WoodSens

Developing and implementing formaldehyde online-senor systems in wood-based panel processing

Project Start: October 2010

Project Duration: 36 months

Project Consortium

Project Coordinator

Dr. Carsten Mai

Organisation 1: Wood Technology and Wood-based Composites Unit
Georg-August-University of Göttingen
Büsgenweg 4, 37077 Göttingen, Germany
Phone: +49 551 39 19807, E-Mail: cmai@gwdg.de

Project Partners

Organisation 2: Laser-Laboratorium Göttingen e.V.
Hans-Adolf-Krebs Weg 1, 37077 Göttingen, Germany

Organisation 3: FAGUS-GECON GRETEN GMBH & CO. KG
Hannoversche Str. 58, 31061 Alfeld, Germany

Organisation 4: Glunz AG
Grecostraße 1, 49716 Meppen, Germany

Organisation 5: Ecole supérieure du Bois
Rue Christian Pauc, 44306 Nantes, France

Organisation 6: FCBA Institut technologique
Allée de Boutaut BP 227, 33028 Bordeaux Cedex, France

Organisation 7: AIDIMA Furniture, Wood and Packaging Technology Institute
Technology Park, Benjamín Franklin, 13, 46980 Paterna, Spain

Project Objectives

WoodSens will develop and apply new sensor technology to the manufacture of wood-based panel (WBP) products such as particleboards, in order to significantly improve their quality and safety, particularly with regard to their formaldehyde emissions. The new sensor technology when used on-line and combined with statistical process control will enable manufacturers to ensure that their products conform to the latest and forthcoming regulations on formaldehyde emission.

In order to achieve the main objective, the project is divided into four steps:

1. Fundamental research on the relationships between raw material characteristics, process parameters and gaseous formaldehyde emissions during and after hot-pressing.

2. Developing a statistical process model to predict the final formaldehyde emissions from the WBP in real time.

3. Developing a laboratory sensor system to directly detect the gaseous formaldehyde emissions of WBP-samples.

4. Developing and verifying an online-sensor system in an industrial plant trial.

Project Approach

The project is seperated into 6 work packages, each led by the partner who is mainly involved in the respective work. The Wood Technology and Wood-based Composites Unit of the University of Göttingen (UGOE) as project coordinator takes over the project management of *WoodSens*. UGOE, ESB, FCBA, AIDIMA and Laser-Laboratorium Göttingen (LLG) will be in close cooperation to perform raw material characterisation (fresh wood, recovered wood, resin and chemical additives). The raw material will be provided by GLUNZ. LLG will develop the new laboratory and on-line sensors, while GRECON will develop an industry-prototype, including control software. Lab-particleboards needed for sensor calibration are provided by UGOE and ESB. Additionally, the effects of the process and raw material will also be examined using lab-made particleboards. The formaldehyde emission and content of these panels will be analysed with the new sensor technologies and also with standard methods. To ensure standardization of the new senor technology, inter laboratory comparisons will be carried out by FCBA, AIDIMA, UGOE and ESB. UGOE will develop a multivariate processing model, which implements all recorded datasets. Finally, process models and sensor prototypes will be tested at the UGOE pilot facility, and also through industry trials at GLUNZ.
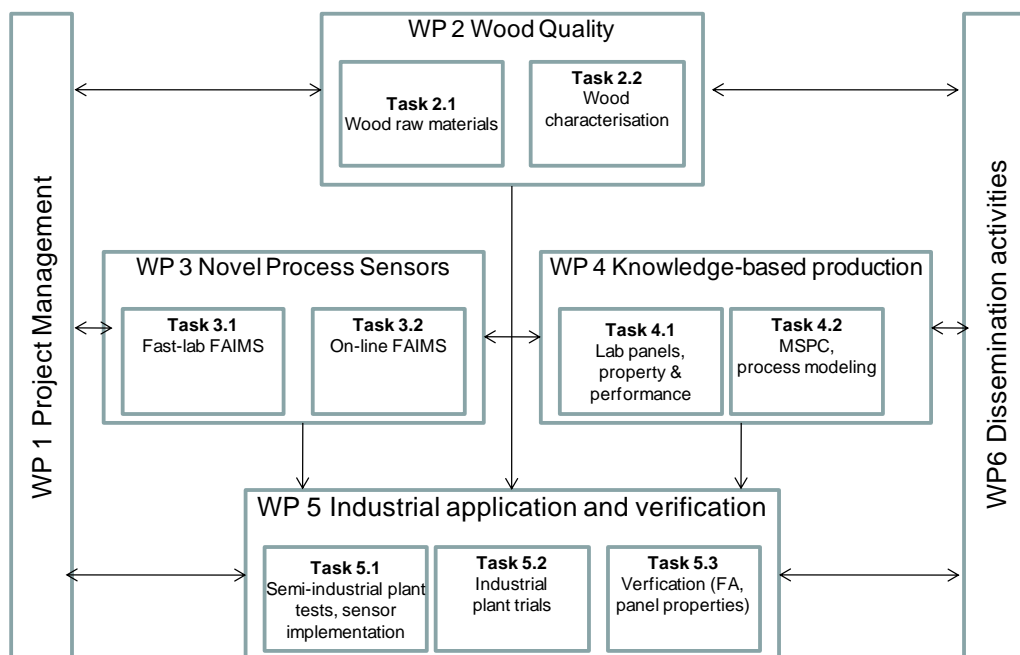

Figure 1: WORKPACKAGES

Expected Project Impact

Quality and innovativeness of this project is demonstrated through several aspects:

(1) It is highly innovative as new sensor devices are developed which are capable of recording formaldehyde release from WBP directly during the production process. (2) New ultra-low formaldehyde emitting wood-based panels are increasingly relevant; the accomplishments of this project will directly contribute to this goal. (3) There are currently no working solutions on the market capable of monitoring formaldehyde release during production. The solutions of this project not only provide new data, but also a much improved raw material – process - product understanding.

Economical relevance

GRECON plans to develop and commercialize marketable measurement systems. The primary key markets are Germany, Europe and the USA. As an introduction scenario, the main potential is seen in WBP producers, producing high quality products with very low emission potentials. Because of the low accuracy and minor velocity of the current standard methods for formaldehyde determination, the new system offers many approaches to optimize the consumption of raw materials and to reduce production costs.

Environmental and social impact

The efficient use of raw materials and their properties in the development of innovative, eco-efficient processes, products and services along different forest-based value chains are strongly fostered with this project. Minimisation of raw material inputs is realized through a knowledge-based approach, which also allows feed-back models in the process and defining raw material needs by product property profiles.

Dissemination and exploitation of results

The research results will be published in international journals. In addition, project members will give presentations at national and international conferences. A *WoodSens* website created by INNOVAWOOD will inform a wider public. At the end of the project a conference in Brussels will be organised by INNOVAWOOD consisting of presentations from all partners about the project impact.

Contact

For further information contact:

Wood Technology and Wood-based Composites Unit, Georg-August University of Göttingen

Büsgenweg 4, 37077 Göttingen, Germany

Dr. Carsten Mai

Phone: +49 551 39 19807

E-Mail: cmai@gwdg.de

Sarah Himmel

Phone: +49 551 39 4039

E-Mail: shimmel1@gwdg.de

Project website: www.woodsens.com