

Newsletter n° 3
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WoodRuB



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LIFE 09+ENV/ES/454



Key Data:

- **Project:**
WoodRuB: utilization of recovered wood and rubber for alternative composite products
- **Funding program:**
LIFE 09+ENV/ES/454
- **Project budget:**
1.838.968 €
- **EC financial contribution:**
918.192 €
- **Duration:**
36 months (2010-2013)
- **Participants:**
9 partners, 5 countries



CONTACT INFO:

woodrub@aidima.es
francesco.balducci@cosmob.it

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WOOD RECOVERY OPPORTUNITIES - ACTION T2 – FINAL RESULTS



Waste wood mainly originates from construction and demolition activities, residential and commercial sectors, furniture and packaging material; the predominant recovery opportunities for waste wood include re-use, direct recycling into other timber products and energy generation.

Managing waste wood

Eu Legislation provides general guidelines but there are differences in implementation at national level. The four countries partner were investigated in order to know their existing different approaches in wood waste management.

In summary only in Germany there is a specific regulation of the subject, even though different solutions have been applied in Italy and UK. More in general however, the development of recycling techniques is not the same for all European countries and some of them still needs a technical and scientific improvement.

Which process in recycling

Wood waste processing consists primarily of sorting, sizing, screening for contaminant removal and further dimensional reduction. The elements must be worked all together in order to have a successful wood processing operation that allows recyclers a better customization wood waste products by recyclers; the objective is the arising of end markets variety and at the same time the optimizing of products' market value.

An obstacle preventing 100% utilization of recovered wood is is the not completely cleanliness for use as a raw material for another product. Currently, the cleanliness of recovered wood is reliant on:

- Disposers and recyclers efficiently sorting treated (which includes all surface finishes and chemical treatments) and non-treated wood into appropriate categories;
- Manual "hand picking" stations to remove gross contaminants, i.e. metal, glass, plastic and treated wood;
- Physical sorting, i.e. sieving, air classifying, magnets, eddy-current drums, etc. to remove smaller non-wood contamination.





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WHAT'S ABOUT THE APPROACH IN RECYCLING?

Unfortunately, the techniques actually used are far from reach 100% effective of recovered wood. For example, it is often impractical to have a range of bins for different grades of recovered wood and, even if they are available, many people do not know, or cannot judge, the difference between one piece and another; so, unsuitable wood can accidentally be included in recycling streams. Once included, it is extremely difficult to separate the unsuitable wood with current technology, and after it is chipped, it is actually impossible to remove unsuitable particles from the rest.

The increasing awareness and concern of contaminants in waste stream is helping to drive technological developments in the art of contaminant detection.

Field versions of laboratory equipment are being developed as a result of improvement of electronics, computing power and batteries.

The progress beyond the state of the art is related to the improvement of quality and quantity of recycled wood, both in terms of analysis and reduction of chemical contaminants, both in terms of higher percentage of removal of foreign particles (sand, metal, plastic, glass, etc.). The real innovation is the strategy to process all recovered wood together, in order to produce particles which are then sorted individually by various real-time analytical techniques.

In such regards, current technology guarantees accurate measures of all contaminant but sometime they can be impractical of high costs, however among all of them Laser Induced Breakdown Spectroscopy (LIBS) and X-RAY Fluorescence are the most reliable inexpensive and easy to apply for a metal analysis.

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Waste wood

VIS/NIR/IR Mechanical Chemical ...

Different procedures

Classification and physical separation



Rubber/Leather



Metal



Plastic



Stone/Glass

Recycling

Incineration with energy recovery

For smelting

For reuse

For concrete and road building

Clean wood chips for particleboards

Contaminated wood chips





Reprocessing Tires...

From a materials point of view, the tire is a mixture of synthetic and natural rubber, to which are added a range of specific substances to ensure performance, durability and safety such as mineral oil, reinforcing fillers, sulfur, which act as catalysts to accelerate the vulcanization process.

Due to vulcanization method (sulfur addition to rubber crating in order to create stronger bonds between the polymers), tires are difficult to melt for reuse; luckily, there are many methods available to make use of the millions of scrap tires in stockpiles throughout the country such as:

Shredding and chipping: mechanical shredding of tires into bigger sizes and the in particles one (20-30 mm sizes)

Crumbing: mechanical or cryogenic process that transform tires into fine granular or powdered particles.

Vulcanizing: treatment of tires to reverse the vulcanization process in the original tire production.

Pyrolysis and gasification: thermal decomposition that produces gas, oil, steel and carbon.

Energy recovery: energy generation by incineration.

In WoodRub project, recovered rubber shall be in form of crumbs (different fractions); in this regard, the optimal process to get them is shredding in ambient temperature by using cryogenic method, a freezing process with the employment of liquid nitrogen.

Cryogenic process: cryogenic processing refers to the use of liquid nitrogen or other materials/methods to freeze tire cheeps or rubber particles before the size reduction.

Whole tires or tire cheeps are cooled down to a temperature of about – 80 °C. Below this “glass transition temperature”, rubber becomes nearly as brittle and glass, and size reduction can be accomplished by crushing and breaking.



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Rubber recovery facilities visits



BIOTROHOS SA (Greece)



RETIRE ABEE (Greece)



RMD SA (Spain)

BIOTROHOS SA (Platykampos Larisas, Greece)

Biotrohos SA is activated in the area of tire recycling (truck and car tires) since 2007.

It is a recycling unit model that follows the European specifications. BIOTROHOS SA is equipped with modern technologies that represent a distinguishing element with foreign firms. The aim of the company is to use recycled tires in ways that are friendly toward human health and environment.

RETIRE ABEE (Drama's Industrial Area, Greece)

RETIRE ABEE is a model firm in recycling all kinds of used tires with European standards. In possession of highly modern machinery of German technology, the company realizes products of high quality rubber, granulated and powder with a production capacity of 24.000 tn yearly.

ECO INDUSTRIA (Senigallia, Italy)

The company has an advanced facility for recycling; the plant is used for the worn tires and rubber and is fully computerized. Activities are selection and processing of tires as well as recovery through mechanical processing cycle.

Particular relevance concerns the realization of anti-shock floors. They are made from recycled material and are in compliance with EC standards as regards safety. The flooring has high shock absorption capacity of impact and a non-slip effect, appearing in this way as an effective tool to prevent accidents.

RMD SA (Leon, Spain)

RMD is a recycling industry of international scope whose office is located in Leon and it was founded in 1991 with the objective of reused metals recovering. Along the lines of metal processing, RMD has another side aimed at the recycling of used tires. Depending on the size of the granules prepared, products are employed for different uses such as children rubber floors or bitumen for road constructions.

CHARLES LAWRENCE INTERNATIONAL Ltd (Newark, UK)

This company was a pioneer in 1990 in conversion of scraps (obtained by commercial vehicle tires) into rubber granules. Today, thanks to an updated plant with a capacity of 20.000 tons of tires/year, Charles Lawrence International produces six standard granule grades, surface materials and equipment used for application and maintenance of surfaces.

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The reference period May-October 2012 has been characterized by tests carried out on new wood and rubber prototypes.

Specifically, in GLUNZ, they have been evaluated at first the physical and chemical properties of eight particleboards typologies, whose differences are due to the percentage variation of resin content and at the same time to the quantity of melamine necessary to the composition of this latter. It should be specified that, for the purposes of an appropriate assessment, the values obtained have been compared with standards applied for P5 particleboards, generally suitable for exterior use and then for humid conditions.

On the whole, positive results have been found both in terms of internal bond, both in relation of modulus of elasticity; moreover, for certain samples, it was observed a satisfying moisture resistance.

The same panels, were then subjected to acoustic tests in ACCIONA, in order to assess the sound absorption capacity: in this sense, a low coefficient has been calculated, which may suggest thereby high reflective properties. In parallel, the same tests were carried out on layers made by KERIDIS with tyres particles, and they have conversely highlighted a good sound absorption capacity.

The results obtained thus represent a valid precondition to justify the use of new materials made by combining wood and rubber, especially if the foreseen application concerns the outdoor environment with the aim of reducing the noise pollution impact.

DISSEMINATION



On 9/11/2012

COSMOB distributed informative leaflets about WoodRub project during the sixteenth fair concerning materials and energy recovery as well as sustainable development. Organized by Ecomondo, the Italian platform in the field of integrated waste management, they have been involved many companies dealing with collection, management, disposal, treatment, recovery and valorisation of waste.



On 15/11/2012

Aidima presented in its pilot course of professional certificate "Carpentry and furniture projects" the Eco-design and life cycle assessment process to raise awareness about the management of environmental aspects in wood-furniture sector, during all operation steps.

WoodRub project, and specially WP related to LCA, was explained as example of new recycled materials research.





On 16/11/2012

at Polytechnic University of Valencia, (Spain) during the course “Waste Engineering of Chemical Engineering” WoodRub project - and specially the used tyres case - was illustrated as an example of new recycled materials research.

The aim was to inform future chemical engineers on the different technologies related to management and treatment of residues that mainly involves treatment technologies of municipal solid waste, different industrial solid scraps and others such as disused tires and cars.

UPCOMING EVENTS



ETRA 20th Annual Conference March, 20-23, 2013, Brussels

ETRA 20th annual Conference – Focus on the future: Technologies, materials and market opportunities

The next ETRA Conference will take place from 20 – 22 March 2013 in Brussels. This event is a excellent opportunity to discuss and debate on key advances in the tire recycling industries during the past two decades, inside and outside of the EU. In this framework, WoodRub Consortium is preparing a presentation to inform stakeholders about the environmental and economic importance of waste management, optimal manner for managing resources and WoodRub new materials as new market for waste and applications of most successful composites. More information will be found soon at www.woodrub.com

Final Conference to be hold during summer 2013

WoodRub project is reaching its final phase. A international conference will be organized to show up results and insights got on wood and rubber waste management. It will attract waste managers, industries, materials researchers and decision makers in the area of material recycling.

More information coming soon in next newsletter and at www.woodrub.com

