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ASD Project: Casting Cell Part Marking Station — Jul 2024 – Aug 2024

What?

- The customer required a part **marking station** for their casting cell, capable of marking **two different parts** using same equipment with **minimum changes.**
- **Initial requirements** were provided by the customer, which were further **refined through feedback.**

How?

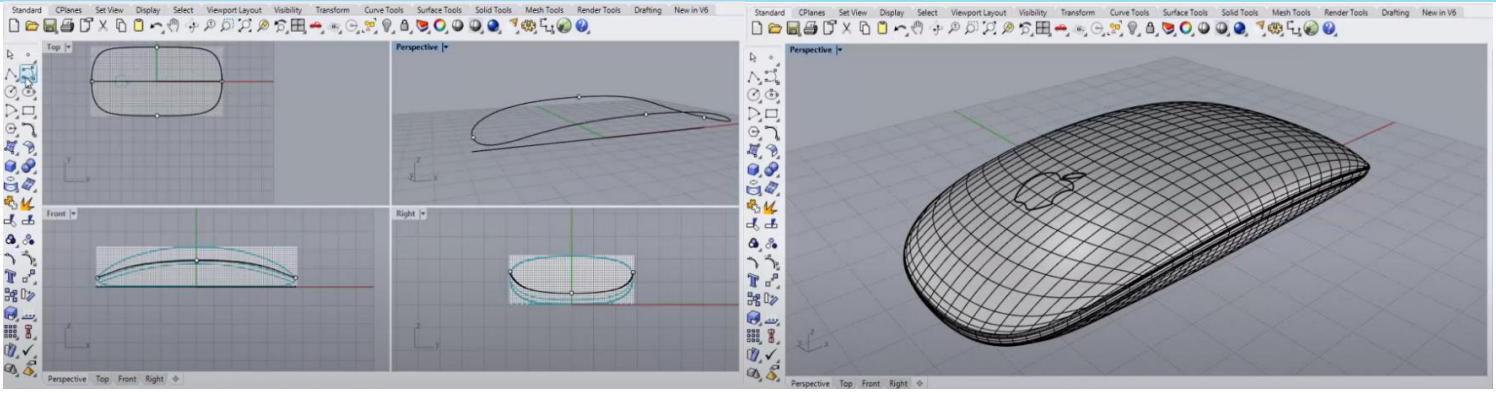
Used **SolidWorks** to:

- Design the structural frame using **structural steel tools**, ensuring **strength and stability** for the station.
- Implemented **motion studies** in **SolidWorks** to simulate and **optimize the operation** of the marking station.
- Created detailed **technical drawings** for manufacturing, including **bill of materials (BOM)** and exploded views for **assembly instructions.**

Results:

- Successfully delivered a fully **detailed and refined design** that met all customer requirements and specifications.
- The design was created with a strong focus on **precision and quality**, ensuring the part marking station would perform reliably in the **production environment**.
- Generated **comprehensive technical drawings** and documentation, enabling smooth transition to manufacturing with **minimal revisions needed.**

Magic Mouse: A Product Design Study: — Jun 2024



What?

- This project aimed to deepen my understanding of **product design** by analyzing the **Magic Mouse**, specifically its limitation of not being usable while charging.

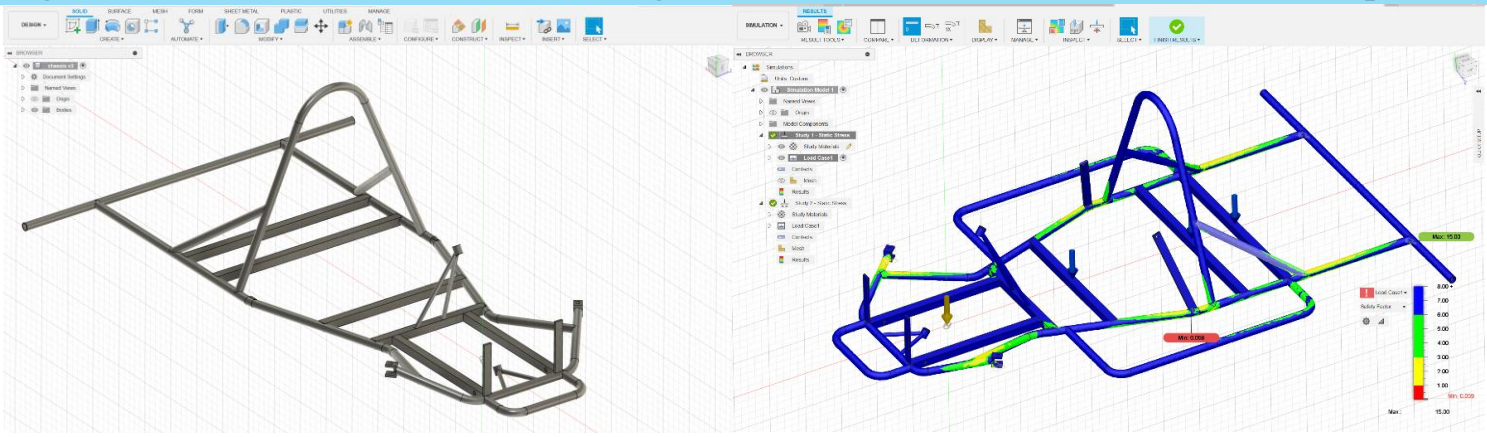
How?

- Used **Rhino 3D's line and surface tools** to model the mouse body.
- Applied **surface modeling** techniques to refine the shape.

Results:

- Gained hands-on experience in **product design** and mastered key tools in **Rhino 3D**.
- Enhanced my proficiency in **3D modeling** and developed a foundational understanding of the **iterative design process**, preparing me for future design projects.

High-Performance Go-Kart Chassis Design: Feb 2024 – Apr 2024



What?

- Designed a **go-kart chassis** with a focus on **structural integrity**, **lightweight design**, and performance optimization.
- Aimed to create a chassis that balances **stability and agility** for **racing applications.**

How?

- Used **CAD** software (such as **Fusion 360 or AutoCAD**) to model the **chassis frame**, ensuring **precise dimensions and geometry**.
- Performed finite element analysis **(FEA)** to evaluate the chassis' strength and stress distribution under various load conditions.
- Iteratively **refined the design** and **modified material** to optimize for **weight reduction** while maintaining safety and durability.

Results:

- Gained proficiency in **CAD modeling** and **FEA**, further developing my understanding of **mechanical design** principles.
- Improved skills in **structural analysis** and **design optimization** for high-performance vehicles.
- Achieved **15% weight-to-strength** efficiency in chassis design.

Tesla Project: Casting Rework Equipment for Scrap Reduction Aug 2023 – Dec 2023

What?

- **Designed and fabricated** equipment to rework casting parts that would otherwise be rejected as scrap due to dimensional issues.
- Conducted **need analysis** to gather initial design requirements and understand the importance of reducing scrap.

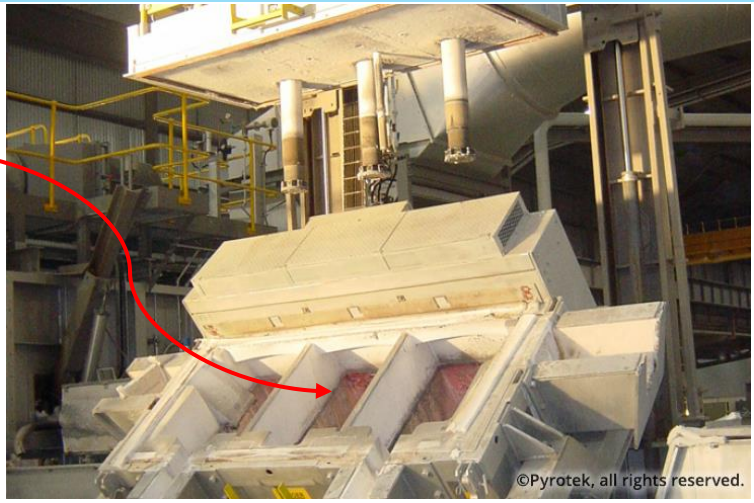
How?

- Utilized **structural steel tools** in **SolidWorks** to design the equipment's body, ensuring durability and functionality.
- Performed **finite element analysis (FEA)** to validate the safety and stability of the design under operational conditions.
- **Collaborated** with the factory team to fabricate the frame using **in-house resources**.

Results:

- **Conducted initial tests** on the frame, **generating results** that supported the hypothesis and **confirmed the design's viability**.
- Achieved desired results, leading to the project being passed on to the process team for **integration** into the production line**, reducing 25% scrap rates** and **improving efficiency.**

Tesla Project: Enhanced Degassing Well Cover Design — May 2023 – Sep 2023



What?

- Due to changes in the degassing operation, the old cover design presented **operational challenges** necessitating a **new cover design.**
- Conducted a **situation analysis** to generate the **initial design requirements** for the new cover.
- **Collaborated with floor engineers** to gather insights on operational issues and understand **real-world challenges**.

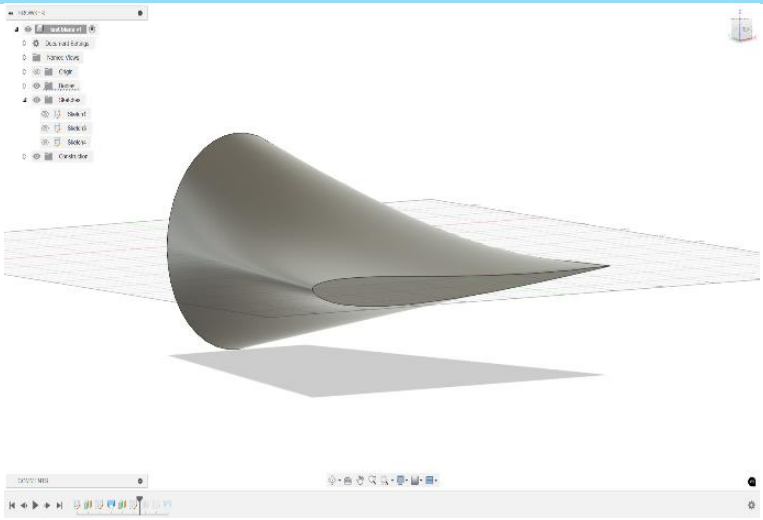
How?

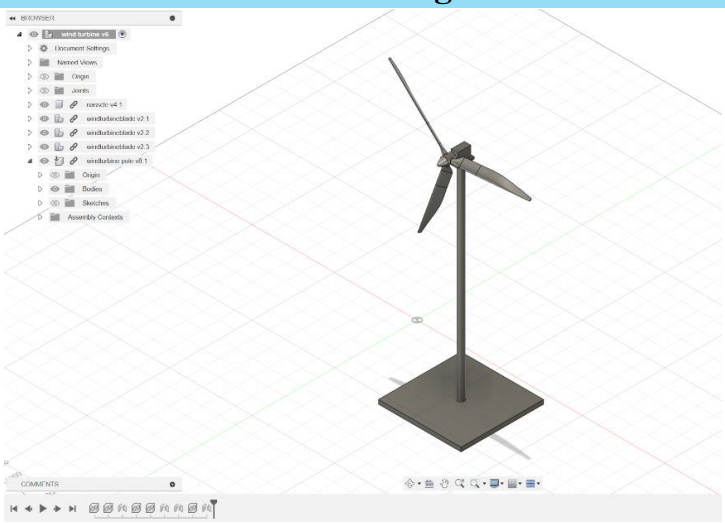
- Used **SolidWorks** and its tools like **structural steel tools** to design the frame of the cover, ensuring structural integrity.
- Applied **sheet metal functions** to enclose the frame efficiently.
- Performed finite element analysis **(FEA)** to verify the safety and stability of the design under operational conditions.
- **Applied GD&T** for precise dimensioning of the cover to **withstand high temperatures**.

Results:

- The new covers **successfully eliminated operational difficulties.**
- The design was **adopted for all other degassing wells** and was considered for implementing across **multiple factories**, enhancing overall **performance and efficiency.**

Terrain-Effect Wind Turbine Model: — Aug 2022 – Dec 2022





What?

- The experiment aimed to evaluate the effects of **different terrain** types on **wind turbine efficiency**.
- The design required a **scaled model** small enough to fit inside a 30 by 30-centimeter **wind tunnel for testing.**

How?

- Utilized **NACA airfoil software** to determine **optimal profiles** aimed to **increase drag and reduce lift** to improve efficiency.
- **Applied GD&T** to scale the wind turbine dimensions accurately, ensuring it **replicated full-size characteristics.**
- used **forming tools** to achieve an **aerodynamic surface finish** on the blades.

Results:

- The design received **positive feedback** from the professor, confirming its alignment with the project objectives.
- Achieved a **90% dynamic similitude** in **testing**, indicating that the scaled blades effectively replicated the performance characteristics of full-scale wind turbines under **real-world conditions.**