ARMGHAN HAIDER

3B | Mechanical Engineering
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SKILLS & ABILITIES |

- Advanced skills in 2D and **3D modelling** using AutoCAD, SolidWorks, Inventor, CATIA and NX including Surface modelling and FEA using ANSYS
- Proficient knowledge of automation systems, machine design and integration of sensors and actuators for prototyping and **mass manufacturing**
- Expertise in **Project Management** through 3 years of experience managing high budget projects

EXPERIENCE |

ENGINEERING SPECIALIST (*WELD TEAM*) | **TOYOTA MOTOR MANUFACTURING CANADA**
SEPTEMBER 2019 - DECEMBER 2019

- Performed **Root Cause Analysis (RCA)** to assess delayed manufacturing times by implementing a fishbone diagram and the 5 Whys
- Spearheaded **multiple projects** such as using fixture design in **SolidWorks** to implement process changes in hemming line robots which reduced part defects, saving over $20,000 annually
- Produced custom-part and tooling **CAD** drawings using SolidWorks while complying with **GD&T**
- Directed a $45,000 QC Lifter project for a critical manufacturing process and ran weekly review meetings with a team of highly experienced engineers

PROCESS ENGINEEERING | **ANDERSEN CORPORATION**
MAY 2018 - AUGUST - 2018

- **Managed** projects valued at over $50,000 which included parts ordering & hiring contractors
- Designed & prototyped custom racks & hinges on **SolidWorks** and Inventor to reduce parts damage by 10% , saving over $35,000 annually
- Executed a **needs analysis** on test racks by identifying **functional** and **constraint** requirements thereby reducing overall project costs
- Exposed to **DFA** & **DFM** principles while communicating with design team to develop new products

FACTORY ADMINISTRATOR | **NESTLE PURINA**
JANUARY 2017 - DECEMBER 2017

- **Modelled** parts and assemblies in SolidWorks to visually represent on-floor equipment to better diagnose maintenance issues
- Created detailed production floor layouts using **AutoCAD** to accelerate expansion plans for the company
- **Implemented** fault management strategies to keep track of downtimes, increasing efficiency by 14%

SUPPORT ENGINEERING | **SHOPLOGIX INC**
JANUARY 2019 - APRIL 2019

- Developed automated scripts to generate unique codes & identifiers
- Implemented features to a complex C# project to enhance functionality, reducing search time

SIDE PROJECTS |

AUTONOMOUSLY GUIDED VEHICLE | **SOLIDWORKS, PID CONTROL, C**

- **Designed** a complete prototype & developed code for an autonomous vehicle with obstacle sensing and averting capabilities using Arduino C

RC AIRCRAFT INTEGRATION | **SOLDERING, CIRCUIT.IO, BATTERY PERFORMANCE ANALYSIS**

- **Integrated** brushless motors, servos, ESCs and mechanical linkages using mechanical design and soldering skills to build an operable flying aircraft

OPEN DIFFERENTIAL | **CAD MODELLING, 3D PRINTING, GEAR DESIGN**

- **Designed** a complex series of parts in SolidWorks optimized for 3D printing and ease of assembly

EDUCATION |

UNIVERSITY OF WATERLOO | WATERLOO, ON
CANDIDATE FOR BACHELOR OF APPLIED SCIENCE
Honors Mechanical Engineering, Co-operative Program - Class of 2021

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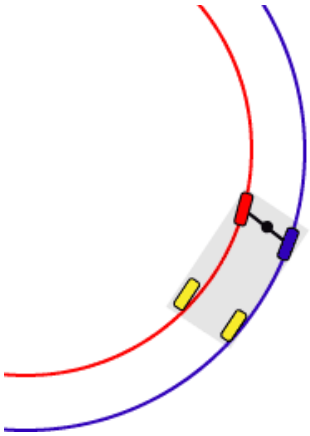
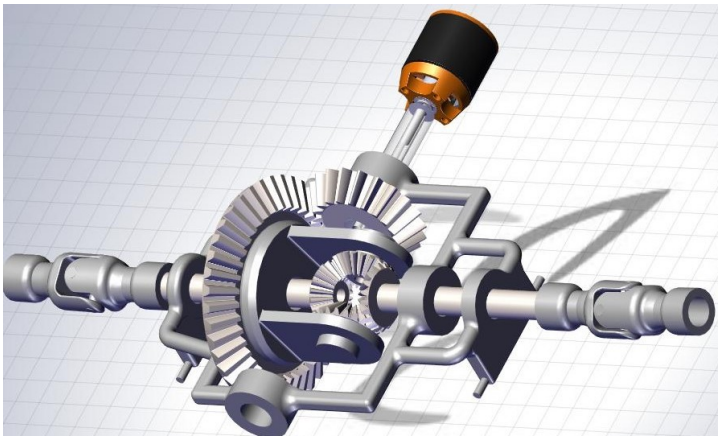
Mechanical Engineering Portfolio

Open Differential Electric Drive-chain

This open differential was designed to prevent wear & tear on an AGV. The key advantage of an open differential is to allow a vehicle to turn without causing the outside wheels to skid . This project involved using SolidWork Gears as well as knowledge of how gearing systems work in modern vehicles.

Modelled for: Side-Project





Purpose:

- To prevent skidding of tires from occurring by allowing complete rotary translation of the tires on the AGV

Approach:

- Adding a differential to allow the axle to rotate at different speeds
- Design for manufacturing/3D printing

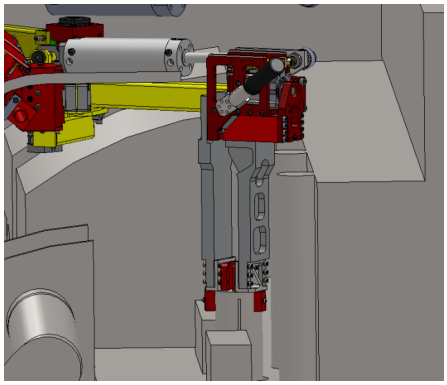
Results:

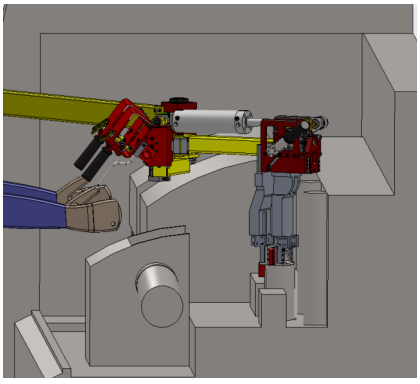
- Project 70% complete
- All parts 3D printed and assembled
- Open differential complete

Gripper Claw Design

AW ARCHITECTURAL COLLECTION

To increase production capacity and operator safety, a new design for an existing manipulator arm was required. This claw would grip 50lb spindles and was required to navigate close quarters. It was designed in **SolidWorks** with assistance from a senior engineer.





Purpose:

- Allow maneuverability in tight spaces inside the machine
- Be able to adjust and prevent dropped spindles

Approach:

- Designed the claw & operating conditions using **SolidWorks,** large assembly mode
- Tested to ensure spacing and dimensional constraints were satisfied

Results:

- Project upon completion **successfully** increased operator safety
- **Production** of molder machine increased by **20%** due to elimination of dropped spindles

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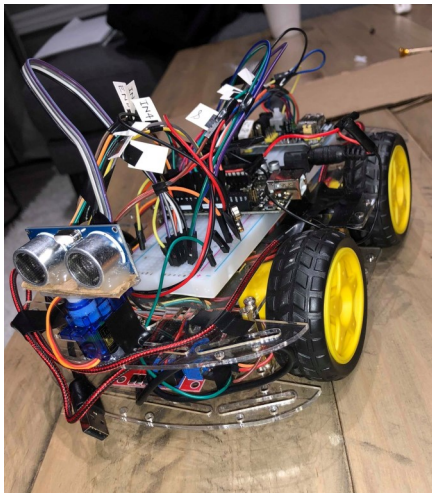
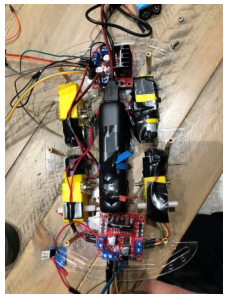
Mechanical Engineering Portfolio

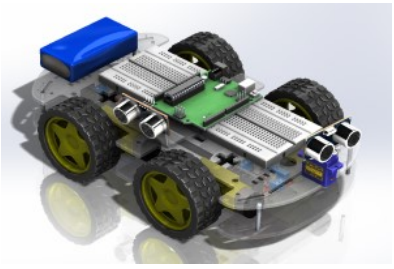
Autonomous Vehicle Project

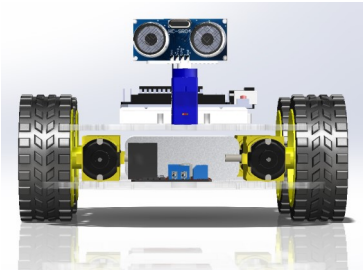


Using Arduino, ultrasonic sensors, DC motors and other electronic hardware, a vehicle was made which could operate without any user input. Its functional requirements were to navigate obstacles using distance sensing capabilities.

Designed for: Self-learning







Purpose:

- To develop an integrated machine which could perform multiple tasks without human intervention

Approach:

- Modelled initial version to decide on look and aesthetics
- Design would incorporate battery charging

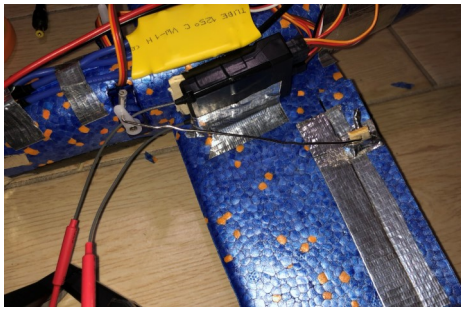
Results:

- **Successfully** detected obstacles to avoid. Furthermore wall following capabilities were added later on to enhance vehicle functionality

RC Airplane Integration

To further my understanding of mechanical & electrical systems, an electric motor airplane was made using servo, props, mechanical linkages, ESCs and more. Special considerations had to be taken into account such as dimensionality of control surfaces and center of mass.

Designed for: Self-learning



Purpose:

- To achieve flight using conventionally available hobbyist equipment
- To learn more about electrical equipment

Approach:

- Positioned linkages to ensure max degree of rotation for control surfaces
- Soldered electronics to reduce weight and complexity

Results:

- **Successfully** detected the root cause of parts failure using FMEA and root cause analysis.
- Increased quality of parts by a total of 10%, resulting in even fewer defects

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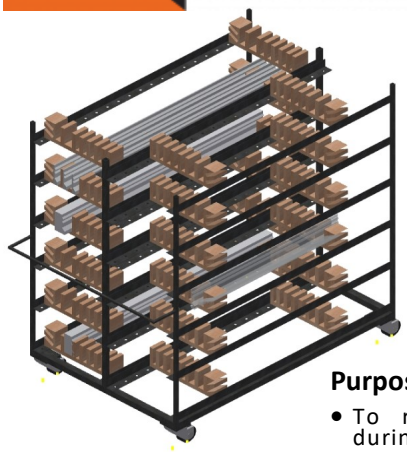
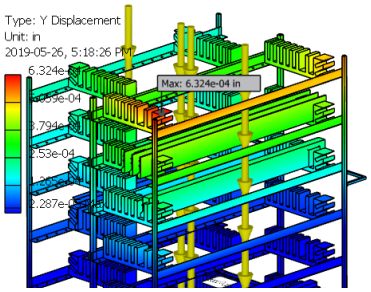
Mechanical Engineering Portfolio

Slider Subassembly Cart

Customized cart used in the assembly stage for transporting aluminum cladding throughout the product processing line. Designed using **Inventor weldments** to achieve over 80% reduction in part defects and a 20% reduction in overall assembly time.

Designed for: Andersen Windows





Purpose:

- To reduce parts damage during transportation
- Increase process line efficiency through reduced loading times

Approach:

- Performed **FEA** to ensure an acceptable safe factor of safety
- Designed a cart which had max customization of storage space

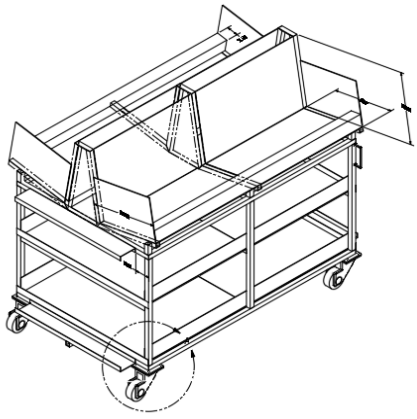
Results:

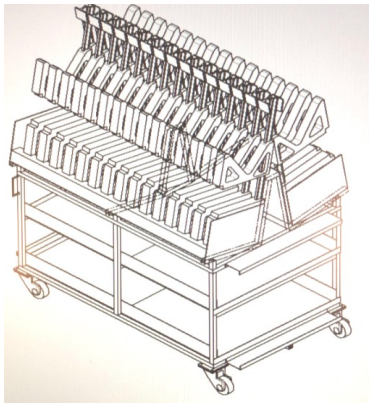
- Cart **successfully** integrated a wide variety of parts to stored and easily accessed
- Reduced part defects by preventing steel-on-steel contact

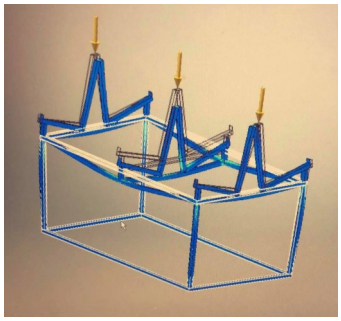
Heavy-Duty Clamp Cart

Custom designed a heavy duty cart used for storing at least 50 clamps each weighing 30lbs. The design had to take into account speed of insertion and removal as well as operator comfort. This design was done using **Inventor.**

Designed for: Andersen Windows







Purpose:

- Quick access to large heavy clamps during set-up
- Consider operator comfort upon inserting & removal operations

Approach:

- Calculated max weight & designed for a factor of safety of 3
- Choose tilted design to reduce cart size to ease maneuverability

Results:

- Frame analysis done to ensure carrying capacity of 1500lbs or more
- **Successfully** reduced load up time to under one minute, a 60% improvement

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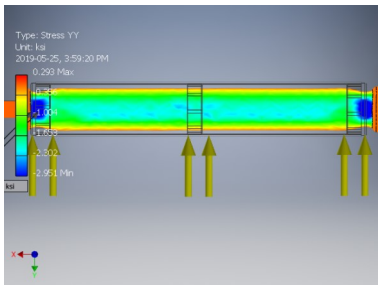
Mechanical Engineering Portfolio

MagPi Pressure Roller

This **SolidWorks** model of a roller was made to find small differences in pressure. These differences were causing delamination inside pressed parts and were thus contributing to part defects which resulted in quality callbacks and warranty claims.

Modelled for: Andersen Windows



Purpose:

- To reduce parts damage due to unequal pressure
- Find the root cause of delamination in wood

Approach:

- Modelled one-to-one replica to find possible failure modes
- Performed FEA detect previously undetected issues

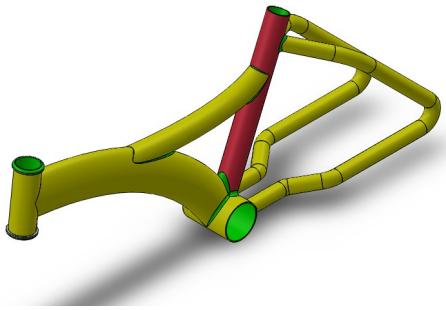
Results:

- **Successfully** detected the root cause of parts failure using FMEA and root cause analysis.
- Increased quality of parts by a total of 10%, resulting in even fewer defects

Bicycle Handle

As a young and ambitious mechanical engineer, I wanted to recreate a complex real life object in SolidWorks. This is because, I enjoy 3D CAD modelling and wanted to test my skills whilst improving my understanding of the software.

Modelled for: Self-Learning



Purpose:

- To learn more about SolidWorks surface modelling

Approach:

- Designed components using different tools such as lofting, filleting and surface-modelling

Results:

- Learned to become more proficient at **SolidWorks** whilst having fun in the process

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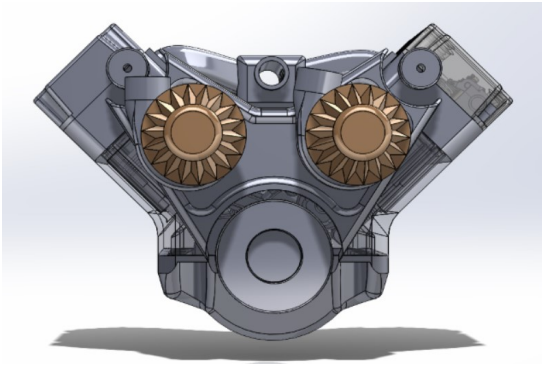
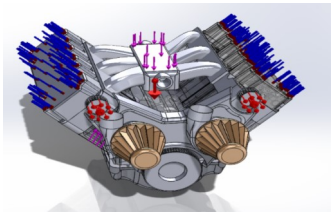
Mechanical Engineering Portfolio

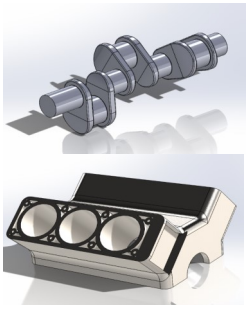
V6 Engine SolidWorks Design

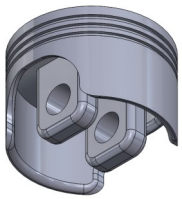


Learned about and designed a V6 engine using online learning. This was done to learn new and advanced concepts of Solidworks. Correct lofting, drafting and design skills were learnt as well as finite element analysis of basic parts

Modelled for: Self-Learning







Purpose:

- To learn more about a V6 engine and improve my personal SolidWorks skillset

Approach:

- Designed components using different tools such as lofting, filleting and surface-modelling

Results:

- Learned to become more proficient at **SolidWorks** whilst becoming familiar with **engine** parts such as piston, camshaft & crankshaft.

Engine Disassembly

This mini-project was done for ME321 & ME340 courses. This project required knowledge of engine disassembly. This was learnt through online tutorials and assistance from trained staff.

School Project: Manufacturing & Dynamics

Purpose:

- Learn more about automotive engine & parts

Approach:

- Used a variety of workshop tools to disassemble as plyers, torque wrench, power drills & more.
- Carefully managed tooling to ensure all parts were properly placed inside the engine

Results:

- Learned a great deal about engines and the fuel combustion process
- Enhanced engine disassembly and reassembly strategies