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## Ergonomic Analysis of Visual and Tactile Information of Materials Used in the Manufacture of Toys

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### Abstract

Products intended specifically for children began to be developed in the second half of the seventeenth century, driven by a change in the adult's view of the role of children in society. Over time it was noted that children were more vulnerable to the risk that the products could offer, and there were rules that seek to promote greater protection to those users. This was decisive in how the industry would follow with their developments.

Among the materials most used in toys and other children's products are wood, polymers (polyethylene, polypropylene and abs, EVA, nylon) and fibers (cotton, polyester, cardboard), as a rule, non-toxic and non-flammable. With technological advances is common to find products that mask their characteristics seeking to better meet consumer expectations. The texture, surface, and color prints directly influence the user of the goods, as well as those characteristics in material that has originally are directly linked to the comfort in handling. Thus classify materials in two stages: in its raw form (or with minimal interventions) and how is presented in toys. We seek to evaluate how their visual impressions differ from tactile sensations they provide, and what the printed products in those intentions.

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### 1. Introduction

The materials selection is an important stage in the development of products, and meet the different issues involved in the design process. The texture, the surface, and the colors directly influence the impressions that you have the products, and these characteristics in materials that have them originally are directly linked to the comfort in handling. According Krippendorff [1] "the human being does not answer the physical qualities of things but what they mean to him." Thus classify materials in two stages: in its raw form (or with minimal interventions) and how is

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presented in toys. We seek to evaluate how their visual impressions differ from tactile sensations they provide, and what the intentions embedded in those products.

The design, as well as other areas has been using this ergonomics with a view to finding solutions to their problems projective. This selection is made through the processes, costs and results to be obtained, but it can not be forgotten that contact with the user is relevant in use may influence their function or consumer choices. This paper seeks a relationship between the concept of visual and tactile ergonomics and materials used in toys, in search of an overview to assist new projects in the area.

## **2. Production for children**

Products specifically designed for children began to be produced in the second half of the seventeenth century, driven by a change in the adult's view of the role of children in society [2]. These initially were very similar to those intended for adults, distinguishing only by the proportions and thematic applied [3].

The toys were made of iron, wood and earthenware so the products represented in miniature. Over time it was noted that children were more vulnerable to the risk that the products could offer, and there were rules that seek to promote greater protection to those users. The first standards that specifically address on the safety on toys are of the 80s. Among the first regulations in the world we can quote "JS 90: 1983 Jamaican Standard Specification for Safety of toys and toys", "Argentine Institute of Rationalization Materials 3583 - Part 1: 1986 Seguridad de los playthings, MARKED, labeled y Packaging "and the international standard" ISO 8098: 1989 Cycles - Safety requirements for bicycles for children. " In Brazil since 1988 certification INMETRO became compulsory. The tests to which the products are subjected aim to ensure user integrity during play or a possible breakdown of the product. This was decisive in how the industry would follow with their developments.

Among the most used materials in the manufacture of children's toys and other products are wood, polymers (polyethylene, polypropylene and ABS, EVA, nylon) and fibers (cotton, polyester, cardboard). With technological advances is common to find products that mask their characteristics seeking to better meet consumer expectations. Van der Linden [4], in their studies highlighted how the visual information of comfort influence in procuring products as work chairs.

## **3. Materials and representing**

The materials have symbolic meanings that are allied to its origin, the sensations and functions they perform in the materials in which they are applied. According to Van der Linden [4] the 'Ideological Pleasure' provided by the product it feel bound to their own values according to the relationship of the aesthetic aspects of the product with your visual repertoire or values that enter.

Natural materials such as wood, leather and the fibers are usually linked to comfort. In experiments with Van Der Linden of work chairs [4], the upholstered in leather were indicated as the most comfortable just based on the user's observation. The timber provides a comfortable tactile sensation directly related to the degree of elasticity and with its heat to a lesser degree [5].

Metals, in turn, are associated with technological products and products with precise dimensions. The material is associated with phases of technological evolution, since the "age of metals." The rapid development of the methods of refining and iron work propitiated that from the nineteenth century industrial machinery were no longer made of wood to be made of metal and there was a rise of large-scale production of metal objects commonly used.

Plastics are generally associated with popular products, practical, low cost and durability. The development of this material led to the large-scale manufacture of products with high strength made with lightweight materials with smooth finish, which do not require treatment or painting, thin-walled, creating easily substitutable products. Thin and light pieces can pass the feeling of an ephemeral work, provisional, subject to time shares. Already massive pieces, large and sections, refer to a condition of robustness and durability [6].

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