

Analysis of defects in wood flooring manufactured by Brazilian companies members of a certification quality program



Ariel de ANDRADE ^(1,2); Marcos MILAN ⁽¹⁾; Saly TAKESHITA ⁽¹⁾ Ivaldo Pontes JANKOWSKY ⁽¹⁾

(1): University of São Paulo, "Luiz de Queiroz" College of Agriculture

(2): ANPM – National Hardwood Flooring Association - Brazil



INTRODUCTION

Wood flooring is a high-value-added product and the defects occurrence, mainly when finished, is not interesting, once it may cause installation problems and in consequence, customers dissatisfaction. In Brazil, ANPM - National Hardwood Flooring Association – developed a Quality Certification Program (PQ) to improve product quality and seek reduction on defects occurrence.

It's important to emphasize, as Deming (2003) affirms, that it's hardly found a "zero defect" in industrial processes. In wood-flooring case, it's hard to get 100% conformities because it is a natural, heterogeneous and variable material, according to Kozak & Maness (2003). However, defects which compromise product installation should be avoided. The absence or minimum of defects is important to captivate customers and for a positive divulgation of product and company. In this way, the present work aims to analyze the current defects on wood-flooring fabricated by Brazilian companies.

MATERIAL & METHODS

The defects evaluation involved products from PQ participants and nonparticipants companies. It has been conducted using ANPM database's information and simulated audits. All products are normally trade in national and international market. The purpose was also to evaluate if there is any differences between products from certified and noncertified companies. The adopted procedures were the same employed on ANPM's PQ, using as base technical standards and audit results. Figure 01 presents a sequential summary of procedures related to audits.

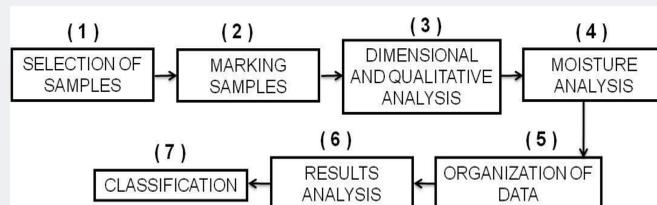


Figure 01 – Audit procedures summary

Defect analysis was performed by evaluating the compliance with technical standard ABNT NBR 15799 - Brazilian Association of Technical Standards (ABNT, 2010), recording defects absence, presence and/or measurement.

Figure 02 presents procedures and materials used during audits. For evaluations were considered information from 120 audits of PQ participant companies and 4 audits of nonparticipants companies.

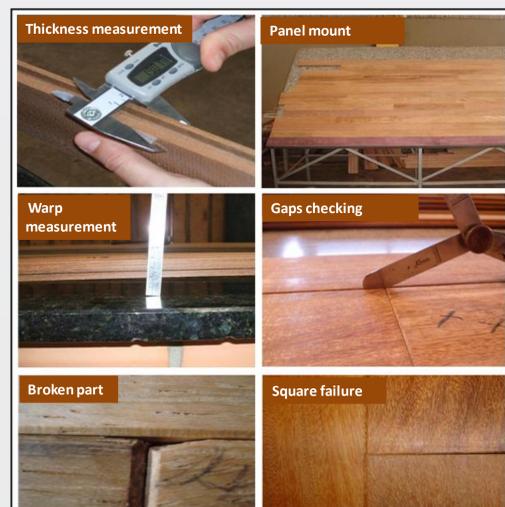


Figure 02 – Realized procedures during audits

RESULTS & DISCUSSION

In 120 audits of PQ participant companies, from a total of 15,000 analyzed wood-flooring samples, 912 presented defects recorded as nonconformities which equate to 6.1% of all. Figure 03 presents results related to observed defects.

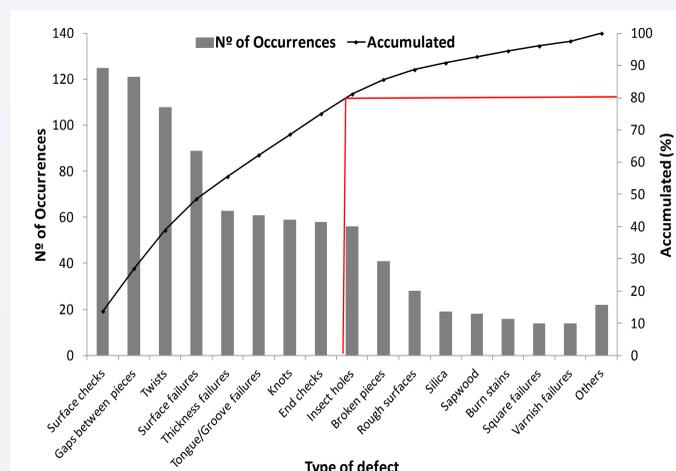


Figure 03 – Wood-flooring defects observed in PQ participant companies

Surface checks was the most frequent item among defects, totalizing 13.7% of all occurrences followed by gaps between pieces at panels mounting moment and twists, each one totalizing 13.3% and 11.8% respectively.

In the 4 audits of nonparticipants companies, from a total of 500 analyzed wood-flooring samples, 142 presented defects recorded as nonconformities, equating to 24.8% of all. This percentage can be considered significant in terms of losses for companies and superior when comparing to the percentage of participant companies' defective sample, which was 6.1%. Figure 04 presents results related to observed defects.

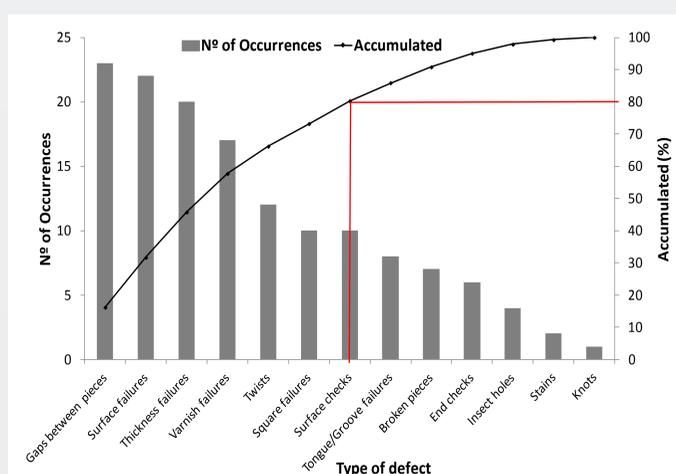


Figure 04 - Wood-flooring defects observed in PQ nonparticipant companies

Presence of gaps between pieces at panels mounting moment was the most frequent item among defects, totalizing 16.2% of occurrences, followed by surface and thickness failures, each one totalizing 15.5% and 14.1% respectively.

Figure 05 presents a comparison between certified companies and noncertified companies. In this case, data refers to 5 certified companies which correspond to 625 wood-flooring analyzed samples and 4 noncertified companies which correspond to 500 analyzed samples.

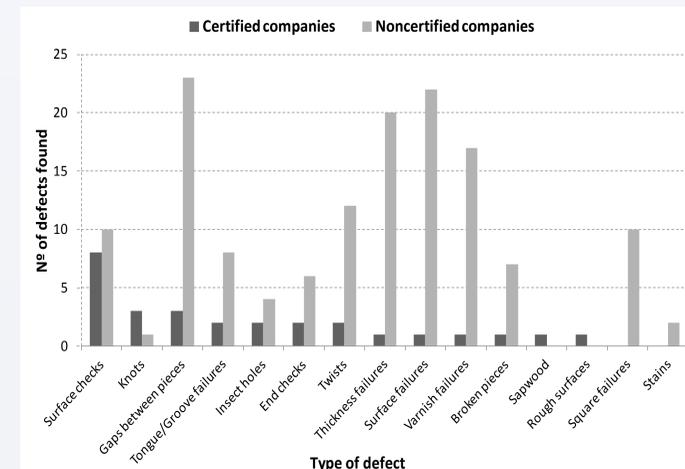


Figure 05 - Comparison between defects of certified and noncertified companies

Analyzing the amount of defects, it can be observed differences on quality patterns of certified and noncertified companies. The 28 registered defects from certified companies represent 4.5% of all analyzed samples, indicating compliance with ABNT NBR 15799 requirements, which allows 5% of nonconformities. Considering noncertified companies, the 142 occurrences represent 28.4% of analyzed samples, i.e., more than 6 times comparing to certified companies and not in conformity with the standard.

Considering noncertified wood-flooring, it is noted that half of defects is related to manufacturing process and the other part consists in handling and classification problems. For wood-flooring of certified companies, the main problem is the surface checks which can be considered classification failure and are often hard to visualize. It can be affirm that process problems of products are more serious than handling and classification problems, which usually are connected to esthetic.

CONCLUSIONS

Certification contributes to defects reduction.

In PQ participants companies, the more frequent defects are those harder to visualize, while in PQ nonparticipants defects are related to manufacturing, handling and classification.

PQ participants companies presented 6.1% of no conforms pieces. In the case of PQ nonparticipant companies, 28.4% of all analyzed samples were classified as non conform pieces, implying in a high amount of loss.

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ACKNOWLEDGEMENTS

- ITTO – International Tropical Timber Organization
- ANPM – National Hardwood Flooring Association – Brazil
- ESALQ/USP - University of São Paulo - "Luiz de Queiroz" College of Agriculture

Contact: Ariel de Andrade – ariel@anpm.org.br / arielandrade@usp.br