

May 1992

OCCUPATIONAL  
SAFETY & HEALTH

Employers'  
Experiences in  
Complying With the  
Hazard Communication  
Standard



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**Human Resources Division**

B-243568

May 8, 1992

The Honorable Dale L. Bumpers  
Chairman, Committee on Small Business  
United States Senate

The Honorable Norman Sisisky  
Chairman, Subcommittee on Exports,  
Tax Policy, and Special Problems  
Committee on Small Business  
House of Representatives

As you know, the Hazard Communication Standard (HCS) requires employers to identify workplace chemical hazards and communicate this information to employees. First promulgated for the manufacturing sector in 1983, HCS was extended to nonmanufacturing employers in 1987. HCS is administered by OSHA, an agency of the U.S. Department of Labor.

In response to your request and after discussions with your offices, we examined (1) the difficulties small employers report they are experiencing in complying with HCS, in particular with the material safety data sheet (MSDS) requirements,<sup>1</sup> and (2) the methodology underlying OSHA's estimates of costs for small employers in nonmanufacturing industries to comply with the MSDS requirements. Consistent with your request, we focused on small employers, although we collected information on employers of all sizes. (In our 1991 report, we responded to other questions you asked about HCS.<sup>2</sup>) We presented our preliminary results in a briefing with your offices on October 24, 1991. Our final results appear in this report, which includes the charts used in that briefing (see app. I).

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<sup>1</sup>Typically, the MSDS is a 1-5 page document detailing, among other information, the chemical's properties and hazards and precautions for its safe use and handling. For examples of MSDSs, see Occupational Safety & Health: OSHA Action Needed To Improve Compliance With Hazard Communication Standard (GAO/HRD-92-8, Nov. 1991).

<sup>2</sup>GAO/HRD-92-8.

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## Results in Brief

Of the small employers (those with fewer than 20 employees) we surveyed who appeared to be complying with the Hazard Communication Standard,<sup>3</sup> almost 70 percent reported little difficulty with either of the two MSDS requirements. However, almost 80 percent of such small employers reported problems complying with HCS's training requirements. Over half of small employers reported some cost increases to comply with HCS's paperwork/clerical requirements, but fewer than a fifth reported "great" or "very great" cost increases.<sup>4</sup>

Although OSHA's general approach to estimating the cost to nonmanufacturing employers of complying with the MSDS requirements is sound, the estimates derived from the cost model depend on the assumptions OSHA made about the values of the variables. Because of data limitations, we did not assess the accuracy of most of the numerical values OSHA assumed in its cost calculations. In one case, OSHA appears to have understated the compliance costs by excluding nonwage benefit costs such as pensions and health benefits from its wage rate variables.

About 45 percent of all employers appearing to comply believed that, on balance, HCS had been beneficial for workers, compared with about 9 percent who reported that HCS had a net negative effect and 36 percent who said it had equally positive and negative effects or none at all. Nevertheless, over 56 percent of all such employers reported a "great" or very "great" improvement in the availability of hazard information in the workplace and in management's awareness of workplace hazards. Also, about 30 percent of the employers said they replaced hazardous chemicals used in their workplaces with less hazardous ones because of information they received on an MSDS.

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<sup>3</sup>We define as appearing to comply with HCS those employers who received MSDSs and provided information to us indicating compliance with the MSDS, labeling, and training requirements. Employers who appeared to be in noncompliance with HCS tended to report less serious difficulty or lower cost increases with HCS. To avoid misstating the actual extent of compliance difficulties and related cost increases, we focused on employers appearing to comply with HCS. Because we did not determine whether employers maintained a written hazard communication program, we did not ascertain actual compliance.

<sup>4</sup>To obtain employers' perceptions concerning HCS's effect on their business operation costs, we asked for what they considered to be the most appropriate responses to several questions regarding the cost impact of various aspects of HCS. These responses ranged from "not at all," "little," "somewhat," "moderately," "greatly," to a high of "very greatly." (See app. II and IV.) We did not obtain actual employer cost data.

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## Scope and Methodology

To answer your question about employers' experience with HCS, we (1) conducted a nationally representative survey of about 2,000 construction, manufacturing, and selected service industry employers, (2) interviewed representatives from five drug and chemical distributor employers, and (3) interviewed OSHA officials about HCS compliance issues.

We surveyed a random sample of employers in three industry groups (manufacturing, construction, and selected service industries) listed in the national data base maintained by the U.S. Small Business Administration as of July 1990. Our results are weighted so that our estimates describe the information we would have obtained had we surveyed the universe of employers in that data base. Because we wanted to compare the experiences of employers of different sizes, we stratified our sample by each employer's number of employees. (See apps. II and IV.)

To answer your question about OSHA's methodology in estimating compliance costs for the standard's MSDS requirements, we obtained and analyzed documentation from OSHA on its model and general methodology for estimating the compliance costs of the standard's MSDS requirements in nonmanufacturing industries. (See app. III.) Our work was performed between July 1990 and July 1991 at OSHA's headquarters and Philadelphia regional office in accordance with generally accepted government auditing standards.

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## Background

Under HCS, chemical manufacturers and importers must evaluate each chemical they produce or import to determine if it is hazardous when used in the workplace. For chemicals determined to be hazardous, the firm must prepare a material safety data sheet. Manufacturers and importers also must label the chemical's container and include the MSDS with the initial shipment of the chemical to employers. Employers who receive hazardous chemicals without labels or MSDSSs must obtain them from the supplier or produce their own. They are also required to (1) maintain a current file of MSDSSs for the chemicals they use and make it accessible to employees, (2) develop a written program describing how they will meet HCS's requirements, and (3) train their employees in the safe handling and use of hazardous chemicals.

In our November 1991 report, we focused on the extent of small employer compliance with HCS. From a nationally representative survey, we found

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58 percent of small employers and 52 percent of all employers to be out of compliance with key requirements of HCS.<sup>5</sup> Moreover, we reported that many small employers may have been out of compliance, not because of HCS's administrative burden but because they were unaware of HCS. Over 29 percent of all small employers said that they had little or no awareness of HCS, and almost 40 percent of those with at least some awareness did not know that employers with 10 or fewer employees are covered by HCS.

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## Principal Findings

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### Most Small Employers Reported No Difficulty Complying With MSDS Requirements

Almost 70 percent of the small employers who appeared to comply reported no difficulty either maintaining a current MSDS file or ensuring employee access to it. For the individual requirements, over 75 percent of these small employers reported no difficulty maintaining a current MSDS file and over 80 percent described no difficulty ensuring employee access to it. (See fig. I.4.) Small employers reported less difficulty complying with the MSDS requirements than did large employers. (See fig. I.5.)

Small employers' ability to comply with the MSDS requirements may be due to the small number of MSDSS they had. Half of the small employers appearing to comply reported that they had 8 or fewer MSDSS, with almost 75 percent having 25 or fewer. By comparison, half of all large employers—those with 500 or more employees—reported that they had 250 or more MSDSS.

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### Some Problems Reported With HCS Training Requirement

Almost 80 percent of small employers who appeared to be complying with HCS reported some problems complying with the HCS training requirements. Insufficient training expertise and that the MSDSS were too complex to use in training were the problems most small employers reported they experienced to at least "some" extent. (See fig. I.7.) Large employers were more likely to report difficulties to some extent with all aspects of the HCS training requirement. (See fig. I.8.)

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<sup>5</sup>Other findings included that the MSDSS had readability, format, and language problems.

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### Half of Small Employers Reported Some Cost Increases Due to HCS Requirements

The implementation of HCS could result in cost increases for small employers. For example, clerical and paperwork costs could increase as employers collect or develop MSDSSs for all hazardous chemicals used in their workplaces and then keep their MSDS files current.<sup>6</sup>

For each individual cost category, over half of the small employers who appeared to comply with HCS reported some increased costs. However, fewer than 15 percent of small employers described these increases as "great" or "very great." (See fig. I.10). A greater proportion of large than small employers said that they experienced cost increases from compliance.<sup>7</sup> (See fig. I.11.) In the key areas of paperwork/clerical and MSDS storage costs, about 40 percent of small employers reported little or no increase in either category and over 80 percent reported at most "moderate" cost increases.

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### Distributors' MSDS Difficulties Appear to Vary by Industry

Compliance difficulties with the MSDS requirement vary by industry, judging from interviews we conducted with distributors of chemicals, pharmaceuticals, and health and beauty aids. Chemical distributors adapted to HCS with few problems, implementing computerized systems for shipping and receiving MSDSSs to respond quickly to customer requests for MSDSSs. Their HCS compliance costs were relatively modest, the distributors said, and did not create an individual competitive disadvantage because they fell on all employers in the industry.

Drug and health/beauty aid distributors also have adapted to HCS, although they reported greater difficulties than the chemical distributors. For distributors handling many chemicals covered by HCS, the tracking systems for maintaining current MSDSSs for each substance and transmitting the appropriate sheets to customers were not as well developed as the systems used by the chemical distributors. In addition, drug and health/beauty aids distributors reported uncertainty about products for which they were required to maintain MSDSSs and customers to whom they should ship MSDSSs.

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<sup>6</sup>In 1987, OSHA estimated that the extension of HCS to nonmanufacturing industries would cost employers about \$687 million during the first year of implementation.

<sup>7</sup>For example, about 76 percent of the large employers had some increase in paperwork/clerical costs from HCS compared with 53 percent of small employers.

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### OSHA Cost Model Sound but Accuracy of Assumed Values Is Unconfirmed

OSHA's methodology for estimating the costs of compliance with the standard's MSDS requirements, including the general approach and equations, is fundamentally sound. However, the estimates derived from the cost model depend on the assumptions OSHA made about the values of the variables. For example, OSHA appears to have understated the costs of complying with the MSDS requirements by not including nonwage benefit costs such as pensions and health benefits into the wage rate variables. Because of data limitations, we did not judge the reasonableness of many of the other numerical values OSHA used in its calculations. The more realistic the assumptions, the more accurate OSHA's cost estimates. (See app. III.)

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### Employers Reported Benefits From HCS to Workers and Management

The effect of HCS on employees was positive in the opinion of nearly half (some 45 percent) of employers of all sizes who appeared to comply with it; negative in the view of about 9 percent. Most of the rest—36 percent, believed that it had equally positive and negative effects or none at all.<sup>8</sup> (See fig. I.15.) Over 56 percent of employers reported “great” or “very great” improvement in the availability of hazard information in the workplace and in management's awareness of workplace hazards.<sup>9</sup> (See fig. I.16.) Large employers were more likely to report benefits from HCS than small employers.

The vast majority of all employers—between 74 and 84 percent—believed that HCS had no impact on productivity, employee or management morale, or workplace-related injuries and illnesses. Between 5 and 10 percent of all employers said worker or management workplace morale declined, and 10 percent said productivity declined. However, about 17 percent of all employers believed that HCS had reduced workplace-related employee injuries, while only about 1 percent said that HCS increased workplace injuries.

Despite MSDSS' weaknesses in format and language, over half of the employers believe that MSDSS provide essential information about the risks, safe handling, and general use of hazardous substances. Almost 30 percent

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<sup>8</sup>HCS could have a negative effect on employees if, for example, the hazard information resulted in increased psychological stress among employees.

<sup>9</sup>About 40 percent of all employers also believed that HCS had a positive effect on management—for example, creating a safer and more productive workplace—compared with less than 20 percent who believed it had a net negative effect.

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of employers said that they replaced a hazardous chemical with a less hazardous one because of information they received on an MSDS.

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## Agency Comments

OSHA believes that our findings demonstrate that the Hazard Communication Standard has contributed significantly to better safety and health for workers while at the same time posing minimal compliance problems for employers. The agency interprets our findings as supporting OSHA's contention that the standard is feasible for small businesses. The agency agreed to consider our concerns regarding their calculation of nonwage benefit costs in future cost estimation efforts and to include this report in its entirety in the record of future rulemaking on this issue. (See app. VI.)

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As arranged with your office, we will send copies of this report to the Secretary of Labor and other interested parties and make it available to others upon request. If you have any questions concerning the report, please call me at (202) 512-7014. We list other major contributors in appendix VII.



Linda G. Morra  
Director, Education  
and Employment Issues

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**Abbreviations**

HCS	Hazard Communication Standard
IMIS	Integrated Management Information System
OSHA	Occupational Safety and Health Administration
MSDS	Material Safety Data Sheet
SBA	Small Business Administration
SIC	Standard Industrial Classification
USEEM	United States Employment and Enterprise Microdata
TPV	Total Present Value



# Occupational Safety & Health: Employers' Experiences in Complying With the Hazard Communication Standard

Figure I.1:

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## GAO Assignment Objectives

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- Identify employers' (especially small employers') difficulties, costs, and benefits in meeting HCS requirements
- Assess OSHA's methodology in estimating compliance costs with the MSDS requirement

**Figure I.2:**

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## **GAO Methodology**

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- **Conduct national employer survey in three industry groups**
  - **focus analysis on employers in likely compliance**
  - **compare data by employer size and industry**
- **Conduct interviews with chemical/drug distributors**
- **Obtain and review OSHA's compliance cost model**

Note: We describe the methodology used to develop our survey in appendix II, which also includes a discussion of the interviews with chemical and pharmaceutical distributors. Appendix III contains our assessment of OSHA's compliance cost estimates regarding the Hazard Communication Standard's MSDS requirements, and appendix IV, responses to selected survey questions and the associated sampling errors.

Figure I.3:

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GAO Employer Experiences With  
HCS: MSDS Duties

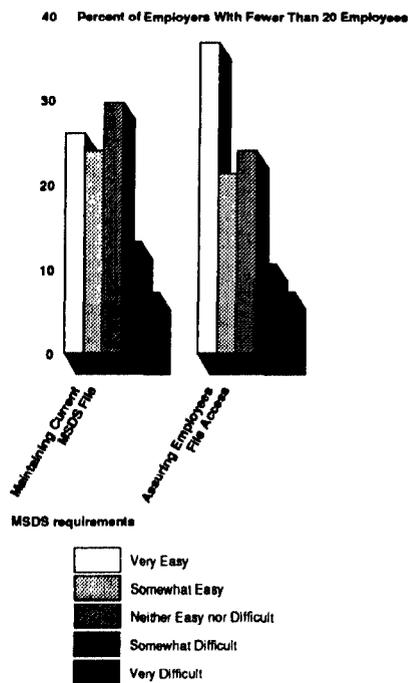
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- About 70 percent of small employers had no difficulty with the MSDS duties
  - maintaining current MSDS file
  - assuring employee access
- Most small employers had 8 or fewer MSDSs
- Most large employers had 250 or more MSDSs and difficulty complying with MSDS duties

Note: About 70 percent of small employers—those with fewer than 20 employees—appearing to comply with HCS reported no difficulty complying with both MSDS requirements.

Figure I.4:

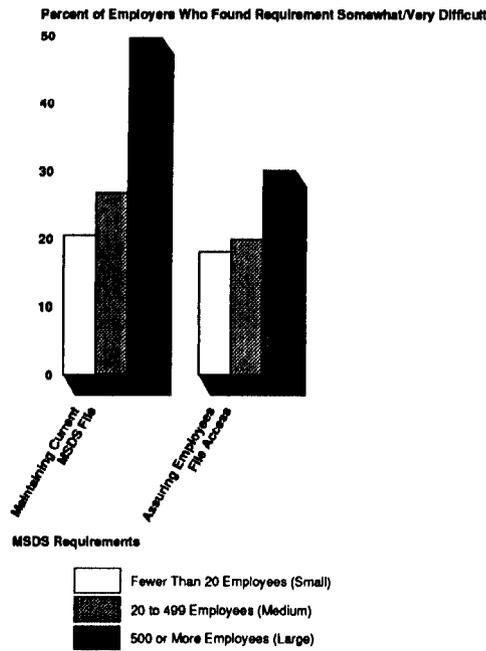
GAO Most Small Employers Report No Difficulty With MSDS Duties



Note: For each individual MSDS requirement, about 80 percent of all small employers appearing to comply reported no difficulty complying. About 7 percent of employers found complying with each MSDS requirement "very difficult." Over 26 percent found maintaining current MSDS files "very easy," and over a third found assuring employees access to the files "very easy."

**Figure I.5:**

**GAO More Large Employers Than Small Report MSDS Difficulties**



Note: Almost 50 percent of large employers—those with 500 or more employees—appearing to comply found it at least “somewhat difficult” maintaining and keeping MSDSs up to date, and about 13 percent found it “very difficult” to do so. Thirty percent of such employers found it “somewhat” difficult ensuring employee access to MSDS files at each worksite, with about 5 percent finding it “very difficult.”

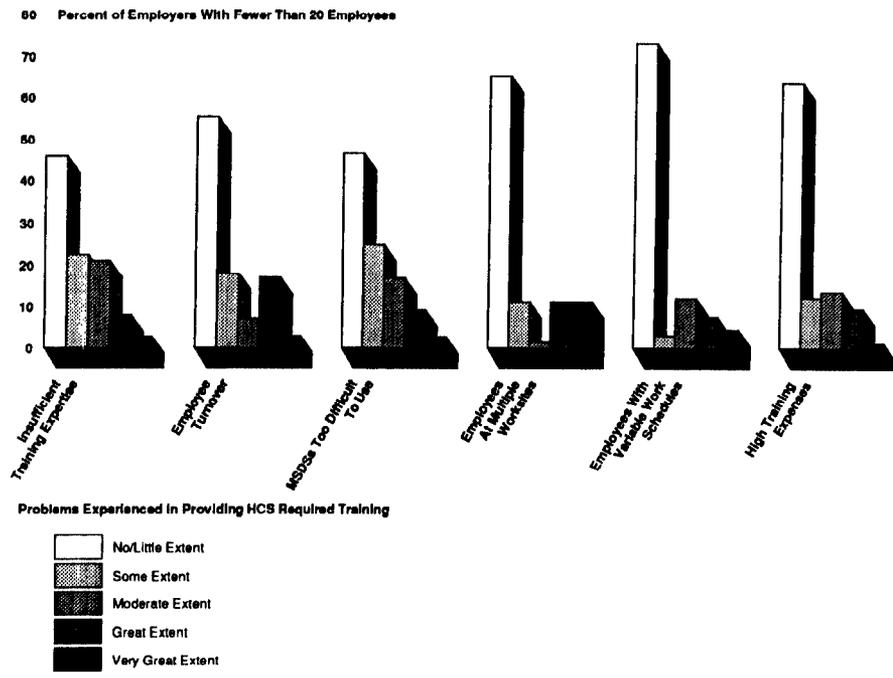
Figure I.6:

**GAO** Employer Experiences With  
HCS: Training Requirement

- 79 percent of small employers had some problems complying with training requirement
- Greatest problems for small employers are with inadequate training expertise and the use of MSDSs in training
- Larger employers more likely to have problems with training requirement

Figure I.7:

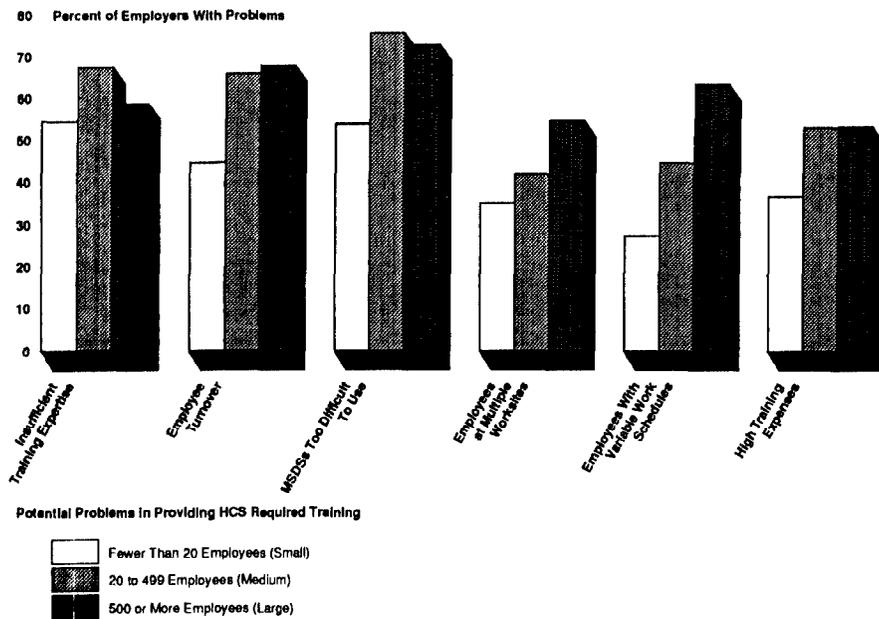
# GAO Small Employers Have Varied Experiences With HCS Training



Note: While 79 percent of small employers appearing to comply reported difficulty at least to "some extent" with the HCS training requirement, at most about 54 percent of such employers had difficulty with any aspect of the requirement. About 22 percent of such small employers had "great" or "very great" difficulty providing training to employees at multiple worksites. About 20 percent of employers had similar degrees of difficulty with employee turnover.

Figure I.8:

## GAO More Large Employers Than Small Report Training Problems



Note: A greater proportion of large than small employers appearing to comply reported difficulties "to at least some extent" on all potential training problems that we asked about (see app.IV). Over 70 percent of these large employers experienced some difficulty integrating MSDSs into their training program compared with about 50 percent of the small employers.

Figure I.9:

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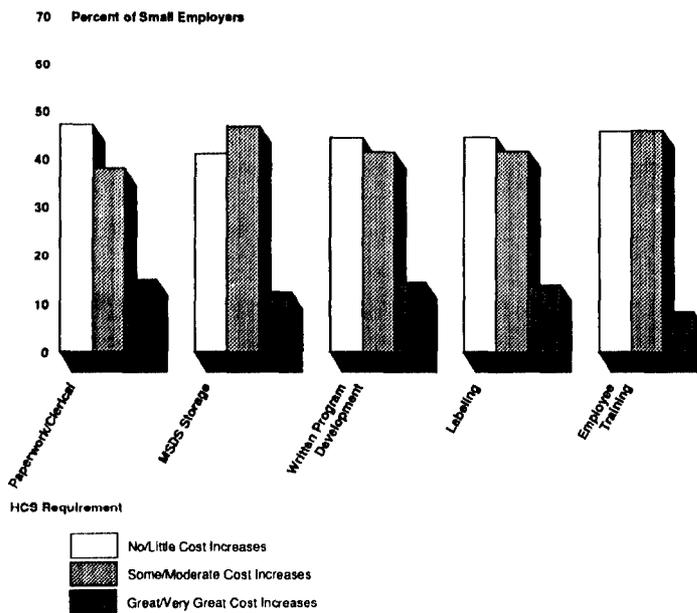
**GAO** Employer Experiences With  
HCS: Compliance Costs

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- Over half of small employers reported some cost increases for each HCS requirement
- Large employers were more likely to report some cost increases than small employers

Figure I.10:

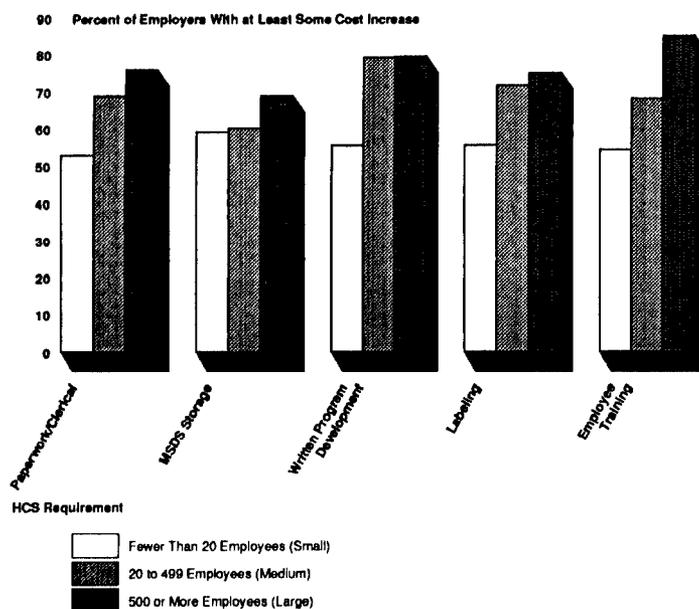
## GAO Over 50% of Small Employers Had Some Cost Increases



Note: For each individual area, over 50 percent of small employers appearing to comply found that their costs had increased "somewhat." However, 15 percent of employers appearing to comply experienced "great" or "very great" cost increases from HCS's paperwork/clerical requirements, the largest proportion of any of the five categories and about 8 percent of such employers experienced "great" or "very great" increases in employee training costs.

Figure I.11:

# GAO More Large Employers Than Small Report Cost Increases



Note: Almost 25 percent of large employers appearing to comply reported "great" or "very great" cost increases from HCS's paperwork/clerical requirements.

Figure I.12:

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GAO Distributors' Experiences  
With MSDS Duties

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Interviews showed that

- Chemical distributors adapted to MSDS duties with little difficulty
- Drug distributors had more difficulty
- Uncertain about the products covered and recipients of MSDSs

Figure I.13:

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GAO OSHA's Cost Methodology

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- Structure and approach of OSHA's cost model regarding MSDS requirements are sound
- However, in one case, OSHA's model may underestimate compliance costs because nonwage compensation is excluded in wage variable

Note. See appendix III for a discussion of OSHA's cost methodology.

Figure I.14:

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**GAO** Benefits Employers Report  
From HCS

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- Over 40 percent of employers report positive HCS effects for employers and employees
- Employers report safety and health improvements due to HCS
- 29 percent of employers say they use a less hazardous chemical in the workplace because of HCS

Figure I.15:

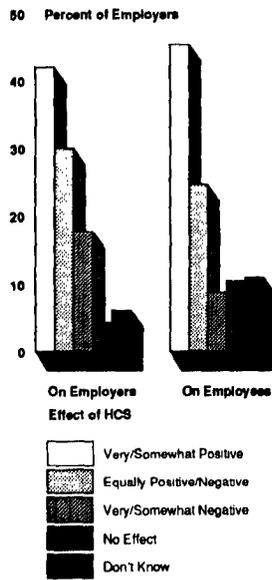
## GAO Other HCS Effects Reported By Employers

- HCS had little effect on productivity, even for those employers reporting great cost increases
- 17 percent of employers report fewer work related injuries
- 16 percent of employers report fewer work related illnesses

Note: Large employers appearing to comply were generally more positive about HCS's effect on both employers and employees than small employers. Over 67 percent of such large employers believed that HCS had a positive effect on employees—compared with about 45 percent of small employers appearing to comply. Almost 60 percent of such large employers believed that HCS had a positive effect on employers compared with about 42 percent of the small employers.

Figure I.16:

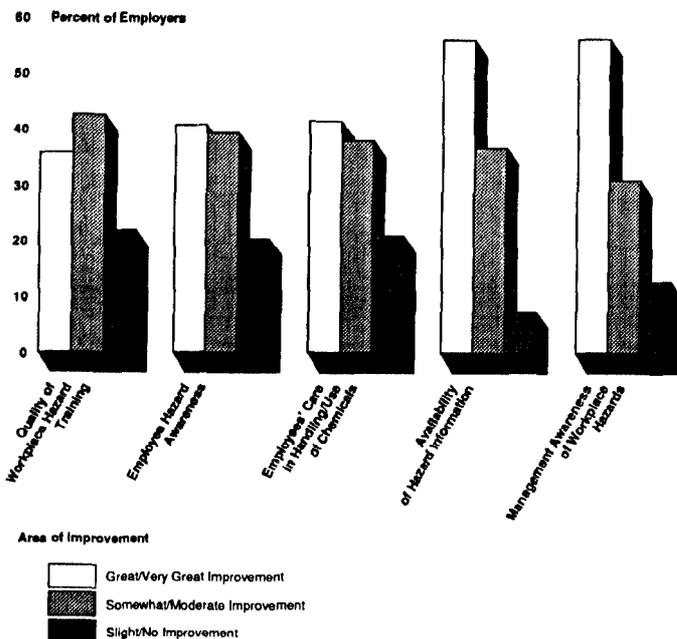
## GAO Over 40% Of Employers Say HCS Has Positive Effects



Appendix I  
Occupational Safety & Health: Employers'  
Experiences in Complying With the Hazard  
Communication Standard

Figure I.17:

# GAO Employers Report Improvements Due to HCS



# GAO's Employer Survey on OSHA's Hazard Communication Standard: Methodology, Sampling, and Analysis

We gathered data on employers' experience with OSHA's Hazard Communication Standard through a questionnaire survey conducted from October 1990 through July 1991. The survey was designed to collect information on the extent of employer awareness and knowledge of and compliance with HCS; employers' perceived costs, benefits, and difficulties in complying with HCS; and sources of employers' information on HCS.

## Questionnaire Design

Our survey questionnaire was designed to ensure that the data collected were consistent.<sup>1</sup> We pretested it with representatives of seven employers in the Washington, D.C., area, including a small and a medium-sized construction employer; a small manufacturing employer; and a small, two medium-sized, and a large personal services business. We gave OSHA officials copies of the draft questionnaire for review. Guided by the results of the pretest and OSHA officials' comments, we revised the questionnaire to ensure that all questions were fair, relevant, and easy to understand and answer. We also tested it to ensure that the task of completing it would not place too great a burden on the respondent.

## Initial and Adjusted Universe and Sample Sizes

We mailed questionnaires to a random sample of employers, stratified by industry and employer size and selected from a July 1990 United States Employment and Enterprise Microdata (USEEM) file data base obtained from the U.S. Small Business Administration (SBA).<sup>2</sup>

The USEEM file includes information on different types of business organizations. We included in our population only records of employers representing (1) employer headquarters with a single establishment, (2) employer headquarters with multiple establishments, or (3) subsidiary headquarters. For employers who maintained operations in several industries or sectors, our questionnaire included instructions to help ensure that answers were provided for what they considered their most typical or common operation.

<sup>1</sup>For a copy of the questionnaire, see Occupational Safety & Health: OSHA Action Needed To Improve Compliance With Hazard Communication Standard (GAO/HRD-92-8, Nov. 1991).

<sup>2</sup>SBA modified an employer data base obtained from the Dun and Bradstreet corporation. We chose USEEM because SBA's modifications improved the file's reliability and SBA frequently updates the information to improve its accuracy. The USEEM file also includes employer phone numbers and addresses, as well as names of employer representatives, to facilitate additional contact if necessary. Finally, we were able to obtain and access the file with minimal difficulty.

We chose our sample from three different industry groups (see table II.1.):

- The manufacturing sector, because it was the first major industrial group covered by HCS, beginning in 1985.
- The construction sector, because it was not covered by HCS until 1987, and although it is an industry with considerable experience with OSHA, a number of its representatives have reported difficulties in complying with HCS.<sup>3</sup>
- The personal services sector, a combination of various service industry operations, including personal services, automotive, and other repair service operations where employees are very likely to come into contact with hazardous chemicals. An industry group not covered by HCS until 1987, it appears to have less experience with OSHA than some others.<sup>4</sup> Representatives of various segments of this sector also have reported difficulties in complying with HCS.

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<sup>3</sup>In FY 1989-90, almost half of all inspections reported in our OSHA inspection data base involved construction worksites. See GAO/HRD-92-8.

<sup>4</sup>In FY 1989-90, only about 3 percent of all inspections reported in our OSHA inspection data base involved worksites in SIC codes 72, 75, and 76. See GAO/HRD-92-8.

**Appendix II  
GAO's Employer Survey on OSHA's Hazard  
Communication Standard: Methodology,  
Sampling, and Analysis**

**Table II.1: Standard Industrial  
Classification (SIC) Codes for Selected  
Industry Groups, GAO Employer Survey  
(July 1991)**

Industry group	SIC code	Description
Manufacturing	2000-3999	All durable and nondurable manufacturing industries
Construction industries	1500-1799	All construction
Personal services	7211	Power laundries, family and commercial
	7212	Garment pressing and agents for laundries and dry cleaners,
	7213	Linen supply
	7216	Dry-cleaning plants, except rug cleaning
	7217	Carpet and upholstery cleaning
	7218	Industrial launderers
	7219	Laundry and garment services
	7221	Photographic studios, portrait
	7231	Beauty shops
	7241	Barber shops
	7251	Shoe repair shops and shoeshine parlors
	7261	Funeral services and crematories
	7500-7599	Automotive repair services, garages <sup>a</sup>
	7600-7699	Miscellaneous repair services

<sup>a</sup>These industries include, among other activities, automotive rental and leasing; general automotive repair; top, body, and upholstery repair and paint shops; tire retreading and repair; and other automotive services.

To obtain information about the experiences of employers of various size, we stratified our sample accordingly, defining employers with fewer than 20 employees as small, those with 20 to 499 employees as medium-sized, and those with 500 or more employees as large (see tables II.2 and II.3).<sup>5</sup>

<sup>5</sup>We classified employers by size and industry according to the initial SBA/Dun and Bradstreet size and industry classification rather than the employers' survey response.

**Appendix II**  
**GAO's Employer Survey on OSHA's Hazard**  
**Communication Standard: Methodology,**  
**Sampling, and Analysis**

**Table II.2: Number of Employers Identified in Selected Industry and Employer Groups, by Size, GAO Employer Survey (July 1991)**

Industry group	Number of employees			All
	1-19	20-499	500 or more	
Manufacturing	346,103	99,329	6,758	452,190
Construction	742,255	51,374	634	794,263
Personal services	693,250	14,390	207	707,847
<b>Total</b>	<b>1,781,608</b>	<b>165,093</b>	<b>7,599</b>	<b>1,954,300</b>

**Table II.3: Number of Employers Sampled by Industry Group and Employer Size Strata, GAO Employer Survey (July 1991)**

Employer size (no. of employees)	Number of employees by industry group			Total
	Construction	Manufacturing	Personal services	
Fewer than 20	300	300	285	<b>885</b>
20 to 499	215	215	203	<b>633</b>
500 +	160	215	94	<b>469</b>
<b>Total</b>	<b>675</b>	<b>730</b>	<b>582</b>	<b>1,987</b>

**Adjusted Sample Size and Response Rate**

We mailed 1,987 questionnaires to employers throughout the United States. After adjustments for employers not meeting our criteria, such as no longer being in operation, being self-employed with no employees, or classified in the incorrect industry, our count was 1,120 responses for a 77-percent response rate (see table II.4). In addition, we assumed that any employer whose questionnaire was returned to us by the U.S. Postal Service as undeliverable and had no forwarding address and no current telephone listing was no longer in operation. Most employers classified as such were in the small employer (fewer than 20 employees) stratum.

**Appendix II  
GAO's Employer Survey on OSHA's Hazard  
Communication Standard: Methodology,  
Sampling, and Analysis**

**Table II.4: Adjusted Sample and  
Response Rate for Industry Group and  
Employer Size Strata, GAO Employer  
Survey (July 1991)**

Industry group/ employer size	Sample size	Adjusted size	Number received	Percent received
<b>Construction</b>				
Fewer than 20 employees	300	137	97	70.8%
20 to 499 employees	215	194	155	79.9
500 + employees	160	148	120	81.1
<b>Total</b>	<b>675</b>	<b>479</b>	<b>372</b>	<b>77.7</b>
<b>Manufacturing</b>				
Fewer than 20 employees	300	159	113	71.1
20 to 499 employees	215	207	160	77.3
500 + employees	215	198	173	87.4
<b>Total</b>	<b>730</b>	<b>564</b>	<b>446</b>	<b>79.1</b>
<b>Personal services</b>				
Fewer than 20 employees	285	149	102	68.5
20 to 499 employees	203	177	128	72.3
500 + employees	94	81	72	88.9
<b>Total</b>	<b>582</b>	<b>407</b>	<b>302</b>	<b>74.2</b>
<b>Total employers with Fewer than 20 employees</b>				
	885	445	312	70.1
20 to 499 employees	633	578	443	76.6
500 + employees	469	427	365	85.5
<b>Total</b>	<b>1987</b>	<b>1450</b>	<b>1120</b>	<b>77.2</b>

As HCS, like OSHA regulations generally, applies only to employers with employees, we excluded employers who reported themselves as self-employed with no employees. In addition, we excluded employers with operations exclusively outside of our designated industries as specified in the SIC codes in table II.1. Finally, we excluded employers who were financial holding companies and had no actual operations or employees in any of the industries we were surveying.

**Measures to Reduce Number  
of Nonrespondents**

To maximize our response rate, we conducted two mail and two telephone follow-ups. The lowest response rates were for the small employer strata, with small personal services employers having the lowest at 69 percent. Scientifically selecting our sample enabled us to use the results to represent employers in the universe. To reflect the employers in the entire universe, we weighted each of the employers in our sample (see table II.5).

To obtain the estimated number in the adjusted universe, we multiplied the adjusted sample of respondents by the corresponding assigned industry

weight. Our estimates represent employers in the universe who probably would have responded had they been sent a questionnaire.

**Table II.5: Determination of Adjusted Universe, GAO Employer Sample**  
 (July 1991)

Industry group/ employer size	Number of employers		
	Adjusted respondents	Assigned weight	Adjusted universe
<b>Construction</b>			
Small	97	2,474.18	239,996
Medium	155	238.95	37,037
Large	120	3.96	476
<b>Manufacturing</b>			
Small	113	1,153.68	130,365
Medium	160	462.00	73,919
Large	173	31.43	5,438
<b>Personal services</b>			
Small	102	2,432.46	248,111
Medium	128	70.89	9,074
Large	72	2.20	159

## Sampling Errors

Because we surveyed a sample rather than the universe of employers, each reported estimate has an associated sampling error. The size of the sampling error reflects the precision of the estimate; the smaller the error, the more precise the estimate. Sampling errors for estimates from this survey were calculated at the 95-percent confidence level. This means that the chances are about 19 out of 20 that the actual number or percentage being estimated falls within the range defined by our estimate, plus or minus the sampling error. For example, if we have estimated that 30 percent of a group has a characteristic and the sampling error is about 6 percentage points, there is a 95-percent chance that the actual percentage is between 24 and 36.

Generally, the sampling errors for employer characteristics did not exceed 9 percentage points at the 95-percent confidence level. However, for the number of employers in certain combined industry and size strata (for example, small construction employers) and certain other characteristics, the sampling errors were higher. Sampling errors are stated in given points for employer characteristics, because this is generally how the size estimates are presented in the report. (Sampling errors are given in app. IV and V.)

## Likely Employer Compliance With Individual HCS Requirements

Using our employer survey data, we defined as in likely compliance employers who said they had received an MSDS<sup>6</sup> and did not report being out of compliance with one or more of the three HCS requirements we asked about.<sup>7</sup> These were:

- Maintenance of a hard copy or computerized file of MSDSS on most or all of the products that contain hazardous substances (one of the MSDS requirements);
- Provision of training to employees on the safe handling and use of hazardous chemicals (training requirement);
- Maintenance of container labels that clearly indicate the identity of the substance and warning of its hazards for most or all of the products for which the employer has an MSDS (labeling requirement).

We measured the extent of any cost increases experienced by employers from various aspects of HCS through a series of questions based on a 6-point scale: not at all, a little, somewhat, moderately, greatly, and very greatly (see app. IV). We measured the severity of seven problems employers may encounter from HCS's training requirement by asking them the extent to which the problems had been encountered at their business: little or no extent, some extent, moderate extent, great extent, very great extent, and don't know/not applicable (see app. IV).

## GAO Interviews With Chemical and Drug Distributors

In May and June 1991, to obtain information on the experience of chemical and drug distributors in complying with HCS, GAO conducted interviews with five firms active in either SIC 5122 (Drugs, Proprietaries, and Sundries) or 5169 (Chemicals and Allied Products Not Elsewhere Classified). The firms were located in either the Baltimore or Philadelphia area. The five firms differed in the amount of sales, the number of employees, number of distributing facilities, primary products distributed and principal markets of operation. Two of the firms distributed chemicals, and three distributed drugs. Of the latter, two also distributed health and beauty aid products and one manufactured drugs.

Interview questions focused around four main issues: (1) the difficulties, if any, the firms have experienced in complying with the MSDS requirements

<sup>6</sup>About 50 percent of all employers reported that they had received no MSDSS.

<sup>7</sup>For a discussion of employer noncompliance with HCS, see GAO/HRD-92-8.

of HCS; (2) the MSDS requirements' effect on the firms' costs; (3) the perceived benefits received, if any, from the MSDS requirement; and (4) suggestions for modifying the HCS requirement.

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## **Assessment of OSHA's Cost Estimate Methodology**

To assess the methodology underlying OSHA's compliance cost estimates for the MSDS requirements in nonmanufacturing industries, we obtained and analyzed documentation from OSHA on its model and general methodology for estimating the compliance costs of the standard's MSDS requirements in nonmanufacturing industries. However, because of data limitations, we did not judge the accuracy of many of the assumptions (for example, the number of chemical hazards used in the workplace of a typical nonmanufacturing firm or voluntary compliance with HCS) made by OSHA in developing its estimates.

# GAO Assessment of OSHA's Model for Estimating Compliance Costs With the MSDS Requirements of HCS

In November 1983, OSHA published a final Hazard Communication Standard covering manufacturing industries. As part of that regulatory effort, OSHA had determined that it was economically feasible for all manufacturing industries to implement the HCS requirements.<sup>1</sup> In May 1985, a U.S. Circuit Court of Appeals ordered OSHA to apply HCS to nonmanufacturing industries unless the Secretary of Labor could state reasons why this application would not be feasible.<sup>2</sup>

To provide direct evidence of the economic feasibility of expanding HCS's coverage, OSHA commissioned a study with the JACA Corporation to estimate the economic impact of extending OSHA to the 50 major nonmanufacturing industry groups within its jurisdiction. The study included estimates of the costs and the general economic impact of this regulatory revision. From this study and other evidence presented in the record, OSHA concluded that extension of HCS to nonmanufacturing industries was economically feasible.

Industry groups and government agencies criticized OSHA's conclusion, contending that OSHA's analysis was flawed and greatly underestimated the HCS compliance costs of nonmanufacturing employers, especially small employers. Some critics have focused on the material safety data sheet requirements of HCS, asserting that it has generated an excessive paperwork burden on employers.

After analyzing OSHA's cost estimate methodology concerning these MSDS requirements, we concluded that OSHA's general approach and the equations comprising its model for estimating the HCS compliance costs are fundamentally sound. However, the estimates derived from OSHA's cost model depend on assumptions made about the values of the model's variables (such as the number of hazardous chemicals used in an employer's workplace). Because of data limitations, we did not assess the accuracy of most of the numerical values OSHA assumed in its cost calculations. The more realistic the assumptions, the more accurate OSHA's cost estimates will be. In one case, however, OSHA appears to have understated the compliance costs by excluding nonwage benefit costs such as pensions and health benefits from its wage rate variables.

<sup>1</sup>A factor in determining whether a specific standard is economically feasible is its affect on the financial viability of an industry. Industrial Union Department, AFL-CIO v. Hodgson, 499 F.2d 467, 477-78 (D.C. Cir. 1974).

<sup>2</sup>United Steelworkers of America v. Aucther, 763 F.2d 728, 739 (3d Cir.1985).

## Summary of OSHA's Cost Model

The costs to chemical manufacturers and importers of complying with HCS differ markedly from the costs nonmanufacturing employers would incur when the standard is applied to them. Under HCS, chemical manufacturers and importers must conduct a hazard evaluation—evaluate each chemical they produce or import—to determine if it is hazardous. For chemicals determined to be hazardous, they must prepare an MSDS providing details on the chemical's properties, hazards, safe use, and handling. In addition, chemical manufacturers and importers must provide MSDSSs to employers who use hazardous chemicals.

Employers who use hazardous chemicals in the workplace must maintain a current file of MSDSSs and permit workers access to that file. In nonmanufacturing industries, most employers likely will use MSDSSs received from chemical manufacturers and importers rather than develop their own MSDSSs. However, (1) employers must maintain MSDS files on hazardous chemicals used in the workplace and (2) employers who distribute hazardous chemicals must provide MSDSSs to their customers. Thus, a nonmanufacturing employer's cost of complying with the requirements will depend on the number of chemical hazards present in the employer's own workplace(s), the number of employers who will require MSDSSs, and the unit cost of preparing an MSDS.

In its cost model, OSHA estimates that keeping MSDS files current will cost the nation's nonmanufacturing industries \$44.9 million the first year and \$84.8 million over 40 years (the latter figure is calculated in terms of total present value—TPV—and assumes a 10-percent discount rate). To distribute MSDSSs to employees will cost nonmanufacturing industries \$19.3 the first year and \$88.9 (TPV) over 40 years.

OSHA also found that the costs of complying with the MSDS requirements alone were about 10 percent of the total compliance costs of HCS, both during the first year and over a 40-year horizon. (See table III.1).

**Appendix III**  
**GAO Assessment of OSHA's Model for**  
**Estimating Compliance Costs With the MSDS**  
**Requirements of HCS**

**Table III.1: Estimated Costs of Compliance With HCS to Nonmanufacturing Industry, OSHA Cost Model**

Dollar figures in millions

HCS requirement	First-year cost	Percent of total first-year cost	Total present value <sup>a</sup>
<b>MSDS:</b>			
Maintain MSDS files	\$44.9	6.5%	\$84.8
Provide MSDS to customers	19.3	2.8	88.9
<b>Total</b>	<b>\$64.2</b>	<b>9.3%</b>	<b>\$173.7</b>
<b>Labeling<sup>d</sup></b>			
Written program <sup>c</sup>	137.4	20.0	170.9
Training <sup>c</sup>	472.9	68.8	\$1,054.6
<b>Total cost of HCS compliance</b>	<b>\$687.3</b>	<b>100%</b>	<b>1,570.1</b>

<sup>a</sup>Assuming a 10-percent discount rate.

<sup>b</sup>Manufacturers and importers must label the container of any hazardous chemicals they ship, and employers who use hazardous chemicals must ensure that each such chemical in the workplace is labeled or otherwise identified.

<sup>c</sup>Employers using hazardous chemicals must develop a written hazard communication program that describes how they will meet HCS's requirements and train their employees in the safe handling and use of the chemicals.

## Basic Equations in OSHA's Cost Model

The OSHA cost model for each of the MSDS requirements involves two equations: one to calculate the unit cost, the other to calculate total costs. The total costs for each requirement are calculated by multiplying the unit cost of preparing or maintaining an MSDS by the number of MSDSS. The equations are corrected for the creation of new businesses, the development of new chemicals and their introduction into the workplace, and prior employer compliance with state right-to-know laws. Nonmanufacturing employers are divided into classes based on their SIC code and size (number of employees). Total costs are estimated for each SIC/size class. The total cost of compliance with HCS is determined by summing the total costs for each class.

The unit costs of both preparing and maintaining an MSDS are calculated by the same formula:

$$AC = W * T + S$$

Where AC is the unit cost, W is the wage rate of the employee, T is the time required by the employee to prepare or maintain one MSDS, and S is the

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**Appendix III**  
**GAO Assessment of OSHA's Model for**  
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cost of supplies used to prepare or maintain one MSDS.<sup>3</sup>

The total annual cost of maintaining MSDSS for each nonmanufacturing size/SIC group is:

$$TC^m = (AC * N * H) * (1 + G^n) * (1 + G^h) * (1 - P)$$

Where  $TC^m$  = the total cost of maintaining MSDSS,  $AC$  = the unit cost,  $N$  = the number of firms in the size/SIC class,  $H$  = the number of chemical hazards in a typical firm,  $G^n$  and  $G^h$  = the growth rates of  $N$  and  $H$  respectively, and  $P$  = the proportion of firms voluntarily complying with HCS.<sup>4</sup>

OSHA assumed that the requirement to ship MSDSS to customers would affect wholesalers of durable and nondurable goods and selected retailers.<sup>5</sup> The total annual cost of wholesalers providing MSDSS is defined as:

$$TC^p = (AC * M * S) * (1 + G^n) * (1 + G^h) * (1 - P) * (1 - Pr)$$

Where  $TC^p$  = the total cost of providing MSDSS;  $AC$ ,  $G^n$ ,  $G^h$ , and  $P$  are defined above;  $M$  = the total number of MSDSS needed by nonmanufacturing firms;<sup>6</sup>  $S$  = the share of total wholesale sales accounted for by the particular size/SIC class; and  $Pr$  = the probability that a firm will buy a hazardous chemical product from a retailer rather than from a wholesaler.

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<sup>3</sup>Data for the wage rate ( $W$ ), the employer time required ( $T$ ), and the supply cost ( $S$ ) variables were described in OSHA, Final Regulatory Impact and Regulatory Flexibility Analysis of the Hazard Communication Standard, Aug. 9, 1983.

<sup>4</sup>The Bureau of Labor Statistics furnished the data on the number of firms in each class/SIC class, while the number of hazards was determined from the National Occupational Hazard Survey and National Occupational Exposure Surveys. The other variables ( $G^n$ ,  $G^h$ , and  $P$ ) were estimated by the JACA Corporation.

<sup>5</sup>Under HCS, wholesalers and distributors must transmit an MSDS with the initial shipment of a hazardous chemical to all employers. MSDSS need not be transmitted if, among other provisions, the hazardous product shipped is (1) prepackaged for sale to consumers or (2) sold in solid form for direct ingestion by a patient. This second exemption includes pills not made into liquid form and/or not crushed or otherwise combined before ingestion. Distributors need not send an MSDS to retailers who have informed them that they do not sell the hazardous chemical to commercial customers or open the sealed container to use it in their own workplace.

<sup>6</sup>The number of MSDSS ( $M$ ) was estimated by the JACA Corporation.

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**Appendix III**  
**GAO Assessment of OSHA's Model for**  
**Estimating Compliance Costs With the MSDS**  
**Requirements of HCS**

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The total annual cost of providing MSDSs by retailers is similarly defined by:

$$TC^P = (AC * M * S) * (1 + G^n) * (1 + G^h) * (1 - P) * Pr$$

The results from OSHA's model depend on the agency's assumptions concerning the values of the variables (such as the level of unit costs, number of chemical hazards present in a nonmanufacturing workplace, number of MSDSs needed, number of firms, or employee compensation costs). Changes in these values will change the calculated total costs.<sup>7</sup> The more realistic OSHA's estimated numerical values for these variables, the more accurate its estimates of compliance costs will be.

Because of data limitations, GAO cannot judge the validity of many of OSHA's assumptions underlying the numerical values it used. However, in one case where we did make an assessment, OSHA likely understated the costs to comply with the MSDS requirements by not including nonwage compensation costs such as pensions and health benefits in the wage rates used in their calculations.<sup>8</sup>

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<sup>7</sup>For example, for the model's voluntary compliance variable, P, OSHA assumed an annual rate of about 2-percent compliance with both MSDS requirements for all industries and employer sizes, except for employers in wholesale trade (SIC code groups 50 and 51), where OSHA assumed a 60-percent compliance rate for the provision of MSDSs.

<sup>8</sup>Correcting for nonwage compliance costs would increase the estimated costs of complying with the MSDS requirement from \$68.7 million to \$87.9 million.

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# Information on Responses to Selected GAO Survey Questions

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This appendix presents response information on selected questions from our survey questionnaire concerning the Hazard Communication Standard. The questions chosen are those relating to issues discussed in this report—including employer compliance difficulties with HCS, as well as the costs and benefits of compliance—and used in the figures throughout the text. Unless otherwise specified, information is for those employers appearing to comply with the HCS.

The associated sampling error is shown in parentheses after each response. For some of the smaller cells, the error may be quite large. Results with sampling errors greater than or equal to +/-20 percentage points are indicated by \*\*. In some instances, response totals may not equal 100 percent due to rounding.

We presented information related to survey questions on employer noncompliance with HCS, OSHA's outreach efforts, and employer problems with MSDSS in our report of November 1991.<sup>1</sup> A complete copy of the questionnaire is included in this earlier report.

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<sup>1</sup>GAO/HRD-92-8.

**Appendix IV  
Information on Responses to Selected GAO  
Survey Questions**

12. Overall, do you believe that OSHA's regulation on right to know has had a positive or negative effect on employers?

Industry group/ employer size	Effect (percent of employers responding)						
	Very positive	Somewhat positive	Equally positive & negative	Somewhat negative	Very negative	None	Don't know
<b>Construction</b>							
Small	**	8%	**	**	**	8%	8%
	**	(+/-15)	**	**	**	(+/-15)	(+/-15)
Medium	13%	26	28%	18%	8%	3	3
	(+/-9)	(+/-11)	(+/-11)	(+/-10)	(+/-7)	(+/-5)	(+/-5)
Large	10	27	29	19	6	3	6
	(+/-7)	(+/-10)	(+/-10)	(+/-9)	(+/-5)	(+/-4)	(+/-5)
Total	25	14	19	16	13	6	6
	(+/-18)	(+/-11)	(+/-14)	(+/-14)	(+/-14)	(+/-10)	(+/-10)
<b>Manufacturing</b>							
Small	17	26	26	9	0	0	22
	(+/-16)	(+/-18)	(+/-18)	(+/-12)	(+/-0)	(+/-0)	(+/-17)
Medium	14	28	32	14	1	9	2
	(+/-7)	(+/-9)	(+/-10)	(+/-7)	(+/-2)	(+/-6)	(+/-3)
Large	17	45	28	9	0	2	0
	(+/-6)	(+/-9)	(+/-8)	(+/-5)	(+/-0)	(+/-3)	(+/-0)
Total	15	28	30	12	1	5	10
	(+/-7)	(+/-9)	(+/-9)	(+/-6)	(+/-1)	(+/-3)	(+/-7)
<b>Services</b>							
Small	**	**	**	6	6	0	0
	**	**	**	(+/-12)	(+/-12)	(+/-0)	(+/-0)
Medium	23	17	29	17	10	0	4
	(+/-12)	(+/-10)	(+/-12)	(+/-10)	(+/-8)	(+/-0)	(+/-5)
Large	25	25	13	18	0	13	6
	(+/-14)	(+/-14)	(+/-10)	(+/-12)	(+/-0)	(+/-10)	(+/-8)
Total	19	**	**	7	7	0	0
	(+/-18)	**	**	(+/-11)	(+/-11)	(+/-0)	(+/-0.5)
<b>Total</b>							
Small	22	20	30	10	8	3	8
	(+/-12)	(+/-11)	(+/-13)	(+/-9)	(+/-8)	(+/-5)	(+/-7)
Medium	14	27	31	15	3	7	3
	(+/-5)	(+/-7)	(+/-7)	(+/-6)	(+/-2)	(+/-4)	(+/-23)
Large	16	43	27	10	0	3	1
	(+/-6)	(+/-8)	(+/-7)	(+/-5)	(+/-0.3)	(+/-2)	(+/-0.3)
Total	19	23	30	12	6	4	6
	(+/-8)	(+/-7)	(+/-8)	(+/-6)	(+/-5)	(+/-3)	(+/-4)

**Appendix IV  
Information on Responses to Selected GAO  
Survey Questions**

Overall, do you believe that OSHA's regulation on right to know has had a positive or negative effect on employees?

**Effect (percent of employers responding)**

<b>Industry group/ employer size</b>	<b>Very positive</b>	<b>Somewhat positive</b>	<b>Equally positive &amp; negative</b>	<b>Somewhat negative</b>	<b>Very negative</b>	<b>None</b>	<b>Don't know</b>
<b>Construction</b>							
Small	**	**	**	8%	8%	**	8%
	**	**	**	(+/-15)	(+/-15)	**	(+/-15)
Medium	15%	30%	25%	8	3	13%	7
	(+/-9)	(+/-12)	(+/-11)	(+/-7)	(+/-5)	(+/-9)	(+/-6)
Large	9	39	22	9	3	9	9
	(+/-6)	(+/-11)	(+/-9)	(+/-6)	(+/-4)	(+/-6)	(+/-6)
Total	26	20	18	8	6	15	7
	(+/-18)	(+/-14)	(+/-14)	(+/-11)	(+/-10)	(+/-14)	(+/-10)
<b>Manufacturing</b>							
Small	17	30	17	9	0	0	26
	(+/-16)	(+/-19)	(+/-16)	(+/-12)	(+/-0)	(+/-0)	(+/-18)
Medium	16	27	30	5	0	17	5
	(+/-8)	(+/-9)	(+/-10)	(+/-4)	(+/-0)	(+/-8)	(+/-4)
Large	22	47	19	5	1	5	2
	(+/-7)	(+/-9)	(+/-7)	(+/-4)	(+/-2)	(+/-4)	(+/-2)
Total	17	29	25	6	0	10	13
	(+/-7)	(+/-9)	(+/-8)	(+/-5)	(+/-0.1)	(+/-5)	(+/-7)
<b>Services</b>							
Small	**	**	**	0	6	6	13
	**	**	**	(+/-0)	(+/-12)	(+/-12)	(+/-17)
Medium	26	18	29	10	4	8	6
	(+/-12)	(+/-11)	(+/-13)	(+/-8)	(+/-5)	(+/-7)	(+/-6)
Large	19	41	9	13	0	13	6
	(+/-12)	(+/-15)	(+/-9)	(+/-10)	(+/-0)	(+/-10)	(+/-8)
Total	19	**	**	1	6	6	12
	(+/-18)	**	**	(+/-1)	(+/-11)	(+/-11)	(+/-15)
<b>Total</b>							
Small	22	23	22	5	5	8	15
	(+/-12)	(+/-12)	(+/-12)	(+/-6)	(+/-7)	(+/-8)	(+/-10)
Medium	17	27	29	6	1	16	5
	(+/-6)	(+/-7)	(+/-7)	(+/-4)	(+/-1)	(+/-6)	(+/-3)
Large	21	47	19	5	1	5	2
	(+/-6)	(+/-8)	(+/-6)	(+/-3)	(+/-1)	(+/-3)	(+/-2)
Total	20	25	25	5	4	11	11
	(+/-8)	(+/-8)	(+/-8)	(+/-4)	(+/-4)	(+/-6)	(+/-6)

**Appendix IV  
Information on Responses to Selected GAO  
Survey Questions**

13. Listed below are things that might or might not be improved as a result of the regulation. In your opinion, to what degree, if at all, has the regulation improved each of the following?

<b>Aspect of workplace</b>	<b>Degree of improvement (percent of employers responding)</b>					
	<b>Very great</b>	<b>Great</b>	<b>Moderate</b>	<b>Somewhat</b>	<b>Slight</b>	<b>None</b>
Quality of your employees' formal/on-the-job training in avoiding workplace hazards	6% (+/-5)	30% (+/-9)	28% (+/-8)	15% (+/-6)	11% (+/-6)	11% (+/-6)
Your employees' awareness of workplace hazards	8 (+/-5)	32 (+/-9)	29 (+/-8)	10 (+/-4)	12 (+/-7)	8 (+/-5)
Your employees' care in handling and use of hazardous substances	8 (+/-5)	33 (+/-9)	25 (+/-7)	13 (+/-6)	7 (+/-5)	14 (+/-7)
Availability of information on hazardous substances in your workplace	14 (+/-6)	42 (+/-9)	26 (+/-8)	11 (+/-6)	1 (+/-1)	6 (+/-4)
Your management's awareness of workplace hazards	17 (+/-7)	40 (+/-9)	27 (+/-8)	4 (+/-2)	2 (+/-1)	11 (+/-6)

**Appendix IV  
Information on Responses to Selected GAO  
Survey Questions**

14. Consider ways the regulation on right to know has affected your business: To what extent, if any, have your clerical costs due to the regulation's paperwork requirements increased?

Industry group/ employer size	Extent of increase (percent of employers responding)					
	None	Little	Somewhat	Moderate	Great	Very great
<b>Construction</b>						
Small	8% (+/-15)	** **	8% (+/-15)	** **	** **	8% (+/-15)
Medium	10 (+/-8)	15% (+/-9)	22 (+/-11)	27% (+/-11)	20% (+/-10)	7 (+/-6)
Large	3 (+/-4)	15 (+/-8)	15 (+/-8)	40 (+/-11)	21 (+/-9)	7 (+/-6)
Total	8 (+/-11)	31 (+/-19)	12 (+/-11)	24 (+/-17)	17 (+/-14)	7 (+/-11)
<b>Manufacturing</b>						
Small	22 (+/-17)	13 (+/-14)	26 (+/-18)	30 (+/-19)	9 (+/-12)	0 (+/-0)
Medium	9 (+/-9)	24 (+/-9)	21 (+/-9)	29 (+/-10)	11 (+/-10)	6 (+/-5)
Large	5 (+/-4)	19 (+/-7)	21 (+/-7)	30 (+/-8)	19 (+/-7)	6 (+/-4)
Total	14 (+/-7)	19 (+/-7)	23 (+/-8)	30 (+/-9)	10 (+/-6)	4 (+/-3)
<b>Services</b>						
Small	** **	** **	13 (+/-17)	** **	13 (+/-17)	0 (+/-0)
Medium	13 (+/-9)	23 (+/-12)	27 (+/-13)	23 (+/-12)	13 (+/-9)	2 (+/-4)
Large	9 (+/-9)	41 (+/-15)	19 (+/-12)	13 (+/-10)	19 (+/-12)	0 (+/-0)
Total	** **	19 (+/-18)	14 (+/-15)	19 (+/-18)	13 (+/-15)	0 (+/-0.3)
<b>Total</b>						
Small	23 (+/-12)	24 (+/-13)	15 (+/-6)	23 (+/-12)	12 (+/-10)	3 (+/-5)
Medium	10 (+/-5)	21 (+/-7)	22 (+/-7)	28 (+/-7)	13 (+/-5)	6 (+/-4)
Large	5 (+/-13)	19 (+/-6)	20 (+/-7)	31 (+/-7)	19 (+/-6)	6 (+/-4)
Total	18 (+/-8)	23 (+/-8)	17 (+/-6)	25 (+/-8)	13 (+/-6)	4 (+/-3)

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**To what extent, if any, have your overhead costs due to storing and  
maintaining information on hazardous substances increased?**

Industry group/ employer size	Extent of increase (percent of employers responding)					
	None	Little	Somewhat	Moderate	Great	Very great
<b>Construction</b>						
Small	0% (+/-0)	** **	8% (+/-15)	** **	8% (+/-15)	8% (+/-15)
Medium	8 (+/-7)	26% (+/-4)	31 (+/-12)	16% (+/-9)	15 (+/-9)	3 (+/-5)
Large	10 (+/-7)	15 (+/-8)	14 (+/-9)	35 (+/-11)	12 (+/-7)	4 (+/-5)
Total	3 (+/-2)	** **	15 (+/-11)	26 (+/-18)	10 (+/-11)	6 (+/-10)
<b>Manufacturing</b>						
Small	22 (+/-17)	9 (+/-12)	** **	17 (+/-16)	9 (+/-12)	0 (+/-0)
Medium	14 (+/-7)	27 (+/-9)	22 (+/-9)	28 (+/-10)	2 (+/-3)	6 (+/-5)
Large	9 (+/-5)	22 (+/-7)	21 (+/-7)	30 (+/-8)	14 (+/-6)	4 (+/-3)
Total	17 (+/-8)	20 (+/-7)	30 (+/-9)	24 (+/-8)	5 (+/-5)	4 (+/-3)
<b>Services</b>						
Small	** **	13 (+/-17)	0 (+/-0)	** **	13 (+/-17)	0 (+/-0)
Medium	17 (+/-11)	30 (+/-13)	19 (+/-11)	23 (+/-12)	9 (+/-8)	2 (+/-4)
Large	13 (+/-10)	28 (+/-14)	31 (+/-15)	19 (+/-12)	9 (+/-9)	0 (+/-0)
Total	** **	14 (+/-15)	2 (+/-1)	** **	12 (+/-15)	1 (+/-0.3)
<b>Total</b>						
Small	18 (+/-10)	23 (+/-12)	14 (+/-8)	32 (+/-14)	10 (+/-9)	3 (+/-5)
Medium	13 (+/-5)	27 (+/-7)	24 (+/-7)	25 (+/-7)	6 (+/-3)	5 (+/-4)
Large	9 (+/-5)	22 (+/-7)	21 (+/-7)	31 (+/-7)	13 (+/-6)	4 (+/-3)
Total	16 (+/-7)	24 (+/-8)	18 (+/-5)	30 (+/-9)	9 (+/-6)	4 (+/-3)

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Information on Responses to Selected GAO  
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**To what extent, if any, have your overhead costs due to developing a written training document increased?**

Industry group/ employer size	Extent of Increase (percent of employers responding)					
	None	Little	Somewhat	Moderate	Great	Very Great
<b>Construction</b>						
Small	**	**	9%	**	**	0%
	**	**	(+/-18)	**	**	(+/-0)
Medium	5%	10%	25	37%	17%	5
	(+/-6)	(+/-8)	(+/-10)	(+/-12)	(+/-10)	(+/-5)
Large	4	13	28	34	16	4
	(+/-5)	(+/-8)	(+/-10)	(+/-10)	(+/-8)	(+/-2)
Total	14	15	15	**	18	2
	(+/-15)	(+/-16)	(+/-12)	**	(+/-10)	(+/-2)
<b>Manufacturing</b>						
Small	13	22	17	**	9	4
	(+/-14)	(+/-17)	(+/-16)	**	(+/-12)	(+/-9)
Medium	7	14	33	27	13	5
	(+/-6)	(+/-8)	(+/-10)	(+/-10)	(+/-7)	(+/-5)
Large	3	17	33	33	10	4
	(+/-3)	(+/-7)	(+/-8)	(+/-8)	(+/-5)	(+/-3)
Total	9	17	27	31	11	5
	(+/-6)	(+/-8)	(+/-8)	(+/-9)	(+/-6)	(+/-4)
<b>Services</b>						
Small	**	**	6	**	13	0
	**	**	(+/-12)	**	(+/-17)	(+/-0)
Medium	10	25	23	17	23	2
	(+/-9)	(+/-12)	(+/-12)	(+/-11)	(+/-12)	(+/-4)
Large	13	28	16	38	6	0
	(+/-10)	(+/-14)	(+/-11)	(+/-15)	(+/-6)	(+/-0)
Total	**	**	8	**	13	0
	**	**	(+/-11)	**	(+/-15)	(+/-0.3)
<b>Total</b>						
Small	20	25	10	31	13	1
	(+/-12)	(+/-13)	(+/-9)	(+/-14)	(+/-10)	(+/-2)
Medium	7	14	31	29	15	5
	(+/-4)	(+/-6)	(+/-8)	(+/-7)	(+/-6)	(+/-3)
Large	4	17	32	33	10	4
	(+/-3)	(+/-6)	(+/-8)	(+/-8)	(+/-5)	(+/-3)
Total	14	21	18	31	14	3
	(+/-8)	(+/-8)	(+/-6)	(+/-9)	(+/-7)	(+/-2)

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**To what extent, if any, have your overhead costs due to following the regulation's labeling requirements increased?**

Industry group/ employer size	Extent of increase (percent of employers responding)					
	None	Little	Somewhat	Moderate	Great	Very great
<b>Construction</b>						
Small	**	**	8%	**	8%	8%
	**	**	(+/-15)	**	(+/-15)	(+/-15)
Medium	10%	19%	27	29%	12	3
	(+/-8)	(+/-10)	(+/-11)	(+/-12)	(+/-8)	(+/-5)
Large	15	16	22	22	24	2
	(+/-8)	(+/-8)	(+/-9)	(+/-9)	(+/-9)	(+/-3)
Total	14	27	14	30	9	6
	(+/-14)	(+/-18)	(+/-11)	(+/-18)	(+/-11)	(+/-10)
<b>Manufacturing</b>						
Small	13	17	**	22	13	0
	(+/-14)	(+/-16)	**	(+/-17)	(+/-14)	(+/-0)
Medium	9	18	31	26	12	5
	(+/-6)	(+/-8)	(+/-10)	(+/-9)	(+/-7)	(+/-5)
Large	5	19	20	39	14	3
	(+/-4)	(+/-7)	(+/-7)	(+/-8)	(+/-6)	(+/-3)
Total	11	18	32	25	12	3
	(+/-6)	(+/-8)	(+/-9)	(+/-8)	(+/-7)	(+/-3)
<b>Services</b>						
Small	**	7	**	13	13	0
	**	(+/-13)	**	(+/-18)	(+/-18)	(+/-0)
Medium	19	21	29	13	17	2
	(+/-11)	(+/-12)	(+/-13)	(+/-9)	(+/-11)	(+/-4)
Large	10	42	26	19	3	0
	(+/-9)	(+/-16)	(+/-14)	(+/-13)	(+/-16)	(+/-0)
Total	**	8	21	13	14	0
	**	(+/-12)	(+/-19)	(+/-16)	(+/-16)	(+/-0.4)
<b>Total</b>						
Small	27	18	20	22	11	3
	(+/-13)	(+/-11)	(+/-11)	(+/-12)	(+/-9)	(+/-5)
Medium	10	18	30	26	12	4
	(+/-5)	(+/-6)	(+/-7)	(+/-7)	(+/-5)	(+/-3)
Large	6	19	20	38	14	3
	(+/-3)	(+/-6)	(+/-6)	(+/-8)	(+/-6)	(+/-3)
Total	20	18	24	24	12	3
	(+/-8)	(+/-7)	(+/-7)	(+/-8)	(+/-6)	(+/-3)

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**To what extent, if any, have your equipment costs due to the purchase of additional safety equipment increased?**

Industry group/ employer size	Extent of Increase (percent of employers responding)					
	None	Little	Somewhat	Moderate	Great	Very great
<b>Construction</b>						
Small	**	8%	8%	**	8%	0%
	**	(+/-16)	(+/-16)	**	(+/-10)	(+/-0)
Medium	18%	26	16	30%	7	3
	(+/-10)	(+/-11)	(+/-9)	(+/-12)	(+/-6)	(+/-5)
Large	19	24	29	21	6	2
	(+/-9)	(+/-9)	(+/-10)	(+/-9)	(+/-5)	(+/-3)
Total	28	14	11	**	8	1
	(+/-19)	(+/-11)	(+/-11)	**	(+/-11)	(+/-1)
<b>Manufacturing</b>						
Small	17	17	26	22	17	0
	(+/-16)	(+/-16)	(+/-18)	(+/-16)	(+/-14)	(+/-0)
Medium	19	23	21	24	8	5
	(+/-8)	(+/-9)	(+/-9)	(+/-9)	(+/-6)	(+/-5)
Large	10	18	29	30	14	1
	(+/-5)	(+/-7)	(+/-8)	(+/-8)	(+/-6)	(+/-2)
Total	18	20	24	23	12	3
	(+/-8)	(+/-8)	(+/-9)	(+/-8)	(+/-7)	(+/-3)
<b>Services</b>						
Small	**	**	**	13	**	13
	**	**	**	(+/-17)	**	(+/-17)
Medium	17	15	17	27	19	6
	(+/-11)	(+/-10)	(+/-11)	(+/-13)	(+/-11)	(+/-7)
Large	13	28	19	34	6	0
	(+/-10)	(+/-11)	(+/-12)	(+/-15)	(+/-18)	(+/-0)
Total	19	**	1	14	**	12
	(+/-18)	**	(+/-1)	(+/-15)	**	(+/-15)
<b>Total</b>						
Small	23	20	10	24	18	5
	(+/-13)	(+/-11)	(+/-12)	(+/-12)	(+/-11)	(+/-7)
Medium	19	23	20	26	9	5
	(+/-6)	(+/-7)	(+/-7)	(+/-7)	(+/-4)	(+/-3)
Large	10	18	29	29	13	1
	(+/-5)	(+/-6)	(+/-7)	(+/-7)	(+/-6)	(+/-1)
Total	21	21	14	25	14	4
	(+/-8)	(+/-8)	(+/-5)	(+/-8)	(+/-7)	(+/-4)

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**To what extent, if any, have your employee training costs due to the regulation's training requirements increased?**

Industry group/ employer size	Extent of increase (percent of employers responding)					
	None	Little	Somewhat	Moderate	Great	Very great
<b>Construction</b>						
Small	0% (+/-0)	** **	** **	** **	0% (+/-0)	0% (+/-0)
Medium	12 (+/-8)	18% (+/-10)	28% (+/-11)	28% (+/-11)	10 (+/-8)	3 (+/-5)
Large	3 (+/-4)	12 (+/-7)	19 (+/-9)	33 (+/-10)	18 (+/-9)	15 (+/-8)
Total	4 (+/-3)	22 (+/-17)	30 (+/-18)	** **	3 (+/-2)	1 (+/-1)
<b>Manufacturing</b>						
Small	17 (+/-16)	22 (+/-17)	22 (+/-17)	17 (+/-16)	22 (+/-17)	0 (+/-0)
Medium	10 (+/-6)	23 (+/-9)	23 (+/-9)	27 (+/-10)	13 (+/-7)	5 (+/-5)
Large	0 (+/-0)	14 (+/-8)	28 (+/-8)	34 (+/-8)	19 (+/-7)	5 (+/-4)
Total	12 (+/-7)	22 (+/-8)	23 (+/-8)	24 (+/-8)	17 (+/-8)	3 (+/-3)
<b>Services</b>						
Small	** **	** **	0 (+/-0)	** **	6 (+/-12)	0 (+/-0)
Medium	17 (+/-11)	17 (+/-11)	23 (+/-12)	35 (+/-14)	8 (+/-8)	0 (+/-0)
Large	6 (+/-8)	31 (+/-15)	19 (+/-12)	31 (+/-15)	13 (+/-10)	0 (+/-0)
Total	** **	** **	2 (+/-1)	** **	6 (+/-12)	0 (+/-0)
<b>Total</b>						
Small	17 (+/-10)	29 (+/-14)	16 (+/-10)	30 (+/-13)	8 (+/-7)	0 (+/-0)
Medium	11 (+/-5)	21 (+/-7)	24 (+/-7)	28 (+/-7)	12 (+/-5)	4 (+/-3)
Large	0 (+/-0.3)	15 (+/-6)	27 (+/-7)	34 (+/-8)	19 (+/-6)	5 (+/-3)
Total	14 (+/-7)	26 (+/-9)	19 (+/-7)	29 (+/-9)	10 (+/-5)	2 (+/-1)

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15. As a result of the regulation, to what extent, if any, has each of the following increased or decreased in your business?

Aspect of workplace	Extent of change (percent of employers)				
	Greatly increased	Somewhat increased	About the same	Somewhat decreased	Greatly decreased
Morale (management)	6% (+/-5)	11% (+/-6)	74% (+/-9)	9% (+/-5)	1% (+/-1)
Morale (employee)	7 (+/-6)	11 (+/-5)	76 (+/-8)	5 (+/-5)	0 (+/-1)
Productivity (employee)	4 (+/-4)	4 (+/-4)	83 (+/-7)	8 (+/-5)	2 (+/-3)
Workplace-related injuries (employee)	0 (+/-0)	1 (+/-1)	82 (+/-7)	11 (+/-5)	6 (+/-5)
Workplace-related illnesses (employee)	0 (+/-0)	1 (+/-1)	84 (+/-7)	9 (+/-5)	6 (+/-5)

21. When your business receives products containing hazardous substances, or substances you believe to be hazardous, how often is the MSDS with the initial shipment, with every subsequent shipment, received whenever a manufacturer updates the MSDS, and/or received after you request the MSDS from the manufacturer or distributor?

Conditions of recent MSDS	Frequency (percent of employers responding)					
	All or almost all of the time	Most of the time	Half of the time	Some of the time	None or almost none of the time	Don't know
With the initial shipment	40% (+/-9)	28% (+/-8)	8% (+/-5)	11% (+/-6)	10% (+/-6)	4% (+/-2)
With every subsequent shipment	20 (+/-9)	23 (+/-8)	7 (+/-4)	25 (+/-8)	19 (+/-8)	6 (+/-3)
Received whenever a manufacturer updates the MSDS	33 (+/-9)	25 (+/-8)	1 (+/-1)	14 (+/-7)	10 (+/-6)	17 (+/-7)
Received after the MSDS is requested from the manufacturer or distributor	59 (+/-10)	19 (+/-8)	1 (+/-1)	9 (+/-6)	3 (+/-2)	9 (+/-6)

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23. For all the MSDSS you have received, how easy or difficult are they for you to maintain and keep up to date and to ensure employee access to them at each worksite?

Requirement	Frequency (percent of employers responding)				
	Very easy	Somewhat easy	Neither easy nor difficult	Somewhat difficult	Very difficult
Maintain MSDSS and keep up to date	24% (+/-8)	24% (+/-8)	28% (+/-8)	16% (+/-6)	7% (+/-5)
Ensure employee access to them at each worksite	34 (+/-9)	23 (+/-8)	25 (+/-8)	13 (+/-6)	6 (+/-5)

25. At your business, have you ever replaced a more hazardous substance with a less hazardous substance because of information received from a MSDS?

Industry group/ employer size	Percent of employers responding	
	Yes	No
<b>Construction</b>		
Small	**	**
	**	**
Medium	20% (+/-10)	80% (+/-10)
Large	40 (+/-11)	60 (+/-11)
Total	26 (+/-8)	74 (+/-8)
<b>Manufacturing</b>		
Small	29 (+/-19)	71 (+/-19)
Medium	38 (+/-10)	62 (+/-10)
Large	70 (+/-8)	30 (+/-8)
Total	37 (+/-17)	64 (+/-17)

(continued)

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Industry group/ employer size	Percent of employers responding	
	Yes	No
<b>Services</b>		
Small	**	**
	**	**
Medium	38 (+/-13)	62 (+/-13)
Large	58 (+/-16)	42 (+/-16)
Total	21 (+/-9)	80 (+/-9)
<b>Total</b>		
Small	25 (+/-12)	75 (+/-12)
Medium	34 (+/-7)	66 (+/-7)
Large	68 (+/-7)	32 (+/-7)
Total	29 (+/-8)	71 (+/-8)

26. Listed below are reasons why a business might not replace a more hazardous substance for a less hazardous substance. Which is the primary reason why your firm does not replace its hazardous substances?

Industry group/ employer size	Reason for not replacing hazardous substance (percent of employers responding)				
	(1)	(2)	(3)	(4)	(5)
<b>Construction</b>					
Small	7% (+/-14)	**	**	7% (+/-14)	**
Medium	7 (+/-6)	51% (+/-13)	26% (+/-11)	3 (+/-5)	13% (+/-9)
Large	5 (+/-5)	39 (+/-11)	33 (+/-11)	6 (+/-6)	17 (+/-7)
Total	7 (+/-10)	40 (+/-19)	28 (+/-18)	6 (+/-9)	19 (+/-16)

(continued)

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Industry group/ employer size	Reason for not replacing hazardous substance (percent of employers responding)				
	(1)	(2)	(3)	(4)	(5)
<b>Manufacturing</b>					
Small	0 (+/-0)	30 (+/-19)	** **	13 (+/-14)	17 (+/-16)
Medium	2 (+/-3)	35 (+/-10)	48 (+/-11)	4 (+/-4)	12 (+/-7)
Large	3 (+/-3)	34 (+/-8)	50 (+/-9)	6 (+/-4)	7 (+/-4)
Total	2 (+/-2)	33 (+/-9)	45 (+/-10)	7 (+/-6)	14 (+/-7)
<b>Services</b>					
Small	0 (+/-0)	** **	** **	7 (+/-13)	13 (+/-18)
Medium	6 (+/-7)	43 (+/-14)	33 (+/-13)	6 (+/-7)	12 (+/-9)
Large	3 (+/-6)	42 (+/-16)	36 (+/-15)	3 (+/-6)	16 (+/-12)
Total	1 (+/-1)	** **	** **	7 (+/-12)	13 (+/-17)
<b>Total</b>					
Small	3 (+/-5)	31 (+/-14)	41 (+/-14)	9 (+/-8)	17 (+/-11)
Medium	4 (+/-3)	39 (+/-8)	41 (+/-8)	4 (+/-3)	12 (+/-5)
Large	3 (+/-3)	35 (+/-8)	49 (+/-8)	6 (+/-4)	8 (+/-4)
Total	3 (+/-3)	34 (+/-9)	41 (+/-9)	7 (+/-5)	15 (+/-7)

**Legend**

- (1) Can't determine from the MSDS how hazardous the substance is
- (2) Don't know whether or not a replacement exists
- (3) No replacement exists
- (4) Replacement costs are too high
- (5) Other (Please specify)

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29. Listed below are problems that might be encountered by a business in providing training to employees on the safe use and handling of hazardous substances. To what extent, if any, do you believe these problems have been encountered at your business?

Problem	Extent of problem (percent of employers responding)					
	Little or/none	Some	Moderate	Great	Very great	Don't know/not applicable
Insufficient expertise in training	38% (+/-9)	24% (+/-8)	22% (+/-7)	6% (+/-5)	3% (+/-3)	8% (+/-5)
High employee turnover or transfer	42 (+/-9)	18 (+/-7)	10 (+/-5)	14 (+/-7)	5 (+/-3)	11 (+/-7)
MSDSs too difficult to use in the training program	36 (+/-9)	26 (+/-8)	20 (+/-7)	8 (+/-5)	5 (+/-3)	6 (+/-5)
Employees located at more than one work site	50 (+/-9)	10 (+/-5)	4 (+/-2)	9 (+/-5)	8 (+/-5)	20 (+/-7)
Employees having variable work schedules	54 (+/-9)	9 (+/-4)	12 (+/-6)	5 (+/-4)	3 (+/-3)	17 (+/-7)
High cost of training	52 (+/-9)	17 (+/-6)	13 (+/-6)	8 (+/-5)	2 (+/-2)	9 (+/-6)

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30. How useful, if at all, would the following be in training your employees on the safe use and handling of hazardous substances?

Type of training assistance	Degree of usefulness (percent of employers responding)					
	Extremely useful	Very useful	Moderately useful	Somewhat useful	Not useful at all	Not applicable
More detailed labels on hazardous product	23% (+/-8)	23% (+/-8)	23% (+/-8)	19% (+/-6)	11% (+/-6)	1% (+/-1)
MSDSs or similar information on hazardous substances that are easy to understand	30 (+/-8)	36 (+/-9)	19 (+/-8)	12 (+/-6)	3 (+/-3)	0 (+/-0.04)
More specific pamphlets or written materials targeted to the hazardous substances used in your workplace	28 (+/-9)	32 (+/-8)	17 (+/-7)	15 (+/-7)	8 (+/-7)	0 (+/-0)
Training videos targeted to the hazardous substances used in your industry	30 (+/-9)	29 (+/-8)	11 (+/-5)	13 (+/-6)	15 (+/-7)	3 (+/-3)

# Data Supporting Figures in Appendix I

**Table V.1: Data For Figure I.4**

	Percent of employers with fewer than 20 employees				
	1	2	3	4	5
Maintaining current MSDS file	26%	24%	30%	13%	7%
Assuring employees file access	37	21	24	11	7

Note: Sampling errors range from +/-14 percentage points for small employers finding it very easy to assure employees access to MSDSs to +/-7 percentage points for those small employers who find it very difficult to maintain a current MSDS file

**Table V.2: Data for Figure I.5**

	Percent of employers who found requirement somewhat/very difficult		
	1	2	3
Maintaining current MSDS file	20%	27%	50%
Assuring employees file access	18	20	30

Note: Sampling errors range from +/-12 percentage points for employers with fewer than 20 employees who find it somewhat/very difficult to maintain a current MSDS file to +/-6 percentage points for employers with 20 to 499 employees who found it somewhat/very difficult to assure employees access to MSDSs.

**Table V.3: Data For Figure I.7**

	Percent of small employers who had problems providing HCS-required training				
	1	2	3	4	5
Insufficient training expertise	46%	23%	21%	8%	3%
Employee turnover	55	18	7	17	3
MSDSs too difficult to use	47	25	17	9	3
Employees at multiple worksites	65	11	2	11	11
Employees with variable work schedules	73	3	12	8	4
High training expenses	64	12	13	10	1

Note: Sampling errors range from +/-15 percentage points for employers with fewer than 20 employees who had problems with insufficient training expertise, employee turnover, and using MSDSs in training to little or no extent; to +/-3 percentage points for those who found employees at multiple worksites a problem to a moderate extent or high training expenses to a great extent. In this table and others, response totals may not equal 100 percent due to rounding.

**Appendix V  
Data Supporting Figures in Appendix I**

**Table V.4: Data for Figure I.8**

	Percent of employers who had problems providing HCS-required training		
	1	2	3
Insufficient training expertise	54%	67%	58%
Employee turnover	45	66	68
MSDSs too difficult to use	54	76	73
Employees at multiple worksites	35	42	54
Employees with variable work schedules	27	45	63
High training expenses	37	53	53

Note: Sampling errors range from +/-15 percentage points for employers with fewer than 20 employees who had problems with insufficient training expertise, employee turnover, and using MSDSs in training to little or no extent; to +/-7 percentage points for those medium-size or large employers who had difficulty using MSDSs in their training programs.

**Table V.5: Data for Figure I.10**

	Percent of small employers who had cost increases		
	1	2	3
Paperwork/clerical	47%	38%	15%
MSDS storage	41	47	12
Written program development	44	41	14
Labeling	45	42	14
Employee training	46	46	8

Note: Sampling errors range from +/-15 percentage points for small employers who experienced little or no increase in labeling requirement costs to +/-7 percentage points for small employers who experienced a great or very great increase from increased employee training costs

**Table V.6: Data for Figure I.11**

	Percent of employers who had cost increases		
	1	2	3
Paperwork/clerical	53%	69%	76%
MSDS storage	59	60	69
Written program development	56	79	80
Labeling	56	72	75
Employee training	54	68	85

Note: Sampling errors range from +/-15 percentage points for small employers who experienced great or very great increases in labeling requirement costs to +/-6 percentage points for large employers who experienced a great or very great increase from increased employee training costs.

**Appendix V  
Data Supporting Figures in Appendix I**

**Table V.7: Data for Figure I.16**

	Percent of employers				
	1	2	3	4	5
On employers	42%	30%	18%	4%	6%
On employees	45	25	9	11	11

Note: Sampling errors range from +/-9 percentage points for employers finding a very/somewhat positive effect from HCS on employees to +/-3 percentage points for employers finding no effect from HCS on employers.

**Table V.8: Data for Figure I.17**

	Percent of employers		
	1	2	3
Quality of workplace hazard training	36%	43%	22%
Employee hazard awareness	41	39	20
Employees' care in handling/use of chemicals	41	38	21
Availability of hazard information	56	37	7
Management awareness of workplace hazards	56	31	13

Note: Sampling errors range from +/-9 percentage points for employers finding a great or very great improvement from HCS on the quality of workplace hazard training to +/-4 percentage points for employers finding slight or no improvement from HCS on the availability of workplace information.

# Comments From the Department of Labor

**U.S. Department of Labor**

Assistant Secretary for  
Occupational Safety and Health  
Washington DC 20210



FEB 24 1992

Ms. Linda G. Morra  
Director  
Education and Employment Issues  
U.S. General Accounting Office  
Washington, D.C. 20548

Dear Ms. Morra:

Thank you for your letter of February 7 to Secretary of Labor Lynn Martin, in which you requested comments on the General Accounting Office (GAO) draft report entitled, Occupational Safety and Health: Employers' Experiences in Complying With the Hazard Communication Standard. The Occupational Safety and Health Administration (OSHA) appreciates the opportunity to present comments on such an important study of hazard communication.

OSHA is encouraged by GAO's overall findings. These findings demonstrate that the Hazard Communication Standard (HCS) has contributed significantly to better safety and health for workers while, at the same time, posing minimal compliance problems for employers.

The objective of the GAO study was to examine the possible difficulties small employers may be experiencing in complying with the HCS, and the methodology underlying OSHA's estimates that was used to assess costs for small employers. OSHA applauds the report for its factual recounting of GAO's findings in the investigation of these two issues.

The GAO findings support the Agency's contention that the standard is feasible for small businesses, and that compliance results in benefits. GAO found that almost 70 percent of small employers that had made an attempt to comply with the standard were able to do so without experiencing significant burdens. This finding is consistent with OSHA's experience in implementing the rule.

Additionally, OSHA considers the benefits of complying with the HCS to be significant. GAO notes that more than half of the small employers who attempted to comply with the standard reported a vast improvement in the availability of hazard information and in management's awareness of workplace hazards. Reported reductions in injuries and illnesses were also significant. Further, GAO found that 30% of all employers (and nearly 70% of large employers) have replaced a more hazardous

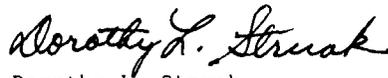
**Appendix VI  
Comments From the Department of Labor**

substance with a less hazardous substance because of information received from a Material Safety Data Sheet. In our view, that represents a very significant finding, and vividly demonstrates the tremendous impact which the HCS is having on the promotion of safe and healthful workplaces.

We were also encouraged by the finding that OSHA's methodology for estimating compliance costs is fundamentally sound. We have endeavored in all such analyses to use accepted and objective economic analysis methodologies. We will continue to try to utilize the most accurate data available in these models, and will carefully review the study's comments with respect to the calculation of non-wage benefit costs.

Finally, let me assure you that OSHA will continue its efforts in assisting employers, especially small employers, in understanding and complying with the HCS. You can be assured that the Agency intends to include the GAO report in its entirety in the record of future rulemaking on this issue.

Sincerely,



Dorothy L. Strunk  
Acting Assistant Secretary

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# Major Contributors to This Report

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## Human Resources Division, Washington D.C.

Carlotta C. Joyner, Assistant Director, (202) 512-7010  
Charles A. Jeszeck, Evaluator-in-Charge  
Susan L. Sullivan, Senior Social Science Analyst  
Wayne M. Dow, Senior Operations Research Analyst  
Tom S. Hungerford, Economist

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## Philadelphia Regional Office

David J. Toner, Regional Management Representative  
Michelle Walker, Senior Evaluator  
William F. Schmanke, Evaluator, Computer Science  
Marilyn R. Fisher, Computer Programmer Specialist

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# Related GAO Products

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Occupational Safety & Health: Worksite Safety and Health Programs Show Promise (GAO/T-HRD-92-15, Feb. 26, 1992).

Occupational Safety & Health: OSHA Action Needed To Improve Compliance With Hazard Communication Standard (GAO/HRD-92-8, Nov. 26, 1991).

Occupational Safety & Health: Worksite Programs and Committees (GAO/T-HRD-92-9, Nov. 5, 1991).

Managing Workplace Safety and Health In the Petrochemical Industry (GAO/T-HRD-92-1, Oct. 2, 1991).

OSHA's Oversight of Federal Agency Safety and Health Programs (GAO/T-HRD-91-31, May 16, 1991).

Occupational Safety & Health: OSHA Policy Changes Needed to Confirm That Employers Abate Serious Hazards (GAO/HRD-91-35BR, May 8, 1991).

Occupational Safety & Health: Inspector Opinions on Improving OSHA Effectiveness (GAO/HRD-91-9FS, Nov. 14, 1990).

Occupational Safety & Health: Options For Improving Safety and Health in the Workplace (GAO/HRD-90-66BR, Aug. 24, 1990).

How Well Does OSHA Protect Workers From Reprisal: Inspector Opinions (GAO/T HRD-90-8, Nov. 16, 1989).

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