

## Pengaruh Aktivasi Mekanik Terhadap Sifat Mekanis dari Geopolimer Berbasis Kaolin = Effect of Mechanic Activation Toward Mechanical Properties of Geopolymer Based on Kaolin

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### Abstrak

Penulisan ini bertujuan untuk menyelidiki pengaruh aktivasi mekanis kaolin mentah pada kekuatan tekan akhir geopolimer.. Aktivasi mekanik dilakukan dengan metode dry ball milling pada kecepatan 250 rotation per minute selama 1 jam. Temperatur curing yang digunakan yaitu 40 oC, 70 oC atau 100 oC selama 24 jam, 48 jam atau 72 jam. Tes tekan dilakukan pada hari ke 2, 7, 14 dan 28 ageing. Aktivasi mekanik bertujuan untuk meningkatkan sifat mekanik. Hasil yang didapatkan yaitu tanpa aktivasi mekanis, kondisi curing optimal pada temperatur 70 oC selama 24 jam dan kekuatan kompresif sebesar 15 MPa setelah 28 hari ageing. Ketika diberi perlakuan mekanis, peningkatan kekuatan tekan sebesar 35% yang diperoleh dengan waktu curing selama 72 jam pada 70 oC atau dengan suhu curing 100 oC didapatkan peningkatan sebesar 76%. Pembentukan gel aluminosilikat alkali dan fase kristal terhidrasi mengendalikan perkembangan kekuatan geopolimer sementara keberadaan carbonated species bertanggung jawab atas degradasi sifat mekanik.

.....The present work aimed to investigate the influence of mechanical activation of raw kaolin on the final compressive strength of as-obtained geopolymers regarding the curing profile. A commercial raw kaolin containing 81.5 mass% of kaolin (labeled KBip) was used. Mechanical activation was performed by dry ball-milling of raw kaolin at 250 rpm for 1 h. The curing temperatures were 40 oC, 70 oC or 100 oC for 24 h, 48 h or 72 h. The compressive tests were conducted on geopolymers after the 2nd, 7th, 14th and 28th days of ageing. Mechanical activation was performed to improve mechanical properties. Results showed that without mechanical activation, the optimal curing condition was 24 h at 70 oC and the com-pressive strength was 15 MPa after 28 days of ageing. Under mechanical activation, improvement of the compressive strength was obtained with a curing time of 72 h at 70 oC (to reach 35% increase) or with a curing temperature of 100 oC (for 76% improvement). The formation of alkaline aluminosilicate gels and new crystalline hydrated phases controlled the strength development of geopolymers while the occur-rence of carbonated species was responsible for the degradation of mechanical properties.