

Applied Semiotics

Communicating Silica Hazards Using New Best Practice Safety Sign Standards

Crystalline silica can be found in abundance in the world around us—in granite rock, quartz, sand and soil. But when crystalline silica is breathed into the lungs as a dust or fine powder, it can cause silicosis—a nonreversible and sometimes fatal lung disease. Crystalline silica has also been linked to kidney and immune system diseases, cancer and other respiratory diseases. Many common workplace activities in the construction industry have the potential to place workers at risk of exposure to **crystal-**

The new signage's goal is to give workers the precise knowledge they need to avoid silica dust hazards.

line silica hazards, including but not limited to, tunneling, dry sweeping, stonemasonry and rock drilling. According to OSHA statistics, silica exposure is a serious threat to nearly 2 million workers in the U.S. with more than 100,000 workers classified in what are considered to be “high risk” jobs.

The good news is that two things can help substantially reduce injuries and deaths related to this hazard: 1) increase awareness of the hazard and 2) define and implement proper workplace procedures that use specific PPE. Safety signage can help accomplish both of these tasks. This article explores how it is possible to achieve better safety communication in the construction industry through the development of new silica hazard safety signs that embody the latest ANSI Z535 safety sign standards and semiotics (the science behind how signs and symbols communicate).

First, let us look at what is typically found in today's workplace. Figure 1 is a dust hazard sign configured to meet the **OSHA 1926.200** Construction Safety and Health regulations. Most safety professionals are unaware that this regulation's sign designs are based on the 1968 ANSI Z35.1 Standard for Accident Prevention Signs, the standard OSHA first used in 1971 to base its regulations for safety signs (1910.145). This regulation states that employers must identify potential hazards in their workplace. By their definition, the OSHA-style signs are overly simplified in their content when compared to the new ANSI standards, and they rarely use graphical symbols—a best practice that is rapidly being adopted for all types of warning messages worldwide.

Safety professionals should be aware of the fact that, as David Michaels, assistant secretary of labor, explained at ASSE's Safety 2012 in Denver, CO, OSHA recognizes the fact that its citations of standards are completely out of date and safety professionals would be

well-advised to use the latest best practice ANSI standards as their go-to resource for improving workplace safety. In the case of safety signs, this standard is ANSI Z535.2-2011 Standard for Environmental and Facility Safety Signs, which counts the old Z35.1 standard as its basis document, thus allowing its use to be acceptable for meeting OSHA regulations.

It is clear that employers have a responsibility to post safety signs in work areas where potential hazards exist and that the ANSI Z535.2 standard should be used for sign designs. This is the starting point because current societal expectations go beyond giving employees merely the “right to know” that a hazard exists. People want to know precisely what the hazard is and how to avoid it. The new ANSI Z535.2 sign technology yields a content-rich safety sign that employs graphical symbols, standardized severity level color-coding and carefully chosen wording to meet this objective. The difference between a well-designed ANSI Z535.2 sign system, when compared to the OSHA-style signs, is day and night.

Now, to the hazard at hand, respirable silica dust. What should the new sign look like? The new signs will not be identical, meaning you will not see the same sign everywhere silica dust hazards are present. This is because intelligent thought needs to be put into defining and displaying specific safety procedures, hygiene rules and PPE requirements related to this hazard, and these things can vary depending on the specific work environment and different companies' rules and best practices. Tailoring the signs to meet specific company/work area needs is the right course of action because the new signage's goal is to give workers the precise knowledge they need to avoid silica dust hazards. Having said this, the new signage should share common elements. Because people's recognition of hazards should be global in scope, the logical starting point for the consistent recognition of silica dust hazards is that silica dust safety signs should use the same graphical symbols.

The new silica hazard sign (Figure 2) incorporates both the ISO symbol for “wear respirator” and one of the new Globally Harmonized System (GHS) symbols—the “Health Hazard” symbol. This GHS symbol will soon be used worldwide in the chemical products industry to indicate a range of standardized meanings, including Carcinogen, Mutagenicity, Reproductive Toxicity, Respiratory Sensitizer, Target Organ Toxicity and Aspiration Toxicity. This symbol's visual representation captures the respiratory nature of silica hazards. While other older symbols could have been used, use of the GHS symbol will help reinforce the GHS initiative

Figure 1 Old OSHA-Style Safety Sign



Figure 2 New ANSI-Style Silica Dust Safety Sign



as the right global method for communicating this type of hazard. Use of this symbol on silica dust hazard signs will also help employees become increasingly aware of the GHS symbol and its “respiratory hazard” meaning, which will help in the recognition and understanding of all types of health-related hazard signs.

The second element that could be standardized with this sign is the choice of signal word, in this case, WARNING. The ANSI Z535.2 standard is clear in its definitions for the use of the three kinds of hazard alerting signal words, DANGER, WARNING and CAUTION. WARNING is to be used when interaction with the hazard “could” result in serious injury or death. DANGER is to be used when interaction “will” result in serious injury or death. And CAUTION is used when minor or moderate injury could result. At this point in time, most research is showing that illness or death “could” result from exposure to silica dust, and so WARNING is the proper choice for signal word, both in terms of probability and severity of injury as defined by ANSI Z535.2.

Lastly, the new sign should use text and/or symbols to communicate all three of the content elements defined by the ANSI Z535.2-2011 standard for hazard-alerting safety signs:

- the nature of the hazard;
- the consequence of interaction with the hazard;
- how to avoid the hazard.

The ANSI Z535 committee did not invent these content items. They have been developed over the last several decades by U.S. courts as the definition for what constitutes an “adequate warning” for product manufacturers. Now we are seeing this same legal measure for warnings being applied to premises—like beaches and swimming pools—where the public could be exposed to hazards. It makes perfect sense to apply this same standard for “adequacy” of information to workplace safety signs, and this is exactly what the 2011 ANSI Z535.2 standard has done. This is the information people need to know to make good decisions to avoid hazards.

So back to the example of a new silica dust hazard sign as shown in Figure 2. It defines the hazard, the

consequence of interaction with the hazard and precisely how to avoid the hazard. It uses both text and universal symbols to achieve effective communication. And that is the objective.

Industry-wide use of these ANSI Z535.2-2011 principles for all hazard-alerting safety signs will provide the construction industry with a standardized means to more effectively communicate substantive safety messages to employees, visitors and the public. Just as important, using the newer ANSI standards will bring the construction industry in line with the adoption of the ANSI Z535.2 safety sign standard that is taking place in a wide variety of industries throughout the country. When completed, this movement will have established an ANSI Z535-based national uniform system for hazard recognition that will better protect people at work, in public places and at home (the ANSI Z535.4 Standard for Product Safety Signs and Labels uses the same safety sign criteria and formats as are used by the ANSI Z535.2 Standard for Environmental and Facility Safety Signs).

As a follow-up to this article, please submit safety issues you think could benefit from the development of a new 2011-ANSI Z535 compliant safety sign. Subsequent Blueprints articles will feature the “old” and “new” signs so CPS members can see the benefits of using the new standards to achieve specific safety communication objectives. Our overall goal in this effort is to help the construction industry establish new benchmark safety signs that both meet the latest standards and use the best practice design principles of semiotics to communicate safety. To submit your ideas, click [here](#). ☺

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