

Development and Production of Costume Models for a Christmas Story in Varaždin

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This paper describes the development and production sequence of costume models for a Christmas story in the city of Varaždin. The project was carried out in cooperation with the Varaždin Tourist Board as part of the Advent project “The Magical City of Father Christmas and Mother Christmas’s House”, in which elves also participate in Advent-related activities. The development of two costume models is presented, including a description of material selection, production procedures, manufacturing techniques, and the machinery applied.

Keywords: *Mother Christmas; elves; pattern pieces; pattern layouts; sewing procedures; sewing machines*

Stručni rad

Razvoj i izrada modela kostima za Božićnu priču u Varaždinu

U radu je opisan razvoj i slijed izrade modela za Božićnu priču u gradu Varaždinu. Proveden je u suradnji s Turističkom zajednicom grada Varaždina kao dio Adventskog projekta „Čarobnog grada djeda Božićnjaka i kuće bake Božićnjak“, u kojem u adventskim zadaćama sudjeluju i vilenjaci. Razvoj dvaju modela kostima prikazan je u ovom radu uz opis odabira materijala, postupaka izrade i tehnika izrade te primijenjenih strojeva.

Ključne riječi: *Baka Božićnjak; vilenjaci; krojni dijelovi; krojne slike; postupci šivanja; šivaći strojevi*

1. Introduction

The Varaždin Tourist Board traditionally organise the Advent in Varaždin event, which has been declared the most beautiful Advent in Croatia last year. The University of Zagreb Faculty of Textile Technology, in cooperation with the Varaždin Tourist Board, contributed to the visual appeal of this festive experience through the production of costumes in 2023 as part of the project “The Magical City of Father and Mother Christmas’s House” [1].

Considering the main objective of developing models that would fit into this narrative, support in the development and realisation of the models was also identified in publications related to the review of the development and characteristics of women’s corsets [2,3]. Within the project, a Mother Christmas' dress model and four elf costume models were created; however, this paper presents two of them: the Mother Christmas dress and the elf costume – Model I. Their detailed description is provided, including the characteristics of the materials used, presentation of pattern pieces and pattern layouts, as well as the developed plan of technological operations.

2. Experimental part

2.1. Materials for the dress of Mother Christmas and the elf costume – Model I

To produce the dress and the costume, fabric of trade name Toledo in red and green colours was used (Fig.1). Artificial fur was applied only to the Mother Christmas dress model, specifically on the upper collar, the sleeve length, and the hemline of the dress (Fig.2).

The Toledo fabric proved to be the most suitable choice among the available options to produce these models. It exhibited the required fullness, hand feel, and an appearance like plush fabric, as well as colour shades appropriate for the intended models. Toledo is a fabric primarily intended for furniture upholstery and interior furnishing rather than for garment production. It would not be suitable to produce conventional garments due to its lower breathability and reduced wearing comfort, but, due to its specific properties, it was selected to produce these costume models. During the development of the prototypes, the fabric met both functional and aesthetic requirements, as well as the necessary properties for the technological processes.

Toledo is a 100% polyester fabric with a surface mass of 400 g/m² and a width of 140 cm ± 2%, treated with

an anti-soiling finish, i.e. a water- and oil-repellent finish (Clean Comfort technology), which enables easy cleaning [4].



a)

MERCIS
fabrics and leathers

TOLEDO		WATER REPELLENT	
SESTAVA COMPOSITION SIBOVINSKI SASTAV ZUSAMMENSETZUNG COMPOSIZIONE	100% POLIESTER 100% POLYESTER 100% POLIESTER 100% POLYESTER 100% POLIESTER		
ŠIRINA WIDTH ŠIRINA BREITE ALTEZZA	140 cm ±2%	TEŽA WEIGHT TEŽINA GEWICHT PESO	400 g/m ² ±5%
TEST	STANDARD	REZULTAT/RESULTS/REZULTATI/ERGEBNIS/ RISULTATI	VOTEK/WERT/ POTKASCHUSS/ TRAMA
RAZTEŽNA TRDNOST TENSILE STRENGTH ČVRSTOČA NA RASTEŽANJE ZUGFESTIGKEIT RESISTENZA ALLA TRAZIONE	EN ISO 13934-1	638 N	542 N
RAZTRŽNA TRDNOST TEAR GROWTH STRENGTH ČVRSTOČA NA KIDANJE WETTERRESISTENZKRIEIT RESISTENZA ALLA LACERAZIONE	EN ISO 13937-3	67 N	61 N
DRSNOST NITI RESISTANCE TO SEAM SLIPPAGE OTPORNOST NA POMERANJE POMERANJE SAVA NAHTSCHIEBEWIDERSTAND RESISTENZA ALLO SCORRIMENTO DELLA CUCITURA	EN ISO 13936-2 PRIAT/KOD/BEA/180 N	1,8 mm	1,5 mm
OBSTOJNOST TKANINE NA DRGNENJE ABRASION RESISTANCE POSTOJANOST TKANINE NA TRLIJANJE SCHIEBERESTANDIGKEIT RESISTENZA ALLA LACERAZIONE	EN ISO 12947-1 EN ISO 12947-2	>100.000	
PILING PILING RESISTANCE PILING PILIBILDUNG RESISTENZA AL PILING	EN ISO 12945-2	2000 OBRATOV/REVUS/OBRATAJA/ TOUREN/GIRI 4 - 5	2000 OBRATOV/REVUS/OBRATAJA/ TOUREN/GIRI 4 - 5
OBSTOJNOST BARVE NA SVETLOBO COLOUR FASTNESS TO LIGHT POSTOJANOST BOJE NA SVETLOSVEI LICHTECHTHEIT RESISTENZA DEL COLORE ALLA LUCE	EN ISO 105-B02	4	
OBSTOJNOST BARVE NA DRGNENJE COLOUR FASTNESS TO RUBBING POSTOJANOST BOJE NA TRLIJANJE REIBECHTHEIT RESISTENZA DEL COLORE ALL'ABRASIONE	EN ISO 105-X12	SIHODRUV/SUBIV/ SUVO/TROCKEN/ SECCO	MOKRO/WET/ MOKRONASS/ UMIDO
VSEBENOST AZO BARVIL CONTAIN OF AZO DYES SADRŽAJ AZO BOJA AZOFARBSTOFFE CONTENUTO DEI COLORANTI AZOICI	DIN EN 14362-1 / -3 [64 LFGB B 82.02.1 / -15	NI ZAZNANA NOT DETECTABLE NE SADRŽI NICHT NACHWEISBAR NON RILEVABILE	
VSEBENOST BARVIL KI POVZROČAJO ALERGIJE ALLERGY CAUSING DYES SADRŽAJ BOJA KOJE UZROKUJU ALERGIJE ALLERGIEERZENDE FARBSTOFFE CONTENUTO DEI COLORANTI ALLERGENICI	ISO 54231	NI ZAZNANA NOT DETECTABLE NE SADRŽI NICHT NACHWEISBAR NON RILEVABILE	
FORMALDEHID FORMALDEHYDE FORMALDEHID FORMALDEHYD	EN ISO 14184-1	NI ZAZNANA NOT DETECTED NE SADRŽI NICHT NACHWEISBAR NON RILEVABILE	

b)

Fig. 1 Toledo fabric used to produce the models:

a) appearance, and b) technical characteristics [4]

Artificial fur was used as a decorative detail to produce the Mother Christmas dress. In terms of raw material composition, it is also made of polyester fibres and features a construction that imitates natural fur, consisting of a woven textile backing and a pile layer (flor).



Fig.2 Artificial fur

Artificial fur (as well as natural fur) is characterised by good thermal insulation properties, i.e. efficient heat retention. In addition, it is economically affordable, offers simple processing and dyeing possibilities, and provides a wide variety of appearances and textures. It is produced using knitting or weaving techniques, and its surface, whether long- or short-pile, can imitate different types of animal fur. Compared to natural fur, it is easier to sew and process. Artificial fur is used in the production of warm outerwear, fashion accessories, decorative home products (such as cushions and blankets), and other decorative items [5].

2.2. Development of costume models

Model development plays an important role in the design process, i.e. in shaping an object while considering the balance between functionality, aesthetics, and the technological process [6]. For many years, Father Christmas has delighted the children of the city of Varaždin, and the new story of Mother Christmas and the elves needed to be integrated into a renewed Christmas narrative. Therefore, the development of a dress model for Mother Christmas and four elf costume models was undertaken. The fashion sketches were selected based on the works of students of the undergraduate professional study Textile, Garment and Footwear Technology at University of Zagreb Faculty of Textile Technology, Study Unit in Varaždin (Fig.3). The Mother Christmas' dress model was conceived as a long, long-sleeved dress. The elf costume – Model I was designed as a two-piece outfit: the upper part is a jacket with $\frac{3}{4}$ -length sleeves, while the lower part consists

of knee-length short trousers. The elf costume – Model II was conceived as a jumpsuit with shoulder straps and knee-length legs. The elf costume – Model III was designed as a two-piece outfit: the upper part is a jacket with $\frac{3}{4}$ -length sleeves, and the lower part consists of long trousers. The elf costume – Model IV was also designed as a two-piece outfit: a short, waist-length jacket with long sleeves and a cape around the neckline, combined with knee-length short trousers. As previously stated, the further elaboration in this paper focuses only on the Mother Christmas' dress model and the elf costume – Model I.

2.2.1. Construction of the Mother Christmas dress and the elf costume – Model I

The basic pattern of a garment represents the foundation for creating the pattern of a specific model. A new model is formed through modelling procedures applied to the basic pattern [7]. The construction of the Mother Christmas' dress model was carried out using the CAD system of the company Lectra and the Modaris software. The main body measurements used for the construction of the Mother Christmas dress and the elf costume are shown in Table 1.

Tab.1 Main body measurements for the construction of the elf costume – Model I and the Mother Christmas dress [8]

	Size 38	Size 42
Designation	/cm	/cm
Bust circumference	88	96
Waist circumference	72	80
Hip circumference	96	104
Height	168	168

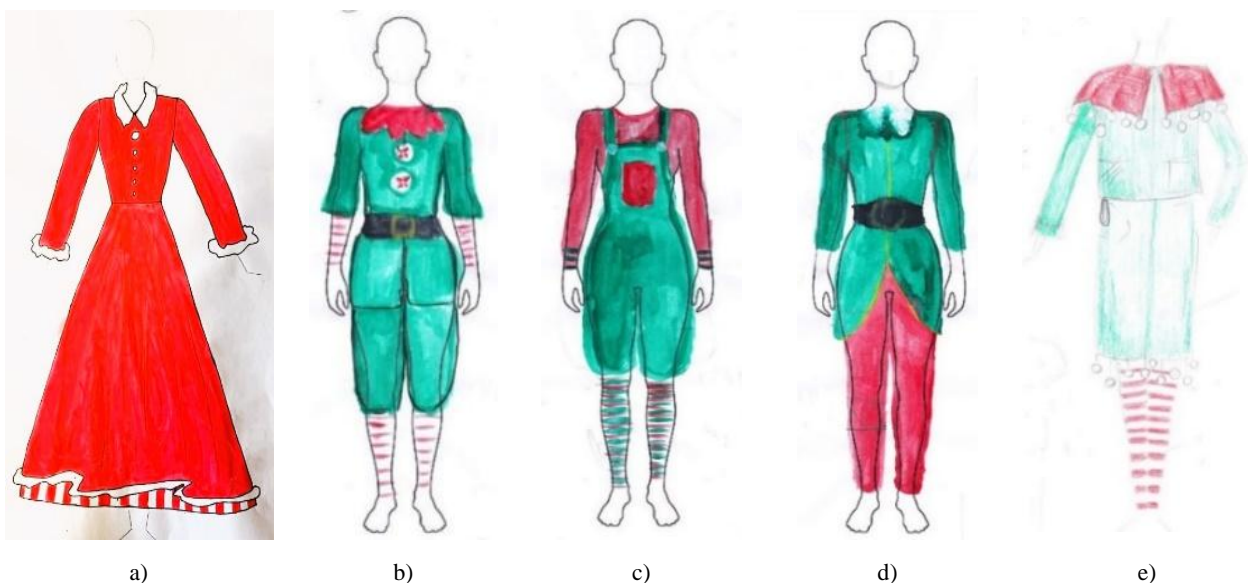


Fig.3 Selected model sketches [6]: a) Mother Christmas model (Klaudija Plantak, Garment Technology), b) Elf – Model I (Tena Šaško, Footwear Design), c) Elf – Model II (Tena Šaško, Footwear Design), d) Elf – Model III (Tena Šaško, Footwear Design), e) Elf – Model IV (Lorena Vugrinec, Garment Technology)

The basic pattern for the Mother Christmas dress was developed in garment size 42, while the basic pattern for the elf costume was developed in garment size 38.

Figs 4 and 5 present the technical drawings of the Mother Christmas dress model and the elf costume, along with their descriptions.

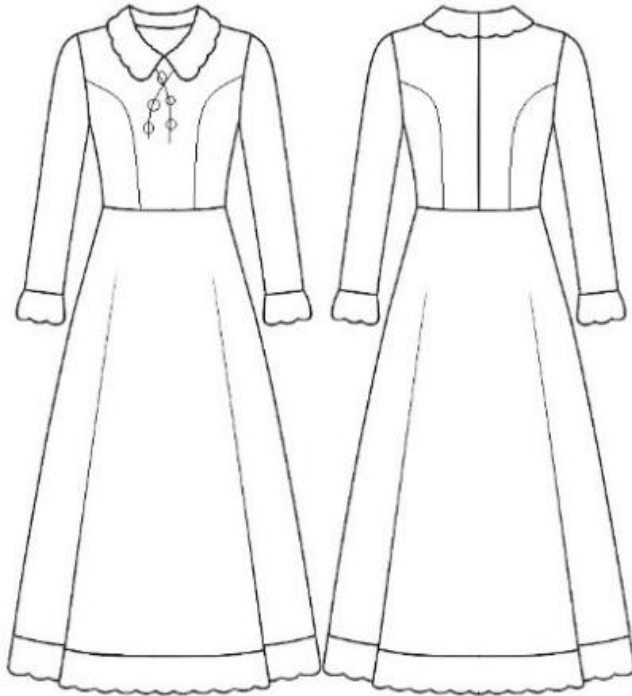


Fig.4 Technical drawing of the Mother Christmas dress model with description

Description of the Mother Christmas dress model

Front part – cut in two sections, upper and lower. The upper part of the dress features two princess seams extending from the armhole to the waistline.

Back part – cut in two sections, upper and lower. The upper back part has three princess seams: one at the centre back and two extending from the armhole to the waistline. At the centre of the upper back part, a slit is provided for the insertion of a concealed zipper.

Sleeves – one-piece sleeves, with fur trim sewn along the sleeve hem, 10 cm in width.

Collar – two-piece collar, cut at the centre. The under collar is made from the base Toledo fabric, while the upper collar is made of artificial fur. Along the inner edges of the front collar, a 1 cm wide tape is inserted, onto which white woollen pom-poms of various sizes are hand sewn.

Dress length – fur trim, 10 cm in width, sewn along the hemline.

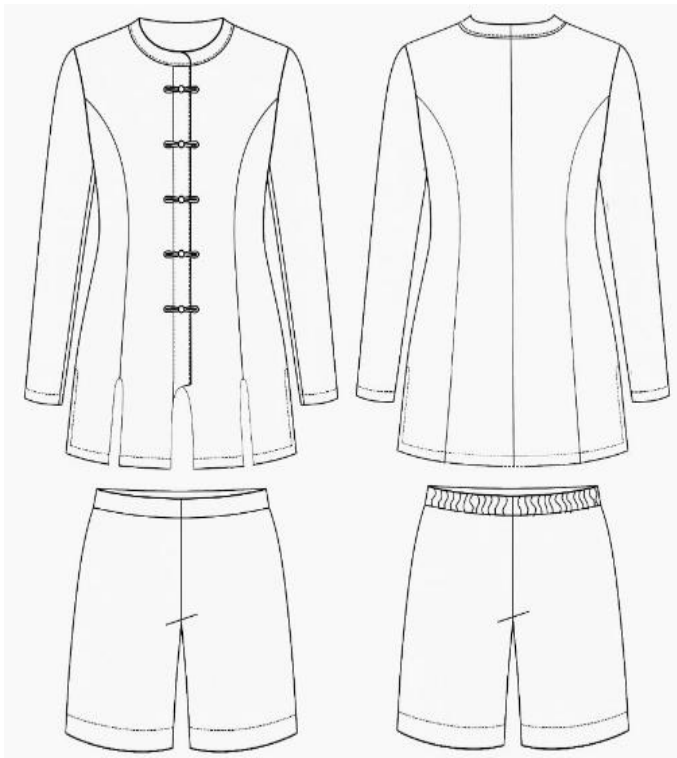


Fig.5 Technical drawing of the elf costume – Model I

Description of the elf costume – Model I

Front part of the jacket – features princess seams, with a 10 cm slit on each seam. The centre front fastening is realised using five decorative buttons. The neckline is round in shape, with facings at the front part and along the neckline. Slits, 10 cm in length, are also present in the side seams.

Back part – features three princess seams.

Sleeves – one-piece sleeves, with the sleeve hem overlocked and turned up to a 3 cm hem.

Jacket length – overlocked and turned up with a 3 cm hem.

Front part of the short trousers – elastic waistband 3 cm in width; the hem is overlocked and turned up to 3 cm.

Back part of the trousers – elastic waistband 3 cm in width; the hem is overlocked and turned up to 3 cm.

2.2.2. Pattern pieces of the Mother Christmas dress model and the elf costume – Model I

Pattern pieces of the Mother Christmas dress model are presented in Fig.6, and of the elf costume – Model I in Figs. 7 and 8.

2.3. Pattern layouts of the costumes

Pattern layouts for the Mother Christmas dress model are shown in Fig.9 and of the elf costume – Model I in Figs. 10 and 11.

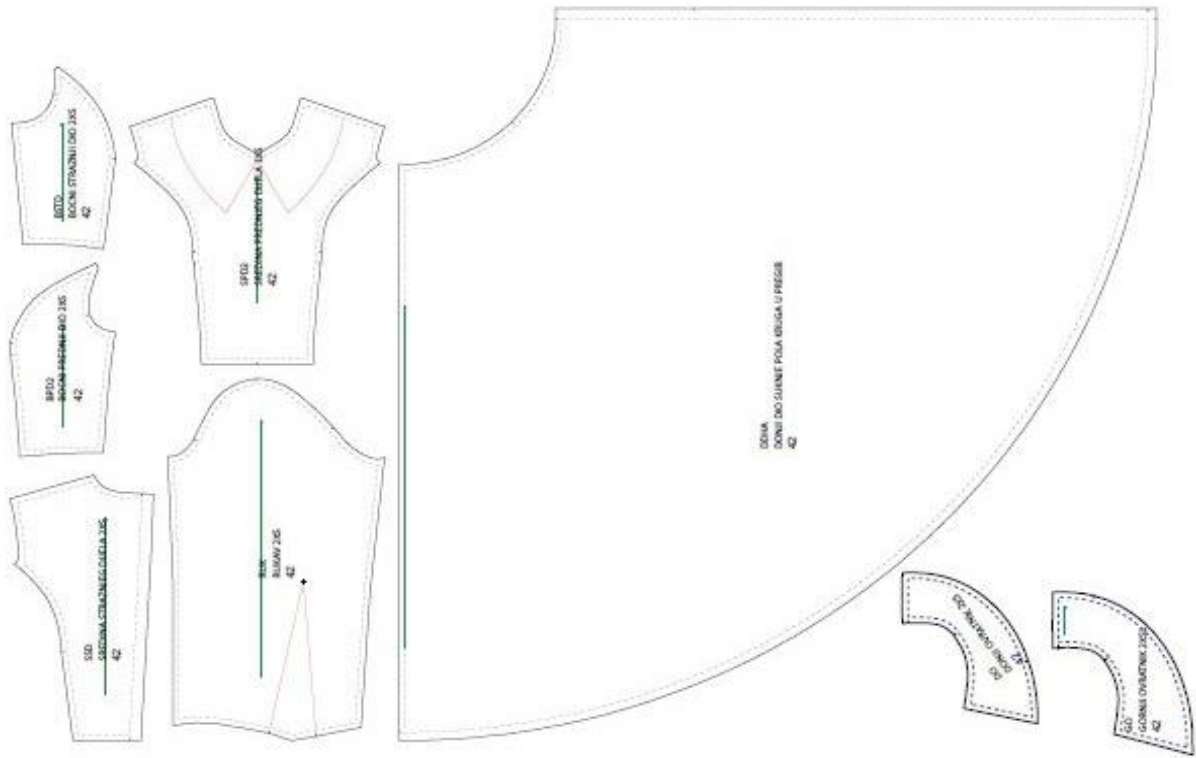


Fig.6 Pattern pieces for the Mother Christmas dress model

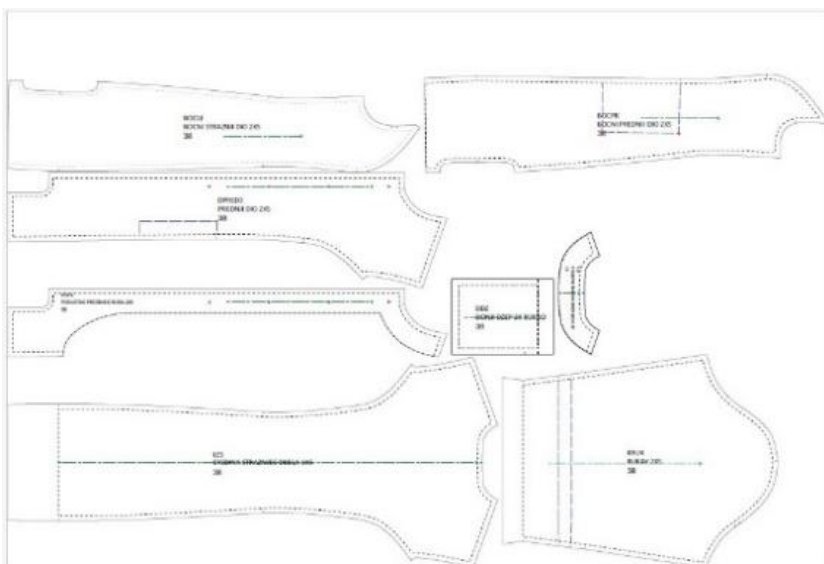


Fig.7 Pattern pieces for the elf model I – jacket

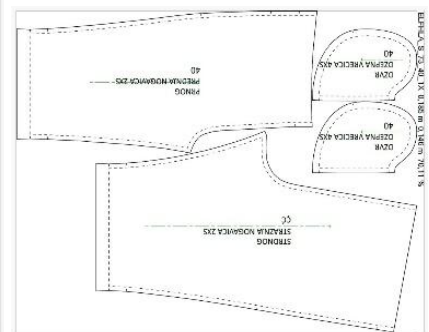


Fig.8 Pattern pieces for the elf model I – trousers

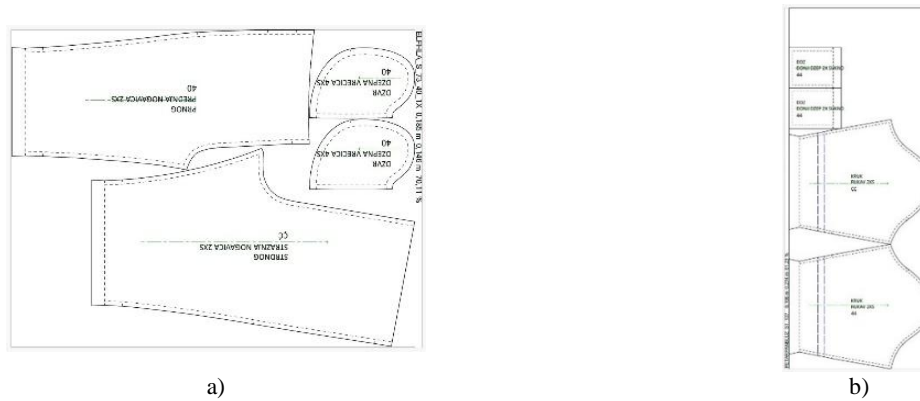


Fig.11 Pattern layout of the elf costume – Model I: a) trousers, b) sleeves

3. Technological processes of producing the Mother Christmas dress and the elf costume – Model I

The cutting was performed using hand scissors, followed by the technological sewing process. For sewing the specified models, a universal sewing machine was used, equipped with a programmed start

and end of seam backtacking, needle positioning at machine stop, and automatic thread trimming. A specialised overlocking machine was used to secure the seam edges, while ironing was carried out on an intermediate pressing table with a steam boiler. Table 2 presents the plan of technological sewing operations for the Mother Christmas' dress, while Table 3 shows the plan of technological operations for the elf costume – Model I.

Tab.2 Plan of technological sewing operations for the Mother Christmas' dress

Technological operation designation	Name of technological operation	Work equipment designation	Work category
1.	Delivery of bundles and sorting of pattern pieces	Ht	III
2.	Overlocking of front dress parts	Ssm	I
3.	Overlocking of back dress parts	Ssm	I
4.	Overlocking of dress sleeves	Ssm	I
5.	Joining princess seams on the upper front part of the dress (×2)	Usm	I
6.	Pressing open the princess seams of the upper front part (×2)	Sii	II
7.	Joining the upper and lower front parts of the dress at the waistline	Usm	I
8.	Joining the centre back seam up to the slit	Usm	I
9.	Pressing open the centre back seam	Sii	II
10.	Insertion of a concealed zipper at the centre back	Usm	I
11.	Joining princess seams on the upper back part of the dress (×2)	Usm	I
12.	Pressing open the princess seams of the upper back part (×2)	Sii	II
13.	Joining the upper and lower back parts of the dress at the waistline	Usm	I
14.	Sewing shoulder seams (×2)	Usm	I
15.	Pressing open shoulder seams (×2)	Sii	II
16.	Hand attachment of woollen round pom-poms to the tape	Ht	II
17.	Joining the upper (fur) and lower (woven) collars with insertion of the tape with pom-poms and turning	Usm	I
18.	Pressing the collar	Sii	II
19.	Attaching and closing the collar to the neckline	Usm	I
20.	Attaching fur to sleeve length (×2)	Usm	I
21.	Hemming the fur on sleeves to a width of 10 cm (×2)	Usm	I
22.	Attaching fur to the dress hemline	Usm	I
	Hemming the fur at the dress hemline to a width of 10 cm	Usm	I
23.	Setting in sleeves into the armholes (×2)	Usm	I
24.	Joining sleeves and side seams of the dress, ensuring alignment of fur seams on sleeves and hemline (×2)	Usm	I
25.	Final pressing of the dress	Sii	II
26.	Final inspection	Ht	II

Legend: Usm - Universal sewing machine, Ssm - Specialized sewing machine, Sii – Steam interphase iron, Ht - Hand tool

Tab.3 Plan of technological sewing operations for the elf costume – Model I

Technological operation designation	Name of technological operation	Work equipment designation	Work category
Upper part - jacket			
1.	Delivery of bundles and sorting of pattern pieces	Ht	III
2.	Overlocking of front jacket parts	Ssm	I
3.	Overlocking of back jacket parts	Ssm	I
4.	Overlocking of jacket sleeves	Ssm	I
5.	Overlocking of jacket pocket	Ssm	I
6.	Overlocking of front facings and neckline	Ssm	I
7.	Joining princess seams on the front part of the jacket with slit formation (×2)	Usm	I
8.	Pressing open the princess seams on the front part of the jacket (×2)	Sii	II
9.	Joining princess seams on the back part of the jacket (×2)	Usm	I
10.	Pressing open the princess seams on the back part of the jacket (×2)	Usm	I
11.	Joining the centre front and neckline facings at the shoulder seam (×2)	Usm	I
12.	Pressing open the shoulder seam of the centre front and neckline facings	Ssm	I
13.	Sewing shoulder seams (×2)	Usm	I
14.	Pressing open shoulder seams (×2)	Sii	II
15.	Setting in sleeves into the armholes (×2)	Usm	I
16.	Joining the sleeve seam and side seam of the jacket with slit formation (×2)	Usm	I
17.	Hemming sleeves (×2)	Usm	I
18.	Hemming the centre front, neckline, and jacket hemline	Usm	I
19.	Marking button fastening positions on the left and right front parts of the jacket (×5)	Ht	III
20.	Cutting cords to length for fastening on the left front part of the jacket (×5)	Ht	III
21.	Attaching cords to fastening positions on the left front part x5	Usm	I
22.	Cutting the cords to size for the right front of the jacket while guiding the cord through the button x5	Ht	III
23.	Sewing the cords to the button positions on the right front x5	Usm	I
24.	Final pressing of the jacket	Sii	II
25.	Final inspection	Ht	II
Bottom part - trousers			
1.	Delivery of bundles and sorting of pattern pieces	Sii	III
2.	Overlocking the front and back trouser pieces and the waistband	Ssm	II
3.	Sewing the pocket bag to the front part of the trousers ×2	Usm	I
4.	Sewing the pocket bag to the back part of the trousers ×2	Usm	I
5.	Joining the pocket bags ×2	Usm	I
6.	Overlocking the pocket bags ×2	Ssm	II
7.	Joining the side seams of the trousers ×2	Usm	I
8.	Joining the seat seam	Usm	I
9.	Joining the inseam	Usm	I
10.	Cutting elastic bands (3 cm) for the waistband to size ×1	Ht	III
11.	Cutting elastic bands (1 cm) for the leg lengths ×2	Ht	III
12.	Sewing the waistband onto the trouser waist	Usm	I
13.	Closing the waistband while inserting and stretching the elastic band	Usm	I
14.	Hemming the trouser legs while inserting and stretching the elastic band ×2	Usm	I
15.	Final pressing of the trousers	Sii	II
16.	Final inspection	Ht	II

Legend: Usm - Universal sewing machine, Ssm - Specialized sewing machine, Sii – Steam interphase iron, Ht - Hand tool

4. Results

The costumes of Mother Christmas and elves have been part of the Advent story of the city of Varaždin since 2023. On the website of the Varaždin Tourist Board, they represent an indispensable element in the presentation of one of the most beautiful periods of the year, undoubtedly the Advent season.

Figs. 12-14 show the produced costumes – the Mother Christmas' dress and the elf costume in their use [9]. During the promotion of the Advent season, they were also used beyond the borders of the Republic of Croatia (Fig.15) [9].



Fig.12 Mother Christmas in her house with toys [9]



Fig.13 Mother Christmas telling stories [9]



Fig.14 Father Christmas and Mother Christmas with the elves in the “Magical City” [9]



Fig.15 Promotion of the Advent season by the Varaždin Tourist Board in Maribor, Slovenia [9]

5. Conclusion

This paper presented the process of developing two models: the Mother Christmas' dress model and the elf costume – Model I. Although the base fabric used to produce the costumes was not primarily intended for the garment, it proved to be well suited to the costume concept. The challenge of realising this collaborative project with the Varaždin Tourist Board, which also involved working with students, resulted in a sense of satisfaction derived from the creative process of developing these costume models. At the same time, the students were educated through practical experience in the process of developing and producing garments for special purposes. The costumes created for the “Magical City of Father and Mother Christmas” gained considerable appreciation from both children and adults, thereby enhancing and enriching the overall Advent experience in the city of Varaždin.

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