

Progress Report #5

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Governor's School at Innovation Park

COS120: Introduction to Research

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Objectives

Over the past few weeks we have been refining our methods before experimentation. The past few weeks have had unexpected interruptions, such as snow, group members falling ill, and the SOL, thus, we weren't able to begin experimentation just yet.

Materials & Methods

At the moment, all of our materials are stored in the Governor's School storage closet. Since our last progress report, we have retrieved the needed protective equipment such as gloves and masks for our team via the Governor School's Chemistry Lab. In addition, we have observed multiple tutorials to ensure that we will be able to safely and effectively mix our cement. With our Personal Protective Equipment and all the supplies available, we are ready to begin as soon as we can. We have approximately 3 gallons of High-Strength Portland Cement, which will be enough to cast extra samples if complications arise. After reviewing our procedure for mixing and casting in detail, we are planning to start with a control sample, along with the samples containing our metallic fillers: Graphite and Iron Oxide. We will hand-mix the concrete, since it is better for smaller projects, according to Quikrete (Quikrete, 2011). Our water-to-cement ratio will be much lower than typical, due to the superplasticizer. While chosen for its effects on particle dispersion for ion pathways, it also significantly reduces the amount of water needed (Alsadey & Omran, 2022).

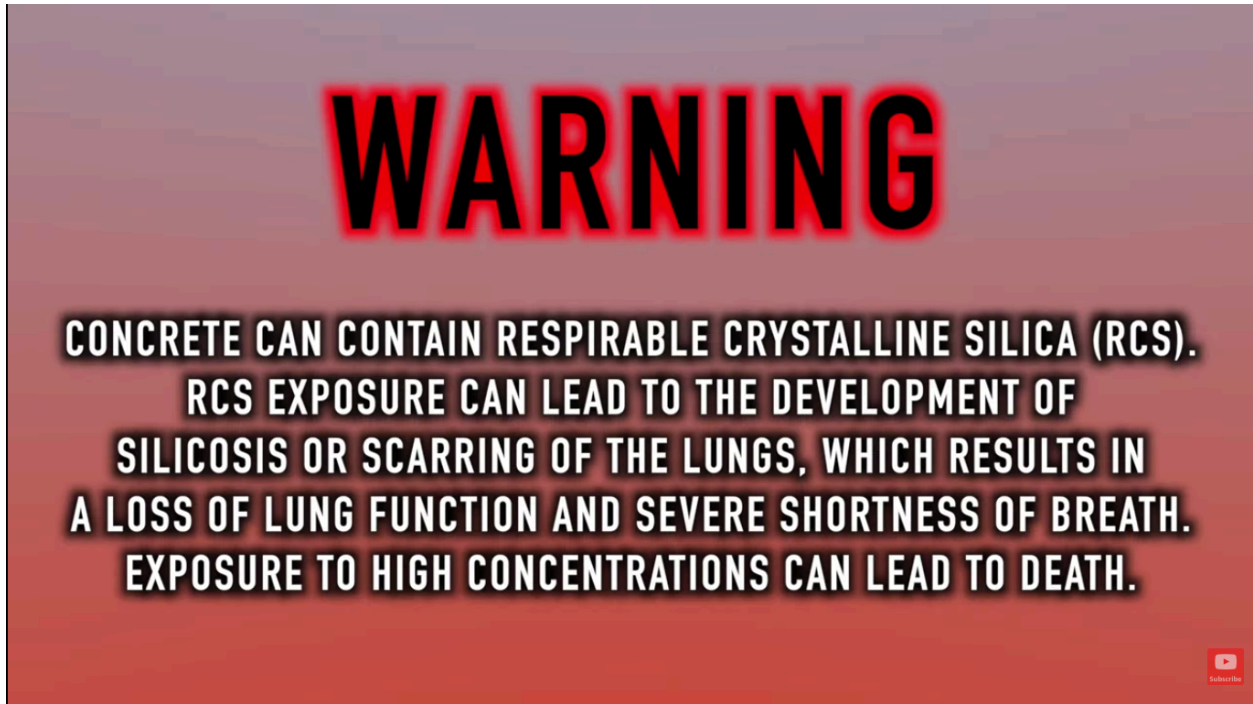


Figure 1. The image pictured above is a screenshot taken from (DIYForKnuckleheads, 2023) demonstrating cement mixing procedures as well as precautions to take.

Data/Results

Unfortunately, we have not yet been able to begin physical experimentation during this reporting period. Data collection will begin in the next phase of the project. Results, including Seebeck voltage readings, estimated Seebeck coefficients, and electrical conductivity comparisons across filler types, will be recorded and analyzed upon the molding and curing of our samples.

References

Alsadey, S., & Omran, A. (2022). Effect of Superplasticizers to Enhance the Properties of Concrete. *DESIGN, CONSTRUCTION, MAINTENANCE*, 2, 84–91.

<https://doi.org/10.37394/232022.2022.2.13>

DIYForKnuckleheads. “The SECRET to Mixing Concrete by Hand Revealed!” *YouTube*, 6 Mar.

2023, www.youtube.com/watch?v=WoAqaRcXMAA

QUIKRETE. (2011, February 23). *How to Hand Mix QUIKRETE® Concrete*. YouTube.

<https://www.youtube.com/watch?v=ANkPGzAEAHI>