European Structural Wood - for sustainable building components

Berichterstattung

Projektinformationen

ESW

ID Finanzhilfevereinbarung: 672757

Projektwebsite

DOI
10.3030/672757

Projekt abgeschlossen

EK-Unterschriftsdatum
2 Mai 2015

Startdatum
1 Juni 2015

Enddatum
30 November 2015

Finanziert unter
INDUSTRIAL LEADERSHIP - Leadership in enabling and industrial technologies – Nanotechnologies

Gesamtkosten
€ 71 429,00

EU-Beitrag
€ 50 000,00

Koordiniert durch
WDE MASPELL SRL
Italy

Periodic Reporting for period 1 - ESW (European Structural Wood - for sustainable building components)

Berichtszeitraum: 2015-06-01 bis 2015-11-30

Zusammenfassung vom Kontext und den Gesamtzielen des Projekts

ESW project develop an innovative technological process which will produce a new constructional material, having higher
yields compared with the best alternatives in terms of technical results, economic and environmental footprint
performances. Our proposed technology uses VacWood for manufacturing an outstanding new bio-material which has the
potential to replace most commonly used structural materials such as concrete, steel and timber. VacWood is a new wood
material output of Tv4newood project financed by Eco Innovation call 2012.
Innovation of ESW material, refers both to the use of the new VacWood material and its bonding systems.
VacWood is the most ecological, cost saving process for wood treatment, where modification of wood fibres structure is
due under vacuum and high temperature. The most important feature of Thermovacuum process is related to its capacity
to improve overall quality of “poor” local timber essences (European ones = low value) in very high quality wood, having
comparable performances with tropical imported wood.
In fact, Vac wood has:
- An extremely uniform reduction of hygroscopic (less than 15% Hr (or lower if needed) in overall wood section;
- Outstanding dimensional stability;
- Very high improvement durability = two or three classes of durability gained with Thermovacuum process (up to class 1);
- Increased hardness;
- Absence of VOC or characteristic odours of other thermally modified wood
These important characteristics of European wood essence treated with Thermovacuum Process enable ESW to become
a unique and innovative product.
The project aim to spread the ESW usage as innovative EWP (Engineered Wood Product) for building sector, for indoor
and outdoor applications. Moreover it intends to improve the production request of VacWood, widening its field of
application and improving its market potentials, providing a new, innovative and alternative wooden product for VacWood
manufacturers and the overall wood market.
The most interesting result achieved is the one at 190°C which represent a perfect optimisation between of overall wooden element characteristics, as well as the small reduction on mechanical resistance (from class GL24hup to GL22h) is offset by a considerable durability improvement (from class 4 = low up to class 2-1 = very high/top).

Arbeit, die ab Beginn des Projekts bis zum Ende des durch den Bericht erfassten Berichtszeitraums geleistet wurde, und die wichtigsten bis dahin erzielten Ergebnisse

During the 6 months of projects we have implemented the following activities:
Technical Assessment
Market Assessment
Economic Assessment
IPR Assessment
Business Plan

Fortschritte, die über den aktuellen Stand der Technik hinausgehen und voraussichtliche potenzielle Auswirkungen (einschließlich der bis dato erzielten sozioökonomischen Auswirkungen und weiter gefassten gesellschaftlichen Auswirkungen des Projekts)

PROGRESS ABOUT TECHNICAL PROPERTY
The most interesting result achieved is the one at 190°C which represent a perfect optimisation between of overall wooden element characteristics, as well as the small reduction on mechanical resistance (from class GL24hup to GL22h) is offset by a considerable durability improvement (from class 4 = low up to class 2-1 = very high/top).
This improved durability (about two or three classes) at top level - equivalent to tropical wood - make the structural element much more resistant to the atmospheric and biologic agents than the not treated one.
Moreover, as Thermovacuum technology was proved with different wood type, the challenge of providing structural elements &/or EWPs with tailored and superior characteristic compared with the Spruce or Radiata Pine ones, comes true. In fact, Thermovacuum process is applied currently for thermo vacuum treatment of Oak or Birch which naturally have higher performances respect the Spruce. The VacWood obtained by Thermovacuum treatment of Oak for instance is particularly hard and durable (Class 1 = > 25 year in external environment) and able to be an alternative to not wooden building materials.

ESW structural elements can be manufactured with a lower environmental impact compared with natural wood (not treated), because they don’t need any further preservation treatment (addiction of chemical, varnish, impregnation agents) for durability extension.

MARKET EXPECTED RESULTS
Market penetration:
- Share about 1% of EU market value for EWPs in target countries (Italy, France, Germany, Austria, Scandinavian, Poland) in five years
- About 18.900 m3 of ESW sold in five years

ECONOMIC EVALUATION

A competitive advantage of VacWood EWPS is that currently at least 7 different type of wood can be conveniently Thermovacuum treated with standardised processes: Ash, Beech, Fir, Oak, Spruce, Poplar, Pine. As well gluing cost are the same for any type of wood (treated or not treated) the Thermovacuum treatment add value to the conventional not treated EWPs with a very low cost increase (between 14% and 20% depending on wood type used as raw material). In fact the resulting EWPs have improved durability (two classes), stiffness, resistance to external atmospheric agents (water / humidity). From another point of view, for achieving the same technical performance, a lower quality raw wood material can be used compared not treated wood. For this reason, the increased product cost (the value added of thermo vacuum treatment process) can be easily compensated by the lower cost of raw material.

IPR CONCLUSION AND STRATEGY

ESW patent protection: both the thermal vacuum process and the machinery to carry out this process are patented by WDE-Mapell in several international countries. The process patents also cover products made by the patented process, therefore the thermo vacuum-treated wood base is protected. As for the complex product obtained by gluing wood treated with the thermal vacuum, clearly being such complex product obtained starting from a base product protected by patent it is also protected. Following these consideration WDE-Maspell decided to start in a second phase with a mark registration of ESW wood. The thermo vacuum treated wood trademark registered name is VacWood.

IPR protection will be consequently based on:

- patent protection for Thermovacuum process
- trademark registration for ESW product
- product certification
- License Agreement for VacWood manufacture and Thermovacuum Process
- Qualification of VacWood suppliers licensees and related third Party Quality process certification for trademark usage on their product
- Qualification of ESW suppliers licensees and related third Party Quality process certification for trademark usage on their product

TURNOVER EXPECTED GROWTH

Turnover growth: thanks the positive evaluation of cost/benefits and the value added to the EWPs using the VacWood as raw material, and considering the growth rate for EWPs in general (Glulam + 100% in 10 years; Finger Joined + 17% per year; CLT + 20% per year) and even considering the most direct alternative product growth (Accoya growth about 15-20% per year) we believe that the mean growth rate for the first five years could be about 40%. The growth rate can be sustained both thanks to the existing network of VacWood producers, new licensees for manufacturing VacWood and new plant buyers.

More in detail here are our forecasts:

- ESW produced in five year: 18.900 m3 (8100 m3 directly manufactured by the Pilot Centre and

10800 m3 purchased from certified VacWood manufacturers)
- Market Value created: 31,2 M€ divides as follow:
o WDE Maspell Turnover from ESW sales: 20,8 M€ in five years
o Value for ESW dealer / distributors: 10,4 M€
o Revenues for VacWood manufacturers from the WDE network: 2,7 M€
- Thermovacuum plant sold by WDE Maspell: 16 in five years
- Turnover from Plant Sale in five years: 5,6 M€
- Overall estimated Turnover for WDE MAspell: 26,4 M€ in five years.

Employment Growth: 17 people
- 2 full time Manager (1 CFO + 1 Marketing manager)
- 1 quality Manager (Organizational skill)
- 2 designer engineers
- 2 technicians (trainers and product assistance)
- 2 assistance and maintenance staff (Thermovacuum machine)
- 3 Thermovacuum Plant workers for Pilot Center
- 3 workers in Gluing and EWP department
- 1 technician – expert in gluing and woodworking
- 1 Purchase Dept.

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Letzte Aktualisierung: 11 Juni 2024

Permalink: https://cordis.europa.eu/project/id/672757/reporting/de