WHAT DOES NIOSH THINK ABOUT ALL OF THIS? A FEDERAL RESEARCH AGENCY'S PLANS TO STUDY SEVERAL SUBSTITUTE ABRASIVES

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Abstract: NIOSH describes its plans to collect health-related, economic, and technical data for silica sand and several substitute abrasives in a laboratory and at selected field site(s).

PROJECT GOAL

This paper will describe the NIOSH project entitled "Evaluation of Substitutes for Silica Sand in Abrasive Blasting." This project is quite distinct when compared to most other NIOSH or abrasive blasting projects.

The long-term goal of this project is to develop comparative health-related, economic, and technical data regarding silica sand and eleven substitutes for silica sand which could help prevent silicosis and deaths from sandblasting. This information could accomplish this goal by persuading abrasive blasting end-users to increase the use of substitutes for silica sand, and hence, decrease the use of silica sand in abrasive blasting.

PROJECT SUMMARY

This project will examine a particular control technique - substitution. Health-related, technical, and economic data will be collected and reported for silica sand and at least eleven substitutes for silica sand in an abrasive blasting laboratory or enclosed booth and at selected field site(s). A third report will be provided that compares the data from the laboratory to the field site(s).

ABRASIVES LISTING AND SELECTION FACTORS FOR EACH ABRASIVE

The eleven substitutes that will be studied along with silica sand in this project are: silica sand treated with a dust suppressant, garnet, staurolite, coal slag, copper slag, nickel slag, olivine, crushed glass, iron oxide, aluminum oxide, and steel grit. The selected abrasives must be the most representative of the abrasive blasting industry and appropriate for the abrasive blasting laboratory and the field site(s) that are selected for this study. The selection factors for each abrasive must include, but not be limited to: (1) manufacturer/distributor, (2) trade name or brand, and (3) grade and mesh. Other abrasives may be added to this list.

TYPES OF DATA COLLECTED

The health-related data that is studied must include, but not be limited to: (1) total dust, (2) respirable crystalline silica dust, (3) radioactivity, and (4) several elements such as arsenic, beryllium, cadmium, chromium, lead, manganese, and nickel.

The technical and economic factors must include, but not be limited to: (1) profile, (2) price per ton of delivered abrasive, (3) number of reuses or recyclability, (4) equipment cost, (5) labor cost, (6) cleaning rate in square feet per hour, (7) disposal cost, and (8) a total operating cost which incorporates all of these factors. Other technical or economic factors that may be.

EXPERIMENTAL DESIGN FACTORS

The substrates that are blasted upon and the contaminants that are attached to these substrates, the standard visual or other appropriate specification that will be used to indicate that the abrasive blasting operation for each test is completed must be common to the abrasive blasting industry. A typical example of a common substrate and attached contaminant might be new maintenance painting projects with commercial grade hot-rolled carbon steel previously coated with a film of lead. A typical common visual standard might be the SSPC-SP10 "Near-White Metal" condition.

The factors that must be controlled to ensure that all

test results are valid must include, but not be limited to: (1) the total area of the substrate that must be blasted upon and the duration and number of blasts and (2) the experience and number of blasting operators if human intervention is involved.

TYPES OF SAMPLES COLLECTED

The following types of samples will be collected and sent to the project officer at NIOSH: (1) pure bulk samples of each abrasive before blasting has commenced, (2) bulk samples of the abrasives that have been contaminated as a result of blasting on the substrate, (3) samples of airborne dust, and (4) a piece of the substrate that is blasted upon. The samples will be used by NIOSH for health-related research that requires freshly fractured abrasive blasting samples, contaminated samples, and samples that are representative of the abrasive blasting industry.

LABORATORY DESIGN

The controlled abrasive laboratory or enclosed booth must simulate an actual common abrasive blasting operation and attempt to control environmental variables such wind velocity and direction, temperature, and humidity so as to provide a homogenous environment whereby the difference in the comparative data are caused only by the abrasive that was used. The most appropriate cleaning procedure must be used when changing from one abrasive to another to ensure that the previous abrasive will not contaminate the test results for the next abrasive.

FIELD SITE(S) SELECTION AND DESIGN

The field site(s) study will take place in actual work sites in which abrasive blasting is normally undertaken so as to be representative of the industry. The same factors that are used in the laboratory study will be used in the field site(s) study. The laboratory study has the advantage of greater control of environmental variables. However, the selected field site(s) study should be more representative of actual abrasive blasting conditions in the real world, but have less control of these environmental variables.

DELIVERY SCHEDULE FOR PROJECT REPORTS

As previously mentioned, a report will be provided which compares the data gathered from the laboratory study to the field site(s) study. Currently, a contractor has submitted a draft protocol for the design of the laboratory. This draft protocol is being reviewed by the project officer at NIOSH. The laboratory report will be completed during September, 1996. The field site(s) study report will be completed during September 1997, and the comparative report will be completed during January 1998.

CLOSING

Although the draft protocol for the laboratory study has been submitted at this time, NIOSH encourages any comments and suggestions that may assist us in our effort to develop the comparative health-related, economic, and technical data regarding silica sand and eleven substitutes for silica sand that have been described in this paper.

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