
The Conceptual Design of Mechanical Products

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Abstract

Modern design society demands that designers have expanded consciousness and an imaginative attitude when creating mechanical things. Unquestionably, concept design is the most in line with the direction in which design theory is moving. Studies in this area are relatively rare, nevertheless. The definition of conceptual design and its characteristics for mechanical items are explained in this article. To advance the theoretical framework of conceptual design for mechanical products and its methodologies, as well as to give direction for the growth of design activities, several principles and methods of conceptual design for mechanical products are being explored. The foundation of product innovation is product conceptual design. Additionally, conceptual product development and product design have a significant impact on product detailed design, product manufacturing development, product market development, as well as the achievement of business strategic goals for companies during the product innovation process.

Keywords: Mechanical Product, Conceptual Design, Design Concept, Product Development, Product Detailed Design.

Introduction

The term "conceptual design" initially appeared in the 1980 book *Conceptual Design* by American graphic designer Ellen Hobart Allen Hubert. The book explains how to arrange concepts in graphic design and how to imbue design items with a concept or idea for better business and product promotion and customer guidance. Few people attempted to comprehend product design from the point of view of "conceptual design" and garner enough attention at that time in the domestic design sector. Because industrial products have mass, automatic, and stylish features, industrial design direction is the primary driving factor behind the technique of "concept design" in the design industry. The design will have a more immediate effect on the manufacturing area, allowing for a quicker and more sensitive response to market information. A new product's conceptual design is especially crucial before it is promoted based on the flow shown in figure 1.

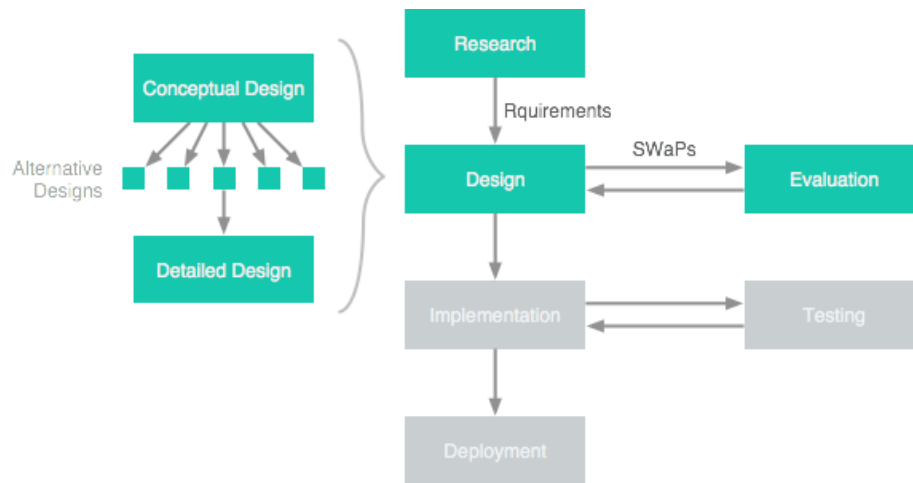


Figure 1: Conceptual Design Flow

We can broadly outline the conceptual design as follows based on the current theoretical description: It is first and foremost a sequence of well-coordinated, focused design activities that begin with the analysis of consumer demands and end with the creation of conceptual goods. An extensive amount of market research must be conducted in order to establish the foundation of the development of a conceptual product. The viability of this outcome, to a considerable degree, defines the product's vitality after entering the market; therefore the foundation of dependability is the key to success. The precise form, materials, structure, and other contents of the abstract concept are then ultimately derived by a succession of scientifically rigorous design system engineering (Zhu, 2014).

Second, it is shown as an ongoing process that changes from coarse to fine, from hazy to clear, and from abstract to concrete. Early in the design process, the designer must carefully research and prepare the programme that will be created. From a range of design concepts, the designer must select the conceptual model that has the greatest degree of accuracy, viability, and market potential (Chen, 2013).

Finally, it is a design technique that makes use of the design concept, which is established as the overarching theme for the entire design process. The design concept is a summary of the thoughts generated from various emotional thinking summed up and refined by designers in view of the design, according to modern media and psychology, which firmly believe that concept is the conclusion of people's thinking about the characteristics and significance which can represent a certain thing or development process (Ye, 2012).

Features of Mechanical Product Conceptual Design

We can clearly comprehend the key characteristics of a mechanical product conceptual design by interpreting the conceptual design. Then, to appropriately guide design efforts in execution, we can build a theoretical foundation for such a design.

Creativeness

Conceptual design needs to place a stronger emphasis on creativity and originality, rejecting any preexisting ideas in terms of form and substance. It doesn't imply that you cannot employ historical symbols, materials, or methods, but that you must approach practice from fresh angles and viewpoints.

Perceptiveness

To put it more plainly, it might be conceptualized as a reasonable or logical deduction, just like "an armchair strategist," with regard to functional difficulties. It is more akin to an experimental scientific experiment, preserving some distance from real life to allow for sufficient mental creativity.

Technological Features

The conceptual design of mechanical products necessitates that we be grounded in the most cutting-edge technological and social awareness of the time, have the courage to try the newest things (new technology, new materials, new technical, new concept of life), and compile the most cutting-edge technological accomplishments of the era in order to stay ahead of the curve. Otherwise, it is challenging to predict the Mechanical trend, to set the pace for it, or to have the opportunity to capture the market's attention.

Conceptual Design Process for Mechanical Product

Unambiguous Design Concept

The key to conceptual mechanical product design is the determination of the design concept. You will become bogged down in the insignificant details if your design concept is unclear.

- What does your mechanical product design aim to achieve?
- What sort of purpose does this mechanical device serve?
- What needs can this mechanical solution fulfill?

These target questions are the key concerns that need to be settled at the outset of the design's study phase. You can fully release your creative ideas after these queries satisfy all the criteria in order to go over the practical obstacles.



Figure 2: Conceptual design Process

Establishing Design Routes

The concept design pathway for mechanical products is the best technique to accomplish the aforementioned goal while fully stretching the imagination and attempting to realize design

thoughts through various paths. What kind of product, for instance, will be designed? What kind of role do they play? How will these objectives and functions be fulfilled? Designers must be logically organized and capable of deductive reasoning in order to manage this process' emotional creative thinking.

Design expression implementation

The best design expression is still required to present good design thoughts and design routes. The "Mechanical product story version" can have conceptual annotations added using the following four techniques (Figure 3)

Painting by hand

The approach that was demonstrated using a sketch or other hand-painted types.

Digital approach

The approach that computer software partially or completely presents.

Model approach

The approach that was demonstrated using a model, either real-size or scaled up, and some materials.

Text-based instruction

The technique that literature prescribe for illustrating concepts, etc.

Conclusion

The design of mechanical devices today requires an increasingly sophisticated conscience and imaginative spirit due to the increasing popularity of design. And while though the pertinent research is still lacking, conceptual design is unquestionably the approach that best aligns with the growth of this new design trend. This essay makes an effort to comprehend what conceptual design is and how mechanical products fit into that definition. It also examines some guidelines and techniques for carrying out conceptual design for mechanical products, and builds a theoretical framework for this design to direct design activities in training.

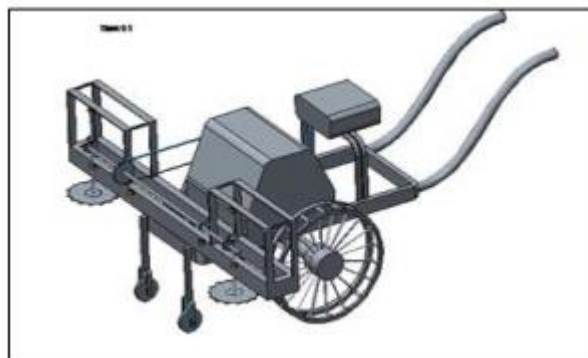


Figure 3: The story version that show the conceptual design of Mechanical product through the hand-painted, digital and copy method.

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