

REFERENCE CARDS

KEYWORDS: architectural precast concrete; brick in-fill; buildings; façade; frame; multistory buildings; precast concrete; prestressed concrete; renovation; repair; stabilizing core; strengthening; wall panels.

ABSTRACT: Precast and prestressed concrete played a prominent role in renovating two old deteriorated buildings in Kansas City, Missouri, into a single state-of-the-art office facility. The solution required the demolition of part of one building (Gatlin Building) with a stabilizing vertical core using a precast, prestressed structural frame. When this structural work was completed, the exterior façade of the Gatlin Building was clad with architectural precast panels using a thin brick in-fill to match the building's original appearance.

REFERENCE: Nelson, Tom, Calcara, James, Falbe, Michael, and Blazer III, H. Cam, "Renovation of Poindexter Office Building, Kansas City, Missouri," *PCI JOURNAL*, V. 43, No. 3, May-June 1998, pp. 12-19.

KEYWORDS: architectural precast concrete; buildings; façade; multistory buildings; precast concrete; renovation; repair; spandrel panels; wall panels; window panels.

ABSTRACT: Architectural precast concrete became the solution of choice in replacing a brick tiled surface with metal frame panel system that had suffered deterioration leading to air and water infiltration over the exterior of a 31-story hotel, residential apartment and condominium building in Grand Rapids, Michigan. A total of 1440 precast components were used on this job including wall panels with punched openings for window units, spandrels, and column covers.

REFERENCE: Scotty, Neale, Marker, Scott, and Timperley, Jon, "Renovation of Plaza Towers, Grand Rapids, Michigan," *PCI JOURNAL*, V. 43, No. 3, May-June 1998, pp. 20-31.

KEYWORDS: arc welding; connections; galvanized steel; hot dip galvanizing; joints; precast concrete; reinforcement; stud welding; welding; zinc coated steels.

ABSTRACT: Many structures are galvanized after they have been welded in order to achieve optimum corrosion protection from the galvanized coating. However, most products in the precast/prestressed industry can easily and satisfactorily be welded after fabrication by practicing the techniques outlined in this article. The guidelines and information are intended to assist in employing the correct techniques to ensure a high quality product or job.

REFERENCE: Livelli, Gregory, and Langill, Thomas, "Guidelines for Welding Galvanized Steel," *PCI JOURNAL*, V. 43, No. 3, May-June 1998, pp. 40-48.

KEYWORDS: analysis; bridge decks; bridges; connections; construction; deck panels; design(structural); girders; grouts; joints; load test; post-tensioning; precast concrete; prestressed concrete; production; punching shear; reinforcement; research; shear keys; shear strength; testing.

ABSTRACT: This study presents a new full depth precast, prestressed concrete bridge deck panel system. The newly developed system includes stemmed precast panels, transverse grouted joints, longitudinal post-tensioning and welded threaded and headless studs. The new system is shown to have better crack control and to be 20 percent more slender and 20 percent lighter in weight than solid conventional reinforced concrete decks.

REFERENCE: Yamane, Takashi, Tadros, Maher K., Badie, Sameh S., and Baishya, Mantu C., "Full Depth Precast, Prestressed Concrete Bridge Deck System," *PCI JOURNAL*, V. 43, No. 3, May-June 1998, pp. 50-66.

KEYWORDS: anchors; connections; deformed bar anchors; grouts; headed studs; plates; plate anchors; precast concrete; research; studs; tension; testing.

ABSTRACT: Results of ten tension tests on post-installed plates with anchors utilizing non-shrink grout are presented. The plate anchors consisted of $\frac{1}{2}$ in. (12.7 mm) diameter x 4 and 6 in. (102 and 152 mm) long headed studs and $\frac{1}{2}$ in. (12.7 mm) diameter x 12 in. (305 mm) long deformed bar anchors. All plates were 8 x 8 in. (203 x 203 mm) with four anchors each. As a control, six plates with 4 and 6 in. (102 and 152 mm) headed studs were cast into the specimens and tested in tension. The results of the tests showed no distinction between failure tension loads or mode of failure for the cast-in and grouted-in plates with headed studs. The ratio of the tension loads for grouted-in plates with headed studs as compared to comparable cast-in plates ranged from 0.94 to 1.01.

REFERENCE: Salmons, John R., "Plates with Anchors Post-Installed with Non-Shrink Grout," *PCI JOURNAL*, V. 43, No. 3, May-June 1998, pp. 32-39.

KEYWORDS: compression; connectors; cyclic loading; deformation; double tees; ductility; monotonic loading; performance; precast concrete; prestressed concrete; reinforcement; research; serviceability; shear strength; tension; testing.

ABSTRACT: The behavior of a particular tee flange-to-flange connector was investigated experimentally under in-plane load conditions. The connector consisted of a steel plate with two fillet-welded reinforcing bars embedded in 2 in. (50 mm) thick concrete slabs. Ten tests were conducted by applying a variety of loading conditions. Test results showed that the connector had a dependable and predictable strength under both monotonic and cyclic loading. Its deformation capacity depended on the type of applied loading. Under monotonic loading, moderate to high levels of deformation ductility were observed. Under cyclic load reversals, however, the deformation capacity and ductility of the connector were limited. Based on the test results, the performance of the connector is evaluated and criteria for future testing of similar connectors are presented.

REFERENCE: Pincheira, José A., Oliva, Michael G., and Kusumo-Rahardjo, Fadjat L., "Tests on Double Tee Flange Connectors Subjected to Monotonic and Cyclic Loading," *PCI JOURNAL*, V. 43, No. 3, May-June 1998, pp. 82-96.

KEYWORDS: analysis; bridge decks; bridges; deflections; design (structural); durability; girders; jointless bridges; joints; link slabs; precast concrete; prestressed concrete; reinforcement; research; serviceability; testing.

ABSTRACT: Maintenance of bridge deck joints is a costly problem. Debris accumulation in the joints can restrain deck expansion, causing undesirable forces in the deck and damage to the structure. Water leaking through the joints is a major cause for the deterioration of bridge girder bearings and supporting structures. Therefore, elimination of deck joints at the supports of multispan bridges will reduce the cost of construction and maintenance. This paper presents the results of a test program to investigate the behavior of link slabs connecting two adjacent simple-span girders, and proposes a simple method for designing the link slab. To illustrate the proposed design method, three design examples are included.

REFERENCE: Caner, Alp, and Zia, Paul, "Behavior and Design of Link Slabs for Jointless Bridge Decks," *PCI JOURNAL*, V. 43, No. 3, May-June 1998, pp. 68-80.