃

Water Circuit Design

Representation for KCL

Air

P

Add

P

Air

P

P total

Parallel Resistance

CSU

Ground Reservoir

Reactive Power

Voltage

Current

CSU

name name

name name

Drain

Parallel Resistance

R

Project Description

R & I Controller

1/14/2016
Electrical Circuit Representation

Materials:

- **Clear Pipe:**
  - Length: 20 – 30 feet
  - Width: 1 - 2-1/2"
  - Cost: $80 - $120
  ($8/3 feet)

- **3-Way Clear Pipe:**
  - Width: 1 - 2-1/2"
  - Cost: 6 – 10 ($9/each)
Materials

- **4-Way Clear Pipe:**
  - Width: 1 – 2-1/2"
  - Cost: 2 – 4 ($10/each)

- **3-Way Clear Pipe:**
  - Width: 1 – 2-1/2"
  - Cost: 8 – 12 ($10/each)

Materials Total cost:
$300 to $350 (without Eaton products)

- **Water Foam:**
  - Quantity: (36 ounce)
  - Cost: ($15/each)

- **Blue Fluid:**
  - Quantity: (22 ounce)
  - Cost: ($3/each)

- **Six Water Tanks**
Eatons workshop

- **Location:**
  - Parma, Cleveland, Ohio.

- **Materials provided by Eaton:**
  - Water pump.
  - Water/Pressure Meter.
  - Water Valves.
  - Clear color pipe cement.
  - HMI controller.

Challenges

- Type of fluids to be used in the project.
  - Blue window cleaner.
  - Bubble Bath (Mr. Bubbles).
- Supporting the weight of the tank vertically.
- How to make resistance either smaller piping or valves.
- Using sensors to measure the flow and pressure and transmitting them to the HMI
- Programming the HMI
Professional Awareness
IEEE Code of Ethics

• 1. to accept responsibility in making engineering decisions consistent with the safety, health, and welfare of the public, and to disclose promptly factors that might endanger the public or the environment;
• 5. to improve the understanding of technology; its appropriate application, and potential consequences;
• 10. to assist colleagues and co-workers in their professional development and to support them in following this code of ethics.

Time Line