

OPTIMIZATION OF GARMENT DESIGN USING SPECIALISED SOFTWARE

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Abstract: *Considering the speed of change in fashion trends, time is one of the most important factors characterizing the marketing of a product. Product quality depends heavily both on design quality and the experience of the person executing the technological phases of the product. Computer aided design systems aim at reducing the time necessary for designing a product and increasing the quality of its design and execution.*

The paper also presents the product “Women Coats” from the creation of the pattern design in Adobe Illustrator, the execution of the patterns in Gemini CAD software up to the presentation of the finished product. The basic pattern of the product was then transformed into 3 model patterns. Some of the coat models presented in paper were designed to be worn in winter and some during the spring-autumn seasons.

Key words: *GEMINI CAD System, Adobe Illustrator, coat for women, basic pattern, model pattern*

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1. INTRODUCTION

Given the speed of change regarding fashion trends, time becomes one of the most important factors that is characterizing the marketing of a product. Product quality depends heavily both on design quality and the experience of the person executing the technological phases of the product. Computer aided design systems aim at reducing the time necessary for designing a product and increasing the quality of its design and execution. Mid-twentieth century is characterized by a new phase in the evolution of the clothing product design methods by introducing automated design systems.

Currently there are many foreign companies that have approached apparel constructive design aided by computer, featuring on the market embedded systems of specialized computer design (CAD / CAM systems) for the creation of new models and product prototyping.

CAD in Textile is used to design fabrics and fabric variations, and to simulate quickly their final appearance through prints reproducing faithfully their color and structure. The

usefulness of CAD has driven the market to produce specific software packages that are tailored to the fashion industry. [1], [2]. The programs are focused on design, pattern making, size grading, nesting of the pattern pieces to maximize use of materials, and integration with automated textile-cutting machines:

- **Auto CAD:** Explore and visualise 2D/3D concepts with a powerful set of intuitive design tools;
- **Assyst** - develops various integrated CAD, PLM products for fashion, interiors industries;
- **Audaces** - CAD/CAM for apparel, footwear, caps, bags;
- **Autometrix** - precision cutting systems, sail design software, CAD software for sewn products industry;
- **Bluewater Software** - develops DeSL web-based software for apparel, footwear, accessories, PLM, more, with Microsoft .NET technology;
- **Centric Software** - PLM software for apparel, luxury goods, consumer goods makers;
- **FashionCAD** - pattern making software by CAD CAM Solutions;
- **Gerber Technology** - patternmaking, footwear, plotting systems, includes AccuMark, Pattern Design, Made to Measure, APDS-3D, Optimizer, Silhouette;
- **Gemini CAD** Product development tools and automated production solutions for sewn and flexible goods; includes **Gemini Pattern Editor**, **Gemini Cut Plan**, **Gemini Nest Expert**;
- **Lectra Systems** - CAD-CAM for apparel, upholstery, footwear, industrial textile applications;
- **Modaris** - flat patterns, fabric specification, grading, 3D virtual prototyping, by Lectra;
- **NedGraphics** - CAD, CAM provider dedicated to apparel, textile industry;
- **OptiTex** - CAD/CAM solutions for sewn goods industry;
- **Patternmaker Software** - CAD system for garment pattern design. Home, expert, professional versions available;
- **Plus 2D** - nesting software for generating optimized layouts, reducing scrap, by Nirvanatech;
- **Quest CAD/CAM** - provides independent sales, services for CAD/CAM systems used in apparel, textile industries;
- **TUKATECH, Inc.** - provides CAD/CAM/CIM services, products for sewn goods industry, including TUKAstudio for fabric, apparel design, TUKAcad for pattern design, grading, marker making;

- **Viable Systems, Inc.** - manufacturer of CAD/CAM systems for design of Jacquard woven fabrics;
- **WhichPLM** - news, information hub for apparel, retail companies looking for PLM solutions;
- **YuniquePLM** - product lifecycle management tool for apparel sector, by Gerber Technology;
- **Zweave** - provides design automation software for clothing, footwear, equipment design companies, tools like Fit Studio, Design Studio, Boston, MA.

Gemini [3], [4], [5], is an integrated system consisting of both software applications and specialized equipment designed to support the entire business of designing and tailoring the products in textile factories and it provides both the technological flow for those working in Lohn system and also for those who design their collections. Gemini CAD system includes three subsystems: Gemini Pattern Editor, Cut Plan program, Gemini Nest Expert.

With the help of **Gemini Paternal Editor** are designed the patterns, the products gradings are performed, it is checked if the the product corresponds dimensionally with the specifications and if the pieces fit perfectly together in order to be sewn, it digitizes templates to be entered into the computer and can be imported models sent by customers on a diskette.

Gemini Cut Plan program is used for: planning and automatic optimization of sizes combinations on different framings and the number of sheets in facings; extraction and preparation of templates for framing making; previewing and storing of the optimized framings; establish the framing and cutting restrictions according to the knitted fabric parameters; automatic calculation of costs and efficiency, fabrics consumption according to color and sizes, report on the quantities ordered, cut effectively and the differences emerged while printing the framings on the plotter and export for the automated cutting head; editing and printing of the cutting plan sheet, archiving the processed orders.

Gemini Nest Expert software is used for the fully automated optimization of the framings with time limit, export to the plotters and automatic cutting machines;

2. THE PRODUCT “WOMEN COAT” - FROM DESIGN TO FINITE PRODUCT

2.1. The product “Women Coat” was drawn with the help of Adobe Illustrator.

The first step in any design activity should be the formulation of the problem in our case, the first step consisted in the artistic design of the model. **Women coat** model has been made using Adobe Illustrator Draw graphics program.

Adobe Illustrator is the perfect solution for the design process. This software has become recognized in the software industry to create vector graphics that can be scaled and edited without loss of resolution or clarity. Illustrator is a very powerful tool that can handle any graphic work. This includes fashion sketches, fashion illustration, print design etc. With proper tuition, it is possible to adapt the generic tools to enable you to produce fast and accurate fashion drawings. For example Illustrator’s Symbol functionality allows to create

libraries of garment components, such as buttons, rivets, pockets etc that can be called upon and added to any sketch using a drag and drop, so basic elements never have to redrawn.[6]

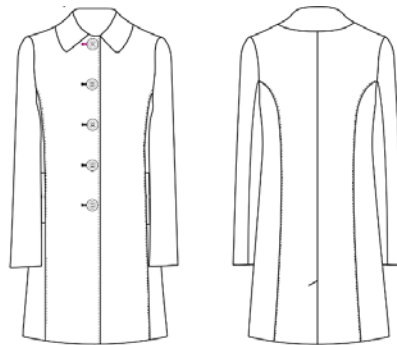
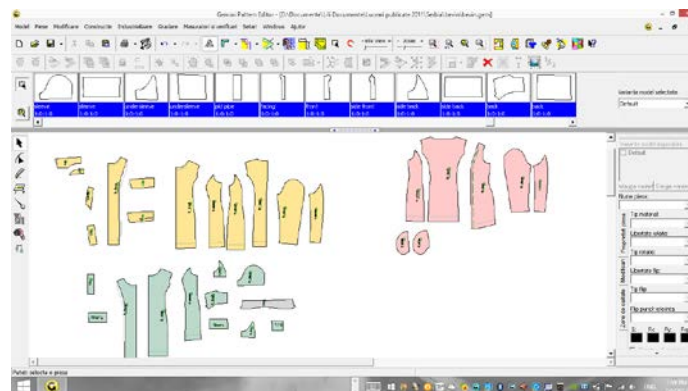


Fig.1. The initial model of the women coat (Bevin Model)

The product was designed to be worn in winter by using thick material.

The next stage of design consisted in patterns development using CAD Gemini and then grading them.

In Gemini Pattern Editor were made the patterns for the coat. The patterns were designed, the gradings of the product were done, it was checked that the product corresponds dimensionally with the specifications and if the pieces fit perfectly together to be then sewn. The patterns of designed and graded models in Gemini Pattern Editor were then extracted by Gemini Cut Plan application. In Gemini Nest Expert were done their optimizations and framing.



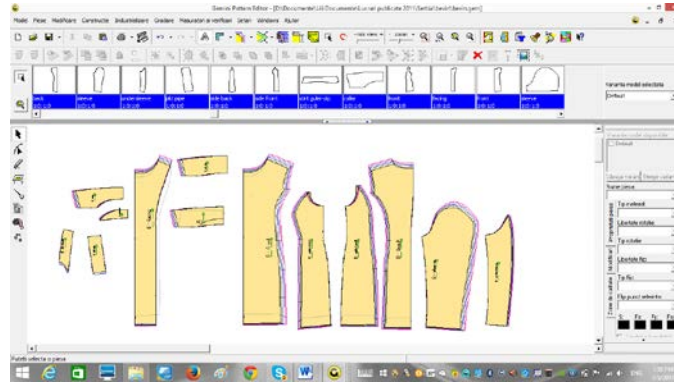


Fig. 2. Elaboration of the basic patterns for Women Coat product by using Gemini CAD program and then their grading

2.2. The transformation of the basic pattern of “Women Coat” in print model

The classic pattern Women coat, in our case Bevin, was then transformed into model pattern - “Offset buttons” model following the following steps:

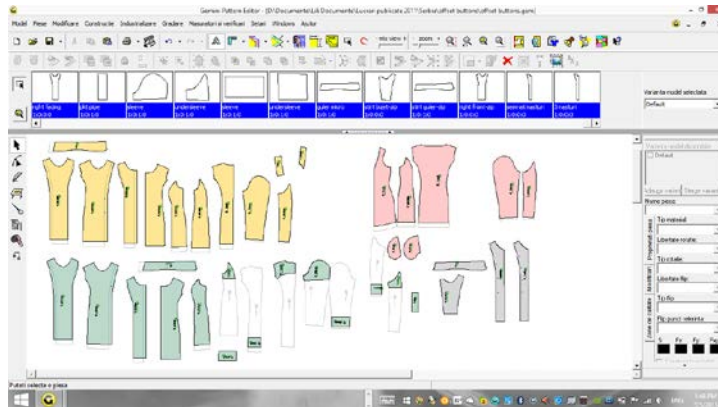
- It is modified the right front part widening around the neck area so when it is closed the right front part should keep in line with the line along the neck from the left side until it reaches halfway up the shoulder as shown here
- The edge line follows in a parallel line the cut between the front and gusset parts, a stitch in which the pocket is mounted
- The model is buttoned
- The collar is also changed, passing from the classic type shirt collar to high collar without being provided with any closing system.



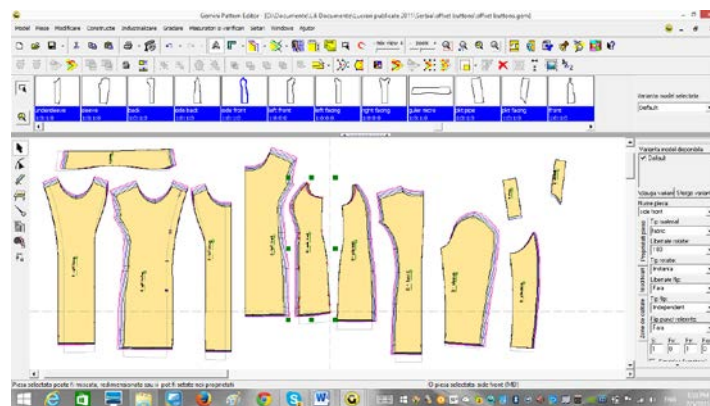
Fig. 3. The transformation of basic patterns in model pattern (Offset buttons model)

Like in the previous case this product was also designed to be worn in winter for its fabrication was used thick material.

The creation of the model patterns using Gemini CAD software and their grading is shown in the following figure:



a.



b.

Fig. 4- a, b. Patterns creation in Gemini CAD for Offset Model buttons

2.2.1. Coat model transformation designed to be worn in winter, into another model that can be worn in spring-autumn season

Based on the previous model (Offset Buttons), a model for the cold season, made another model-Offset Model zip- was created, very comfortable and trendy, this time for spring-autumn seasons, using thinner materials (e.g. cotton, polyester or leather or leather substitute).

For this model, which in this case has a zipper closure, the same parts as in the previous model were kept, modifying only the front left part which was cut following the line

of the front right part edge, inside the cut the zipper was sewn. The sleeves were also changed: the sleeves will not be cut around the cuff but there will be a simple sleeve. The collar was extended on the right side so it can be tacked.

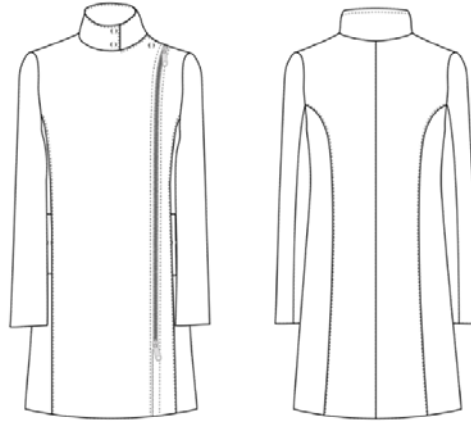
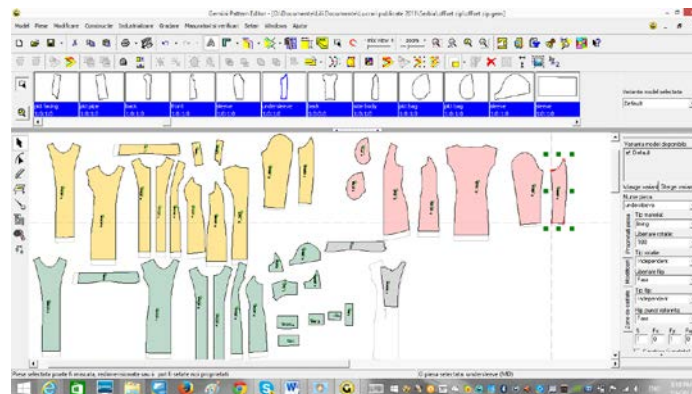
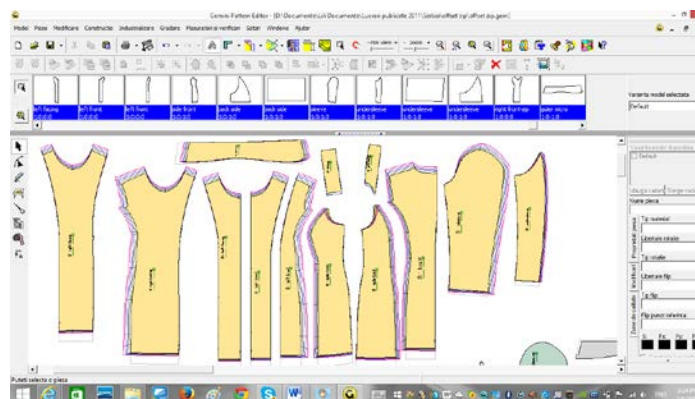


Fig. 5. Offset zip Model

The creation of the model patterns using Gemini CAD software and their grading is shown in the following figure:



a.



b.

Fig. 6- a, b. Patterns creation in Gemini CAD for Offset zip Model

2.2.2.1. Modifying the Offset zip model in another model Derby Model

In this model we used all parts of the previous model except the collar which was given up. The front right pattern was cut on a line parallel to the front left edge part at a distance of approximately 2 cm and thus two colors or materials of different compositions can be combined.

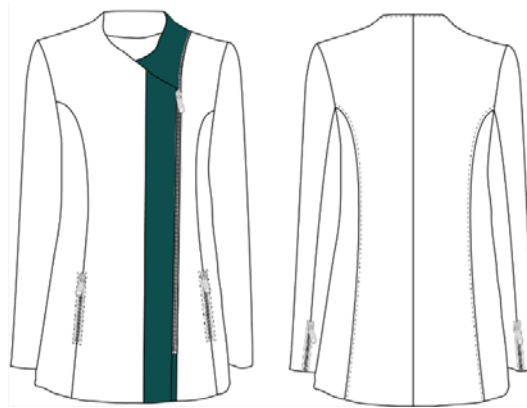
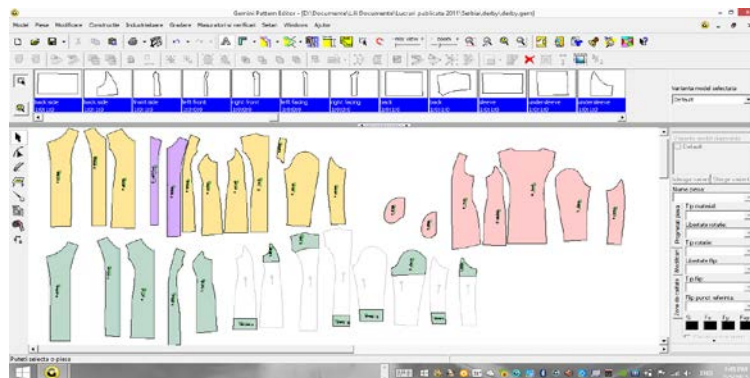
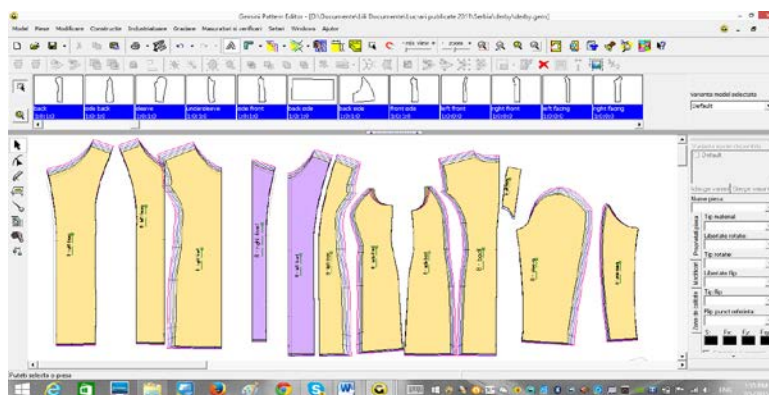


Fig.7. Derby Model

The creation of the model patterns using Gemini CAD software and their grading is shown in the following figure:



a.



b.

Fig. 6- a, b. Patterns creation in Gemini CAD for Derby Model

All the 4 variants of the model “Women coat” were executed at the Sayatex SRL company from Oradea, Romania and are presented in the following figure:



Fig. 7. The 4 variants of the model “Women coat”

3. CONCLUSIONS

We wish to conclude by affirming that the use of automated systems of clothing design presents a number of advantages over manual methods. They are increasing the design results reliability in eliminating the repetitive design phases, and in reducing the amount of manual calculations specific to the creation of clothing patterns.

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