



MANAGING SUBCONTRACTOR SAFETY

Bureau of Engineering Research
The University of Texas at Austin

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CII was founded in 1983 to improve the cost effectiveness of the nation's largest industry. The members, who represent a broad cross-section of owners and contractors, believe that many of the problems that limit cost effectiveness are common ones, and that real improvements can be best accomplished in a cooperative environment with the benefits being shared by the construction industry at large.

CII uses the acronym TOPICS to describe the research effort. TOPICS signifies the six research thrust areas: Technology, Organization, People, Information, Controls, and Sigma (meaning others). A historical listing of the task forces for each area are listed below.

Technology

- Advanced Technological Systems
- Computer Integrated Design & Construction
- Constructability
- Electronic Data Management
- EPC Flexibility
- Modularization
- Technology

Organization

- Constructability Implementation
- Partnering
- Project Organization
- Project Team Building
- Project Team Risk/Reward Allocation

People

- Construction Work Force
- Education and Training
- Employee Effectiveness
- Safety
- Zero Accidents

Information

- CICE Impact Evaluation
- Industry Data & Statistics
- International Construction
- Model Plant
- Owner Engineering Organization
- Project Management Assessment Survey

Controls

- ASCE Quality Manual
- Change Order Impacts
- Claims
- Contracting, Phase II
- Contracts
- Cost/Schedule Controls
- Design
- Materials Management
- Overtime
- Overtime Phase II
- Productivity Measurement
- Quality Management
- Quality Performance Measurement
- Total Quality Management

Sigma

- Construction 2000
- Insurance
- Retrofit Projects
- U.S. Navy Demonstration Project

The Construction Industry Institute
The University of Texas at Austin
3208 Red River
Suite 300
Austin, Texas 78705-2650
(512) 471-4319
FAX (512) 499-8101

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**Prepared by
The Construction Industry Institute
Safety Task Force**

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PREFACE

The Occupational Safety and Health Administration (OSHA) began to take aggressive steps in the 1980s to force compliance with the safety regulations on multi-employer worksites. In many instances, general contractors have received duplicate citations and fines for the safety violations of subcontractors. While work-related industrial injuries have declined steadily over the past years, construction worker injuries continue at a frequency rate twice that of all other industrial workers. In addition, construction worker deaths occur at a rate three times higher than all other industrial workers combined. These statistics provide partial justification for OSHA's close scrutiny of the construction industry.

In addition to the increased efforts by OSHA to improve compliance with safety regulations, legislation has been proposed that would further regulate the construction industry. This increased focus on construction safety is further aggravated by an increase in the number of third party suits brought against general contractors and owners by specialty subcontractor employees. Simply stated, safety is serious business with the government and in the courts. Safety violations can be costly and are to be avoided. Worker injuries, similarly, are costly as well as contributing to human suffering, negative publicity, and lost productivity.

The CII Safety Task Force recognizes that subcontractors historically have been ignored by prior construction safety research. The results presented in this report provide clear evidence of the role that general contractors play in influencing subcontractor safety. The bottom line is that general *contractors play a stronger role in the safety of their subcontractors than do the subcontractors themselves* in spite of the OSHA regulations that state that the employer is responsible for providing the employee a safe place to work.

Subcontractor safety performance is influenced by the coordination effort of the general contractor, the emphasis that is placed on safety, and the general safety tone established in construction operations on a daily basis. Coupled with the possibility of litigation from an injured employee of a subcontractor, it only makes good sense that the safety of all workers, employees of the general contractor and subcontractors alike, be given a high priority.

For a general contractor to demonstrate the importance of safety, the company must make a firm commitment to influence the way their subcontract-

tors manage safety, beginning with subcontractor executive management. This commitment to safety by a contractor or subcontractor can be demonstrated through an effective formal safety program. As shown through this CII research study, it also must be evident in the contractor's or subcontractor's management policies.

The research by the Safety Task Force shows the important role that general contractors play in jobsite safety. To assist in managing safety on construction projects, the task force has developed guidelines that should be considered for implementation. For those contractors and subcontractors without formalized safety programs, guidelines for an effective safety program also were developed. These guidelines are appended as part of this document.

INTRODUCTION

Worker safety should be of considerable interest of all parties involved in the construction process. Others have estimated that worker injuries total nine billion dollars each year. A reduction in these costs of only five percent would result in an annual savings of over \$450 million. The added benefits of fewer injuries include reduced human suffering, improved goodwill, increased productivity, and decreased absenteeism.

The task force notes that in several areas of the United States projects are downsizing and the use of smaller contractors is increasing. Considering the lack of knowledge concerning subcontractor safety, this is the subject of the first CII Safety Task Force research project. Since many projects are constructed principally by specialty contractors, it is clear that significant cost savings can be made through a better understanding of how safety performances of contractors can be improved. For purposes of this publication, all contractors or subcontractors working for a general contractor will be classified as "subcontractors."

Most construction contracts are awarded to prime or general contractors who, in turn, subcontract substantial portions of the work to subcontractors. Subcontractors undertake work that general contractors usually do not have the skills or resources to perform. It is common on construction projects, particularly building projects, for over 80 percent of the work to be subcontracted to 20 or 30 subcontractors. Clearly, subcontractors play an important role in the construction industry.

The subcontractor typically is required to perform under the same terms as those established between the general contractor and the owner. The role of the subcontractor is unique, however, in that the sole contractual arrangement is with the general contractor. Despite this, each subcontractor is expected to work in harmony with various parties including the owner, the architect/engineer, and the various other subcontractors employed on the project.

Subcontractors range in size from single owner firms with no employees to large corporations employing hundreds of workers. Significant numbers of subcontractors are employed on almost all construction projects. Therefore, the study of subcontractors, particularly those which are smaller in size, should be of overall benefit to the construction industry. In fact, this benefit should be more pronounced if the industry continues to move away from the "super projects" and toward smaller projects employing

smaller firms. Findings show that general contractors have a significant influence on their subcontractors. This is similar to the role that owners play in relation to their general contractors. Consequently, information gained from this study can be broadly applied to the construction industry.

PURPOSE AND METHODOLOGY

The purpose of the CII Safety Task Force research was to identify the primary means by which general contractors influence the safety performances of their subcontractors. In addition, the magnitude of that influence was to be assessed. Like most safety research efforts, the goal was to add to the body of knowledge so that effective measures can be implemented to reduce the cost of accidents.

This CII research effort was unprecedented in that no known safety research studies have focused on subcontractor safety. The research consisted of two different studies. One study focused on subcontractor safety on small projects, while the other focused on subcontractor safety on large projects.

The study involving small projects involved only those firms within the Puget Sound and San Francisco Bay areas. The task force examined the management styles employed by general contractors and how these various styles affected the safety performances of their subcontractors. Over 90 telephone interviews were conducted, generally with field supervisory personnel. A survey was mailed to subcontractors in the geographical areas noted above to obtain additional data.

For the study on large projects, the task force examined over 50 projects located throughout the United States by interviewing general contractor representatives on those projects. In addition, the task force interviewed over 125 subcontractors. In both this study and the one described above, the measure of safety was calculated as the number of injuries incurred by each subcontractor's crews per one million hours of worker exposure.

SUBCONTRACTOR SAFETY ON SMALL PROJECTS

Research Method

The data from the Puget Sound and San Francisco Bay area contractors was initially analyzed separately, however, the results were consistent between the two studies. As a result, the analysis was simplified by analyzing all of the information as if it came from one source.

The objective was to identify the means and the extent by which general contractors influence the safety performances of their subcontractors. Statistical analysis resulted in a model (see Figure 1) which describes the importance that general contractors play in influencing the safety performances of their subcontractors. The model reveals the following five factors under the control of general contractors that influence subcontractor safety:

- Effective project management
- Effective job coordination
- Managerial emphasis on job safety
- Strong interpersonal skills of supervisors
- Safe work environment

The strongest factor identified in the model concerns job management. That is, projects that run smoothly tend to be those with better subcontractor safety performances. A project that operates under pressure will not run smoothly. For example, pressure is imposed on the entire construction team when a project runs behind schedule. More pressure is generally felt on competitively-bid, lump sum or fixed price projects rather than on negotiated and cost-plus projects. The top managers of the general contractor also can play a crucial role by imposing job pressures on the projects through their communications. Conversely, these top managers can provide the leadership necessary to develop a clear communications network among all parties on the project, which is essential for effective teamwork.

Another factor having influence on subcontractor safety is project coordination. The term "coordination" is used broadly to include all means by which the various parties on construction projects are made aware of their respective roles and responsibilities. On large projects, coordination may occur naturally when a small group of workers, including subcontractors,

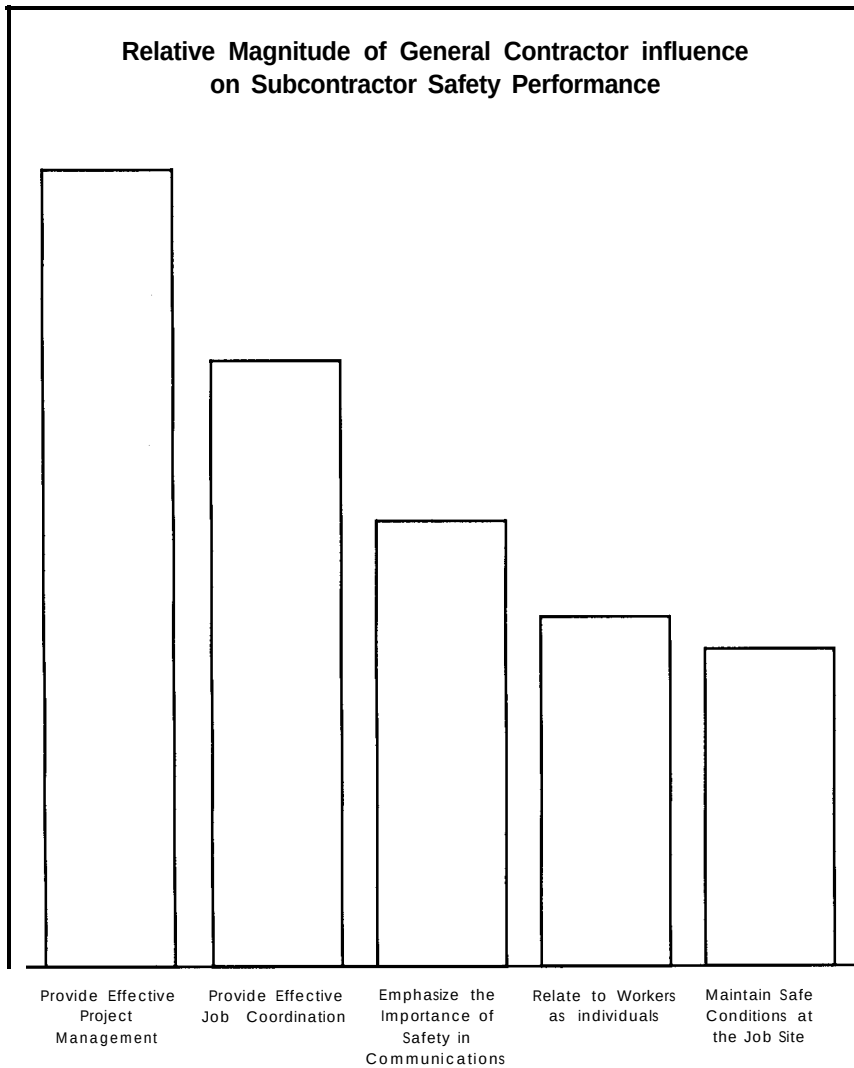


Figure 1. Means by which project managers of general contractors influence subcontractor safety performance on small projects.

work toward a common goal on a day-to-day basis. This team spirit carries on from project to project when the team members remain substantially the same. This team effort was noted to be associated with better subcontractor safety performance.

It is important for contractors to emphasize safety in their daily communications. This communication should clearly reflect top management's commitment to project safety. This information can be conveyed through conversation, in written communication and by action. Top management must stress that profits will be jeopardized if safety is compromised. If the message is clear and consistent, all parties involved at the project level, including subcontractors, will benefit.

Findings also show that subcontractor safety performance is improved when the project supervisors of the general contractor exhibit strong interpersonal skills. These supervisors do not lose sight of the fact that the various parties involved in the construction process are individuals with feelings that must be respected. It makes no difference if the individual is a worker on the project for the first time or is a seasoned foreman.

The last factor identified as influencing subcontractor safety performance is maintaining a close adherence to the safety standards. The physical conditions on a project can be evaluated by such measures as the quality of the housekeeping, ladders, scaffolding, and electric wiring. The results show that a well-maintained project results in better safety performance for subcontractors.

In summary, this study revealed that *general* contractors can significantly improve the safety performance of subcontractors by providing effective *project* management and *job control*. In addition, general contractors contribute to subcontractor safety through their coordination efforts, their emphasis on safety, their understanding of workers as individuals and their actions to minimize hazards in the work place. In general, subcontractor safety can be improved by such practices as:

- Selecting job supervisors carefully
- Establishing long-term relationships with suppliers
- Communicating relevant matters to affected parties
- Developing team spirit
- Coordinating all job activities
- Recognizing the importance of project safety day-to-day