



Material safety data sheets

Who uses them?

Neal Langerman

The MSDS program is working, but not the way OSHA intended

In 1983, the U.S. Occupational Safety and Health Administration (OSHA) published a Final Rule (29 CFR 1910.1200) entitled the Hazard Communication Standard, which was intended to improve the safety of employees by providing them with needed chemical safety information in the form of labels, material safety data sheets (MSDSs), and training. Since the 1983 promulgation of the standard, industry has developed a large infrastructure committed to compliance with this regulation. Although OSHA has published several substantive amendments to the 1983 rule, the overall intent and effect have not changed: Industry, academia, and government must ensure that chemical containers are properly labeled and that current MSDSs are reasonably available to employees.

The infrastructure that manages the MSDS requirements includes specialists who develop these technical documents; a distribution system composed of chemical manufacturers, distributors, and importers; and end-user employees who are responsible for maintaining and distributing a library of MSDSs for each affected employer. In some cases, the end-user task is relatively simple: A California-based food-processing company, for example, has 12 MSDSs for its operations. In other cases the task is overwhelming: A Chicago-based research facility

has more than 41,000 MSDSs representing the various chemicals on site.

In addition to the distribution and management structure, an entire training and educational support industry has been developed to ensure that employees are sufficiently trained to read and understand the MSDSs for the chemical products they use in their daily work.

Compliance with this regulation is expensive. In 1992, Chemical Safety Associates (CSA) began to examine the impact of MSDSs on workers. We decided to evaluate MSDS use as a reasonable measure of the overall effectiveness of MSDSs. Our hypothesis was that if employees were using MSDSs regularly to obtain safety and health information, the OSHA program was performing as intended and helping workers be more aware of potential chemical hazards. We expected that if MSDSs were not being used by employees, the benefit of these documents was lost, and the basic objectives of the OSHA program are suspect.

The survey

We used a survey questionnaire to collect the data for this study. All of the questions (see box) except one were multiple choice to make it easy for respondents to complete the survey and to facilitate data analysis. The questions were designed to determine

job functions and to determine how respondents used MSDSs. We defined MSDS use to exclude structured training sessions related to MSDSs; we specified that use meant an employee's referring to an MSDS to obtain information about a chemical.

Questionnaires were distributed during training programs that CSA conducted in various company's facilities or during "open-registration" seminars sponsored by CSA during 1993 and part of 1994. A total of 349 respondents contributed to the study. They represented a variety of employment categories: environmental affairs (53 people), safety (25 people), health or medical (23 people), hazardous waste management (34 people), manufacturing or production (100 people), emergency response (98 people), and other job functions (16 people). This population included employees who actually work with chemicals in addition to environmental, safety, and health specialists.

What we learned

Questions 1 and 2 were intended to obtain information about chemical use at each facility. To supplement the survey, we asked for information from company officials about the actual number of chemicals used. When this information was compared with the responses to Question 1, we found that the typical employee overestimated the number of chemicals on site. In response to Question 2, most employees estimated that 10-100 chemicals can be found in their assigned work areas. This tendency to overestimate the number of chemicals does not seem to affect employee attitude or the MSDS program. We believe that employees generally do not feel threatened by their place of employment, and those who work with chemicals normally do not experience excessive fear of chemicals.

According to survey participants' answers to Question 3, MSDSs for the chemicals in their assigned work area were readily available (Figure 1). The methods for MSDS distribution within a facility varied greatly. Almost half (46%) of the respondents had MSDSs available in their work area, 28% had access in a central library, 15% had access in both a central library and nearby

MATERIAL SAFETY DATA SHEETS (MSDSs) have been required to be readily available in the work place since the Hazard Communication Standard (29 CFR 1910.1200) was issued by OSHA in 1983. According to OSHA, the purpose of the MSDS is to provide employees with information needed to work with chemicals safely. Please help CHEMICAL SAFETY ASSOCIATES (CSA) assess the effectiveness of the MSDS program.

This is a confidential survey. Please answer the questions to the best of your knowledge and ability. Thank you for your cooperation.

1. What is **your estimate** of the number of chemicals and trade name products your company has at this location?

- a. More than 1000
- b. 500-1000
- c. 100-500
- d. Less than 100

2. What is **your estimate** of the number of chemicals and trade name products that are in your immediate assigned work area?

- a. 0-10
- b. 10-100
- c. 100-1000
- d. More than 1000

3. What is **your estimate** of the percentage of the chemicals in your immediate assigned work area for which MSDSs are readily available?

- a. 100%
- b. 98-100%
- c. 90-98%
- d. 75-90%
- e. I do not have any idea

4. At my company, MSDSs are available (mark all applicable):

- a. In a binder located in my immediate work area
- b. In a central library
- c. In both a central library and a nearby satellite library
- d. Via an online access system
- e. Other (please describe)

5. I last received training on MSDS use _____ months ago.

- a. 1-3
- b. 4-6
- c. 7-9
- d. 10-12
- e. More than 12

6. I last referred to a MSDS for information either I or a co-worker needed (for other than training purposes) _____ months ago.

- a. 1-3
- b. 4-6
- c. 7-9
- d. More than 9
- e. Never

7. When I refer to an MSDS for information, I generally **DO** or **DO NOT** find the information I need.

- a. Do
- b. Do not

8. The information on most MSDSs is

- a. Generally at the correct technical level
- b. Too technical
- c. Not technical enough

9. I find most MSDSs

- a. Filled with jargon and incomprehensible
- b. Readily understandable
- c. Written in a manner I cannot easily understand
- d. Difficult to follow
- e. a, c, and d

10. I think the MSDS program at my company is meeting the OSHA intended purpose (see top of the survey for a summary of the OSHA intended purpose).

- a. True
- b. False

11. Do you work in one of the following departments?

- a. Environmental Affairs
- b. Safety
- c. Health or Medical
- d. Hazardous Waste Management
- e. None of the above

12. If you answered "None of the above" in question 11, please indicate your department or primary assignment. _____

Thank you for your cooperation.

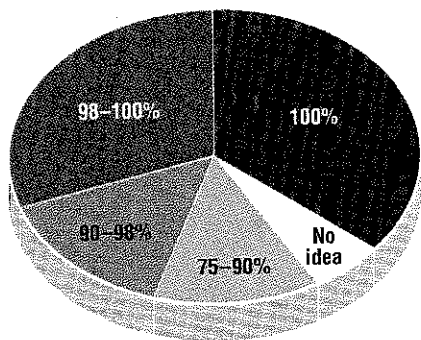


Figure 1. Question 3 results: Percentage of chemicals in the work area for which MSDSs are available.

satellite library, and only 12% of the respondents indicated that MSDSs were available via computer (Question 4).

The last statistic is interesting because more than 80% of the companies covered in the survey have some form of network distribution of computer capability, which allows electronic distribution of MSDSs. Various safety and health professionals at these companies told us that the lack of a convenient method of transferring MSDS content into a database was the major issue preventing implementation of online MSDS distribution. The other frequently cited reason was the potential to incur liability for the MSDS information if any changes were made when transferring the data into electronic format.

Questions 5 and 6 were designed to examine MSDS training and use practices: the number of months since the employee was last trained on the use of a MSDS (Figure 2) and the frequency of MSDS use to obtain actual information (Figure 3). The training responses suggested, but did not prove, that employers were of the opinion that documented training met the performance standard concept of the Hazard Communication Standard. OSHA, in its 1910.1200 Compliance Document, clearly indicates that training alone is not sufficient.

At first glance, it appears that employees are frequently seeking information from MSDSs. Closer examination of the survey results, however, shows that more than 75% of the 152 respondents who had referred to MSDSs within the three months before the survey were health, safety, or environmental specialists, whose jobs

required them to access and use information generally found on MSDSs. Among the nonspecialist employees, more than 50% either had never used an MSDS or had not referred to one in more than nine months. This was the most disturbing finding of the study because it indicates that the Hazard Communication Standard is not achieving its stated purpose: providing information to the employee. MSDS use at locations with electronic distribution did not differ discernibly from those locations with traditional paper distribution methods.

Responses to Question 7 indicate that the information needed is on the MSDSs, if the employee looks for it. Respondents also thought that the information is generally at the correct technical level (Question 8), although one-third of them found the information "too technical." Almost half of the respondents (48%) said that the MSDSs were written in a manner that made comprehension difficult (Question 9). This figure increased to more than 85% when the health, safety, or environmental specialists' responses were removed from this question.

After we obtained the data, we interviewed employees to try to understand their reluctance to refer to MSDSs more frequently. Our experience at a large electronics manufacturing facility suggests that simple employee apathy may not be the explanation. We talked with a group of chemical handlers, 10 employees who routinely worked with large volumes of concentrated mineral acids. They indicated that they knew the acids were corrosive, "so why look at the MSDSs?" When asked if they thought that periodic review of the MSDS would refresh their understanding of potential health effects, they again cited the corrosiveness of the acids and argued that they really didn't need additional information. These employees expressed an observation, consistent with the survey results (Question 10), that the MSDS program at their company was doing an adequate job of meeting OSHA's stated purpose.

Is it working?

Review of the results of this study indicate that the MSDS program is very effective in providing company health,

safety, or environmental specialists with the information needed to perform their jobs. However, it is not very effective in communicating hazard information to the workers who actually use the chemicals. The reasons for this appear to be more related to comprehension of the MSDS content than to distribution. One factor that may alleviate this situation is the development of a recommended MSDS format that has been formally adopted by ANSI (ANSI Z400.1 MSDS Standard). The industry-consensus standard (not an OSHA regulation) calls for MSDS content to be organized into four sections; the most immediately needed information is located near the front of the MSDS.

The ANSI standard format, however, probably will not increase the number of workers seeking hazard information voluntarily. In this aspect, the survey results indicate that the MSDS portion of the Hazard Communication Standard is not successful in communicating information to employees.

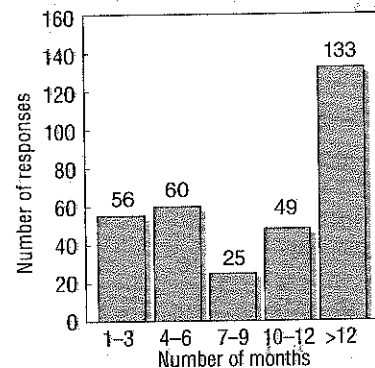


Figure 2. Question 5 results: Number of months since last MSDS training.

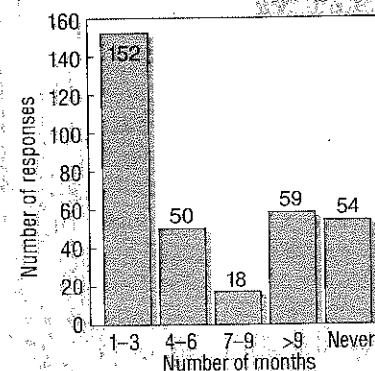


Figure 3. Question 6 results: Number of months since last MSDS use.

Is the Hazard Communication Standard working effectively? The direct results of this survey suggest the answer is "no"; but this is too simple a response. For the people who really need to understand the information on MSDSs for their own well-being—those who handle chemicals on a day-to-day basis—the current system does not work. However, by providing technical information to company officials who are charged with developing and implementing health and safety programs, the availability of MSDSs indirectly does help protect every employee.

What can be done to improve employee use of MSDSs? Probably the most important action can be taken with no regulatory change, and at only a minor cost to employers: Increase the frequency of training designed to enhance understanding of the information in the MSDSs. Implement a program that would have line supervisors review one or two key MSDSs with affected employees on a regular basis. Supervisors could review the potential physical hazards and the acute and chronic health effects for each chemical with affected employees once each year. The cost for a workplace that routinely handles 12 chemicals would be 30 min each month. We believe this is a reasonable and effective way to encourage workers to exercise their right to know.



Neal Langerman, a DivCHAS member, received his bachelor's degree in chemistry from Franklin and Marshall College and his Ph.D. in physical chemistry and thermodynamics from Northwestern University. In 1980, he helped establish Chemical Safety Associates (9163 Chesapeake Dr., San Diego, CA 92123-1002; 619-565-0302). A registered environmental assessor and a certified environmental inspector, he consults with many companies worldwide to improve chemical-handling practices, develop emergency response teams, and upgrade industry safety practices. ●

Firefighting, continued from p. 11

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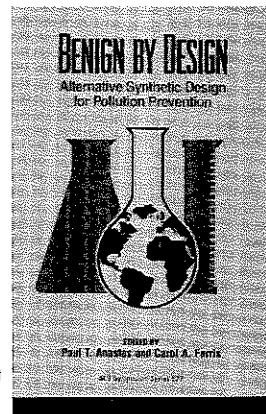


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