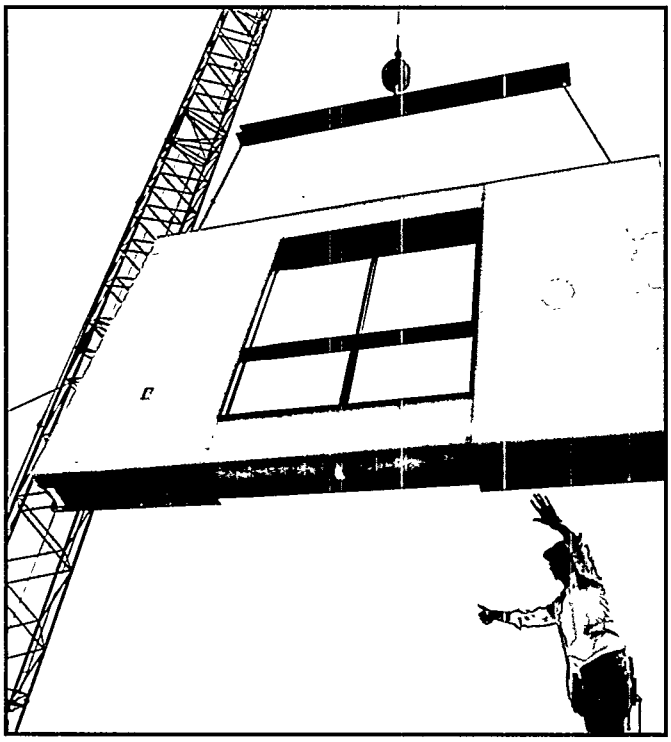
many. Other applications being developed include crack arresters for pipeline retrofit and reinforcement of steel pipe.

Exfoliated Graphite Fibers

Conventional high-strength graphite fibers are very brittle and require extreme handling care, in fabrication as well as in application. Through research funded by the DOE, a less brittle graphite fiber has been developed. This exfoliated graphite can be bent to a radius of curvature as small as 5mm without breaking. Composites which could exhibit lower density, improved ductility, and higher electrical conductivity can be fabricated from the exfoliated graphite. Because the exfoliation process for making these fibers can be conducted at low temperatures, manufacturing costs may also be lower than current high-cost methods of producing high-strength fibers using graphite. A strong, lightweight composite material such as this could find ready application in airplane and auto bodies, where weight reduction could result in vast gasoline savings.



In construction with integrated concrete technology, prefabricated panels are lowered into place and then connected by a poured-in-place structural concrete grid to improve energy efficiency by 40-50%.

Photo credit: LENS-ART PHOTO

Integrated Concrete Technology

A DOE grant was used to test the performance claims of an innovative building technology, which has since been incorporated in more than a dozen large building projects in the United States and abroad. The construction process uses a poured-in-place structural concrete grid to connect prefabricated, highly insulated permanent walls. The wall components have a very low heat transfer coefficient of R=30 or better. Because the two-step operation accomplishes seven construction processes at the same time, buildings can be constructed much more efficiently. Construction time for multistoried buildings can be cut by 30 percent, and the building's energy consumption will be 40-50 percent less than a traditional structure. Buildings using Integrated Concrete Technology are 60 percent lighter than comparable structures and use heating systems that are half as large as those used in buildings of equal size.

Compressor Control Systems

With support by a DOE grant, an inventor completed development of a microprocessor-based control system for regulating centrifugal and reciprocating equipment used in natural gas compressor stations. The invention achieves significant energy savings in plants using multiple compressors, maintaining optimum efficiency for as many compressors as possible when operating conditions extend beyond their optimum range. The control system can be introduced at low cost with nominal interference in normal operation for retrofit purposes, and with little effort for new installations. Energy savings sufficient to give a product payback in weeks are achieved by matching compressor load to energy requirements for engine startup. Although the savings