

## TEHNOLOŠKI UTJECAJ ADITIVA MINERALA I POLIMERA NA RJEŠENJA KOD PRIJANJANJA ŽBUKE

### TECHNOLOGY INFLUENCE OF THE MINERAL AND POLYMER ADDITIVES ON ADHESION OF PLASTER SOLUTIONS.

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Pregledni rad

**Sažetak:** U ovom radu opisano je eksperimentalno istraživanje provedeno na sastavu olakšane mješavine suhe žbuke. Eksperiment je proveden uzimajući u obzir četiri glavna sastojka mješavine kao temelj za kasniji analitički model. Posebna pozornost dana je na prijanjanje smjese za podlogu, kao jedno od najvažnijih pokazatelja kvalitete žbuke.

**Ključne riječi:** žbuka, perlitni pijesak, prijanjanje

Subject review

**Abstract:** This paper describes the research of the facilitated dry plaster mixture compositions. The experiment was performed taking into account four main ingredient mixtures as a basis for the later analytical model. Special attention is given to the mixture's adhesion to the substrate, as one of the most important indicators of the quality of plaster.

**Key words:** plaster, pearlitic sand, adhesion

## 1. INTRODUCTION

In modern construction, almost none of its stages are completed without the application of dry building mixes (SSS). Demand for the products with CCC is increasing every year by 25-30%. Due to the significant expansion of the requirements, the composition of the modern plastering materials becomes considerably complicated. Dry construction mixtures are multicomponent organomineral systems [2].

## 2. RESEARCH AND RESULTS

In this paper we have researched compositions of the facilitated dry plaster mixture. The experiment was conducted on the optimal 18-point-like plan [1]. Four factors of composition were varied (1,000 pbw of dry mix): X1 - coquina limestone,  $80 \pm 20$  m.ch.; X2 - circulite pearlitic sand,  $40 \pm 10$  m.ch. ; X3 - Tylose 60010,  $1.15 \pm 0.15$  m.ch; X4 - Vinnapas RE 5034N, 1.5

$\pm 0.5$  m.ch. ; content of cement clinker, quartz sand, lime, pore-forming and water-repellent additives remained unchanged. Mixtures were prepared by dry blending of the components in a special mixer, which provides a qualitative distribution of the components in the composite. One of the most important quality indicators for all types of plaster solutions, including the facilitated, is adhesion to the substrate. To conduct experiments on polymer-cement binder selection was conducted for water requirement. All mixtures had the same mobility ( $16 \pm 17$  cm). According to the results of the research the following conclusion was obtained; the increase of water requirement is observed with the injection of large amounts of limestone and perlite. Injection of the high-dose hydroxyethylcellulose lowers water requirement. However, despite the equality of mobility of all mixtures, their rheological properties were substantially different. Measurement of the adhesion value was performed using the device DYNA Z16 and the results of its determination to the 18 experimental compositions were obtained following the ES model ( $se = 0.0307$ ):

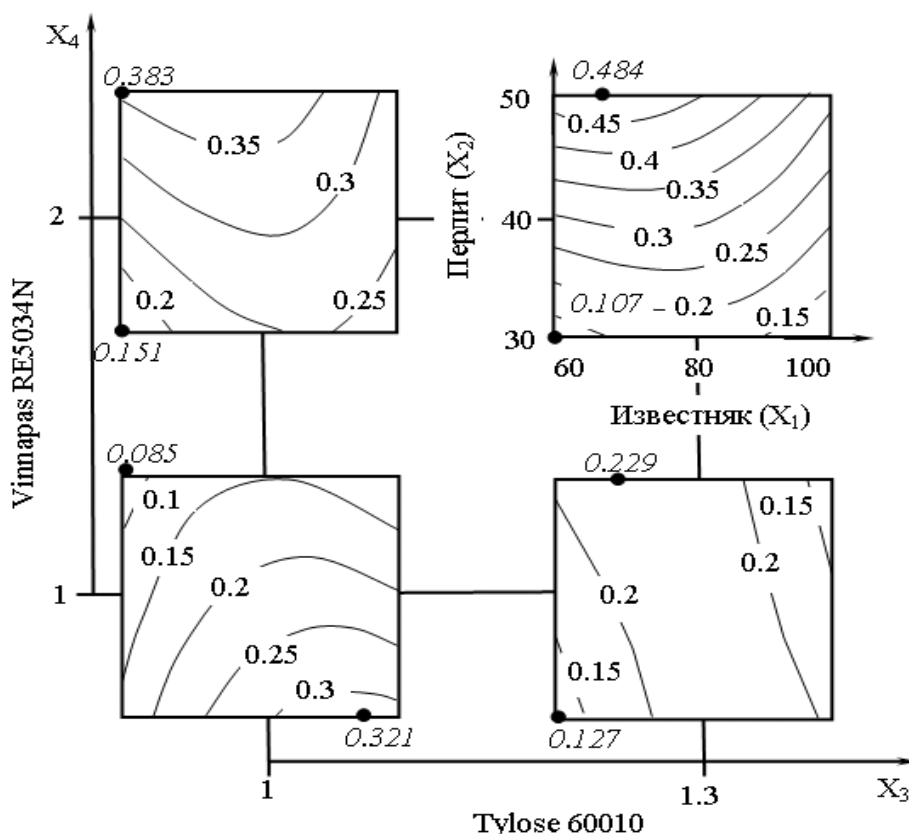
$$A_{th} \text{ (MPa)} = 0.304 \pm 0x_1 - 0.06x_1^2 - 0.04x_1x_2 - 0.02x_1x_3 - 0.02x_1x_4 + 0.04x_2 \pm 0x_2^2 + 0.04x_2x_3 + 0.07x_2x_4 \pm 0x_3 - 0.04x_3^2 \pm 0x_3x_4 + 0.05x_4 \pm 0x_4^2 \quad (1)$$

### 3. DISCUSSION AND CONCLUSION

According to the model (1) a diagram was constructed shown in Fig. 1 in the form of a "squares on the square", showing the influence of variable factors on the adhesion of facilitated plaster solution. Thus, the field of each small square displays the influence of the amount of ground limestone and perlite, while depending on the coordinates of the small square on the bearing square, the number of methylhydroxyethyl cellulose and Vinnapas changes.

Diagram analysis allows us to say that the adhesion of plaster solution to the substrate is substantially

increased by increasing the amount of redispersible powder Vinnapas, which is quite an expected effect. At the maximum dosage of Vinnapas, adhesion level is reaching above 0.4 MPa, which may be considered as desirable for long-term work of the solution in the real world. Changing the dosage of methylhydroxyethylcellulose affects the adhesion in a less significant way. With this increase of the amount of this component the level of adhesion raises for the compositions with the highest dosage of Vinnapas and somewhat reduces it for the compositions with a small amount of re-dispersible powder.



**Figure 1** Influence of the varied factors of composition of SSS on the adhesion of plaster solution.

It is important to note that in almost all the compositions studied, with the exception of the area

$X_3 = X_4 = -1$ , adhesion increased with raising amounts of perlite and reached a maximum at a dosage of limestone, which is close to the value of 70 pbw. This means that the highest adhesion was demonstrated by compositions with high viscosity.

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### 4. LITERATURE

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