



The Business Roundtable

**Construction Industry
Safety Excellence Awards Program**

**Model for an
Owner Safety Process**

**Shell Oil Company
1990 Owner Award Recipient**

Model for an Owner Safety Process

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Definitions

The Business Roundtable... an association of over 200 chief executive officers of American companies in all fields who examine public issues that affect the economy and develop positions that seek to reflect sound economic and social principles.

CICE... Construction Industry Cost Effectiveness, a cooperative long-term campaign of the construction industry, open to all owners, contractors, architects and engineers, labor organizations, regulators, construction professionals, academics and others interested in any aspect of construction.

Its objective: To improve the cost effectiveness of the American construction industry. It began as the Construction Industry Cost Effectiveness Project of the Construction Committee of The Business Roundtable. It is made up of Task Forces and Committees responsible for continuing to develop and implement recommendations to enhance construction cost effectiveness.

A-3, "Improving Construction Safety Performance"... a guideline developed by the CICE Project Task Force encouraging owners to develop programs and procedures that influence contractor safety performance. The A-3 Report outlines potential long range cost savings to owners by improving contractor's performance.

CISE... a cooperative effort between owners, contractors and contractor associations to improve constructions safety awareness with a goal of reducing human suffering and construction costs. **The Construction Industry Safety Excellence Awards Program recognizes Business Roundtable members who have utilized the recommendations of A-3, Improving Construction Safety Performance, and achieved superior safety results.**

Objectives of the CISE Awards Program

- Improve safety management and results
- Enhance the use of BRT Report A-3 Recommendations
- Improve the availability and the quality of safety statistical data
- Enhance the cooperation between the BRT and construction industry associations
- Increase the safety awareness of owners and constructors
- Provide safety models and encourage their uses
- Maximize the impact of BRT efforts to achieve Report A-3 objectives
- Establish credible, unique, prestigious, nationally recognized awards

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Shell Oil Company

Headquartered in Houston, Texas, Shell Oil Company is an oil, gas and chemical company operating primarily in the United States. With annual revenues in excess of \$23.0 billion, Shell employs over 30,000 people in many locations carrying on a tradition of achievement that has made it:

- One of the nation's most successful oil and gas explorers and developers;
- a leader in offshore production and enhanced oil recovery technology;
- a top refiner and marketer of gasoline and jet fuel;
- an innovator of a number of industry firsts and milestones—many through its own research;
- a principal manufacturer and supplier of specialty chemicals, including raw materials for the detergent industry, thermoplastic rubber and a leading line of industrial catalysts;
- a growing coal producer, and a developer of other energy technologies such as coal gasification, and
- a developer of advanced composite materials technology, using polymers in construction materials and lightweight composite structural parts for automobiles and aircraft.

Shell Oil dedicates itself to a proactive, positive Construction Safety Program that considers the health and safety of contract employees working at Shell facilities to be just as important as that of Shell employees. Shell uses the recommendations contained in The Business Roundtable CICE Report A-3, "Improving Construction Safety Performance," as a basic building block for its construction safety process. Shell Oil Company has achieved significant reduction in contractor OSHA recordables and lost workday rates on its construction projects each year since 1985.

As the recipient of The Business Roundtable Construction Industry Safety Excellence (CISE) Owner Award, Shell believes it has the obligation and responsibility of sharing its experience to help commitment and performance. Please call the Manager of Engineering and Project Management at (713) 241-3812 for more information, or write to:

Shell Oil Company
Two Shell Plaza
P.O. Box 2099
Houston, TX 77252-2099

Attn: Manager Engineering and Project Management

Shell Oil Company's application for the Owner Safety Award is reprinted in its entirety as a *Model for an Owner Safety Process*.

Model for an Owner Safety Process

Executive Summary

As part of the Total Quality Management System, Shell's proactive Construction Safety Program continues to reflect corporate leadership and commitment in the field of managing construction safety. The aim of the Shell Construction Safety Program is to direct safety consciousness to the working craft level. To accomplish this major task, Shell uses many key safety program elements, which are fully described in the next section of this paper. Because Shell believes in and strives for the added value and benefits derived from a safe construction project, Shell actively promotes and consistently practices the fundamental elements of a good construction safety plan. Elements of an effective safety plan are safety during design, contractor prescreening, safety in the contract, close management participation in the field effort, and safety statistic reporting.

Shell is also at the leading edge in the continual improvement of the Construction Safety Program by developing and expanding items such as the Direct Incentives to Workers and the Reviews of Operability and Safety. During this last year, Shell has expanded emphasis on Root Cause Analysis for Incidents, Senior Management Participation after Every Significant Incident and Management of Change Relating to Process Hazards.

Shell maintains that thorough and complete communication is necessary at all levels within the company. To illustrate this philosophy, Shell has senior management, project management, technical engineering and field supervisory personnel participate in the safety process. Shell also uses many cross-sectional communication and motivation techniques such as written procedures, team building, training and incentives to convey the necessity of construction safety internally within Shell and externally with our contractors. For Shell, establishing safety expectations at the beginning of a project and asking for feedback during and after the project are vital components of the communication process.

When it comes to safety in contracts, Shell does not differentiate between firm price and cost plus contracts. For all types of contracts, safety requirements and guidelines are set at the beginning of the project and then monitored throughout construction.

Statistics show that Shell's persistent corporate leadership efforts in safety are fruitful. Shell's OSHA incident rates and severity rates for 1989 were only 1/10 the national average. As a further illustration, Shell has made a steady improvement over the past four years in OSHA Recordable Incident Rates (Figure 1) and in Lost Workday Incident Rates (Figure 2).

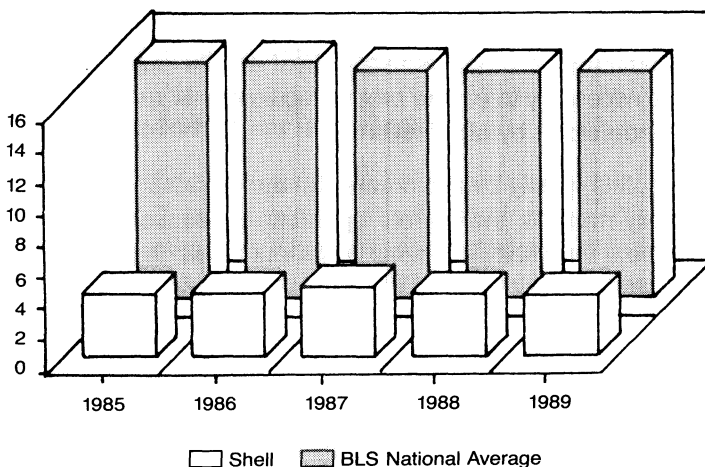


Figure 1. OSHA Recordable Incident Rates

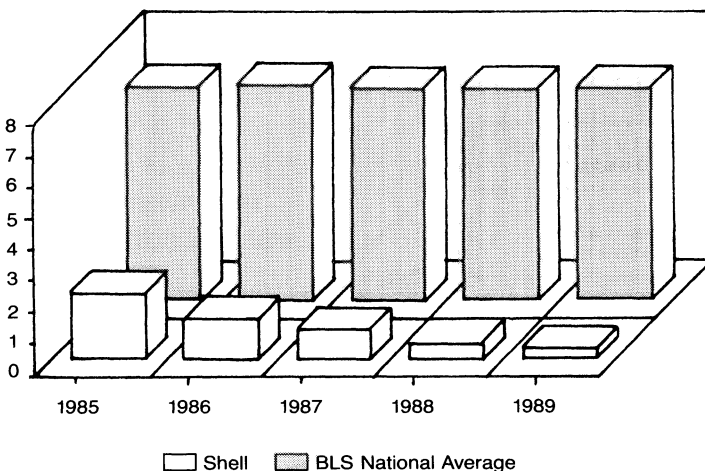


Figure 2. Lost Workday Incident Rates

Elements of the Shell Construction Safety Program

Safety begins with Shell's approach to and practice of Total Quality Management. Shell's commitment to quality starts from top management and reaches to each plant employee throughout the company. Shell uses the Total Quality Management System and extensively trains its people in this quality process. "Do it right the first time" is only the starting point for continual quality improvement. This quality stance places a high priority on upfront communication requirements. Clear and thorough communication channels are necessary to ensure project requirements such as construction safety are understood by all parties.

Furthermore, this quality stance creates an atmosphere whereby changes can be readily made to the current operations. Because change without control can be a very risky business, Shell manages change at all project levels to attain the desired control.

One part of the Total Quality Management System is the Construction Safety Program. Proper communication channels and management positions are in place to make sure that the desired safety results are kept in proper perspective throughout the project phases: process engineering, detailed design, procurement and construction.

Shell's Construction Safety Program (Figure 3) uses a systems approach to control construction safety performance, starting with a construction design element and concluding with the contractor statistic reporting element.

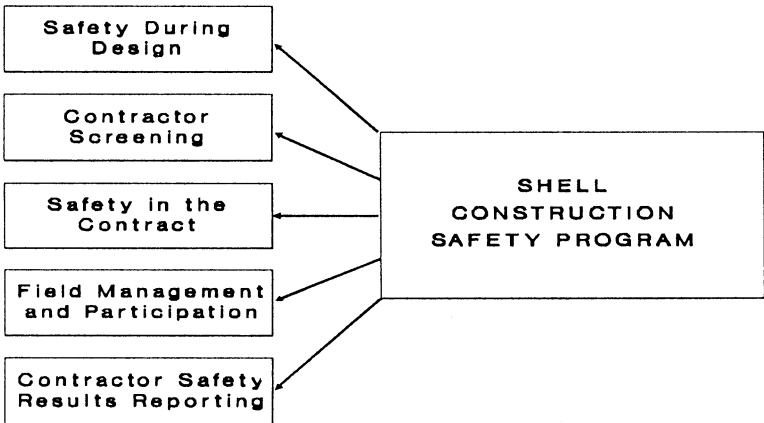


Figure 3. Elements of Shell's Construction Safety Program

As shown in Figure 3, the five Construction Safety Program elements are:

- I. Ensuring Safety During Design
- II. Screening Contractors for Safety
- III. Incorporating Safety in the Contract
- IV. Participating in and Managing Field Safety Program Activities
- V. Summarizing and Reporting Contractor Safety Results

I. Ensuring Safety During Design

As part of the project design process, Shell conducts a formal Operability and Safety Review. This review begins with the structured distribution of project documents among key Shell personnel: design engineers, process engineers, location operations representatives, location maintenance representatives and safety representatives. They carefully review all aspects of the project on paper and check for proper design, logic, constructability, safety, layout and future use (e.g., operability and maintenance). Next, a face-to-face meeting takes place with these project design reviewers to discuss in detail their project critique comments.

II. Screening Contractors on Safety

Shell uses objective and subjective analysis criteria to screen potential contractors for projects. The four screening criteria are the contractor's:

- EMR Rating
- OSHA Statistics
- Qualifications Presentation
- Safety Organization Structure

EMR Rating. Shell hires only contractors with an EMR of 1.0 or better. Based on Business Roundtable figures, this assures that Shell will start with a contractor safety performance base in the top 65 percent of the nation.

OSHA Statistics. All potential contractors must submit their OSHA statistics for the last three years. Shell carefully analyzes the contractor's safety statistics and safety trends to see which areas of their safety program are getting better or worse. Based on these results, Shell can determine if a contractor is seriously demonstrating safety performance in the field.

Qualifications Presentation. Each potential project contractor makes a presentation to Shell management relative to the contractor's construction qualifications. Because safety is a major item in this presentation agenda, Shell can analyze the contractor's attitude and approach toward safety. For example, Shell compares the contractor's previous safety project manning experience level with Shell and other industry contacts.

Safety Organization Structure. Shell requires that the contractor's safety organization structure reports directly to the contractor corporate management and not to production-related management lines, thereby preventing production goals from interfering with safety objectives. This contractor safety reporting requirement helps to ensure that the contractor will make safe construction project decisions.

III. Incorporating Safety in the Contract

Shell believes that the contract is an extremely powerful tool to clearly define safety requirements. For Shell, the contract is the first formal opportunity for Shell to convey contract work requirements, to set expectations and to establish minimum acceptable safety standards.

Furthermore, the contract identifies three basic interface areas:

- Contractor Written Safety Program
- Contractor Safety and Work Requirements
- Contractor Safety Cash Incentives

Contractor Written Safety Program. Shell requires that every contractor develop a Written Safety Program specific for the project. Shell reviews this program for inclusion of the typical Business Roundtable elements. Additionally, the contractor must extend this program to its sub-contractors.

Contractor Safety and Work Requirements. Every Shell contract includes a "General Conditions" section that defines the applicable general and specific safety requirements and the contractor's conduct for all phases of work. For example, Shell tells the contractor that specific laws and regulations must be followed. Also, because Shell operates chemical and hydrocarbon facilities, Shell has specific plant rules and procedures to regulate contractor work tasks. All contractors must follow these procedures.

To accommodate location-specific work task instructions, Shell includes in the General Conditions a Safety Guidelines and Requirements section for the proposed construction site. These work instructions include Co-ordination of Work, Smoking Restrictions, First Aid, Accidents, Fire Safety, Housekeeping, Personal Protective Equipment, Emergencies, Roadway and Vehicular Traffic, Employee Conduct, Chemical Handling, Open Flame and Sparks Control, Operating Permits, Equipment Tie-Ins, Start-up, and Safety Training.

Contractor Safety Cash Incentives. Shell encourages the use of safety incentives in construction projects. Shell has developed incentive principles (Figure 4) that are the basis for all safety incentives.

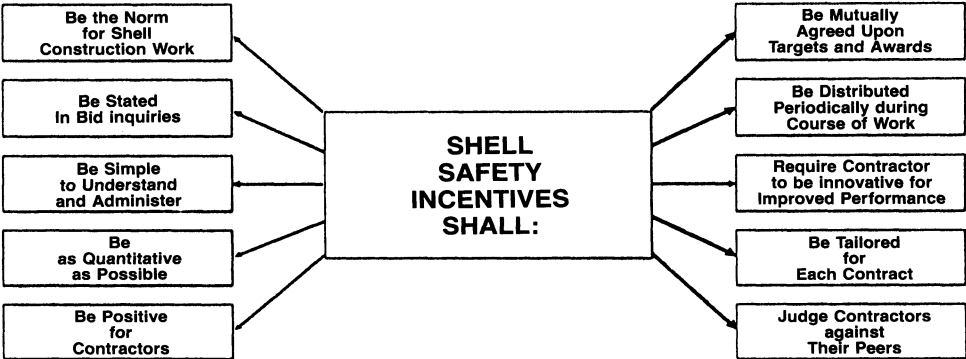


Figure 4. Principles of Shell Safety Incentives

Shell generally offers two types of Contractor Safety Cash Incentives, both of which are defined in the contract. One cash incentive goes to the contractor and is used to help defray the management cost of the Contractor Safety Program. The other cash incentive goes to the craft working level in recognition of superior safety performance.

Also, provided in the contract are the incentive amounts and the formula for distributing the monies. Although, cash incentives on a large project can be in the multi-million dollar range, Shell believes that money spent for incentive programs is an excellent investment for both parties, a win-win situation.

IV. Participating In and Managing Field Safety Program Activities

To ensure that the contractor effectively implements all aspects of safety during the construction phase, Shell actively participates in and monitors the field safety program activities. Listed below are the means by which Shell accomplishes this:

- Priority of Safety
- Shell Safety Representative
- Team Building
- Safety Training
- Recognition and Cash Incentive Awards
- Accident Investigation

Shell continues to strive for participation in and awareness of the safety program at all work levels. The end goal is to have foremen, supervisors and craft personnel embrace the safety program.

Priority of Safety. Shell treats safety as the highest project management priority. Other priorities such as schedule, cost and productivity follow safety in importance. To keep safety in such a high profile, Shell separates safety from other project endeavors. Meetings are an effective tool for Shell to emphasize the importance of construction safety.

Shell holds a weekly Safety Coordination Meeting to address only safety issues. Shell also emphasizes safety by starting all other coordination meetings with safety issues as the first agenda item.

Shell, the contractor and the subcontractors attend the weekly Safety Coordination Meeting with key representatives from management, safety and supervisory areas. All concerned parties participate in the safety issue discussions. The meeting opens with the contractor presenting the previous week safety statistics, followed by the contractor and the subcontractors giving reports on general safety activities. The meeting ends with discussion of any open issues between Shell and the contractors.

Shell Safety Representative. A Shell Safety Representative who has proven experience in aspects of field construction and in the requirements for working at a manufacturing facility is an important participant in every

construction project. The Safety Representative is the focal point for the exchange of safety-related information between Shell and the contractors.

The Representative is responsible for the following functions:

- Implementing the awareness of the safety program to all work levels
- Checking compliance with contractor and Shell safety procedures
- Monitoring the adequacy of contractor safety progress
- Collecting contractor safety statistics

At the very beginning of site construction, the Safety Representative must know and understand both the Contractor's Written Safety Program and the Safety Requirements and Guidelines required by Shell. This is necessary in order for the Representative to carry out the responsibilities listed above. The Representative is a key influence to Shell project management and contractor project management in determining contractor safety job assignments and durations.

During construction, the Shell Representative regularly monitors contractor safety, communicates safety statistic results to appropriate project management, and makes specific suggestions to the contractor at the first indication of a positive or negative trend.

As construction nears completion and Shell prepares to start up the facilities, communication becomes even more important and procedures must be closely followed. The Safety Representative actively coordinates safety-related activities pertaining to the completion of the construction phase and the commissioning of the start-up phase. For example, the Representative personally reviews start-up programs such as electrical and utility activation.

Team Building. Shell is currently an industry leader in establishing programs for Team Building. Shell believes that teamwork is an essential component of the communication process. Work groups learn the skills necessary to surface, confront and remove blockages that hinder the group's performance and satisfaction. In the last few years, Shell has established individual team building programs for projects. Past team building programs resulted in improved and more efficient communication between Shell and the contractors.

Safety Training. Shell also believes that training is an important aspect of any safety program. The Safety Representative coordinates training of contractor personnel (from contractor site management to craft workers) concerning plant safety rules and procedures. Site training usually includes a combination of lectures, video presentations and handouts.

Shell also assists external non-profit organizations who support the construction industry. Frequently, Shell covers training fees and associated costs.

Recognition and Cash Incentive Awards. Shell continues to be a leading force in the use of incentives for safety, productivity and project management. Shell encourages and usually funds the typical milestone or progressive recognition awards (e.g., pens, caps, coffee cups, banner boards, etc.). Furthermore, Shell has also made great strides in giving cash incentives to project participants, ranging from craft workers to management.

Shell believes that there are two sides to incentives. First, the contractor must possess the desire to take the extra steps necessary to get the incentive without sacrificing other parts of project administration. Second, an incentive cannot be a hollow offer; the incentive must be attainable.

As mentioned earlier, Shell generally offers two types of Safety Cash Incentives. One cash incentive goes to the contractor to help defray the management cost of the contractor's safety program. (Shell makes the contractor incentive payments immune from normal contractual constraints such as retention, pay periods, etc. to ease any financial burden.) The other cash incentive goes to the craft working level in recognition of superior performance. Both incentives are defined when the contract is written.

The safety cash incentive awards, usually between \$1 and \$2 per man-hour worked, are based on an objective goal (no lost time accidents) and on subjective goals decided by a Safety Incentive Team. Members of this team are Shell representatives (project manager, project engineer and safety representative) and contractor representatives (resident construction manager, resident file engineer, construction superintendent and safety manager). The team meets weekly to establish safety criteria, to discuss safety issues in an open forum and to agree on an incentive award within the constraints of the contract.

Accident Investigation. Shell believes in placing a high priority on addressing and investigating safety incidents. First, Shell has made the commitment that all safety incident locations shall be visited by a corporate management representative within 48 hours of the incident. This committed corporate response demonstrates Shell's unswerving attention to safety and ensures that the proper resources are available to address the incident. Next, a meeting takes place between Shell corporate management and the contractor's management to discuss the following concerns as they relate to the safety incident:

- a. What precipitated the incident?
- b. What are the root causes of the incident?
- c. What is the most effective communication technique for explaining relevant incident concerns such as root cause, lessons learned and safety changes?
- d. What management changes are needed to avoid a repeat incident?

After an incident, Shell or Shell's contractor submits an Accident Report that circulates throughout Shell.

Shell's Root Cause Analysis Program helps to determine the true cause of a given incident. This program is based on the National Safety Council paper "Accident Investigation." Appropriate technical, construction and location representatives are assigned to the Root Cause Analysis Team. This team reports its findings to the project, the location and corporate Shell.

V. Summarizing and Reporting Contractor Safety Results

Contractor safety results are the basis for analyzing the contractor's attitude, approach and progress in the area of safety. Shell insists that the contractor keep accurate and timely safety statistics. Shell uses weekly and quarterly meetings to summarize and communicate contractor safety results.

Weekly, the contractor provides the safety statistics to the Safety Coordination Team Meeting and to the Shell Project Team Meeting. Quarterly, a Shell head office representative summarizes the safety statistics and distributes the results to Shell senior management for their review.

Results

Shell is proud of its commitment to an excellent and proven Construction Safety Program. The yearly results in OSHA Recordable and Lost Workday Incident Rates (Figures 1 and 2) reveal that Shell continues to show a steady improvement. Using figures from The Business Roundtable CICE Project Report A-3, the Shell safety performance saves or prevents at least 85 lost workday causes per year. This number corresponds to well over \$2 million in savings per year for the contractors and Shell.

Conclusion

To keep safety in proper perspective, Shell conducts an annual Project Execution Workshop through which corporate Shell communicates all the aspects of project execution to the various Shell locations. Location management, location engineers and contractors attend this workshop. Shell informs the attendants of location-specific and general safety information concerning policies, expectations, safety statistics, new programs, latest safety trends, team building and incentive contracting. This workshop provides a forum for communicating feedback to the contractor. If particular safety subjects need more emphasis, Shell schedules separate meetings with a contractor.

The year-end safety incident rates and the information gathered from open communication meetings help to evaluate the effectiveness of the Shell Construction Safety Program, identifying areas and program elements that require some improvement. Program improvements identified this last year were the expanded emphasis of the Root Cause Analysis for Incidents, the Management Participation after Every Significant Incident and the Management of Change Relating to Process Hazards.

Shell will continue to look at ways to perfect the Shell Construction Safety Program until the optimum program has been established and fully implemented. This continual program improvement approach is a result of our corporate leadership commitment to quality programs such as the Shell Construction Safety Program.

Owner Safety Award Requirements

The Owner Safety Awards of the Construction Industry Safety Excellence (CISE) Awards Program recognizes commendable safety management by a member company of The Business Roundtable who has most effectively implemented the recommendations of The Business Roundtable CICE Report A-3 on “Improving Construction Safety Performance.” The award is bestowed upon the owner/company who can show the most exemplary program of safety management that goes beyond merely adopting a safety program to demonstrate a serious, vigorous, persistent owner’s management commitment to make the program work. The strategy underlying the awards process is to recognize stellar performers while increasing implementation of The Business Roundtable CICE Report A-3 industry-wide by soliciting and publicizing model programs which can be emulated by the peers of the outstanding achievers.

The awards are intended to convey The Business Roundtable’s full support of hands-on management of safety by owners whose performance indicates recognition of their direct economic stake in the safety performance of their constructors whose accident costs are a business expense to owners and a controllable cost that can be reduced by owners. This can be achieved through establishment of an effective construction safety program executed by constructors and aggressively supported by owners.

Description

Annual safety awards are presented to the owner program that most effectively implements the recommendations of The Business Roundtable CICE Report A-3, either for a particular project or operating facility, or for an entire operating entity, i.e., division, department or major functional group.

Criteria

The Business Roundtable CISE Awards Program for Owners is based upon a panel evaluation of applications submitted by owner companies addressing the following elements:

- executive summary
- statement of problem (or starting conditions)
- elements of program
- results, including supporting statistical data
- conclusions and recommendations.

The panel assesses or measures **managerial accountability** based on:

- the recipients of accident reports and frequency distribution of the reports, to how high a level do they reach;
- the frequency of project safety inspections and the degree to which they include project managers and field superintendents;
- the frequency of safety meetings for field supervisors; and
- the method of compiling accident records and accident costs and their reporting frequency; looking for the most effective system for accountability of results. Greater accountability comes from a more detailed system.

The panel assesses or takes a measure of **management's commitment** based on evidence of:

- management demonstrating a serious, vigorous, persistent commitment to make the program work;
- management commitment that goes beyond talking about good safety performance (Has the owner's commitment been backed up by willingness to financially support the constructor's efforts to ensure an effective safety program?);
- safety management practices and procedures in use that optimize the owner's role (Are the principles of management control commonly applied to other resources equally applied to safety?);
- the acceptance of responsibility for safety performance by the line organization (Is safety a line management responsibility?).

The panel looks for evidence of **advanced elements** that indicate:

- the owner has undertaken a supportive role to improve construction safety performance; and
- the owner pioneered new, innovative approaches that go above and beyond CICE Report A-3 Recommendations.

CICE Principles

1. The cost effectiveness of the construction process can be controlled and major savings achieved if top management gives it the same attention and direction applied to production, marketing and other mainstream functions.
2. The owner puts the money in. He has the economic incentive and the means to fix the goals, set the standards and control the process.
3. It takes major changes across the board to improve cost effectiveness.
4. Modern management systems are as important in construction as in other business functions.
5. New technology will reduce costs, improve quality and expedite the construction process.
6. Construction cost effectiveness depends on people—their training, upgrading, supervision, motivation, involvement, commitment . . . proper use of their skills . . . and the practices and conditions that control their performance on the job.
7. Projects are most successful when all elements—planning, design, field construction, start-up, operation and maintenance—are integrated from initial concept to completion.
8. Contracts should be written to fit the specific job, fairly and adequately recognizing the legitimate interests of all parties.
9. “Team-building” is a practical and productive way to maximize the contribution of the diverse interests, skills, resources and people involved in any project.
10. Local conditions affect a project’s cost effectiveness and owners have a legitimate interest in them.
11. An effective safety program benefits employees; enhances motivation, morale and communications; and has a positive cost/benefit ratio.
12. Getting more construction for the money requires the creation and execution of a structured and practical action plan. CICE Recommendations, CII Studies and other sources provide a sound basis for developing one.

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CICE REPORTS

The Findings and Recommendations of The Business Roundtable's Construction Industry Cost Effectiveness project are included in the Reports listed below. Copies may be obtained at no cost by writing to The Business Roundtable, ATTN: CICE, 200 Park Avenue, New York, NY 10166.

Project Management—Study Area A

- A-1 Measuring Productivity in Construction
- A-2 Construction Labor Motivation
- A-3 Improving Construction Safety Performance
- A-4 First and Second Level Supervisory Training
- A-5 Management Education and Academic Relations
- A-6 Modern Management Systems
- A-7 Contractual Arrangements

Construction Technology—Study Area B

- B-1 Integrating Construction Resources and Technology into Engineering
- B-2 Technological Progress in the Construction Industry
- B-3 Construction Technology Needs and Priorities

Labor Effectiveness—Study Area C

- C-1 Exclusive Jurisdiction in Construction
- C-2 Scheduled Overtime Effect on Construction Projects
- C-3 Contractor Supervision in Unionized Construction
- C-4 Constraints Imposed by Collective Bargaining Agreements
- C-5 Local Labor Practices
- C-6 Absenteeism and Turnover
- C-7 The Impact of Local Union Politics

Labor Supply and Training—Study Area D

- D-1 Subjourneymen in Union Construction
- D-2 Government Limitations on Training Innovations
- D-3 Construction Training Through Vocational Education
- D-4 Training Problems in Open Shop Construction
- D-5 Labor Supply Information

Regulations and Codes—Study Area E

- E-1 Administration and Enforcement of Building Codes and Regulations

Summaries - More Construction For The Money
- CICE: The Next Five Years and Beyond

Supplements - The Workers' Compensation Crisis . . . Safety Excellence Will Make A Difference (A-3)

Audiovisual presentations are also available. For information write The Business Roundtable, ATTN: AUDIOVISUALS.

The Business Roundtable

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