METHOD AND DEVICE FOR THE ACCURATE MEASUREMENT OF WOOD MOISTURE

INVENTION DESCRIPTION

Wood moisture levels have an influence in its phisical and mechanical properties. Moisture also increases the risk of attack by insects and fungi, producing wood rotting. Considering the existing diversity of landscapes and environments, it is very common to industrially process wood of native species with special properties that are not adapted to the resistance moisture meters (megohmmeter) currently on the market.

Most commercial devices do not allow accurate measurement of the wood moisture level required by the standards and adapted to the different types of native woods, showing inaccuracy levels above 3%. This fact causes constant complaints and distrust about the quality of wood between sellers and buyers of wood.

The implementation of CE Marking in sawmills must be performed according to EN 14081-1: 2011 standard. This standard establishes requirements regarding the quality of the measurement of the megohmmeters. Such required precision is difficult to enforce in practice by most of the existing commercial devices, as they show systematic deviations of the measurements with respect to the real values due to improper use of internal calibration curves and problems associated to the estimation of equivalent resistance of the wood.

Based on the above, the majority of commercial devices for the measurement of wood moisture present two main problems: they do not have the precision required by EN 14081-1 standard, and the curves of internal calibration used by these devices are not suitable to the species frequently measured.

For all the above, systems for measuring the moisture in wood according to the European standards are necessary.

Researchers at the University of Valencia have developed a new megohmmeter and a resistive method for measuring moisture in wood which improves the accuracy of the known methods and megohmmeters.

The new method is based on multiple iterations with changes in voltage, allowing to obtain a value closer to the real moisture of the sample, due to the precision obtained and to the adjustment to the type of native wood and temperature. Furthermore, the system is configurable depending on the species to be measured and the calibration curve can be customized.

The accuracy level of the resistive measurements obtained through the use of this novel technology is close to the 1%, which is a remarkable improvement in comparison with the megohmmeters currently on the market.

BUSINESS APPLICATION SECTORS

The new technology could have multiple applications on science materials, for the measurement of wood moisture levels along its industrial transformation process:

- In the lumber industry: The technology could be used in sawmills, wood drying facilities, warehouses…
- In the construction and building restoration: It could be used for monitoring moisture levels in buildings with wood structures (ceilings, walls…)

TECHNICAL ADVANTAGES AND BUSINESS BENEFITS

The main advantages of the invention are:

- Higher accuracy, which allows the use of the technology in CE marking of the wood used in construction.
- It allows compensation for different types of wood and temperature.

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- Faster stabilization of the measurement compared to similar commercial devices.
- Low cost and battery power allowing its use as a portable measurement and monitoring system or places with difficult access,
- It facilitates the annual calibration of the measurement procedure by readjustment of the measurement algorithms, ensuring the compliance with European legislation on the matter.
- High connectivity, versatility and ease of use, which allows its use as a single device as well as a network of connected devices for the continuous measurement of wood moisture.

DEVELOPMENT STATUS OF TECHNOLOGY

The technology has been validated in different commercial wood species. Several functional prototypes have been developed and successfully tested the industry and in construction environments. These developments have used the financing of the proof of concept program “Valoritza I Transfereix” of the University of Valencia.

INTELLECTUAL PROPERTY RIGHTS

The tecnology is protected through the following Intellectual Property Rights:

- Patent ES2566775 “Método resistivo y sistema para la medida de la humedad en un material fibroso y programa de ordenador”

COLLABORATION SOUGHT

- License agreement, use, distribution or commercialization.
- R & D project to apply to other sectors.

RELATED IMAGES

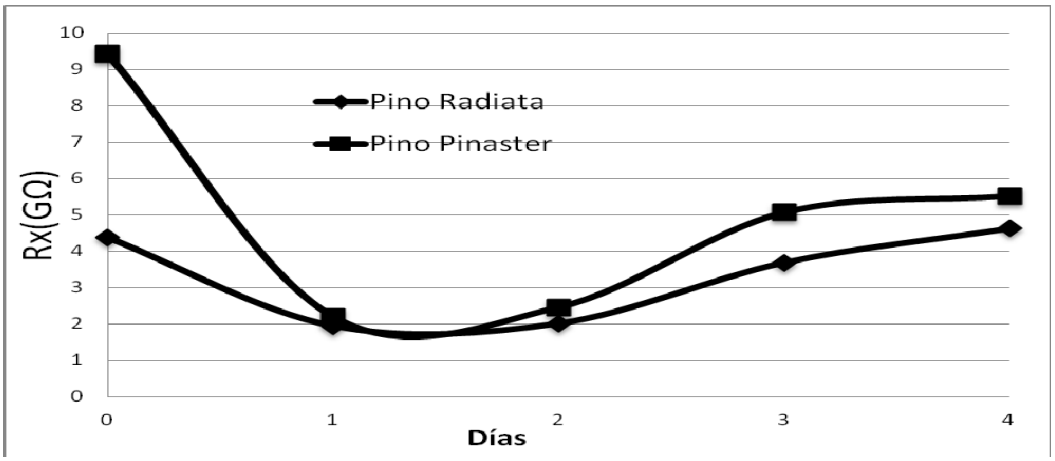

Figura.1. Resistive values for two species of wood (Pinus radiata and Pinus pinaster).

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Figura 2. Example of different species of wood

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