SHEAR BEHAVIOR OF REINFORCED CONCRETE BEAMS WITH A SMALL AMOUNT OF WEB REINFORCEMENT

Songkram Piyamahant

A dissertation submitted to
Kochi University of Technology
in partial fulfillment of the requirements for
The Degree of Master of Engineering

Supervisor
Professor Hiroshi Shima

Department of Infrastructure System Engineering
Kochi University of Technology
Kochi, Japan

January 2002

ABSTRACT

In 1995, Hyogoken-nambu Earthquake destroyed many of Shinkansen viaduct structures that were a very large column section, approximately 900 mm., and a small amount of web reinforcement. With respect to this evidence, the shear strength formula was clarified in size effect but it still does not clarify the superposition method when a small amount of web reinforcement is extremely employed. Following that, the aim of this research is based on shear behavior and superposition method $V_{cr}+V_s$ by intending on a minimal amount of web reinforcement. Accordingly, 4 reinforced concrete specimens with web reinforcement ratio equal 0.035%, 0.05%, 0.065%, and 0.08% were conducted under monotonic loading. Moreover, two measuring systems for aggregate interlocking and shear resisted by web reinforcement were designed to use in investigating shear resistance mechanism. Consequently, the experiment shows that shear carrying capacity of 3 smallest amount of web reinforcement is the same and the superposition method is safe to predict the shear carrying capacity of reinforced concrete beam with a small amount of web reinforcement as shear span ratio 3.0. Similarly, other design codes also show the same degree of safety as the superposition method is employed. Not only that, but also the result of aggregate interlocking shows the same amount of stress transfer across the crack since the larger crack width corresponding to larger sliding of crack surface possesses the same stress transfer as that of smaller crack width and sliding.