ABSTRAK

Kapasitas lentur dan geser balok merupakan dua parameter penting yang digunakan dalam perencanaan suatu struktur beton bertulang. Secara umum, respon beban-lendutan termasuk pola retak yang merepresentasikan kapasitas balok dapat dihitung berdasarkan beban maksimum yang terjadi sampai balok runtuh. Lendutan dan pola retak dipengaruhi beberapa variabel, seperti kekuatan tarik baja, kekuatan tekan beton, dan detail penulangan.

Penelitian ini bertujuan untuk meneliti kekuatan lentur dan geser dari balok beton bertulang dengan bahan beton yang berbeda menggunakan beban statis. Balok berdimensi 200x300 mm dan panjang 2000 mm dan diperkuat dengan tulangan memanjang dan tulangan sengkang seperti yang ditunjukkan pada Bab 4. Dua bahan beton yang berbeda, yaitu *high strength concrete* (HSC) dan *self compacting concrete* (SCC) yang digunakan dalam penelitian ini. Dalam penelitian ini, empat jenis balok beton bertulang dengan bahan dan detail penulangan yang berbeda diteliti untuk mengukur keuletan, kekuatan lentur dan kekuatan geser menggunakan beban dua titik.

Hasil penelitian menunjukkan bahwa nilai daktilitas semua benda uji lebih dari 1. Dalam penelitian ini, balok SCC lebih daktail dibandingkan balok HSC karena nilai daktilitasnya lebih besar. Secara teoritik semakin tinggi nilai daktilitas suatu balok, maka akan semakin baik dalam keberlanjutannya menahan beban. Nilai beban yang dapat ditahan dan nilai lendutan yang terjadi pada balok SCC lebih besar dibandingkan balok HSC. Selain itu, semua benda uji balok mengalami keruntuhan tarik. Pada kondisi ini, baja tulangan mengalamileleh terlebih dahulu sebelum beton mencapai regangan batasnya. Pola retak yang terjadi adalah retak lentur dan geser. Perbedaan keretakan pada setiap variasi balok disebabkan karena perbedaan jarak antar tulangan sengkang.

Kata kunci: Lentur, Geser, Lendutan, Pola retak, Daktilitas

ABSTRACT

Flexural and shear beam capacities as well as ductility are important parameters used in a design of reinforced concrete (RC) structure. In general, the load-displacement response including crack propagation representing the beam capacity can be computed based on the maximum applied load acting on the two-point load until the beam collapsed. The deflection and crack pattern are affected some variables, such as tensile strength of steel, compressive strength of concrete, and reinforcement detail.

The aim of this research is to investigate the flexural and shear strength of reinforced concrete beams with different concrete materials subjected to static incremental loads. The beam had a dimension of 200x300 mm and 2000 mm in length and was reinforced with longitudinal and transversal reinforcements as shown in Chapter 4. Two different concrete materials; i.e., high strength concrete (HSC) and self compacting concrete (SCC) were used in this research. In this research, four typical RC beams with different material and reinforcement detail were examined to measure their ductility, flexural and shear strengths under the two-point load.

Based on the experimental tests and referring to the load-displacement responses, the SCC beams have shown more ductile compared to the HSC beams. Theoretically, the higher ductility value of a beam, then its performance is going to be better in resisting the applied loads. In line with the aforementioned results, the strength of the SCC beams were higher than other HSC beams. As well as on the deflection result, the SCC beams have also higher than other HSC beams. urthermore, all of the beams suffered under-reinforced concrete where the reinforcing steel yielded first before the concrete reached the strain limit. The pattern of the cracks were flexural and shear cracks. The difference in cracks in each beam variation is due to the difference of stirrups spacing and concrete materials as shown in Chapter.

***Keyword**: Flexural, Shear, Deflection, Crack Pattern, and Ductility*