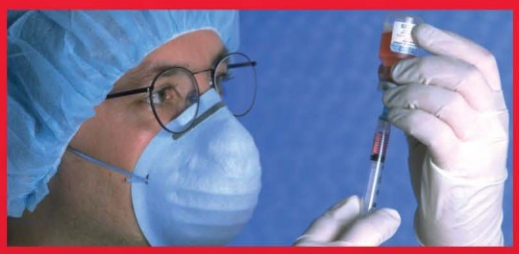

OFFICE OF SPONSORED RESEARCH

McGill

TECHNOLOGY OPPORTUNITY

Production of Carbonate-Bonded Construction Blocks from Steel-Making Residues

Inventors at McGill have developed a technology that utilizes waste materials as feedstock to produce a durable and environmentally-friendly construction block. Traditionally, concrete construction blocks utilize cement as a binder and generate significant carbon dioxide (CO_2) emissions. The proposed construction blocks are made from two steel-making residues: steel slag as binder and iron slag as aggregate. Instead of using the current practice of steam activation, carbon dioxide is added as the activator. Using waste residues from steel-making and carbon dioxide results in a “green” process to produce construction blocks. Physical testing of the “green” blocks has shown that the compressive strength is comparable to the commercial cement-based blocks, while durability is superior to the commercial units. As well, the McGill blocks are more resistant to moisture ingression and to freeze-thaw cycling. These “green” blocks reduce the amount of carbon dioxide emitted to produce construction blocks, preserve natural resources that would otherwise be used to produce concrete blocks, and offer a viable alternative to carbon capture and storage to reduce our carbon footprint. The technology is patent-pending.

Applications

- Construction blocks
- Basement walls
- Foundation walls
- Landscaping blocks
- Partition walls
- Exterior walls

Advantages

- Replaces cement with steel slag as binder for blocks
- Uses existing block production lines to make the blocks and conduct the curing
- Superior mechanical and durability properties compared to current blocks
- Reduces CO_2 emissions by eliminating cement and by carbonation uptake
- Preserves natural resources for both binder and aggregates
- Reduces the waste sent to landfills

The Lead Inventors

Yixin Shao

Associate Professor - Department of Civil Engineering and Applied Mechanics
Ph.D.: Northwestern University (U.S.A.)
B.Sc.,M.Sc.: Tongji University (China)

Research Description: Professor Shao's expertise is in the area of civil engineering materials and their structural applications. His research interests include fiber-reinforced cement-based composites, fiber-reinforced plastic composites, utilization of wastes, environment-friendly building materials, durability, and stress and strain analysis.

Mehrdad Mahoutian

Ph.D. McGill University (Canada)
M.Sc.: University of Alberta (Canada)
M.Sc: Sharif University of Technology (Iran)
B.Sc.: University of Tehran (Iran)

Research Description: Mahoutian's specialty lies in the field of cementitious and construction materials. His research interests include durability of concrete, composite materials, environment-friendly building materials, image analysis, self compacted concrete, carbon dioxide sequestration, utilization of waste, microstructure of cement, fiber reinforced concrete and lightweight concrete.

CONTACT:

Mark Weber, Ph.D., P.Eng.
Office of Sponsored Research
McGill University
Tel: 514-398-8949
Email: mark.weber2@mcgill.ca
Opportunity: Exclusive license and/or research collaboration
Ref.No.14061

McGill

OFFICE OF SPONSORED RESEARCH