Tesla and VEX Robotics
21549D
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This picture shows a Tesla model Y on an AI generated road
https://www.motor1.com/tesla/model-y/

Tesla is a company that produces and sells cars all over the world and they are known for their fully electric cars which is very important going into the future for technology and the planet. The company was founded by Elon Musk who is a very famous businessman as well as the richest man in the world. He is the CEO of SpaceX, founder of xAI, co-founder of Nueralink and the co-founder of OpenAI.

We chose this company as it relates quite a lot to VEX robotics as the design engineering process is quite similar such as possibly note booking and keeping a track of all the flaws made in prototypes or putting the designs on a CAD website. As said before, they make fully electric cars which shows how they adapt their design depending on the environment which is something that everyone who participates in VEX, no matter their role in the team, learn and try to do

Tesla and why we chose them
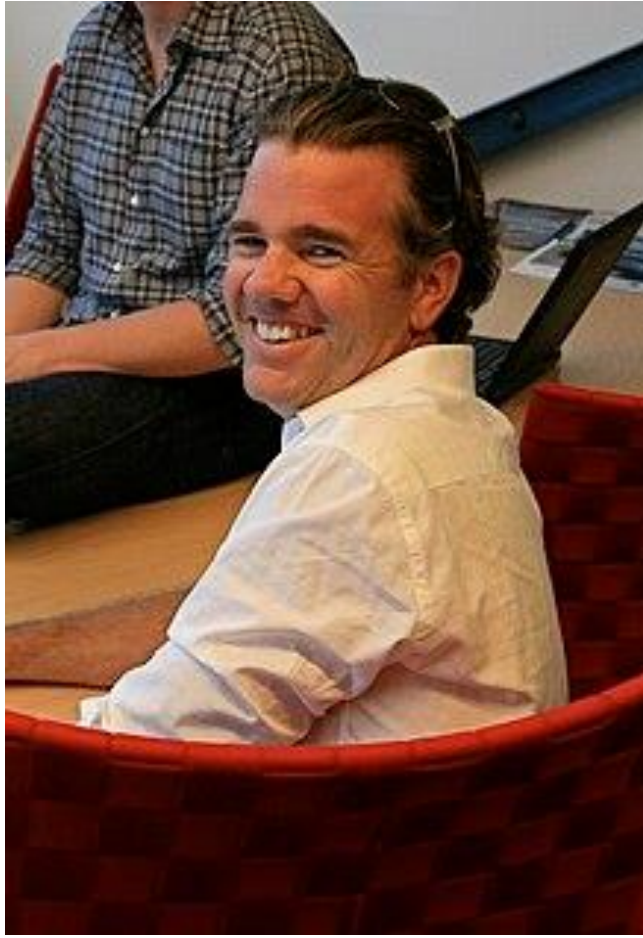
Holzhausen in 2008
https://en.wikipedia.org/wiki/Franz_von_Holzhausen

To understand Tesla's design process, we thought that we would have to focus on the designers itself which is why we started research on one of their main designers. His name is Franz von Holzhausen. He has overseen design at Tesla, and he led the designs for Tesla model S, Model 3, Model X, Model Y, Semi, Cybertruck and Tesla Roadster. He previously worked at Mazda where he was chief of design where he led many successful designs and a concept car (created by him) debuted at the 2006 North American International Auto Show. All these facts show that in Tesla, the designs are unique and created by designers who have had a lot of work experience which is how they must be very successful.

How we studied Tesla and its design process

"Possibly the most common error of a smart engineer is to optimise a thing that should not exist." - Elon Musk

Make the Requirements Less Dumb

Delete the Part or Process

Simplify or Optimise the Design

Accelerate Cycle Time

Automate

MUSK'S 5 STEP DESIGN PROCESS | *Elon Musk*

MODELTHINKERS.com

The design process created by Elon Musk Is a lot different in comparison to a normal one. As you can see in the image, there are 5 different steps.

Firstly, it is to make the requirements less dumb. Musk tells us that "your requirements are definitely dumb; it does not matter who gave them to you" and from this, he is trying to tell us to question the question. He uses this step to test different assumptions.

Secondly, delete the part or process. As of Musk " If you're not adding things back at least 10% of the time, you're clearly not deleting enough" and he suggests this so you can start lean and build up only when it is required to do so.

Three, Simplify or optimise the design. He explains that "Possibly the most common error of a smart engineer is to optimise a thing that should not exist" which is telling us to work through the first two steps and if it works well, optimise the plan

Then, accelerate cycle time. In this, he is basically warning us that it will be problematic if you point your efforts in the wrong direction, saying "if you're digging your grave, don't dig faster" which is a very helpful quote to understand this step in the design process

Finally, Automate. As this is the final step, do not go ahead of yourself with this steps. He relates the story of narrowing down a robotic process to build the battery mats in the Tesla Model 3. He says that he spent way too much time and effort on the mat until a person asked him what the mat was for. Turns out that it had been created to reduce sound but was no longer required and this shows us that we save the longest steps for last

Design Process
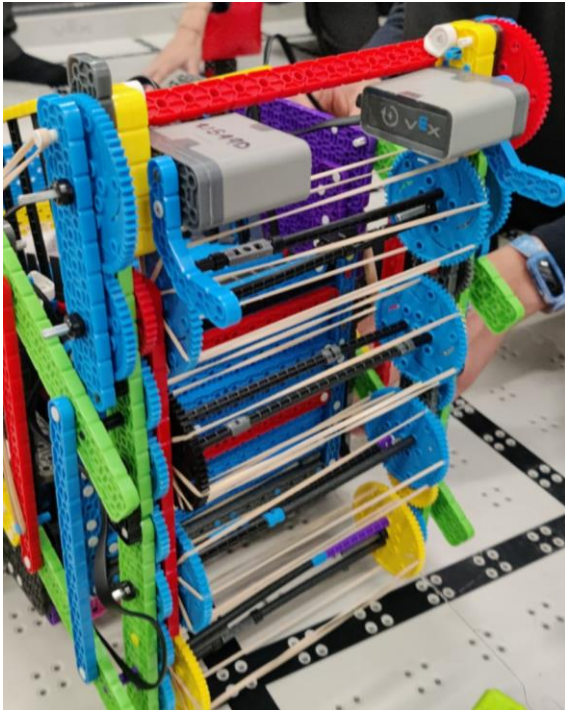
21549D's Old Intake
Very heavy and inefficient
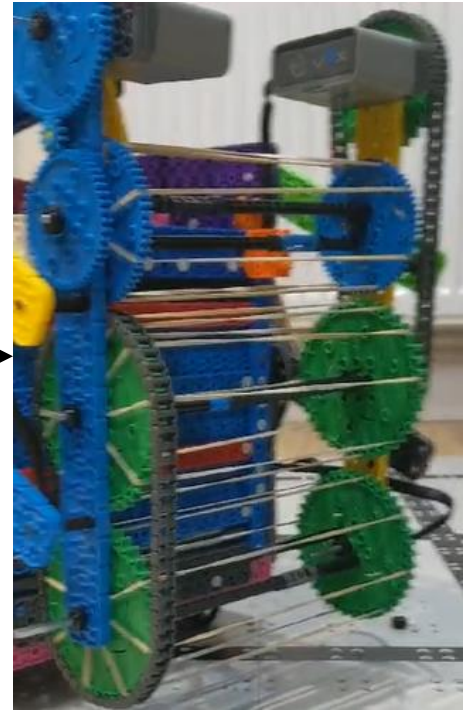
21549D's New Intake
Quite Light and efficient
We removed extra gears

Our team, PowerSurge, tries to question all the different design ideas mentioned by team members and the one with the most pros and least cons would get chosen to prototype. After that, we usually remove excess parts which may make our bot slower or less efficient in other ways and if the removal of excess parts work successfully, we optimise and advance on our idea and then usually we try to practice as much as we can. Elon Musk's design process is very helpful for VEX designs.
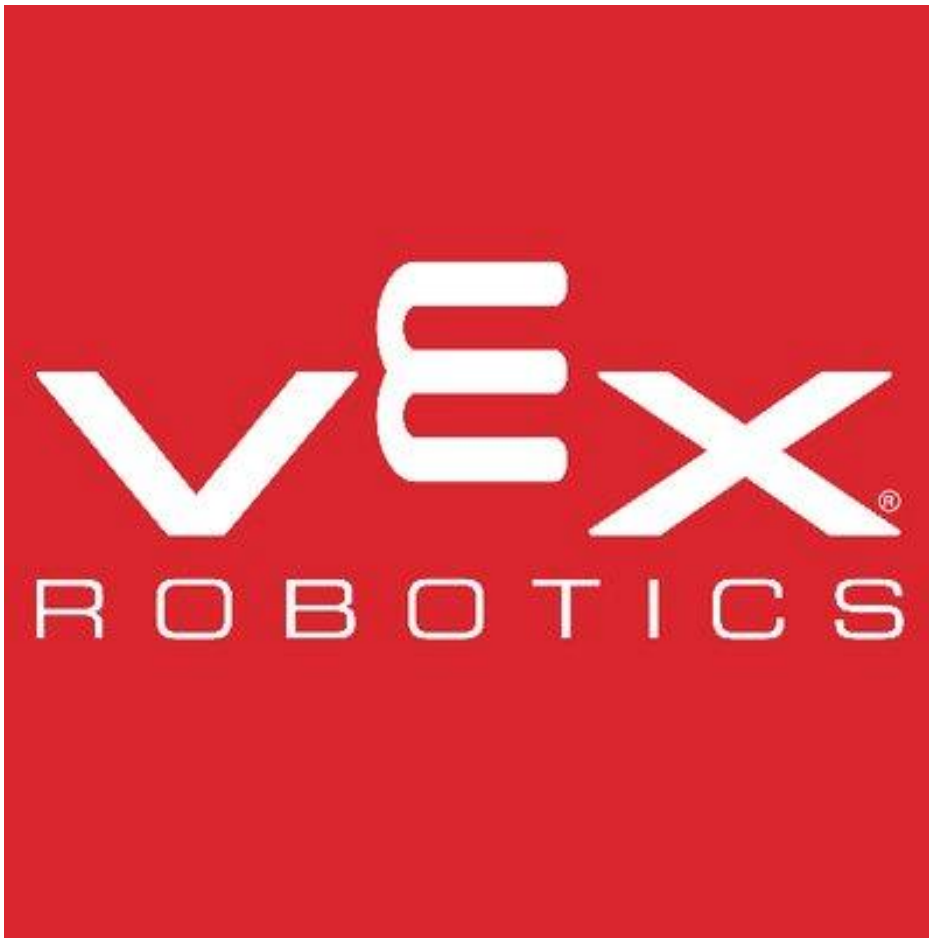
VEX prepares us for a future STEM career as it teaches us how to work under pressure as when you are at nationals or worlds, every single match you play will be worth a lot so if you are in that situation, you must be able to withstand the pressure and VEX makes many opportunities for you to do so. We also learn a good amount of coding which can also open many different job opportunities in the future. This is why I believe that VEX prepares us for the future and our careers.

How does participation in VEX prepare us for a future career

[Model Thinkers](#)

[Tesla Designer](#)

[VEX Robotics](#)

[Telsa Wikipedia](#)