Strengthening Lightweight Concrete

Polymer impregnation substantially strengthens lightweight concretes. Vacuum soaking followed by radiation polymerization using a Co60 gamma source impregnates perlite concrete, foamed glass concrete, and mearcrete with polymethyl methacrylate. This process improves the bond between the cement and aggregate and strengthens the cement phase.

With this process the concretes absorb polymer ranging from 31 percent (by volume) for foamed glass concrete to 49 percent for perlite concrete. Compressive strength of unimpregnated samples, generally, is less than 1000 psi. Compressive strength of most impregnated samples varies from 3000 to 6000 psi. Adding 15 percent polymer to concrete having an unimpregnated strength of 5000 psi increases its strength to the 18,000 to 20,000 psi range.

The lightweight concretes strengthened by the polymer impregnation process should be a useful development for the construction industry.

Note:
Requests for further information may be directed to:
Mr. Glenn K. Ellis
Technology Utilization Officer
Office of Information Services
U.S. Atomic Energy Commission
Washington, D.C. 20545
Reference: TSP72-10430

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Inquiries concerning rights for commercial use of this information may be made to:
Mr. George H. Lee, Chief
Chicago Patent Group
U.S. Atomic Energy Commission
Chicago Operations Office
9800 South Cass Avenue
Argonne, Illinois 60439

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