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ENERGY-EFFICIENT CONCRETE PRODUCTION USING PRESSING TECHNOLOGY AND ITS APPLICATION TO RELATED MATERIALS

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Abstract

This study investigates the role of pressing technology in the production of energy-efficient concrete and its application to related building materials. Modern construction requires sustainable and low-energy solutions due to increasing environmental concerns. Energy-efficient concrete can significantly reduce energy consumption and carbon emissions while improving mechanical properties. The study also explores the application of pressing techniques in the production of composite materials such as bricks and lightweight blocks. The study also explores the application of pressing techniques in the production of composite materials such as bricks and lightweight blocks.

Keywords: energy-efficient concrete, pressing method, sustainable materials, density, construction technology

1. Introduction

Concrete is one of the most widely used construction materials in the world, but its production is associated with high energy consumption and

environmental impact. The construction sector contributes significantly to global energy use and CO_2 emissions.

In recent years, researchers have focused on developing energy-efficient concrete technologies, including the use of recycled materials, alternative binders, and improved production methods. Among these, the pressing method has gained particular attention due to its ability to improve structural properties while reducing energy consumption.

2. Energy-Efficient Concrete: Modern Trends

Energy-efficient concrete is designed to minimize energy use during both production and **operation**. Modern approaches include:

- use of recycled aggregates;
- application of industrial waste materials;
- reduction of water-cement ratio;
- improvement of thermal insulation properties.

These approaches allow not only improving strength characteristics but also reducing the environmental impact of construction materials.

3. Pressing Technology in Concrete Production

The pressing method is an effective way to increase the density and strength of concrete. During pressing, the material is compacted under high pressure, which leads to a more uniform and dense structure.

Main advantages of pressing technology:

- reduction of internal voids;
- increase in compressive strength;
- improvement of durability;
- decrease in water absorption.

As a result, the material becomes more resistant to external influences and requires less energy during production and operation

4. Application to Related Materials

Pressing technology is widely used not only in concrete production but also in other building materials, such as:

- clinker bricks;
- concrete blocks;
- ceramic materials;
- composite construction products.

The application of pressing technology in these materials improves their mechanical properties and reduces production energy consumption. This makes the technology highly promising for the modern construction industry.

5. Discussion

The integration of pressing technology with sustainable materials contributes to the development of a new generation of construction materials.

The main advantages include:

- reduction in energy consumption;
- improvement in structural performance;
- decrease in environmental impact.

However, further research is required to optimize pressure parameters and material compositions depending on specific applications.

6. Conclusion

Pressing technology plays a key role in the development of energy-efficient concrete and related materials. It significantly improves physical and mechanical properties while reducing energy consumption and environmental impact.

Future studies should focus on combining pressing methods with recycled and low-carbon materials to achieve maximum efficiency in construction.

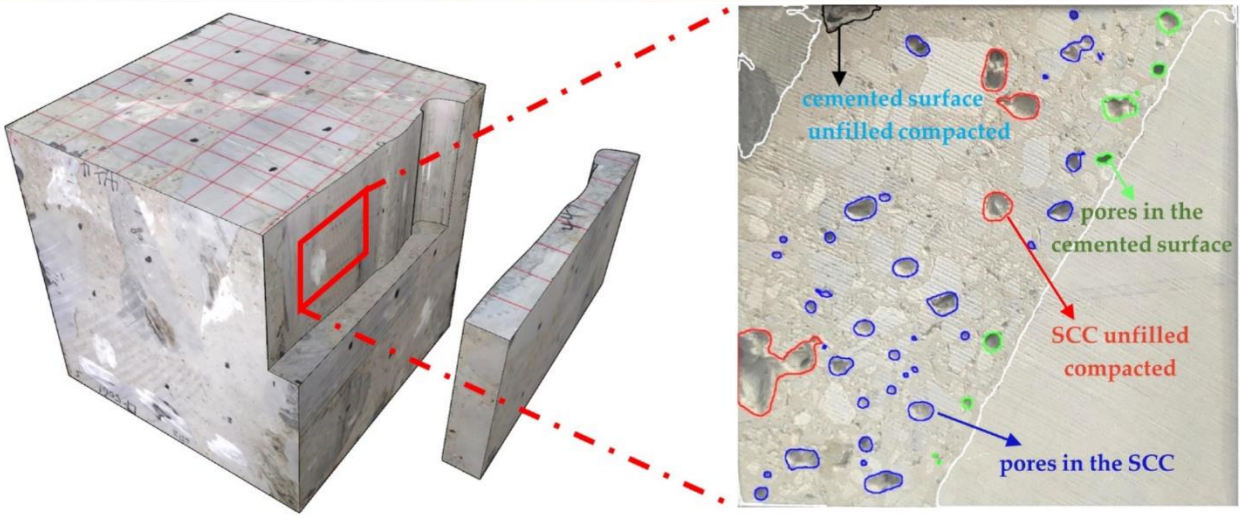


Figure 1. Effect of pressing duration on the compressive strength of concrete

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