

AN EVALUATION OF DRUG TESTING IN THE WORKPLACE

A STUDY OF THE CONSTRUCTION INDUSTRY

By Jonathan Gerber¹

Abstract:

In the last 15 years, drug testing in the workplace has gone from ground zero to widespread universal employer acceptance. This growth is particularly evident within the construction industry. High rates of drug- and alcohol-abuse in the construction industry, coupled with the high-risk, safety-sensitive nature of the industry's jobs have prompted many companies to implement a variety of drug prevention strategies — particularly when the safety of workers and the public hang in the balance.

The present study uses meta-analytic techniques to investigate the efficacy of workplace drug-testing programs in reducing injury incident rates and workers' compensation experience-rating modification factors. Empirical analysis suggest that companies that implement drug-testing programs experienced a 51% reduction in company incident rates within two years of implementation from a rate of 8.92 incidents per 200,000 work-hours to 4.36 incidents. The difference was proven statistically significant when compared to injury incident rates for the entire construction industry during the same time period. Empirical analysis of an additional data set supports the finding that companies that drug test experience a significant reduction in its workers' compensation experience-rating modification factor.

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ACKNOWLEDGEMENTS

I would like to thank the following groups and individuals for their help in producing this study:

- Professor Robert S. Smith for his insightful comments and guidance in the design of the study and survey instrument. He has immeasurably improved this report.
- Cornell University's School of Industrial and Labor Relations for their generous funding of this project.
- Carl Heinlein and the Associated General Contractors Safety and Health Committee for allowing me to utilize AGC's membership directory for the purpose of developing a survey sample.
- Fred Ariola and Mike Helvacian of the National Council on Compensation Insurance for providing me with the workers' compensation experience-rating modification factor data needed to carry out this study.
- The staff of the Institute for a Drug-Free Workplace for their comments on an early draft of this report.
- The employers that participated in this study.
- My wonderful parents, Barbara and Lee, and sister, Heidi.
- Finally, I wish to thank the following persons for their encouragement and help in producing this report: Garrett Fail, Joshua Glick, Marc Kutner, and Lauren Allison Isaacs.

EXECUTIVE SUMMARY

This report presents the findings of an independent research project at Cornell University's School of Industrial and Labor Relations directed at studying workplace drug-testing programs in the construction industry. The study, which was conducted in December 1999, had four primary objectives:

- (1) to develop an understanding of the factors that influence and inhibit the implementation of workplace drug-testing programs in the construction industry;
- (2) to determine what impact drug testing has on company performance indicators as perceived by construction industry officials (i.e. owners, human resource managers, safety directors);
- (3) to determine the empirical relationship between workplace drug-testing programs in the construction industry and company lost-time injury incident rates; and
- (4) to examine the impact of workplace drug-testing programs on the workers' compensation experience-rating modification charged (or credited) to employers in the construction industry.

To meet the study's objectives two primary research approaches were utilized. First, to explore factors affecting the implementation of workplace drug-testing programs and their effectiveness, an attitude questionnaire was administered to company officials in the construction industry (i.e. owners, human resource managers, safety directors). Secondly, longitudinal and cross-section analyses were performed to assess the effectiveness of workplace drug-testing programs on reducing company injury incident rates and workers' compensation experience-rating modification factors (MODs). Injury incident rate data needed for the study were obtained from questionnaire responses. Workers' compensation experience-rating modification factors (MODs) were provided by the National Council on Compensation Insurance (NCCI) for those companies located in states where the NCCI is the official rating bureau. Where possible, the NCCI provided MODs for the years 1995 through 2000.

The results reported are based on scientific analysis of data collected from 71 companies by a voluntary survey faxed to a randomly selected national sample of four hundred five (405) construction companies in December 1999.

Attitude Findings

According to the U.S. Department of Health and Human Services, the construction industry has a higher percentage of current illicit drug and alcohol users than any other occupation category. It is estimated that in 1997, 14.1 percent of full-time construction workers, aged 18-to-49, were current illicit drug users, and 12.4 percent engaged in heavy alcohol use. This percentage is nearly double the national average for all industries of 7.7 percent and 7.6 percent, respectively.

- The overwhelming majority of respondents, regardless of whether their company has a drug-testing program in place, perceive substance abuse to be a moderately serious problem in the construction industry.
- The majority of construction company officials believe the problem of drug- and alcohol-abuse in the construction industry has decreased in the past five years.

From large international corporations to relatively small local contractors, construction companies are implementing programs to ensure that their workforces are productive, their workplaces are safe, and the success of their businesses is not hindered by substance abuse.

- The number one reason why employers in the construction industry drug test their employees and job applicants is to promote the safety of their workers and those who use their products and services. In addition, company officials believe that drug testing contributes positively to a company's image and is an effective deterrent in preventing drug abuse.

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- The number one reason why some employers in the construction industry do NOT drug test their employees and job applicants is a concern for increased legal liability. In addition, some company officials believe that drug testing is too costly and/or is prohibited/restricted by state legislation.
- Company size is a significant factor in whether a construction company has a drug-testing program in place. As a result, small firms may be particularly vulnerable to problems of substance abuse because drug abusers seek out firms that do not test.
- In addition, state laws prohibiting or restricting and employers' right to drug test significantly hinders the implementation of drug-testing programs.

Performance Indicator Findings

- Drug testing is notably effective in reducing workers' compensation experience-rating modification factors. Over a five-year period from 1995 to 2000, the average company that implemented drug testing between 1994 and 1996 experienced an 11.41 percent reduction in its workers' compensation experience-rating modification factor from a MOD of 0.973 to a MOD of 0.862. This difference was found to be statistically significant.
- Drug testing is most effective in reducing workers' compensation experience-rating modification factors in the first three years immediately following the implementation of a program.
- The average company that drug tests in the study sample reduced its injury incident rate 51 percent within two years of implementation from a rate of 8.92 injuries per 200,000 work-hours to 4.36 injuries per 200,000 work-hours. This difference was found to be statistically significant.
- More than 72 percent of respondents with a drug-testing program in place believe that the benefits of drug testing outweigh the costs. Only 11 percent (or four respondents) believe the costs to be greater.
- Company officials generally believed that their drug-testing program had a positive impact on all organizational indicators. According to respondents, drug-testing programs made the most positive impact on the overall safety of the work environment, quality of job applicants, and reducing workers' compensation costs.

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INTRODUCTION

Drug testing is part of the fabric of hiring and employment in America today. In the last 15 years, drug testing in the workplace has gone from ground zero to widespread universal employer acceptance. In 1983, less than one percent of employees were subject to drug testing. Today, approximately 49 percent of full-time workers, aged 18-to-49, are subject to some form of workplace drug testing (SAMHSA, 1999:56).

This growth is particularly evident within the construction industry, which has long considered safety a top priority. High rates of drug- and alcohol-abuse in the construction industry, coupled with the high-risk, safety-sensitive nature of the industry's jobs have prompted many companies to implement a variety of drug prevention strategies including drug testing, particularly when the safety of workers and the public hang in the balance.

The U.S. Department of Health and Human Services (HHS) reports that the construction industry has a higher percentage of current illicit drug and alcohol users than any other occupation category. It is estimated that in 1997, 14.1 percent of full-time construction workers, aged 18-to-49, were current illicit drug users, and 12.4 percent engaged in heavy alcohol use. This percentage is nearly double the national average for all industries of 7.7 percent and 7.6 percent respectively (SAMHSA, 1999:26).

Despite having the highest percentage of substance-abusing workers, the construction industry ranks near the bottom for the percentage of workers subject to drug testing. In 1997, 25.8 percent of full-time construction workers, aged 18-to-49, reported that their employer screened applicants for drugs; 25.7 percent said that they were subject to random testing; 22.4 percent were subject to "for-cause" testing; and 27.2 percent were subject to post-accident testing (SAMHSA, 1999:57). The national average for all industries in 1997 were 38.6, 25.4, 30.1, and 28.7 percent respectively (SAMHSA, 1999:56). Furthermore, in 1997 only 55.6 percent of full-time construction workers, aged 18-49, reported that their workplace had a written policy concerning drug or alcohol use. The national average reported in 1997 was 70.3 percent (SAMHSA, 1999:45).

The detrimental effects of substance abuse in the workplace are well documented and have human costs that are unacceptable to any reasonable person. According to the President's Drug Advisory Council, drug abuse costs American employers \$75 billion annually — or \$640 for every employee in the country. Specific examples also illustrate the costs of employee drug abuse effectively: (1) the former Chairman of General Motors said that drug abuse costs GM \$1 billion per year; (2) a BellSouth spokesman said that 40 percent of its health care costs were attributable to substance abuse; and (3) American Airlines lost \$19 million due to one employee — high on marijuana at the time — at its central reservation computer (de Bernardo, 1994:11).

A study published by the National Council on Compensation Insurance (NCCI) stated that in 1989 "a 10 percent reduction in alcohol consumption would have reduced total workers' compensation costs by 5.6 percent to 4.1 percent due to frequency and 1.5 percent due to severity." This would have translated to a savings of \$2.5 billion including \$1.85 billion due to a reduced frequency of claims, and \$468 million due to a reduction in claim severity (Durbin, 1991:40).

Despite this and many other studies providing clear evidence of the deleterious effects of substance-abuse on safety and other job performance indicators, in September 1999 the American Civil Liberties Union (ACLU) released a 27-page report, "Drug Testing: A Bad Investment." The ACLU accuses drug testing advocates of promoting "junk science" based on "unsubstantiated claims" and "phantom research" (ACLU, 1999:5).

This report presents the results of a study conducted to test the hypothesis that drug testing is worthwhile. It is the author's hope that the information contained in this report will serve to inform company officials in the construction industry.

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DEFINITIONS

Incident rate, as defined by the Occupational Safety and Health Administration (OSHA), is the total recordable occupational injuries and illnesses per 100 full-time workers (or 200,000 work-hours) per year.

$$\text{Change} = \text{INRTB} - \text{INRTA}$$
$$\text{RChange} = [(\text{INRTB} - \text{INRTA})/\text{INRTB}] * 100\%$$

where INRTA = incident rate after the implementation of drug testing; and INRTB = incident rate before the implementation of drug testing. Where possible these variables were computed by taking the average of two years.

The experience period used to determine an employer's workers' compensation experience-rating modification factor (or MOD) generally consists of three completed years of experience ending one year prior to the effective date of the modification. For example, for a rating effective January 1, 2000, the experience period would contain experience from policies effective January 1, 1996; January 1, 1997; and January 1, 1998.

$$\text{Change} = 1995 \text{ MOD} - 2000 \text{ MOD}$$
$$\text{RChange} = [(1995 \text{ MOD} - 2000 \text{ MOD})/1995 \text{ MOD}] * 100\%$$

where 1995 MOD = modification factor in 1995; and 2000 MOD = modification factor in 2000.

RESEARCH OBJECTIVES

The primary objectives of the research was to measure statistically the effect of drug testing on company injury incident rates and workers' compensation experience-rating modification factors (MODs) for a sample of construction companies over a period of five years. This was accomplished by evaluating the average Change after the implementation of drug testing in the sample. The fundamental hypothesis was that company injury incident rates and MODs decrease significantly following the implementation of a drug-testing program.

The first null hypothesis was that the two variables INRTB and INRTA are equal (not significantly different), versus the alternative hypothesis that the two variables are not equal (significantly different). Mathematically speaking

$H_0: \mu = 0$ ($\mu = \text{Change} = \text{INRTB} - \text{INRTA}$) *against*

$H_A: \mu \neq 0$

The second null hypothesis was that company MODs in the years 2000 and 1995 are equal (not significantly different), versus the alternative hypothesis that the MODs are not equal (significantly different). Mathematically speaking

$H_0: \mu = 0$ ($\mu = \text{Change} = 2000 \text{ MOD} - 1995 \text{ MOD}$) *against*

$H_A: \mu \neq 0$

The secondary objectives of the study were to develop an understanding of the factors that influence and inhibit the implementation of workplace drug-testing programs in the construction industry and to determine what impact drug testing has on company performance indicators as perceived by construction industry officials (i.e. owners, human resource managers, safety directors).

LIMITATIONS, ASSUMPTIONS, & DEFINITIONS

Because the sample was not large enough to break down by category, all drug-testing programs were treated equally. In cases of a company implementing different drug testing types in different years, the first type implemented was considered the beginning of the policy implementation. Furthermore, no distinction was made between general contractors and sub-contractors.

The ideal research vehicle for examining the issues presented in this report would be an extensive database of individual claim data that includes the direct cause of the incident, from a variety of construction firms and under a variety of circumstances. These data unfortunately do not exist. The present analysis is offered as a second best strategy for evaluating this important public policy issue. Hopefully, future research will be possible to refine the analysis presented here.

A confidence interval of 95 percent (5 percent significance level) was adopted as a criterion for acceptance or rejection of any hypothesis except where mentioned otherwise.

The term substance abuse refers to problems associated with the abuse of all drugs, legal and illegal, including alcohol. Tobacco was not included.

Current illicit drug use is defined as any illicit drug use in the past month. Heavy alcohol use is defined as having 5 or more drinks per occasion on 5 or more days in the past month.

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METHODOLOGY

To meet the study's objectives two primary research approaches were utilized. First, to explore factors affecting the implementation of workplace drug-testing programs and their effectiveness, an attitude questionnaire was administered to company officials in the construction industry (i.e. owners, human resource managers, safety directors). Secondly, longitudinal and cross-section analyses were performed to assess the effectiveness of workplace drug-testing programs on reducing company injury incident rates and workers' compensation experience-rating modification factors. Incident rate data needed for the study were obtained from questionnaire responses. Workers' compensation experience-rating modification factors (MODs) were provided by the National Council on Compensation Insurance (NCCI) for those companies located in states where the NCCI is the official rating bureau. Where possible, the NCCI provided MODs for the years 1995 through 2000.

Four hundred five (405) construction companies were solicited to participate in this study. These companies were chosen randomly from the national membership directory of the Associated General Contractors (AGC). No distinction was made between company size, location, or type of service provided. The presence of a drug-testing program was not known prior to solicitation. Randomly selected companies were sent a cover letter and four-page questionnaire via facsimile. The questionnaire was designed to be answered by both companies with and without drug-testing programs in place.

A total of 75 companies responded, of which four had insufficient data and are not included in this report. Of the 71 participating companies that are included in this report, 50 had a drug-testing program in place at the time of the survey (December 1999). Caution must be exercised when estimating the population percentage of construction companies that have drug-testing programs in place. The responding companies are self-selected and the sample percentage (50 out of 71, or 70 percent) does not truly represent the prevalence of drug testing in construction industry population. The current percentage of construction companies believed to conduct drug testing is 27.2 percent (SAMHSA, 1999:57).

PROFILE OF SURVEY RESPONDENTS

Since the group responding to the questionnaire was self-selected, the respondents and their companies are characterized in this section to provide some idea of the respondent population.

The largest proportion of respondents identified themselves as a president or owner (35 percent). An additional 23 percent indicated that they were a safety or risk management manager/director, and 13 percent stated that they held a personnel or human resources position.

	Count	Percent
Personnel, human resources	9	13.04
Director of safety, risk management	16	23.19
Vice president, CFO, manager, administrator, controller	15	21.74
CEO, president, owner	24	34.78
All other	3	4.35
Unknown	2	2.90

The distribution of the study sample by employer size is provided in Table 2. Close to half of the companies in the study sample were small firms with less than 199,000 annual work-hours or 99 employees (48 percent). Medium-sized companies with 200,000 to 499,000 annual work-hours comprised nearly 34 percent of the sample and 18 percent of respondent firms had more than half a million annual-work hours or 250 employees.

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Table 2: Distribution of Respondents by Company Size			
Number of Annual Work Hours	Employee Equivalent	Count	Percent
up to 99,000	up to 49	14	31.82
100,000 – 199,000	50-99	7	15.90
200,000 – 499,000	100-249	15	34.09
500,000 or more	250 or more	8	18.18

The majority of respondents (61 percent) reported that their worksite were open-shopped (union membership is not a prerequisite for employment). The remaining 39 percent hire only through a union. This percentage is somewhat higher than the industry average. According to the U.S. Bureau of Labor Statistics, industry-wide, the vast majority of wage and salary construction workers are not union members. In 1999, 19.1 percent of industry workers were members of a labor union or a representative employee association (BLS, 2000).

Table 3: Distribution of Respondents by Union Status		
	Count	Percent
Union	26	39.39
Non-union	40	60.61

Employers with drug-testing programs were asked when they began their testing program. More than half (57.14 percent) of all respondents reported implementing a drug-testing program during or after 1994.

Table 4: Distribution of Respondents that Drug Test by Year of Program Implementation		
	Count	Percent
1985 – 1987	5	10.20
1988 – 1990	7	14.29
1991 – 1993	9	18.37
1994 – 1996	12	24.49
1997 – 1999	16	32.65

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QUESTIONNAIRE RESULTS

Presented in this section are findings obtained from the attitude portion of the questionnaire. Four areas were examined: (1) respondent perceptions of the magnitude of substance abuse in the construction industry, (2) factors affecting the implementation of workplace drug-testing programs, (3) beliefs about their effectiveness, and (4) attitudes toward Federal and state regulations.

PERCEPTION OF SUBSTANCE ABUSE IN THE CONSTRUCTION INDUSTRY

Respondent severity ratings of the magnitude of substance abuse in the construction industry are presented in Table 5. The majority of respondents, regardless of whether their company drug tests, agree that as far as problems affecting the construction industry in the United States go, drug- and alcohol-abuse is a moderately serious problem. Not one respondent stated that he/she thought that substance abuse in the construction industry was not a problem.

	Companies that Drug Test		Companies that Do Not Drug Test		All Companies	
	Count	Percent	Count	Percent	Count	Percent
A very serious problem	8	21.05	1	5.56	9	16.07
A moderately serious problem	23	60.53	10	55.56	33	58.93
A somewhat mild problem	6	15.79	4	22.22	10	17.86
A very mild problem	1	2.63	3	16.67	4	7.14
No problem at all	0	0.00	0	0.00	0	0.00
Total	38	100.00	18	100.00	56	100.00

Table 6 contains respondent estimates of the proportion of employees who abuse drugs or alcohol in the construction industry. Estimates were evenly split with most respondents reporting a mean of 16 to 20 percent. This estimate is slightly higher than the national average of current illicit drug users reported by the Department of Health and Human Services (14.1 percent). There was virtually no relationship between having a drug-testing program in place and respondent estimates of the prevalence of substance abuse.

	Companies that Drug Test		Companies that Do Not Drug Test		All Companies	
	Count	Percent	Count	Percent	Count	Percent
0 to 5%	3	7.89	1	5.56	4	7.14
6 to 10%	4	10.53	4	22.22	8	14.29
11 to 15%	8	21.05	2	11.11	10	17.86
16 to 20%	10	26.32	4	22.22	14	25.00
21 to 25%	6	15.79	5	27.78	11	19.64
More than 25%	7	18.42	2	11.11	9	16.07
Total	38	100.00	18	100.00	56	100.00

Respondents were asked to state whether they thought problems with substance abuse in the construction industry, compared to five years ago, have increased, decreased, or remained the same. As shown in Table 7, respondents from companies that drug test and companies that do not drug shared the same perception of the trend of substance abuse in the construction industry. Respondents generally believed that substance abuse has decreased in the past five years (46.30 percent). Only 20 percent stated that they thought substance abuse in the industry has increased since 1995.

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	Companies that Drug Test		Companies that Do Not Drug Test		All Companies	
	Count	Percent	Count	Percent	Count	Percent
Increased	8	21.62	3	17.65	11	20.37
Decreased	17	45.95	8	47.06	25	46.30
Remained the same	12	32.43	6	35.29	18	33.33
Total	37	100.00	17	100.00	54	100.00

INFLUENCES & INHIBITORS OF DRUG TESTING IMPLEMENTATION

One of the primary research objectives of this study was to identify factors that influence or inhibit the implementation of drug-testing programs in the construction industry. Such factors are examined in this section.

Importance of Reasons for Implementing Drug-Testing Program

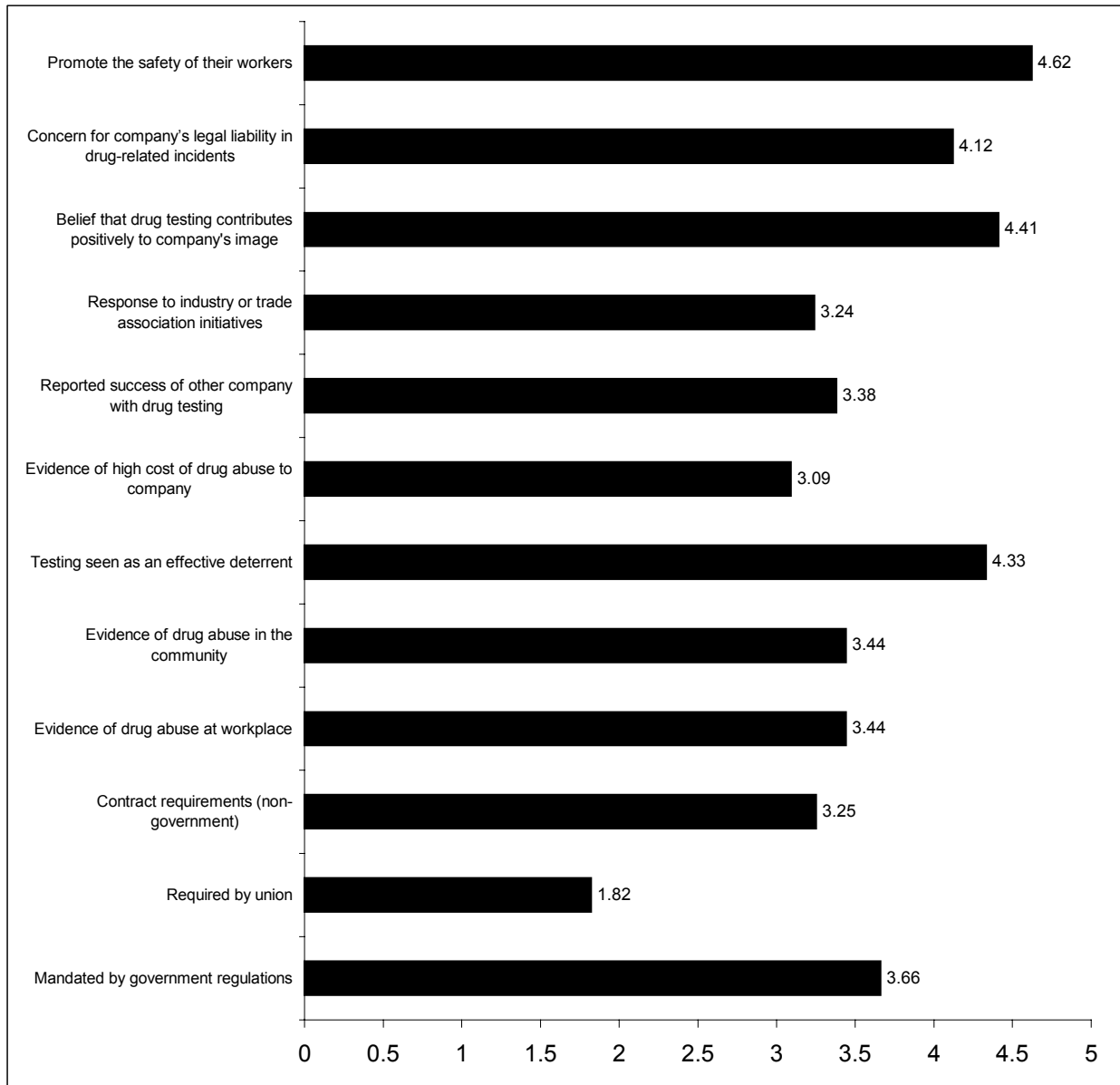
Respondents were asked to rate the importance of 12 factors in their decision to implement a drug-testing program. The rating scale ranged from 1 to 5, with 1 being “very unimportant” and 5 being “very important.” Figure 1 displays the mean scores of the reasons given by respondents. The top three reasons for implementation were: to promote the safety of their workers and those who use their products and services (4.62); a belief that drug testing contributes positively to a company’s image (4.41); and as an effective deterrent — getting employees to stop using illicit drugs or preventing them from starting (4.39). The only factor that was rated as being unimportant was union requirements (1.82).

One factor which was also found to influence employers’ decision to implement drug testing is to fulfill contract requirements, both government (3.66) and non-government (3.25). This is particularly true of large companies. Many clients that enter into contracts with construction firms have begun to require drug testing of workers both to minimize legal liability and in recognition of the benefits of a drug-free workplace. The largest client of construction services — the U.S. Government — in 1988 enacted the Drug Free Workplace Act that requires government contractors who seek a federal contract valued at \$25,000 or more to certify that it will provide a drug-free workplace by taking specific actions that may include drug testing. Several states have enacted similar legislation.

In addition, some respondents stated that their decision was influenced by the possibility of saving on their workers’ compensation premiums (3.69). In recent years a number of states have established voluntary programs that offer employers at least a five percent discount on their workers’ compensation insurance premium if they implement drug-free workplace programs that include drug testing by the state. Some insurance companies have voluntarily offered similar programs to their customers. The effectiveness of drug-testing programs in lowering workers’ compensation experience-rating modification factors will be discussed in a later section.

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Figure 1: Importance of Reasons for Implementing Drug-Testing Programs



Means are based on the following scale: 1 = Very Unimportant, 2 = Unimportant, 3 = Neutral, 4 = Important, 5 = Very Important

Importance of Reasons for Not Implementing Drug-Testing Program

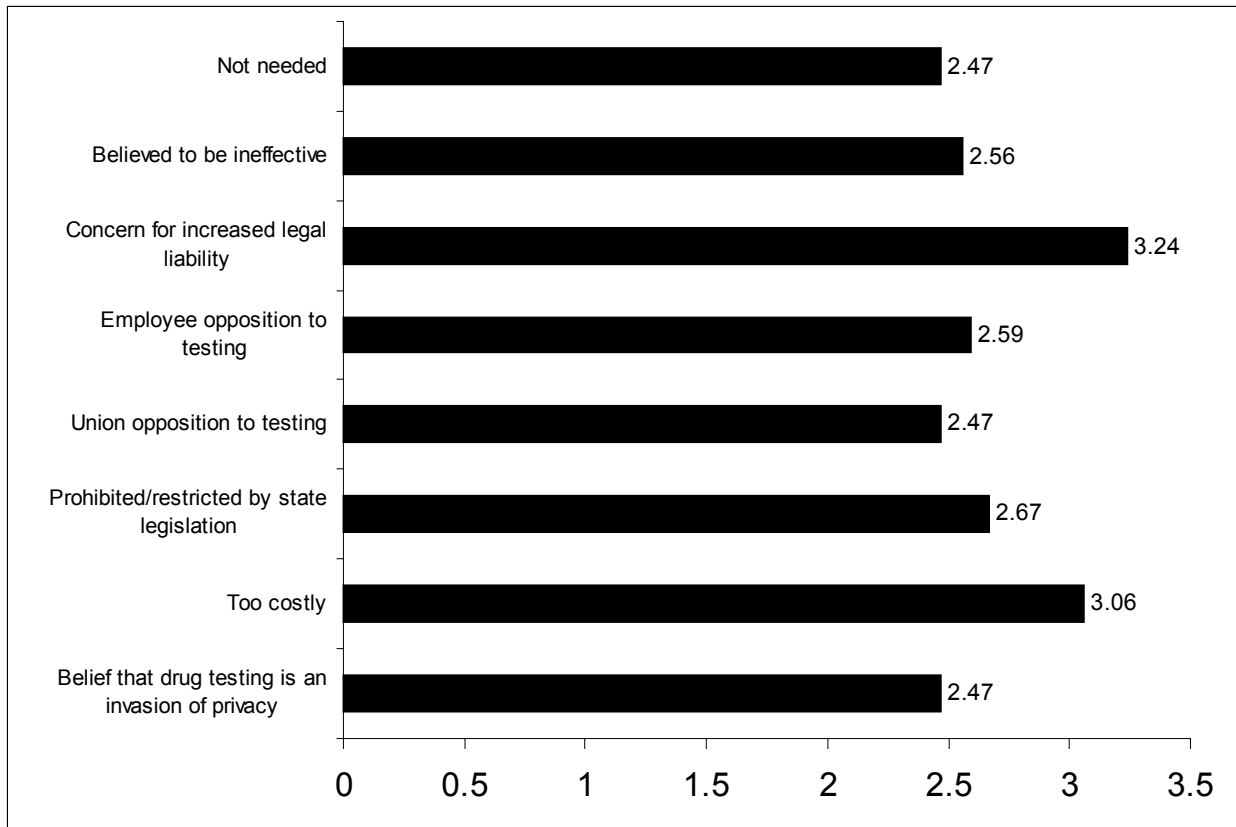
Respondents who indicated that they did not drug test were asked to rate the importance of each of 8 reasons in their company's decision not to implement a program. The same 1 to 5 scale used to determine why drug-testing programs were implemented was also used to assess why such programs were not implemented. Figure 2 displays the mean scores of the reasons given by respondents as to why they decided not to implement a drug-testing program. Most factors were considered neutral to slightly important. Nevertheless, the top three reasons mentioned were: concern for increased legal liability (3.24), too costly (3.06), and prohibited/restricted by state legislation (2.67). Not one factor was considered by respondents to be unimportant.

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Certainly the decision to implement a drug-testing program is an economic decision like any other company decision. There are expected costs and benefits. For a business decision to make economic sense the costs must be outweighed by the expected benefits. Ultimately, both the costs and potential benefits of the program must be assessed. A drug-testing program typically has fixed and variable costs. The fixed costs may include policy development, legal consultation, supervisor training, employee drug-awareness education, and, in some instances, the setup of an employee assistance program. The variable costs are related to the number of tests conducted and the number of tests confirmed by a medical review officer annually — these costs depend on the testing method used (i.e. urinalysis, hair, blood, sweat patch, saliva, and breath), the location of the specimen collection site (on-site or off-site), the number of drugs tested for, and their respective cut-off levels.

Comparatively, employee (2.59) and union opposition (2.47) were also rated as important inhibitors. This seems reasonable since drug-abusing workers are likely to oppose the implementation of a workplace drug-testing program and express their dissent. It is also likely that unionized workers would oppose drug testing as an infringement of their privacy. It is not unforeseeable that drug testing can be viewed differently by employees. Some may accept drug testing as an effective tool to promote drug-free workplaces, while others may regard it as infringement upon their right to privacy. How employees receive it depends largely on whether employers take appropriate procedural safeguards in implementing and developing the drug-testing policy. These safeguards may include involving employees in developing company policy, consistent enforcement of company policy, effectively communicating company policy to all employees, maintaining confidentiality of results and proper chain-of-custody procedures, providing employees with rehabilitation or an employee assistance program, and educating employees about the dangers of drugs and alcohol.

Figure 2: Importance of Reasons for Not Implementing Drug-Testing Programs



Means are based on the following scale: 1 = Very Unimportant, 2 = Unimportant, 3 = Neutral, 4 = Important, 5 = Very Important

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Analysis of Structural Factors

To gain a better understanding of potential inhibitors of the implementation of drug testing, a regression was conducted to examine the structural differences between respondent companies that drug test and that do not drug test. The company characteristics studied were: (1) company size, (2) union status, (3) state laws governing an employers' right to drug test, and (4) the magnitude of company incident rates before testing. Table 8 contains the definitions for variables considered in the analysis.

Variable	Definition
Company size	Average total company work-hours in 1997-98 (per 200,000 work-hours)
Union status	Indicator Variable = 1 if company hires only through a union
Magnitude of company incident rates	For companies that drug test: INRTB For companies that do not drug test: average incident rate in 1997 and 1998
State laws	Indicator Variable = 1 if company is located in state with prohibitive or restrictive drug testing legislation

The regression results for this analysis are presented in Table 9. The results suggest that company size, magnitude of company incident rates, and state laws governing an employers' right to drug test are significant factors that may impact the implementation of a workplace drug-testing program.

Constant	0.5865
Company size	0.0769 (2.56)**
Union status	-0.0027 (-0.02)
State laws	-0.4762 (-3.13)***
Magnitude of company incident rates	0.0122 (1.71)*
Sample Size	40
F Statistic	4.56
R-squared	34.2%

* Statistically significantly different at $p < .10$; ** at $p < .05$; *** at $p < .01$.

State laws

It was revealed by the regression analysis that the nature of state laws is an important determinant of a company's decision or capability to implement a drug-testing program. At the time the survey was administered (December 1999), six states had restrictive or anti drug-testing laws. They are Minnesota, Montana, Maine, Connecticut, Rhode Island, and Vermont. While the laws in each of these states differ, they all substantially limit the employers' right to drug test his/her workers.² It is often very difficult for employers in these states to implement such a program without facing serious legal liability. In these states, the probability of adopting a drug-testing program falls by 47 percent, holding all other factors constant.

Size

It seems logical that there exists a strong relationship between company size and the decision to implement drug testing. According to the U.S. Department of Health and Human Services, small workplaces (fewer than 25 employees) are least likely to have a drug-testing program in place. In 1997, about three-fourths (73.6%) of full-time workers employed in large establishments (500 or more employees) reported that their workplace had at least one type of workplace testing program. Slightly more than half (57.5%) of employees in medium-size establishments (25 to 499 employees) reported at least one type of workplace testing program; and 27.5 percent of in

² On the other hand, other states have encouraged workplaces to adopt drug testing, even going as far as establishing voluntary programs that offer employers discounts on their workers' compensation insurance premium.

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small-size establishments (less than 25 employees) reported that their workplace had at least one type of workplace testing program (SAMHSA, 1999:56).

Several factors may contribute to this relationship. First, organizational size has been positively associated with formalization (Hall, et al., 1967). Second, the per worker cost of establishing and maintaining a drug-testing program are less for large companies due to economies of scale. Third, large construction firms are more likely to win government contracts that stipulate them taking specific actions that may include drug testing. Fourth, because of experience-rating and related factors, lowering workers' compensation costs provides greater incentives for large firms than for small firms since the degree of experience rating is greater in large firms (Collier, 1995:4). Fifth, smaller companies tend to have a strong desire to sustain a "family" environment. Finally, small companies tend to have fewer resources to implement aggressive policies. Unfortunately, because of these factors, small companies are particularly vulnerable to problems of substance abuse among their employees because drug abusers may seek work at smaller firms where the likelihood of drug testing is slim.

Magnitude of company incident rates

The regression analysis results support the view that companies with higher incident rates are more likely to implement drug testing as a possible solution. This relationship seems logical as employers may believe substance abuse is the likely cause of this high incident rate, and thus, may decide to implement a drug-testing program.

Union status

Union status was not found to be a significant factor in employers' decision to implement drug testing. According to the questionnaire, 53 percent of respondents believe that labor unions were supportive or very supportive of the company's decision to implement drug testing. Only 23.5 percent of company officials stated that labor unions were opposed to drug testing. In addition, many companies mentioned that different unions had different reactions towards drug testing. As a result, within some firms, certain employees were not subject to testing as per union restrictions.

Table 10: Perceptions on Labor Union Involvement

	Count	Percent
Very supportive	2	11.76
Supportive	7	41.18
Indifferent	4	23.53
Opposed	3	17.65
Strongly opposed	1	5.88

In recent years, many construction groups and associations have recognized the benefits of drug testing and have encouraged construction companies to implement programs. The American Road & Transportation Builders Association (ARTBA) offers its members a variety of substance abuse prevention services through an outside, independent contractor. In addition, the American Subcontractors Association (ASA) and the Associated General Contractors (AGC) offer education materials and informational videos specifically designed to help members deal more effectively with the problems of drugs in the workplace.

PERCEIVED EFFECTIVENESS OF DRUG TESTING

The perceptions of respondents about the effectiveness of drug testing are explored in this section.

Respondents that drug test were asked to consider the costs and benefits of their company's drug-free workplace program and state whether they believed the costs are greater, less than, or equal to the benefits. More than 72 percent of respondents believe that the costs of drug testing are less than the benefits it provides. Only 11 percent (or four respondents) believe the costs to be greater.

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Table 11: Perceptions of the Costs & Benefits of Drug Testing Companies that Drug Test		
	Count	Percent
Costs are greater than the benefits	4	10.81
Costs are less than the benefits	27	72.97
Costs are offset by the benefits	6	16.21
Total	37	100.00

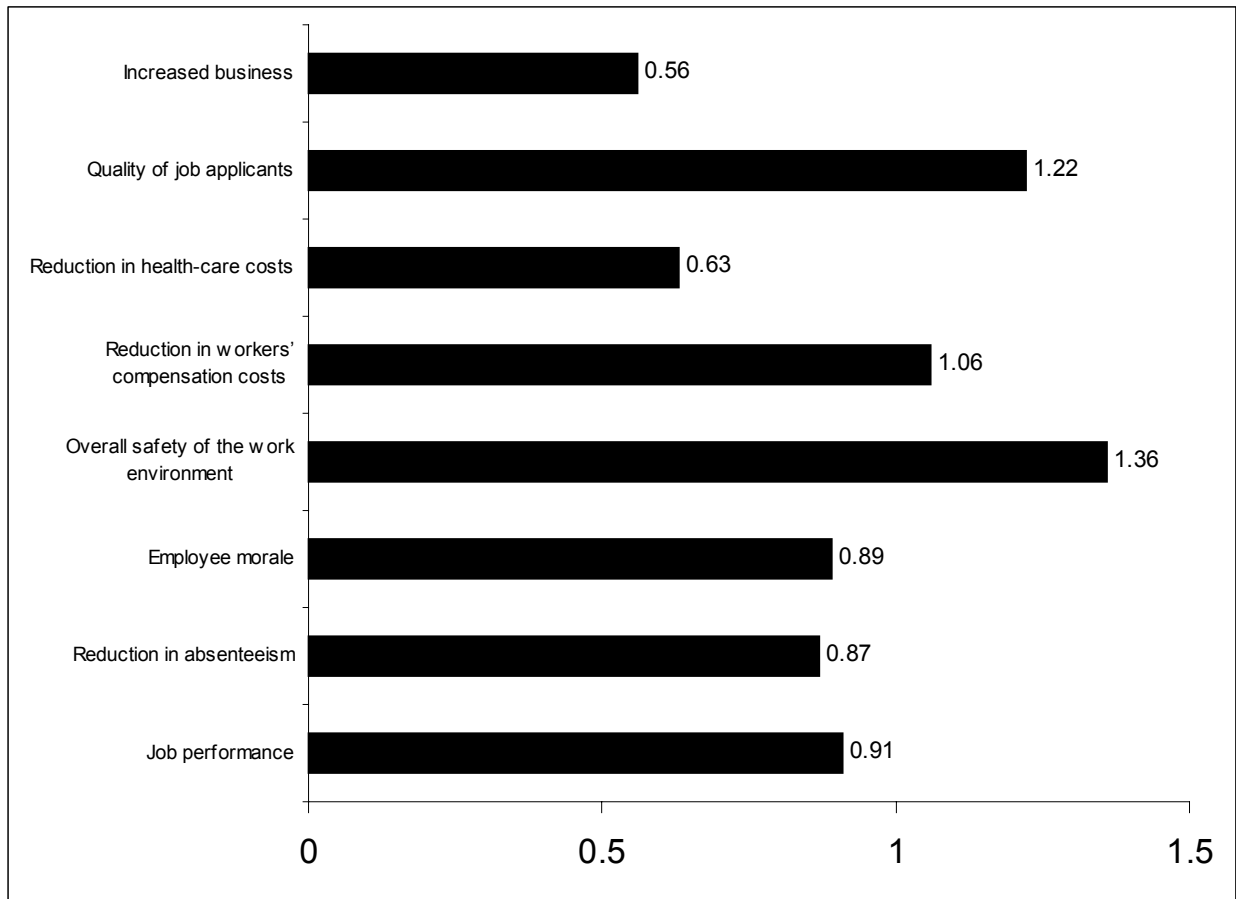
Respondents that drug test were also asked to rate the impact of their company’s drug-testing program on several organizational indicators including job performance, absenteeism, employee morale, safety of the work environment, workers’ compensation and health care costs, quality of the job applicants, and the level business in general. The rating scale ranged from +2 to –1 with +2 being “significant improvement”, +1 being “some improvement”, 0 being “no impact”, and –1 being “adverse impact”.

As Figure 3 shows, company officials generally believed that their drug-testing program had a positive impact on all organizational indicators. According to respondents, drug-testing programs made the most positive impact on the overall safety of the work environment (1.36), quality of job applicants (1.22), and reducing workers’ compensation costs (1.06). The impact of drug testing on company incident rates and workers’ compensation costs will be discussed in later sections. The least significant improvement was experienced in the overall level of business. Health-care costs were also only improved marginally. No organization performance indicator was perceived by respondents to be impacted adversely by drug testing.

When asked to note the most important positive aspect of workplace drug testing, most respondents mentioned that drug testing is an effective “self-screening” method of deterrence. In other words, it enables employers to effectively screen out potential drug problems before they become *their* drug problems. When a company announces that it has adopted a drug-testing program, three things generally happen immediately: (1) the company gets fewer job applicants; (2) some applicants walk into the company’s personnel office, realize they would be subject to drug testing, and walk out; and (3) some applicants, when called back for a preemployment drug screening, decline. For this reason, the mere announcement that a company has a drug-testing program has favorable effects. Before the company ever administers a single drug test, it already will have screened out many potential drug problems for its workplace. It is by far the most common type of drug testing in the workplace and is the least controversial, most cost-effective, and legally safe type of testing available to employers. There are no issues of performance, severance pay, benefits, seniority, or pensions; and it is the least likely to cause morale problems in the workplace. In addition, it sends a message out to new and existing employees that the company is intolerant of drug abuse (de Bernardo, 1994:22-23).

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Figure 3: Impact of Drug-Testing Program



Means are based on the following scale: -1 = Adverse Impact, 0 = No Impact, 1 = Some Improvement, 2 = Significant Improvement

ATTITUDES TOWARD FEDERAL AND STATE REGULATIONS

Another area of examination in the questionnaire was the views of respondents about state and Federal regulations concerning drug testing. In general, respondents felt that Federal and state regulations should be made somewhat stronger than they are currently, as seen in Table 12. Although close to 40 percent felt that the current laws are just right the way they are. Only one respondent stated that he/she felt the current regulations should be eliminated completely. The reader should keep in mind that in most instances, responses to this question varied by state. In addition, only companies that drug test were asked to complete this question.

	Count	Percent
They should be made much stronger	9	24.32
They should be made somewhat stronger	10	27.03
They are just right the way they are	15	40.54
They should be weakened somewhat	2	5.41
They should be eliminated completely	1	2.70
Total	37	100.00

DRUG TESTING AND COMPANY INCIDENT RATES

The construction industry has taken great strides to improve the safety and health on construction worksites. Since 1988, injury incident rates for the entire United States construction industry population have fallen steadily annually. In ten years, from 1988 to 1998, the industry's injury incident rate decreased more than 40 percent, from 14.6 injuries per 200,000 work-hours to 8.8 injuries per 200,000 work-hours (See Table 13). Among the efforts taken have been additional worker training, education, incentive programs, and employee involvement. This section will examine whether this steady decrease can be ascribed (at least in part) to the implementation of drug-testing programs in construction firms in recent years.

Table 13: U.S. Construction Industry Injury incident Rates (total recordable cases)											
Bureau of Labor Statistics											
Year	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
National Rate	14.6	14.3	14.2	13.0	13.1	12.2	11.8	10.6	9.9	9.5	8.8

The average company that drug tests in the study sample reduced its injury incident rate 51 percent within two years of implementation from a rate of 8.92 injuries per 200,000 work-hours to 4.36 injuries per 200,000 work-hours.³ The reader should bear in mind that injury incident rates for the entire construction industry have decreased steadily over the past ten years. In fact, in an average five-year period between 1988 and 1998, injury incident rates for all companies have declined approximately 19 percent.

The average injury incident rates for all respondents by year in relation to the year of implementation (for companies that drug test only), as well as for the years 1997 and 1998 (for both companies that do and do not drug test) are provided in Table 14.

Table 14: Injury incident Rates for Study Sample		
Year	Companies that Drug Test	Companies that Do Not Drug Test
Two years prior to implementation	8.79	
One year prior to implementation	8.66	
One year after implementation	4.61	
Two years after implementation	5.06	
INRTB	8.92	
INRTA	4.36	
Change	-4.56	
RChange	-51.12%	
1997	4.87	5.13
1998	4.15	6.32

For the fundamental hypothesis that company injury incident rates decrease significantly following the implementation of a drug-testing program (the two variables INRTB and INRTA are equal), a paired t-test was conducted. It was found that $t = -6.298$ with a probability less than or equal to 0.0001 that the null hypothesis cannot be rejected. In other words, the difference in the mean incident rates before and after the implementation of a drug-testing program (Change) is significant at the 1% significance level.

³ By sorting the study sample according to particular company structural factors further observations were studied. Cross-section analyses of Change (INRTB – INRTA) versus particular company structural factors revealed that there exists no significant correlation between the decline in company injury incident rates following the implementation of drug testing and company size, union status, and recent significant company growth.

DRUG TESTING AND EXPERIENCE-RATING

Workers' compensation laws mandate that if a person is injured while in his/her role as an employee, the employer is automatically liable for medical care and partial replacement of wages.⁴ As such, workers' compensation provides employers with effective financial incentives to implement workplace safety programs and policies that may include drug testing (Kahley and Sornberger, 1995). The incentives of these programs to prevent workplace injuries and illnesses can be observed through experience rating.

Experience-rating is a statutorily mandated program designed to charge certain employers insurance premiums based on individual past loss experience. The experience is used to calculate the premium by using a formula modification, or MOD, which compares the employer's actual loss record to the overall average for its particular business type in the state. Each business, according to its industry, has an annual number of expected workers' compensation losses. If the company's losses equal the industry standard for that year in that state, its experience-rating modification factor is 1.00. Safer-than-average firms have a MOD lower than 1.00. Conversely, firms with higher-than-average losses have a MOD higher than 1.00. In use, a modification of 1.50 increases a \$300,000 premium to \$450,000. The appropriate rating bureau (i.e. NCCI) typically computes and promulgates experience-ratings for eligible insureds annually and provides this information to the insureds' carrier for calculation of the policy premium.

In Table 15 the average experience-rating modification factors are provided, broken down by year. The year of program implementation is not considered.

Table 15: Experience-Rating Modification Factors for Study Sample			
Year	Drug Test	Do Not Drug Test	All Companies
1995	0.923	0.935	0.926
1996	0.936	0.955	0.941
1997	0.895	0.957	0.914
1998	0.898	0.982	0.922
1999	0.833	0.958	0.871
2000	0.842	0.950	0.870

Table 16 displays the distribution of the study sample by year of program implementation. More than half (54.54 percent) of the companies analyzed in this section began drug testing during or after 1994

Table 16: Distribution of Study Sample by Year of Program Implementation											
Year	1987	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Number of companies	2	4	1	3	2	3	3	3	4	6	2

To test the null hypothesis that company MODs in 2000 and 1995 are equal, separate paired t-tests were conducted for both companies that drug test and companies that do not drug test. Only companies that implemented drug testing between the years 1994 and 1996 are included in this analysis. The 1995 MOD for these companies represents the workers' compensation experience-rating modification factor prior to implementing a drug-testing program. The 2000 MOD for these companies represents the workers' compensation experience-rating modification factor after implementing a drug-testing program. Since MODs are calculated using three completed years of experience, it was not considered necessary to take the average of several years of MOD data as an estimate of observation.

For companies that drug test it was found that $t = -8.835$ with a probability less than or equal to 0.0001 that the null hypothesis cannot be rejected (Table 17). This result suggests that the difference in the mean workers' compensation experience-rating modification factors in the years 2000 and 1995 is significant at the 1% significance

⁴ Nearly every state has enacted legislation making employees injured in the workplace due to a substance abuse problem ineligible to claim workers' compensation benefits. Nevertheless, injuries and illnesses in the workplace impose indirect costs on employers that are separate from actual losses.

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level. Thus, it can be concluded that the workers' compensation experience-rating modification factor before and after drug testing were significantly different for companies that drug test. For companies that do not drug test it was found that $t = 0.8606$ with a probability 0.4078 that the null hypothesis cannot be rejected. This result suggests that companies that do not drug test did not experience a significant decline (or increase) in its workers' compensation experience-rating modification factors between 2000 and 1995.⁵

In summary then, the findings from this analysis suggest that drug testing is highly effective in reducing construction site injuries. Over a five-year period from 1995 to 2000, the average company that implemented drug testing between 1994 and 1996 experienced an 11.41 percent reduction in its workers' compensation experience-rating modification factor from a MOD of 0.973 to a MOD of 0.862. This difference was found to be statistically significant at the 1% significance level. During this same time period, the average company that does not drug test experienced a 1.60 percent increase in its experience-rating modification factor.

Variable	Companies that Drug Test	Do Not Drug Test
Number of companies	10	12
1995 MOD	0.973	0.935
2000 MOD	0.862	0.95
Change	-0.111	0.015
RChange	-11.41%	1.60%
t (H_0 : Change = 0)	-8.935	0.861
Probability	< 0.0001	0.4078

To test whether the effectiveness of drug testing in reducing workers' compensation experience-rating modification factors is consistent over time, a multiple regression analysis was performed. The ratio 2000 MOD/1995 MOD was regressed on a set of indicator variables indicating the year drug testing was implemented in a particular company (X_i). The results of this regression are reported below in Table 18.

Constant	1.00
1987	-0.0277 (-0.503)
1989	-0.0374 (-0.784)
1990	-0.0543 (-0.806)
1991	-0.0848 (-1.69)
1992	-0.1018 (-1.85)*
1993	-0.1323 (-2.63)**
1994	-0.1351 (-2.69)**
1995	-0.1105 (-2.20)**
1996	-0.0806 (-1.69)
1997	-0.0378 (-0.841)
Sample Size	33
F Statistic	1.86
R-squared	45.8%

* Statistically significantly different at $p < .10$; ** at $p < .05$; *** at $p < .01$.

⁵ A cross-section analysis was conducted whereby companies that do not drug test, as well as companies that implemented drug-testing programs between 1994 and 1996, were included in a regression that compared the relative decline in MODs between the years 2000 and 1995. It was found that the decline in experience-rating modification factors between the years 2000 and 1995 was greater for companies that drug test than for companies that do not drug test at the 1% significance level ($t = -5.38$).

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The results from this analysis suggest that the effectiveness of drug testing in reducing experience-rating modification factors persists over time and is most effective in the first three years immediately following the implementation of a program.

Companies that implemented drug testing in 1993 and 1994 experienced the greatest difference in MODs between the years 2000 and 1995. Companies that implemented drug testing prior to 1993 or after 1994 experienced less significant declines suggesting that drug testing is effective in reducing company MODs and that the effect persists but does not grow past the first few years. The reader should bear in mind that while drug-testing programs are only marginally effective in further reducing MODs several years after implementation, they almost certainly are effective in keeping MODs from rising further, as occurred with companies that do not drug test.

CONCLUSIONS

The findings of this study suggest that drug testing works — and works well when applied properly and legally. However, considerable care should be used in interpreting these findings. Factors other than workplace drug-testing programs may have influenced the various studied parameters. The findings discussed in this report are not in any way definitive or conclusive.

Experience-rating

The results of this study suggest that drug testing is notably effective in reducing workers' compensation experience-rating modification factors. Over a five-year period from 1995 to 2000, the average company that implemented drug testing between 1994 and 1996 experienced an 11.41 percent reduction in its workers' compensation experience-rating modification factor from a MOD of 0.973 to a MOD of 0.862. This difference was found to be statistically significant at the 1% significance level. During this same time period, the average company that does not drug test experienced a 1.60 percent increase in its experience-rating modification factor.

Furthermore, it was revealed that compared to companies that do not drug test, the relative decline in experience-rating modification factors between the years 2000 and 1995 for companies that drug test was found to be statistically significant. In addition, a multiple regression analysis suggests that drug testing is most effective in reducing workers' compensation experience-rating modification factors in the first three years immediately following the implementation of a program. While drug-testing programs are only marginally effective in further reducing MODs several years after implementation, they almost certainly are effective in keeping MODs from rising further, as occurred with companies that do not drug test.

Injury incident rates

The average company that drug tests in the study sample reduced its injury incident rate 51 percent within two years of implementation from a rate of 8.92 injuries per 200,000 work-hours to 4.36 injuries per 200,000 work-hours. This difference was found to be statistically significant; however, it is not definitive and should be interpreted with considerable care. Injury incident rates for the entire construction industry have decreased steadily during the past ten years. As stated previously, the construction industry has taken great strides to improve the safety and health on construction worksites in recent years. In an average five-year period between 1988 and 1998, injury incident rates for all companies have declined approximately 19 percent. It is the author's belief that this steady decrease can be ascribed (at least in part) to the implementation of drug-testing programs.

Factors that influence and inhibit drug testing

Because of experience-rating and related factors, lowering workers' compensation costs provides greater incentives for large firms than for small firms. This is reflected in the finding that large firms are more likely to implement drug testing (Collier, 1995:4). Employers are hesitant to invest scarce resources to identify and reduce drug and alcohol abuse in their own workplaces. But there are costs other than workers' compensation that are associated with work-related injuries and illnesses that any size firm can save; and to the extent that contractors pass on some of their savings, they benefit the consumer as well. These other costs may include, for example: lost production, reduced productivity, damages, liability suits, staff time, and administrative costs.

In addition, it was revealed that the implementation of drug testing is influenced by state regulations governing an employer's ability to drug test his/her workers have a significant impact — either positive or negative — on a company's decision to implement a substance-abuse prevention policy that includes drug testing.

Companies can no longer afford to remain idle and allow drug abuse to plague their workplace. For employees, the consequences of drug abuse can be tragic not only for users and their families, but also for co-workers and customers who are put in jeopardy by others' illicit drug use. Moreover, beyond the physical dangers, employees' jobs may be jeopardized if a company's profitability is undermined by poor performance, mistakes, and accidents due to drug abuse.

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Employers not only have a right to strive to maintain a workplace free from drug abuse, they have a responsibility to implement a fair, consistent, and equitable drug-abuse prevention program with due consideration of the rights, responsibilities, and interests of all concerned parties. It is important to understand, however, businesses must not conceive of drug testing as a substitute for effective drug education and rehabilitation. Nor does it constitute as a complete safety and health program when implemented alone.

All drug testing must be conducted as part of a comprehensive drug-prevention program aimed at preventing and managing substance abuse in the workplace. This includes: (1) acting in accordance with a written corporate policy, (2) performing confirming tests using a different chemical process to help assure accuracy before acting upon a positive drug screen, (3) assuring chain-of-custody and proper documentation for test samples, (4) maintaining the confidentiality of test results as reasonably and appropriately as feasible, and (5) utilizing scientifically and medically accepted laboratory protocols and procedures to assure accuracy and fairness.

POLICY IMPLICATIONS

The results of this study have important public policy implications. Recommendations are offered in this section.

- It is important for policy-makers to insure that small businesses are able to obtain cost-effective drug testing services. This can be accomplished by increasing government subsidies, providing tax credits, and/or mandating discounts on workers' compensation insurance premiums to companies with qualified substance-abuse prevention program that includes testing and education programs. Currently, seven states have voluntary workers' compensation premium reduction laws that enable employers to receive a 5-to-20 percent discount on the workers' compensation insurance. These states include: Alabama, Florida, Georgia, Mississippi, Ohio, South Carolina, Tennessee, Virginia, and Washington. The results from this study suggest that these programs successfully influence employers' decisions to implement substance-abuse prevention programs that include drug testing. These programs should be expanded to include discounts on health insurance and general liability insurance premiums.
- Because it appears that government contract requirements (both Federal and state) requiring mandatory substance-abuse prevention policies and programs has a significant positive effect on the development of these programs, these requirements should be considered a powerful tool in the battle against substance abuse in the workplace. Such incentives can make possible an investment in the workforce that is otherwise prohibitive.
- State laws prohibiting or restricting an employers' right to drug test should be reviewed and, if necessary, modified to enable companies to implement cost-effective programs. Currently, six states have restrictive or anti drug-testing laws. They are Minnesota, Montana, Maine, Connecticut, Rhode Island, and Vermont. While the laws in each of these states differ, they all substantially limit the employers' right to drug test his/her workers.
- The single greatest factor to improving safety and health is a commitment of a company to protect its workers. Business owners should be assisted in better diagnosing the need for drug testing by industry/trade associations and unions. One of the strongest factors to influence implementation revealed by the questionnaire results was a perception of need. Therefore, it is important that employers be able to identify whether substance abuse is plaguing their workplace, and the industry in general.
- Education should be provided to the legal community and insurance industry. These two groups are prominent sources of information for the respondents of this study. Therefore, it is important that they be armed with information that is factual, reliable, and up-to-date.
- And lastly, it is important for business owners to be aware that improving safety and health must become part of their company's culture

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