REFERENCE CARDS

KEYWORDS: ACI Code; buildings; codes; design (structural); frames; NEHRP Provisions; precast concrete; prestressed concrete; seismic forces; seismic provisions; shear walls.

ABSTRACT: This article is a follow-up to a series of three prior papers discussing significant modifications approved for inclusion in the 2000 NEHRP Provisions, dealing with the design of precast concrete seismic-force-resisting systems. This paper discusses the corresponding provisions that are expected to be included, for the first time, in the 2002 Edition of the ACI 318 Building Code Requirements for Structural Concrete, and describes the relation between the ACI and NEHRP Provisions.

REFERENCE: Ghosh, S. K., Hawkins, Neil M., "Seismic Design Provisions for Precast Concrete Structures in ACI 318," PCI JOURNAL, V. 46, No. 1, January-February 2001, pp. 28-32.

KEYWORDS: bracket; carbon fiber reinforced polymer; column bracket; design (structural); fabric wrap; repair; research; strengthening; testing.

ABSTRACT: This paper examines the repair or rehabilitation of column brackets using CFRP (Carbon Fiber Reinforced Polymer) bonded fabric. A column bracket test specimen is designed, analyzed, precracked, repaired and tested. The experimental program loaded the original bracket to 75 percent of its normal capacity by 50 percent and retested. The repaired bracket exceeded the predicted strength increase. The CFRP fabric wrap was found to be an extremely effective form of column bracket repair. Surface preparation and CFRP installation procedures are discussed. Detailed design recommendations and a design example are included.

REFERENCE: Corry, Robert W., Dolan, Charles W., "Strengthening and Repair of a Column Bracket Using a Carbon Fiber Reinforced Polymer (CFRP) Fabric," PCI JOURNAL, V. 46, No. 1, January-February 2001, pp. 54-63.

KEYWORDS: beams; cracking; precast concrete; prestressed concrete; prestress force; research; strain; strand; transfer length.

ABSTRACT: In this study, concrete strains were monitored in three pretensioned concrete beams during the cutting of the strands. The beams were 32 ft (9.75 m) long with a 51/2 x 23 in. (140 x 584 mm) rectangular cross section. The transfer length was determined from the strain data and from the end slip of the strands measured with linear variable differential transformers (LVDTs). The results of the study showed longitudinal tensile strain near the end of the beams prior to cutting all the strands. These strains were large enough to cause cracking which was not visible after release of all the strands.

REFERENCE: Steinberg, Eric, Beier, Jonathan, Sargand, Shad, "Effects of Sudden Prestress Force Transfer in Pretensioned Concrete Beams," PCI JOURNAL, V. 46, No. 1, January-February 2001, pp. 64-75.

KEYWORDS: bridges; bulb-T girders; design (structural); precast concrete; prestressed concrete; slab-on-piles; standardization; transition structures; transportation structures.

ABSTRACT: Precast, prestressed concrete has played a prominent role in the design and construction of Boston's Central Artery/Tunnel Project. The previous four articles have shown the many innovative ways in which precast concrete products have been used in this project. In this Part 5 article, the authors discuss the use of standardized precast, prestressed transition structures, especially the slab-on-pile and the New England bulb-T girder.

REFERENCE: Hill, Jennifer, Hsu, Ru-Chu, Chandra Vijay, "Central Artery/Tunnel Project: Standardized Precast, Prestressed Transition Structures," PCI JOURNAL, V. 46, No. 1, January-February 2001, pp. 22-27.

KEYWORDS: architecture students; education; employment; PCI Summer Intern Program; engineering students; student education.

ABSTRACT: A joint subcommittee of the PCI Professional Member Committee and the PCI Student Education Committee has collaborated to develop the PCI Summer Intern Program. The purpose of this program is to offer summer employment opportunities to engineering and architecture students with PCI producer plants, industry suppliers, consulting engineer firms, and architecture firms. This article discusses the various components of this program and poses typical questions and answers regarding the program.

REFERENCE: Lanier, Michael W., Barr, Paul, Scholz, Kathleen, "PCI Intern Program – A New Industry Initiative," PCI JOURNAL, V. 46, No. 1, January-February 2001, pp. 82-84.

KEYWORDS: architecture; bridge; canopy; connections; construction; cruise terminals; design (structural); double tees; pedestrian bridge; precast concrete; prestressed concrete.

ABSTRACT: The canopy of the Port of Miami Terminals 3, 4, and 5 in Miami, Florida provides shelter for embarking and disembarking cruise ship passengers as they transfer to buses, taxis and cars. Precast/prestressed concrete proved to be the fastest and least expensive solution to an innovative architectural and structural design. By creatively combining and connecting the precast components together, the elegant lines and soaring architectural motif intended by the architect was achieved on the fast track construction schedule demanded by the owner. This article presents the architectural features, structural design considerations and construction highlights of the project.

REFERENCE: Ramos, Bruno Elias, Colao, John, Martinez, Paul, Troiani, Peter G., Wolfstahl, Ted, "Precast Concrete Canopy Offers Innovative Design and Fast Track Construction," PCI JOURNAL, V. 46, No. 1, January-February 2001, pp. 14-21.

KEYWORDS: beams; bonded reinforcement; codes; design (structural); precast concrete; prestressed concrete; prestress transfer; reinforcement; research; strength design.

ABSTRACT: This paper presents a rational method for the design of pretensioned flexural concrete members due to the effects of prestress transfer. Conditions at prestress transfer often control the level of prestress that can be placed in pretensioned flexural members. It is proposed that the flexural design of pretensioned, prestressed concrete members for the effects of prestress transfer be based on strength design criteria. In practice, the proposed method will generally lead to higher prestress levels than the empirical limit of $0.6f'_{ci}$ given in the ACI Code and AASHTO Specifications. A significant advantage of the proposed strength design approach is that it automatically and rationally allows for calculation of any top bonded reinforcement required to maintain strength at transfer with controlled tension cracking.

REFERENCE: Noppakunwijai, Panya, Tadros, Maher K., Zhongguo Ma, and Mast, Robert F., "Strengthening Design of Pretensioned Flexural Concrete Members at Prestress Transfer," PCI JOURNAL, V. 46, No. 1, January-February 2001, pp. 34-52.

KEYWORDS: architecture; construction; design (structural); erection; precast concrete; prestressed concrete; stadia; stadium.

ABSTRACT: A precast/prestressed concrete solution, using a GMP (Gross Maximum Price) approach, was instrumental in the realization of this magnificent, multi-million dollar, 16,000-seat, tennis stadium in Southern California.

REFERENCE: Nasser, George, D., "Wells Tennis Stadium Garden," PCI JOURNAL, V. 46, No. 1, January-February 2001, pp. 118-121.