SUSTAINABLE CAPSTONE PROJECTS (SCAP)
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Manometer design and construction

CYPRUS INTERNATIONAL UNIVERSITY

GROUP MEMBERS

- **Saliha Bakari Isa (Biomedical Engineering)**
- **Sultan Ahmed (Mechanical Engineering)**
- **Marwa Amali (Energy systems engineering)**
- **Samuel Gbemi (Mechanical Engineering)**

INTRODUCTION

- A manometer measures fluid pressure and is crucial in many industries. Designing a new manometer aims to improve accuracy, usability, and versatility.
- The main motivation for this project is to address the limitations of existing manometers by innovating with a modern, efficient design that uses sustainable and waste materials.. Additionally, there is a growing need to incorporate environmentally friendly materials, reducing waste and promoting sustainability in engineering and manufacturing processes.

MATERIALS USED IN CONSTRUCTION

Re-Used/Recycled Materials:
- Wooden Boards
- Drink Can

Other Materials:
- Measuring Tape
- Rubber pipe
- Silicon glue
- screws

FINAL PRODUCT

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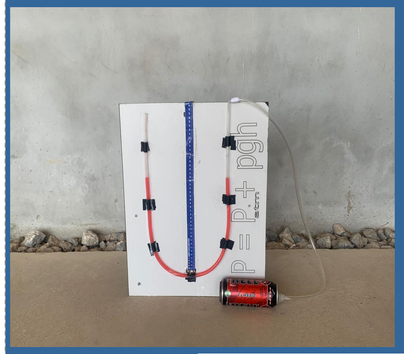
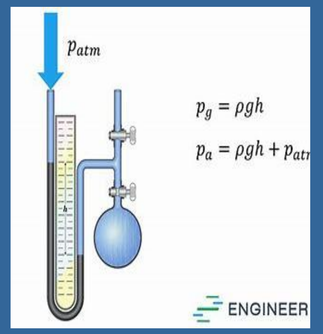
Constructed Version of the Project

- The constructed manometer consists of a sealed can connected to a U-shaped tube filled with water. One end of the U-tube is open to the atmosphere, while the other end is attached to the can. The can is designed to be heated, which in turn increases the pressure of the air inside it.

How It Works

- When the can is heated, the air inside it expands, increasing the pressure. This increased pressure pushes the water in the U-tube, causing a rise in the water level on the side connected to the can and a corresponding drop on the open side. The difference in the water levels between the two arms of the U-tube can be measured to determine the pressure inside the can. The height difference is directly proportional to the pressure increase caused by heating.





RESULTS AND DISCUSSION

Results

- Pressure Measurement Accuracy: The manometer accurately measured pressure changes when the can was heated, validating its design.
- Response to Heating: Heating the can increased internal pressure, raising the water level in the U-tube as expected
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- Leak Prevention: Effective sealing ensured no significant air leaks, ensuring reliable pressure measurements.
- Repeatability and Reliability: Consistent test results across multiple trials confirmed the manometer's robustness**.**

CONCLUSIONS

- Practical Skills: Working on the project enhanced practical skills in design, construction, and troubleshooting.
- Integration of Theory and Practice: The project reinforced the importance of integrating theoretical knowledge with practical application.

REFERENCES

1. https://engineerexcel.com/manometer-equation/