THE DESIGN PROCESS IN THE DEVELOPMENT OF CERAMIC FLOOR TILES FOR ACCESSIBILITY

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1. INTRODUCTION

The objective of this paper is to present the development process of the research project entitled "Ceramic Floor Tiles for Accessibility" aimed at internal public environments and the meeting of new demands in the Brazilian ceramic material market. The research, which has still not been completed, focuses on the design of a new line of floor tiles which assist visually impaired people with orientation and movement. Thus, we have addressed the design process relevant to the project, as well as aspects of industrial production, conception, generation and product materialization.

The recent passing of new Brazilian accessibility laws has led to a series of fiscal benefits and the reform of urban spaces and construction in order to promote the inclusion of people affected by disabilities. In this new context, the absence of tactile floor tiles for people with visual impairments became evident, especially their usage indoors in public buildings. Due to their physical properties and integration possibilities with already existing flooring, ceramic tiles present great advantages for use as internal flooring. The creation of an integrated line of tactile floor tiles satisfies this need.

2. METHODOLOGY

In view of the complexity of the problem, it was sought to integrate professionals from different professions such as architects, engineers, industrial designers, as well as companies from the ceramic sector and people with visual impairments. For the development of the new product, the Universal Design methodology was employed, in order to incorporate regulation requirements and industrial production. User criticism and participation during testing was fundamental in order to define the characteristics of the products. The principal requirements observed were: the strength of each of the tiles, the relief and colour contrast between tactile floor tiles and surrounding flooring, and safety and comfort while walking. These are also important aspects for the functioning of the system as a whole, design harmony between the three types of tile, and the colour significance of each tile.

Figure 1. Photos of tests carried out with visually impaired people.

3. RESULTS AND DISCUSSION

In response to these project requirements, three types of floor tile were created: alerting, directional and decisional. The "alerting" tiles warn of the presence of potential dangers, for example stairs, watercourse, differences in floor height, etc. "Directional" floor tiles in turn mark out safety routes where the user can walk, and finally a new type of floor tile named "decisional" has been created which marks out route and direction changes. In accordance with the current Brazilian standard (ABNT:NBR9050), the alerting tiles meet this rule, which creates a duplicity in meaning as it can equally mean "danger" as it can a possible route choice.

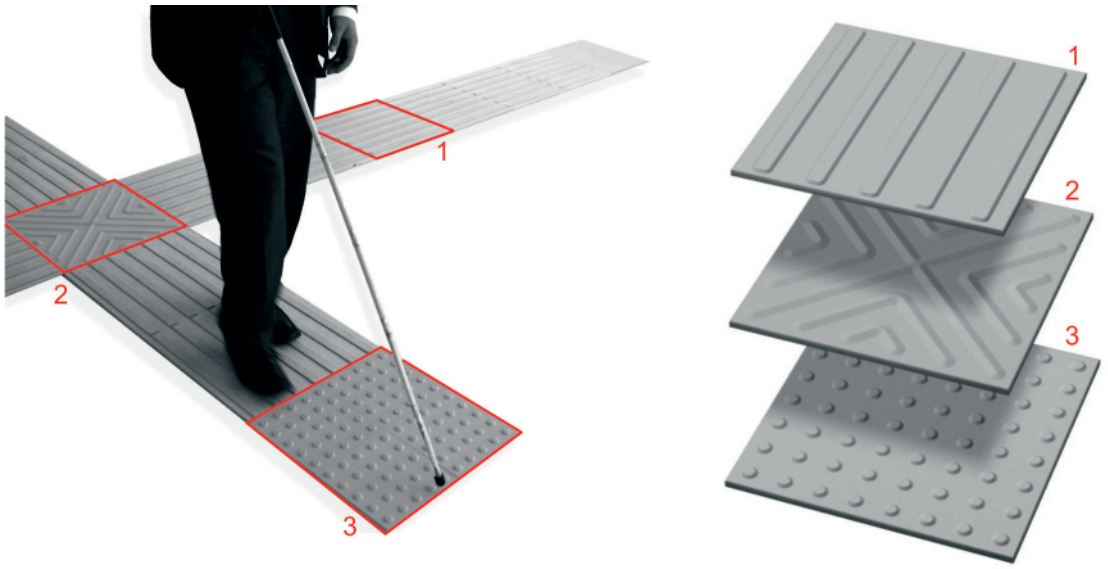

Figure 2. Tactile floor tiles: track and directional (1), decisional (2) and alerting (3) tiles

Another important design aspect is the sound contrast which must exist between tactile tiles and surrounding flooring. International recommendations and Brazilian standard (ABNT NBR 9050, 2004) recommend sound contrast (differentiated sound) at the touch of the walking stick as a desirable physical characteristic for floor tiles which warn of potential dangers (alerting). Bentzen (2000) verified during testing with directional tiles and common surrounding tiles that the contrast between products installed in external areas is related to its material makeup and also to its installation on the substrate. In this case, the presence of a space between the tile and the substrate (air) increases the sound contrast of directional tactile floor tiles.

Apart from considering these aspects, it is very important to bear in mind that directional floor tile systems are not isolated and their application is not only connected to surrounding flooring but also to the architectural environment. In order to guarantee the correct application in line with its logic in the different spaces and to provide consistency in the new codes of use, it is necessary to take into account the colour contrast and sonority of the system in relation to the surrounding flooring and their dimensional compatibility. Other important technical aspects are: surface water runoff, resistance to impact and abrasion, and conformance to local technical standards.

Currently, the manufacture of moulds is planned in order to start off production on an industrial scale. This will be followed by new tests with visually impaired people in an already existing environment, and the production of materials in order to disseminate the knowledge acquired and assure correct use of the new ceramic products.

REFERENCES

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