5327A in Tesla's Footsteps

VRC High School - Career Readiness Online Challenge

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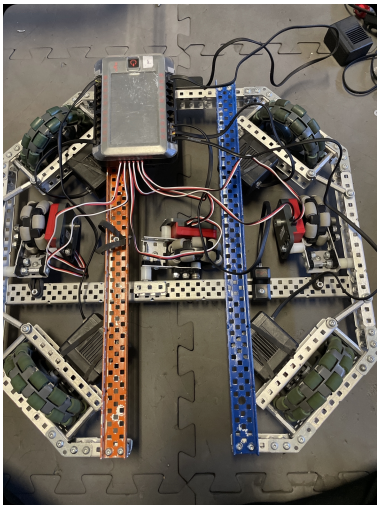
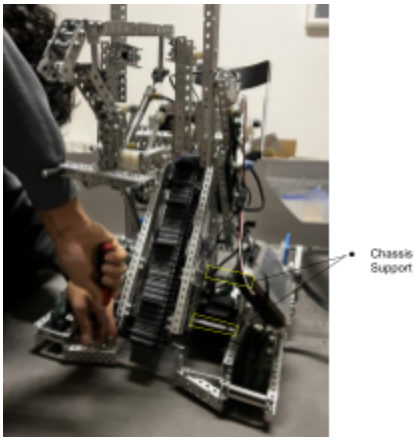
In a popular market with lots of competitors, the key factor to keep in mind is efficiency. 18 years ago, a small startup with the name Tesla embarked on their journey with a particular goal in mind, to create a powerful, efficient car unlike any other. And as we watched the brand

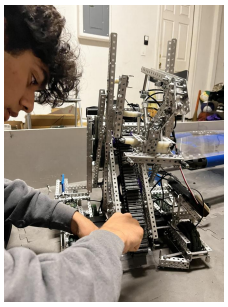


new reveal of Tipping Point on our cellphones, we all knew efficiency was key – that efficiency is what will triumph and set us apart. Our design process paralleled that of Tesla's, and our goals resonated with Tesla's mission to create effective, minimalistic electric cars. We wanted to create a simple, compact robot by design but a dynamic and robust one in performance. Moreover, Tesla innovates from a physics standpoint, and part of what lies at the base of our robot's design is potent science. We used classical mechanics to our advantage when it came to building our robot, a true engineering approach to evaluate from first principles. To learn about Tesla's utility of the engineering design process, we pulled information from interviews and presentations with Franz von Holzhausen, Tesla's head designer.

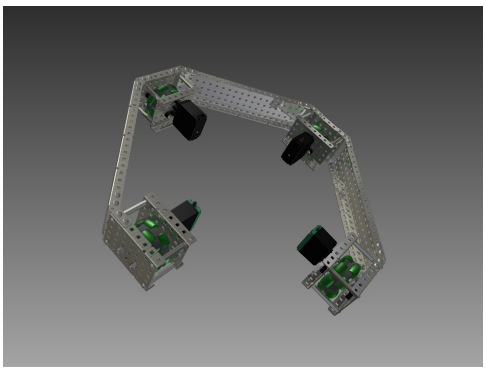
Essentially, creative collaboration rests at the very core of Tesla's design process, with the first step of defining the problem and researching constituting a creative discussion. In this discussion, Tesla reaches out to experts from different departments and industries in motive to clearly outline the design challenge. Similarly, our team came together in an analogous fashion with an incentive to understand, reaching outwards and towards the past for learning experiences. Our team conducted analyses on the last

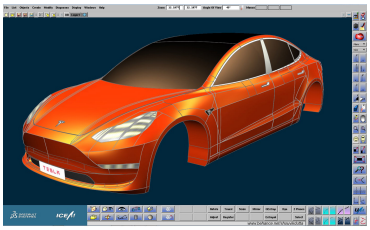


ten seasons of VEX Robotics, gaining an understanding of what made certain teams great and what exactly led to a team's pitfalls. Like Tesla engineers reached out to experts from different industries for an understanding, our team gained a collective understanding through taking inspiration from reveals of other robots as well as mentors who have done VEX Robotics in the past.



We transitioned into our next phase of brainstorming. what Tesla calls "Ideating", layering idea upon idea to build a greater solution. What builds the bridge between a sketch on paper to a tangible automobile is the use of AutoDesk Alias. Autodesk Alias is used as a method of trial and error in the Tesla workspace as designers will tend to run computer simulations on theorized systems. Our team correlated this as we built our first designs of our robot on Fusion 360, outlining the different bases we wanted to use as well as a rough outline of the subsystems we desired in our robot. However, instead of running computer simulations, we bridged the gap of theory to reality through building the physical robot and testing it constantly, where we would 'ideate' through examination. As Tesla approaches closer to a physical prototype, they begin planning their next phase: Beta Testing.

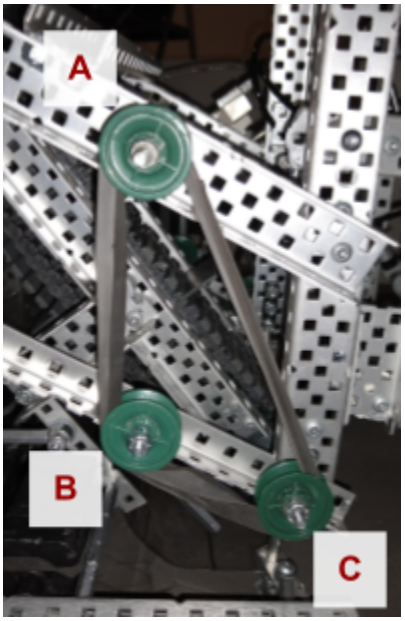




Tesla's third phase of the Engineering Process involves running the vehicle through a gauntlet of tests such as crash and safety and speed and efficiency, which is analogous to our own method of testing

in our own game field. After receiving an adequate crash test score, Tesla starts conducting its beta testing, acquiring a diverse field of drivers to drive the car on public roads and test for functionality. From the beta testing, Tesla is able to grasp an awareness of its improvements to UX usability. Similarly, our team parallels Tesla's beta testing through our tournaments, a learning opportunity to build a greater, more powerful robot. Tesla surveys its consumers and testers whereas we rigorously took notes at our tournaments of compelling designs of other times, our own pitfalls, and what we can do better next time. Thus, we cycle back to the game field, building our robot piece by piece and going back to the fundamentals of the robot through Fusion 360.

Tesla is a strong advocate for the Toilet Method in Product & UX design, a matter of marrying simplicity and effectiveness. The Toilet. To flush, the easiest mechanism for use would be a button or a lever to push. The effectiveness of a toilet arises from the use of siphons and atmospheric pressure rather than power and pipes. The 'glue' as Tesla calls it is the combination of intricate elements between the best solution and simplest solution, the pulleys, the engines, the logic gates. This is efficiency, exactly what our team was geared towards from the beginning, designing a simple, efficient robot. We've used the toilet method in multiple instances in our Tipping Point journey, an example of which being to reinforce the strength of our mogo frontal intake lift in order to prevent slipping gears when picking up mogos. The simplest solution involved the use of rubber bands. The best solution involved adding some sort of crossbar or attachment across



our c-channels of our 4-bar lift in order to reinforce strength. Our marriage of the two was the concept of triangle banding.

On a surface level, our robotics path is similar to a UX design sprint for companies like Google and Microsoft, a testament to getting us ready for future careers. However, this path has provided more than just readiness for a corporate job. If anything, VEX Robotics has developed a persistence within us, an undying curiosity, a curiosity to question everything, the why behind every design, every idea. VEX Robotics has shown us that there's always more than one solution and if you keep at it long enough, a greater solution will arise. It stressed the importance of community, how important trust is in a team, how working hard becomes a more meaningful experience when one works with others alongside them. For future projects beyond high school, VEX Robotics has given us valuable teamwork experience. We came into this program bug-eyed, curious, and a little scared, but together, we've all emerged as scientists, engineers, artists, and leaders. VEX Robotics has made dreamers, something the STEM industry and the world needs more of to push the barriers of innovation.

Credits

https://www.mygreatlearning.com/blog/teslas-design-thinking-approach-how-design-thinking-worked-for-tesla/

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