

MEDNARODNO SREČANJE
SLOVENSKEGA PAPIRNIŠTVA
INTERNATIONAL MEETING
OF SLOVENE PAPER INDUSTRY
2021 / 22

25.th DAN SLOVENSKEGA PAPIRNIŠTVA
DAY OF SLOVENE PAPER INDUSTRY
48.th MEDNARODNI LETNI SIMPOZIJ DITP
INTERNATIONAL ANNUAL SYMPOSIUM DITP

ZBORNIK POVZETKOV BOOK OF ABSTRACTS



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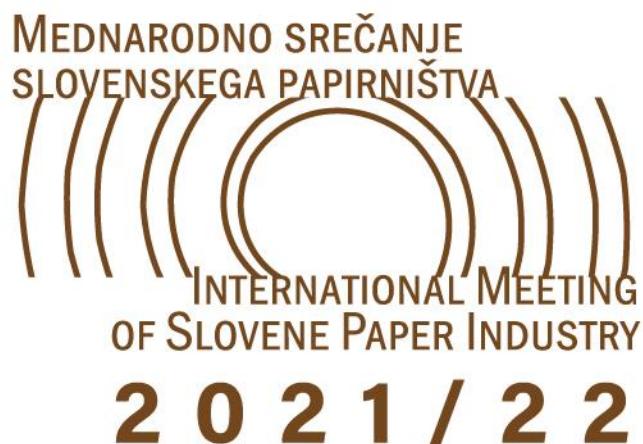
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25. DAN SLOVENSKEGA PAPIRNITVA
25th DAY OF SLOVENE PAPER INDUSTRY



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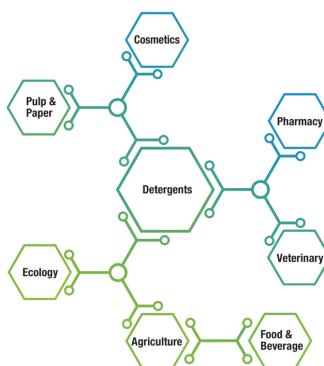
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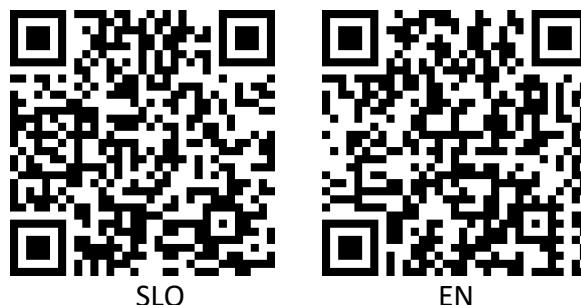


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PAPIR ZDAJ – MATERIAL ZA KROŽNO
GOSPODARSTVO

PAPER NOW – MATERIAL FOR CIRCULAR ECONOMY

BIOLOŠKI ODPADEK PAPIRNIŠKE INDUSTRIJE KOT DODATEK RASTNIM SUBSTRATOM ZA GOJENJE RASTLIN

Gregor Osterc, Marko Zupan, Boris Turk, Ana Slatnar

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V sodobni vrtnarski je velika potreba po uporabi kakovostnih rastnih substratov. Sodobne usmeritve narekujejo uporabo nadzorovanih sistemov v rastlinjakih. To pomeni, da uporabljeno vodo za zalivanje rastlin zbiramo, prečistimo in ponovno uporabimo, kar pomeni, da je potrebno uporabljati kakovostno vodo in seveda kakovosten rastni substrat, če želimo pridelati kakovostne sadike ali rastline. S potrebo zmanjševanja proizvodnih stroškov, se danes v vrtnarski proizvodnji rastline dalj časa goji v istem rastnem substratu, s čimer se izognemo pogostemu presajaju, kar povečuje stroške proizvodnje. Šota je še vedno večinski rastni substrat vrtnarske proizvodnje in je izrazito omejen naravni vir. Zato je neobhodno nujno, da povečamo intenzivnost iskanja alternative za njeno zamenjavo z drugimi možnimi rastnimi substrati, če se le da čim bolj lokalnega izvora. Hkrati pa z vključevanjem potencialno uporabnih industrijskih odpadkov v ta proces vključujemo sekundarne surovine (krožno gospodarstvo) in zmanjšujemo odpadke.

Bio-mulj, tako smo poimenovali mulj, ki ga v največji meri predstavlja odmrla bakterijska masa je odpadek v papirniški industriji. Po nekaterih osnovnih analizah (prostost potencialno toksičnih elementov, velika sposobnost vezave vode,...) kaže kot morebitno zanimiv dodatek rastnim substratom, ki jih uporabljamo za gojenje različnih kmetijskih rastlin. Pred širšo uporabo v kmetijstvu oz. vrtnarstvu je potrebno proučiti učinke bio-mulja na rast in razvoj rastlin.

Leta 2021 smo postavili 5 različnih poskusov, v katerih smo proučevali učinke bio-mulja v različnih deležih v rastnem substratu na rast in razvoj izbranih vrst kmetijskih rastlin v obdobju gojenja teh rastlin, učinke bio-mulja na rast in razvoj kalic izbranih zelenjadnic ter sorptivno sposobnost bio-mulja v primerjavi z različnimi drugimi mineralnimi snovmi, ki jih uporabljamo kot dodatek rastnim substratom. Prvi rezultati kažejo, da dodatek bio-mulja rastnemu substratu ne pomeni nikakršne toksičnosti za rastline. Rastline do določene razvojne stopnje lahko uspešno gojimo tudi v čistem bio-mulju, kot rastnem substratu. Najboljše rezultate smo v večini primerov dosegli ob dodatku 25 % volumskega deleža bio-mulja rastnemu substratu. Pri tem deležu bio-mulja v rastni substrat smo lahko v splošnem izmerili najboljšo rast in razvoj rastlin, tako nadzemnega, kot podzemnega dela in tudi rastline so bile prodajno najkakovostnejše (primer solate).

BIOLOGICAL WASTE OF THE PAPER PRODUCTION INDUSTRY AS AN ADDITIVE OF GROWING SUBSTRATES USED FOR PLANT CULTIVATION

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There is a great demand on growing substrates of best quality in common horticulture industry. Modern trends based on usage of controlled systems in growing houses. This means, that the water used for the plant watering is accumulated, cleaned and used again, therefore the usage of qualitative water and substrate is necessary to obtain qualitative plants. Today, in the view of reducing costs, horticulture plants are growing in pots longer period due to avoid the demand of several replantings which enhance the production costs. Peat is still the major growing substrate in the horticulture production and represents a strong limited natural source. It is absolutely necessary to enhance intensity of searching alternatives for peat as potential growing substrates which are possible local origin. On the other side, including the industrial waste in this process means that the secondary materials are used again (circular economy) and the trash amount is lowering.

Bio-silt is a mix of dead bacterial mass and is a waste of paper industry. Based on some elementary analyses (absence of potential toxic elements, high ability of absorbing of water, etc.) this bio-silt is shown as a potential interesting substance using as an additive to growing substrates, which are used for growing of different landscape plants. Before bio-silt is widely used in landscape and horticulture praxis, the effect of this bio-silt on plant growth and development should be tested.

In the year 2021 five different experiments were set, where the effect of bio-silt added in the growing substrate in various ratio was tested on growth and development of some landscape plants during the period of their growing, on growth and development of seedlings of different vegetable plants and on sorption ability of bio-silt compared with some other minerals, which are used as an additive to growing substrates. First result show that the addition of bio-silt to the growing substrate does not represent any toxic danger for the plants. Plants can be grown up to the specific level even in pure bio-silt as a growing substrate. The best results have been generally conducted using the substrate with 25 vol% of bio-silt in growing substrate. The strongest growth and the best development of plants (green parts and roots as well) was generally measured at this bio-silt ratio in the substrate, plants have also been the best quality for selling (salad).

PRUNUS SEROTINA EHRH., ALTERNATIVE RAW MATERIAL FOR PAPER PRODUCTION?

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There is increasing need for alternative raw materials for paper production. Teams all over the world are searching for best supplements of birch, pine, beech wood. With increasing awareness of environment condition, new sources of cellulose fibers are to be investigated. EU indicated several directions of development of researches in terms of environment protection. One of them is controlling and reduction of the occurrence of invasive alien plant species (IAPS). In this work we characterized fibers and paper made from one of the most common IAPS for central Europe – black cherry (*Prunus serotina* Ehrh.). This bush-like tree supplants many native species in central European forests, there is cut down in early stage of growth. In the work we used a wood from north located Dąbrowa district of Polish State Forests. Samples were taken from several plants in the age between 6 and 12 years from the same location. Trunk was debarked manually and then cut into small cubes of about 1 cm per each side. We have performed several Kraft delignifications to reduce chemicals intake. After each trial, morphology of the fibers was checked using Valmet Fiber Image Analyser FS5 and laboratory handsheets were made on Rapid-Köthen sheet forming machine. Basic properties of the formed sheets were determined, such as grammage, thickness, tensile properties, bursting strength, tearing resistance, surface properties in terms of air permeability and roughness according to Bendtsen and optical properties.

INOVATIVNI PAPIR ZA INOVATIVNE GRAFIČNE IZDELKE

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Enoletne rastline, tujerodne invazivne rastline, odpadna biomasa v kmetijstvu in industriji predstavljajo bogat vir surovin, med drugim tudi za izdelavo papirja. Papir izdelan z dodatkom vlaken iz teh virov predstavlja alternativo klasičnemu papirju in omogoča izdelavo unikatnih grafičnih izdelkov.

Na Inštitutu za celulozo in papir so izdelali papir različnih gramatur iz jute, japonskega dresnika, navadne robinije in kanadske zlate rozge.

V sodelovanju z Naravoslovnotehniško fakulteto so iskali možnosti predstavitve papirjev v obliki grafičnega izdelka. Študenti Gaja Bajc, Maja Černe, Nuša Glavič, Selene Gombac, Alisa Kim Jagodic, Maja Koder, Jure Komel, Tereza Lenardič, Lara Mrhar, Sara Štemberger, Natalija Vodopivec so pri predmetu Načrtovanje ekološke embalaže oblikovali notesnike, zvezke in papirno embalažo.

Idejne zasnove grafičnih rešitev so večinoma temeljile na značilnostih rastlin. Študenti so izbrali grafične elemente, definirali barvo in vrsto pisave. Pri načrtovanju izdelkov in grafičnem oblikovanju so upoštevali smernice ekološkega oblikovanja. Predstavljene so njihove rešitve od idejne zasnove do končnih rešitev.

INNOVATIVE PAPER FOR INNOVATIVE GRAPHIC PRODUCTS

Gregor Franken¹, Klementina Možina¹, Diana Gregor-Svetec¹, Tea Kapun²

¹University of Ljubljana, Faculty of Natural Sciences and Engineering, Ljubljana, Slovenia

²Pulp and Paper Institute, Ljubljana, Slovenia

Annual plants, invasive alien plant species and biomass waste from agriculture and industry represent a rich source of raw materials, among other to produce paper. Paper made with the addition of fibers from these sources is an alternative to traditional paper and enables the creation of unique graphic products.

At the Pulp and paper institute several papers of different grammage were manufactured from jute, japanese knotweed, black locust and Canadian goldenrod.

In cooperation with the Faculty of Natural Sciences and Engineering, they looked for possibilities of presenting papers in the form of a graphic product. At the subject Design of sustainable packaging students Gaja Bajc, Maja Černe, Nuša Glavič, Selene Gombac, Alisa Kim Jagodic, Maja Koder, Jure Komel, Tereza Lenardič, Lara Mrhar, Sara Štemberger, Natalija Vodopivec design notebooks and paper packaging. The conceptual designs of the graphic solutions were mostly based on the characteristics of the plants. Students selected graphic elements, defined the color and typeface. Eco-design guidelines were followed in product planning and graphic design. Their solutions from conceptual design to final solutions are presented. State of the art technology, knowledge and adaptability are the distinguishing merits that our company strives towards and allow us to produce the most advanced and demanding special products.

*PAPIR ZDAJ – PRAVA TRAJNOSTNA EMBALAZNA
REŠITEV*

*PAPER NOW – TRULY SUSTAINABLE PACKAGING
SOLUTIONS*

**NEW TRENDS, CHALLENGES AND FUTURE PERSPECTIVES IN BIO-BASED BARRIER COATING
OF PACKAGING MATERIALS**

*Samir Kopacic, Anna Mayrhofer, Daniel Mandlez and Wolfgang Bauer
TU Graz, Graz, Austria*

Producers of packaging materials are increasingly aware of the advantages of bio-based materials and their utilization in barrier coatings for packaging papers. Paper based packaging material is widely used, environmentally friendly and recyclable. Because of its porous structure this fibre based material does not protect packed goods from environmental effects and therefore it is rarely used in this case as a primary packaging material. In order to minimize food quality deterioration, reduce food waste and extend the shelf life of food, a good barrier against gas, water, odor active compounds, grease and mineral oil is needed. Naturally, renewable materials such as nano- and microfibrillated cellulose, polylactides, polysaccharides and proteins are in the focus of our ongoing research projects and have a potential to substitute synthetic polymers used for barrier coating of food packaging materials. These bio-based materials, applied on paper or paperboard, could provide interesting functionalities while still maintaining the environmentally friendly characteristics of the packaging material. Our work is based on application of coating technology and biopolymers in barrier coating of packaging papers. Coatability of bio-based materials and their application as a barrier for paper-based food packaging are main targets of our project.

.Migrations of mineral oil hydrocarbons, legal situation in food packaging and functional barrier solutions

David Prevost, Polona Teržan

Omya International AG, Baslerstrasse 42 CH-4665 Oftringen Switzerland

The topic of mineral oil migration from packaging material, especially the aromatic fraction comprising 3 or more benzene rings to food has gained attention in the last years. Increasing consumer awareness and improvements in analytical methods have led to systematic analysis of certain types of food, e. g. chocolate. The Council of Europe has made drafts on a law covering this topic. So far no EU-wide legislation has been passed. Germany as a member state has introduced the DE Mineral Oil Ordinance which will become legally binding in the near future. Despite being "only" a national, German law without an European counter-part, the German Mineral Ordinance will become a "Gold Standard" thus affecting the whole European packaging industry. This lecture will give an overview on the current legal situation of the topic. From a technical perspective an introduction on mineral oil migration and possible technical solutions will be given. Different types of mineral oil contamination are distinguished and there are a number of potential sources. The Omya Barrier Portfolio includes "Extomine M" as proved barrier solution to hinder mineral oil migration effectively. Advantages and challenges, practical experience and customer feedback will be reported.

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EFFICIENCY – PART 1*

INNOVATIONS IN TRAINING TO IMPROVE SAFETY, PRODUCTIVITY AND EFFICIENCY OF THE PAPER INDUSTRY

Michael Neumann

J.M. Voith SE & Co. KG / VPH, St. Pölterer Straße 43, 89522 Heidenheim, Germany

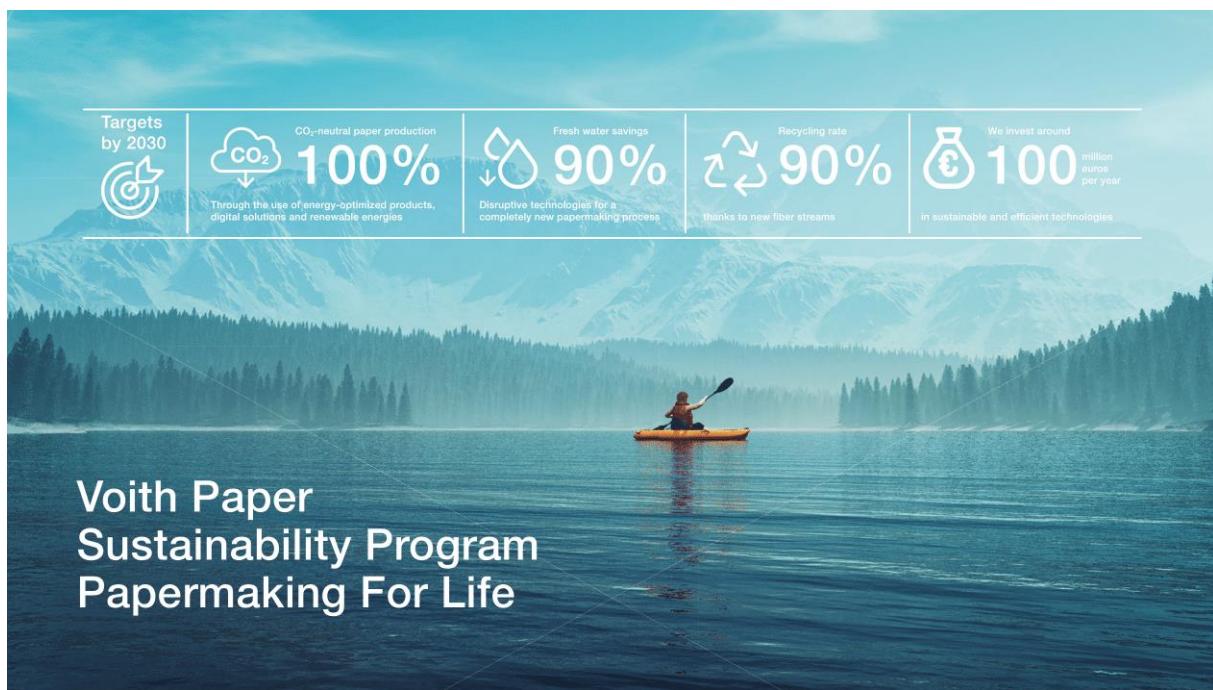
As the paper industry targets zero accidents, sees retirement of many skilled, experienced staff and trains a new generation of employees, how do we improve the effectiveness of our people?

Voith PaperSchool provides blended learning courses which combine interactive e-learnings, Virtual Reality and classroom sessions to engage participants in a time-effective way, either online, at paper mill sites, or in Voith Training Centers. These single courses or entire training paths are designed to improve professional skills and papermaking knowledge.

At basic, intermediate or advanced levels, from stock preparation to the winder, the technology-oriented learning ensures a high level of interest during training.

Whether using an interactive e-learning session, Virtual Reality to simulate the paper mill experience or practicing with a full size drying cylinder replica to be ready for a quick, safe rescue from a confined space, the blended learning experience is an effective way to meet specific needs of training and knowledge in a paper mill.

The presentation will be held online. To give you a deeper insight, we would like to give a live demonstration of the virtual reality system during the lecture, depending on the technical possibilities.



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OPTIMIZED PERFORMANCE BY DATA ANALYSIS, SPECIALIST SUPPORT & COLLABORATION

Masen Mouchantat¹, Mikko J. Lehtola², Balázs Hornyák³

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Performance Agreements are a way to develop mills towards optimized performance and enable better life cycle planning. Long term cooperation will improve the plants and mills availability, efficiency, quality, process stability and its maintenance planning in a cost-effective way.

There are KPIs set, and furthermore; the availability and performance is ensured by periodical inspections and follow-ups. Energy or raw materials savings are often be main KPI's of the agreement. Process stability and quality variability have also significant impact on paper and board mill productivity and profitability.

The best results from collaboration are received through a dedicated development team, which is utilizing shared resources locally and specialist resources globally. The means of achieving the performance improvements can include on-site audits, inspections, condition and process monitoring, training, optimization and possibly a dedicated engineer on-site.

Results are often cost reduction in terms of raw material, chemicals and energy, reduced quality variability or improvement on performance & OEE. Our agreements for asset reliability and process optimization are securing sustainable results.



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valmet.com/pmpiloting



NEW ANDRITZ PRIME PRODUCTS FOR STOCK PREPARATION

Thomas Schiffer

Andritz AG, Stattegger Strasse 18, 8045 Graz, Austria

ANDRITZ has launched several new products that are perfect for stock preparation systems processing virgin or recycled fibers as well as fibers from annual plants.

The TwinFlo Prime refiner is the very latest development featuring concentrated performance in a very compact LC refiner design. The new disc refiner builds on the success of more than 2,000 LC refining plants from ANDRITZ operating all over the world and combines the well-proven basic principles of the conventional TwinFlo refiner with the higher energy input possible, reduced maintenance needs, and increased refiner plate lifetime. The fixed connection between rotor and shaft is the technological cornerstone of the new LC refiner.

The PrimeFilter D is ANDRITZ's cutting-edge technology in thickening and fiber recovery. The new disc filter builds on ANDRITZ disc filter technology, which has been well proven over decades, and brings together several key technological innovations – like HHw technology (high-consistency, high-freeness pulp application and wider distance between discs), CC bagless sectors and two-level shaft sealing – to improve throughput and reduce both investment and operating costs.

Further product launches coming soon! A comprehensive new LC pulping system not only enables excellent slushing, but also places particular emphasis on the efficient separation and removal of rejects. An innovative cleaner combines two cleaning stages in one unit and offers significant advantages in terms of cleaning efficiency, wear and energy consumption.

A

PULP & PAPER

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DO CELOTNIH PAPIRNIH STROJEV

CELOVITE TEHNOLOGIJE IN STORITVE Z DODANO VREDNOSTJO

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Od priprave snovi do navijalnega dela, vključno z stroje za proizvodnjo toaletnega programa, papirne in kartonske stroje, sisteme zračne tehnike

in energetike, klobučevine in valji, avtomatizacija in črpalk ter celovite storitve. Ponujamo rešitve za celotne linije in posamezne komponente. Izkoristite naše znanje, globalne izkušnje ter svetovno mrežo storitev. Inovativna tehnologija,

vsestrsansko preizkušena v naših pilotnih obratih, gre z roko v roki s natančnim poznavanjem procesov.

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DOING MORE WITH LESS... AND NO WASTE

DECARBONIZATION, DIGITALIZATION AND DECENTRALIZATION: HOW GAS TURBINES COGENERATION CAN SUPPORT THE ENERGY REVOLUTION IN THE CURRENT UE CONTEXT

Thomas Schulze¹, Branka Bajde Gabrovšek²

¹Solar Turbines Switzerland Sagl, Via Campagna 15, 16595 Riazzino Locarno TI, Schwitzerland

²C&G d.o.o. Ljubljana, Riharjeva 38, 1000 Ljubljana, Slovenia

Solar Turbines is very well known to the Tissue industry as a robust and experienced solution provider for gas-turbine cogeneration plants and tissue direct drying integrations.

In the midst of an unprecedent geo-political crisis, after two years of COVID19 and in an economy with an increasingly green connotation, also the management of energy has to be able to evolve in terms of planning, operations and flexibility.

We are requested to make our turbines to highly perform with less fuel, to produce only when it's needed, increasing the uptime in an efficient and sustainable way.

Starting by supporting the design of new operative conditions of the Yankee Hood driven by the integrated cogeneration in coordination with the main market players, Solar Turbines, with its "Tissue-Cogen" experts, is now suitable to develop analysis and tools able to simulate and evaluate economic and environmental performance and therefore to achieve, monitor and maintain the main sustainability and efficiency goals, first of all decarbonisation.

Solar Turbines presentation will give an insight how the design and planning phase merged with the new combustion systems, the increased capabilities to non-conventional and high hydrogen fuels and connectivity will create value through lifecycle support for its customers.

UČINKOVITO ODVODNJAVANJE - MODULAR WATER MANAGEMENT

Holger Sold

*MWN Niefern Maschinenfabrik GmbH, Bahnhofstraße 51-53, 75223 Niefern-Öschelbronn
Germany*

MWN-ov modularen sistem upravljanja vode vključuje sveženj ukrepov za izboljšanje učinkovitosti odvodnjavanja na vseh sesalnih valjih. Vsak modul je mogoče uporabiti kot posamezno komponento ali v kateri koli želeni kombinaciji, odvisno od posameznih predpogojev in zahtev.

Poudarek je predvsem na izboljšanju suhosti, kakovosti papirja in dolgoročnem nemotenem obratovanju.

Korak za korakom:

1. Optimizacija geometrije sesalnih con
2. Uporaba / optimizacija metlice brisalcev
3. Implementacija sistema strgal / šaberjev
4. Korita za lovljene vode
5. Notranji oscilirajoči sistem visokotlačnih šob

EFFICIENT DEWATERING – MODULAR WATER MANAGEMENT

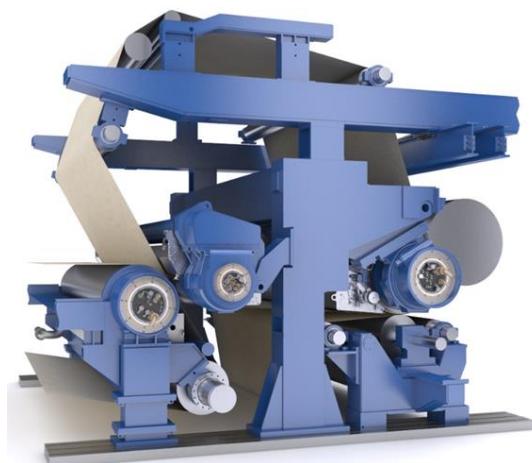
Holger Sold

*MWN Niefern Maschinenfabrik GmbH, Bahnhofstraße 51-53, 75223 Niefern-Öschelbronn
Germany*

MWN Modular Water Management comprises a bundle of measures to enhance dewatering performance of almost any suction roll. Each of those can be applied as a single item or in any desired combination, depending on individual preconditions and requirements.

The focus is mainly targeting on improving dryness, roll runnability and sheet quality – step by step:

1. *Suction geometry optimization*
2. *Application / optimization of wiper blade*
3. *Implementing of doctoring system*
4. *Save all tray*
5. *Oscillating internal HP-shower system.*



ANALIZA ODVAJANJA VODE ZA OPTIMIZIRANO DELOVANJE STISKALNIC V PAPIRNEM STROJU

Frank Kretschmer

SchäferRolls d.o.o., Zgornji Brnik 370, 4210 Brnik, Slovenia

Naraščajoče zahteve glede kakovosti in nenehna optimizacija delovanja papirnega stroja so prioritete vsakogar, ki želi ostati v prednosti pred ostalimi.

SchäferRolls Surface Optimizer (SSO) je bil posebej razvit za optimizacijo dezenov oblog pri stiskalnicah v papirnem stroju. To računalniško simulacijsko orodje omogoča učinkovitejše načrtovanje geometrije površine oblage in obnašanje odvodnjavanja v nipu. S tem lahko natančno načrtujemo učinkovitost odvajanja vode na vseh funkcionalnih valjih z uporabo analize vodnega razmerja. Nepravilnosti, ki bi lahko nastale zaradi neprimerenega dezena, lahko tako vnaprej eliminiramo in s tem zagotovimo konstanto kvaliteto papirja skozi celoten življenjski cikel oblage.

Cilji:

- Optimizacija dezena oblage (luknje, žlebovi) za povečanje učinkovitosti odvajanja vode.
- Možnost prihranka energije in izboljšanja življenjske dobe filca.
- Zmanjšanje stroškov vzdrževanja z vnaprejšnjim načrtovanjem življenjskega cikla valjev.

Na podlagi analize odvodnjavanja v stiskalnici in ocene dejanskega stanja s strani ekipe SchäferRolls Application Engineering, lahko tako pripravimo predloge za optimizacijo oblog in dezenov za doseganje definiranih ciljev.

V predstavitvi so predstavljeni postopki in rezultati, ki so nastali na podlagi zanimivih študij primerov naših strank.

DEWATERING ANALYSIS FOR AN OPTIMIZED PERFORMANCE

Frank Kretschmer

SchäferRolls d.o.o., Zgornji Brnik 370, 4210 Brnik, Slovenia

Increasing quality requirements and the constant optimization of machine performance are on the agenda for anyone who wants to stay ahead in the future.

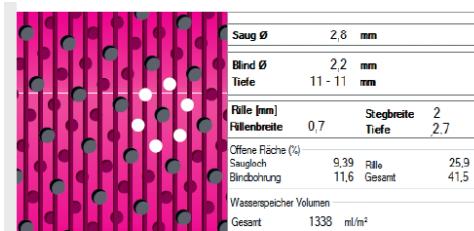
The SchaeferRolls Surface Optimizer (SSO) was specially developed to optimize the surface design of roll covers in the press section of a paper machine. This computer simulation tool lets design a roll cover surface geometry and nip behaviour to be more efficient, enabling you to, for instance, precisely plan the dewatering performance of the functional rolls in the press section over the roll cover's entire life cycle using water balance analyses. Irregularities in the surface profile that could lead to the paper quality being compromised are avoided.

Targets:

- Optimize cover design to increase dewatering efficiency
- Potential to save energy and improve clothing lifetime
- Reduce maintenance costs by planning rolls life cycles in advance

Based on a dewatering analysis and the evaluation of the actual situation by SchaeferRolls Application Engineering, optimisation proposals are developed to achieve the defined customer targets.

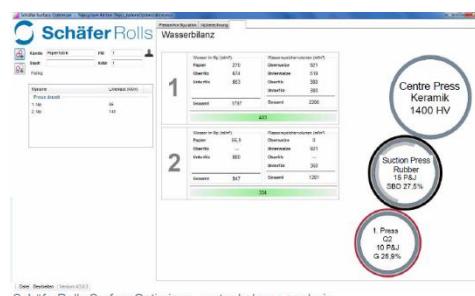
In the presentation the procedure and the results are presented on the basis of some interesting customer studies.



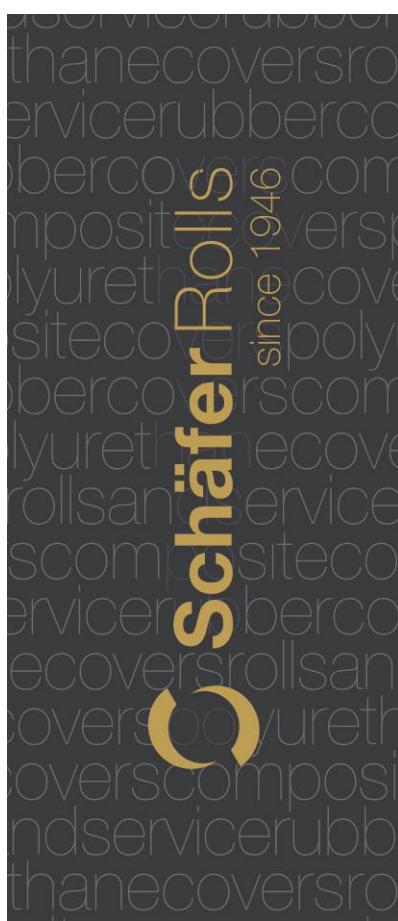
More efficient dewatering methods while increasing the water storage volume



Graph of water storage volume over life cycle



SchäferRolls SurfaceOptimizer – water balance analysis



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AI-BASED MACHINE VISION SOLUTIONS FOR THE FUTURE OF PAPER MAKING

*Christoph Herzog, Adolf Wachter, Denjen Schnedl, Roland Kurz
IBS Austria GmbH, Hauptstraße 22, 8833 Teufenbach-Katsch, Austria*

The Austrian-based IBS Paper Performance Group is unrivaled in optimizing paper, board and pulp machines and has extensive know-how in dewatering solutions. With the iTABLE®, IBS reinvented the process of paper making. So far, the technology is installed on more than 170 machines worldwide. In 2016, IBS acquired Papertech, one of the leading suppliers of machine vision solutions. More than 1.200 TotalVisionTM web monitoring and inspection systems are installed in 42 countries worldwide.

By combining the know-how and intensive research work, TotalVisionTM 4.0, a suite of innovative and patented applications, was born. These solutions – combining high-end vision and leading dewatering technology - are able to take paper production to the next level. Innovative applications enable the paper maker to monitor and control stock activity, formation or even the wet line and cut through. Additionally, self-learning algorithms and artificial intelligence play a decisive role in future web inspection applications and other solutions. All of these tools will have a positive impact on the way of paper making in the future and further increase paper quality and machine runnability.

PROCESS & PRODUCT OPTIMIZATION OF TESTLINER PRODUCTION TO INCREASE SCT-VALUES WITH THE HELP OF EMTEC CAS- AND FPA TOUCH!

*Eric Haagen
emtec Electronic GmbH, Gorkistrasse 31, 04347 Leipzig, Germany*

Almost every produced paper, is made to be converted. Due to the increased shipping of products in the private and business sector, there is also an increased demand of raw papers for the corrugated board production. These raw papers (liner and fluting) are made mostly complete out of recycled paper. Due to this fact and more and more almost completely closed water circulation systems in paper mills, some problems for the quality control occur.

For the testliner production, the SCT-value is one of the necessary parameters for the quality classification of the produced paper. Paper mills normally produce different qualities of testliner regarding the requirements of their customers. These qualities, the paper mill must verify. According to the ISO 2758 standard, specific testliner qualities (testliner 1, 2 and 3) need to reach certain SCT-Values to obtain the individual certification.

Our application example shows the negative influence of the anionic trash particles to the interaction between cationic starch and the fibers in the pulp suspension. It will also show, how to optimize the overall production process, reduce costs and resources and simultaneously increase the necessary SCT-Values by the help of the emtec particle charge analyzer "CAS touch!" and the Zeta-Potential-Analyzer "FPA touch!".

OCENA RAZSIVITVE POTISKANEGA ETIKETNEGA PAPIRA Z VKLJUČENO RFID OZNAKO

Diana Gregor-Svetec¹, Andreja Pogačar¹, Ivana Bolanča-Mirković²

¹Univerza v Ljubljani, Naravoslovnotehniška fakulteta, Ljubljana, Slovenija

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Tržne analize napovedujejo hitro rast tiskane elektronike v bližnji prihodnosti, med drugim izdelavo anten za različne aplikacije. Tiskane RFID antene so vse bolj prisotne zaradi hitrejše, bolj ekonomične in ekološke izdelave RFID oznak v primerjavi s postopkom jedkanja. Lahko jih natisnemo na toge in gibke materiale z uporabo različnih tiskarskih tehnologij. V našem primeru smo za tisk UHF RFID antene uporabili sito tiskarsko tehniko.

Tiskali smo na visokobeljen, sijajni etiketni papir z gramaturo 80 g/m². Analiza površinskih lastnosti je bila narejena z namenom določitve potiskljivosti papirja. Etiketni papir smo potiskali v offsetni in elektrografske tehniki tiska. Na polautomatskem sito tiskarskem stroju smo na notranjo, nepotiskano stran etikete natisnili UHF RFID anteno z uporabo srebrne prevodne funkcionalne barve.

Ocena reciklabilnosti je bila izvedena v skladu z INGEDE metodo 11. Metoda opisuje postopek ocene učinkovitosti razsivitve tiskanih izdelkov po alkalnem flotacijskem procesu. Raziskava je pokazala, da prisotnost RFID oznak ni bistveno vplivala na sam potek recikliranja. Primerjalna analiza pa je pokazala, da ima prisotnost funkcionalne barve določen vpliv na razsivitev potiskanih etiketnih papirjev. Srebrna prevodna barva ostane vezana na vlakna in je ni mogoče enostavno odstraniti iz papirja. Kljub temu, je bila za oba vzorca, tako offsetni kot elektrografske tiskane etiketni papir z vključeno UHF RFID oznako, določena dobra reciklabilnost, predvsem zaradi neznatnega poslabšanja v optičnih lastnostih. Po postopku razsivitve pa je na laboratorijskih vzorcih papirja ostalo večje število majhnih delcev nečistoč (do 600 µm) ter nekaj večjih delcev (nad 2000 µm).

DEINKABILITY OF PRINTED LABEL PAPER WITH INTEGRATED RFID TAG

Diana Gregor-Svetec¹, Andreja Pogačar¹, Ivana Bolanča-Mirković²

¹University of Ljubljana, Faculty of Natural Sciences and Engineering, Ljubljana, Slovenia

²University of Zagreb, Faculty of Graphic Arts, Zagreb, Croatia

Estimations in market analysis predict rapid grow of printed electronics in near future, among them production of antennas for different applications. Printed RFID antennas are becoming increasingly common because of the possibility of producing RFID tags more economically, ecologically and rapidly in comparison to etching. They can be printed using different printing technologies on rigid and flexible materials. In our case, the screen printing technology was applied to print the UHF RFID antenna.

A high-white gloss label paper with grammage of 80 g/m² was used for printing. Surface characteristics were analyzed in order to determine the printability of the paper. The label paper was printed using offset and electrographic printing technologies. The UHF RFID antenna was printed using a silver conductive functional ink on the backside of the printed label paper, using a semi-automatic screen printer.

The assessment of recyclability was performed according to INGEDE Method 11. Method describes a procedure to evaluate the deinkability of print products sub-sequent to alkaline flotation. The research has shown that the recycling process was not disturb much by the

presence of RFID tags. Comparative analyze has shown that the presence of functional ink influences the deinkability of printed label paper to some extent. Silver conductive ink tends to remain bond onto the fibers and is not easily extractable from the paper. Nevertheless, evaluation of deinkability parameters has revealed good deinkability for both, offset and electrographic printed label paper with integrated UHF RFID tag, mainly because of only small decline in optical properties. A higher number of small dirt particles (up to 600 µm) and a few big particles (over 2000 µm) remained on laboratory handsheets, after deinking.

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