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EDITOR'S MESSAGE



The materials issue

Having spent most of my career specializing in civil engineering materials, I see it as a topic that many structural engineers should understand in more detail. In some cases, advances in materials technology precede the ability of structural engineers to make use of them; in other cases, the demands of structural design motivate the development of materials.

The design of mobile, offshore oil-exploration structures back in the early 1980s made apparent the need for concretes with sufficiently high strength-to-weight ratios to limit the draft of a floating structure so that it could be towed off the relatively shallow North Slope of Alaska. The development and testing of high-strength, lightweight concretes to meet that need was the project that launched my own career toward materials research. On the other hand, our cover story highlights applications that have been made possible by the development of high-strength, centrifugally cast concrete. A second feature article reviews applications of fiber-reinforced concrete in the precast concrete industry.

Our peer-reviewed papers in this issue examine several aspects of the materials used in precast, prestressed concrete. We look at self-consolidating concrete and two applications of fiber-reinforced polymers. We also look at the effects of deterioration of the steel and the concrete on the residual capacity of bridge beams.

As Jim Toscas discussed in his Winter 2012 President's Message, "Something to Think About," precast concrete producers are well placed to be able to take advantage of innovative materials. The environment of a precast concrete plant lends itself to better control of the materials and fabrication process than could ever be hoped for on a construction site, allowing precasters to be at the forefront of technology without undue risk to themselves or the public. Self-consolidating concrete is well established in precast concrete plants. PCI's Concrete Materials Technology Committee is examining ultra-high-performance concrete and geopolymer concrete for possible future implementation. ▮

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