

# **VEX VRC 2022-2023**

## **Reverse Engineering Online Challenge**

### **Summary Report**



**Gael Force Assassins**  
**5327A**  
**Dublin, California, United States**

By: Rushil, Jayden

# Table of Contents

	Entry	Page #
1.	Introduction	3
2.	Flowchart	4
3.	Disassembly	5-6
4.	Non-Electronic Components	7-8
5.	Electronic Components	8
6.	Conclusions	9
7.	References and Sources	10



# Introduction

## What is the Secura Belgian Waffle Maker?

The Secura Belgian Waffle Maker is a unique waffle toaster that has a variety of capabilities that optimize the waffle toasting experience. The toaster includes LEDs indicating whether the waffles are ready or not, a thermostat controlling the temperature of the waffles, and a spring-loaded locking mechanism.



## Flowchart

The first step we took was to indicate specific steps required to safely and efficiently disassemble the waffle maker.

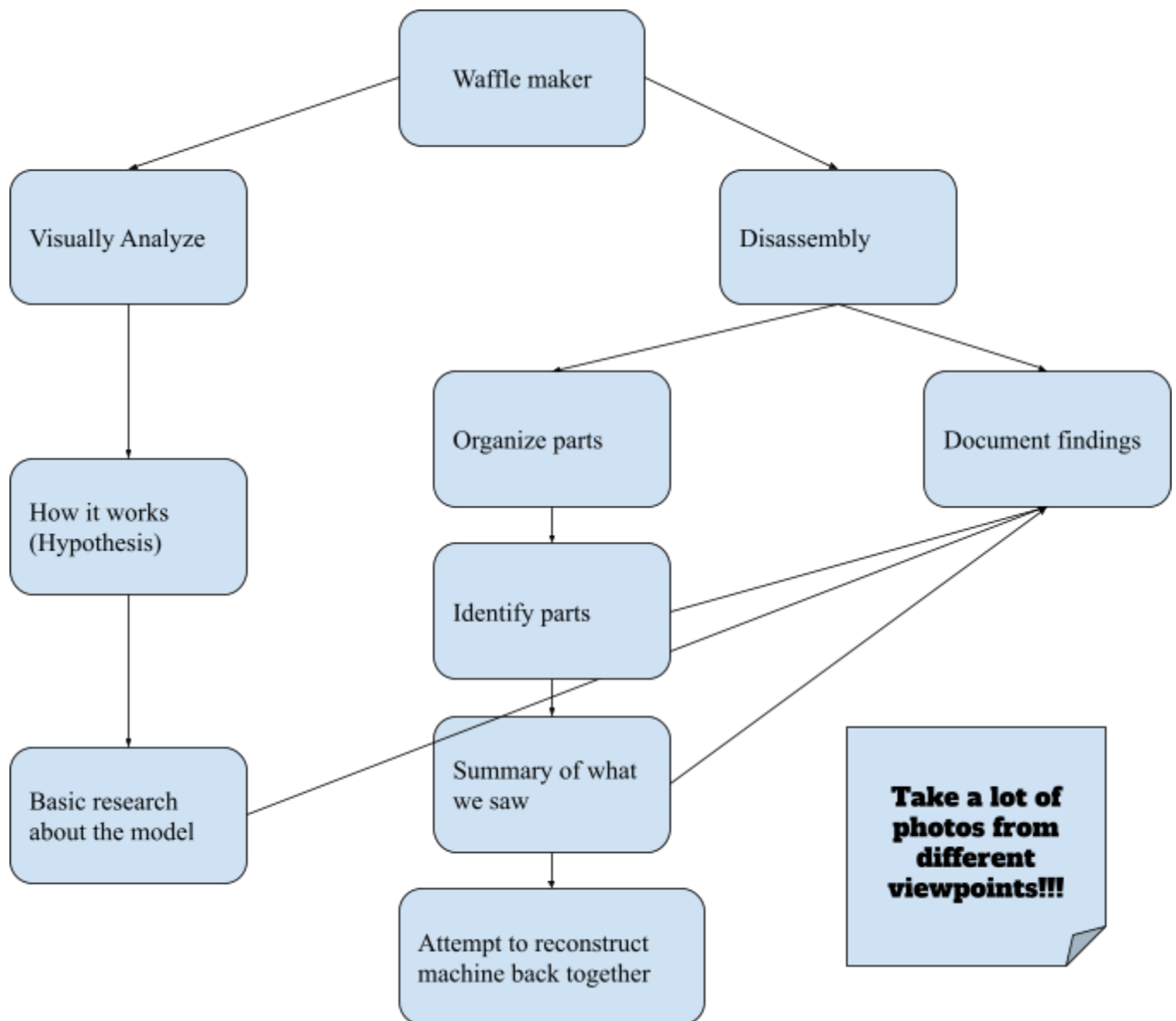




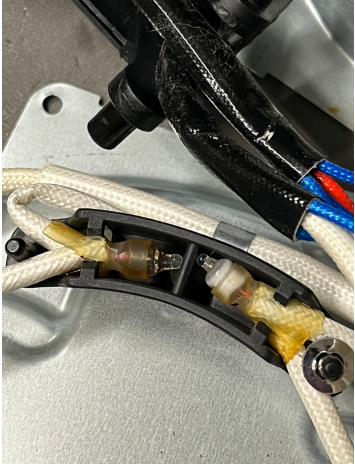


Figure 1. Flowchart of disassembly process

## Disassembly

## Materials:




- Phillips-head screwdriver
- Pliers
- Safety goggles

Name	Description	Picture
Unscrewed rotating stand	The first step involved removing the rotating stand from the rest of the waffle toaster.	
Removed wiring panels and waffle plate	Next, we removed the waffle plates from the toaster, which revealed the inner heating units.	

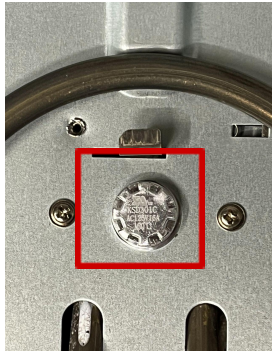
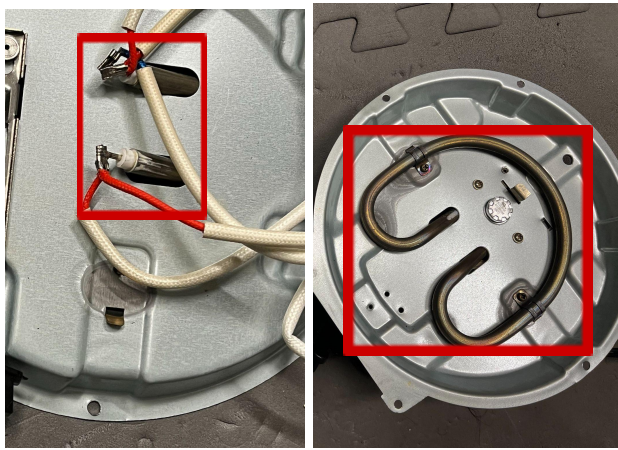
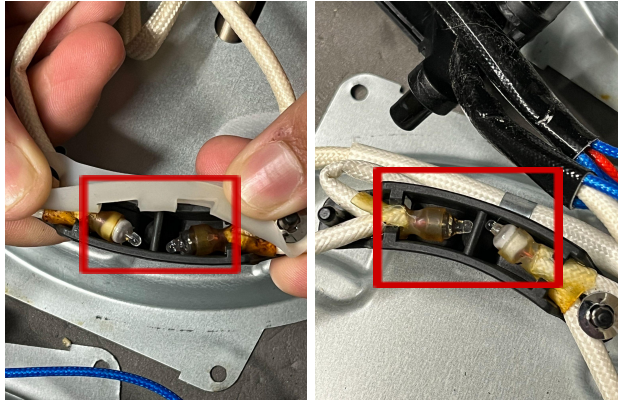
<p><b>Unscrewed LED panels</b></p>	<p>Then, we unscrewed the panels that hid the LED lights which indicated whether or not the waffles were completed or ready for consumption.</p>	
<p><b>Ball joint pried open</b></p>	<p>The final step was prying open the ball joint. Now, all of the wiring and electronic components of the waffle maker were visible.</p>	
<p><b>Complete disassembly</b></p>	<p>Completely disassembled, the parts included two waffle plates and two handles, along with two slots for the ball joint, a thermostat, and the heating unit.</p>	



## Non-Electric Components

Name	Description	Picture
Waffle plates and lid	The waffle batter is placed throughout this plate in order to distribute the waffle batter.	
Spring-loaded locking mechanism	This locking mechanism holds the toaster closed while in use. The toaster is unlocked when the spring is released.	
Ball joint	By revolving around this joint, waffle batter is dispersed throughout the waffle plate.	

# Electronic Components

Name	Description	Picture
<p>Uxcell KSD301 Temperature Control Switch Thermostat 150C N.C 250V 10A</p> <p><b>Data Sheet</b>  <a href="https://www.calcoelectric.com/images/pdfs_thermostats/calco_ksd301series.pdf">https://www.calcoelectric.com/images/pdfs_thermostats/calco_ksd301series.pdf</a></p>	<ul style="list-style-type: none"> <li>- A type of thermostat that regulates the temperature of the waffle machine</li> </ul>	
Waffle Iron	<ul style="list-style-type: none"> <li>- Conducts heat through direct connection of a series of wires</li> </ul>	
LED	<ul style="list-style-type: none"> <li>- 2 sets of 2 LED's on each side of the waffle maker.</li> <li>- One LED indicates the power is on, and the other indicates the waffle maker is warm enough to start baking</li> </ul>	



## **Conclusions/Findings**

As we disassembled the waffle maker, we soon realized that there were electronic components: a thermostat, LEDs, and wiring. While there were a lot of interesting mechanical components such as the spring-loaded dethatcher ball joint, the machine was just too simple to research. During the documentation process, we found that flowcharts are especially helpful in describing a certain process as a model rather than words. Overall, the waffle machine was a fun side challenge that developed our research, documentation and photo taking skills.

## Sources and References

1. <https://www.thesecura.com/product/secura-360-rotating-belgian-waffle-maker-w-removable-plates/> (Description about the product)
2. [https://www.calcoelectric.com/images/pdfs\\_thermostats/calco\\_ksd301series.pdf](https://www.calcoelectric.com/images/pdfs_thermostats/calco_ksd301series.pdf) (Description about the thermostat)
3. [https://ald.kitchen/products/p\\_ap595-he-heating-elements-replacement-parts-for-ap-595-waffle-iron?variant=41701885346024](https://ald.kitchen/products/p_ap595-he-heating-elements-replacement-parts-for-ap-595-waffle-iron?variant=41701885346024)  
(Explanation of waffle iron)