CERAMICS AND ARCHITECTURE

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ABSTRACT

« Orthographic projection in the representation of architecture inherently privileges the surface. When the three-dimensional world is sliced to become a bidimensional representation, the physical objects of a building appear flat. Although the plans have a third dimension, it must be recognised that the occupants rarely distinguish anything but flat surfaces behind which the structure and the system of installations hide. While the commonly accepted mantra states that architects design space, in actual fact architects make (draw) surfaces. This privilege of the surface leads to the use of materials in two differentiated ways. In the first, the material is identified as surface: the visual understanding of architecture is determined by the visual qualities of the material. In the second, as architecture is synonymous with surface - and material too - we think of materials essentially as flat products. As a result we group them in two great bidimensional applications: the outer envelope and the inner covering...... »

Michelle Addington and Daniel Schodek Smart Materials and Technologies. We have initiated the present report on CERAMICS AND ARCHITECTURE with this bibliographic reference because we think it helps understand, from the logic of architectural representation, the development that present ceramic products have undergone, as well as their current tendencies.

Ceramic products have been widely used in the architectures of all ages and countries, almost always in covering floors, walls and facades, fulfilling a variety of functions, such as appearance, trafficability and impermeability. On the other hand, in recent years ceramic products have undergone an unprecedented technological evolution, giving rise to more efficient manufacturing processes and innovative products: ceramic tiles with specific appearances, large-sized pieces or pieces with special technical characteristics... It might be said that both the technology used in the manufacture of ceramic products and the quality of these products have reached a prestigious position and, therefore, one might be led to assume that everything was going well.

However, in our view, despite this good positioning as architectural covering there are a number of issues that hamper its full acceptance among some architecture and construction professionals: architects, technical architects, engineers and developers. These issues have been the subject of discussion by the group of professionals listed below in a work meeting on 28 October in Castellón. The arising discussion has served to draw up the present report.

1. ACTIONS THAT THE PROFESSIONALS ASK THE CERAMIC PRODUCT INDUSTRIES FOR

- To conceive ceramic products with greater 'appeal'. Although there is no question about the advances mentioned above in relation to the quality and variety of ceramic tiles, it has been requested quite insistently that they should contribute greater added value to differentiate them from other coverings. Several lines have been set out to achieve the requested 'appeal':
 - To act on formal aspects. To make complete series of dimensionally coordinated pieces, to produce large sizes for special applications, to make three-dimensional pieces.
 - To equip tile with new technological properties. Tile is envisioned as too banal a product, despite the unquestionable information it carries. Products with new functions should be studied and developed. At the moment Western society is sensitive to ecological issues and sustainability; products could be conceived for exteriors or interiors which, in addition, to having an interesting appearance also contribute to the environmental quality of architecture; climate-regulating, acoustic comfort and use of natural light. The development of more flexible tiles has also been commented, in order to improve their trafficable properties and therefore make them appropriate for constructing more ergonomic flooring as well as tiles for technical floorings.
 - To think also about the constructive system. At the moment construction products are inevitably associated with other products, jointly forming a constructive system. The system as a whole fulfils a series of functions. To construct a ventilated curtain wall it is not sufficient to find tiles of extraordinary quality, fastenings and mountings are also required that

enable joining the tiles, easily and reliably, to the supporting elements of the facade. The present adhesive installation procedures for inner tilings do not enable these to be readily replaced. It would be appreciated if there was a system that facilitated the partial disassembly of the tiling before the inopportune failure of the underlying installations, or total disassembly if the tiling has suffered the passage of time, either for tangible reasons, such as physical degradation, or for intangible reasons, for instance by no longer looking modern. This application could be of key importance in the tourist sector, as substitution would be stimulated and it would enable readily recycling the extracted material.

• Technical information within ready reach. In spite of the indubitable efforts being made by companies and institutions linked to the world of ceramics to inform architecture and construction professionals of the characteristics of the products and technological processes involved, it is equally true that this information does not usually reach everybody. In our view, the information needed for specifying and building the most common constructive solutions in accordance with the standards and regulations should be readily available on the Internet.

In addition, there should be expert consultancy firms on ceramic materials and their various applications in architecture. Sometimes the use of a given ceramic product can go beyond what is currently considered usual, and it may be necessary to conduct specific studies to conceive and to construct a given solution with assurance of success. The non-existence of these knowledge companies, which occupy an intermediate place between the industry and the architecture professional, can constrain the use of ceramics in an innovative application, generally bound to a singular building. The importance has also been remarked of using ceramic products and their systems in high-profile buildings owing to the relevance that these have in the professional world.

• Reliability and quality of the end product. The request for innovative products and systems should not be understood as a flight forward, without concern for issues such as reliability and quality of the constructive solutions made with ceramic products. Instead, the importance has been stressed of assuring the quality of the construction processes.

Different professionals take part in the constructive process of the covering: the architect and building director, conceiving, specifying and directing the construction, the product manufacturer in supplying the necessary materials, the worker in executing the solution and the quality control technicians in testing the result. The final quality is reached if each and every participant performs his mission appropriately. However the success of the ceramic tile will ultimately depend on the success of the product that has been constructed with the tile: flooring, a facade...... For this reason it is essential that the professionals who take part in the process should act diligently, following their own quality assurance systems. The success of the ceramic product depends on the success of the group of participating professionals. For example, to avoid the dispersion of responsibilities in the execution chain, there is a Brazilian company that sells 'turnkey' ceramic tiling, with which it accepts total responsibility for all the process stages, as well as for end product quality.

2. ACTIONS THAT COULD BE UNDERTAKEN BY THE CERAMIC PRODUCT COMPANIES

We have attempted to point out the needs and deficiencies that architecture and construction professionals face. The ceramic product *cluster*, as it has accurately been termed by one of the participants in the meeting, could undertake the following actions:

- To research and develop new products and systems with more performance features and particularly with greater added value: emotional or technical, than the ones proposed by other sectors for similar applications.
- To increase their presence among architecture and construction professionals. It has been noted that professionals who attended the meeting, with extensive experience in building construction were unacquainted with the technological importance of the sector. It is recommended that a Web site of the ceramic world should be elaborated with all the relevant information. Furthermore it is also advisable to foster the creation of engineering companies that are experts in construction with ceramic products, which would act as an *interface* between the *cluster* and the professional.
- To watch over the final quality of the constructed product. The constructive processes need to be planned in a reliable way. The ceramic product *cluster* should supply each participant with the necessary information to able him to perform his function suitably: design criteria, specifications for the complete definition of the project, accredited installation methods and quality control procedures.
- To pervade ceramic products and their systems with a sustainability culture. Manufacturing processes need to be made more efficient, reducing wastes, whether gas, liquid or solid, as well as minimising water and energy consumption.

More added value should be contributed to products and systems, providing them with functions that favour sustainability and comfort in general, and creating detachable systems that prioritise easy recovery and recycling of the materials.

Attendees:

Jaume Avellaneda	<i>Professor of the Department of Architectural Constructions. Universitat Politècnica de Catalunya.</i>
Joan Ardèvol	Technical Architect
Ernest Boira	Tile installation teacher
José Castellano	Manager of Cerámica Decorativa
Antoni Cumella	Ceramist. Manager of Cerámica Cumella
David Ginés	Member of the R&D+i Department of Porcelanosa Butech
José Luis Porcar	Director of the Instituto de Promoción Cerámica (Castellón County Council)
Javier Portolés	Head of Innovation Projects at TAU CERÁMICA
Felipe Pich	Architect
Carlos Quintans	Architect - Director of the journal TECTÓNICA
Celina Vacca	Architect