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Pengaruh Retrofitting Cat Fiberglass terhadap Kuat Lentur Arah Tegak Lurus (Out-of-Plane) Dinding Pasangan Bata Ringan (AAC)
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INTISARI

Dinding pasangan bata ringan *Autoclaved Aerated Concrete* (AAC) banyak digunakan sebagai elemen pengisi dan pembatas ruang karena memiliki berat sendiri yang ringan serta proses pemasangan yang relatif cepat. Meskipun demikian, karakter AAC yang berpori dan memiliki kapasitas tarik rendah membuat dinding pasangan AAC rentan mengalami retak dan keruntuhan akibat beban tegak lurus bidang (*out-of-plane*). Salah satu metode perkuatan permukaan yang dapat diterapkan secara sederhana adalah cat *fiberglass*. Penelitian ini bertujuan untuk menganalisis pengaruh *retrofitting* cat *fiberglass* terhadap kuat lentur *out-of-plane*, respon beban-lendutan, pola retak, dan mekanisme keruntuhan dinding pasangan AAC.

Benda uji berupa panel dinding pasangan AAC dengan tiga variasi, yaitu tanpa perkuatan (DBRTP), cat *fiberglass* satu sisi (DBR1FG), dan cat *fiberglass* dua sisi (DBR2FG). Setiap variasi terdiri dari tiga benda uji. Pengujian kuat lentur dilakukan dengan konfigurasi *four-point bending* mengacu pada BS EN 1052-2:1999. Data beban dan lendutan direkam menggunakan *load cell*, LVDT, dan sistem akuisisi data. Analisis dilakukan terhadap kuat lentur dengan koreksi momen akibat berat sendiri dan alat distribusi beban, persentase peningkatan kuat lentur, kurva beban-lendutan, dan dokumentasi pola retak.

Hasil pengujian menunjukkan bahwa kuat lentur rata-rata DBRTP sebesar 0,59 MPa. Penggunaan cat *fiberglass* satu sisi meningkatkan kuat lentur rata-rata menjadi 0,74 MPa atau meningkat 24,53%, sedangkan penggunaan cat *fiberglass* dua sisi menghasilkan kuat lentur rata-rata sebesar 0,91 MPa atau meningkat 54,02%. Benda uji dengan *retrofit* mampu mencapai beban maksimum lebih tinggi dibandingkan benda uji tanpa perkuatan, meskipun respons pascapuncak masih bervariasi antarspesimen. Pola keruntuhan seluruh benda uji didominasi oleh retak lentur pada daerah momen konstan. Pada beberapa benda uji *retrofit*, terlihat indikasi pelepasan lokal pada tepi lapisan. Hasil penelitian menunjukkan bahwa cat *fiberglass* berkontribusi meningkatkan kapasitas lentur *out-of-plane* dinding pasangan AAC, dengan kinerja yang dipengaruhi oleh kualitas lekatan lapisan ke permukaan acian dan kondisi lokal benda uji.

Kata kunci: dinding pasangan AAC, cat *fiberglass*, kuat lentur, *out-of-plane*, pola retak

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ABSTRACT

Autoclaved Aerated Concrete (AAC) masonry walls are widely used as infill and partition walls because of their low self-weight and relatively fast construction. However, the porous characteristics and low tensile capacity of AAC make these walls vulnerable to cracking and failure under out-of-plane loading. One surface strengthening method that can be applied in a simple manner is fiberglass paint. This study aims to analyze the effect of fiberglass paint retrofitting on the out-of-plane flexural strength, load-deflection response, crack pattern, and failure mechanism of AAC masonry walls.

The specimens were AAC masonry wall panels with three variations: unstrengthened walls (DBRTP), walls retrofitted with fiberglass paint on one side (DBR1FG), and walls retrofitted with fiberglass paint on both sides (DBR2FG). Each variation consisted of three specimens. The flexural test was carried out using a four-point bending configuration in accordance with BS EN 1052-2:1999. Load and deflection were recorded using a load cell, an LVDT, and a data acquisition system. The analysis included flexural strength corrected for self-weight and load-distribution device effects, percentage increase in flexural strength, load-deflection curves, and crack pattern documentation.

The results show that the average flexural strength of DBRTP was 0.59 MPa. One-sided retrofitting increased the average flexural strength to 0.74 MPa, or 24.53%, while two-sided retrofitting produced an average flexural strength of 0.91 MPa, or 54.02%. The retrofitted specimens reached higher maximum loads than the unstrengthened specimens, although their post-peak responses varied. The failure pattern was dominated by flexural cracking in the constant moment region. In several retrofitted specimens, indications of local peeling were observed along the coating edges. These results indicate that fiberglass paint contributes to improving the out-of-plane flexural capacity of AAC masonry walls, with performance influenced by the bonding quality between the coating and skim coat surface, and by local specimen conditions.

Keywords: *AAC masonry walls, fiberglass paint, flexural strength, out-of-plane, crack pattern*