

Performa Mekanis Botol PET Bekas sebagai Panel Lantai Struktural = Mechanical Performance of Reused Plastic Bottle as Structural Floor Panel

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Abstrak

Eksperimen dalam menggunakan kembali botol PET sebagai bahan bangunan telah banyak dilakukan, di antaranya adalah kuat tekan botol PET sebagai bata dinding eksterior (Mansour, et.al., 2015); konsumsi energi botol PET sebagai insulasi atap (Racolta, et.al., 2016); kuat tekan dan kuat lentur botol PET sebagai dinding interior (Santana, 2016); dan kuat tekan botol PET sebagai dinding dan slab (Oyinlola, et.al., 2018).

Paper ini membahas mengenai hasil eksperimen dari kuat tekan dan kuat lentur rangkaian botol PET sebagai panel lantai struktural. Rangkaian botol PET akan dieksplorasi dari aspek posisi, pengikat, pola susunan, pengisi, ukuran, dan posisi tumpuan.

Hasil eksperimen menunjukkan bahwa rangkaian botol PET lebih baik dibanding posisi, pengikat, dan pengisi lainnya. Kemudian rangkaian botol PET dengan pola dimana lebih banyak botol menghadap bawah memiliki kuat tekan lebih baik sementara rangkaian botol PET dengan pola dimana lebih banyak botol menghadap atas memiliki kuat lentur terbaik dibanding pola susunan lainnya. Sementara itu, semakin kecil ukuran dan semakin banyak penumpu rangkaian botol PET, semakin besar kuat lenturnya.

There have been many experiments regarding reusing plastic bottles, especially polyethylene (PET) as building materials. Some of them are experimenting about their compressive strength as exterior wall bricks (Mansour, et.al., 2015); their energy consumption as roof insulations (Racolta, et.al., 2016); their compressive and flexural strength as interior wall (Santana, 2016); and their compressive strength as walls and slabs (Oyinlola, et.al., 2018).

This paper discusses the compressive strength and the flexural strength of PET bottles as structural floor panels. The position, binder, pattern, filler, size, and support of the PET bottles panel will be explored in order to reach the optimum combination of compressive and flexural strength.

Experimental result shows that PET bottles panel with upright position, sealant binder and sand filler has better compressive strength and flexural strength compared to other position, binders and fillers. It also shows that the panels with more bottles face downwards have better compressive strength than other patterns, while panels with more bottles face upwards have better flexural strength than other patterns. On the other hand, the panel with smaller size and higher amount of support shows better flexural strength.