

Guidelines for the Use of Computers for Engineering Calculations

Structural engineering practice has evolved radically in the last 20 years. Before 1980, the production of calculations was the most time-consuming aspect of design, and this slow pace provided time for the designer to think and rethink the basis of the model being used. Now, computers deliver results of calculations quickly, making a realistic representation of the structure become more apparent as the time for subconscious reflection has reduced. The result is the necessity for more formal methods for developing and assessing the reliability of computer models. This publication advocates a logical and disciplined approach to computer-assisted engineering based around a process where each stage has built-in checks, with the key components of the process being people, software, and hardware. It shows how errors in using computers for engineering design have led to drastic failures, such as the sinking of a newly constructed offshore gravity platform in a Norwegian fjord in 1990. It is shown how the procedures could have been mapped onto the platform design to identify the errors that caused the failure of the structure.

The Institution of Structural Engineers, 11 Upper Belgrave Street, London, SW1X 8BH, UK, 2002, 48 pp.

The Graphic Standards Guide to Architectural Finishes: Using MASTERSPEC® to Evaluate, Select, and Specify Materials

The purpose of this book is to facilitate a more complete understanding of the issues relevant to evaluating, selecting, and specifying finish materials and to empower architects and designers to make informed choices for their projects. When selecting materials and products and when writing specifications, designers use MASTERSPEC®, a product of the American Institute of Architects (AIA) published by ARCOM. By combining the resources of Architectural Graphic Standards and MAS-

TERSPEC, this book efficiently assists an architect who is preparing a project's construction documents.

The American Institute of Architects, John Wiley & Sons, Inc., Hoboken, New Jersey, 2002, 271 pp.

Tests of Corroded Unbonded Seven-Wire Tendons with Broken Wires

Colin MacDougall and F. Michael Bartlett

Results of tests on six 13 mm (0.5 in.) diameter monostrand tendons, each subjected to one of three aggressive treatments to accelerate corrosion and with one or two broken outer wires, are presented. The remaining prestress fractions and wire strain distributions, when compared with data from tests of uncorroded 13 mm (0.5 in.) tendons with identical geometric and mechanical properties, indicates that the behavior of the unbonded seven-wire tendons with broken wires is significantly affected by corrosion. Generally, the load-elongation response of the corroded tendons approaches that of an uncorroded tendon with no broken wires.

ACI Structural Journal, V. 99, No. 6, November-December 2002, pp. 803-818.

Transfer Length of Strands in Prestressed Concrete Piles

Baolin Wan, Kent A. Harries, and Michael F. Petrou

A top bar effect has been identified in prestressed concrete piles. The effect that this top bar has on the development of the prestressing strand is investigated. Strand transfer length is found to be proportional to the observed end slip. While the average transfer length of all strands in a section may satisfy the assumptions inherent in the ACI transfer length equation, due to the top bar effect, top-cast strand transfer lengths are considerably in excess of the ACI-calculated value. The flexural behavior of the pile,

accounting for varying transfer lengths through its section, is investigated. Finally, recommendations for in-plant testing and acceptance criteria for prestressed strand bond quality are proposed.

ACI Structural Journal, V. 99, No. 5, September-October 2002, pp. 577-585.

Post-Installed Anchors Used in Concrete

This "Specifiers' Guide" provides information on a wide product range of post-installed anchors used in both new concrete construction and repair situations. A post-installed anchor can provide structural connectivity for a variety of applications. Different mechanisms exist to achieve the structural capacity needed; the most common are mechanical (expansion or drilled-in) or adhesive (epoxy or cementitious) fastening of the bolt to the base concrete. This guide provides appropriate concrete applications for almost 50 different products made by ten manufacturers.

Structural Engineer, V. 3, No. 6, July 2002, pp. 42-45.

Avoiding Injury in Cold Weather: For Humans and for Recently-Cast Concrete

Kenneth C. Hover

Cold weather can bring out peak performance in both portland cement concrete and the human body while at the same time putting both at risk of cold weather injury. One reason for this common vulnerability to cold weather is that both freshly cast concrete and the human body are water-based systems, and are, therefore, susceptible to freezing in winter weather. Portland cement needs water to hydrate and cold weather cannot only freeze this essential water, but dry and windy winter weather can also rapidly desiccate warm, moist concrete.

Concrete International, V. 24, No. 11, November 2002, pp. 31-36.