

**Abstract**

This research study is a pilot paper that humbly aims to establish the statistical correlation between the concentration of crystalline silica and the concentration of respirable dust for concrete polishing operations in the construction industry. Also, the study sought to find a linear regression model that would predict the value of crystalline silica concentration given a breathable dust concentration value for concrete polishing operations. The study also seeks to establish the intervals with 95% confidence in which the average values and individual values of crystalline silica concentrations were found given a respirable dust concentration value.

The limited resources allowed only 10 personal samples to be taken from workers performing concrete polishing operations following the NIOSH 7500 and NIOSH 600 sampling and analysis methodology. The samples were taken in three projects, at different times, in each sample two variables were analyzed; concentration of breathable dust and concentration of crystalline silica in  $\mu\text{g}/\text{m}^3$  at Bureau Veritas laboratories in Canada and the United States. Statistical analysis of sample results found that there was a linear correlation between the concentration of crystalline silica and the concentration of breathable dust, obtaining a Pearson correlation coefficient of  $r_p = 0.957898$ . It was also subjected to statistical analysis and scenario compliance testing for the linear regression model that relates crystalline silica concentration and breathable dust concentration. Also, statistical models calculate the errors of linear regression that will allow to establish the intervals with 95% confidence in which the average values and the individual values of the crystalline silica concentration ( $\text{mg}/\text{m}^3$ ) were found given a respirable dust concentration value ( $\text{mg}/\text{m}^3$ ) for concrete polishing operations.

Considering the absence of laboratories in our country and the high cost of crystalline silica analysis, this work is a first attempt to help workers and employers in the construction industry assess exposure to crystalline silica when performing concrete polishing operations only by knowing the respirable dust concentration.

**Keywords:**

Crystalline silica, breathable powder, concrete polishing, correlation, linear regression, Pearson coefficient, silicosis, confidence interval, descriptive statistics, statistical inference