

USULAN KURVA TEGANGAN-REGANGAN BETON MUTU TINGGI TERKEKANG WELDED WIRE REINFORCEMENT

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ABSTRAK

Kurva tegangan-regangan beton terkekang, serta perumusan empirisnya, telah lama dikembangkan dan diusulkan oleh para peneliti. Sampai saat ini, model-model pengekangan yang dikembangkan diperoleh dari hasil eksperimen kolom beton yang dikekang secara konvensional oleh tulangan lateral. Model-model tersebut tidak sesuai untuk kolom beton yang dikekang oleh Welded Wire Reinforcement (WWR). Dalam makalah ini, disajikan evaluasi terhadap hasil eksperimen peneliti untuk memperoleh kurva tegangan-regangan beton yang dikekang oleh WWR. Parameter yang ditinjau dalam studi ini antara lain variasi rasio diameter terhadap spasi sel (d/C_i), spasi, dan rasio volumetrik. Prediksi perilaku kekuatan dan daktilitas kolom beton mutu tinggi yang dikekang oleh WWR juga disajikan dalam makalah ini. Kurva tegangan-regangan usulan penulis dibandingkan hasil eksperimen peneliti, termasuk kurva analisis usulan peneliti lainnya. Pengaruh efektivitas pengekangan, seperti konfigurasi grid, spasi serta rasio volumetrik, pada kekuatan dan daktilitas kolom beton mutu tinggi yang dikekang oleh WWR juga dibahas. Dari perbandingan, ditunjukkan bahwa kurva tegangan-regangan beton mutu tinggi terkekang usulan dapat memprediksi hasil-hasil eksperimen dengan cukup akurat.

KATA KUNCI: daktilitas; efektivitas pengekangan; kekuatan; kolom beton mutu tinggi; kurva tegangan-regangan; model; WWR.

ABSTRACT

The stress-strain curves of concrete, including their empirical equations, have been long developed and proposed by several researchers. To date, the confining models developed were obtained from the experimental results of concrete columns conventionally confined by lateral reinforcement. These models are not applicable for concrete columns confined with Welded Wire Reinforcement (WWR). In this paper, an evaluation on the experimental results from researchers to obtain the stress-strain curves of concrete confined with WWR is presented. The parameters observed in this study are the variation of the ratio of diameter to cell spacing (d/C_i), spacing, and the volumetric ratio. The predictions on the strength and ductility behaviors of high-strength concrete columns confined with WWR are also presented in the paper. The stress-strain curves proposed by the authors are compared with the experimental results from other researchers, including their proposed analytical curves. The effects of confining effectiveness, such as grid configuration, spacing, and volumetric ratio, on the strength and ductility of high-strength concrete columns confined with WWR are also discussed. From the comparisons, it shows that the proposed stress-strain curve of confined high-strength concrete with WWR can predict the experimental results reasonably accurately.

KEYWORDS: confining effectiveness; ductility; model; high-strength concrete columns; strength; stress-strain curves; WWR.

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