Fabrication of High Insulation Building Materials

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Patent Pending

Description of Technology

Bricks are an essential building material used in many building projects. Today's most popular brick is made of expanded shale. Shale bricks have been fabricated for a while without much innovation applied.

Researchers at the University of Wyoming have created a new brick made of coal pyrolysis chars. Pyrolysis chars are made from heated coal, a byproduct of coal power plants. The advantages of this new brick are high thermal insulation and better moisture absorption capability than traditionally-produced bricks. A low bulk density of 1.24-1.36g cm3 is another benefit of pyrolysis chard. There is a trade-off between the mechanical property and insulation property with the char bricks, and properties can be balanced to obtain the desired result. If balanced correctly, the char bricks are able to obtain a compressive strength of 19.1MPa which meets the building code and industrial standards of brick. The coal byproduct used is also less expensive than expanded shale, leading to a lower overall cost. This brick can significantly improve the coal economy by creating another use for coal rather than solely combustion. Char bricks also have a lower break-even point than traditional bricks so starting up production is a risk-averse decision. The many benefits of char bricks make them superior to the traditional expanded shale products in almost every way.

Applications

The coal pyrolysis char brick is superior to traditional expanded shale products in many ways and can be used in all brick building applications while costing less and providing better properties for the end user. The benefits of the new pyrolysis char bricks allow them to replace traditional bricks in every application.

Features & Benefits

- Thermal conductivity of the char bricks is as much as 73.7% less than traditional bricks
- 67.93% and 45.77% higher performance in water absorption and desorption capability, respectively, compared to traditional bricks
- Low bulk density (light weight) of 1.24-1.36 g cm-3
- Pyrolysis chars are a by-product of coal refineries which makes then inexpensive and makes the break-even point far less than that of its competitor
- Paint adhesion is the same strength as traditional bricks
- Good noise barrier

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