KM'S STUDIO

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IS IT POSSIBLE TO IMPROVE THE TRADITIONAL RAMMED EARTH WALL ?.

The function of architecture is to protect us and our creation from the atmospheric elements.

1.- Technique. Architecture has to withstand the aggressions of our environment and, at the same time, it has to generate comfort for us.

If we consider what is the best way to protect ourselves from inclement weather, it is very possible that we opt for a dry cave. The only problem a cave would have is the lack of natural light, but what if we could have the technical quality of a cave, with the architectural form we want?. The construction case that we propose is the one referred to the compressed earth method.

Archeology shows us that in the history of architectural construction there are notable cases of walls built with mortars composed of the same materials that make up a cave, that is, earth, stones and clays, which have survived to this day with good structural health.
In particular, when these mortars were used to make monolithic walls, the quality of the mortars closely resembled the quality of the best cave walls. The sensation of protection, real, that the tectonics of this type of walls give us, together with the maintenance of the perfect humidity to ensure comfort, make this type of construction the most logical.

1.a.- Problem to solve. But if we observe the geographical latitude in which the compressed earth walls were built, we will realize that they were located in hot and, above all, dry areas. This situation clearly points to the problem of this type of construction, which is none other than humidity or water contact.
To solve this problem, taking the following three aspects as a reference, and with the aim of being able to build Rammed Earth walls in higher latitudes, we have improved the productivity and quality of this type of architecture with up to 90% use of Natural Raw Material Local.

1.a.a.- The construction method is not as simple as squeezing earth between two wooden boards, but this earth has to be prepared by sifting it and choosing the amount of stones and earth in relation to the strength of the binder, which in this case is its own clay from the ground, if you have it. In the event that the clay in the earth is not strong enough to maintain the structure of the wall, we must add more clay, or other binders such as lime, plaster or cement. All in all, the land process is costly in terms of technical and human logistics.

1.a.b.- The human effort that must be made to press the earth with around 1000 kg of compression is very high and takes a long time, so there are not many people willing to give continuity to such effort.

1.a.c.- The traditional Rammed Earth wall is relegated to dry climates because the simplest type of clay to exploit does not behave very well with water or in humid climates, collapsing or making maintenance an endless task.

1.b.- Solution offered. The improvement that we propose in KS lies in the work with binders THROUGH OUR GEOPOLYMER with a result that we can demonstrate and that we reference in the following points:

1.b.a.- Reduction of the execution time because it is not necessary to compress the mass beyond depositing it with a regular compactness.
Innovation. We formulate from 350 kg / M3 to 2,200 kg / m3 so that we can choose the density of the construction elements.

1.b.b.- Wall thickness reduction because the structural capacity of the new set compound is much higher than that of the traditional wall.
Innovation. The new construction element preserves the physical qualities of the traditional wall with a tenacity like Tuff Stone or fired earth (first quality ceramic).

1.b.c.- CO2 absorption because it is the element of the air necessary for the hardening of the mass to be carried out correctly and the wall can be put into service with sustainable quality over time. Innovation. We work with methods that seek silicateization.

1.b.d.- Greater range of Earth to be used because our Geopolymer accepts different qualities or richness of Earth, even land WITHOUT clay.
Innovation. The logistics are reduced to almost zero in the case in which the Earth left over from the preparation of the land is used.

1.b.e.- Possibility of manufacturing different densities conferring different insulation and toughness. Innovation. Our Geopolymer accepts the use of natural fibers such as cork or rice husk to give insulation and lightness to the dough, or like hemp or flax to give the dough armor. Likewise, he accepts the structural use of wood.

2.- Aesthetics. In addition, it must have an adequate visual reading of what we understand as logical and natural.

But how do we build that architecture? In nature there are no right or sharp angles where we can live, nor does there exist in nature a flat color since color and texture are organized in glazes or unfocused color. So why do we build with flat surfaces and right angles with flat, dense colors? Well, we will not be the one to argue about why or how we have arrived at the current "rational" architecture, but we can refer to the fact of building with natural matter.

2.a.- We can build the wall with a sufficient finish quality to protect it with the same visual language of the material used.
Innovation. By using the same soil that makes up the terrain, the visual impact on the ecosystem is reduced.

2.b.- We can define the tectonics of the architecture, being able to choose between different textures and colors.
Innovation. The high range of materials that our Geopolymer accepts includes marine and forest residues.

Joaquim Melchor at 22/10/2021