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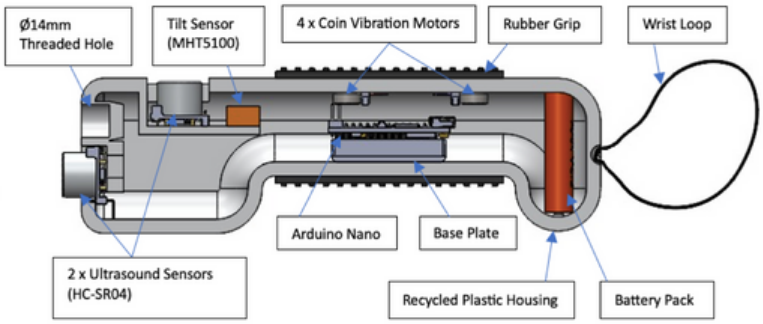
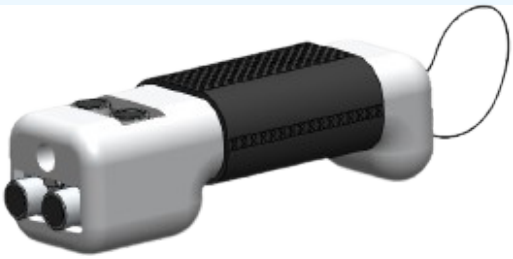
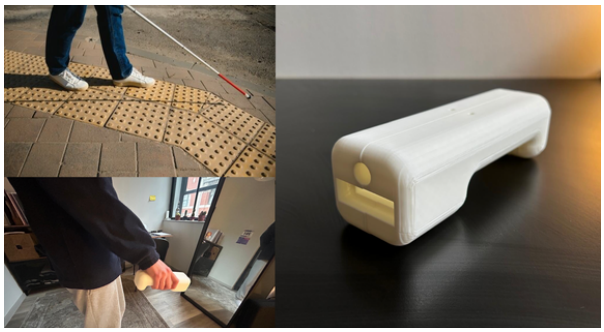
VIMA - VISUAL IMPAIRMENT MOTION ASSISTANT

*click the VIMA logo to learn more







What?

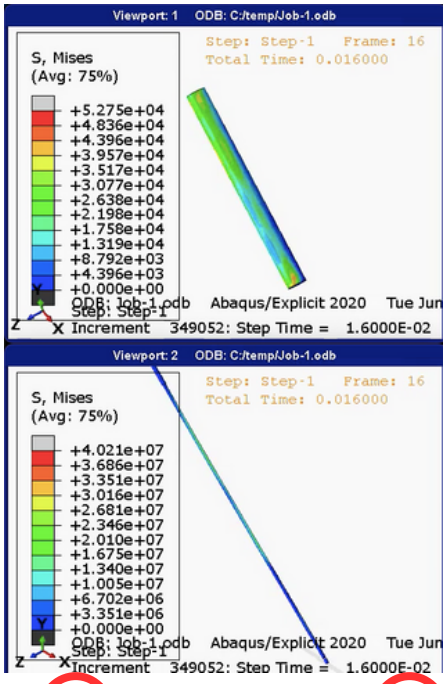
- VIMA is a **detachable handle** harnessing strategically placed sensors and vibrative actuators providing **real time feedback** to sense obstacles.
- It detects overhanging objects and replicates white cane sensations.

How?

- Produced **3D CAD** models and detailed **2D engineering drawings** for VIMA's Enclosure using **SolidWorks**
- Used Arduino and several sensors for electrical infrastructure
- Fabricated using **rapid prototyping** methods (3D Printing)

Results

- Outputted obstacle detection data and haptic feedback with a **95% similarity** to traditional white canes.
- Provided visually impaired users with accurate navigation in urban environments



1 Presence Detection
2 Distance Measurement
Input
3 Distance Analysis
4 Obstacle Detection
5 Haptic Feedback
Output

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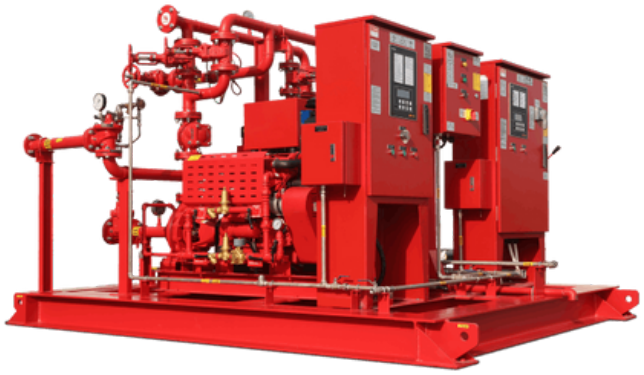
AUTOMATED TESTBED SETUP - NAFFCO



What?

- Reduce amount of time it takes to test fire pumps for QA/QC
- Minimize human operator error

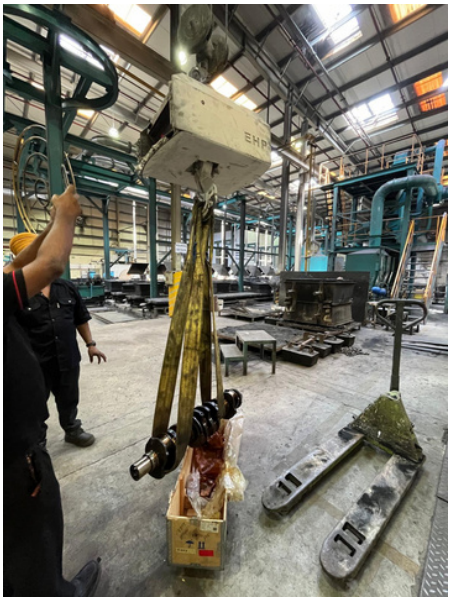
How?

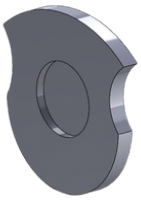
- Used **Pneumatic Actuator** to design flow control
- Used **SCADA** software for real time motoring of system

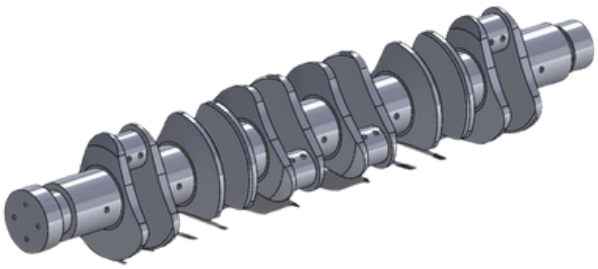
Results

- The design fulfilled its purpose with **97% accuracy** (vs.85% previously when readings were done by humans)

KNIFE EDGED CRANKSHAFT - NAFFCO







What?

- Design and fabricated a knife edged crankshaft for **improved efficiency** in fire pump motors
- Performed a **needs analysis** to initiate the design process

How?

- Designed on **SolidWorks**
- Used **CNC machining** to cut out desired shape

Results

- Increased efficiency by **8%** due to decreased windage and rotational mass
- Improved High-RPM Performance

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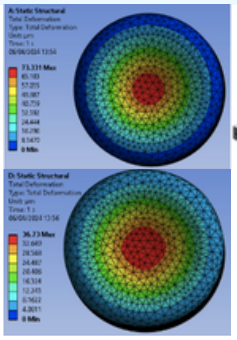
HYPERLOOP - HYPERLOOP MANCHESTER

*click the BEE logo to learn more

What?

- Designed Hyperloop chamber exterior door system to withstand a pressure difference of 1 bar

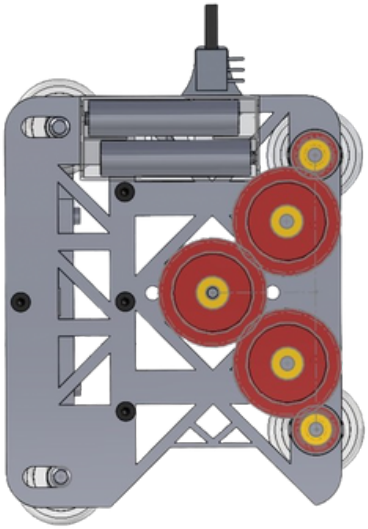
How?

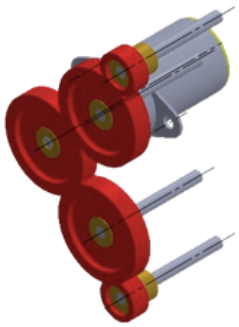
- Used **SolidWorks** to design doors
- Used **ANSYS** for FEA simulation of structure

Results

- Designed a cost effective door that met the design requirements

PIPE CRAWLER - IMECHE DESIGN CHALLENGE 2023





What?

- Create a lightweight and sturdy internal pipe crawler
- Pipe crawler is designed to climb pipe in the fastest time

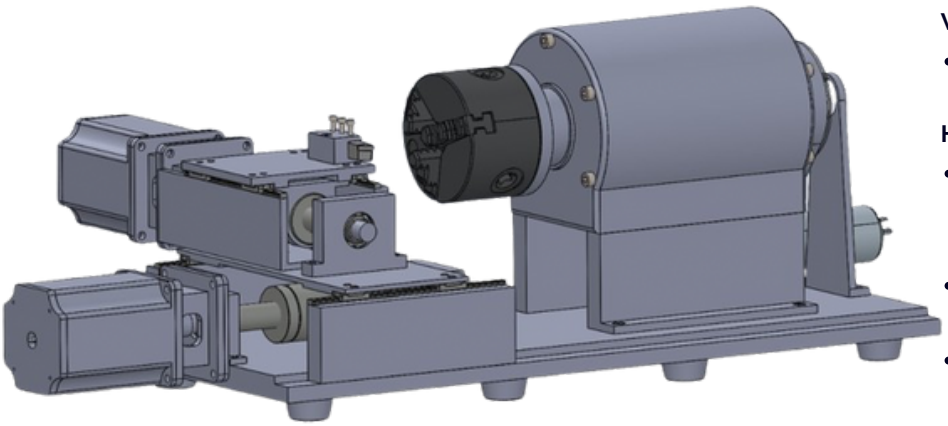
How?

- Used **SolidWorks** to design the crawler
- Used **Excel** to produce the bill of materials

Results

- Climed 3m pipe in 14 seconds

LATHE



What?

- Designed a lathe with a 3 jaw chuck

How?

- Used **SolidWorks** to design this due to the lathe's complex geometry and multiple components.
- Calculated cutting force, spindle bearing loads and deflection.
- Applied **GD&T** on all drawings.