Arts and technology – Mosaic new techniques and procedures

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Abstract. The relationship between art and technique has been along the time one that is inseparable and systematic, artists appealing to various technologies, tools and practices that help them stimulate their imagination. Today there is a new category of artists, coming from a technical or scientific field, that are being 'trapped' in this „game of art”. The mosaic, even if it is an old technique, responded to the social requirements and it evolved over time, being constantly related to aesthetic and artistic thinking, discoveries of science, assimilating permanent new techniques and technologies, diversifying its artistic forms of expression and methods of transposition. Not being bound any more to a religious institution, which was its birth place, today, she migrated to all public spaces. Works of art in public space have become today an active factor in reshaping the urban aesthetic landscape.

1. History of mosaic

The relationship between art and technology, has been throughout the ages one that is inseparable and systematic, artists turning to various techniques and technologies, tools and different practical processes in their workshops, that were helping to stimulate their imagination. All this is equally an ongoing challenge, the artists fate being to "snatch" materials using tools, different work techniques, their expressive virtues, skillfully discovered and subordinated to our emotional feelings and artistic emotions, giving them life in real artistic creations.

![Figure 1. Details with the arrangement of stones in the mosaic](image_url)
Discoveries, different techniques attributes and technologies in art, were along time a well kept secret in artists and guilds workshops, knowing that working methods have not been explained by artists, they have chosen the power of example through their work, in passing the knowledge, craft and practical exercise witch is visible plainly in recipes, precisely followed codes, hand books of work in achieving the artistic creation. It is more than suggestive the argument of Filippo Brunelleschi (1377-1446) in concealing the knowledge results: "Do not share your inventions to the many, only share with those few who understand and love science. To reveal too much of your inventions and achievements, is one and the same thing with relinquishing ones fruits of ingenuity. Many are ready when they hear the inventor speaking, to minimize and deny it’s accomplishments, so that they do not have credibility in honorable places, but after a few months or a year later, they may use the inventor words in speeches or other projects" [1].

Art history confirms and demonstrates that the links, the connections between art and technology are not new concerns. The technological revolution of the last decades, after the ‘60s that develops in a fast pace and it’s becoming in the first place a global political and economic stake, witch constitutes a support for new forms of art. Concerned closely with the evolution of these phenomena, Florence Meredieu mentions the impossibility to set limits for a "real mutation of a civilization" - another revolution began recently and is likely to further change our relations with the world: "the revolution of lights, the virtual image called a synthesis, interactivity, the direct participation of the viewer, creating a world of synthetic sensations, all contributing to creating artificial universes, which makes us believe that in the future, it may even compete in "replacing" our old ways of perception. Our reference to the concept of reality, the relationships we maintained for millennia, with our old planet is likely to falter, the world of images and artificial universes, is becoming prevalent" [2].

Interference of fine arts is becoming more present; precisely because of the borders mobility that is separating them, be it painting, graphics, sculpture or performing arts, installations, photography, video, new media, that take out of the performance and technology which are always in a perpetual change, "causing" thus, new concepts that deliver the artistic message, but also helps to its reception.

It is understood that the invasion of new technologies, materials and processes of their application, have been and are accepted by the other arts: architecture, theatre, music, dance, cinema, so that the result of the artistic product or work of art, is fixed, is implemented in a vast network of communication, in a complex and competitor world and it imposes it’s self as the messenger of human sensibility. Artistic mastery perfection of the human spirituality cannot be entirely subordinated to
technology, thus the artist is assuming the task to create the artistic and metaphorical universe, which erases the individual identification of materials and techniques by spiritualizing them, in a distinct message of artistic creation. The German expressionist painter Max Beckman, preoccupied and immersed in his own personal investigation to discover those values and phenomenon that had semantically charged the universe of personal creation, mentions knowingly that: "What I want to show in my work is the idea that hides behind the so-called reality. I find my self looking for a bridge that leads from visible to invisible [...]. One of my problems is finding my own self, which has only one form and it is immortal, to find it in animals and people, in heaven and in hell that together makes up the world we live in" [3].

Works of art in public spaces, in this technique, have become today an active factor in the aesthetic reshaping of urban landscape. In this context, we are mentioning the project from 2005 initiated by American artist Mary Sherman from the Boston College of Art (Boston - MIT - Program in Art and Technology - The title Project at UNESCO - Trans Cultural Exchange) where I was invited to participate with a personal creation. The International Project of Art Installations - made from vitrified tiles (burning the ceramic fragment at 1280 degrees C and coloured glazes at over 1180 degrees C) - had the end objective of completing and assembling a polychrome mosaics form, with free thematic subjects, in public spaces and public culture institutions, in the following countries: Azerbaijan, Bosnia and Herzegovina, Canada, France, Finland, Germany, India, Israel, Mexico, New Zealand, Taiwan, Turkey, USA, Slovakia, Vietnam, Wales Country. The only condition at this art project was the imposed size of the tiles which were 20 by 20 cm.

According to DEX (Romanian Word Dictionary) the meaning of the word mosaic is defined as: "a decorative work technique, which consists in an artistic assembly of small pieces of marble, ceramic, glass, enamel, and so on; of various colors stuck together with mortar or mastic." The historical evolution of this art technique has seen many transformations and developments due to the discovery of new materials, and new ways of working with it. From simple pavements stone in two colors, the mosaic has evolved during The Greek Hellenistic Period and later in Ancient Rome, to extensive figurative compositions, with a sober polychromy, but also very charming, knowing that this technique has a decorative character with specific requirements, we simplified the drawing to it’s most expressive lines, ennobling with chromatic harmonization, resulting from joining the different colored stone cubes.
The peak of Mosaic Art is in the Byzantine religious art in an exceptional iconographic register, unsurpassed until today. Cubes of colored stones, where juxtaposed on the principles of harmonic color arrangements were highlighted by the insertion of colored glass cubes or gilded with gold leaf cubes (between two glass plates), conferring thus an immaterial like atmosphere in the scenes with the represented subjects. The triumph of artistic metaphores and visual message of these representations, made invisible the materials witch made up and contributed to the ineffable images. In Islamic art mosaics framed harmoniously laid ornamental combining vegetal and geometrical motifs, joined and completed by calligraphic Persian inscriptions (The Qur'an prohibits isomorphic and anthropomorphic representations). As an artistic technique, alternative to easel painting, mosaic fascinate the imagination, students involved in the learning and assimilation of theoretical knowledge presented in the classroom are excited to practice realize this technique, through learning the processes and working methods, using the tools and instruments and materials to complete the projects and the implementing techniques that have always had shortcomings.
2. Methods and technique use for mosaic

Preparing materials for mosaic technique has always been an ongoing concern for ceramics resistance to variations in temperature, glazes vitrification and mortars application on the wall, whether we talk about the application on both indoor or outdoor spaces. "I experienced a good period of time with masses of layered tiles, covered by vitrified glazes to be permeabilize the porous area" [4] frequently using metal oxide, cobalt oxide, for nearly almost all shades of blue, at high-temperature melting and fixing, copper for a variety of green, red iron oxide, for reds, zinc oxide that carries a remarkable flexibility in a high temperature environment.

To get the little cubes covered with precious materials for mosaics we have used a colloidal gold based liquid (9-11% gold and platinum 11%) each time giving to this artistic creation technique a professional standard.

In conclusion, we should mention several technological milestones, which will help to identify the novelty brought by this art techniques, reborned today and used on a increasingly wider scale. In addition to the technological status of this technique, we have pursued a gradual lightening and a more efficient way of transport of the mosaic panels from the workshop where they were created and worked on, to the transposition site from the building, whether it is placed inside or outside the building.

The transport of these mosaic panels is made as safe as possible, their lifting on the scaffolding at the building site is made under effective control, the transposition of the mosaic panel on wet mortar, helps to prevent the falling of the stones and it also makes bonding areas between the panels disappear (both so visible after the „washing” of the mosaic) and eliminating the risk of displacement and thus having a perfect matching of the panels, especially in circular or ovoid surfaces.

The steps in this project consist in increasing the drawing at the scale of 1/1 to the final size of the project and establish the local tones, modulation and modelling of the colours on the surfaces for enhanced and intensified effects of light/ shadow, the final settlement for the coloured cubes, with the possibility of returning and rearranging them along the way, applying and gluing (Dermacol a rate of 150g / 1 liter water)sheets of wrapping paper over the little cubes surface, and after drying 24 hours later, drawing, cutting and numbering the resulting boardswitch composes the whole image.

![Figure 7. Details of the mosaics execution (Photographs Papiu G)](image)

After cutting to size the contour shapes from the final mosaic work, depending on the to the elements, characters and details of the composition, without putting the accent on the exact dimensions of the plates but on the primary elements of the composition. After turning the boards upside down, we applied on the back a mesh of fiberglass witch is normally used in insulation of facades, using a flexible tile adhesive witch had a 10 mm thickness, thus after drying it was easier to transport them.
with minimal risks from the workshop to the jobsite. The wall on which the mosaic will be placed, is receiving a layer of mortar 15 - 20 mm thick over which we start placing the component boards of the mosaic.

![Figure 8. Details of the mosaics execution (Photographs Papiu G)](image)

Attention is focused on setting correctly the essential parts of the image in the original project, and after 48 hours of drying, we eliminate the sheets of paper that kept the boards of the mosaic together, this is called „washing the mosaic” that will be followed by the grouting and refinishing operations.

![Figure 9. Detail of „washing the mosaic”](image)

In this case also, we will take into account to adapt the colour of the grout to the chromatic and compositional scheme of the mosaic thus completing and continuing the narrative elements. To protect the mosaic, especially when positioned outside, it used to be polished with a layer of beeswax but today weakly a layer or 2 of varnish for stone surfaces.

3. Conclusion
About the purposes and ideals of the artist, the creator, always subject to a permanent "review process", subject to permanent improvement and always submitted to compromise, that the
contemporaneity demands most of the time, in various justifications. Michelangelo, one of the titans of Italian Renaissance, emphasized the decisive role of The Creator in society. "I would venture to say that a man can not achieve perfection if it aims to please the ignorant and not the real connoisseurs of his own craft, and if it is not odd or peculiar or however you wish to call it" [3].

![Pentecost and Resurrection scene](image)

Figure 10. The completed works – Pentecost and Resurrection scene (dimensions: 2,20 cm diameter), St. Elias Orthodox Church, Baia Mare

References

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