

Designing A Butt Collector by Computer Aided Design (CAD)

Arif Selim EREN

Abstract: The purpose of this study is to introduce a butt collector designed via CAD. With this aim the literature is reviewed and the originality of the product is verified. Then, the author made pencil sketching and these sketches are turned into a CAD model. This is an initial design of an industrial product. As the software, SOLIDWORKS is used. The figures demonstrate the design and some implications for further research are provided.

Keywords: Butt Collector, CAD, Design

I. INTRODUCTION

For public areas it is a big problem to keep the area to sustain clean. Many people are using these places and drop litter to the ground. For bigger items it is easier to collect but for cigarette butts and sunflower husks. The idea came up with an interview to a cleaner. He complained about the difficulty of collecting these items. Then, the author thought there should be an innovative way of doing so. After that, he started some pencil sketching and this initial product is constituted. The future of production management is reported to be adhered to CAD (Gökçearsan, 2017: 135). So, researchers must design their sketches for faster mass production. The time elapsed to put something in the market is shortening and the rivalry is increasing day by day. In short, this study includes the stages of design and some implications for future research.

II. LITERATURE REVIEW

There is a big sum of literature on CAD and 3D design. As the present study aims to introduce a new design, it focused on this part of the literature. Former studies provided a strong basis for the present one. Their methodology, findings and implications are covered. The results are presented below; First of all the most relevant study is conducted by Kadir and Mohajerani, 2012: 313). They compared the physical properties of cigarette butts and fired clay bricks. Their study showed that cigarette butt contains more harmful ingredients. This finding is essential for the present study as it depicts the importance of butt collection.

Secondly, Varol et al. (2005: 47) conducted a study on development of a piece in CAD. Their stages for design are adopted in this study. Moreover, Yan and Gu (1996: 307) made the review of literature on rapid prototyping. Gökçearsan (2017: 135) also discusses the consequences of CAD. Dani and Gadh (1997: 855) has a similar work focusing on VR. Similarly, Öngöz et al. (2017: 69) has worked on a VR court. Furthermore, Renner and Ekart (2003: 709) studies on CAD's genetic algorithms. Their study

provides contributive information on designing with a scientific concept. On the other hand, Chandrasegaran et al. (2013: 204) placed their work on the evolution of production systems. Similar to Renner and Ekart (2003: 709), this study also provides the techniques used in designing production. Arandyus and Tomc (2016), focused on converting sketches into 3D models on the computer. Lastly, González-Lluch et al. (2017: 64) emphasizes the importance of design quality and mentions some criteria. Hereby, necessary information for design of the present study is gathered. Their methodology is adapted.

III. CONCEPTUALIZING AND SKETCHING

The design started with an idea. The author used the information that he obtained from the interview with the cleaner. The cleaner mentioned some obstacles to collect the cigarette butts. First of all he mentioned that these items are small and effused to the ground. So, the design should handle with smaller objects. Secondly the cleaner complained about leaning forward is a problematic issue for their daily work. Moving here, the design should prevent leaning. Lastly the cleaner has problems in discharging the collector that he uses as this design includes a brush and the collector as different parts. So, the design should combine these two and would be easy to discharge.

IV. VISUALIZATION WITH COMPUTER AIDED DESIGN (CAD)

Computer Aided Design (CAD) is to use computer systems in order to design the good which is being produced or to be produced soon. This good can vary from a very small micro-chip to large apartment buildings. With the usage of CAD designers and engineers also architects, etc. can make their designs on the computer. By doing so they can make necessary changes faster and more accurately. After finishing the design they can install the whole system together and check whether it will work or not. Ingham (1990), Stark (1986), Krouse(1982), Encarnaçao & Schlechtendahl (1983), Hunt & Johnson (2000), Kloos & Pardo(2004), and Besant (1983) give wide range of information on CAD.

The sketches and concepts developed in the earlier phases of design are reexamined and the main sketch is constituted on the right plane. The sketch is completed and layers are created by extrusion. Then, the block is shelled. A new sketch is drawn to obtain the handle. Lastly, another sketch is created on the right plane and the brush of the design is added. Consequently the bristles are constituted and the design is ready.

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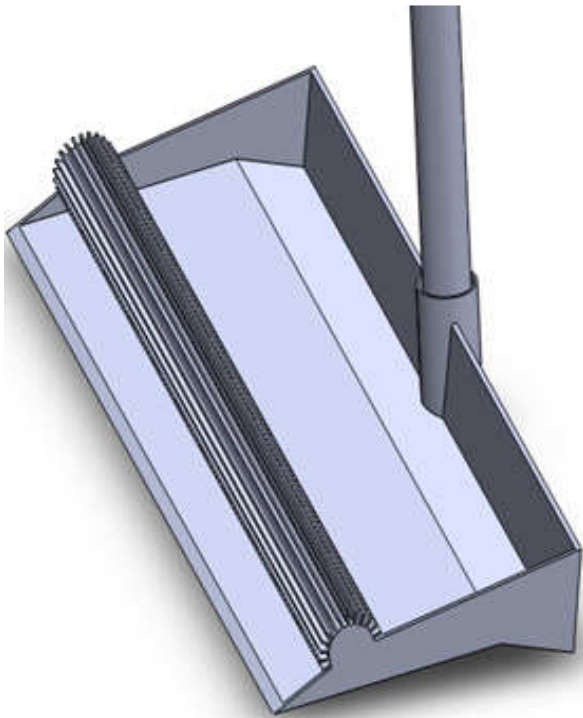


Figure 1. The Final Design

It is expected to be a new design to meet the simplification, interoperability and reusability (González-Lluch et al., 2017: 64) qualifications. The present design is simple as it includes very few parts. It can be used in many contexts ranging from municipalities to schools or for even domestic uses. Lastly the design is reusable as it is made up of plastics. The mass of the design is calculated to be 680.02 grams, which is pretty optimal for a handy tool.

V. CONCLUSION, LIMITATIONS AND IDEAS FOR FUTURE RESEARCH

The present study introduces a new industrial product designed according to the complaints of the user. The design depicts a butt collector. It is developed by following the stages mentioned in the former studies. This study has also some limitations. The cleaner that is interviewed was untutored so he was having difficulties in expressing the problems in cleaning processes. Secondly, the design is constituted only as a 3D model and it should be produced and on-site testing is needed. To do so, plastic injection machines are needed and the researcher doesn't have this instrument yet.

The researchers can make similar interviews with other professionals and design tools and equipment for future researches. Time of men of the century is short and there must be some attempts to do things easier and innovative products are being purchased more. So, the practitioners of production should consider this fact.

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APPENDIX

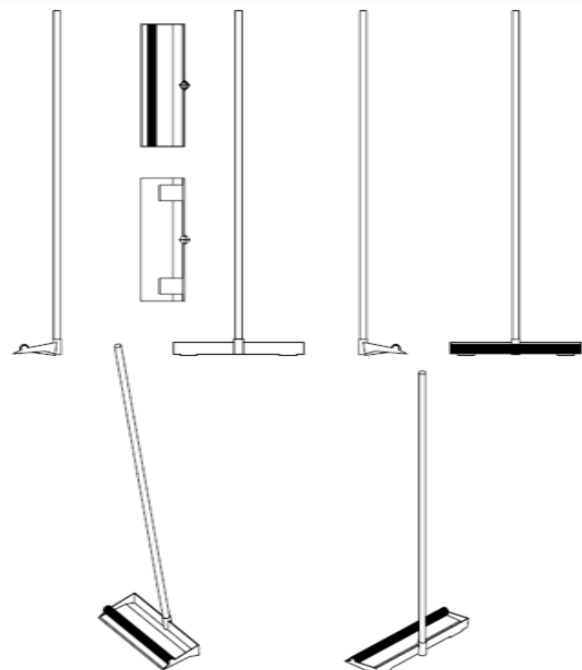


Figure 2. Technical Drawings





Figure 3. Side Plane

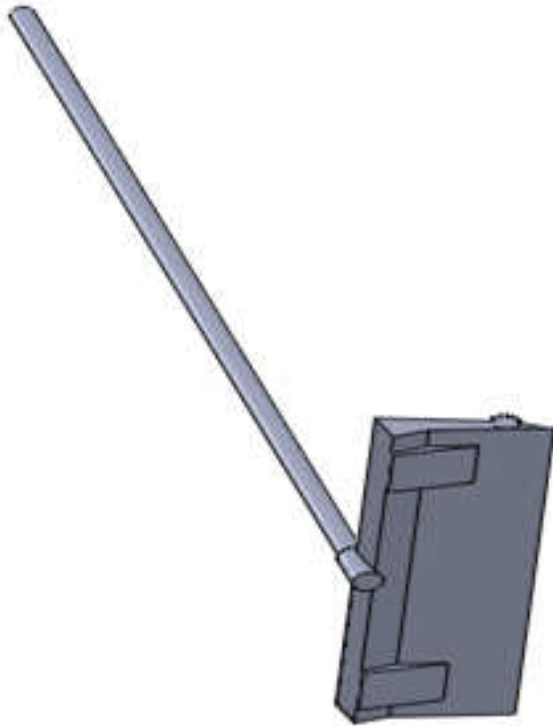


Figure 4. Bottom Plane

AUTHOR'S



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