

SHEAR DESIGN OF 10,000 psi CONCRETE BEAMS WITH WEB REINFORCEMENT

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ABSTRACT

This paper presents results of an evaluation of the shear strength of high-strength concrete with shear reinforcing at levels near the minimum amount as specified by the ACI 318-83 and 318-89. This research was conducted in four stages: literature review and design of test, specimen fabrication, specimen testing, and analysis of results and conclusions. A total of nine beams ranging from 14' to 20' in span length were fabricated and tested to examine the minimum shear steel requirements for high-strength concrete. These beams were fabricated using 10,000 psi concrete. Shear span to depth ratio (a/d) and the nominal shear reinforcement index (v_s) were varied. Three beams each with a shear span to depth ratio of 3, 4, and 5 were tested. The nominal shear reinforcement index was varied from 50 to 100 psi. The beams were simply supported and tested under a two point loading system. Different types of failures were studied along with the propagation of cracks. Effects of the various parameters on the behavior of the beams are discussed in detail in the paper. Analyses of results show that the v_s minimum must be increased with an increase in the compressive strength (f_c) of the concrete used. This study also resulted in the conclusion that sudden increase of v_s minimum from 50 to 100 psi for f_c of 10,000 psi as specified by ACI 318-89 should be avoided and a smooth increasing transition be adopted.