

Evaluation of the Recycled Gypsum Plaster Properties with Additives

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Abstract

This study evaluated the influence of additives on the properties of the recycled gypsum plaster in the fresh state (consistency and setting time) and hardened state (hardness and compressive strength). The products: sodium citrate, crude and distilled glycerin, and Glenium were used. The additive content changed to improve the properties in fresh and hardened states. Results show that sodium citrate retards the setting time, whereas the compressive strength and hardness showed a significant decrease compared to the reference. Both glycerin did not show positive results. Glenium improved significantly the consistency of the paste, but reduced the hardness and the compressive strength of the recycled gypsum plaster.

Key words: gypsum plaster, recycled gypsum plaster, additives.

Introduction

Gypsum plaster is a versatile material and it can be used for decorative ornaments to wall renderings. The wastes from gypsum plaster can be recycled and their characteristics depend on the crystal structure, which is formed during the calcination period¹. The setting is faster, and this property can be modified with additives to reach the same performance of the gypsum plaster². This study evaluated the use of additives on the properties of the recycled gypsum in both fresh and hardened states.

Results and Discussion

Materials used: recycled gypsum, and additives (sodium citrate, crude and distilled glycerin and Glenium). The properties were observed in both fresh (consistency and setting time) and hardened states (hardness and compressive strength). Sodium citrate increased setting times (Figure 1); however, the compressive strength (Figure 2) and the hardness were reduced.

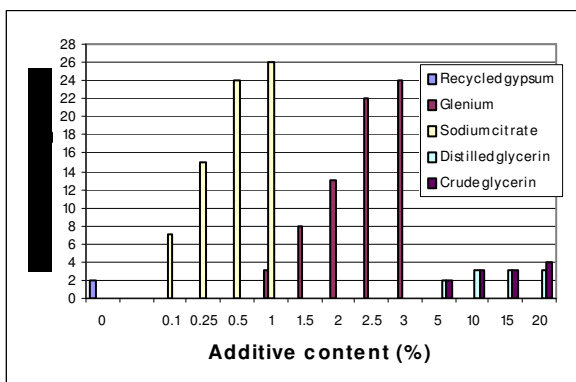


Figure 1. Initial setting times.

Distilled and crude glycerin made needed a high content to improve the setting time, but it has not increased significantly. It was not possible to mold

the specimens for testing, indicating that this cannot be used in industrial plants.

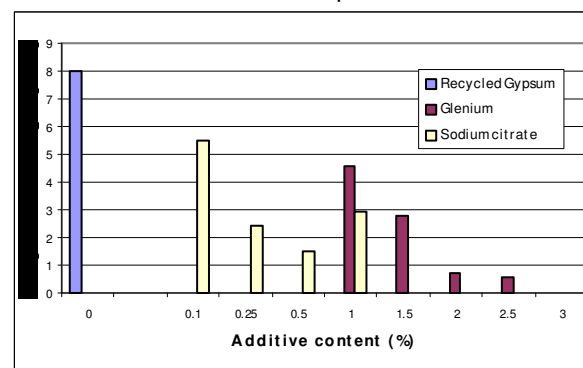


Figure 2. Compressive strength results.

Glenium changed the setting times with a content higher than 1.5%. The consistency was improved, but the compressive strength was lower than the reference.

Conclusions

This study showed that sodium citrate was the most effective on setting, but compressive strength was lower as additive content was higher. None of the tested additive was effective in improving the properties of the recycled gypsum plaster for industrial use.

Acknowledgement

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¹Pinheiro, SMM. Gesso reciclado: avaliação das propriedades para uso em componentes [PhD Thesis]. Campinas (SP). 2011.

²Hincapie, A.M.; Cincotto, M.A. Efeito de retardadores de pega no mecanismo de hidratação e na microestrutura do gesso de construção. *Ambiente Construído*, São Paulo, v.1, n.2, p.7-16, jul. 1997.