Oregon Tool Electric Chainsaw

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Oregon Tool
Sensor Placement Analyzation

PURDUE POLYTECHNIC

Customer Background

- Established in the early 1940s Oregon Tools is a renowned company that has been a pioneer in providing high-quality tools and equipment for various industries, primarily focusing on outdoor power equipment and cutting solutions.

Problem Statement / Scope of Work

- We aim to improve chainsaw safety, maintenance, and useability through the experimentation of optimal sensory locations for relaying feedback to the manufacturer.

Requirements Matrix

Design Requirements

- Characterization of data
- Ability to measure vibration
- Ability to measure sound
- Is able to be implemented within the chainsaw in a minimally invasive manner
- Monitors the characteristics of chainsaw performance
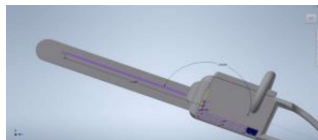
Experimentation / Concepts Exploration

Figure 1- CAD Model of Chainsaw

Figure 2- Location 2 for sensor

Figure 3- Location 1 for sensor

Figure 4- CAD Model 2nd view
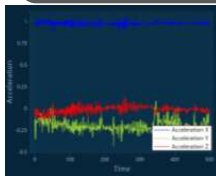
Final Design

Figure 5- WITMOTION program graph

Figure 7- Location 3 for sensor

- We opted for the second test location for sensor placement in our final design, as it yielded superior results based on the collected data.

Figure 6- MATLAB feature graphs from Location 2

Failure Mode and Effect Analysis

Testing

Testing Procedure

- Objective/Deliverables
  - Gather Data
  - Classification, Characterization and Analysis
  - Determine the best locations for sensor placement on chainsaw
- Mounting the Bluetooth sensor to three specified locations on the chainsaw
- Set board on saw-horse
- Perform 5 cuts halfway while collecting data on each cut
- Label files by cut, location, and wood type
- Repeat with other 2 wood types
- Final Design: Location 2

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