PENGARUH PENAMBAHAN LIMBAH SERAT BAJA RINGAN DENGAN PRESENTASE 1% DAN 4% TERHADAP KUAT TEKAN DAN KUAT LENTUR BETON

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ABSTRAK

Seperti halnya jenis baja pada umumnya, baja ringan (*cold formed steel*) merupakan material yang mempunyai kuat tarik yang tinggi. Bahkan kuat tarik baja ringan lebih tinggi dibanding baja *hot rolled*, sehingga profil penampang baja ringan bisa lebih kecil. Standar kuat tarik baja ringan berada dikisaran 550 MPa. Penambahan serat baja ringan pada penelitian ini diharapkan mampu menambah nilai kuat lentur dan kuat tekan beton.

Mix design diperhitungkan menggunakan metode ACI 318 *concrete,* untuk selanjutnya dilakukan pembuatan benda uji silinder beton untuk kuat tekan dan balok beton bertulang untuk kuat lentur. Benda uji yang dibuat yaitu beton normal, beton serat baja ringan 1% dan beton serat baja ringan 4%. Setelah itu dilakukan perawatan benda uji dengan cara perendaman selama 28 hari. Pengujian dan analisis kuat tekan didasarkan pada SNI-1974-2011 dan kuat lentur mengacu pada SNI-4431-2011.

Hasil penelitian menunjukkan bahwa pemanfaatan serat limbah baja ringan terhadap kuat tekan dan kuat lentur beton berpengaruh secara signifikan. Nilai kuat tekan beton mengalami peningkatan pada 1% yaitu 36,66 MPa dan penurunan pada 4% yaitu 35,36 MPa, tetapi masih lebih tinggi dari beton normal yaitu 33,32 MPa. Nilai kuat lentur beton normal yaitu 14,68 MPa dan mengalami peningkatan pada 1% dengan nilai 16,71 MPa dan 4% dengan nilai 17,46 MPa. Nilai kadar optimum penambahan serat baja ringan untuk kuat tekan beton yaitu 1%, sedangkan kuat lentur beton yaitu 6% berdasarkan hasil penelitian kolaborasi.

Kata kunci: Baja, Beton, Lentur, Serat, Tekan

ABSTRACT

Like other types of steel, cold-formed steel is a material with great tensile strength, even stronger than the tensile strength of hot rolled steel, thus the cross-section profile of cold-formed steel may be smaller. The standard tensile strength of cold-formed steel is around 550 MPa. The addition of cold-formed steel fibers in this research was expected to increase the flexular strength and compressive strength of concrete.

The mix design was calculated using the ACI 318 concrete method, followed by preparation of concrete cylinders as specimens to examine compressive strength and reinforced concrete beams

to examine flexular strength. The specimens prepared were normal concrete, concrete with cold-formed steel fiber by 1%, and concrete with cold-formed steel fiber by 4%. Afterwards, those specimens were maintained by having them immersed for 28 days. The testing and analysis of compressive strength were undertaken based on the Indonesian national standard SNI-1974-2011 while for flexular strength, they referred to the Indonesian national standard SNI-4431-2011. Findings suggest that the use of cold-formed steel waste fibers has a significant effect on compressive strength and flexular strength of concrete. Concrete's compressive strength increased at 1%, which was 36.66 MPa, and decreased at 4%, which was 35.36 MPa, but it was still higher than that of normal concrete, which was 33.32 MPa. The flexular strength of normal concrete was 14.68 MPa and it increased at 1% (16.71 MPa) and 4% (17.46 MPa). Based on the findings of collaborative research, the optimum value for the addition of cold-formed steel fibers for concrete's compressive strength was 1%, while for its flexural strength was 6%.
***Keywords**: Compression, Concrete, Fiber, Flexular, Steel*