

# 137650

**Tesla is making history in the automotive industry with its innovative electric vehicles. The company's advanced technology is opening up new possibilities for automotive engineers and revolutionizing the way we think about transportation. Today, we'll go behind the scenes to find out more about Tesla's design process and how it is leading the charge in the industry. Tesla is renowned for its pioneering and highly advanced electric vehicles. This success can be attributed to its implementation of the engineering design process, a methodical way of problem-solving and product creation.**

## **TEAM 137650- MTS ONYX**

### ***Tesla's Use of the Engineering Design Process Leads to Success in Developing Innovative Electric Vehicles***

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## Why Tesla?

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As a group who specialize in engineering and invention, we elected to research Tesla due to its trailblazing technology and ground-breaking approach to product development. We were eager to learn more about the company's design process and how it has helped it to thrive in the automotive industry. Moreover, Tesla's concentration on sustainability and renewable energy is compatible with our personal values and interests as a group, making it an even more fascinating subject to study.





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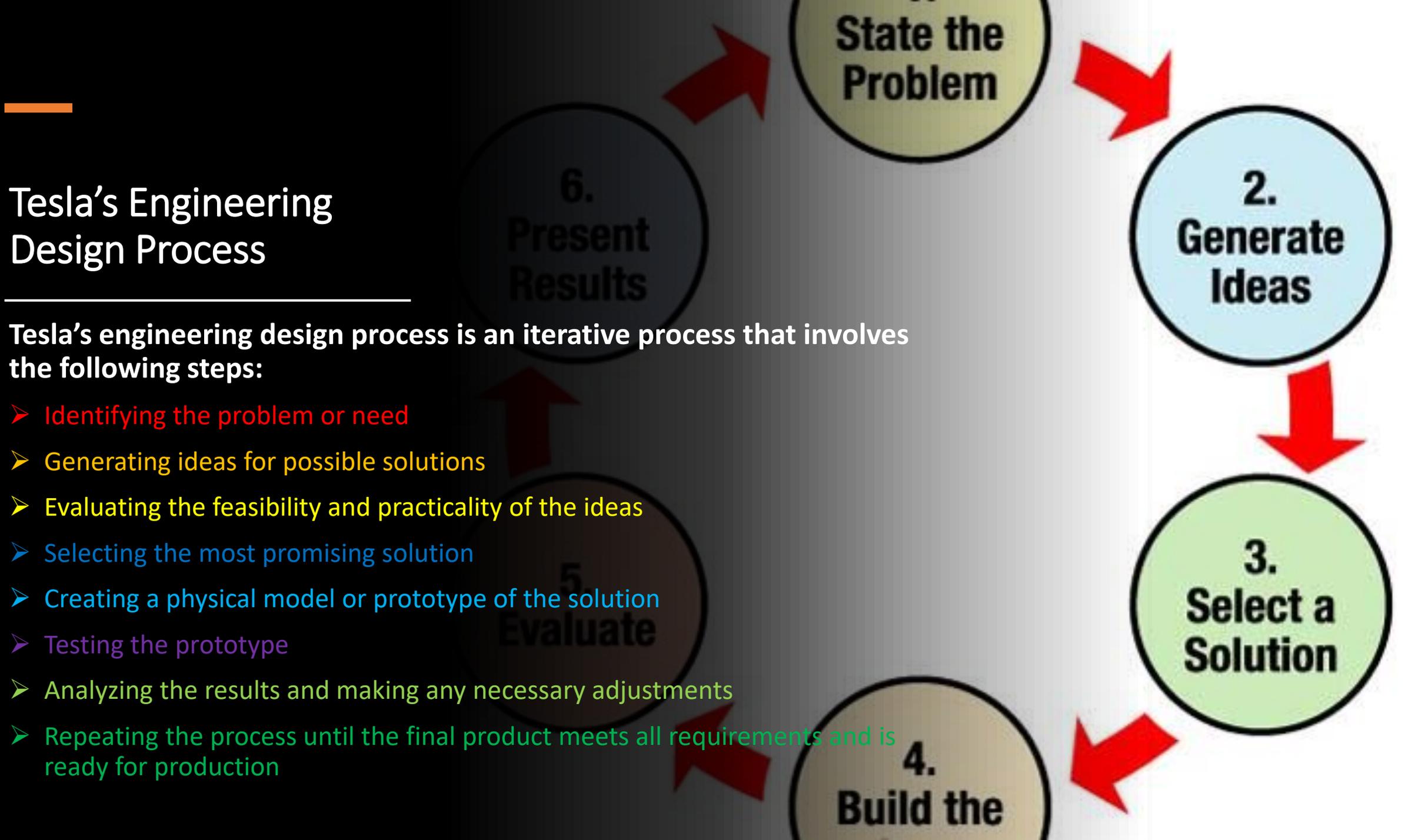


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# Tesla's Engineering Design Process

Tesla's engineering design process is an iterative process that involves the following steps:

- Identifying the problem or need
- Generating ideas for possible solutions
- Evaluating the feasibility and practicality of the ideas
- Selecting the most promising solution
- Creating a physical model or prototype of the solution
- Testing the prototype
- Analyzing the results and making any necessary adjustments
- Repeating the process until the final product meets all requirements and is ready for production



# How 13765C Implements This

Fig 1.1

- Identifying the problem or need
- Generating ideas for possible solutions
- Evaluating the feasibility and practicality of the ideas

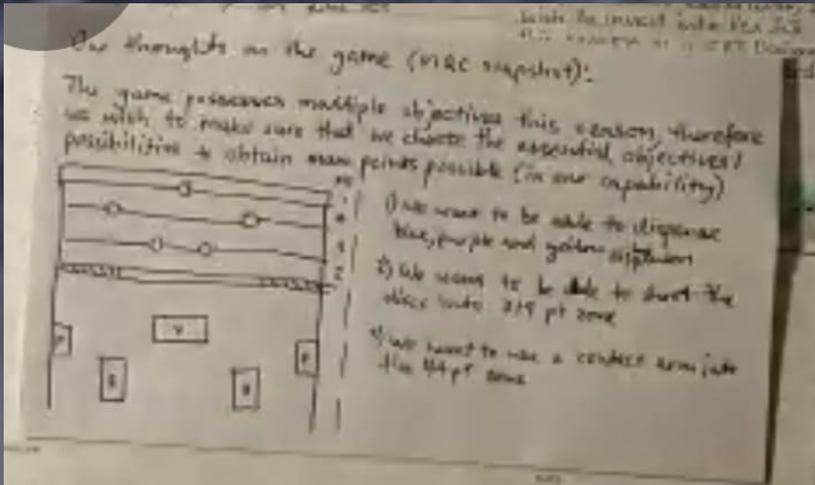


Fig 2.1

- Selecting the most promising solution
- Creating a physical model or prototype of the solution

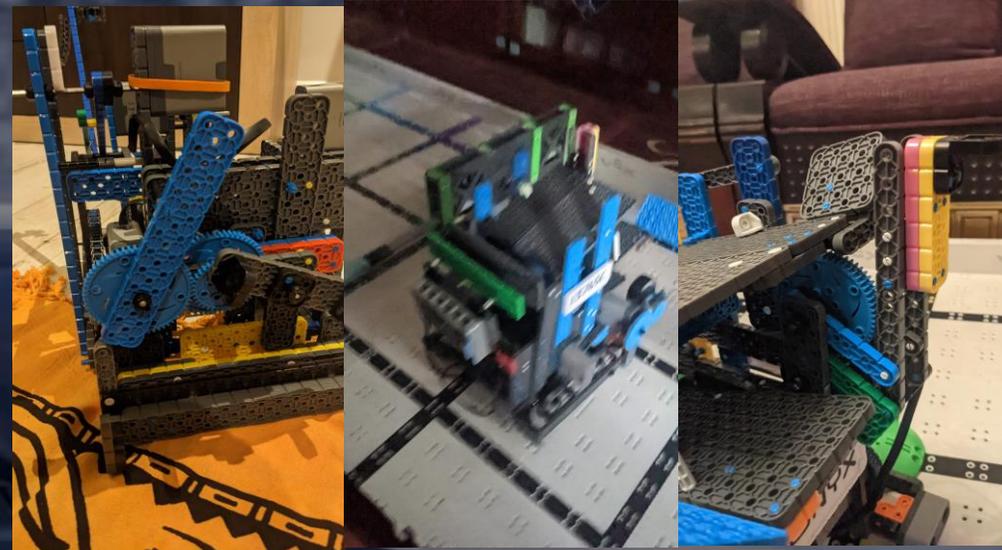
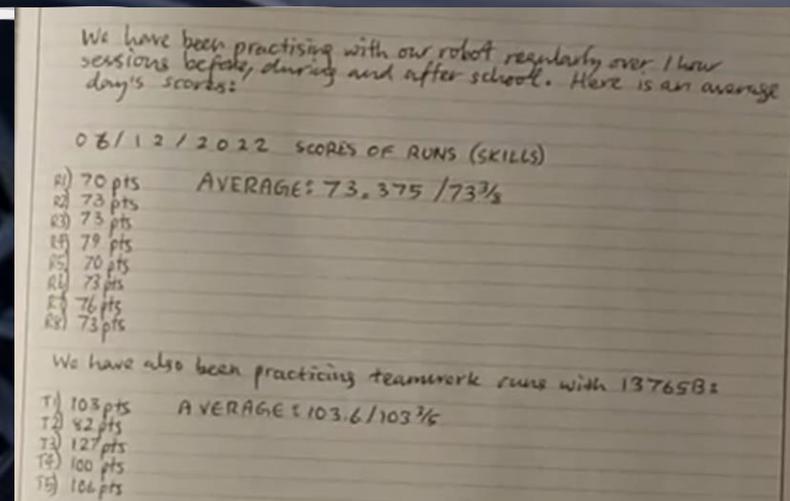
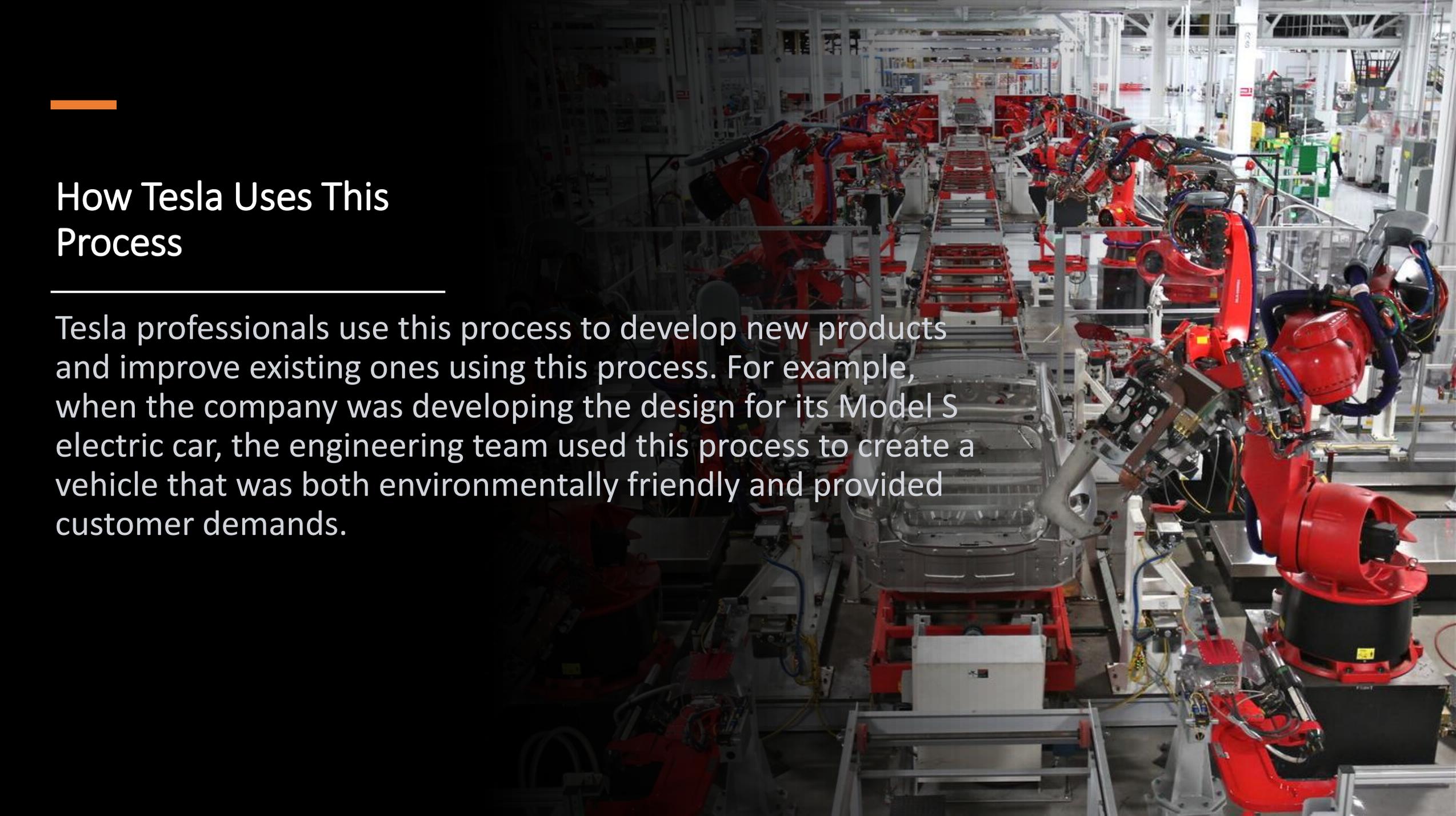


Fig 3.1

- Analyzing the results and making any necessary adjustments
- Repeating the process until the final product meets all requirements and is ready for production

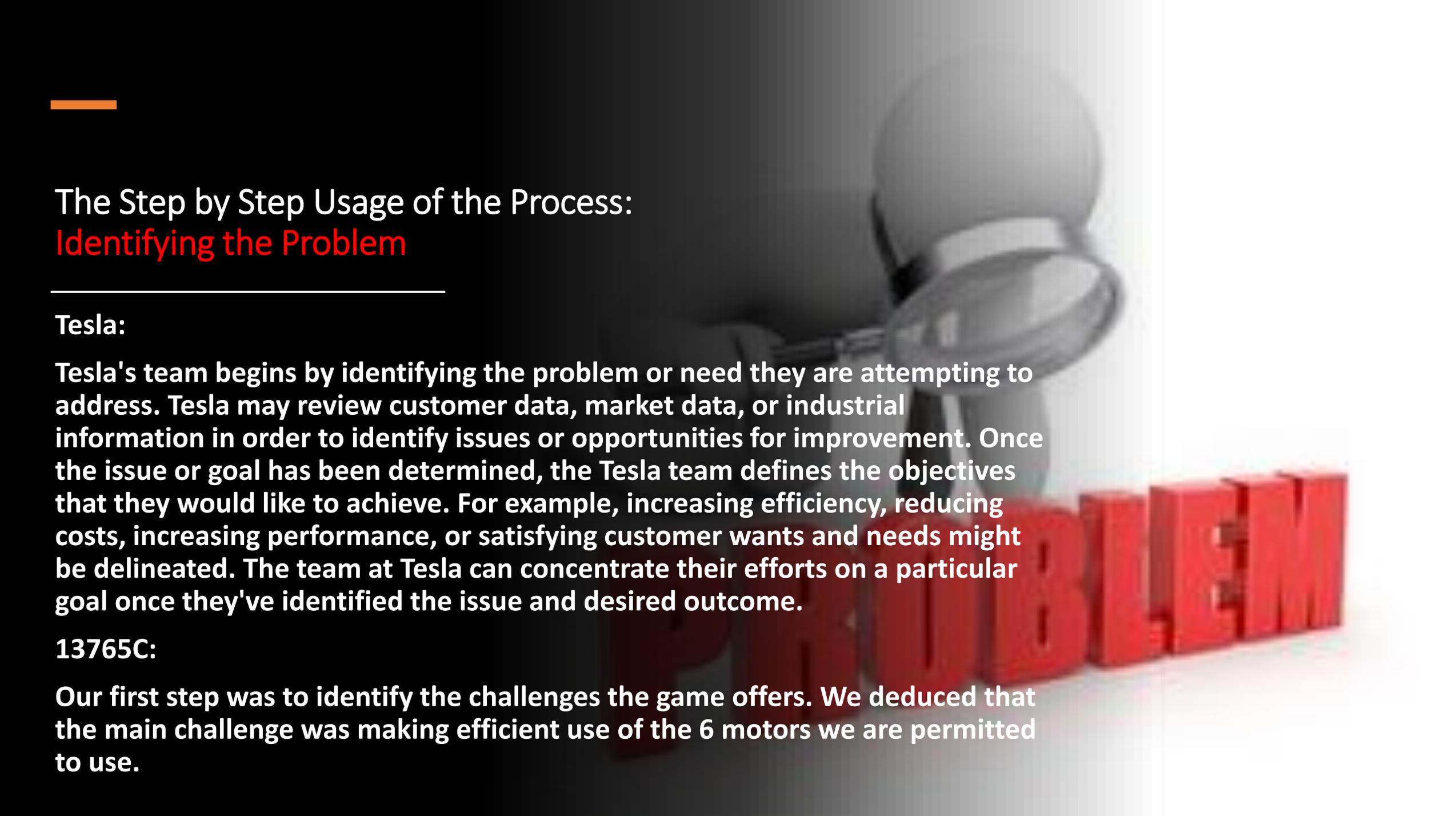


A photograph of a Tesla factory assembly line. The scene is filled with numerous red robotic arms (likely KUKA or similar) positioned along a long conveyor belt. The conveyor belt is carrying several car chassis, with one in the foreground being particularly prominent. The factory floor is industrial, with various pipes, cables, and structural elements visible. The lighting is bright, typical of a large manufacturing facility. The overall impression is one of a highly automated and organized production environment.

## How Tesla Uses This Process

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Tesla professionals use this process to develop new products and improve existing ones using this process. For example, when the company was developing the design for its Model S electric car, the engineering team used this process to create a vehicle that was both environmentally friendly and provided customer demands.

A hand holding a magnifying glass over the word 'PROBLEM' in large red 3D letters. The background is a dark, blurred image of a hand holding a magnifying glass over the word 'PROBLEM' in large red 3D letters.

## The Step by Step Usage of the Process: **Identifying the Problem**

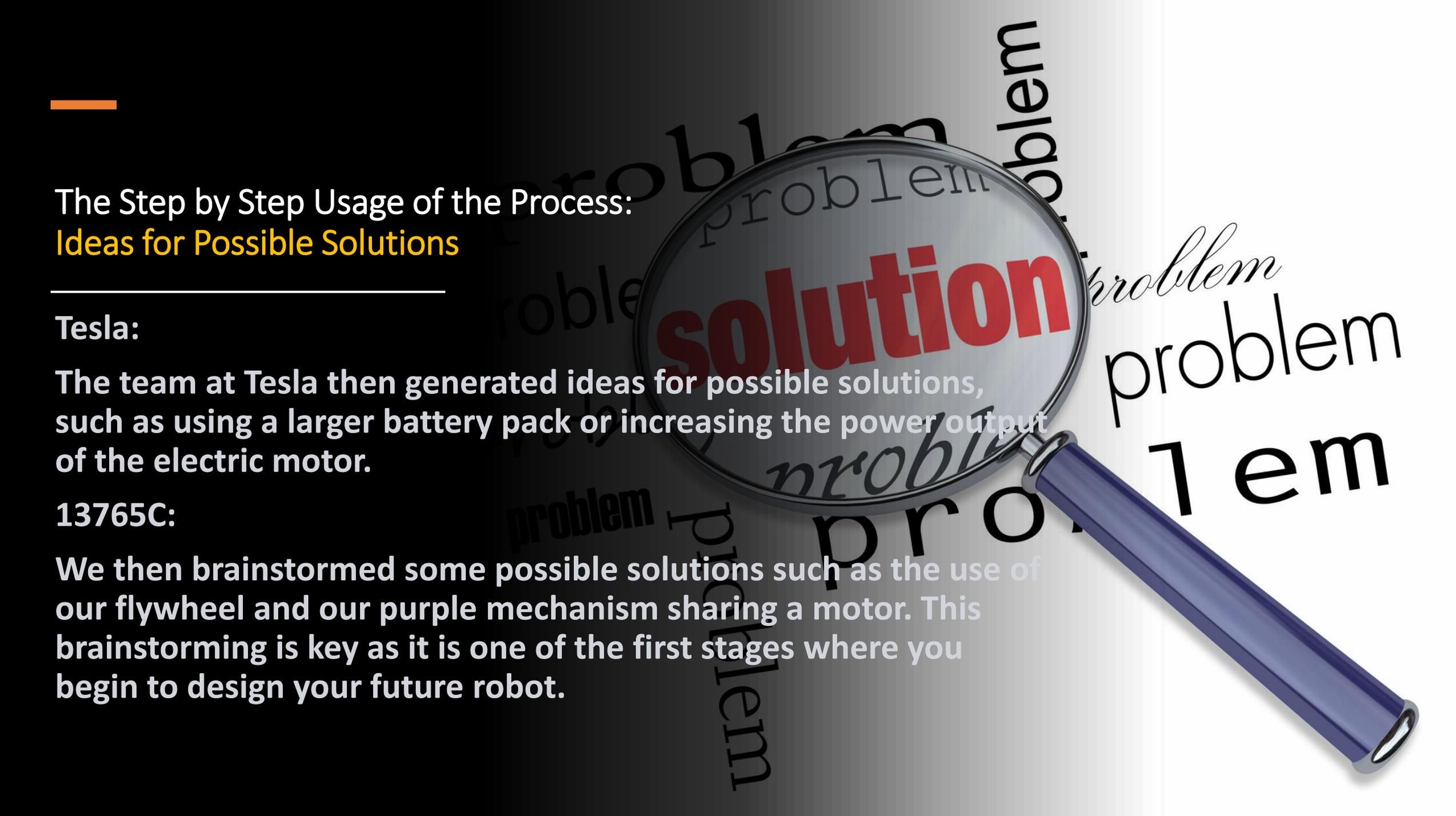
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**Tesla:**

Tesla's team begins by identifying the problem or need they are attempting to address. Tesla may review customer data, market data, or industrial information in order to identify issues or opportunities for improvement. Once the issue or goal has been determined, the Tesla team defines the objectives that they would like to achieve. For example, increasing efficiency, reducing costs, increasing performance, or satisfying customer wants and needs might be delineated. The team at Tesla can concentrate their efforts on a particular goal once they've identified the issue and desired outcome.

**13765C:**

Our first step was to identify the challenges the game offers. We deduced that the main challenge was making efficient use of the 6 motors we are permitted to use.

A magnifying glass with a blue handle is positioned over the word "solution" in red, bold, sans-serif font. The word "solution" is centered within the lens of the magnifying glass. The background is white with the word "problem" repeated multiple times in various fonts and colors (black, grey, blue) and orientations, creating a collage effect. An orange horizontal bar is located at the top left of the page.

## The Step by Step Usage of the Process: Ideas for Possible Solutions

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Tesla:

The team at Tesla then generated ideas for possible solutions, such as using a larger battery pack or increasing the power output of the electric motor.

13765C:

We then brainstormed some possible solutions such as the use of our flywheel and our purple mechanism sharing a motor. This brainstorming is key as it is one of the first stages where you begin to design your future robot.



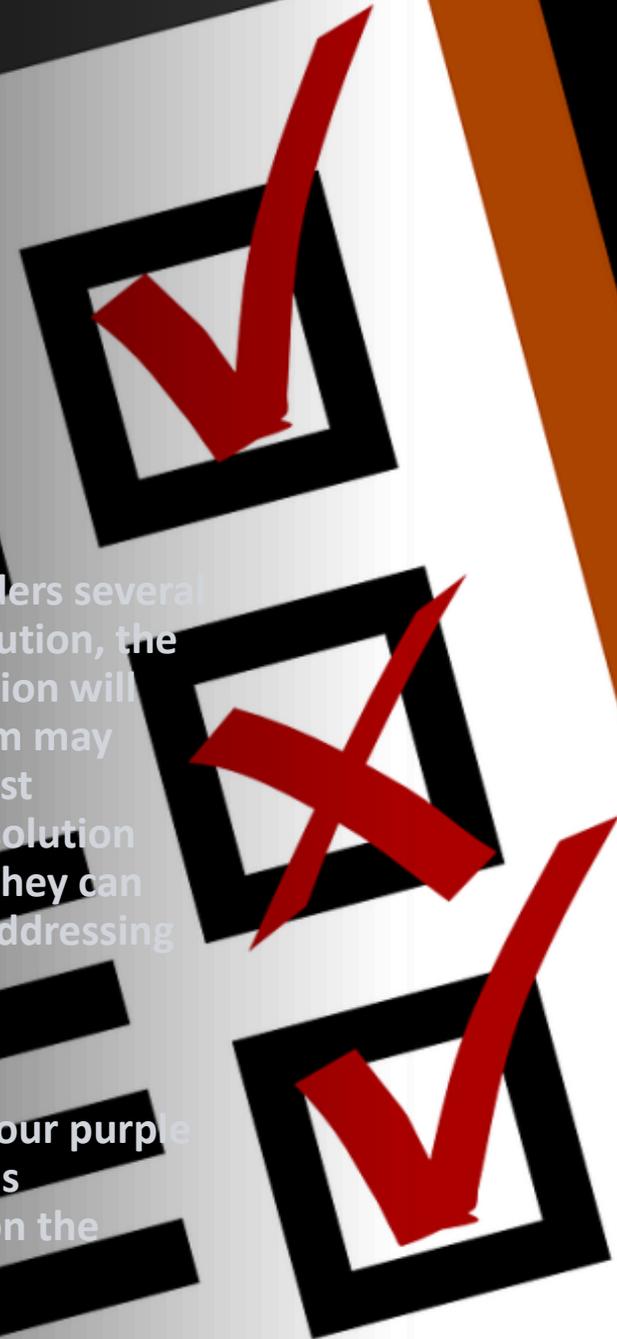
## The Step by Step Usage of the Process: Selecting the most promising solution

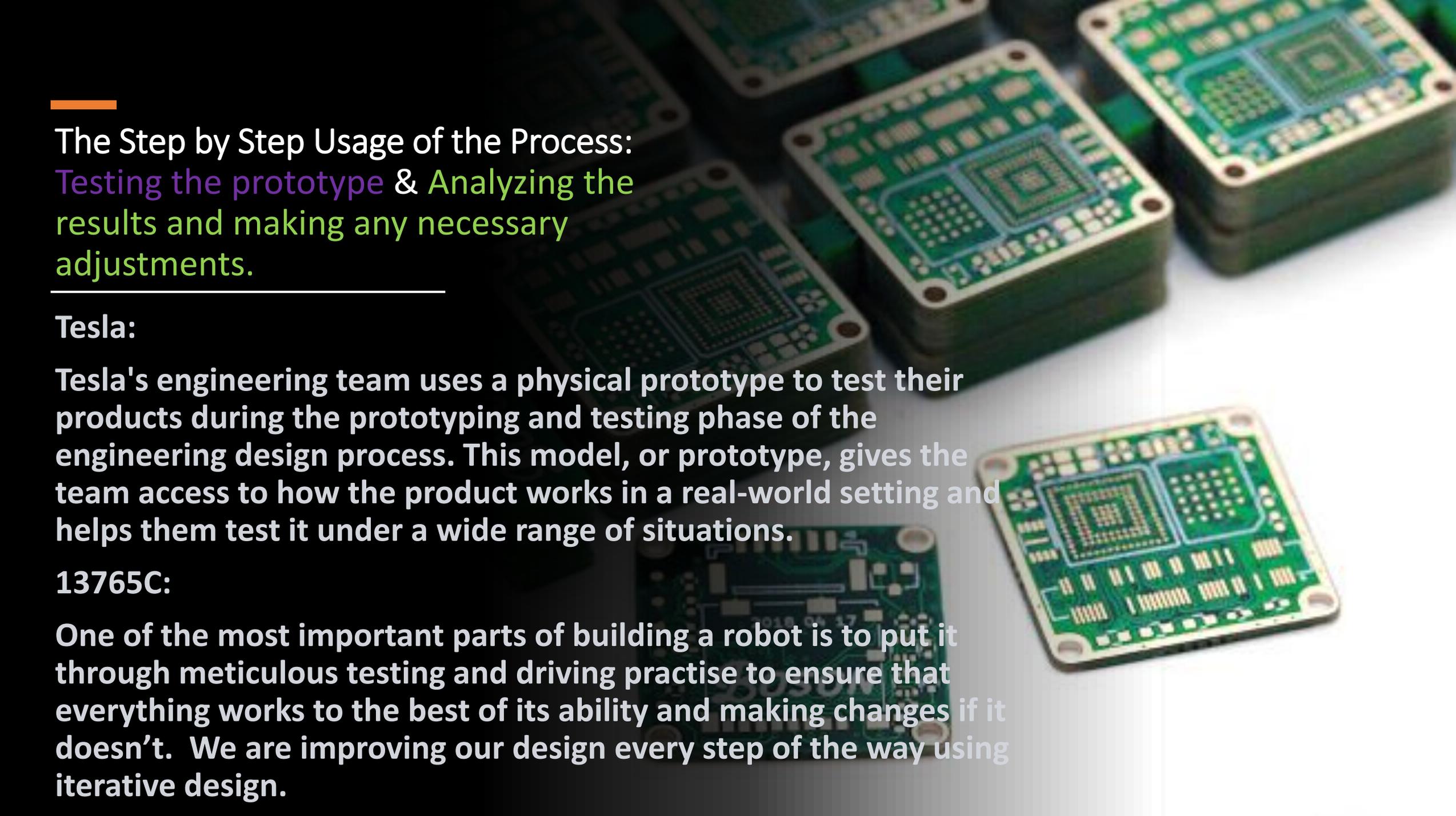
Tesla:

When evaluating possible solutions to a problem or need at Tesla, the team considers several factors. These might include the cost and resources required to implement the solution, the potential obstacles or limitations that may arise, and the potential effect the solution will have on the final product. To choose the most advantageous option, the Tesla team may utilise cost-benefit analyses and decision-matrix analyses. The selection of the most beneficial option is made by weighing the advantages and disadvantages of each solution and selecting the one that has the greatest potential for success. This guarantees they can move forward with confidence, satisfied that they've made the correct choice in addressing the problem or requirement they desire.

13765C:

After days of building many different implementations of motor sharing between our purple mechanism and flywheel, we decided our one that we would put on our robot. It is important to do this so that you don't have any surprises once it is implemented on the robot.





The Step by Step Usage of the Process:  
Testing the prototype & Analyzing the results and making any necessary adjustments.

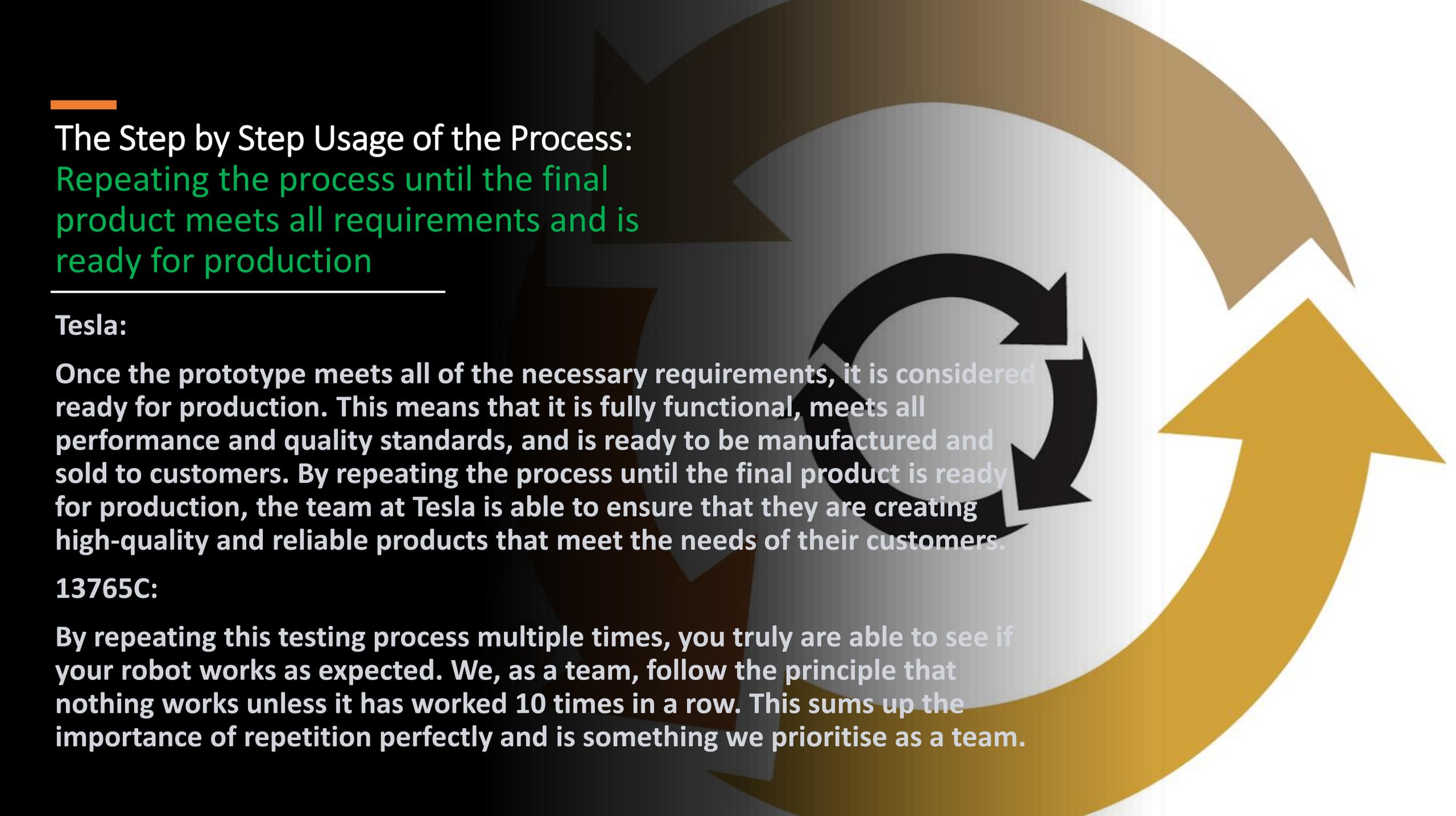
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**Tesla:**

Tesla's engineering team uses a physical prototype to test their products during the prototyping and testing phase of the engineering design process. This model, or prototype, gives the team access to how the product works in a real-world setting and helps them test it under a wide range of situations.

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One of the most important parts of building a robot is to put it through meticulous testing and driving practise to ensure that everything works to the best of its ability and making changes if it doesn't. We are improving our design every step of the way using iterative design.



**The Step by Step Usage of the Process:**  
Repeating the process until the final product meets all requirements and is ready for production

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**Tesla:**

Once the prototype meets all of the necessary requirements, it is considered ready for production. This means that it is fully functional, meets all performance and quality standards, and is ready to be manufactured and sold to customers. By repeating the process until the final product is ready for production, the team at Tesla is able to ensure that they are creating high-quality and reliable products that meet the needs of their customers.

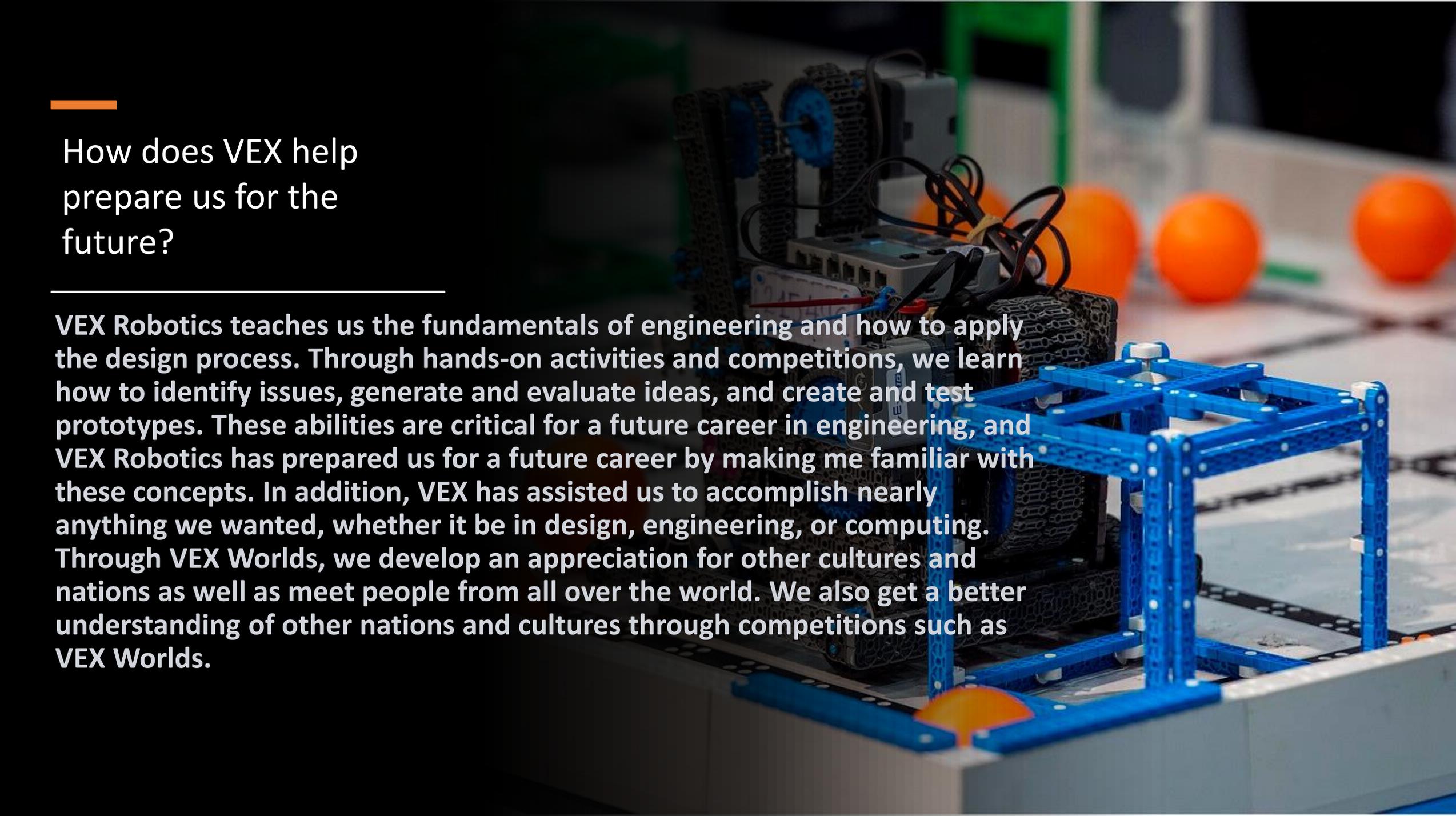
**13765C:**

By repeating this testing process multiple times, you truly are able to see if your robot works as expected. We, as a team, follow the principle that nothing works unless it has worked 10 times in a row. This sums up the importance of repetition perfectly and is something we prioritise as a team.



**When something is  
important enough  
you do it even if  
the odds are not in  
your favor**

**- Elon Musk**

A close-up photograph of a VEX Robotics robot. The robot is primarily white with a prominent blue frame structure. It features several orange spherical sensors or lights. The background is blurred, showing other parts of the robot and a green structure.

How does VEX help  
prepare us for the  
future?

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**VEX Robotics teaches us the fundamentals of engineering and how to apply the design process. Through hands-on activities and competitions, we learn how to identify issues, generate and evaluate ideas, and create and test prototypes. These abilities are critical for a future career in engineering, and VEX Robotics has prepared us for a future career by making me familiar with these concepts. In addition, VEX has assisted us to accomplish nearly anything we wanted, whether it be in design, engineering, or computing. Through VEX Worlds, we develop an appreciation for other cultures and nations as well as meet people from all over the world. We also get a better understanding of other nations and cultures through competitions such as VEX Worlds.**