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Research and Experimentation for Clay Sedimentation in Aquatic Environment

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Abstract: The clay in the aquatic environment begins to precipitate depending on the saturation level of the solution. The purpose of this work is to monitor this subsidence of the clay and to see its course with photographs. The photos are then analyzed with the Adobe Photoshop program, so that the students of the 3rd grade of the High School are able to follow the evolution of the precipitation phenomenon through the analysis of the photos and the probability density distribution function of the three pigments (RBG (Red-Blue-Green) in the technology course). The rate of clay settling as shown in the photos requires a prerequisite for the use of soil conditioners in specific clay soils. The students who participated in the workshop had the opportunity to get in touch with the phenomenon of subsidence, the processing of the brightness of the images with the program Adobe Photoshop and the study of soil improvement alternatives.

Key words: Clay, sedimentation, experiment, adobe photoshop, soil conditioner.

1. Introduction

Clay is a non-uniform and inhomogeneous material. It has very different characteristics in every part of the Earth and in every place. One clay is never the same as another. The special characteristics of each clay are formed depending on: the origin and the type of clay it contains, the composition of the soils of each area (content of minerals, metals, organic materials, etc.), the granulometric composition of the clay of each place (percentages clay, silt and sand). Because of all this, each clay has different physical properties and mechanical strengths. The static and thermal behavior and the other properties of its structural elements as well as its constructions, differ accordingly [1].

In order for a clay structure to meet the requirements of the seismic regulations of an area as well as the desired thermal behavior dictated by the climate, but at the same time to fully utilize the beneficial properties of the clay and to be resistant to damage and time, the properties must be checked first of local soil and then its necessary improvements [2].

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The suitability tests of the clay can be done at two levels: laboratory tests and empirical tests at the construction site. Laboratory tests are necessary mainly for: the determination of the properties and strengths of the material as a precondition for the preparation of building specifications, the determination of production specifications for standard products or industrial clay structural elements, the control of safety and reliability of structures in the case of large projects [3].

The precise control of the clay additionally allows its comparative evaluation with the other building materials and supports the recovery of its reliability and the highlighting of the advantages and the quality that it offers. It is therefore considered a prerequisite for its institutional certification, as the pre-eminently friendly building material for humans and the environment [4].

Some of the most important and necessary tests that determine the characteristics of the clay and at the same time give directions and instructions for its improvement are the following: control of granulometric composition: precipitation method, sieving method, combination of the two methods, water content

measurement; behavior measurements water relationship: swelling, shrinkage, plasticity, water resistance, capillary water absorption, corrosion from rain and frost, drying time; water vapor behavior measurements: resistance to water vapor diffusion, equilibrium moisture, heat formation, dew formation specific heat capacity, thermal conductivity, heat flow velocity, thermal radiation, thermal expansion; strength measurements: cohesion, compression, dry tensile strength, tensile strength, flexural, adhesion, friction, elasticity, edge impact, pH measurements radiation u high frequencies.

2. Experimental Procedure

Initially we observe that the sediment of the clay is between 500-600 mL of the volumetric cylinder in which we have placed 900 mL of clay solution [5-7]. In Fig. 1, it is shown the solution initially. In Tables 1, 2 and in Fig. 2 it is shown the concentration of pigments in the suspension from the analysis of Adobe Photoshop.

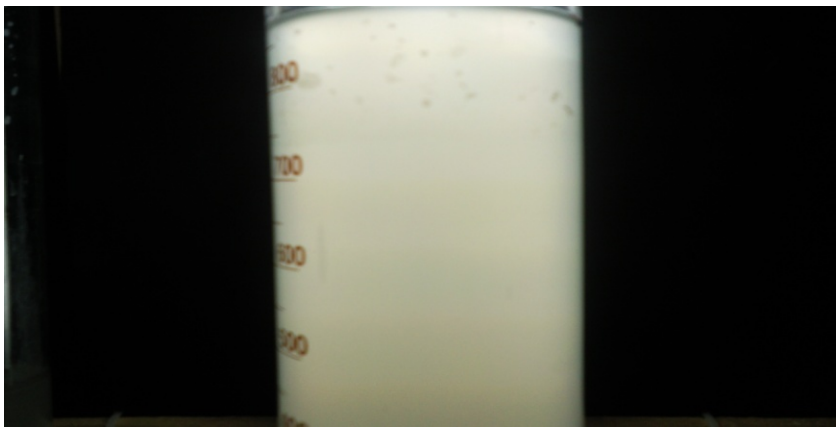

Fig. 1 The solution initially.

Table 1 The concentration of pigments in the suspension from the analysis of Adobe Photoshop.

Scale units	Scale factor	Count	Area	Perimeter	Circularity	Height	Width	Gray value				Integrated density	Histogram
								Minimum	Maximum	Mean	Median		
Pixels	1	1	116,622	1,366	0.785396	341	342	99	153	129.1134	131	15,057,460	Histogram-1.csv

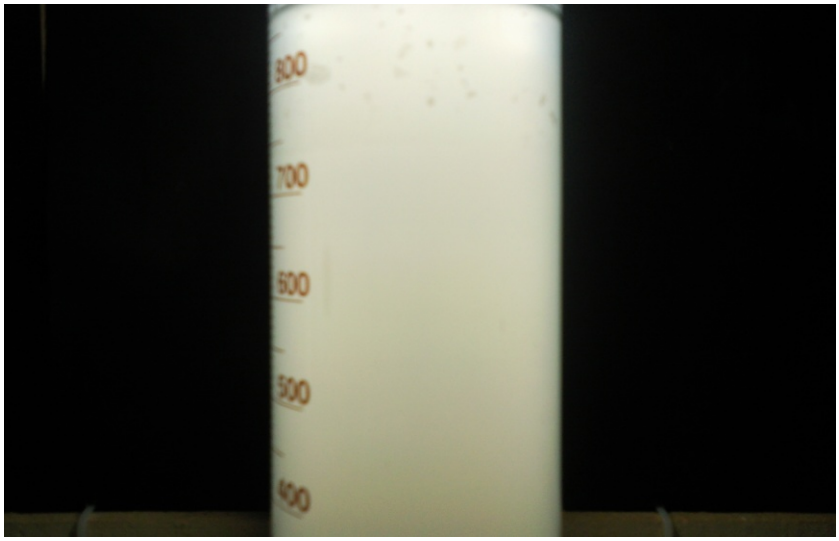

Fig. 2 The concentration of pigments in the suspension from the analysis of Adobe Photoshop.

Table 2 The concentration of pigments in the suspension from the analysis of Adobe Photoshop.

Height	Width	Gray value				Integrated density	Histogram
		Minimum	Maximum	Mean	Median		
341	341	124	172	151.490553	152	17,615,473	Histogram-1.csv

3. Conclusions

The rate of clay settling as shown in the photos requires a prerequisite for the use of soil conditioners in specific clay soils. The students who participated in the workshop had the opportunity to get in touch with the phenomenon of subsidence, the processing of the brightness of the images with the program Adobe Photoshop and the study of soil improvement alternatives.

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