Introduction to CAD systems in textile

Before starting any design it is vital that we completely analyze the end-users of that designed fabric.

To analyze this, aspects like end-user age group,gender, location, types of ware, and a place for wear are considered. Fabricwise, yarn count, PPI, EPI, thread density, fabric thickness, fibre types, fabric structures, and weave types are considered.

Some technical parameters like finishing types, dye, and printing types are also important to create a design for the fabric or any garment.

Visualization before making that design or piece of garment is essential. CAD stands for Computer-Aided Design. CAD is basically software that allows drawing designs for textile applications.

Introduction of CAD for textile

When the products in the pre-manufacturing stage are designed with the help of computer-based tools, it is termed CAD or Computer-aided design.

It is also known as CADD or CAID and is also used for "Computer-aided design and drafting" and 'Computer-aided Industrial Design respectively. This software is generally mostly used in the engineering field to represent the manufacturing of products or to create engineering designs.

Designs for textile applications mean, creating designs that can create on the fabric surface.

It includes woven designs like twill weaves, dobby designs, Jacquard designs, Certain kinds of Knitted designs, printing designs, and embroidery designs.

For each and every design, separate versions of CAD software are required.

Computer-Aided Design (CAD) is a boon for all designing and manufacturing industries regarding the Textile. CAD provides much higher efficiency and productivity as compared to the normal pen and paper design.

The CAD system and its tools have become an essential component of garment manufacturing - fast fashion makers, designers, and even traditional fashion manufacturers.

CAD is a virtual representation of the art effect in the designing field.

With the help of CAD, the long and cumbersome process of designing has now been converted to a mere simple process on a computer system.

CAD can be used to design curves and figures in two-dimensional (2D) space like curves,surfaces, and solids in three-dimensional (3D) space. Even a 2D design can be converted to 3D for a better representation of the design.

In the olden days, the designer created their designs with the help of a pencil and paper on point paper or on specific lined paper. But with the innovations in the loom and design, the main challenge faced in this process was it can't suitable for the increasing demand for design variation, frequent change in styles, and customer taste in the market.

These limitations became the reason for the invention of CAD systems in the design and fabric manufacturing process.

The application for CAD broadly came into the market when computer designing had come to a level where it could be incorporated into the apparel industry

With the CAD system, several innovative ideas come into the design industry.

CAD is slowly able to do a week's work within a day and concerning updates, this work is done within some minutes or hours.

Now CAD programs have become an essential tool for weaving, printing, embroidery, and garments, and for fashion designers.

Questions -

1. A detailed description of a CAD system in textile.
2. 2. What is a CAD system in textiles?

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Applications of CAD systems in textiles

CAD designs

(Broadly, CAD is applicable for all kinds of engineering, but here is the only discussed application and work of CAD which are related to textile technology.)

The main CAD application is to give dimension to any design and make it suitable for the fabric formation process.

Other usages of CAD are changed by experimenting with it, configuring the design according to needs, archiving the design, exchanging data and information related to the design between teams and organization, adding progress of the designs for future analysis, assisting tool for product manufacturing using a computer system which may include both hardware and software.

The output of CAD is vital for the weaving process because it contains information, such as materials, processes, dimensions, and tolerances, according to application-specific conventions.

With CAD any desired shapes can be made virtually by joining, cutting, rotating, and modifying at different levels.

Assembling various model designs can be done to get an overview of how the fabric will look at the final and that will allow us to make changes accordingly.

With the use of CAD, software designers can visualize the final product and its appearance, and it also helps in synthesizing and analyzing documentation of the design.

Along with conversion from 2D to 3D, the software also helps in giving animations to the product and this will help the designer on how the design will work and thus allow to make immediately make any modification according to it. All these factors and features will help drastically improve the productivity of the design, speeding up the process, and lowering design costs with a shorter project completion time.

With the CAD software, the designing professionals have better options for various design tools that will help in easing up the process of designing like mirroring, accurate shapes, etc. along with thorough engineering analysis of the proposed design.

The tools also help designers inspect the design for any errors.With CAD the accuracy of the design increases drastically reducing errors thus leading to better and more accurate design.

With a lower number of errors and better availability of references, the manufacturing process becomes much faster with reduced wastage which could have been due to faulty design.

The next step after designing is the making of the drawing. With CAD software standardization of the drawing has become easier with fewer drawing errors and greater legibility.

Along with this, it has also allowed us to make communication of the designs easier as the designs are transferred digitally within seconds, decreasing lead/manufacturing time. Any changes that are to be made in the design can be easily transferred back, corrected, and sent back for the next authentication.

In the case of design documentation for weaving and any other process, it can be done very efficiently with CAD software. The method of documentation of an existing pattern can be done through a digitizer and then stored digitally for later use.

This design documentation uses can from referencing older designs to geometric and dimensions of the product, its components, and subassemblies, material specifications of the components, and bill of materials of the components.

With the easy process of documentation, CAD software can create better databases for designs that can be used for manufacturing and speeding up the process. Rather than searching for any particular design for reorders, it can be found directly from the database.

3D designing being the future of CAD has already started influencing the world of fashion. With features like 3D virtual sample-making, wherein we can altogether bypass the physical process of sample-making and dramatically reduced the time and cost associated with product development. With it, we can also make a virtual 3D avatar of a human figure just by scanning through specific hardware. Simulations of fabric are also made it possible to visualize the physical properties of the fabric which include pleats, textures, transparencies, drapability, etc.

With 3D modelling, there is no need for a physical sample to be made. Everything starting from sample making, photoshoots for online sales, and buyer communication can be done through it. This also eliminates the need for having an inventory as every design can be stored online for future reference.

CAD application for textile designs

Modern CAD contribution

- Therefore it is important to use / Purchase appropriate software and Purchasing the software for any company should depend upon its requirement.

- Sometimes designer falls into false marketing strategies of software and purchases software that are not according to the requirement and provide extra features or brand value.

- In the case of higherpaid versions, the budget that must be allotted for the software and should the expected ROI (Return on Investment) comes from it.

- Before purchasing, any software, if possible then try it free trial version. This will confirm that default computer systems or hardware work with that or against the requirements of CAD software vendors. (If not supported, then the software may not function properly.)

- Nowadays, many paid software gave free trials for an initial time like 15 days, 1 month, or even up to 3 months of a free trial. This will always be helpful for an estimate of the work process regarding software.

- In some cases, the software is free for some features, while upgrade versions with charges are available for more features and applications.

- The software has to be a user-friendly interface for the operator to feel comfortable using it.

Questions -

1. Which are the different applications of CAD systems in textiles?
2. 2. How modern CAD has contributed to textiles?

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