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Historical Development of Glauch Mixtures: From Ancient Time to Modernity

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Abstract

This article examines plaster mixes from ancient times to modern types such as traditional gypsum, cement, and lime mortar types. Since dry construction mixtures did not exist at all until the mid-20th century, this provides an analysis of the development of modern plaster compositions. As the population's standard of living improves, consumers are increasingly paying attention to the issues of environmental safety and the harmlessness of the materials used. Materials for interior finishing have the greatest impact on human health, not only because they are in direct contact with humans but also because they participate in the formation of the room's microclimate.

Keywords: Plaster mixture, superplasticizer, gypsum binder, lime, Ancient Egypt, Ancient Greece, calcium hydroxide, polymer, clay, gypsum, cement, puzzolan.

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1. Introduction

Plaster mixes are among the oldest building materials used by humanity for thousands of years. Their development is closely linked to the evolution of architecture, construction technologies, and decorative art. The first plaster coatings were used not only for leveling walls but also to protect structures from moisture, heat, and mechanical damage. Over time, plaster has become an important element in the decorative design of buildings and interiors. The history of plaster mixes covers a vast period—from ancient Egyptian clay and gypsum mortars to modern polymer and high-tech compositions. In different historical eras, various types of binders were used: clay, gypsum, lime, cement, puzzolan materials, and synthetic additives. Modern plaster mixes are the result of centuries of accumulated experience in construction technologies.

Relevance of the study.

1. The emergence of the first plaster mixtures

The first plaster coatings appeared as early as the Neolithic era. Archaeological research shows that as early as 7,000 years ago, people used mixtures of clay and fired gypsum for finishing dwellings.

In the early stages of civilization, the main components of plaster were clay, sand, straw, lime, and gypsum.

Clay was the most accessible material. It was mixed with plant fibers to reduce cracking. Such coatings were used in Mesopotamia, Egypt, and Eastern countries.

Plaster played a particularly important role in Ancient Egypt. The Egyptians used gypsum and lime mortars in the construction of pyramids and temples. The joints between the stone blocks were filled with special gypsum mixtures.

In addition to its construction function, plaster also played a decorative role. Surfaces were covered with paints, ornaments, and reliefs. To increase durability, resins and natural varnishes were used.

2. Plaster mixtures in Ancient Greece

In Ancient Greece, plaster coatings developed significantly due to the development of architecture and art. Greek craftsmen improved lime mortars, achieving high strength and smooth surfaces.

The basis of Greek plaster was lime mixed with:

Sand, marble dust, and small mineral fillers.

Marble crumbs allowed for the creation of decorative coatings resembling natural stone. Later, this technology became the basis for the famous Venetian plaster.

In ancient Greece, plaster was widely used for decorating temples, decorating public buildings, creating frescoes, and protecting stone masonry.

Particular attention was paid to multi-layer application technology. The lower layers contained coarse sand, while the upper layers contained fine marble powder. This ensured the durability and decorativeness of the coating.

3. The Development of Plaster in Ancient Rome

Ancient Rome was a crucial stage in the development of plaster mixes. The Romans improved the technology of preparing mortars and introduced new construction materials.

The most significant achievement was the use of putzolan additives—volcanic ash—which increases the water resistance and strength of the solutions.

Roman plaster mixes included lime, sand, volcanic ash, marble dust, and brick crumbs.

Roman masters used the technique of "stucco," a decorative plaster based on lime and marble dust.

Fresco painting was used for the wall painting, applying paints to raw plaster. This technology made it possible to obtain durable images.

Roman plaster was distinguished by its high moisture resistance, durability, plasticity, and decorativeness.

Many Roman structures have survived to the present day due to the quality of construction mortars.

4. Plasterwork in the Middle Ages

After the fall of the Roman Empire, the development of construction technologies temporarily slowed down. In the Middle Ages, plaster was primarily used as a technical material.

The main functions of plaster coatings were to protect walls, insulate buildings, fill cracks, and prepare surfaces for painting.

In Europe, lime solutions were widely used. In wooden buildings, clay mixtures with straw were used.

Despite the general decline of decorative art, monasteries and cathedrals continued to be decorated with frescoes. The technology of applying plaster was preserved in Byzantine and ancient Russian architecture.

5. The Renaissance and the Development of Decorative Plaster

The Renaissance was a time of new flourishing for the art of plaster. Architects and artists once again turned to ancient technologies.

Decorative plaster was particularly developed in Italy. It was here that the famous Venetian plaster appeared, imitating natural marble.

The mixes included lime, gypsum, marble flour, glue, and natural pigments.

During this period, the scraffito technique became widespread—applying several layers of multicolored plaster and then scraping through the pattern.

Decorative coatings became an important part of the architecture of palaces, cathedrals, and public buildings.

6. Development of plaster mixtures in the 19th–20th centuries

The Industrial Revolution significantly changed the production of building materials. The emergence of cement became the most important stage in the development of plaster mixes.

In the 19th century, cement mortars, gypsum-cement mixtures, and lime-cement plasters began to be actively used.

Cement plasters possessed high strength, moisture resistance, frost resistance, and durability.

In the 20th century, the development of the chemical industry led to the emergence of polymer additives, plasticizers, hydrophobizers, and reinforcing fibers.

This made it possible to significantly improve the performance properties of the plaster mixes.

2. Conclusion

The history of plaster mixes spans thousands of years and reflects the development of human civilization. From simple clay mortars of antiquity to modern polymer

compositions, plaster has undergone a complex path of improvement.

Each era has contributed to the development of technology:

Ancient Egypt - gypsum and lime mixtures;

Ancient Greece - decorative marble surfaces;

Ancient Rome - putzolan solutions and knock;

The Renaissance era - the development of artistic plaster;

19th–20th centuries — cement and polymer mixtures;

modernity - high-tech composite materials.

Today, plaster mixes continue to be improved, combining traditional technologies with modern achievements in construction chemistry.

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