TOAST: THE ECO-FRIENDLY WAY

Product Design and Prototyping

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Sponsors: Greg Voorhies, Willard Branch
Advisor: Dr. John Parmigiani

BACKGROUND

- No toasters on the market are marketed specifically as eco-friendly.
- Two-slot toasters do not have independently operated slots. Resulting in wasted energy if only a single slot is filled.
- Cost cutting measures have resulted in the use of cheaper materials, resulting in shorter product life and more waste.

SPECIFICATIONS

Toaster Heats Air to a Certain Temperature	1100[°F]
Toaster Has Low Power Consumption	700 [W]
Toaster Has a Long Product Life	4000 cycles per slot

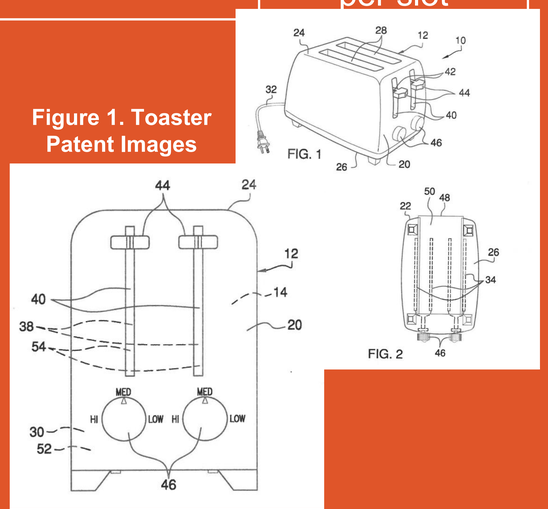

Figure 1. Toaster Patent Images

TEAM OVERVIEW

Our team consists of two mechanical engineering majors and two mechanical and manufacturing dual majors. This is the first project in a potential series of projects meant to bring the patent by the patent holder, Willard Branch, into a physical product.

OUR GOALS

Creating a functioning appliance is a far more challenging project than it first appeared. However, through perseverance and communication with our sponsor we were able to create a functional prototype that represents the combination of our vision and their patent.

By combining two existing single-slot toasters into a system as shown in figure 3, we created a functioning example of our sponsor's patent. This has been included in a form factor matching figure 2. The timer dials are mounted at the top of the toaster for easier use of the appliance.

MATERIALS

In order to meet the eco-friendly goals of our sponsors, it is essential that we choose the right materials. As can be seen in figure 4 and 5, materials make up the majority of lifetime energy consumption and the product's carbon footprint.

Therefore, our team has chosen to move forward with the use of bio-plastics for the external shell due to its reduced carbon footprint, and Nichrome wire for the heating elements as it features significant durability.

Figure 2. CAD Model of Prototype

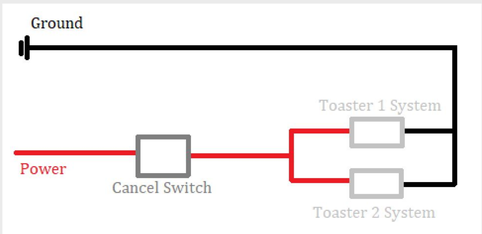

Figure 3. Diagram of Circuitry

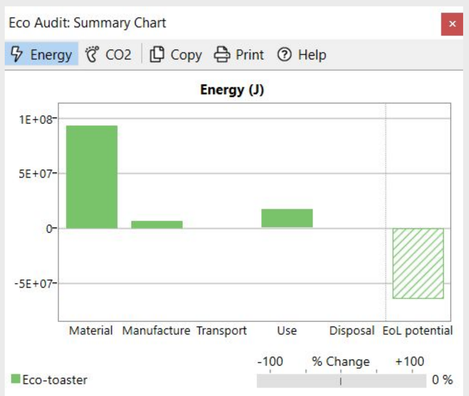

Figure 3. Eco-Audti Energy Consumption

PROJECT STATUS

- The current state of the project has involved two iterations of a prototype design, resulting in the current produced product.
- Materials have been selected for subsequent steps of the toaster production in order to continue meeting the eco-friendly goal.

NEXT STEPS

- Create a prototype with unique components to this design.
- Design a circuit board and determine necessary toaster functions. (Bagel, defrost, etc.)
- Determine specific manufacturing processes for components.

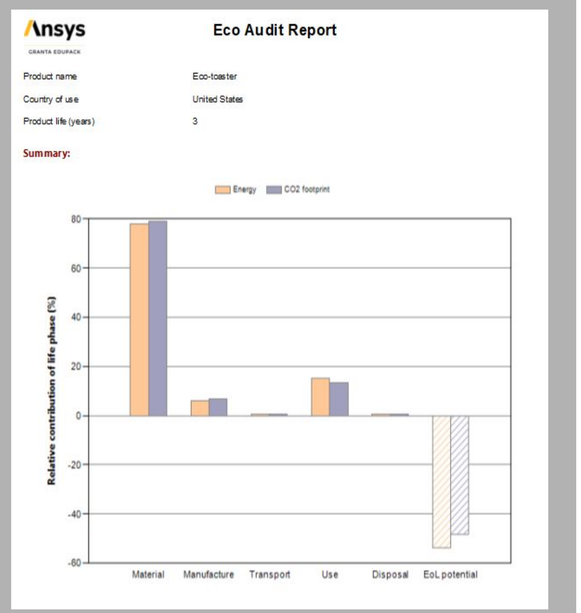

Figure 3. Eco-Audti CO2 Generation

Oregon State University