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DISCUSSION

Proc. Paper 7386

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INFORMATION RETRIEVAL

The key words, abstract, and reference "cards" for each article in this Journal represent part of the ASCE participation in the EJC information retrieval plan. The retrieval data are placed herein so that each can be cut out, placed on a 3 x 5 card and given an accession number for the user's file. The accession number is then entered on key word cards so that the user can subsequently match key words to choose the articles he wishes. Details of this program were given in an August, 1962 article in CIVIL ENGINEERING, reprints of which are available on request to ASCE headquarters.

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7419 TORSION, SHEAR, AND BENDING ON STIRRUPED L-BEAMS

KEY WORDS: beams (supports); bending; concrete (reinforced); interactions; L-beams; moments; shear stress; stiffness; stresses; structural engineering; torsion

ABSTRACT: Test results on reinforced concrete L-beams with closed stirrups under combined torsion, shear, and flexure are reported. Emphasis is placed on beams having less longitudinal steel than required to develop the full potential shear strength of the beams, that is, beams which in the absence of torsion would fail in flexure. Based on test data an interaction surface is defined for L-beams with symmetrical top and bottom steel which checks test results closely. Stiffness in torsion before and after diagonal cracking is examined. The large drop in stiffness after initial diagonal cracking under combined loadings is examined. Measurements of strain show additional stresses in longitudinal bars resulting from torsion, but stresses of significance only after diagonal cracking. The total demand for longitudinal steel is perhaps not as great as the sum of that required for moment and torsion calculated separately.

REFERENCE: Behera, Umakanta, and Ferguson, Phil M., "Torsion, Shear, and Bending on Stirruped L-Beams," Journal of the Structural Division, ASCE, Vol. 96, No. ST7, Proc. Paper 7419, July, 1970, pp. 1271-1286.

7395 SHAKEDOWN TESTS ON STEEL BARS AND BEAMS

KEY WORDS: beams (supports); bridges; deflection; plastic design; steels; structural engineering; testing

ABSTRACT: The results of experiments on two-span continuous beams subjected to various programs of variable repeated loading are reported and analyzed. The loading program was designed to simulate the effects of a one and two point heavy load moving slowly across the beam. The experiments were performed on 1.5 in. by 0.75 in. rectangular, heat treated, steel bars and on as-rolled, wide-flange, two-span steel beams. The test results are examined in accordance with a shakedown analysis based on the "simple" plastic theory. Design implications with special reference to bridges are also considered.

REFERENCE: Eyre, Dale, G., and Galambos, T. V., "Shakedown Tests on Steel Bars and Beams," Journal of the Structural Division, ASCE, Vol. 96, ST7, Proc. Paper 7395, July, 1970, pp. 1287-1304.

7400 EXPERIMENTAL STRESSES AND STRAINS FROM HEAT

KEY WORDS: bridges; curved beams; curves; fabrication; girders; heating; highways; strains; stresses; structural engineering

ABSTRACT: To obtain information on the heat curving process for the fabrication of horizontally curved highway bridges, an analytical and experimental investigation was conducted to determine the residual stresses, strains, and curvature in a typical heat-curved girder. The analytical results were reported separately. The 52-ft-long test girder was a typical welded, A36 steel, plate girder. Residual stresses before heat curving were determined by sectioning. The remaining 46-ft-long girder was curved to a radius of 397 ft in six successive runs by using a continuous heat-curving process. Strains and temperatures were recorded during each run, and the residual stress, strain, and curvature after each run were determined. The behavior of the girder was in agreement with the analytical investigation. When compared with the experimental values, the analytical solution satisfactorily predicted the residual stresses but underestimated the residual curvature.

REFERENCE: Brockenbrough, Roger L., and Ives, Kenneth D., "Experimental Stresses and Strains from Heat Curving," Journal of the Structural Division, ASCE, Vol. 96, No. ST7, Proc. Paper 7400, July, 1970, pp. 1305-1331.