

RECOMMENDED READING

fib bulletin suggests remedies for imperfections

Task Group 6.8, Treatment of imperfections in precast concrete structural elements, in Commission 6, Prefabrication



fib (International Federation for Structural Concrete) bulletin 41, *Treatment of Imperfections in Precast Structural Elements*, is now available for purchase from the *fib* secretariat.

The bulletin addresses the most common types of imperfections encountered during the manufacture, stacking, transport, and erection

of precast concrete structural elements and suggests a number of possible remedial actions. The remedial actions depend on the severity of the imperfection, the feasibility of repair, and the consequences on the intended use of the concrete member.

This document deals with precast concrete elements that do not meet the quality as intended in the design. It compares imperfections in quality with the specified requirements so that the effect of the imperfection can be evaluated. Recommendations are provided on methods to prevent such imperfections, the effects that they can have, and any necessary actions for rectification.

The bulletin applies to prefabricated concrete members made of reinforced or prestressed normalweight concrete. Products include beams and columns, concrete walls, hollow-core slabs, double Ts, slabs, and beams for beam-and-block floors. Water-retaining structures are outside the scope of this document.

fib (International Federation for Structural Concrete); 2007; Lausanne, Switzerland; 74 pp.; Sw F 80 for non-members.

Device for prestressing CFRP sheets described

Piyong Yu, Pedro F. Silva, and Antonio Nanni

“Description of a Mechanical Device for Prestressing of Carbon Fiber-Reinforced Polymer Sheets—Part I” describes a mechanical device used for prestressing carbon-fiber-reinforced polymer (CFRP) sheets.

Significant features of this mechanical device are

- the CFRP sheets are directly anchored to the device itself,
- prestressing is easily achieved while the device is not yet attached to the reinforced concrete beam,
- the prestressing is applied with a manual torque wrench without the need for power-operated hydraulic jacks,
- fiber-reinforced-polymer (FRP) U-wraps can be easily attached to the end of the prestressed CFRP sheets,
- the prestressing transfer is accomplished under slow strain rates.

This paper describes in detail the main features and the application procedures for this mechanical device for the flexural strengthening of reinforced concrete beams.

To investigate the feasibility of using this device for flexural strengthening, the experimental program consisted of testing seven reinforced concrete beams under a four-point bending-test setup. Test results indicate that the device was efficient in applying prestressing to the CFRP sheets and, as predicted, in comparison with the control beams, the flexural capacity and serviceability of the beams were increased after strengthening with the prestressed CFRP sheets. In “Flexural Strength of Reinforced Concrete Beams Strengthened with Prestressed Carbon Fiber-Reinforced Polymer Sheets—Part II,” the experimental and analytical results obtained from the flexural program are discussed in further detail.

ACI Structural Journal, V. 105, No. 1, January–February 2008, pp. 3–10.

Device for prestressing CFRP sheets tested

Piyong Yu, Pedro F. Silva, and Antonio Nanni

“Flexural Strength of Reinforced Concrete Beams Strengthened with Prestressed Carbon Fiber-Reinforced Polymer Sheets—Part II” outlines an investigation of the feasibility of using a device to strengthen seven reinforced concrete beams with prestressed carbon-fiber-reinforced polymer (CFRP) sheets.

In “Description of a Mechanical Device for Prestressing of Carbon Fiber-Reinforced Polymer Sheets—Part I,” the main features and the application procedures for this mechanical device are discussed. In this paper, theoretical and experimental results related to prestressing levels that can lead to debonding of the sheets immediately after transfer and during flexural testing are discussed together with the investigation on the increase in flexural capacity that results from prestressing and anchoring the CFRP sheets at the beam ends with U-wraps.

ACI Structural Journal, V. 105, No. 1, January–February 2008, pp. 11–20.

Strengthening with prestressed CFRP laminates

P. França, A. Costa, and J. Appleton

Significant research on strengthening reinforced concrete structures with carbon-fiber-reinforced polymer (CFRP) laminates has been done in recent years. The interest in prestressing this material and the evaluation of the behavior of the strengthened reinforced concrete structures are the focus of this paper. A technique of strengthening reinforced concrete slabs with prestressed CFRP laminates was tested on several T-cross-section, large-scale reinforced concrete beams.

“Prestressed CFRP Laminates for Flexural Strengthening of Reinforced Concrete Beams” establishes comparisons between the reference reinforced concrete beam and the strengthened beams with prestressed and non-prestressed CFRP laminates. To simulate the behavior of the beams, a nonlinear numerical model was used and validated by experimental results. This strengthening technique with prestressed CFRP laminates revealed a substantial improvement, both at serviceability and ultimate states, when compared with the reference beam and with the non-prestressed CFRP-laminate-strengthened beam.

Structural Concrete, V. 8, No. 1, December 2007.

ULI chronicles evolution of parking structures

Shannon S. McDonald

The Parking Garage: Design and Evolution of a Modern Urban Form examines the parking structure from an architect’s perspective. Shannon McDonald chronicles the evolution and future of parking-structure innovations from early elevator and ramp designs to the modern, sustainable structures of today.

Topics include early design issues, synergistic land-use connections, form and function, mechanization, structure and materials, parking as a building type, aesthetics, and the role of the parking structure in transportation, energy, and urban planning.

Urban Land Institute (ULI); 2007; \$87.95 for non-members; \$69.95 for ULI members.

ASCE special issue covers natural, human-made hazards

Yahya C. Kurama, guest editor



This special “Precast-Prestressed Concrete Structures under Natural and Human-Made Hazards” issue of the American Society of Civil Engineers’ *Journal of Structural Engineering* is divided into sections covering frame buildings, wall buildings, floor diaphragms, and bridge structures.

Guest editor Yahya C. Kurama is a professor in the University of Notre Dame’s Department of Civil Engineering and Geological Sciences. His editorial states that the 18 articles in this issue include “the analysis, testing, behavior, and design of precast/prestressed concrete structures under earthquakes, blast, and impact; prestressed masonry; progressive collapse; code requirements; and recent developments in precast/prestressed concrete structures under extreme loading conditions.”

Journal of Structural Engineering, V. 133, No. 11, November 2007.