Evolution of quality wood flooring in Brazilian companies members of a certification program

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INTRODUCTION

In Brazilian forest industry, companies in general are characterized by exportation of low-value-added feedstock, which is not interesting from the economic and social view. Brazilian manufacturers companies of the so-called Wood Products of Higher-Value-Added (PMVA) are still very incipient in relation to added-value when comparing to other kind of industry, so is required the adoption of strategies and actions for its proper development.

Quality certification can be an alternative to increase added-value for wood products. In Brazil there are few developed initiatives related to this kind of certifications and one of these facing wood-flooring has been developed by ANPM – National Hardwood Flooring Association.

Quality can be defined as a combination of marketing, engineering, production and maintenance characteristics of products and services which, when in use, will attend to costumers' expectations. There are eight quality categories: performance, features, reliability, conformance, durability, service, esthetics and perceived quality. It is possible to affirm that market demand for quality products purchase is increasing and this tendency is reinforced by an intense competition between companies. These aspects make the quality control an indispensable requirement in the productive sector (GARVIN, 1992; FEIGENBAUM, 1994).

Considering the quality certification developed by ANPM, it's important to confirm if it has generated positive impacts on product quality. In this sense, the research objective is to present and analyze progress toward wood-flooring quality in Brazilian companies which are part of the quality certification program (PQ) developed by ANPM.

MATERIAL & METHODS

The evaluation of quality evolution was made from information available on ANPM database and considered only companies members of its PQ. The intention was to evaluate if, with periodical audits, there was an improvement in product quality. Audits - which involve product sample (hardwood flooring) and defects, dimensions and moisture content quantification - result in the qualification (or not) of the wood-flooring producer company in PQ. Figure 01 presents a summary of the sequential procedures related to audits.
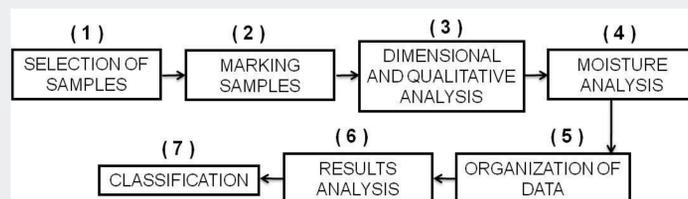

Figure 01 – Audits procedures summary

The analysis has been realized evaluating the attendance to the technical standard NBR 15799 from ABNT (Brazilian Association of Technical Standard) relative to standardization and classification of wood flooring (ABNT, 2010). Briefly, the analyzed aspects are classified according to the following tolerances:

Thickness: 0,2mm of tolerance in relation to nominal dimension.

Width: 0,2mm of tolerance in relation to nominal dimension.

Moisture content: 1,5% of tolerance in relation to nominal moisture content.

Defects: The analysis has been realized consisting absence, presence or defects measurement.

Figure 02 presents realized procedures and used materials during audits. For evaluation it has been considered information from 48 audits realized in 6 companies and 8 complete cycles, noting that the selection criteria was the greater constancy on audits realization.
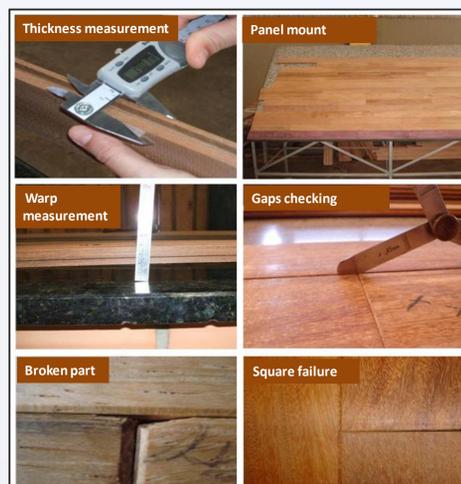

Figure 02 – Realized procedures during audits

RESULTS & DISCUSSION

According to the results, improvement on wood-flooring quality standards has occurred, as it can be visualized on Figure 03. The analysis has been made considering the moving average of conformities values of every 3 audit cycles.
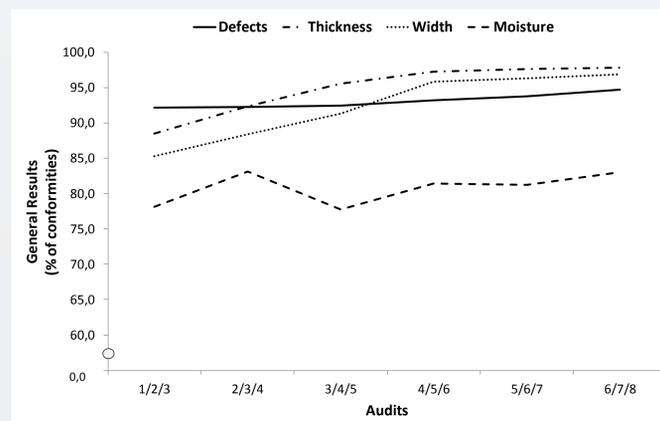

Figure 03 - General results of quality evolution

The items defects, thickness and width showed better consistency on the quality pattern, indicating easier control. Considering moisture content, it can be noted more significant variation along the audits, indicating an item harder to control. In addition, the items defect, thickness and width, besides an increasing tendency on quality pattern, always presented a conformity percentage higher than 90% after approximately the fourth audit cycle. In the moisture content case, after the fourth audit cycle, is observed an increasing tendency on quality pattern, however the higher conformities index do not reach 85%. At the end of audit cycle, the item thickness presented better results of conformities, followed in descending order by width, defects and moisture content. It's important to emphasize that, according to the specifications, for the whole lot approval its necessary a minimum of 95% of conformities for all the items (ABNT, 2010).

Moisture presented more difficulties to control. On Figure 04, it can be observed this item's distribution in the 48 audits comparing it to the intended conformities level (95%).

In only 10 audits, were obtained conformities index over 95%, amounting 20,8% of total. The highest moisture content variation can be observed oscillating between 4% and 100% of pieces which are conform.
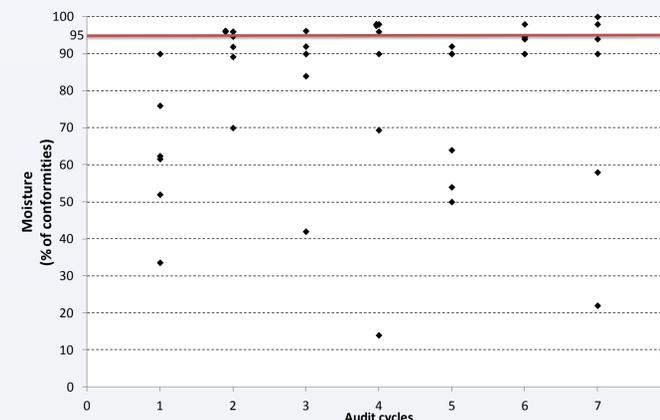

Figure 04 – Moisture conformities index distribution

According to Kozak and Maness (2003), in a study involving Canadian industries, it's probable that conventional drying schedule is being carried out inappropriately, causing the described variations and not reaching the desired moisture level. Although, even when process is properly conduced and monitored, moisture changes may occur during other stages of product's manufacture and storage.

Others aspects may also have influenced on the moisture level variation, with emphasis on the following ones: dryers and controller deregulated or/and inadequate; not calibrated moisture measurer; inadequate drying schedule; lacking on training or technical knowledge of professionals; variation on feedstock (different species or time on patio); hurry to order delivery, causing a process condition faster than adequate.

CONCLUSIONS

The certification program implementation had a positive impact, improving the wood-flooring quality pattern and this impact was increasing over time.

The items defect, thickness and width presented better constancy in quality, being easier to control while moisture content had worst constancy in quality, being harder to control.

Obtained information on quality audits allowed to identify problems on productive problem and the needing for corrective action for solving these problems.

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