



CONSTRUCTION INDUSTRY INSTITUTE™

SAFETY PLUS:
MAKING ZERO ACCIDENTS
A REALITY

Construction Industry Institute

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Air Products and Chemicals	AZCO
Anheuser-Busch Companies	BE&K
Aramco Services Company	BMW Constructors
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Cargill	Black & Veatch
Celanese	Burns & McDonnell
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DuPont	CSA Group
Eastman Chemical Company	Chicago Bridge & Iron Company
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General Motors Corporation	Dick Corporation
General Services Administration	Dillingham Construction Holdings
GlaxoSmithKline	Eichleay Engineers & Constructors
Intel Corporation	Emerson Process Management
International Paper	Fluor Daniel
Eli Lilly and Company	Foster Wheeler USA Corporation
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NASA	Graycor
Naval Facilities Engineering Command	Hatch
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Pfizer	Jacobs
Praxair	Johnson Controls
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U.S. Department of Commerce/NIST	S&B Engineers and Constructors Ltd.
U.S. Department of Energy	The Shaw Group
U.S. Department of Health and Human Services	Siemens Westinghouse Power
U.S. Department of State	Stevens Painton Corporation
U.S. Steel	Structural Group
Weyerhaeuser Company	Technip USA Corporation
	Turner Construction Company
	Walbridge Aldinger Company
	Washington Group International
	Williams Group International
	Zachry Construction Corporation
	Zurich North America

**Safety Plus:
Making Zero Accidents A Reality**

**Prepared by
The Construction Industry Institute
Making Zero Accidents A Reality Project Team**

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Executive Summary

This research effort is a follow-on effort to the zero accidents work sponsored by CII in the early 1990s. Since that time, it has become apparent that changes have occurred in how safety is being addressed by many progressive, proactive construction firms. This study identifies the current best practices in the construction industry that make a difference in safety performance and that move the industry toward the goal of zero accidents.

The Making Zero Accidents A Reality Project Team identified the following nine key topic areas that contribute to improved safety performance:

1. Demonstrated management commitment
2. Staffing for safety
3. Planning: pre-project and pre-task
4. Safety education: orientation and specialized training
5. Worker involvement
6. Evaluation and recognition/reward
7. Subcontract management
8. Accident/incident investigations
9. Drug and alcohol testing

These topic areas, discussed in this research summary, are listed in order of how the development of a safety initiative might take place. There is no attempt to prioritize them. The project team suggests that these initiatives be taken as a consolidated group as good safety performance cannot be achieved with only one of the topic areas being implemented. Of course, it is readily agreed that demonstrated management commitment is of paramount importance.

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Introduction

The construction industry has historically been one of the most demanding and dangerous industries in the United States. The industry, however, recently has taken major steps in identifying and eliminating the causes of accidents on construction sites. Both owners and contractors are realizing that the initial investment and the continuous efforts to maintain a good safety record pay off by not only reducing injuries on the job site, but by also contributing to an “on time” and “within budget” project delivery.

The larger construction companies generally have been the most aggressive in pursuing the goal of zero accidents. Many are the pacesetters and, therefore, the safety record and the way safety is structured in these firms are of great importance to the construction community. Their strides in safety are so significant that injury frequency rates that were once the goals of firms have now become unacceptable levels of safety performance for them.

Purpose

The purpose of this study was to further assess the status of the safety performance of large construction companies, which by and large lead efforts to improve overall safety on the job site and pursue the goal of eliminating worker injuries. Most of these firms have implemented the basic Five High-Impact Zero Accidents Techniques (safety pre-task/pre-project planning, orientation training, safety incentives, alcohol and substance abuse program, and accident investigations) that have been widely publicized since the CII research presented them in 1993. However, until now no formal effort has been made to assess the current means by which safety performance is assured in large project settings.

Methodology

The methodology followed in this study is summarized in the following steps:

- Projects to be included in the study were large, defined as those having construction costs in excess of \$50 million.
- A survey instrument was developed that covered a wide range of safety practices and techniques. These questions included all levels of personnel associated with each project. The questionnaire contained 10 pages of questions.
- Data were collected through personal interviews conducted with key safety personnel at the job site and, when logistics made job visits impractical, interviews were conducted over the telephone. Interviews were conducted in a time frame that ranged from 30 minutes to three hours.
- The program called Statistical Package for the Social Sciences (SPSS) was used for inputting and analyzing the data.
- Data were analyzed with specific attention focused on strong correlations between specific practices and injury frequency rates, measured in terms of the number of OSHA recordable injuries per 200,000 hours of worker exposure.
- Additional data were acquired from large construction firms listed among the top 400 construction firms by *ENR* magazine. This resulted in a total of 102 responses. The salient results are reported.

Findings

The Study Database

A total of 38 interviews were conducted with safety management personnel on large construction projects in the U.S. Each of the 38 respondents provided information on the majority of the subjects covered by the survey. The projects included petrochemical, industrial, public works, transportation, hotel-casino, and commercial building projects. These ranged in value from about \$50 million to \$600 million and were diversely located in the U.S. The projects had an average estimated cost of construction of \$254 million and a mean duration of 25 months. The mean percent of project completion (at the time of the interview) for the whole sample was 58.5 percent. The projects employed an average of 339 workers at the time of the interview, 922 workers at peak level, with 1,280 new workers hired to date. More than half (55.9 percent) of the projects were at or past the peak level. The projects had an average of 30 percent of the workers who had previously worked on other company projects.

Regarding the type of contracting arrangement being used, almost half of the projects employed a general contract arrangement. Also, close to half of the projects had a lump sum contract between the owner and the contractor. The majority of the owners (75.8 percent) involved in these projects were found to allocate specific amounts of funds to promote safety, but on more than half (51.6 percent) of the projects the safety performance did not affect the distribution of these funds. Sixty percent of the projects had owner safety personnel on site. The majority of the owners (76.5 percent) involved in these projects were from the private sector.