ARMGHAN HAIDER

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3B | Mechanical Engineering Student

SKILLS

CAD SOFTWARE

- **SolidWorks** *through 3 years of experience designing jigs, fixtures, carts & specialty equipment*
- **NX** *through work with UWAFT involving car parts modelling*
- **Inventor** *through small parts and fixture implementation at Nestle*
- **Auto-CAD** *through work at Nestle Purina for equipment mapping*

MECHANICAL

- **GD&T** *skills from equipment dimensioning & positioning*
- **3D printing** *to prototype fixtures at Andersen to test for viability*
- **Laser cutting** *done for school projects as well as poster for UWAFT team*

ELECTRICAL

- **Soldering** *done for brushless motor and sensor wiring*
- **Circuit** & **PCB** *board design done through with side projects*
- **PLC** *expertise though work, project & coursework*

SOFTWARE

Python | VBA | React JS | C/C++

EDUCATION

B. Applied Science (B.AS)

University of Waterloo *2016 - 2021*

Relevant Courses

- *Intro. To Control Systems ME360*
- *Mech Eng. Design I ME322*
- *Manufacturing Processes ME340*
- *Manufacturing Processes ME340*

DESIGN TEAM

UWAFT - Design Team

- *Drive Shaft Research*
- *Mount and hinge for base plate*

EXPERIENCE

Weld Engineering Specialist — *Sept-2019 - Dec-2019*

Toyota Motors - *Cambridge, ON*

- *Performed* **Root Cause Analysis** *(RCA) to assess delayed manufacturing times by implementing a fishbone diagram and the 5 Whys*
- *Designed fixtures in SolidWorks to implement process changes in hemming line robots which reduced* **part defects,** *saving over $20,000 annually*
- *Gained valuable equipment procurement and* **project management** *experience through Toyota Business Plan and multiple other projects*
- *Exposed to* **DFM** *and* **DFA** *principles while communicating with the design team to develop the most efficient method of assembly for a new product*

Support Engineering — *Jan-2019 to Apr-2019*

Shoplogix - *Oakville, ON*

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

Process Engineering — *May-2018 to Aug-2018*

Anderson Corp. - *London, ON*

- *Managed* **project budgeting** *valued at over $50K which included parts ordering, hiring subcontractors & monitoring workflow*
- *Designed & prototyped custom racks & hinges on* **SolidWorks** *and* **Inventor** *to reduce parts damage by 10% , saving over $35K annually*

Factory Administrator — *Jan-2017 to Dec-2017*

Nestle Canada - *Mississauga, ON*

- *Created* **parts, assemblies & drafts** *in Solid-Works and AutoCAD for visual representation and design purposes*
- *Utilized* **Fishbone** *and* **Root Cause** *analysis to diagnose machine downtimes as well as diagnose part failures*

SIDE PROJECTS

Autonomously Guided Vehicle (AGV) | Solidworks, PID Control, C

- **Designed** *a prototype &* **developed** *code for an autonomous vehicle with obstacle sensing and averting capabilities using Arduino C*
- **FEA Analysis** *done to ensure* **AUV** *parts met a factor of safety of at least 2.5*

RC Aircraft Integration | Soldering, Circuit.io

- *Integrated brushless motors, servos, ESCs and mechanical linkages to build an operable aircraft capable of maintaining sustained flight*
- *Designed & 3D printed landing gear using FEA analysis to ensure durability under sustained loading conditions*

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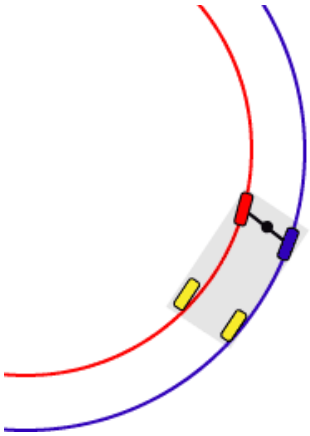
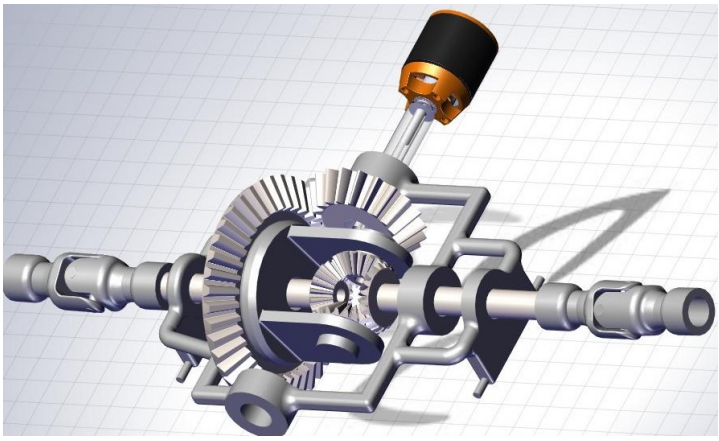
Mechanical Engineering Portfolio

Open Differential Electric Drive-chain

This open differential was design to prevent wear and tear on an AGV. The key advantage of an open differential is allow a vehicle to turn without causing the outside wheels, which travel a longer distance than the inside wheels, to skid. This project involved using SolidWorks Gears as well as knowledge of how gears work & mate with each other. **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.

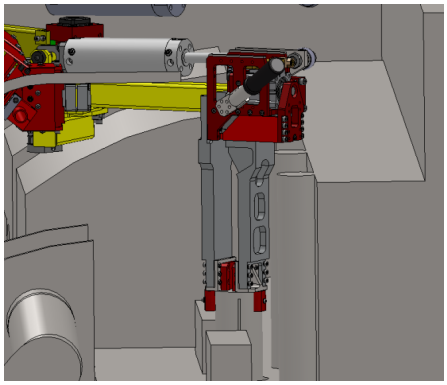
Results:

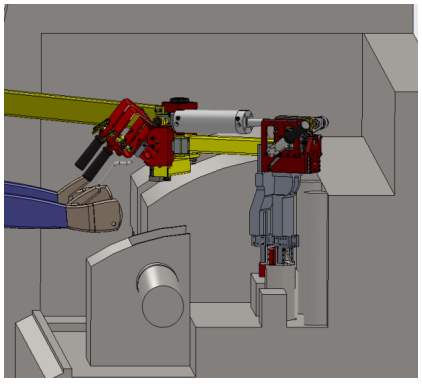
- Project 70% complete.
- All parts 3D printed and assembled.
- Open differential complete.

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 signed 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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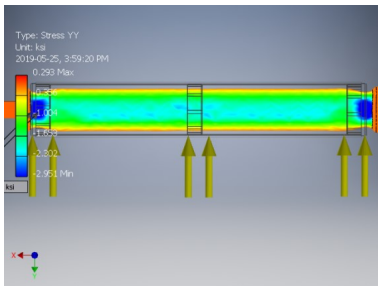
Mechanical Engineering Portfolio

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

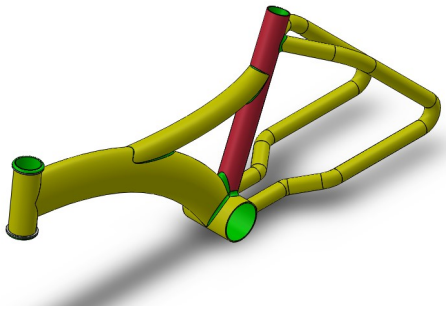
Results:

- **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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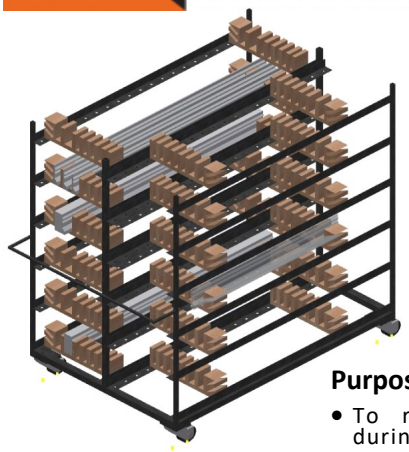
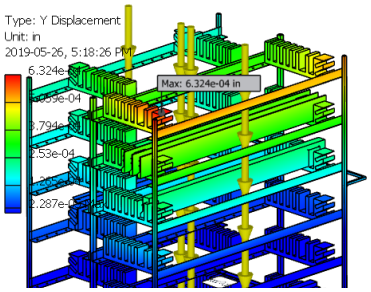
Mechanical Engineering Portfolio

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

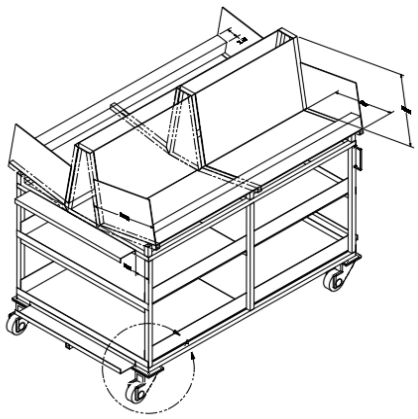
Results:

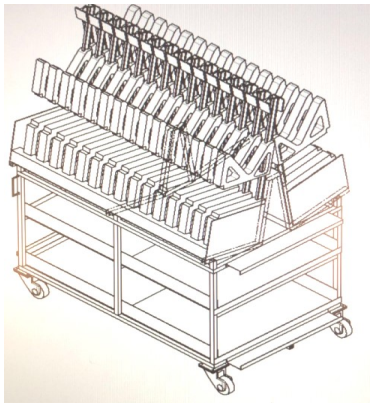
- Cart **successfully** integrated a wide variety of parts to stored and easily accessed
- Reduced part defects by preventing steel-on-steel contact

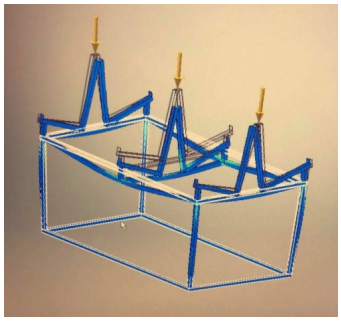
Heavy-Duty Clamp Cart

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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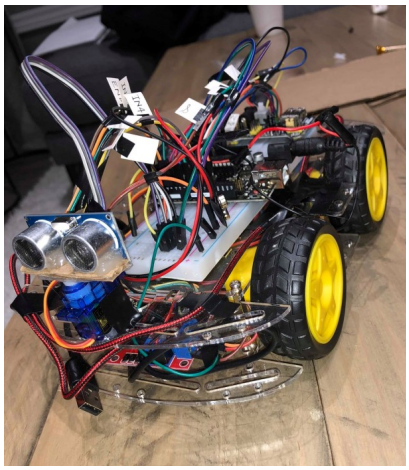
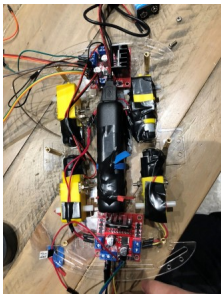
Mechanical Engineering Personal Portfolio

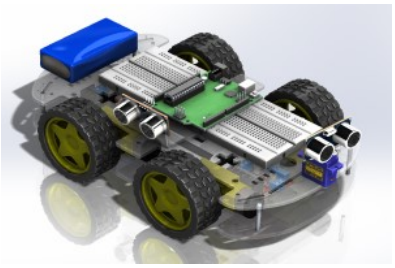
Autonomous Vehicle Project

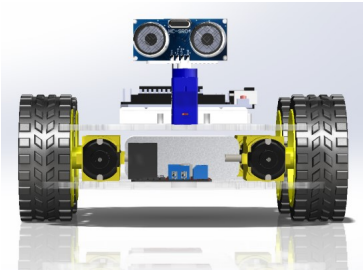


Using Arduino, ultrasonic sensors, DC motors and other electronic hardware, a vehicle was made which could operate without any user input. Its functional requirements were to navigate obstacles using distance sensing capabilities.

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

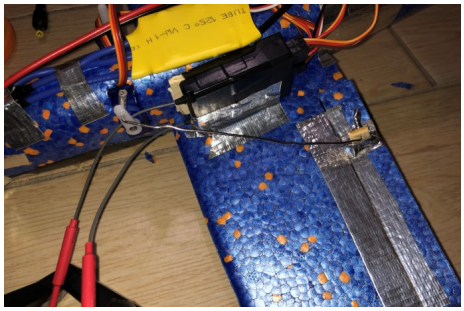
Results:

- **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