# REVIEWS OF TECHNICAL PUBLICATIONS

## Sulfate Attack on Concrete – Separating Myths From Reality

P. Kumar Mehta

The controversies generated by contradictory expert testimonies in several law suites involving sulfate attack on concrete, and by the large numbers of recently published papers containing data on the subject, have caused considerable anxiety about sulfate attack mechanisms and the service life of concrete structures. Frequently, the physical attack by salt crystallization is being confused with the classical sulfate attack, which involves the chemical interaction between sulfate ions from an external source and the constituents of cement paste, In addition, there is also an internal sulfate attack – a chemical attack in which the source of sulfate ions resides in the concrete aggregates or cements. In recent literature, internal sulfate attack in steam-cured concrete products made with cements containing higher-than-normal sulfate content is being projected as something fundamentally different from the external sulfate attack. Some of the controversies about sulfate attack are addressed in this article, and it is concluded that a holistic approach is necessary to separate the real cause of concrete deterioration from the imaginary ones.

*Concrete International*, V. 22, No. 8, August 2000, pp. 57-61.

## Segmental Precast Concrete Piles: A Solution for Underpinning

Tarek Hassan, Sami Rizkalla, Sital Rihal, and Dominic Parmantier

This article describes a new construction methodology for underpinning structures that use segmental precast concrete piles. Behavior of the proposed system at various limit states is presented based on an experimental program that was conducted to determine behavior under axial and eccentric loading conditions, as well as to determine flexural strength. The testing program used prototypes of the segmental piles to evaluate the ultimate load-carrying capacity and the mode of failure. A case study for using the proposed system for underpinning the 90-year-old Legislative Building of the Province of Saskatchewan is presented.

*Concrete International*, V. 22, No. 7, July 2000, pp. 19-20.

## Prefabricated Concrete Semiarches Span the St. Sauveur River

Philippe Donnaes

Situated close to the southern pier of the Normandy Bridge, in Northern France, which until last year was the world's longest cable-stayed bridge, a 951 ft (290 m) viaduct is being built over the St. Sauveur River to link the Normandy Bridge to the A13 Highway near the city of Honfleur. The viaduct crosses two local roads as well as the Honfleur-Pont l'Eveque rail link. To build the multi-arch viaduct required 160 prefabricated concrete semiarches, each 49 ft (15 m) long, which are assembled on site. This article discusses how the viaduct is being constructed.

*Concrete International*, V. 22, No. 7, July 2000, pp. 19-20.

## Partially and Fully Prestressed Concrete Sections Under Biaxial Bending and Axial Load

Jose A. Rodriguez and J. Dario Aristizabal-Ochoa

A general method that determines the ultimate strength capacities and interaction diagrams for any orientation of the neutral axis of a prestressed concrete section of any shape under axial load (tension or compression) and bending about two axes is presented. The proposed method can be used in the study of the effects of creep, shrinkage, and confinement of the concrete, as well as relaxation in the prestressed steel (bonded and/or unbonded) on the nominal strength and failure mode of partially or totally prestressed concrete sections under biaxial bending and axial load. Five examples are presented to verify and show the effectiveness of the proposed method.

*ACI Structural Journal*, V. 97, No. 4, July-August 2000, pp. 553-563.

## The Architecture of Claddings

Luigi Amighetti

Presents an overview of new innovations that are being made in cladding loadbearing precast concrete commercial buildings. Architectural precast panels are being used with exciting new shapes, texture, color, and art-form at competitive prices.

*Elite*, Revista Internazionale di arte della prefabbricazione (International Magazine of Precast Concrete Art), Bergamo, Italy, No. 1, 2000, pp. 24-37.

## Prefabrication of the Øresund Tunnel Elements: the Development and Design of the Casting Yard

R. Spreng, R. Bittner, P. Gernigon and A. Piquet

During the bidding stage, The Øresund Tunnel between the island of Zealand (Denmark) and Malmo (Sweden) presented a formidable challenge to the joint venture companies bidding for the project. The project was to be the largest immersed tube tunnel ever built. It was to be built in a very sensitive environment, under severe climatic conditions and to very rigorous design and construction requirements. The bid submitted by Øresund Tunnel Contractors for design and construction of the Øresund Tunnel met this challenge by proposing the use of an innovative system for casting and launching the tunnel elements. The two key concepts that made up this system were incremental match casting of full tunnel cross-sections and the launching of the completed tunnel elements from a two-level casting basin. The success of this cast and launch system depended on the development of various construction methods proposed at the bidding, and how well those methods conformed to the tunnel design. This paper describes the development and evolution of these methods from the end of the bidding stage to their actual implementation.

*Structural Concrete, Journal of the fib*, Fédération Internationale du Béton, V. 1, No. 2, June 2000, pp. 77-89.