Chalk Glock: Convenient Chalk Writing Device

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Abstract

The majority of chalk pieces used at UCSB are discarded once they become 1 inch or less in length. Chalk often breaks or leaves unwanted residue on hands and clothing. The goal of this project was to design a convenient chalk writing device that solved these problems. The Chalk Glock surpasses these project goals while remaining more lightweight, easier to load and adjust, and more cost-efficient than existing chalk writing devices.

Research

Twenty-three lecturers from various departments were surveyed to determine the most common problems associated with chalk. This data prioritized design concerns and challenges for the Chalk Glock. Fortunately, all of these problems are minimized if not eliminated by our functioning prototype.

Design and Development

The Chalk Glock limits chalk dust when writing, increases ease of writing when chalk is short, and improves the chalk sticks' resistance to cracking. To prevent the chalk from sliding during the act of writing, an overhanging finger rest with a protruding tooth was developed to allow for a comfortable, yet effective way to apply pressure to the stick.

A guide slot was designed for a finger to slide the chalk down the housing, dispensing the chalk as desired. Chuck teeth surround the exposed chalk at the writing surface, securing the stick with an even and constant pressure.

Conclusion

The Chalk Glock is both simple and cost-effective. With proper marketing, this product can be sold to instructors and institutions at a low price, improving the chalk-using experience while reducing chalk waste. In summation, it accomplishes our goals, while proving that simplicity is often the best solution.

Testing and Analysis

FEA analysis was performed on our model to determine its overall strength and weakness areas. Under fixed-end conditions, the prototype did not fracture, despite the extensive 100 Newtons applied to the free end. The maximum displacement was 12 mm. The product will not undergo forces this large during use. Nonetheless, this testing proves the robustness of our design.

In a side-by-side comparison with a leading chalk writing device, the Chalk Glock proved to excel in chalk length efficiency, reload time, and overall simplicity.

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References