REFERENCE CARDS

KEYWORDS: architectural concrete; buildings; column covers; construction; design (structural); facades; mullions; precast concrete; production; spandrels; wall panels; window panels.

ABSTRACT: This paper examines trends and techniques used in Canada for the manufacture of architectural precast concrete spandrel, column cover, mullion and window panels. The advantages and recommended applications of different form materials are discussed and suggestions are offered on how to achieve efficient production of units in a precast factory. The methods of achieving and the end results of various finishing methods are illustrated. Practical suggestions for transporting and erecting different types of panels are given. Many of the concepts are illustrated with examples of outstanding products and buildings where the architect's concept was successfully and economically realized by the use of different architectural precast concrete panel systems.

REFERENCE: Fowler, John R., "Overview of Canadian Practices in Architectural Precast Concrete for Building Facades," PCI JOURNAL, V. 33, No. 1, January-February 1988, pp. 24-43.

KEYWORDS: analysis; design (structural); hollow-cored section; interaction diagram; I section; poles; precast concrete; prestressed concrete; production.

ABSTRACT: A strength design procedure based on the ACI 318-83 Building Code is developed for circular hollow-cored and I-shaped prestressed concrete poles and is implemented in a microcomputer program for an IBM PC. Load-moment interaction diagrams are automatically generated for any input values of the main variables. Three types of prestressing tendons with nonlinear stress-strain relations are considered. The effects of tendon configuration and other design parameters such as type of prestressing tendon, average prestress, concrete compressive strength and reinforcing index are evaluated. Nondimensionalized design charts for prototype conditions are presented.

REFERENCE: Bolander, Jr., J., Sowlat, Koz, Naaman, Antoine E., "Design Considerations for Tapered Prestressed Concrete Poles," PCI JOURNAL, V. 33, No. 1, January-February 1988, pp 44-67.

KEYWORDS: bridges; construction; design (structural); elevated structures; precast concrete; prestressed concrete; railroads; rapid transit systems; transportation systems.

ABSTRACT: The author describes the design and construction features of the new elevated line of Mexico City's Metro. This 5.6 km (3.5 mile) long structure, with beams spanning 40 m (131.23 ft), uses precast prestressed concrete extensively together with some innovative structural design solutions.

REFERENCE: Rioboo Martin, Jose Ma., "A New Concept in Structural Design for Mexico City Elevated Metro," PCI JOURNAL, V. 33, No. 1, January-February 1988, pp. 112-141.

KEYWORDS: bridges; construction; I girders; precast concrete; prestressed concrete; production.

ABSTRACT: A newly developed prestressed concrete I girder, capable of spans up to 164 ft (50 m), played a key role in the winning concrete alternate design for a 1345 ft (410 m) long, sharply curved nine-span bridge.

REFERENCE: "Annacis Channel East Bridge," PCI JOURNAL, V. 33, No. 1, January-February 1988, pp. 148-157.

KEYWORDS: bridges; deck panels; design (structural); fatigue; performance; precast concrete; prestressed concrete; research; strand extensions; testing.

ABSTRACT: Static and fatigue loading tests were conducted on a full scale bridge specimen constructed using precast prestressed concrete panels placed over precast prestressed girders, and covered with a cast-in-place bridge deck. The northern half of the bridge had panels with transverse prestressing strands extending about 3 in. (76 mm) beyond the panel edges, while the southern half had panels without such extensions. The overall and local behavior of the bridge, both with and without transverse panel strand extensions, was satisfactory. Bridge deck capacities correlated well with the lower of the two loads predicted by yield line and punching shear analyses. Construction details, while not affecting overall performance, did significantly affect local behavior.

REFERENCE: Bieschke, Lee A., and Klingner, Richard E., "Effects of Transverse Panel Strand Extensions on the Behavior of Precast Prestressed Panel Bridges," PCI JOURNAL, V. 33, No. 1, January-February 1988, pp. 68-88.

KEYWORDS: bond; design (structural); flexural strength; hollow-core slabs; precast concrete; prestressed concrete; production; research, strand slip; testing.

ABSTRACT: The object of this experimental study was to examine the effects of excess initial strand slip on strand development in hollow-core slabs. Results were obtained from eleven concentrated load tests conducted on seven hollow-core slab test specimens. The observed capacities in the tests were compared to predicted capacities computed according to the ACI Code and a strand slip theory. Results of the test program appear to confirm the applicability of the ACI Code equations where initial strand slip is limited to allowable values, but indicate that these equations do not safely predict the capacity of slabs having excess initial strand slip. The strand slip theory, on the other hand, appears to adequately predict the reduced capacity and failure mode of slabs having such excess slip.

REFERENCE: Brooks, Mark D., Gerstle, Kurt H., and Logan, Donald R., "Effect of Initial Strand Slip on the Strength of Hollow-Core Slabs," PCI JOURNAL, V. 33, No. 1, January-February 1988, pp. 90-111.

KEYWORDS: AASHTO beams; bridges; construction; design (structural); precast concrete; prestressed concrete.

ABSTRACT: The precast prestressed concrete alternate design made it possible for this 2550 ft (777 m) long 21-span bridge to be built 14 months ahead of schedule with a 20 percent savings in construction costs.

REFERENCE: "La Plata River Bridge," PCI JOURNAL, V. 33, No. 1, January-February 1988, pp. 158-164.

KEYWORDS: boat pier; construction; design (structural); marine structures; precast concrete; prestressed concrete.

ABSTRACT: Precast prestressed deck channel sections, finger pier slabs, piles and pile caps provided strength, durability and economy for a 416 ft (127 m) long commercial boat pier situated in a hurricane prone harbor.

REFERENCE: "Commercial Boat Pier C-1," PCI JOURNAL, V. 33, No. 1, January-February 1988, pp. 142-147.