

ART OF SHOES: A COMFORT, STYLISH & INNOVATIVE DESIGN OF SHOES

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Abstract

The shoe design is a technical realization of the look and functionality of a shoe. Design by doing is done using the free hand pattern engineering technique. This technique provides many advantages over traditional approaches to make pattern and shoe design. The design process is aimed at finding innovative design based on current market, trends and performances. In this research paper, we discuss the process of shoe designing by using the Free Hand Pattern making technique. The free hand patterns are a technique for making a design through engineering. To create a prototyping process. The designs can be adapted to fit the needs of the user. The shoes can be designed with the help of computer aided design (CAD) systems to help in the creation, modification, analysis and optimization of the design.

Keywords: Innovation, Shoe design, CAD/CAM, Pattern engineering.

1. Introduction:

Men's as well as women use different types of fashion accessories. Among them, shoes have emerged as the most important part of the person's attire. The consumer is now highly concerned about their footwear and they are spending lots of money in order to buy the best pair of shoes, which can provide them with style and comfort. People selected their shoes quite carefully and they try to match them with their cloths. Matching the footwear with cloth has become an important aspect of modern fashion and helps in making more stylish.

Shoes are no more a necessity that you need to protect your feet. They are now related to the personality and characters of person. The art of shoes has become a reputed name in the footwear industry in recent years, fulfilling this need of fashion and comfort in a beautifully designed pairs.

When you are looking to pick up shoes from the art range, you are benefitted in every way as a customer. These shoes exhibit exciting and innovative designs which has helped to captivate the mind of the customers. The shoes are designed meticulously and each of the styles in distinct from each other. The shoes provide you with an adequate level of comfort and you can walk around freely with them. These shoes are made in a variety of colors and you can discover new patterns while buying them. Size is also not a problem when you are selecting these kinds of shoes. There is variety of shoes on offer and you can select them as per your convenience.

A shoes which are made from leather or non-leather material, the quality of raw material, their tanager, their cutting value and wastage, the proper selection according to their components requirement, their cost factors and actual consumptions play an important role for shoe manufacturers. Hence we can select the materials as per the quality of the shoes. For manufacturing of good quality of footwear, the following point should have observed –

- ❖ Well defined specification.
- ❖ Checking and testing of all input materials.
- ❖ In process control.

- ❖ Final quality check
- ❖ Monitoring quality.

A comfort, stylish and innovative footwear designing play an important role in the development of the good quality of footwear.

2. Product orientation:

Management fails to understand those factors that shape the ability of the business to satisfy the needs of the customers in competitive market. For example-

- ❖ Changing requirement of the customer
- ❖ Strategies of competitors.
- ❖ Attractiveness of the market to new competitor.
- ❖ Induction of latest technology and machineries.
- ❖ Power of the companies that supply resources.

3. Roots of new product development:

- ❖ Idea generation
- ❖ Customers reaction about product
- ❖ Business analysis – root causes of failure and new diversification.
- ❖ Test of customer and marketing
- ❖ Commercialization
- ❖ Key marketing preparation

4. Needs of cost objective in footwear designing:

- ❖ Earn a certain return on investment in the subsequent period.
- ❖ Achieve a certain amount of market share in the future.
- ❖ Attain a certain amount of market growth in sales.
- ❖ To gain the restore order in fluctuating market.
- ❖ Prevent competitors from entering the market by constant and improve quality.
- ❖ Maintain the loyalty of middle men and their sale support.
- ❖ Keep an eagle eye to sale of weak items in the product line.
- ❖ To set the price at a level that will maintain the product performance.

5. Footwear designing:

Shoe design is not about fancy sketches or colorful prints. Shoe design is a technical realization of the look and functionality of a shoe. Design is the first thing that needs to be done to make any type of shoe. The shoe design process can keep people, especially beginners in making shoes, away from the creative process. The problem is lack of knowledge and confusion about how to design shoes.

Questions that often arise for beginners are-

- ❖ How to design shoe without making a shoe design drawing?
- ❖ How to show shoe design ideas when you do not have the ability to sketch.
- ❖ How to get great design ideas?

The skill of sketching shoes is not only about drawing beautiful shoes, but also more than that is requires knowledge of the correct shoes model parameters. Considering the anatomy of the foot makes a shoe that not only looks good but also comfortable so that it need shoe proportions when applying the shoe design to a shoe.

6. Design thinking:

Design thinking is a series of divergent and convergent thinking processes. The essence of the divergent and process is to create choices, while the essence of the convergent process is to make choices. This suggestion is in line with the opinion who believed that design is a unique ability o whole thought – a combination of

usefulness and meaning. In other words, design thinking optimizes the combined capacities of the left and right brains.

Good designers have implemented a human – centered- creative process to build meaningful and effective solutions. However, this approach also needs to be adopted in large organizations so that it requires standardization as a formal framework. Thus, design-thinking was born as a methodology for applying creative design process to traditional business problems.

design thinking framework follows the overall flow of three main categories, namely-understand, explore and materialize. Within this large group there are 6 phases- empathize, define, Ideate, create a prototype, test and implement.

There are two major spaces in the design thinking process, namely the problems space and the solution space. Problem space is from empathy and definition. The solution space is formed from ideations and prototype. The results of this solution are then performed testing to validate the new design hypothesis bar.

Design thinking is an approach that revolutionizes our thinking patterns in various areas of life and problems-solving perspectives. Therefore, designs thinking often start with the question “**what problems are being encountered?**” followed by “**what is the cause of problem?** Design thinking uses the designer’s sensibility and methods in creating something valuable for consumers based on opportunities that are in accordance with desirability, technological feasibility and business strategy viability to foster sustainable innovation. The mission of design thinking is to translate observation to inspiration. Inspirations then lead to “the creation of product and services” that will increase the quality of life. This method inspires individual to have a broad spectrum of innovative activities using human – based design ethos. In other words, design thinking is acting out the innovation process.

Design thinking focuses on innovative solutions. The data collection process is aimed at obtaining inspiration through benchmarks, and trend observation. This search includes consumer needs and desires, technological capabilities, communities and financial availability. It requires awareness of consumer’s needs and desires and the ability to build people’s – expectation of a better life.

The main mission of design thinking is the ability to translate observation to a whole new insight on new opportunities up-to the point that it becomes goods and services that consumers really need. To achieve this, empathy is needed. Empathy involves observing and understanding what other say, do or think. It is a success determinant for solving others problem and a source of inspiration to find unarticulated needs. In other words, we need to know and care about others in order to come up with meaningful innovations for them.

7. CAD Designing:

Computer – aided design (CAD) is the use of computers or work stations to aid in the creation, modification, analysis and optimization of a design.

CAD/CAM is the abbreviation of computer aided design and computer aided manufacturing. It is the fastest mode of making the designs along with their patterns. One can change the designs as and when required. Many style variations can be developed on one last copy or the standard that has been digitized.

Computer aided design was introduced in the footwear industry in 1970. Initially it was used primarily for pattern grading. It enabled manufacturers to perform complex grading easily and quickly. CAD systems today have been developed with a much wider range of functions, logos, textures and other details can be incorporated in to product designs of both the uppers and soles to help reinforce branding on all areas of the model. It automates routine procedures, increasing speed and consistency whilst reducing the possibility of mistakes. CAD data can now be used effectively for a wide variety of activities across footwear manufacturing business.

CAD/CAM generates data at the design stage, which can be used right through the planning and manufacturing stages.

CAD/CAM software are pc workstation – based, which are on module to perform the activity as requirement, like wise 2D module for 2D Designing, pattern engineering, grading etc. 3D for surface modeling to generate the rendered view of a product.

CAD/CAM consists of two major components; -

7. (a) Hardware components and software components:

Hardware components are Input, Devices, process device and output devices. Input devices are 2D (two dimensional) and 3D (three dimensional) digitizers used for digitizing standards, patterns, last & heels. 2D and 3D scanners are used for scanning photos, sketching, material, last feet, soles and heels. Digital camera used to capture the texture pictures.

Process device is PC workstation with monitor, keyboard, and mouse. Specification of the devices will be as per the requirement of the application CAD.

Output devices perform the role of CAM. These are printers used for printing report, images or 3D printers for prototypes building, cutters, plotters used for cutting paper pattern and material cutting. Milling machines, turning machines, CNC machines are also out devices of CAD.

7. (b) Pattern Grading:

Grading is a process of producing a size range of patterns from an original model size that is increased or decreased proportionally to the original model size.

When we talk about grading most people tend to associate this with the upper only but we also need to grade the bottom tooling area as well. If done correctly we can combine many components which are in turn saves capital cost for tooling equipment and makes manufacturing much easier by reducing the number of sizes needed to cover the overall size range.

In general design process that was followed is-

- ❖ Understanding the characteristics of the material
- ❖ Exploring the potential
- ❖ Implementing
- ❖ Optimizing the design.

8. Understanding material characteristics:

Understanding material characteristics is to treat materials to recognize the characteristics they have. Material engineering is the application and enhancement of the properties of materials by the process, design formation of materials. Engineering materials help to learn the basic relationship between the structure and properties of materials, and then used to design the structure of these materials to get the desired properties.

Material introduction includes the introduction of materials properties (Mechanical, physical and chemical), aesthetic characteristics, dimensional characteristics and structural characteristics. Material characteristics of the material is the response or behavior shown by a particular material to a given loading in the form of force, torque or combination of both physical properties are changes that an object experiences without forming substances. Physical properties can be observed without changing the substances that make up the materials. Physical property includes – the form of the substance, the color of the substance, solubility, Conductivity, magnetizer and boiling and melting points. The physical strength of the skin such as tensile strength, tearing strength, elongation, wrinkle temperature and stiffness.

9. Design optimization:

Design optimizations are consideration so that design has optimal value. This includes consideration of compromises with other aspects to ease of production.

10. Free hand pattern technique:

Design by doing is done using the “Free hand pattern technique” Designing shoes with the free hand pattern technique is a technique of designing shoe through pattern making. In this designing process the shoes worked with different materials such as paper, fabric or leather which are worked directly on the final shoe.

This is a “non-traditional” way of making shoes that has been developed for all footwear. It is created from the knowledge of the pattern making. For that, the free hand pattern technique is something that requires basic knowledge of pattern making.

The free hand pattern technique provides many advantages over traditional approaches to pattern making and shoe designing. Some of the advantages are –

- ❖ Shoe design and create pattern without any calculations.
- ❖ Easy to learn tools to learn tools to simplify the design process.
- ❖ The possibility to create 3D elements on the footwear.

11. Prototype creation:

The prototype creation starts with the computer design, and then followed by the top-part process by making the main form. The process is then followed by bottom part like out sole process, assembling and finishing. The material specification of the top part, insole and outsole. The top-part materials consist of bull grain or brush-off leather and prepared with different type of tanning and finishing auxiliaries. The materials create a shiny surface, and are easy to clean. Even without regular polishing, the surface of the skin pores will still look natural. The lining materials are a mixture of combed cotton, soft imitation and dipping materials imitation. Meanwhile, the insole material uses two layers called the top and bottom parts. The top part uses taxon coated with combed cotton. Finally, the outsole material is made from mix of javarin and rubber soles. Rubber soles is used because it is relatively lighter, less slippery, and more flexible in movement.

After the top part process is completed, the next step is preparation of bottom part. This process is divided into two parts – out sole production and insole production. Out sole is the bottom of a shoe which makes a direct contact with the ground. The characteristics of a good insole are, among others, durable, water resistance and firm grip. Meanwhile, insole is the inner part of a shoe which makes direct contact with the sole of the feet. The insole materials will determine the comfort level of the shoe.

Once the top and bottom part are completed, the next process is attaching the top part to the bottom part. This process is known as assembling. It starts by cementing the bottom part of the top side using special glue. During the assembling process, the top and bottom parts come in pairs with predetermined size. In order for the shoe from to match the foot contour, Last is used.

12. Standardization of footwear quality:

Standardization is needed to certify the production quality of the footwear. These are divided into technical, non-technical and consumer perception aspects.

13. Conclusion:

In conclusion, the significance of shoes as essential elements of personal style and comfort has evolved significantly. The modern consumer's meticulous selection process and emphasis on matching shoes with clothing reflect the integral role of footwear in contemporary fashion. The art of shoe design has responded to this demand by offering innovative and stylish designs that prioritize both functionality and aesthetics. The product orientation and new product development frameworks outlined shed light on the complexities of meeting consumer demands and adapting to market dynamics. Emphasizing the cost objectives in footwear designing underscores the multifaceted considerations that drive the industry's competitiveness and growth. Furthermore, the sections on footwear designing, design thinking, CAD designing, and pattern grading developed into the technical and creative aspects of the footwear design process. A comprehensive understanding of material characteristics and the design optimization process is essential for designing footwear that not only meets consumer needs but also aligns with production feasibility. The discussion on the free hand pattern technique and prototype creation highlighted innovative approaches to shoe design, showcasing the intersection of traditional craftsmanship with modern technology. Furthermore, the standardization of footwear quality underscored the importance of incorporating technical, non-technical, and consumer-centric factors into the production process. In closing, the footwear industry's journey from traditional craftsmanship to leveraging advanced design and manufacturing technologies underscores the ongoing quest to meet the evolving needs of consumers. The interconnected processes of design thinking, material engineering, and quality control underscore the industry's commitment to producing footwear that is not only stylish but also functional and durable. This comprehensive approach to footwear design and development sets the stage for continued innovation and excellence in the global footwear industry.

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