Material Usage and Condition of Existing Bridges in the U.S.

Shri Bhide

This report summarizes data on the use and condition of bridges in the United States built through 1999 of reinforced and precast/prestressed concrete, structural steel, and timber. Data are extracted from the National Bridge Inventory (NBI) as of November 30, 1999, and include federal, state, county, and city bridges carrying public roads. The NBI is maintained by the Federal Highway Administration (FHWA) from data provided by highway departments throughout the United States. Tables and figures present information on both the number and deck area of existing bridges. Market share and performance of bridge materials are given by year of construction.

Portland Cement Association, 5420 Old Orchard Road, Skokie, IL 60077, September 2001, 28 pp.

Simplified Seismic Design Approach for Friction-Damped Unbonded Post-Tensioned Precast Concrete Walls

Yahya C. Kurama

This paper addresses the seismic design of unbonded post-tensioned precast concrete walls with supplemental friction dampers. In recent years, a significant amount of research has been conducted on unbonded post-tensioned precast walls because of their construction simplicity and desirable seismic characteristics, such as a self-centering capability and an ability to undergo large nonlinear lateral displacements with little damage. These displacements can be significantly reduced by using supplemental friction dampers along vertical joints between two walls. A simplified performance-based seismic design approach is introduced to reduce the maximum displacement of the walls below an allowable target displacement. Nonlinear dynamic time-history analyses of 6-, 8-, and 10-story prototype walls show that the design approach is effective in reducing the lateral displacements to prevent significant damage in the walls under maximum credible ground motions.


Special Hybrid Moment Frames Composed of Discretely Jointed Precast and Post-Tensioned Concrete Members (ACI T1.2-XX) and Commentary (T1.2R-XX)

This draft document is a proposed ACI standard and, as part of the standardization process, it is available for public discussion until December 1, 2001. The document defines procedures that can be used to design special hybrid moment frames composed of discretely jointed precast concrete beams post-tensioned to concrete columns. Such frames are suitable for use in regions of high seismicity. After a major seismic event, that moment frame can be expected to exhibit minimal damage in beam-column regions and negligible permanent displacements. This document describes the procedures that the designer must use to demonstrate through analysis that such frames have strength and toughness at least equal to those of comparable monolithic frames. The commentary describes some of the issues addressed by the Innovation Task Group and Collaborators in developing the standard.


Concrete Reaches New Heights in High Seismic Zone

This article describes special seismic-resisting features of the Paramount Apartments in San Francisco, California, slated for completion in late 2001. The structure will be the tallest concrete building in a region of high seismic activity in the United States. With a construction cost of approximately $90 million, the 39-story, 420 ft (128 m) tall building will hold 486 apartment units with a total area of 660,000 sq ft (61,000 m²). The designers combined precast and cast-in-place concrete to meet the project's aesthetic and functional demands. The project is the first significant application of the ICBO-approved Precast Hybrid Moment Resistant Frame.

Engineered Concrete Structures, V. 14, No. 2, August 2001, pp. 1-3, Portland Cement Association, 5420 Old Orchard Road, Skokie, IL 60077.

Facade Engineering: The Challenge for Structural Engineers

Stephen Ledbetter

This article explores the role and abilities of facade engineers and their relationships with structural engineers. A building's facade creates challenging design problems because they are quite complex and frequently fail during or shortly after construction. The facade engineer must be able to address the structural complexities yet maintain respect for the appearance of the building.

The Structural Engineer, V. 79, No. 11, June 5, 2001, pp. 13-14, The Institution of Structural Engineers, 11 Upper Belgrave Street, London SW1X 8BH, United Kingdom.

Hybrid Construction: The Way Forward

Mike Downing

This article discusses why the structural precast concrete industry must exploit the tremendous potential of hybrid concrete construction, citing the Toyota building near Epsom, Surrey, U.K., as an example. For owners, the value criteria in hybrid construction include aesthetics, function, construction speed, responsiveness, safety, buildability, and confidence. To overcome perceived problems, the industry must bring about a greater awareness of hybrid concrete construction's benefits.

The Structural Engineer, V. 79, No. 11, June 5, 2001, pp. 18-19, The Institution of Structural Engineers, 11 Upper Belgrave Street, London SW1X 8BH, United Kingdom.