Supplementary Materials: Predictive Model of Setting Times and Compressive Strengths for Low-Alkali, Ambient-Cured, Fly Ash/Slag-Based Geopolymers

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Online Resource 2

Figure S1 plots the first-order derivatives of the data in Figure 6A–C from the article in order to examine the rates of change in compressive strengths. The linear extrapolations are based on the last two time points (14 and 28 days) except in the cases when excessive setting rates (60 wt% slag) resulted in non-convergence of the data. In these cases, in order to generate a non-zero slope, the time points at 7 and 28 days were used. These plots are extrapolated in order to predict these strength developments as projections of the ultimate aging times (i.e., completion of reactions) and, by extension, the ultimate compressive strengths. Such parameters can be important to engineering applications as they impact upon true capacities, assignment of safety factors, potential for size reduction, and the extended aging times in order to justify them.

Table S1 shows that the percentage error between the experimental and interpolated data is <10% except for some of the samples with the highest slag content; these samples were those for which the extrapolation was based on the compressive strength data for 7 and 28 days.

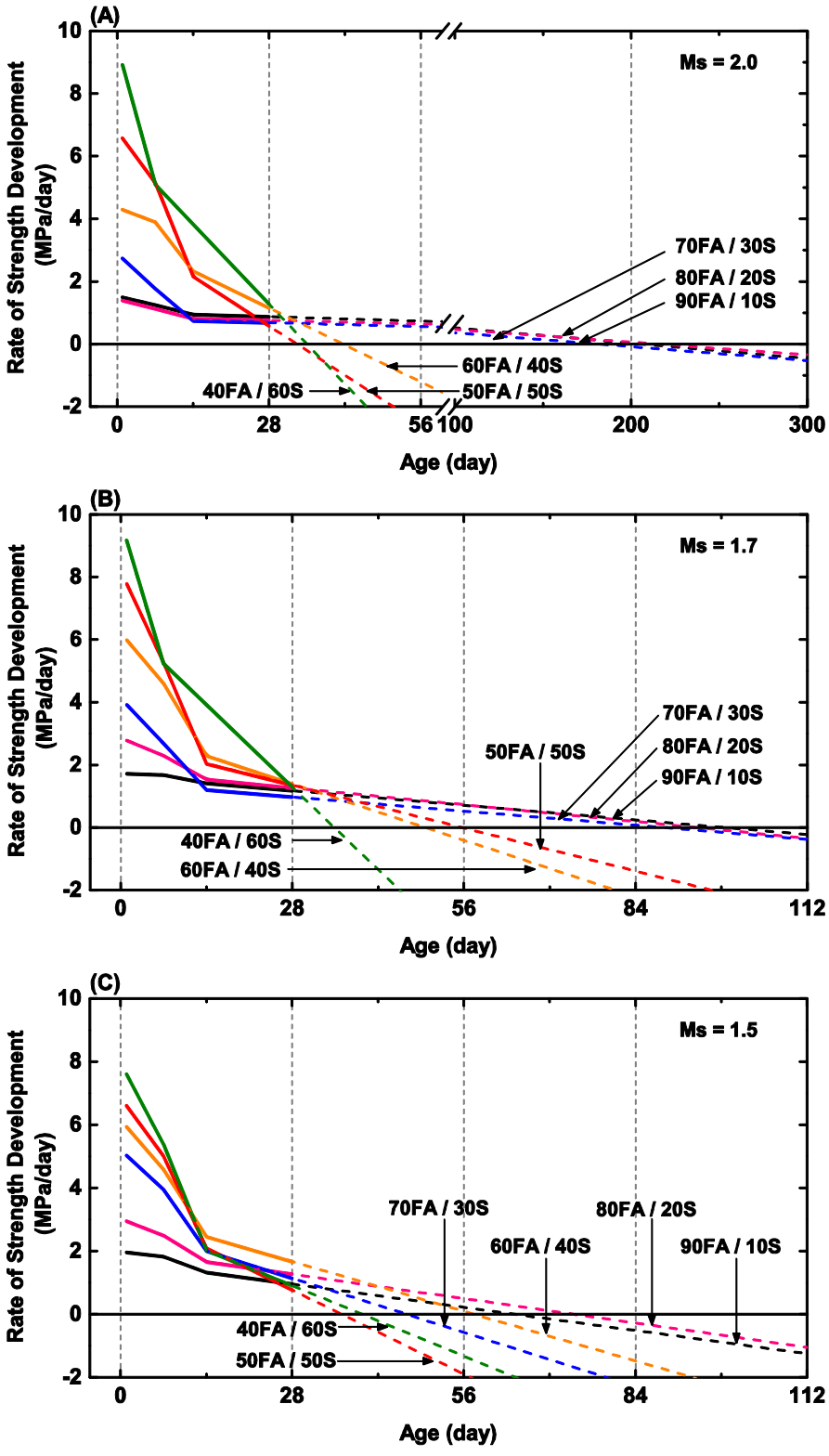

Figure S1. Rate of compressive strength development (bold lines) and extrapolated values (dashed lines) as a function of age and Ms (alkaline activator/SCMs mass ratio of 0.5, and water/binder mass ratio of 0.3) of ambient-cured geopolymer mortars. (**A**) M_s = 2.0, (**B**) M_s = 1.7, (**C**) M_s = 1.5

Table S1. Percentage error between experimental and interpolated data.

	Age (day)			
Ms = 2.0	**1**	**7**	**14**	**28**
90FA / 10S	0.0	3.9	−0.7	−1.9
80FA / 20S	0.0	3.0	−1.1	−1.4
70FA / 30S	0.0	7.4	−3.3	−3.6
60FA / 40S	0.0	2.0	4.1	−6.7
50FA / 50S	0.0	6.0	3.0	−9.8
40FA / 60S*	0.0	12.2	−13.6	−31.1
Ms = 1.7	**1**	**7**	**14**	**28**
90FA / 10S	0.0	0.6	2.4	−2.6
80FA / 20S	0.0	4.6	1.0	−4.5
70FA / 30S	0.0	7.7	−2.4	−3.2
60FA / 40S	0.0	6.3	0.8	−6.3
50FA / 50S	0.0	9.4	−2.0	−6.5
40FA / 60S*	0.0	12.3	−15.4	−31.0
Ms = 1.5	**1**	**7**	**14**	**28**
90FA / 10S	0.0	2.3	3.4	−4.6
80FA / 20S	0.0	4.2	1.2	−4.1
70FA / 30S	0.0	6.3	1.5	−6.9
60FA / 40S	0.0	6.5	0.5	−5.7
50FA / 50S	0.0	5.5	1.7	−7.8
40FA / 60S	0.0	8.0	0.0	−8.0

*Error for these mixes is greater than ±10% due to alteration of method of extrapolation.

As can be seen in Figure S1, the points at which the linear extrapolations cross the line for the rate of nil compressive strength development give the projected ultimate curing times in Figure 8A–D in the main content.