REFERENCE CARDS

KEYWORDS: analysis; arches; bridges; connections; construction; design (structural); history; joints; precast concrete; rehabilitation; reinforcement; repair; Spain; structural analysis.

ABSTRACT: The authors discuss the conceptual plan, component design and reinforcement, structural analysis, together with the precasting and construction techniques used in renovating the famous María Cristina Bridge in San Sebastián, Spain.

REFERENCE: Arenas, Juan J., and Mainar, Javier, "Renovation of the Historic María Cristina Bridge," PCI JOURNAL, V. 31, No. 2, March-April 1986, pp. 20-39.

KEYWORDS: bridges; bridge decks; connections; construction; design (structural); economy; full-depth panels; highway bridges; precast concrete; prestressed concrete; railroad bridges; rehabilitation; repair; research; stay-in-place panels.

ABSTRACT: This report describes applications of full depth, precast concrete panels for the rehabilitation of deteriorated bridge decks and the construction of new bridges. Emphasis is placed on systems of construction and the economy derived in using precast concrete for bridge construction. The report presents design systems, details of joints and joint material used for a number of highway and railway bridges. The advantages and a few of the difficulties involved in this construction method are discussed including some pertinent research work.

REFERENCE: Biswas, Mrinmay, "Precast Bridge Deck Design Systems," PCI JOURNAL, V. 31, No. 2, March-April 1986, pp. 40-94.

KEYWORDS: cracking; deflections; design (structural); ledger beams; precast concrete; reinforced concrete; research; spandrel beams.

ABSTRACT: Excessive lateral displacements of reinforced precast concrete ledger beams have been observed during construction of several structures, and have required expensive remedial action. To ascertain the cause of deflections, and to gain information upon how the problem could be avoided, a series of quarter scale reinforced precast beams encompassing the full range of depth to span ratios usually encountered in practice were loaded within the service load range.

The tests indicated that a slight rotation of the principal axes, caused by the ledge and the eccentric reinforcement is a primary cause of lateral displacements. Some secondary displacements may also have occurred, but appear to be of minor importance. Recommendations for design are given, which should reduce the magnitude of lateral displacements to within acceptable limits.

REFERENCE: Cleland, Ned M., and Baber, Thomas T., "Behavior of Precast Reinforced Concrete Ledger Beams," PCI JOURNAL, V. 31, No. 2, March-April 1986, pp. 96-117.

KEYWORDS: analysis; composite sections; cracking; creep; design (structural); deflections; determinate structures; indeterminate structures; nonprestressed concrete; post-tensioned concrete; precast concrete; prestressed concrete; relaxation; shrinkage; serviceability; strain; stress.

ABSTRACT: Distribution of strain and stress in a reinforced concrete section subjected to a normal force combined with bending due to prestressing and other loads introduced in stages are derived. The analysis does not need to be preceded by an estimate of the prestress loss due to creep and shrinkage and relaxation of prestressed steel.
The derived equations apply to cross sections made up of one type of concrete or to composite sections made of two concrete types or of concrete and structural steel. The approach presented is applicable to statically determinate or indeterminate structures with any amount of prestressing varying from zero allowing cracking to full prestressing eliminating cracks.
The stress and strain and the corresponding elongations and deflections are calculated using three numerical examples of members with and without prestressing subjected to normal force and bending to demonstrate the proposed method.

REFERENCE: Ghali, Amin, "A Unified Approach for Serviceability Design of Prestressed and Nonprestressed Reinforced Concrete Structures," PCI JOURNAL, V. 31, No. 2, March-April 1986, pp. 118-137.

KEYWORDS: construction; marine structures; piles; platform; precast concrete; prestressed concrete.

ABSTRACT: Precast prestressed concrete piles saved both time and money in constructing this fast track ship repair facility in Portsmouth, Virginia.

REFERENCE: "Moon Ship Repair Facility," PCI JOURNAL, V. 31, No. 2, March-April 1986, pp. 138-143.

KEYWORDS: erection; precast concrete; post-tensioned concrete; prestressed concrete; stadium.

ABSTRACT: Erection and maintenance requirements made precast and cast-in-place concrete the first choice in building materials for this baseball stadium facility in Richmond, Virginia.

REFERENCE: "The Diamond," PCI JOURNAL, V. 31, No. 2, March-April 1986, pp. 144-149.

KEYWORDS: architectural precast concrete; construction; building; spandrel panels; wall panels.

ABSTRACT: Architectural precast concrete panels added distinction to this five-story office building (in Paramus, New Jersey) while complementing existing stone buildings in the area.

REFERENCE: "Evans K-10 Office Building," PCI JOURNAL, V. 31, No. 2, March-April 1986, pp. 150-154.