

Original Scientific Paper *Izvirni znanstveni članek*

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Study of Inkjet Print Quality Using Colourimetry and Principal Components Analysis

*Uporaba kolorimetrije in analize glavnih komponent
(PCA) za določanje kakovosti odtisov narejenih
s kapljičnim tiskalnikom*

In the research, quality of prints made with inkjet printer Canon ImagePROGRAF W8400 using two different papers, matt coated and glossy photo paper, was determined. In addition, the impact of Wasatch softRIP settings – draft and high – on print quality was investigated. Software package Profile Maker 5.0.8 was employed for the creation of ICC colour profiles for both printing quality settings and both papers. For quality assessment of ICC profiles, a test chart with colour patches located within printer colour gamut was made by the open source program ArgyllCMS. Test chart was printed with different colour profiles and then measured. Quality of prints was assessed by means of colour difference equation ΔE_{ab}^* and multivariate statistical tool principal component analysis.

The results have shown that the RIP settings have no influence on print quality when glossy photo paper was used as a substrate. Final prints made on matt coated paper are of acceptable quality, although they possess a slightly smaller colour gamut when compared to the prints made on glossy photo paper. This is a consequence of different paper structure, however matt paper can accept larger amount of ink than glossy but also gives less saturated prints.

Keywords: printing quality, colour reproduction, inkjet printing, printer profiling, principal components analysis

V prispevku je raziskana kakovost odtisov narejenih s kapljičnim tiskalnikom Canon ImagePROGRAF W8400 na dveh različnih papirjih in sicer na motno in sijajno premazanem foto papirju. Pri tem je na Wasatch softRIP-u raziskan vpliv nastavitve kakovosti tiskanja – nizka in visoka – na samo kakovost odtisa. Za izdelavo ICC barvnih profilov pri obeh kakovostih tiskanja in pri obeh papirjih je bil uporabljen programski paket Profile Maker 5.0.8. Za določanje kakovosti ICC profilov je bila v odprtokodnem programu Argyll izdelana testna tablica z barvnimi polji, ki so se nahajala znotraj območja barvnega obsega tiskalnika. Testna tablica je bila natisnjena z uporabo različnih barvnih profilov in potem izmerjena. Kakovost odtisov je bila določena s pomočjo enačbe za barvne razlike ΔE_{ab}^ in analize glavnih komponent.*

Rezultati so pokazali, da v primeru uporabe sijajno premazanega foto papirja, nastavitve na RIP-u nimajo vpliva na samo kakovost odtisa. Kakovost končnih odtisov narejenih na motno premazanem papirju je sprejemljiva, čeprav imajo ti odtisi nekoliko manjši barvni obseg v primerjavi z odtisi narejenimi na sijajno premazanem papirju. To je posledica različne strukture papirja, saj lahko motno premazan papir sprejme večjo količino tiskarske barve od sijajno premazanega papirja, vendar so barve na končnem odtisu nekoliko manj nasičene.

Ključne besede: kakovost tiskanja, barvna reprodukcija, kapljični tisk, profiliranje tiskalnika, analiza glavnih komponent

Pregledni znanstveni članek *Scientific Review*

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Od CIE kolorimetrije do modelov barvnega zaznavanja

From CIE Colourimetry to Colour Appearance Models

Nastanek barvnega vtisa je povezan s tremi dejavniki: predmetom opazovanja, svetlobnim virom in z opazovalcem, na katerega vplivajo psihofizične lastnosti, izkušnje, čustva, kulturni vplivi in okolje z drugimi barvami, svetlostjo in kontrasti. CIE kolorimetrija ovrednoti barvni dražljaj s številkami, ki so sorazmerne občutljivosti človeškega vizualnega sistema na kratke, srednje in dolge valovne dolžine, neodvisno od načina nastanka barvnega dražljaja. Z nastankom digitalnih upodobitvenih sistemov je postala izjemno pomembna tudi pri barvnem upravljanju. Vendar se na tem področju ne srečujemo več z izoliranim barvnim dražljajem, temveč z različnimi mediji in pogoji opazovanja. V ta namen so za napoved barve pri spremembi medija in spremembi pogojev opazovanja razvili in vpeljali modele barvnega zaznavanja.

Ključne besede: kolorimetrija, model barvne prilagoditve, barvna konstanca, metamerija, indeks barvnega videza, modeli barvnega zaznavanja

The three factors, indispensable for the colour perception, are a light source, an object and an observer with his psychophysical properties, experiences, emotions, culture and environment influence with other colours, illuminations and contrasts. CIE colourimetry specifies a colour stimulus with numbers proportional to the stimulation of the human visual system, independent of how colour stimuli was produced. CIE colourimetry became much more prevalent with the development of digital imaging systems also in the field of colour

management, where colour stimulus is not isolated but depends on different media and viewing conditions. For that purpose, colour appearance models for prediction of colour appearance across changes in media and viewing conditions, was developed.

Keywords: colourimetry, chromatic adaptation, colour constancy, metamery, colour rendering index, colour appearance models

Izvirni znanstveni članek *Original Scientific Paper*

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Vpliv prisotnosti nanosrebra na funkcionalne in uporabne lastnosti tkanin

Influence of Nanosilver on Functional and Applicable Fabrics Properties

Namen raziskave je bil proučiti vpliv prisotnosti protimikrobne sredstva na podlagi nanosrebra (Ag) na morfološke, kemijske in fizikalne lastnosti tkanin. Uporabljene so bile tri tkanine, in sicer dve 100-odstotni bombažni (CO1 in CO2) in tkanina iz mešanice bombaža in poliestra v razmerju 65 % / 35 % (CO/PES). Tkanine so se razlikovale po morfološki strukturi, debelini, gostoti, zavojih preje, hidrofilnosti in predobdelavah. Kot protimikrobno sredstvo je bilo uporabljeno koloidno srebro, ki je bilo naneseno na tkanine po izčrpalnem postopku pri koncentraciji 0,05 % na maso blaga. Koncentracija Ag na apretiranih vzorcih tkanin je bila določena z analizo ICP-MS. Morfološke lastnosti vlaken so bile določene s SEM, omočljivost tkanin z metodo tankoplastnega pronicanja in meritvami stičnih kotov vode. Določeni so bili belina, indeks porumenitve, zračna prepustnost ter pretržna sila in raztezek tkanin. Iz rezultatov je razvidno, da sta na količino adsorbiranega Ag neposredno vplivali surovinska sestava in predobdelava tkanin. Koncentracija Ag na tkaninah je naraščala v naslednjem vrstnem redu: CO/PES < CO2 < CO1. Na manjšo količino Ag na tkanini CO/PES je vplivala prisotnost hidrofobnih poliestrskih vlaken v mešanici, ki so zmanjšala omočljivost tkanine. Mercerizacija tkanine CO1 je povečala absorptivnost vlaken za Ag v primerjavi z beljeno tkanino CO2. Omočljivost tkanin CO1 in CO2 se v prisotnosti Ag ni spremenila, pri tkanini CO/PES pa se je celo povečala. Nanos Ag ni vplival na morfološke lastnosti vlaken, povzročil je rahlo zmanjšanje beline, zračne prepustnosti in pretržne trdnosti.

Ključne besede: bombaž, poliester, adsorpcija srebra, vpliv morfoloških lastnosti, vpliv predobdelave, omočljivost, belina, fizikalne lastnosti

The purpose of this research was to determine the influence of the presence of the antimicrobial agent based on nanosilver (Ag) on the

morphological, chemical and physical properties of fabrics. In the experiment, two 100% cotton woven fabrics (CO1 and CO2) and a cotton/polyester (65%/35%) woven fabric (CO/PES) were used. Fabrics differ from each other in the morphological structure, thickness, density, twist of threads, hydrophilicity and pretreatment processes. Colloidal silver of the concentration 0.05% on the fabric weight was applied on fabrics with the exhaustion method. The concentration of Ag was determined with the ICP-MS analysis. The morphological properties of fibres were determined with SEM, the wettability of fabrics with thin-layer wicking and the measurement of the contact angle with water. Whiteness, yellowness index, air permeability as well as breaking strength and breaking elongation were determined as well. The results showed that the composition and pretreatment processes of fabrics greatly influenced the amount of adsorbed Ag. The concentration of adsorbed Ag on fabrics increased as follows: CO/PES < CO2 < CO1. The lowest concentration of the adsorbed Ag was affected by the presence of hydrophobic polyester fibres in the CO/PES fabric that decreased the fabric wettability. The mercerization of the CO1 fabric increased the absorptivity of fibres for Ag in comparison with the bleached CO2 fabric. The presence of Ag did not change the wettability of CO1 and CO2 fabric, in the case of the CO/PES fabric it even increased. The application of Ag did not influence the morphological properties of fibres; it only slightly decreased whiteness, air permeability and breaking strength.

Keywords: cotton, polyester, adsorption of silver, influence of morphological properties, influence of pretreatment, wettability, whiteness, physical properties

Izvirni znanstveni članek *Original Scientific Paper*

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Vrednotenje vpliva različnih dejavnikov pri odstranjevanju standardnih umazanij z bombažnih tkanin z večfaktorsko analizo variance

Evaluation of the Influence of Different Parameters in Removing Standard Soil from Cotton Fabric Using Multi-Factorial Analysis of Variance

V študiji smo proučevali vplive različnih dejavnikov na uspešnost odstranjevanja standardnih umazanij z bombažnih tkanin in jih ovrednotili z večfaktorsko analizo variance (ANOVA). V raziskavi sta bila uporabljena dva tržna tekoča detergenta (P1 in P2), tržno sredstvo za odstranjevanje madežev (OXI) in dve standardni umazaniji, naneseni na bombažni tkanini, izdelovalca Empa iz Švice, in sicer izdelka 101 (E101) in 116 (E116). Vzorci tkanin so bili

oprani v skladu s standardom SIST EN ISO 105-C06 na tri načine, in sicer pranje v deionizirani vodi brez detergenta, pranje z dodatkom detergenta P1 ali P2 in pranje z mešanico detergenta P1 ali P2 in OXI. Pranje je bilo izvedeno v aparatu Launder-Ometer pri temperaturi 40 in 60 °C pri različnem številu ciklov pranja, in sicer 1, 3, 5 in 10. Pri temperaturi 60 °C je bilo izvedeno tudi pranje vzorcev v deionizirani vodi le z OXI. Učinkovitost pranja je bila ovrednotena z določitvijo barvnih razlik, ΔE_{ab}^* , med nepranim in pranim vzorcem tkanin. Rezultati pranja so bili statistično obdelani z uporabo večfaktorske statistične analize ANOVA. S štirifaktorsko statistično analizo ANOVA smo vrednotili vplive štirih dejavnikov na ΔE_{ab}^* , in sicer vrste in strukture umazanije, vrste in strukture pralnega sredstva, temperatura pranja in števila ciklov pranja. Ugotovljeno je bilo, da vsi naštetih dejavnikov statistično značilno vplivajo na vrednosti ΔE_{ab}^* pri 99-% stopnji zaupanja, največji vpliv pa ima temperatura pranja. Tudi interakcije pralno sredstvo-temperatura pranja, pralno sredstvo-umazanija in temperatura-umazanija statistično značilno vplivajo na vrednosti ΔE_{ab}^* , medtem ko vpliv interakcij pralno sredstvo-cikli pranja, temperatura-cikli pranja in cikli pranja-umazanija statistično ni značilen. Analiza je tudi pokazala, da med delovanjem pralnih sredstev P1 in P2 ni bistvenih razlik, kar pomeni, da sta sredstvi enako učinkoviti pri odstranjevanju proučevanih umazanij.

Ključne besede: pranje, standardna umazanija, bombažna tkanina, vpliv različnih dejavnikov, učinek pranja, analiza variance

In the study, the influence of several factors on the effective removal of standard soils from a cotton fabric was evaluated with the multi-factorial analysis of variance (ANOVA). Two commercial liquid detergents (P1 and P2), commercial powdered stain removal agent (OXI) and two standard soils, applied on cotton fabric, were used in the study. Both studied fabrics are EMPA test materials from Switzerland. The first one is batch 101 (E101) soiled with carbon black/olive oil and the second one is batch 116 (E116), soiled with blood/milk/ink. The washing of fabric samples was conducted in accordance with the SIST EN ISO 105-C06 standard, using three different manners of washing, i.e. washing in deionised water without the addition of a liquid detergent, washing with the addition of P1 or P2, and washing with the addition of the mixture of P1 or P2 and OXI. All washings were performed in the apparatus Launder-Ometer at the temperatures of 40 and 60 °C using different numbers of washing cycles, i.e. 1, 3, 5 and 10. The washing in deionized water with OXI was also performed at the temperature of 60 °C. The washing efficiency was evaluated by determining the colour difference between the unwashed and washed fabric samples. The washing results were analysed using the statistical analysis of variance (ANOVA). The influence of four factors (soil type, detergent type, washing temperature and washing cycle) on ΔE_{ab}^ was evaluated with the four-factor ANOVA. It was found out that all factors have a statistically significant influence on ΔE_{ab}^* at 99% confidence interval, the temperature having the highest*

impact among them. The interactions washing agent-temperature, washing agent-soil and temperature-soil also have a statistically significant influence on the value of ΔE_{ab}^ , whilst the influence of washing agent-washing cycles, temperature-washing cycles and washing cycles-soil interactions is statistically insignificant. Between the liquid detergents P1 and P2, no essential differences are present in their action, confirming that both liquid detergents are equally effective at the removal of standard soils.*

Keywords: washing, standard soil, cotton fabric, influence of different factors, washing efficiency, analysis of variance

Izvirni znanstveni članek *Original Scientific Paper*

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Oblikovanje »lotosovega efekta« na bombažni tkanini s plazmo, encimi in apreturo sol-gel

Creation of "Lotus Effect" on Cotton Fabric with Use of Plasma, Enzymes and Sol-gel Finishing

V raziskavi je bil proučevan vpliv predobdelave bombažne tkanine z okolju prijaznimi postopki, kot sta plazma in encimi na kakovost vodo- in oljeodbojne apreture sol-gel. Vzorca, obdelani z nizkotlačno plazmo vodne pare, celulozami in tudi njunima kombinacijama, so bili naknadno impregnirani z modificiranim fluoroalkil siloksanom. Morfološke spremembe modificiranih in apretiranih celuloznih vlaken so bile proučene z vrstično elektronsko mikroskopijo. Prisotnost perfluoriranega nanokompozitnega apreturnega filma na površini tkanine je bila potrjena s Fourierjevo transformacijsko infrardečo spektroskopijo. Vodoodbojnost apretiranih vzorcev pred pranjem in po večkratnem pranju je bila določena z meritvami statičnih stičnih kotov vode, oljeodbojnost pa po standardni metodi AATCC 118-1966 T. Določeni so bili koti zdrsa kaplje vode po površini apretirane tkanine kot tudi vpliv modifikacije in apreture bombažne tkanine na njeno togost in pretržno trdnost. Iz rezultatov je razvidno, da je predobdelava tkanine s plazmo in encimi povzročila nastanek mikro- do nanostrukturirano hrapavost površine vlaken, kar je posledično vplivalo na povečanje stičnih kotov vode nad 150°, zmanjšanje kota zdrsa in povečanje oljeodbojnosti apretirane tkanine. »Lotosov efekt« je bil najbolj izražen na apretiranih vzorcih, ki so bili predobdelani s plazmo. Kemijska modifikacija vlaken ni bistveno spremenila togosti tkanine, nekoliko je poslabšala njeno pretržno silo.

Ključne besede: bombaž, plazma, encimi, apretura sol-gel, lotosov efekt, fizikalne lastnosti

In this research, the influence of the pre-treatment of cotton using environmentally friendly processes, i.e. plasma and enzymes, on the quality of hydro- and oleophobic sol-gel coating was studied. The samples were pre-treated with low-pressure water vapour plasma, cellulases and their combinations, and subsequently finished with modified fluoroalkil siloxane. The morphological changes of the pre-treated and finished cellulose fibres were examined with the scanning electron microscopy. The presence of perfluorinated nanocomposite coating on the fabric samples surface was confirmed with the Fourier transform infrared spectroscopy. The hydrophobicity of finished samples before and after repeated washing was determined by measuring static contact angles of water, while the oleophobicity was determined according to the AATCC 118-1966 standard method T. The sliding water angles were measured on the surface of finished fabric samples. The impact of pre-treatment and finishing of cotton fabric on its stiffness and tensile strength was measured as well. The results show that the pre-treatment of cotton using plasma and enzymes results in the creation of micro- to nanostructured surface roughness of fibres, increased water contact angle higher than 150°, decreased sliding water angle and increased oleophobicity of sol-gel finished fabric. The "lotus effect" was the most noticeable on the finished samples, pre-treated with plasma. The chemical modification of fibres did not change the stiffness of the fabric; however, it did slightly worsen its breaking force.

Keywords: cotton, plasma, enzymes, sol-gel finish, lotus effect, physical properties

Izvirni znanstveni članek Original Scientific Paper

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Vpliv vlage na natezne lastnosti encimatsko obdelanih vlaken Crabyon®

Humidity Impact on Tensile Properties of Enzymatically Treated Crabyon Fibres

Vlakna Crabyon® so tržno uveljavljena vlakna, ki vsebujejo poleg celuloze še hitozan. Zaradi njegove prisotnosti imajo izdelki antibakterijski učinek in so koži prijazni na otip, zato so primerni tudi za uporabo v higienskih izdelkih. Namen raziskave je bil proučiti strukturne spremembe in natezne lastnosti encimatsko obdelanih vlaken Crabyon®, izpostavljenih različnim pogojem vlage pri stalni temperaturi. Vlakna so bila obdelana z encimi celulazami, obdelava je trajala od 30 do 60 minut. Določile so se natezne lastnosti in narejena je bila analiza krivulje specifična napetost/raztezek in analiza podatkov. Encimatsko obdelana vlakna so bila izpostavljena štirim različnim pogojem vlage, in

sicer 30-%, 45-%, 65-% in 80-% pri stalni temperaturi 20 °C. Z encimatsko obdelavo se zniža stopnja kristalnosti vzorcev, obdelanih s 30- in 60-minutno encimatsko obdelavo, medtem ko se orientacija zmanjša pri vzorcih, obdelovanih 30 minut z encimi. To vpliva na nižjo pretržno napetost in večji raztezek kot z neobdelanimi vlakni. Po 60 minutah obdelave se specifična pretržna napetost nekoliko zmanjša, medtem ko je pri pretržnem raztezkazu znatno povečanje v primerjavi z vlakni, ki so bila z encimi obdelovana 30 minut. Encimatsko obdelana vlakna so tako manj trdna, vendar bolj fina kot neobdelana. Prav tako se pri encimatsko obdelanih vlaknih z večanjem vlage zmanjša specifična pretržna napetost, medtem ko se pretržni raztezek poveča.

Ključne besede: vlakna Crabyon®, encimi, natezne lastnosti, vlaga Crabyon® fibres are among the first fibres on the market which have apart from cellulose also chitosan in their structure. Due to chitosan, the fibres have antibacterial properties and are used in many fields as hygienic products. The aim of the research was to determine the structural changes and the changes in the tensile properties of the fibres which were treated with enzymes cellulase. The analyses of tensile properties were performed on enzymatic fibres treated for 30 and 60 minutes, and tested at four different levels of humidity (30%, 45%, 65%, 80%) at constant temperature 20 °C. The tensile properties were determined and the analysis of the curve specific stress/extension was done. The research showed that an enzymatic treatment causes in fibres a lower degree of crystallinity at both treatment times. Orientation is lower at the fibres treated for 30 minutes, lower is also specific stress, while extension is higher, compared to the untreated fibres. After 60 minutes of enzymatic treatment, specific stress is slightly lower, whereas breaking extension is much higher in comparison with the fibres treated with enzymes for 30 minutes. The results showed that the enzymatically treated fibres are more pronounced and fine when relative humidity is higher than in the standard testing atmosphere.

Keywords: Crabyon® fibres, enzymes, tensile properties, relative humidity

Strokovni članek Professional Paper

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Novosti na področju nege tekstilij – Texcare 2012

Novelties in Field of Textile Care – Texcare 2012

V prispevku so predstavljene novosti s področja nege tekstilij izbranih izdelovalcev strojne opreme in izdelovalcev sredstev za pranje ter kemično in mokro čiščenje, prikazane na sejmu

TEXCARE 2012. Tako izboljšave strojne opreme, kot tudi optimizacija postopkov nege z vidika združevanja posameznih faz, zniževanja temperature in časa obdelave ter uporaba ekološko sprejemljivejših sredstev, vodijo do trajnostnega razvoja postopkov nege tekstilij. Novosti v strojni opremi se kažejo predvsem v konstrukcijskih izboljšavah, ki se odražajo v zmanjšani porabi energije in naravnih virov. Sredstva za pranje postajajo vse bolj koncentrirana, zaradi česar se zmanjša njihova poraba, uporaba brezhalogenskih topil pa omogoča ekološko prijaznejše postopke kemičnega čiščenja. Trajnosti razvoj je prisoten na vseh področjih nege tekstilij – pranju in profesionalni negi (kemično čiščenje in mokro čiščenje).

Ključne besede: TENCARE 2012, novosti, nega tekstilij, pralna sredstva, pranje, kemično čiščenje, mokro čiščenje, likanje

Novelties in the field of textile care by selected manufacturers of machines and manufacturers of dry cleaning agents, wet cleaning agents and laundry detergents, shown at TENCARE 2012, are presented in the paper. The machinery improvements and the optimisation of processes in terms of integration of individual phases, lower processing temperature, shorter processing time and the usage of ecologically acceptable cleaning agents, lead to sustainability in textile care processes. The novelties in machinery are mostly present in construction improvements, which can be reflected in lower consumption of both energy and natural resources. The consumption of laundry detergents is decreasing due to more concentrated products, whilst the usage of halogen-free solvents enables more ecologically friendly dry cleaning process. Sustainable development is present in all areas of textile care – laundering and professional care (dry and wet cleaning).

Keywords: TENCARE 2012, novelties, textile care, laundry detergents, laundering, dry cleaning, wet cleaning, ironing

Strokovni članek *Professional Paper*

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Izvoz je pomagal panogi iz recesije *Export Facilitated Slovenian Textile and Clothing Industry from Recession*

Slovenska tekstilna, oblačilna in usnjarskopredelovalna industrija (TOUPI) ima 415 družb in 11.775 zaposlenih. Prvič po letu 2007 so imele družbe tekstilne, oblačilne in usnjarskopredelovalne industrije pozitiven rezultat poslovanja, to je 13,5 milijona evrov neto čistega dobička.

Pogled na gibanje proizvodnje v zadnjih letih pokaže, da je bilo zaradi finančne in gospodarske krize dno doseženo leta 2009,

nato pa je začela proizvodnja postopno naraščati. Marca 2012 je bila proizvodnja tekstilij na ravni 40 % proizvodnje iz leta 2005, proizvodnja oblačil 60 %, proizvajalci usnja in usnjenih izdelkov pa so za nekaj odstotnih točk preseglili vrednost proizvodnje iz leta 2005.

Hkrati z zmanjševanjem proizvodnje se je močno zmanjševalo tudi število zaposlenih, od leta 2007 do 2011. za 9300 delavcev. Lani se je število zaposlenih celo povečalo, le v proizvodnji tekstilij število zaposlenih še vedno nekoliko upada.

Tekstilna, oblačilna in usnjarskopredelovalna industrija je velik izvoznik, saj z izvozom ustvari skoraj 75 % prihodkov od prodaje izdelkov. Izvoz je bil tudi v letu 2011 gibalo proizvodnje in lahko rečemo, da je panogi pomagal iz recesije.

Rezultati poslovanja TOUPI v letu 2011 kažejo, da se je krčenje TOUPI po treh zaporednih kriznih letih umirilo. Vendar pa panoga za nadaljnji razvoj nujno potrebuje ustrezne pogoje poslovanja: prožen trg dela, dostopnost do finančnih virov, industrijsko politiko in promocijo s poudarkom na perspektivnosti panoge. S promocijo panoge in njenih uspešnih podjetij je treba razbiti stereotip, da slovenska tekstilna industrija opravlja le dodelavna dela in da je ta panoga primerna za manj razvita okolja s prebivalci z nizko stopnjo izobrazbe.

Ključne besede: tekstilije, oblačila, usnjarskopredelovalna dejavnost, proizvodnja, zaposleni, izvoz, uvoz, dodana vrednost

In the Slovenian textile, clothing and leather-processing industry, there are 415 companies employing 11,775 workers. For the first time since 2007, this industry branch has achieved positive operating results for the year 2011, i.e. namely €13.5 m of net profit.

A review of the manufacture output in the last couple of years shows that the output bottomed out in 2009 due to the financial and economic crisis, and it was then when it began to improve gradually. In March 2012, the textiles output reached 40% of the output from 2005, the clothing output 60%, while the leather processing output was even higher by a few percentage points than in 2005.

The output decrease was accompanied by the employment reduction – there were by 9,300 fewer employees in the period 2007–2011. In 2011, the number slightly increased, while it was still decreasing in the textile sector. The Slovenian textile, clothing and leather-processing industry is a major exporter, for its export represents 75% of the turnover of the whole sector. Thus, the export was also the production motive power in 2011 and it could be stated that it was the export that helped the sector in the recession. According to the production analysis, the downsizing in 2011 calmed. Nevertheless, for a further development of this industry branch, proper business conditions are required, namely flexible employment market, access to financial markets, industry policy and promotion with the emphasis on the industry perspective. With the promotion of the industry and its successful companies, we should break down the stereotype, i.e. that the Slovenian textile and clothing

industry provides only outward processing trade and belongs to underdeveloped markets with a low educational level of employees.

Keywords: textiles, clothing, leather-processing industry, output, employment, export, import, added value

Predstavitev projekta *Presentation of Project*

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Nova oblačilna podoba hostes s sloganom Slovenijo čutim

New Clothing Image of Hostesses with Slogan I Feel Slovenia

Projekt je primer spodbujanja ustvarjalnega razvoja mladih in partnerstva, ki temelji na sinergiji aktivnosti šole z zunanjimi ustanovami. Sodelovanje šole dijakom omogoča nadgradnjo izobraževanja na konkretnih projektih in pridobivanje dragocenih izkušenj pri realizaciji in organizaciji, kar je zelo pomembno za sam poklic in nadaljnje delo. Njihovo delo je zaradi večje motivacije, ustvarjalnosti in komunikacije učinkovitejše in uspešnejše.

Namen prispevka je prikazati idejno snovanje in končno realizacijo kolekcije oblačil, ki temelji na digitalnih in klasičnih tehnologijah pri oblikovanju in izvornih fotografskih zapisih, fotografijah in nekajminutnem videu. Namenjeni so tiskanim in vizualnim medijem ter spletnim stranem. E-učilnica pa omogoča aktivno sodelovanje učitelja z dijakom pri razvoju idej, vrednotenju in njihovi analizi, načrtovanju in končni realizaciji. S tem je dijakom omogočeno sprotno reševanje tehničnih in oblikovalskih problemov,

učitelji pa laže spodbujajo in usmerjajo njihovo ustvarjalnost ter inovativnost.

Medijsko zelo odmeven dogodek sodelujočim dijakom omogoča pridobiti dodatne reference za njihovo osebno mapo oz. »Europass«.

Ključne besede: Svetovno veslaško prvenstvo Bled 2011, kolekcija oblačil za hostese, sodelovalni projekt, timsko delo, fotografije in video

The aim of the project was to show how the creative development of the young can be enhanced based on the synergy between school activities and other institutions. The school's active participation offers students the opportunity to take their training to a higher level; it gives them the chance to gather valuable experience on the organisation and implementation of real-life projects, the latter being of great importance for their professional career and work. Due to better motivation, creativity and communication, students' work is more effective and more successful.

The aim of this article is to present both the scheming and the final production of a clothing collection the designing of which is based on digital as well as classic technologies, authentic photographic records, photographs and a short video. The material was made for the press and television, and for websites. The so called e-classroom allows teachers to co-operate on a daily basis with their students as far as the development of ideas, evaluation, analysis, planning and final realisation are concerned. In this way, students can solve technical and design problems as they go along, whereas the teachers can encourage and direct their students' creativity and innovative ideas more easily. This famous event will enable the participating students to obtain additional references for their portfolios or their Europass, respectively.

Keywords: World Rowing Championships Bled 2011, clothing collection for hostesses, co-operation project, team work, photographs and video