

## Study of Chemical and Physical - Mechanical Properties Lime Mortar with Addition of Natural Resins

**Authors :** I. Poot-Ocejo, H. Silva-Poot, J. C. Cruz, A. Yeladaqui-Tello

**Abstract :** Mexico has remarkable archaeological remains mainly in the Maya area, which are critical to the preservation of our cultural heritage, so the authorities have an interest in preserving and restoring these vestiges of the most original way, by employing techniques traditional, which has advantages such as compatibility, durability, strength, uniformity and chemical composition. Recent studies have confirmed the addition of natural resins extracted from the bark of trees, of which Brosium alicastrum (Ramon) has been the most evaluated, besides being one of the most abundant species in the vicinity of the archaeological sites, like that Manilkara Zapota (Chicozapote). Therefore, the objective is to determine if these resins are capable of being employed in archaeological restoration. This study shows the results of the chemical composition and physical-mechanical behavior of mortar mixtures eight made with commercial lime and off by hand, calcium sand, resins added with Brosium alicastrum (Ramon) and Manilkara zapota (Chicozapote), where determined and quantified properties and chemical composition of the resins by X-Ray Fluorescence (XRF), the pH of the material was determined, indicating that both resins are acidic (3.78 and 4.02), and the addition rate maximum was obtained from resins in water by means of ultrasonic baths pulses, being in the case of 10% Manilkara zapota, because it contains up to 40% rubber and for 40% alicastrum Brosium contain less rubber. Through quantitative methodology, the compressive strength 96 specimens of 5 cm x 5 cm x 5 cm of mortar binding, 72 with partial substitution of water mixed with natural resins in proportions 5 to 10% in the case was evaluated of Manilkara Zapota, for Brosium alicastrum 20 and 40%, and 12 artificial resin and 12 without additive (mortars witnesses). 24 specimens likewise glued brick with mortar, for testing shear adhesion was found where, then the microstructure more conducive additions was determined by SEM analysis were prepared sweep. The test results indicate that the addition Manilkara zapota resin in the proportion of 10% 1.5% increase in compressive strength and 1% with respect to adhesion, compared to the control without addition mortar; In the case of Brosium alicastrum results show that compressive strengths and adhesion were insignificant compared to those made with registered by Manilkara zapota mixtures. Mortars containing the natural resins have improvements in physical properties and increase the mechanical strength and adhesion, compared to those who do not, in addition to the components are chemically compatible, therefore have considered that can be employed in Archaeological restoration.

**Keywords :** lime, mortar, natural resins, Manilkara zapota mixtures, Brosium alicastrum

**Conference Title :** ICCUEE 2015 : International Conference on Civil, Urban and Environmental Engineering

**Conference Location :** Venice, Italy

**Conference Dates :** June 22-23, 2015