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COMPOSITE MANUFACTURING OF NATURAL RUBBER AMAZON - ANALYSIS OF MECHANICAL RESISTANCE AND ABRASION RESISTANCE

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ABSTRACT

This paper analyzes the mechanical and thermal characteristics of samples of composite fabric coated with natural rubber by vulcanization, which are the smoked forest fabric (TFD or SFF), fabrics of the forest in an oven vulcanization (TFE of OFF), which samples provided by COOPFLORA - reserve of tappers of Machadinho d'oeste in Rondonia, in the Amazon and industrial laminated fabric (TLI or ILF) manufactured in the state of Sao Paulo by Ecologica Laminados S.A. With aspect similar to leather produced in the Amazon forest handmade and samples coated in industrial process produced in São Paulo State that responded with a better performance in resistance to traction, resistance to rupture and stretching, however they all meet the standards for shoes, accessories and clothing.

Keywords: natural rubber, resistance mechanical, textile composite, design sustainable.

INTRODUCTION

It is within this context that the composite fabrics made of natural rubber resin, produced by natives and rubber tappers in the Amazon . It is from the *Hevea brasiliensis* that many families earn their livelihood, and each tapper contributes to the preservation of 300 acres of forests. Since, there is little scientific information and technology on the production processes of the vegetable leather[1][2]. This objective of this investigation is to compare the studied material with the technical standards. The tests for resistence rupture and stretching applied by ADAMEL LHOMARGY Dynamometer, and The specimens were prepared for analysis in the dry state. They were divided into three test groups subdivided into warp and weft, five specimens of each in dimensions of 50 mm by 200 mm, while the composite handmade and semi-handmade composites were subjected to 100 Kgf cell. (1.000N) while the industrial ones to a pressure of 200 kgf cell. (2.000N) and grab speed of 80 mm / min. for both.

This abrasion experimental is to determine the wear resistance of the fabrics exposed to friction, in the apparatus Abrasimeter Martindale , in which 4 specimens were cut of each fabric, forming three groups [4]. The analysis method is the mass loss, correlating wearing off with the number of cycles. Was calculated per unit of surface standards [5], and subjected to a pressure of 9kPa weight.

RESULTS AND CONCLUSIONS

The vulcanized textile in oven resented greater traction, rupture and stretching resistance. The rupture is directly related to the strength of stretching and traction, being simultaneous the

moment of rupture of the fabric at the apex of elasticity and at the same time of the peak traction, Table 1.

Table 1 - Traction, rupture and stretching resistance comparative analysis

	Oven Forest	**Smoked Forest**	**Industrial Laminated**
Rupture (N)	332.7	360	661
Stretching (%)	12.60	16.60	26.64
Traction and rupture in (Kgf)	30.89	36.70	67.40
Thickness (mm)	0.52	0.54	0.72

Regarding the industrialized fabric, it presented considerable difference in warp and weft direction, and resistance warp direction more than four times, but low stretching in warp direction and 48.11% in stretching of the weft, that is, the analysis revealed a composite highly resistant in warp direction and extremely elastic in the weft direction, probably favored by textile structure in satin and percentage of elastane yarns in the weft direction. All tests showed tensile and rupture strength exceeding 30 kgf, as quoted by it is an index good enough when dealing with footwear, clothing and fashion accessories.

Laminated industrial fabrics, it was noticed at cycle end of 13,000 cycles, three samples showed wearing off reaching the rupture of the coating layer, which was recorded weight loss per unit of surface of 0.008 g / cm. In coated cured by textite smoking in the forest there was no tactile sensation of stickiness, and the etching process maintained the average of 4000 cycles showing no significant loss in mass**.** Fabrics vulcanized in oven analyzed bore cycles of abrasion extremely higher in comparison with other investigated (Table 2), with mass loss negligible of 0.001 g / mm², with minimum visual damage.

Table 2- Comparative abrasion analysis

Samples	**Mass**	**Mass after abrasion**	**Cycles**
	(g/cm²)	**(g/cm²)**	
Smoked Fabric	0.044	0.044	4,000
Oven Fabric	0.056	0.055	72,500
Industrial Laminated	0.067	0.059	9,500

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