CALIDOSCOPIO

PROJECT FOR AN INDUSTRIAL CERAMIC MOSAIC SYSTEM WITH IRREGULAR PROFILES FOR TILING LARGE SURFACES.

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SUMMARY:

The poster shows the computer assisted design process used for creating a ceramic mosaic system for tiling large surfaces. This system consists of a multiple transfer module made up of tiles with an irregular profile. The module is made up of seven pieces with fixed geometrical shapes which have the property of tiling the plane with constant joints. The scaling study allows using the module both in floor and wall tiling applications, indoors and outdoors. The prototype now being presented is obtained by computerized hydraulic cutting of a finished ceramic product, although the product could also be put into industrial manufacture at companies making smaller-sized products.

A combinability study stemming from turning this module round is also shown. The profile obtained by the set of seven pieces means they can be placed in six different positions, giving rise to an extremely high number of combination possibilities (n^6, where n is the number of modules combined). Also shown are several possibilities for forming supermodules which make installation easier and enhance the marketing of the product.

Last of all there is a composition study from the combination of the rotations and colour arrangement, as well as a virtual image where a possible application of the product is proposed.

REPORT

TECHNICAL REPORT

Calidoscopio is a ceramic mosaic system which consists of a multiple transfer module made up of 7 different irregular tiles, and which was conceived for tiling large surfaces, though it can also be used for borders. The final aim pursued is a product that allows surfaces to be tiled with visual results similar to that of «trencadis».

The creative process used in generating this module is based on modifying the profile of a single polygon, called the base polygon, which has the property of tiling the plane, meaning that it covers the surface without overlapping or leaving any gaps. To simplify the resulting product, sets of polygons such as equilateral-right angle triangles, octagonal-square, Penrose tiles and others were discarded.

There is a wide variety of possibilities for selecting the base polygon. First of all we have the equilateral triangle, the square and the regular hexagon. Secondly we have any polygon stemming from the former ones: irregular hexagons, rectangles, right angle or isosceles triangles. Lastly, one can choose irregular polygons not covered in the above categories, that is any polygon which enables tiling the plane.

The choice of the hexagon as a base polygon provides the following advantages:

- Tiling the plane
- Affording the greatest number of rotations of the tile, which entails greater visual variation.

After choosing the base polygon, its perimeter is modified in order to conceal its regularity. This modification is based on the use of lines with angles of 30º on the original profile, while keeping the symmetry of each side in respect of its mid point.

Lastly, the resulting polygon will be divided so that these lines are as similar as possible to the perimeter. The final module is thus hidden in the resulting set.

Through using a set of 7 pieces, the module obtained can be combined with itself in six different positions, giving rise to an extremely high number of combination possibilities (n6, where n is the number of combined modules). If a tile colour arrangement is added as well, the possibilities are multiplied still further, thus yielding a truly personalized product.

The scaling of the module enables it to be applied both in flooring (large sizes) and cladding (small sizes), adapting to the space to be tiled, so that for large surfaces a bigger module will be chosen than for small ones.

Fixing can be done per individual module, or by grouping several modules together to form supermodules, which can facilitate installation and enhance marketing of the product.

For making the product, a computerized hydraulic cutting system of a finished ceramic product was used, though the industrial application of the product could also be carried out at companies making smaller-sized products by pressing.

This system allows recycling tiles with production faults on their fair face, thus helping to preserve the environment, while reusing waste products.

GRAPHIC REPORT

LEFT-HAND PANEL

On one side of this we can see the **Calidoscopio** creation process, and on the other some examples of combinability.

1. Creative process.

We start from a hexagon (base module) on which the perimeter is modified and then the inner space is divided into 7 irregular tiles. Lastly we go on to obtain the real format, which is the result of deducting the joint spacing between tiles from the theoretical size. As can be observed from the last image the resulting module can be combined with itself perfectly.

2. Combinability.

This shows some of the possibilities for grouping modules together to form supermodules, yielding new sets of tiles that offer new opportunities for tiling the plane.

The options shown here are as follows:

In the **first line** we can see two combinations created by the systematic repetition of one sole module in the same position, in which there was an intervention with colour in the pieces composing this; a third combination was also created by repetition of a module, arranged in two positions or rotations (0º and 180º).

The **second line** shows a supermodule made up of three modules whose repetition generates hexagonal roses. In each of the three examples given the module is set in a position or rotation that is different from the other two, forming the supermodule, with a different colour in the tiles: each rose is made up of six supermodules (18 modules) plus a central plain-coloured module.

The **third line** is made up of two possibilities for tiling spaces with rectangular perimeters created from a rectangular supermodule comprising four modules with the particular feature that one of these is split into two. The two examples given were constructed by repeating one and the same supermodule, with colour intervention in the pieces, generating a carpeting effect in the first case and a border design in the second.

Finally, the **fourth line** gives an example of the possibilities for covering large surfaces with a hexagonal supermodule, of 7 modules, in which each of these was laid out in the position or rotation most suitable for making the pattern desired by intervening with colour in the pieces. The 49 pieces (7 modules x 7 pieces) which generate this supermodule, make it suitable for obtaining figurative patterns and tiling large surface areas.

CENTRAL PANEL

Here we can see an image created by computer systems which reflects the application of **Calidoscopio** in a large public space: on the left of the image there is a vertical strip which illustrates the design chosen. This arrangement would be applied in real space by preassembling the tiles on a mesh backing containing 7 modules, forming a hexagonal supermodule, in order to provide fast, high quality installation.

RIGHT-HAND PANEL

This shows a study of composition or arrangements, both for floor and wall tiling.

The ceramic flooring arrangements show:

Firstly an outdoor space where **Calidoscopio** is used sporadically on the side edging and in the hexagonal border in the centre, designed for the zone which surrounds trees in public spaces. In both interventions, one starts from the system seen in the left-hand panel (combinability - 1st line, that is, by repetition of the same module, in which there was colour intervention. As regards the format of the module proposed in this case, this would be 25 cm. in width, and for fixing the supermodules shown beside this are recommended.

The **second** arrangement shows an interior space, in which a square covering has been placed, generated from the four hexagonal supermodules (7 modules) shown at their tops, with their rotations. The size of the module is 20 cm. in width.

In the cladding section there are two possibilities, with two facings being shown.

The **first** arrangement is designed for a bathroom, where **Calidoscopio** is used for making a skirting like a wainscoting and a large border at the top of the wall. In both cases a hexagonal supermodule (7 modules) was used, which, by constant repetition in the border, combined with 180º rotations in the skirting, produces these surfaces. The size of the module is 20 cm. in width.

The **second** wall shows fruit designs for a kitchen. In this case the whole wall is covered with the module. To generate this surround, hexagonal supermodules are used as a base, and within these the fruit design is «drawn» by the intervention of colour in the elements forming the module. Apart from these, there is a two-module supermodule used as for finishes or trims, and two differently coloured modules to fill in the surface left to be tiled. The size of the module used is 12 cm. in width.

PROTOTYPE

This was obtained by computerized hydraulic cutting of natural porcelain tile. To make it, six identical supermodules (3 modules) were needed, combined in the way shown on the left-hand panel (combinability - 2nd line), plus a central module.