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UFRGS study reuses polyester fabric waste in the manufacture of shoe assembly

Master's dissertation aimed to re-use waste from the footwear industry in its own new assemblies, reducing environmental impacts

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The re-use of polyester fabrics waste in the footwear industry in insoles; the employment of natural resources; and the reduction of environmental impacts were the objectives of the research conducted by [Tabata Morgana Conti](#) in collaboration with the [Graduate Program in Mining, Metallurgical and Materials Engineering \(PPGE3M\)](#), in her dissertation presented in May 2021. Tábata used polyester fabric waste generated in the footwear industry to create shoe assembly insoles – structures that support the shoes –, restoring these residues back to the production process.

Although accepting the importance of the theoretical basis of her research with bibliographic references, it was in practice that the author of the dissertation managed to show the greater potential of her study. Gradually adapting the construction processes, she says that it took about seven months in the practical stage (out of a total of one and a half years of research) to find a good compatibility of the different materials before she finally reached the ideal production standard. Tábata assembled four formulations, with 5%, 10%, 15% and 20% polyester, and subjected them all to physical-chemical and mechanical tests in order to respectively analyze moisture content and other aspects and to assess tensile strength, for example. She also performed tests with the Scanning Electron Microscope (SEM), which allows microscopic analysis with a magnitude increase of up to 30 thousand times. Formulations with 5% and 10% polyester showed good results at all stages – even if not as efficient as the 100% new material, but within satisfactory parameters.

"The main aspect of the work would be sustainability, as the purpose is to actually reuse this material, put it back to use and boost the economy. The second point would be the issue of bringing more technology into the industry, combining university and industry, things which sometimes seem so distant, but in fact they are not," argues Tábata. She advocates for more technological investment in the Brazilian companies and an evolution together with the academic support.

The university has an expertise in technology and research, and today most industries need it. The approach would be for the university and the companies to partner up to make things happen effectively, because companies often have funding and workforce, but lack some of the technological knowledge that universities hold.

Tabata Conti

Local context and necessity

Because she lives in a zone where the footwear industry is very active (city of Portão, in the Vale do Rio dos Sinos), the theme chosen by Tábata reflects the reality of her region and family. As it is something very present in her day-to-day

life, it was not complicated to choose the theme. "It is a real demand. It evolved a lot in recent years in this regard, but there are still several different types of rejects that do not have an environmentally correct destination. There is also the need to find a specific use for the materials that were left as waste from the process," she affirms.

The residents of the region immediately supported the research. The researcher explains how the common sense of reuse is becoming increasingly stronger among the local population, probably due to the fact that most of these people have a family member or acquaintance who works in the footwear, leather or chemical industry, and they can feel the positive impact of the study.

Even though it is a product that has waste in its material precisely because it is reused, the researcher highlights how satisfactory the results of her creation were. She also points out how she grew professionally and personally with the dissertation: "The master's degree gives you another perspective, it shows the importance of combining knowledge with practice in one work". The next step will be to make an industrial scale test for the evaluation of product efficiency in partnership with a shoe manufacturer who intends to recycle this type of waste from the footwear industry and re-use the material in the form of new insoles with a sustainable manufacturing appeal.

Dissertation

Title: [Reuse of polyester fabric waste from the footwear industry in insoles](#)

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