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### Impact of initial silica modulus of sodium silicate on the compressive strength of alkaline activated fly ash based mortar

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#### ABSTRACT

This study investigates the impact of silica modulus ( $M_s = \text{SiO}_2/\text{Na}_2\text{O}$ ) on the compressive strength of (AAMFA) fly ash based mortar. Three mixtures of alkaline activated mortar C1, C2 and C3. The alkali activator solution (AAS) was comprised of sodium hydroxide (10 Mole) and sodium silicate. The sodium silicate with various initial silica modulus were characterized by their  $\text{SiO}_2/\text{Na}_2\text{O}$  molar ratio of 2.0, 2.2, and 3.3, respectively. The sample from each mixture was characterized based on the CS and microstructure changes using useful tools of XRD and FTIR analysis. The results obtained indicated that the highest CS achieved among the three mixtures were 48.23 MPa of mixture C2 prepared with  $\text{SiO}_2/\text{Na}_2\text{O}$  molar ratio of 2.2. This was mainly due to higher binder formation (N-A-S-H gel type) and a higher rate of reaction of the main source material. This result is in line with XRD and FTIR analysis results finding.

**Keywords:** fly ash, alkaline activated,  $\text{Na}_2\text{SiO}_3$ .