



<b>Research for the Benefit of SMEs</b>		
<p><b>Title: Development of a novel solvent-free coating process for wooden facades</b></p> <p><b>Acronym: DURAWOOD</b></p> <p><b>Grant Agreement Number: 232296</b></p> <div style="text-align: center;">  </div>		
<b>Deliverable 8.4</b>	<i>Demonstration Activities Report</i>	
<b>Associated WP</b>	WP6 – Demonstration	
<b>Associated Task</b>	Task 6.1: Planning of a Demonstration Programme Task 6.2: Execution of the Demonstration Programme Task 6.3: Demonstration Monitoring, evaluation and conclusions	
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<b>Prepared by (Lead Partner)</b>	Innovació i Recerca Industrial i Sostenible (IRIS)	
<b>Partners Involved</b>	ARY, STUBA, SETA	
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<b>Dissemination Level</b>	PU	

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## **Publishable Executive Summary**

This report outlines part of the work carried out as part of an EC funded project called DURAWOOD - *Development of a solvent-free coating process for wooden facades* in the work package 6- *Demonstration*.

The DURAWOOD project is ending on November 31st 2011 and therefore project consortium organized 2 demonstration events of project results and achievements to public during the last 6 months of the project. Demonstration sessions were held in 2 countries to gain maximum spreading of knowledge generated during the project. Project achievements were disseminated using presentations and guided tours through the project partners' facilities and developed DURAWOOD process prototype. Locations were 2 wood producers whereby preliminary industrial validation trials had been realised during previous weeks and dates were set according to those of validation trials and to allow sufficient time afterwards for testing the material treated (weathering and fungi resistance are long lasting tests) during the remainder of the project (for more details on these trials see D5.2 *Report on the industrial results and recommendations for future commercialization*).

In addition, during the last month of the project, the consortium participated in a large trade fair during the last month of the project (Eurosurfas, Barcelona, November 14-18, 2011) whereby a video of the prototype was presented together with 4 posters summarising the project and the results obtained at each of the RTD partners' (for more details on this fair see D8.4 *Final Plan for the Use and Dissemination of the Foreground*).

## 1. Introduction

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## 2. Report on Demonstrations activities

Project DURAWOOD had 2 demonstration sessions hosted at 2 project partners in 2 EU countries (table 1). The general introduction to the project repeated in each event, although each demonstration was partly adapted to follow the development of the project.

**Table 1: DURAWOOD demonstration sessions**

Where	When	Who		What – the content
		Host	Audience	
Spain, Yiecla	31 May 2011	ARY	Furniture producers and technical expert in wood sectors	workshop regarding the DURAWOOD project including a practical demonstration of the process prototype
Slovakia, Ruzomberoc	9 September 2011	SETAS	Furniture producers and	workshop regarding the DURAWOOD

k			press people for wood sector	project including a practical demonstration of the process prototype
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Description of each event is provided below. Each event also featured the participation of an external wood expert who located the progresses made by DURAWOOD versus existing wood treatment techniques.

## 2.1 Demonstration session in Spain

The company ARY located in Yiecla, Spain, hosted the first demonstration session for the project in Spain. The workshop was held in the facility of CETEM, a technical center of the Murcian region for wood and furniture located in the same city as ARY ([www.cetem.es](http://www.cetem.es)). The practical demonstration of the prototype was held in the facilities of project partner ARY. This demonstration session was organized for presenting the new wood treatment to wood and furniture producers and others interested stakeholders from the supply and value chain, as well as to the staffs of the hosting technical center. It was an excellent opportunity for networking.

Members of the project consortium invited a small number of people to this demonstration session, mainly local such as business partners from ARY. The reason was to privilege the attendance of a broader origin of people at the final demonstration session that would be held 3 months later in SETAS once the project validation would be more advanced. The agenda for this event (Annex 1) was distributed together with formal invitations.

The event started at 9.00 with registration with 16 attendees (including 4 from outside the consortium). Attendees (picture 1) were from 5 countries: Slovakia, Turkey, Germany, Spain, Czech Republic.



Picture 1: Attendees at the 1st demonstration session in Spain

Project consortium members tried to present all important findings and achievements of the DURAWOOD project, but keeping in mind not to reveal any confidential information that could endanger patentability of project results. The demonstration session was oriented to presenting the development of the new plasma treatment process as well as the potentials, benefits and possible ways of use. Treated wood materials with DURAWOOD technology were showed as well as samples showing fungi incubation tests.

The demonstration session started with short welcome speeches of the hosts: ARY and CETEM (figure 2).



Figure 2: Jesus Sanz Perpiñan, director of CETEM introducing the hosting technical center

Research results of the DURAWOOD project were presented by responsible R&D partners using PowerPoint presentations. Elodie Bugnicourt, IRIS (coordinator), presented the structure and objectives of the project “Introduction to the DURAWOOD project”. Then an industrial partner presented the different type of plasma technologies: Miroslav Gulan from PLASTECH, with a presentation called “Introduction to the plasma technology” to located the context of the project. The RTDs then gave an overview of the development carried out in the project: Radovan Tino (figure 3), STUBA, presented “Development of plasma treatment, variable parameters and tests”; Anne Baars, ttz Bremerhaven, presented “Characterization of the plasma effect on fungi growth in wood”; and Alejandro Rosales, IRIS, presented “Principle of DURAWOOD process and its integration in wood facilities”.



Picture 3: Radovan Tina from STUBA presenting key results in terms of lab scale development of the DURAWOOD technology

After the presentations of the project consortium members, invited speaker: Francisco Melero, from CETEM gave lecture on “Wood treatments” and positioned DURAWOOD in this context. This part of demonstration session was concluded with questions from the audience and answers for the project R&D members.

Afterwards, all attendees were transferred to ARY’s facilities.

There the prototype machine for wood treatment was presented (figure 4). The machine was running at speed of 1 m/min during the demonstration and its different stages could were presented and explained by Alejandro Rosales from IRIS. More details about the prototype can be found in *D5.1- Manual of installation instructions of the DURAWOOD prototype*.



Figure 4: DURAWOOD prototype

Finally, Elodie Bugnicourt from IRIS and Radovan Tino from STUBA explained about the contact angle evaluation and atline instantaneous evaluation of the DURAWOOD effect of the wettability of wood by water.

Guided tour through the production at ARY was organised as well and the attendees could see the production of wooden furniture, their coating, cutting, planning operations.

At the end of the demonstration session all external attendees were asked to fulfil the feedback form (Annex 2). Most of them found the session very useful and reported that they would keep in contact with the consortium for possible further collaboration or use of the DURAWOOD system when available.

In terms of logistic aspect related with the organisation of the event, attendees wished to receive support documents to follow during the presentation but also in order to promote the project to other possible company who would be interested so it was decided that presentations will be shared. Also it was decided as per the feedback of project partners that a specific area with DURAWOOD posters would be dedicated for next Demonstration session.

A copy of an article published in local press by CETEM can be found in Annex 3.

## 2.2 Demonstration session in Slovakia

The second demonstration session for the DURAWOOD project was held in SETAS on September 9. The presentations were made in a conference room in the Kultura Hotel in Ruzomberok where SETAS is located. It was particularly targeted at the local wood manufacturers but the consortium also took the chance to invite additional contacts who expressed interest in the project results at different occasions when presenting the project to public or via internet.

25 people (9 external attendees and 16 consortium members) took part in the event (figure 5). External attendees were from the academic, coating, wood, pharmaceutical industry and press sectors. They had different interest in the system such as understanding the disinfection effect of plasma, to the possible treatment of wood and

the coverage of one of the only Large European project with such a strong Slovak participation.



Figure 5: attendees of the demonstration session in Slovakia

The agenda is reported in annex 1. The event mainly followed the same structure in terms of presentations from the consortium although the presentations were shorter to allow a better stressing of the important results and updates had been brought to reflect the last updates (figure 6).



Figure 6: Presentation during the demonstration in Slovakia (Anne Baars, ttz on the left and Alejandro Rosales, IRIS on the right)

A local recognized expert on wood coating took part in the event: M. Smollar, ex professor at the Slovak Forest Products Research institute and now leading the company Tekos s.r.o. The presentation was given in Slovak due to the large number of attendees from that countries, and Radovan Tino ensured the simultaneous translation to English (picture 7). M. Smollar stressed the increased use and improvements of water borne coatings whereby DURAWOOD could contribute.



Figure 7: Slovak wood expert invited at the second demonstration: M. Smollar

Once again, the DURAWOOD project prototype machine built at IRIS was demonstrated to wood samples at semi-industrial speed (picture 8).



Figure 8: Prototype demonstration in Slovakia

Participants acknowledged the interest of the information provided and the invaluable assets of new wood treatment.

Feedback forms (annex 2) were collected leading to the following results. In terms of sectors of the participants, 34% were involved in the production and implementation of treatment of wood, 16% in the production of coating and surface treatment technologies for wood, 34% were from the marketing, magazines and information sectors and finally 16% were involved in research and development activities.

Encouragingly, 84% estimated that the content of the session was very useful for them, the last 16% acknowledged an average usefulness.

The DURAWOOD system met the needs of the organization of 17% of the respondents and could be of interest for another 34% maybe after receiving further information or making tests. The rest would not directly use the system in their factories since they may be involved in different sectors, but they may be able to suggest their network of customers or suppliers in the wood industry to use it.

The increased durability of coated wood with water borne coating and the reduction in the wood sensitivity to fungi were equally important for participants, before environmental aspects or hydrophobization effect for better adhesion of solvent based coatings.

Finally, in terms of recommendations, participants suggested to improve the design of the electrode placement and to increase the depth of surface treatment to have a deeper impact of plasma, both aspects having been taken into account by the project consortium also for future improvements.

Woodmakers magazine and portal Drevari.sk spread the information about the technology. Annex 3 presents 2 articles published after the event.

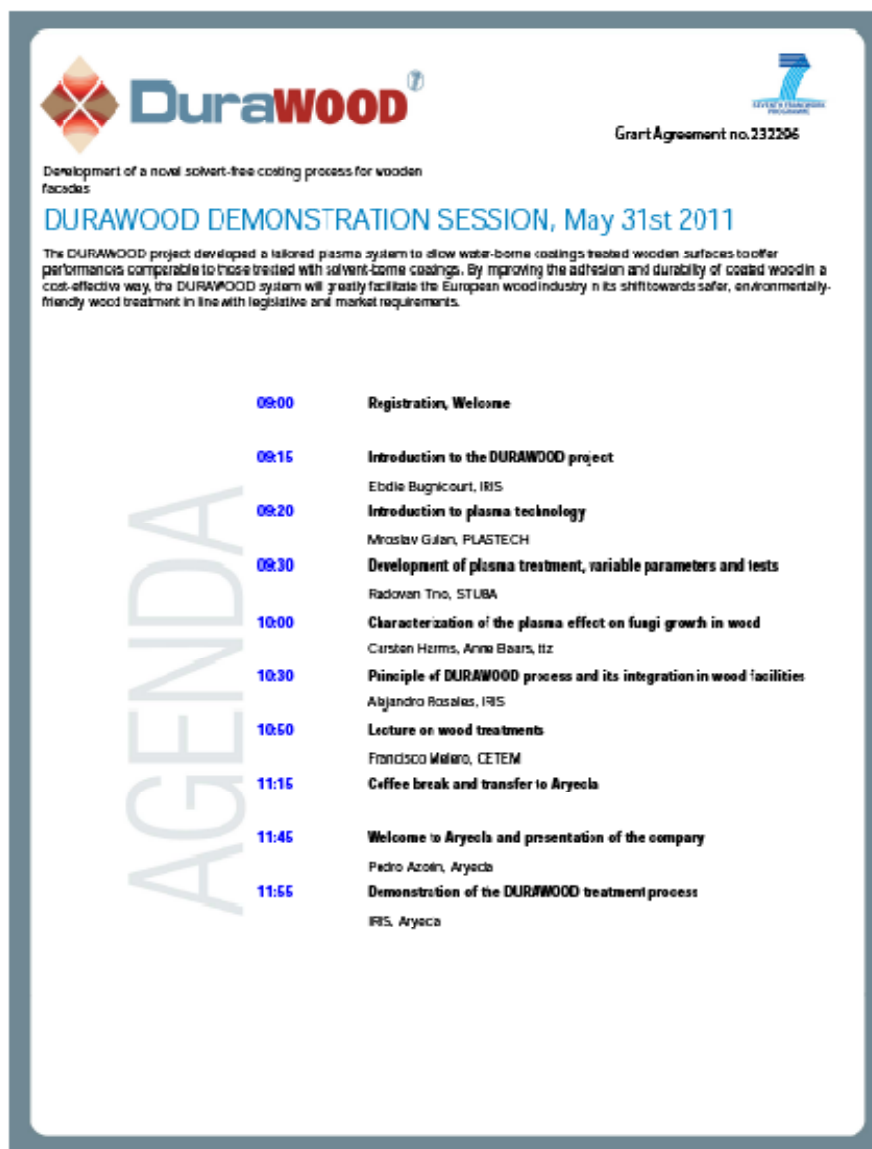
### **3. Conclusions**

As showed in the deliverable reporting the demonstration activities realized during the DURAWOOD project whereby 2 main events were organized, an active demonstration strategy was followed at the end of the project to ensure that the results of the project mainly in terms of effect of the new wood treatment and the prototype for wood treatment would gain visibility among potential end users and related industries. The events were held in Spain and Slovakia to show the new wood treatment system in the facilities of 2 wood manufacturers.

Afterwards, the consortium also participated in a trade fair to showcase the results of the project at a larger scale: Eurosurf, Barcelona, November 14-18, 2011 whereby a video of the prototype was presented together with 4 posters summarising the project and the results obtained at each of the RTD partners' (for more details on this fair see D8.4 *Final Plan for the Use and Dissemination of the Foreground*).

## Annex 1: Agenda of the demonstration events

### Agenda of the Demonstration in Spain



**DuraWOOD**<sup>®</sup>

Grant Agreement no. 232206

Development of a novel solvent-free coating process for wooden facades

**DURAWOOD DEMONSTRATION SESSION, May 31st 2011**

The DURAWOOD project developed a tailored plasma system to allow water-borne coatings treated wooden surfaces to offer performances comparable to those treated with solvent-borne coatings. By improving the adhesion and durability of coated wood in a cost-effective way, the DURAWOOD system will greatly facilitate the European wood industry in its shift towards safer, environmentally-friendly wood treatment in line with legislative and market requirements.


<b>09:00</b>	<b>Registration, Welcome</b>
<b>09:15</b>	<b>Introduction to the DURAWOOD project</b> Ebdie Bugnicourt, IRIS
<b>09:20</b>	<b>Introduction to plasma technology</b> Miroslav Galen, PLASTECH
<b>09:30</b>	<b>Development of plasma treatment, variable parameters and tests</b> Radovan Trno, STUBA
<b>10:00</b>	<b>Characterization of the plasma effect on fungi growth in wood</b> Carsten Herms, Anna Beers, Itz
<b>10:30</b>	<b>Principle of DURAWOOD process and its integration in wood facilities</b> Aljandro Rosales, IRIS
<b>10:50</b>	<b>Lecture on wood treatments</b> Francisco Melero, CETEM
<b>11:15</b>	<b>Coffee break and transfer to Aryeca</b>
<b>11:45</b>	<b>Welcome to Aryeca and presentation of the company</b> Pedro Azóin, Aryeca
<b>11:55</b>	<b>Demonstration of the DURAWOOD treatment process</b> IRIS, Aryeca

AGENDA



<b>12:45</b>	<b>Q&amp;A</b>
	AI
<b>13:00</b>	<b>Conclusion and discussion on the benefits of DURAWOOD treatment</b>
	AI
<b>13:15</b>	<b>Buffet lunch, end of demonstration session</b>

Please, In order to attend to this WorkShop fill in all the fields below.

<b>Attendant Name</b>	<b>Company Name</b>
<input type="text"/>	<input type="text"/>
<b>E-mail</b>	<b>Phone Number</b>
<input type="text"/>	<input type="text"/>
<input type="button" value="Send"/>	

<b>CETEM</b> Calle Pasteros s/n, Yeda 30510 - Murcia - Spain	<small>To reserve your place, please contact:</small> <b>Dr.ing. Elodie Bugnecourt</b> E:elodie@iris.cat elodiebugnecourt@iris.cat, tel: + 34 93 254 219 03 www.durawood-p27.eu	 <small>PREPARED BY</small>
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Agenda of the Demonstration in Slovakia )

Grant Agreement no.232296

Development of a novel solvent-free coating process for wooden facades

**DURAWOOD DEMONSTRATION SESSION, September 9th, 2011**

The DURAWOOD project developed a tailored plasma system to allow water-borne coatings treated wooden surfaces to offer performances comparable to those treated with solvent-borne coatings. By improving the adhesion and durability of coated wood in a cost-effective way, the DURAWOOD system will greatly facilitate the European wood industry in its shift towards safer, environmentally-friendly wood treatment in line with legislative and market requirements.

**AGENDA**

<b>09:00</b>	<b>Registration, Welcome</b>
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<b>09:20</b>	<b>Introduction to plasma technology</b> Miroslav Gajan, PLASTECH
<b>09:30</b>	<b>Development of plasma treatment, variable parameters and tests</b> Radovan Trno, STUBA
<b>10:00</b>	<b>Characterization of the plasma effect on fungi growth in wood</b> Carsten Herms, tcz
<b>10:30</b>	<b>Principle of DURAWOOD process and its integration in wood facilities</b> Alejandro Rosales, IRIS
<b>10:50</b>	<b>Lecture on wood treatments</b> M. Smolár
<b>11:15</b>	<b>Coffee break and transfer to SETA</b>
<b>11:45</b>	<b>Welcome to SETA and presentation of the company</b> Jan Sestina
<b>11:55</b>	<b>Demonstration of the DURAWOOD treatment process</b> IRIS, SETA

AGENDA

**12:45**      **Q&A**  
AI


**13:00**      **Conclusion and discussion on the benefits of DURAWOOD treatment**  
AI

**13:15**      **Buffet lunch, end of demonstration session**

Please, in order to attend to this WorkShop fill in all the fields below.


<b>Attendant Name</b>	<b>Company Name</b>
<input type="text"/>	<input type="text"/>
<b>E-mail</b>	<b>Phone Number</b>
<input type="text"/>	<input type="text"/>

This workshop is free of charge and held at

 A. BERNOLÁKA 1  
034 01 BRNOŽOMBEROK  
SLOVAKIA

To reserve you place, please contact

Dr. Ing. Elodie Bugnicourt  
EcoMaterials  
ebugnicourt@iris.cat, tel. +34 93 554 25 03  
[www.durawood-fp7.eu](http://www.durawood-fp7.eu)

  
#PREFERENTIALDEVELOPMENT

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## Annex 2: feedback forms

### Feedback form for Spain:

#### Development of a novel solvent-free coating process for wooden facades

Grant Agreement nº: 232296



DURAWOOD DEMONSTRATION SESSION, May 31st 2011, Yecla

### Cuestionario de evaluación de la jornada:

1) ¿El contenido de la jornada ha sido de utilidad para las necesidades de tu organización?

- Muy útil
- Útil
- Poco útil

2) ¿En tu opinión, el evento?

- Ha superado tus expectativas
- Ha cumplido tus expectativas
- No ha cumplido tus expectativas

3) Por favor, marca si estás de acuerdo o no con:

	Totalmente de acuerdo	Acuerdo	Ni acuerdo,/Ni desacuerdo	En desacuerdo	Totalmente en desacuerdo
El evento ha sido una buena oportunidad para contactar con otras organizaciones					
Los conocimientos facilitados en el evento han sido valiosos.					
El material y la documentación complementaria han sido de utilidad					
El nivel de los ponentes es alto					

	Totalmente de acuerdo	Acuerdo	Ni acuerdo,/Ni desacuerdo	En desacuerdo	Totalmente en desacuerdo
El lugar y la ubicación de la jornada ha sido el adecuado.					

4) En relación a las otras organizaciones que has conocido durante la jornada:

- Contactaré con una o más organizaciones de inmediato después de la jornada.
- Conservaré los datos de una o más organizaciones para contactarles durante los siguientes días.
- Conservaré los datos de una o más organizaciones para contactarles más adelante.
- Es poco probable que contacte con alguna organización

5) Por favor, indícanos a continuación tus sugerencias para futuras jornadas

7) Quieres recibir información de las próximas Jornadas organizadas?

- SI, pueden utilizar mis datos.
- NO, elimine mis datos su base de datos del proyecto.

Nombre.....

Organización.....

E-mail.....

**MUCHAS GRACIAS POR TU COLABORACIÓN!**

**Feedback form for Slovakia:****Development of a novel solvent-free coating process for  
wooden facades**

Grant Agreement n°: 232296

**DURAWOOD DEMONSTRATION SESSION**  
9 September 2011 - SETA, Ruzomberok, Slovakia**Feedback form****1. Was the content of the session useful for you?**

- Very useful
- Average
- Not very useful

**2. What is your business?**

---

**3. Does the DURAWOOD system meet the needs of your organization?**

- Yes
- Maybe
- No

**4. What are your overall impressions of the DURAWOOD technology?**I would be very interested in testing the technology in my installation I can see clearly how DURAWOOD can be integrated in my facilities **5. Rank the two most important motivations for investing in a technology such  
as DURAWOOD? (Please tick two)**Increased durability of coated wood with water borne coating Reduction in wood sensitivity to fungi Other, please specify: 

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**6. Do you have any other comments? Do you have recommendations of the improvements for the DURAWOOD system?**

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**If you would like to be kept up-to-date with DURAWOOD developments, please enter optional information below:**

Name: \_\_\_\_\_ Email: \_\_\_\_\_

**THANKS A LOT FOR YOUR COLLABORATION!**

## Annex 3: Articles published after the demonstration events

### Article about the Spanish event:

#### **CETEM acogió la reunión del Proyecto Europeo Durawood**

Durante el 31 de Marzo y 1 de Junio tuvo lugar en las instalaciones de CETEM la reunión del proyecto de investigación Durawood. En este proyecto, que participa la empresa asociada a CETEM Aryecla, S.L, participan a su vez 9 socios de 5 países (Alemania, Eslovaquia, España, República Checa y Turquía), de los cuales 3 son organizaciones de investigación y 6 son empresas.

El objetivo del proyecto Durawood es desarrollar un sistema de acabado ecológico de bajo coste y con mínimo contenido en fungicidas. La especial relación entre la madera y el agua obliga a conseguir que la superficie de la madera repela el agua mediante su impermeabilización. Por tanto mediante la ejecución del proyecto lo que se pretende conseguir es la repelencia al agua o impermeabilización mediante el uso de descargas eléctricas de gas (plasma). De esta manera, se conseguirá una mejor adhesión y durabilidad de los productos acabados, manteniendo criterios medicambientales y económicos.

La empresa ARYECLA que tiene una importante participación en el proyecto, mostró en sus instalaciones el prototipo del sistema de acabado ecológico desarrollado en el marco del proyecto. Mediante este sistema se ha conseguido disminuir el contenido de hongos con un tratamiento basado en plasma. Este tratamiento permite eliminar la aparición de hongos en maderas usadas principal-

mente en exteriores, evitando por tanto el uso de fungicidas que contienen diversos agentes químicos. CETEM participó como experto técnico en la reunión realizando una presentación sobre los principales tratamientos que actualmente se aplican en madera.

El proyecto Durawood, que está liderado por IRIS Reserch & Development, es un proyecto europeo perteneciente al Séptimo Programa Marco y a la convocatoria investigación en beneficio de las PYMES. Esta convocatoria permite el desarrollo de soluciones tecnológicas avanzadas, para hacer frente a problemas empresariales concretos de empresas europeas. Gracias a este programa un mínimo de 3 empresas situadas en tres estados miembros distintos de la Unión Europea pueden cooperar mediante la ayuda de organizaciones de Investigación como CETEM para desarrollar productos o procesos innovadores. □

Fuente: CETEM



**Reunion del proyecto DURAWOOD**

## Article about the Slovak event:

Plazma bude chrániť povrch dreva

Tuesday, 13 September 2011 20:25

[http://www.drevmag.com/index.php?option=com\\_content&view=article&id=462%3Aplazma-bude-chrani-povrch-dreva&catid=38%3Ainformacny-servis&Itemid=73&lang=en](http://www.drevmag.com/index.php?option=com_content&view=article&id=462%3Aplazma-bude-chrani-povrch-dreva&catid=38%3Ainformacny-servis&Itemid=73&lang=en)



Projekt 7.RP EU DURAWOOD je zameraný na ochranu povrchu dreva v exteriéri pomocou vodných náterových systémov aplikovaných účinkom plazmy na povrch dreva. Do riešenia sa zapojili 3 výskumné organizácie a 6 malých a stredných firiem z Turecka, Španielska, Slovenska, Nemecka a Českej republiky. Projekt koordinuje španielska organizácia IRIS, na Slovensku STU – Fakulta chemickej a potravinárskej technológie prostredníctvom Ústavu polymérových materiálov. V Ružomberku sa dňa 9.9.2011, necelé 3 mesiace pred ukončením projektu, uskutočnilo demonštračné hodnotenie prínosov riešenia. Drevársky magazín bol pri tom.

Tenká vrstva 4  $\mu\text{m}$  atmosférickej difúznej plazmy pri kontakte s povrchom dreva aktivuje jeho povrch, čím zabezpečuje lepšie naviazanie náterovej látky a tým následne poskytne vyššiu pevnosť spoja drevo-náterová látka. Plazmová úprava okrem toho aj sterilizuje povrch, čím zabraňuje rastu drevokazných húb pod aplikovanou náterovou látkou. Využitie tejto technológie je reálne na drevené fasády budov a exteriérový nábytok.



Zo Slovenska výskum koordinovala STU – Fakulta chemickej a potravinárskej technológie prostredníctvom Ústavu polymérových materiálov. Na výskume sa podieľal tím pod vedením Ing. Radovana Tiňa, PhD., ktorý osobne oboznámil v rámci stručných hodnotiacich referátov všetkých prítomných s výsledkami rozsiahlych laboratórnych testov, ktoré boli podkladom k zostrojeniu prototypu zariadenia. Teoreticky o ochranných náteroch dreva, používaní náterových systémov, aplikácii vodou riediteľných lakov, vytváraní zmenených parametrov základného materiálu po ochrane povrchu pred vlhkosťou referoval Ing. Milan Smolár.

Výskumu a zostrojeniu zariadenia pre povrchovú úpravu dreva plazmou sa venovali pracovníci španielskej firmy IRIS. Aplikáciu DCSBD elektród riešila FCHPT STU spolu s tímom prof. Černáka z Oddelenia experimentálnej fyziky Matematicko-fyzikálnej fakulty UK. Elektronický zdroj vyvinula a vyrobila firma KAMEA Electronic Piešťany. Zariadenie je schopné generovať difúznu atmosférickú nízkoteplotnú plazmu a pomocou nej upraviť povrch plochého dreveného panelu. Posuv rýchlosťou 1 – 5 cm/s zabezpečuje plazmovú úpravu 20 – 35 m<sup>2</sup>/hod.



Testy boli robené na šírke 8 cm, avšak prototyp zariadenia je schopný pracovať s panelmi do šírky 30 cm. Šírka dreveného panelu určeného na nanášanie je ovplyvnená usporiadaním elektród pre generovanie plazmy. Stroj môže byť súčasťou výrobnéj linky, zaradený pred uzlom povrchovej úpravy. Obstarávacia investícia je na úrovni 25 tis. €. Účinok plazmovej úpravy na povrchu dreva bol odskúšaný systémom na meranie uhla zmáčania povrchu vodnou kvapkou. Rýchla a jednoduchá metóda umožňuje sledovať aj zdanlivo neviditeľné, avšak merateľné fyzikálno-chemické zmeny na tuhých povrchoch. Ukážka testu zariadenia sa uskutočnila v prevádzke drevárskej firmy SETA.

Podrobnosti budú uvedené v budúcom čísle časopisu Drevársky magazín.

Plazma bude chrániť povrch dreva, Drevarsky Magazin, pp 26-27, October 2011

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## Plazma bude chrániť povrch dreva



Projekt 7. AP EU DuraWood, zameraný na ochranu dreva v exteriéri pomocou vodných náterových systémov, možno aplikovať účinkom plazmy na povrch dreva. Do riešenia sa zapojili tri výskumné organizácie a štyri malé a stredné firmy z krajín EÚ: Španielska, Nemecko, Slovensko a Českej republiky.



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Foto: archív autora a Ing. Igor Patráš

Tenkovrstva 4 µm atmosférickej difúznej plazmy pri kontakte s povrchom dreva aktivuje jeho povrch, čím zabezpečuje lepšie naviazanie náterovej látky. V nadväznosti na to poskytuje vyššiu pevnosť spoja dreva a náterovej látky. Plazmová úprava okrem toho aj sterilizuje povrch, čím zabraňuje rastu drobnokazných húb pod aplikovanou náterovou látkou. Využitie tejto technológie je možné na drevoné fasády budov a exteriérový nábytok. Projekt riešia pod garanciou

španielskej organizácie IRIS od 1. 12. 2009 a výstup je termínovaný do 24 mesiacov.

### Demonštračné hodnotenie prínosov riešenia

Zo Slovenska výskum koordinuje Fakulta chemickej a potravinárskej technológie Slovenskej technickej univerzity (FCHPT STU) v Bratislave prostredníctvom Ústavu polymérových materiálov.

Necelá tri mesiace pred skončením projektu (9. 9. 2011) sa v Ružomberku uskutočnilo demonštračné hodnotenie prínosov riešenia. Na výskume sa podieľa tím, vedený Ing. Radovanom Títom, PhD., ktorý v rámci stručných hodnotiacich referátov informoval o výsledkoch rozsiahlych laboratórnych testov, predstavujúcich podklad na zostrojenie prototypu zariadenia. Teoreticky o ochranných náteroch dreva, používaní náterových systémov, aplikácii lakov, riadiacích vodou a o vytváraní menších parametrov základného materiálu po ochrane povrchu pred vlhkosťou referoval Ing. Milan Smolár.

Príprava na odskúšanie prototypu zariadenia na povrchovú úpravu dreva plazmou



### Úprava povrchu plochého dreveného panelu

Výskumu a zostrojeniu zariadenia na povrchovú úpravu dreva plazmou sa

Difúzne koptanými povrchovými bariérovými výbojovými nerovanými na povrchu keramickej elektródy



## technológie

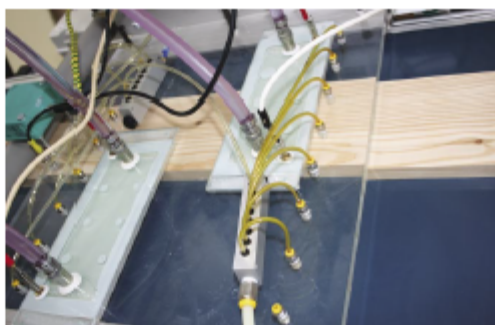
venovalo viacerým firmám v koordinácii pracovníkov španielskej firmy IRIS. Celý projekt koordinovala Dr. Ing. Elodie Bugnicourtová, ktorá aplikáciu elektrod riadila s FCHPT STU spolu s tímom prof. Čomáka z oddelenia experimentálnej fyziky Matematicko-fyzikálnej fakulty Univerzity Komenského v Bratislave. Elektronický zdroj vyvinula a vyrobila firma KAMEA Electronic Plešany. Zariadenie je schopné generovať dlženu atmosférickú nízko-plotnú plazmu a pomocou nej upraví povrch plochého dreveného panelu. Posuvom panelu rýchlosťou 1–5 cm/sek. zabezpečuje plazmovú úpravu 20–35 m<sup>2</sup>/hod.

## Zariadenie súčasťou výrobnéj linky

Testy boli vykonané na latke so šírkou 8 cm, no prototyp zariadenia je schopný pracovať s panelmi do šírky 30 cm. Šírka dreveného panelu určeného na nanášanie je ovplyvnená usporiadaním elektrod na generovanie plazmy. Stroj môže byť súčasťou výrobnéj linky, zaradený pred úzom povrchovej úpravy. Obstarávacia investícia stroja je na úrovni 25 tis. €. Zariadenie je vhodné aj do malej drevárskej firmy a je nenáročné na spotrebu energie (11 centov/hod.). Ukážka testu bola aplikovaná vo firme SETA v Ražomberku.



Testovanie zmien povrchovej energie sledovaním kontaktného uhla kvapky vody



Prechod skúšobnej vzorky cez elektrody na generovanie plazmy

Časť medzinárodného riešiteľského kolektívu. Sietazlava je koordinátorka celého projektu DurWood Dr. Ing. Elodie Bugnicourtová zo Španielska



DM 10/2011

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