Sweet Strength: The Retarder of Cement

Reuel, Paris

Some say “if one is driving a cement mixer and is stuck in traffic, throw your soda into the mixture.” The rational for people adding sugar to cement is that it extends the time before it sets. This research both supports and refutes the saying and ultimately shows that adding sugar is highly ineffective. However amounts of sugar in Portland cement were miniscule (around .2-.5%), compared to this research which tested higher sugar concentrations to find trends in the data. It tested 6 different saccharides at 0, 2 and 4% sugar content for strength and time to solidify. This showed that the saccharides all follow the same trend that as sugar content increased both strength and set time decreased. From there, the research focused on the main binding agent in Portland cement and on one sugar (because they all followed the same trend). The sugar investigated was Glucose. The research tested the amount of time the reaction takes to come to completion by observing the change in temperature. When the temperature reaches its maximum heat it reached completion. Sugar was added to the solution in intervals of .01M until .1M was achieved. A graph was created to show that the addition of sugar inhibited the hydration of CaO. This showed that the decrease in set time in Portland cement was due to another factor other than the interaction between CaO and sugar. No matter the case, both experiments showed that the addition of sugar decreases the integrity of the cement.

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