

The Owners Voice to the Construction Industry CONSTRUCTION USERS ROUNDTABLE

Construction Owners' Safety Blue-Print (OSB)

R-807 April - 2017

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List of Abbreviations

- BLS U.S. Department of Labor, Bureau of Labor Statistics
- CII Construction Industry Institute
- EMR Experience Modification Rate
- H&S Health and Safety
- JSA Job Safety Analysis
- OSHA Occupational Safety and Health Administration
- PDCA Plan Do Check Act
- PMT Project Management Team

1.0 Introduction

In 2015, the U.S. construction industry suffered 937 fatalities according to the U.S. Department of Labor, Bureau of Labor Statistics (BLS). That was more than any other private sector occupation in the U.S. Unfortunately, construction routinely falls among the nation's five most dangerous occupations and economic losses resulting from construction accidents reach into the billions of dollars every year.

However, construction-related fatalities are not just a problem in the U.S. In 2014, the Association of Workers' Compensation Boards reported 232 construction-related deaths in Canada. Eurostat documented 781 construction fatalities across the European Union that same year. The economic loss globally is, like that of the U.S., on a grand scale.

Of greater consequence and impossible to quantify is the personal toll - the human suffering that accompanies any construction accident. Those most immediately affected are the injured workers along with their families, friends, and co-workers. However, other stakeholders, including architects, engineers, designers, construction contractors, and owners, share the consequences.

A statement from the first *Owners' Safety Blueprint* (OSB)— "All stakeholders, including workers, bear responsibility for creating and maintaining safe construction workplaces" — still holds true today. The Construction Users Roundtable (CURT) continues to believe and promote the idea that construction owners hold the greatest leverage, which is the leadership and authority to influence the behavior of others. For this reason, owners are the best candidates to lead the construction industry toward consistent achievement of safe projects.

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CURT's Philosophy: It's Up to the Owners

No one can deny there are hazards associated with construction work. However, construction owners can protect workers and themselves if they are willing to lead the way by using the Plan-Do-Check-Act (PDCA) cycle to identify risks (strategic through tactical) and implement proactive processes and programs to minimize those risks. Owners who cannot (or will not) be accountable for safety are courting disaster in both a human and a business sense.

Safety is a business deliverable as well as a personal commitment. True leadership by individual owners can help reduce injuries, disabilities, and deaths. By reducing the number of safety incidents, the owner benefits by keeping valuable craft workers and supervisors on the job. This ensures productivity, quality, and morale stay high while project costs are controlled.

The Guiding Principles for Safety

CURT has identified four **Guiding Principles for Safety** that can serve as a starting point for owners ready to take charge of their safety effort. The principles are:

- Continuous improvement is the fundamental driver on the road to zero accidents and injuries.
- Safety must be a core value, with zero incidents being the only justifiable goal.
- An organization will achieve whatever performance level it is willing to accept. No construction-related injury, illness, or damage to property or the environment is acceptable.
- Owners must commit to preventing all such injury, illness, or damage by engaging contractors and craftspeople on safety.

By using the PDCA cycle to support these principles, owners will establish a culture of safety that is incorporated in the organizations goals, standards, programs, and behaviors. The Guiding Principles do not replace the legal or regulatory obligations of each stakeholder. Instead, they foster an environment that supports safe work practices and processes. In this environment, all parties are encouraged to go beyond their legal obligations and take reasonable measures to prevent any injuries or illnesses.

About This Document

CURT has created this *Construction Owners' Safety Blueprint* as a strategic **guideline** for safety management that any organization can follow, provided it will commit itself to direct owner involvement and the time and resources that requires. The OSB calls on owners to:

- 1. Set the expectations for safety that each stakeholder will be expected to deliver.
- 2. Establish a safety culture that reinforces the Guiding Principles for Safety above, from project inception through closeout.
- 3. Plan, perform, monitor, measure, report, and redirect safety management efforts to ensure achievement of all safety-related objectives in the project life cycle.

Appendix A, "Construction Health and Safety Management System — Tactical Elements," provides owners with proven, tactical elements and user practices that should be considered when developing a comprehensive construction safety program.

It is also the basis for the Construction Industry Safety Excellence Award program and is used by CURT for

evaluating an organization's efforts and effectiveness in managing safety.

Note: While CURT advocates owner involvement as a means to achieve workplace safety, it also recognizes the risks associated with such involvement. Interaction with contractor personnel can have a profound impact on safety performance, but owners must take care to influence contractor behavior without interfering with the contractor's legal responsibilities as an employer. Contractors are ultimately responsible for the safety of their employees. This document is not intended to suggest otherwise.

2.0 Setting Expectations

Organizational leaders establish safety expectations by how they communicate and, through their actions, show all employees and stakeholders that safety is a core value. It should be evident to all that work with the owner company that safety is integral to the company's way of doing business and is seen as a foundation for decision making.

To support this approach each owner company should have a formal written policy that clearly states safety is a company value and safety performance is considered a project deliverable equal to other deliverables, such as cost, quality, and schedule. The policy must be signed by top management and state the owner expects the following:

- 1. All stakeholders will commit to the Guiding Principles for Safety outlined on page 2 and will integrate these principles into their work.
- 2. All parties will integrate safety into their planning, readiness, execution, and commissioning.
- 3. Operational discipline will be practiced at all levels.
- 4. Stakeholders will understand their client's safety expectations and will routinely meet or exceed them.
- 5. All stakeholders will manage safety as a business deliverable

This policy should be shared with all stakeholders including the owner's employees, the construction contractors, and subcontractors. (In addition, it should be shared with others that will venture onto the construct site such as vendors and visitors to ensure they understand the importance of safety during their visit.) By highlighting the owner's commitment to evaluate safety throughout the project cycle, from planning to post-project evaluation, the value of safety becomes clear to all who read the policy.

Expectation #1: All Stakeholders Will Commit to the Guiding Principles for Safety

Owners who have identified safety as one of their core values have demonstrated that safety is part of the fabric of who they are as an organization. Unlike products, services, priorities, or other aspects of a business, core values do not change with time or circumstances. Organizations that understand, communicate, and reinforce their core values can then insist on contractors and subcontractors who also commit to those values.

Organizations that have identified safety as a core value have specified how that value translates to the project level in that:

- Any illness, injury, or near miss is unacceptable. (This echoes the Guiding Principles for Safety.)
- To prevent injuries, owners should go beyond a regulatory compliance approach to planning.
- Employees at all levels have specific safety responsibilities that are integrated into work processes.

Core values manifest themselves in concrete ways when they are integrated into an organization's regular, ongoing work processes.

Expectation #2: Safety Will Be Integrated into Work Processes

To achieve an incident-free and injury-free workplace, owners and contractors must evaluate all work processes and activities from a safety standpoint, using a graduated risk assessment approach. This approach involves investigating, tracking, trending, and learning from safety auditing and near misses, thus promoting continuous improvement. In every aspect, the workplace must prove that safety is not just another item on a list of things to accomplish — it is the very manner in which things get done.

For those in leadership roles, integrating safety means evaluating all decisions related to design, cost, schedule, and quality, to determine their impact on safety. Team members at all levels are expected to ensure their own safety, ensure the safety of those around them (to the extent possible), and deliver safe work products. All team members have safety-related responsibilities and accountabilities.

Consideration should be given to integrate safety into all construction activities - from strategic to tactical. For example:

- Execution strategy. At the design phase, consider approaches that increase worker safety, such as modular construction.
- Scheduling overtime. Fatigued workers are more vulnerable to accidents.
- Using lower-cost materials or tools. Make sure lower-cost alternatives do not introduce additional hazards.
- Working with "live" systems. Can work be coordinated to take place on de-energized systems? Opt for this safer approach whenever possible.

Expectation #3: Operational Discipline Will Be Practiced at All Levels

Operational discipline is the routine practice of desired on-the-job behavior at all levels of every phase of the project. It exists in a workplace where "the right things are done the right way, every time, even when no one is watching."

Organizations that have effective operational discipline typically have comprehensive safety management systems that have the following attributes:

- Clear policy, standards, and controls for the management of safety, including behavior.
- Observation and coaching of employees and contractors to actively engage them on safety and reinforce safety as one of the organization's values.
- A process for rigorously managing any deviation from the standards.
- A process for timely sharing of industry-related construction experiences (both internal and external), incidents, and events.
- A process for rigorous management of change.
- A process for taking project safety experience (near misses, injuries, events, trends), evaluating lessons learned, and transferring those learnings to programs and plans for current and future projects.

When operational discipline is in place, employees and contractors who adopt the desired behaviors feel valued and rewarded. Because the workforce's experience base is often that at-risk behavior and unsafe conditions are not only commonplace, but also expected and acceptable, eliminating at-risk behavior and unsafe conditions on construction sites must be a major focus of the project team.

Expectation #4: Owner Safety Expectations Will Be Understood and Met

This expectation carries responsibilities for both the owner and the contractor. Once the owner has established expectations for safety that can reasonably be understood and achieved, contractors (including craft workers) should be expected to:

- Know what safety requirements are specified in their contract.
- Initiate communication with the owner to gain clarification on safety expectations.
- Manage subcontractors to the same standards.
- Take initiative where appropriate to ensure that safety expectations are met.
- Meet expectations at all times not just when the owner is watching.

Expectation #5: Safety Will Be a Business Deliverable; What Gets Measured Gets Done

To make this expectation a reality, the following must be true in both the owner and contractor organizations:

 Safety is a measurement of all parties' individual and organizational efforts to prevent adverse safety incidents. Safety metrics are balanced with both leading and lagging indicators and carry equal weight among all stakeholders and at all levels.
Observation, reporting, and trending of leading safety indicators is an important determinant of a safety program's quality and ability to prevent incidents.

It is not enough to set expectations for safety. Owners and contractors must establish the requirements and assist in providing resources needed to meet them.

The Business Value of Safety for Contractors

For some time, legal and economic forces have been motivating owners to rethink their contracting relationships. It is in the contractor's best interest to make an owner's safety expectations its own.

Contractors who minimize costs associated with injuries are more competitive against their peers and more attractive to enlightened owners. Contractors who do not minimize the costs associated with injuries are at a competitive disadvantage. The bottom line: Safety is good business.

3.0 Establishing Your Safety Culture on a Project

Owners do not get to choose the moment when a project's safety culture begins to form and take root. At the latest, this starts on the first day the project team is established, and possibly even before that through the actions and expectations of the owner.

What owners do get to choose is *when* they will become active participants in the process. As owners, are we going to provide the leadership to actively nurture and build the safety culture the way we want it to be, or are we going to just hope that a robust safety culture will magically appear? Owners who choose not to participate early will likely be disappointed in the outcome. Management participation in safety is not a spectator sport. Owners must not only be engaged, but also be engaged early in establishing a positive safety culture.

Incorporate Safety In The Contract

One of the key ways to establish a safety culture for a project is through effective contracting. When the contract is properly developed, the safety expectations will be reflected in every project activity. This helps reinforce the culture of safety. Safety requirements should be established in all key phases of contracting, including:

- Crafting the contract
- Staffing the project
- Bidding the work
- Preparing for construction
- Overseeing construction

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Crafting the Contract

To the greatest extent possible, a contract for construction should support the Guiding Principles for Safety and the owner expectations discussed in this publication. Contract language should clearly state the owner expects safety to be a core value of all who participate on project. It should include the safety expectations, level of performance, behaviors, and deliverables that will be required of the contractors. It should specify safe work practices and excellent safety performance are valued and will be recognized.

Contract language must define the relationships between owner and contractor and must clearly establish the owner in the role of leader. This means specifying what actions the owner can take to contribute to achieving the desired safety performance without interfering with the contractors' work. The contract must also address the resources, procedures, and goals the owner will use to fulfill the leadership role.

When preparing a construction contract, an owner must decide what type of language best reflects its expectations for contractor performance. If the owner is most concerned with the contractor's means and methods for completing a requirement (the "how"), then the contract must explicitly list those means and methods in enough detail to allow the contractor to comply. However, if the result (the "what") takes precedence, the owner's focus should be on crafting contract language that makes the "what" understandable and achievable.

 "How" Language (means and methods-based): Owners choosing to specify how work will be done must recognize that they may become accountable for the outcome. The contractor firm will likely be held responsible only for the degree to which it performed the specific contract requirements. "What" Language (results-based): Owners choosing to focus contractor requirements on results must define the outcome they seek. The language chosen must be easily understood and must show that the outcome can be accomplished. Once an owner opts for the "what" approach, the "how" will have to be left primarily to the contractor's discretion.

	Possible Mix of Contract Language Types for Safety					
	"How"		"What"			
	Reporting labor hours and safety performance metrics		Completing job with no injuries			
	Reporting job site incidents per prescribed reporting and potification procedure		Ensuring a drugfree workforce			
	Performing "hot" work according to certain guidelines		Staffing a job to deliver safety results			
			Having process in place for risk assessment			

Note: Some state laws prohibit certain owners from dictating contractors' means and methods. For the most part, these owners can define contractor requirements only in terms of results.

Balancing the Two Types of Contract Language

Many owners find that for establishing both standard and discretionary safety requirements, a successful contract contains a mix of both language types.

Standard or basic requirements establish baseline expectations and remind contractors of their legal obligations. Such requirements include clauses stating that the contractors are in control of the work and have responsibility for the safety of the employees; that they must adhere to all federal, state, and local requirements; and that they must hold all their subcontractors to the requirements of the general contract.

Beyond these basic clauses, owners can decide how much information and guidance should be included to describe their goals for the project. Safety requirements for special situations (e.g., working around existing processes, coordinating work with owner operations, or performing hot work or critical lifts) may need to be included. The best location for these types of requirements (whether in the contract itself, the general conditions, or the specifications) depends on the importance of the requirement and on which contract document takes precedence over others in the event of a conflict.

Other requirements an owner might consider adding in the contract include partnering, subcontractor selection and management, incident investigation, visitor protocol, emergency response, and public protection.

As the contract takes shape, the project's safety expectations and staffing requirements become clearer, and the owner can begin to form the project team.

Of course, contract terms differ greatly. Owners and contractors have various ways of conveying expectations based on state laws, country laws, customs, project size, and the relationship between the parties.

Staffing the Project

A capable team can play a significant role in creating and sustaining the desired safety culture. The project team's role in establishing the desired safety culture includes:

• Working with bidders and contributing to the award decision.

- Steering the project before and during construction.
- Defining and practicing safety requirements.
- Observing and reinforcing safety expectations.
- Delivering a consistent and constant message throughout the project that safety is a core value.
- Ensuring consistent adherence to safety requirements by a large, diverse, and everchanging number of personnel.

Continuity also affects sustaining the safety culture and achieving the desired safety performance. If the owner's resources and organizational structure permit it, the team should include dedicated employees to assist in all aspects of the project, from bidding through construction and beyond. In some cases, the owner may need to contract for project administration or other skills. Either way, the project team should be in place and cognizant of project requirements well before bidding.

While staffing a project, the owner should decide some basic issues about how the team will function:

- How will roles and responsibilities be defined?
- Which team members will have the authority to act or make decisions?
- What are the team's administrative support requirements, and how will these be met?
- What logistical issues need to be addressed before construction begins?
- How many team members should be dedicated to safety?

With regard to the last question, there is no industry standard on safety professional staffing ratio for construction. However, some criteria owners should consider include, but are not limited to, the maturity of the owner and contractors' safety culture & systems, the level of risk associated with the project (this may vary during various phases of the project), the number of workers onsite each day, and the experience level & safety knowledge of supervision and craft workers.

The contractual safety requirements will likely be communicated to prospective contractors as part of the bid package. With staffing in place, the owner's team can turn its attention to the bidding phase.

Bidding the Work

Owners who proactively seek out and hire safe contractors experience better safety results on their projects. The owner's safety focus should be reflected at the following points in the bidding process:

- Preparing bid instructions and documents.
- Conducting the pre-bid meeting.
- Evaluating the bids.
- Awarding the contract.

Owners who can legally **prequalify contractors** should do so based on their health and safety management system and programs as well their past safety performance.

Only companies that meet the owner's safety requirements should be eligible to be prequalified for the safety component of the contractor evaluation process. (Other criteria might include cost, quality, and schedule management.)

In order to be successful, prequalification must be based on the following principles:

- The selection process should be fair and based on verifiable data, and applied consistently.
- The evaluation criteria should be objective, quantifiable, and demonstrable.
- The safety evaluation prequalification criteria, evaluation method, and rating system (if applicable) should be shared with contractors.
- Each contractor that submits information should receive feedback on how their organization fared with respect to the established criteria.
- Each contractor's evaluation results should be kept confidential, and not shared with other contractors.

The contractor's safety performance must be demonstrated and documented, not just promised. All site and project contractors should be prequalified, including subcontractors and sub-tier contractors. To be effective, owners must provide adequate resources, time, and funding for the prequalification effort.

For more information on the contractor safety prequalification process, please reference the most recent version of CURT's Construction Safety: Contractor Safety Prequalification (as of this writing P-801 Updated March 2014) document.

Preparing Bid Instructions and Documents

Bid instructions describe how the bid process will work and provide the owner's expectations for safety, including what the owner expects to see in a bidder's response regarding safety. They can also alert bidders to key information (e.g., safety performance) in the larger bid package.

In the plans and specifications, the owner should provide information about unique safety issues that

might not be apparent in a routine site visit (for example, hazardous materials on site, process chemical or other potential exposure, or known subsurface conditions). This information enables contractors to submit more knowledgeable and accurate bids.

Conducting the Pre-Bid Meeting

The pre-bid meeting with each prospective bidder gets the owner and prospective bidder together for questions and discussion about the project and bid documents; a site visit may also be scheduled. Here the owner can again demonstrate its commitment to safety.

In conducting the meeting, the owner's project team members should set a tone that encourages an open exchange of information.

At a minimum, the meeting should address the following:

- Owner's expectation that the Guiding Principles will apply to the project and that safety is the core value.
- Any information related to known risks contractors will face in performing the work.
- Permitting what permits need to be secured for the project (including any permits required for particular work activities), and how to obtain them.
- Applicable plant or site rules.
- Applicable safety procedures.
- Contractor orientation requirements.
- Warning and emergency response information and procedures.
- Owner's method and criteria for evaluating bids.

- Owner expectations for:
 - Format/organization of bid responses.
 - Safety supervision by contractors.
 - Qualifications of contractor supervisory staff, including specific safety training.
 - Specific owner health and safety programs and initiatives in which the contractor will be required to participate.

Evaluating Bids

The owner's bid evaluation process should assess each contractor's health and safety management system and safety history. As was mentioned earlier regarding the prequalification process, a rating should be objectively be assigned to each bidder. This approach ensures that safety will be treated as an objective measure of bid responsiveness.

(For more information on evaluating a health and safety management system, see Appendix A, "Construction Health and Safety Management System—Tactical Elements").

Proposals should explain the contractor's strategy for performing the work safely. The contractor should address what it perceives as critical challenges and known major risks in the project, and should affirm its commitment to preventing accidents and other negative events.

Contractors should also explain the process they use for evaluating and selecting subcontractors, and should name any subcontractors they propose to use on the owner's project, as practicable. Subcontractors should be expected to commit to and integrate the Guiding Principles for Safety, and the contractor should be able to demonstrate this to the owner's satisfaction.

Awarding the Contract

The owner's award of contract should include the opportunity to meet with the successful bidder to reiterate the importance of safety and the contractor's commitment to an incident- and injury-free project. Feedback may also be given to non-successful bidders to help them close any gaps.

Preparing for Construction

After deciding on a contractor, the owner should meet the contractor's staff and reinforce key safety goals (including safety as a core value) before work begins. As soon as possible after the award, the owner should schedule a post-award meeting with the contractor for this purpose.

A second meeting during this phase will call upon the contractor to summarize its understanding of the project and its strategy for constructing it (pre-construction conference). Also within this phase, the owner should take steps to verify safety qualifications and, as appropriate, ensure completion of safety training by all owner, contractor, and subcontractor personnel who will work on the project.

Getting Acquainted: The Post-Award Meeting

In this meeting, owner principals are introduced to the contractor's site management leadership team and workers. While introductions may already have taken place during the bidding phase, the post-award meeting gives the owner an opportunity to re-evaluate the level of involvement by contractor principals and reiterate the importance of safety.

A key goal of this meeting should be to review safety requirements with the people who will actually do the work. Roles and responsibilities for the implementation of the project safety program should be confirmed among the parties involved (owner, contractor, and subcontractors). Although the contractor should already be aware of safety expectations by way of the bidding process, the owner should make certain that all staff who will be on site have a complete understanding of those expectations. Owners can supplement the contractor's internal communications system to transmit safety information to workers in the field.

In the post-award meeting, the owner should also notify the contractor to begin preparing for the preconstruction conference, which will require the contractor to demonstrate its understanding of the project.

Confirming Contractor Commitment to Safety: The Pre-Construction Conference

This meeting is a last opportunity for the principal parties (owner and contractor) to reassess their commitment to safety, their plans, and their expectations before the project moves forward.

The contractor's team should present its approach to safe project execution and its basis for decisions made up to this point. Owner personnel hearing the presentation will evaluate the contractor team's understanding and decision-making process.

Other aspects of the contractor's preparation, including which team members they bring to the meeting, who leads the presentation, and what the presenters say, also give the owner insight into how the contractor organization will respond to job requirements and perform the work.

During the presentation, the owner should compare the contractor's statements with the contract requirements to assess the contractor's level of understanding. If presenters omit important items or demonstrate uncertainty, the owner team can pose questions and provide clarification.

- Evidence that the contractor is prepared to work safely includes: A policy that clearly stipulates that safety is a core value for the project.
- Specific proposals for all major requirements, including submittals, processes, and high-risk or hazard areas.
- Plans for project administration.
- Mechanisms for:
 - Promoting and reinforcing the desired safety culture, including worker involvement and participation in safety.
 - Craftworkers to communicate safety concerns openly to supervision.
 - Rapidly disseminating reports of safety incidents, including contributing factors and actions taken to prevent recurrence and lessons learned for others.
 - Establishing a threshold for project safety stand-downs to recalibrate and regain commitment to safety should periods of poor safety performance become apparent.
 - Identifying, eliminating, controlling, and mitigating hazards and risks.
 - Observing safe and unsafe behaviors, including coaching for establishing clear expectations for safety.
 - Identifying and planning to avoid foreseeable damage events.
 - Capturing and applying safety lessons learned to other phases/tasks of the project and future work.

- Plans for responding to events they cannot foresee.
- Methods and frequency for reporting safety performance using both leading and lagging performance indicators.
- Strategy for overseeing and coordinating subcontractor work.
- Grasp of how staffing, roles, hazard preparation, and other plans affect safety performance.

Team Dynamics

The pre-construction meeting also allows owners to observe the interaction among key participants. Overt personality conflicts can impede team communication and add pressures that, ultimately, may lead to lapses in safety performance. Concerns about the team dynamic should be addressed before personnel are committed to the work and fully engaged.

Ensuring Safe Work: Validating Worker Training and Qualifications

The safety culture demands that workers — owner and contractor personnel alike — possess the skills and training they need to deliver maximum safety performance. The owner must begin by verifying that its own representatives have completed the appropriate safety training, understand the contractual requirements, and know how to evaluate contractor performance (especially on safety activities and goals).

The owner should also confirm that the contractor's craft workers are qualified. This should have been established during the bidding process, when the contractor provided details of its workers' prior training and experience, but equipment operators in particular may need to provide evidence of their qualification before beginning work.

An often overlooked aspect is ensuring front line supervision are adequately trained and prepared to lead the job safely. This training includes not only technical safety knowledge, but also communication skills and management skills. Front line supervisors that have been trained to encourage two way communication, problem solving in others, and conflict resolution, as well as the technical aspects of safety will more likely succeed in the field.

Finally, the value of site-specific training cannot be overstated. Contractor employees should be prepared by attending specific training and orientation on the project site. Ideally, craft workers and management staff should not be allowed on the site before completing a site-specific safety orientation. The primary contractor should conduct the orientation, which should cover all information workers need to know before going into the construction area. Everyone who will be on the site should attend this orientation, including the owner's representatives. Owner participation in the contractor's orientation, in an introductory or summary manner, will significantly reinforce the safety message to the workers.

Overseeing Construction

The owner's role during project construction is to implement and sustain, through its leadership, the integrity of the safety culture established in the preceding phases. Some actions the owner can take to preserve that culture are listed in this section. During construction, the owner will also be monitoring safety performance and taking action to redirect safety management efforts through cooperation with the contractor and per contractual agreements.

See and Be Seen

The owner's active presence on site is essential. Regular visits, including safety inspections and walkthroughs of construction areas, remind project workers that safety is the core value. It is important to safely engage workers and let them know their safety is a value to the owner.

Set a Good Example

Owner personnel on site must model their own expectations for proper behavior, attire, and personal protective equipment.

Hold People Accountable for Safety

Owner personnel on site must regularly check and assess the assigned safety accountabilities of various project personnel. Timely feedback must be provided regarding contract performance and contractual safety obligations.

Stay Current on Project Issues

To prevent safety goals from becoming lost amid a project's many daily demands, the owner must know the challenges facing the project team. The owner must also check for and be assured that engagement in safety at all levels is being reinforced, promoted, and maintained. From this informed position, the owner can be ready to give advice and make decisions as necessary.

Communicate with Craft Workers

By periodically discussing the project with the people actually doing the work, the owner gains the significant advantage of being able to gauge the team's safety culture and safety management efforts. Workers' attitudes and practices are instrumental in achieving an injury-free project, and talking to workers will help the owner evaluate the effectiveness of the contractor's safety management process. Through these discussions, the owner can gauge the degree to which workers are aware of the owner's safety values and goals. Finally, interaction between the owner and craft workers helps build a sense of shared commitment.

Anticipate and Plan

Safety-conscious workplaces develop plans of action for both routine and unexpected events, including the following.

Incident Reporting and Mitigation System

This system involves developing protocols for:

- Reporting, documenting, and mitigating job site hazards.
- Reporting safety incidents and all injuries including first aids and near misses.
- Investigating incidents, performing root-cause analyses, taking corrective action, and communicating results.
- Setting metrics to gauge the degree of achievement (elements measured should include both leading and lagging indicators), including regular monitoring and trending of the metrics to foresee potential breakthrough incidents.
- Dealing with external agencies, including inspections and investigations by the Occupational Safety and Health Administration (OSHA), insurers, and other external agencies.

Work Stoppage Plan

When a work stoppage occurs, potential dangers multiply. Owners can plan for this possibility by developing a plan for access control and management in
the event work is disrupted by a labor dispute or other problem.

Reinforce, Reinforce, Reinforce

Many different types of job site programs can be developed to support safety goals. Owner commitment to such programs will demonstrate to stakeholders that safety is a core value and a measure of project success. Some examples of programs that keep the safety message prominent:

- A site/property management system for • construction safety, to include:
 - A contractor processing system (possible elements include access management, substance-abuse testing, site-specific orientation, credential review, and discipline policy review).
 - Site/property requirements, including easy-toread information on site requirements and restrictions.
 - Shutdown coordination and lockout/tagout procedures.
 - A dedicated "Owner Safety Coordinator."
- Periodic "toolbox talks" to review any unsafe incidents or other safety concerns.
- Continuous improvement programs, where lessons learned are constantly recorded and fed back to the contractor organization.
- Recognition programs, in which companies and • individuals who "live" the owner's safety philosophy receive meaningful rewards for safety program leadership and participation. Owners should encourage and support achieving significant safety performance milestones.

• Safety auditing program, with audits directed at all levels of the project, reminding all parties of the importance of safety standards.

4.0 Monitoring Safety Performance

Consistent with the "C" in the PDCA cycle, once established, the safety culture needs periodic checks by the owner to ensure that it is functioning properly. Owners should also monitor the contractor's safety performance during project delivery and, when necessary, act decisively to bring that performance into line with project goals and expectations (the "A" in the PDCA cycle).

Owners should track incident precursors, low-level events, near misses, and first aid incidents, and evaluate trends of common factors. Where appropriate, owners should initiate project-wide stand-downs before a more serious incident occurs. These provide an opportunity for the owner and contractors to recalibrate and recommit to their safety values.

Elevating Safety over Other Project Demands

During construction, the owner must "walk the talk" on safety. Pressure to complete the project can cause owner and contractor personnel alike to focus excessively on cost and schedule issues, potentially neglecting safety. It is up to the owner to ensure that safety remains the project's core value and is not subordinated to other demands. Contractors and subcontractors will respond to this leadership by delivering what the owner demonstrates to be most important.

Ensuring Contract Compliance

Like any other requirement, the safety performance delivered by the contractor must meet the standards specified in the contract. Owners should constantly assess the contractor's safety performance and take corrective action as necessary.

Evaluating Job-Site Safety

Owner site visits do more than send a message about the importance of safety — they also give the owner a first-hand look at safety performance in the field. Owner representatives regularly read reports from the contractor and attend meetings to gauge work performance, but these activities do not substitute for seeing the work as it gets done. Site visits also allow the owner to compare observed work practices with written and verbal reports of progress.

The owner should talk periodically with members at all levels of the project team, including craft workers, to validate that reports received are consistent with what is happening on site. If the project is performing as required, the owner should recognize the team's achievements. If the project is not meeting safety expectations, the owner must intervene in accordance with the contract.

Providing Feedback

Feedback should come in multiple forms throughout the project. It should result from ongoing communication between the owner's representatives and the site.

Recognition

When a contractor meets or exceeds the owner's expectations for safety, the owner should recognize the accomplishment. Recognition shows workers that the owner's representatives know what is happening on the project, understand the challenges workers face in delivering safety requirements, and appreciate worker efforts.

Corrective Action

Corrective feedback and discipline become necessary when safety standards are not being met. Actions taken should be consistent with the remedies provided in the contract. They may range from issuing instructions that will correct the shortcomings to removing one or more failing performers (at any level of the organization). Discipline should be applied consistently throughout each owner location or site.

Final Critique

Contract completion brings an opportunity to evaluate safety performance yet again. Before any contractor departs from the site, the owner should hold a critique meeting. This meeting should be a dialogue, with the owner providing an evaluation of safety performance and the contractor giving feedback on the owner's involvement and influence on results.

Auditing; Determine Safety Condition and Gaps

The owner should develop and implement a system of formal, routine safety audits that reinforce safe work practices. By assessing the safety of workers and vital work processes systematically, audits may reveal areas for potential improvement. When audits are conducted consistently and at all levels of the organization, the owner can accurately evaluate the contractor's effectiveness at administering the project. However, contractors must be made aware that the owner's audits do not substitute for the contractors' own safety audits.

A thorough auditing program should evaluate:

- "Artifacts of activity" such as other inspections, plans, records of safety meetings, records of noncompliance, reports or orders from regulators, corrective action plans, and any other activities related to safety performance.
- Physical areas throughout the site, to confirm that work practices reflect standards and match reports submitted to date.

After audits are conducted the results should be formally documented and shared with key stakeholders. Trends should be analyzed and lessons learned communicated and incorporated into program improvements. Any deficiency found during the audit that was not immediately corrected should be: 1) documented; 2) assigned a person to be responsible to lead correction the deficiency, and; 3) assigned a date to confirm corrective action was completed.

5.0 Safety in Developing Countries

As was mentioned earlier, the CURT OSB and The Guiding Principles do not replace the legal or regulatory obligations of each stakeholder. However, unless superseded or surpassed by legal requirements, or prohibited by law, the recommendations in this document should be implemented.

The CURT OSB was created to establish the standard for safety performance regardless of which countries owners operate in or what challenges those countries may pose. However, CURT recognized that emerging markets present unique challenges. For example, to provide more specific guidance for those doing business in China, CURT published the China OSB Supplement with plans to produce additional documents, as well. Based on member experience, there are some general principles that can be followed when working in emerging markets.

While the means and methods of achieving good safety performance may change from one location or market to another, the four **Guiding Principles for Safety** always remain the same. That being the case, CURT members have found there are often unique safety challenges in developing countries. These include, but are not limited to:

- The level of safety commitment varies significantly across countries.
- Safety is often not a value; profit is often the driver.
- Auditing and inspection are critical to sustain safe behaviors and conditions.
- Workforce turnover is often an issue

- Prequalification is often more difficult and time consuming.
- A reluctance to share information seen as negative, including safety incidents.

The challenges require a blend of the recommendations previously mentioned in the document along with some special strategies, philosophies, and tactics to help ensure success. They are:

- A. Set expectations
- B. Establish a safety culture
- C. Prequalify contractors
- D. Influence contractors
- E. Monitor results
- F. Demand Results

A. Set Expectations

It is critical the owner establish clear overarching safety expectations via a written safety policy that is incorporated into contracts. These are:

- Safety is a core value.
- Safety is integrated into all work.
- Safety is not an "add on" activity; it is part of the overall project management.
- Safety rules will be documented.
 - They are mandatory.
 - They will be applied consistently.
 - There will be consequences if they are not followed.

- Safety expectations will be communicated and they are expected to be met.
 - o If it's in the contract it is expected to met.
 - Contractors will be trained.
 - o Owner will provide ongoing feedback.
 - Owners will monitor and verify. contractor actions meet expectations.
 - There will be consequences if expectations are not met.
 - Owners will reward and celebrate success.
- Safety is as much a required deliverable as is cost, quality, and schedule.

Engage contractors as early as possible so they have adequate time to review owner safety requirements and standards. The priority of safety as first and foremost over schedule and cost must be well communicated, repeated often, and indisputable.

B. Establish a Safety Culture

It is the owner's exclusive responsibility to set expectations clearly and to establish robust safety programs where operating rigor is robust "Operating rigor" means that everyone on the construction site does the right thing, even when no one is looking. The skill sets required to achieve good operating rigor in safety are transferable; they are automatically applied to other areas, and result in improvements result to cost, schedule, and quality as well as safety. Operating rigor can, and should, be established on day one, when there are fewer people to influence and molding the culture is easier. It is easier to create a culture of safety than it is to "fix" a poor safety culture that is already in place. Owners should establish core requirements such as a project safety plan, project/site specific orientation, and ongoing daily safety engagements such as safety tours, toolbox talks, method statement reviews, and daily JSA reviews. Any at-risk behavior or conditions should be pointed out, corrected, and shared. Conversely, good performance should be reinforced with a form of positive recognition that meets with cultural norms.

One of the best ways to show the importance of safety is to have Top Management engagement. The team will take its cues from the site leadership. From setting safety key performance indicators (KPIs) to correcting unsafe conditions or behaviors while walking the construction site, the leaders' actions will establish the baseline for the project.

It is important to clearly communicate and reinforce safety systems, risk assessment and hazard elimination/reduction, and a culture where each person has ownership and accountability for safety.

C. Prequalification

Similar to the prequalification section addressed in this document, contractors should be evaluated on objective and verifiable criteria including, but not limited to:

- Safety management system and programs
- Safety culture
- Safety results
- Sustainability (consistency) of the criteria above.

With pre-qualification, many multinational companies request a look at a similar site the contractor is working on before they finalize the contract. This gives a very good basis to understanding the level of safety and quality that the contractors work toward. Because level of prequalification information varies greatly from country to country, owners should expect to have to " help" their contractors through this process.

D. Influence the Contractor

CURT members have found there are seven key factors in influencing contractors in developing countries.

- See and be seen in the field.
- Set a good example; walk the talk.
- Stay current with the project; understand. where there are gaps, hot spots, trends, etc.
- Communicate with key stakeholders and confirm understanding.
- Anticipate potential problems and plan potential countermeasures; encourage reporting of all safety incidents, conduct root cause analyses, evaluate incident trends, implement countermeasures and confirm effectiveness.
- Provide feedback on an ongoing basis. •
- Consistently reinforce the importance of safety through toolbox talks, audits, sharing of lessons learned.

It is not uncommon in some countries for contractors to not meet safety requirements in contracts. When this occurs the owner must stand firm and not make compromises for their safety expectations.

E. Monitor Results

At both a strategic and tactical level the Plan-Do-Check-Act cycle should be followed. This means owners should analyze the implementation and effectiveness of the overall safety management systems as well as the dayto-day safety requirements and performance.

Results should be shared with all key stakeholders including craft workers. As KPIs are met or exceeded, appropriate recognition should be provided. (Note: It is important to reinforce actions, conditions, and processes that do NOT encourage workers to not report incidents or injuries.)

F. Demand Results

Owners must continually reinforce safety is as much a required deliverable as is cost, quality, and schedule to everyone that participates in a project. It is not uncommon for contractors to weigh costs more heavily. Ongoing reinforcement solidifies the value of safety throughout the project life cycle.

6.0 Summary

There will always be hazards in the construction industry, but construction does not need to be dangerous. Owners must establish a strong safety culture to minimize risk of occupational injuries and illnesses. This can be done by incorporating risk analysis and management as part of the PDCA cycle throughout all phases of a project. When this is done properly, the likelihood of safety incidents diminishes significantly.

CURT owners that have incorporated the principles in this document into their construction management processes, from the design phase to post-project reflection, have seen improvement in safety results. However, it hasn't stopped there. They have also seen improvement in productivity, quality, cost optimization, and morale.

The Construction Users Roundtable (CURT) continues to believe and promote the idea that construction owners hold the greatest leverage, which is the leadership and authority to influence the behavior of others. When owners embrace the Guiding Principles along with a strong safety culture, we are doing our part to make sure workers go home each day as healthy (or healthier) as they were when they began their day on our projects.

For tactical, proven elements of a successful construction health and safety management system, see Appendix A, "Construction Health and Safety Management System — Tactical Elements."

Appendix A: Construction Health and Safety Management System — Tactical Elements

This appendix is intended as a **guideline** for developing a comprehensive construction safety program. While the elements and user practices described here merit consideration, not all will be appropriate for every workplace. The appendix, like the accompanying document, is not intended to impose any legal requirement on owners.

Presented here are 16 health and safety management system elements and user practices. They have been extracted from statistically significant health and safety user practices in the construction industry through such affiliations as the Construction Industry Institute (CII) and the Construction Users Roundtable (CURT). For the purposes of this document, the term "user practices" is defined as those system features that have been associated with the reduction of incidents and injuries on project sites during project execution. In addition, the user practices and learnings listed here were deemed statistically significant in lowering project injury and illness rates and severity, and proved even more effective when used in concert with one another.

For more information on the elements included here, see the publications listed in the Reference Documentation section at the end of this document.

1. Policy and Leadership: The system should provide for communicating the vision (i.e., the Road to Zero) and policies, and for demonstrating management's commitment to a health and safety culture that drives toward zero accidents and incidents. This requirement would apply internally and externally, as appropriate, to other stakeholders of the construction project. The system should include a means of confirming that the policies are accessible, communicated, understood, and implemented. Examples of this type of effective policy and leadership include:

- Owner includes safety expectations and deliverables in individual performance contracts and assesses results on a planned basis.
- Project Manager is committed to health and safety and demonstrates it.
- Owner provides extra funds (outside of contract) to promote project safety.
- Owner participates in conducting project safety orientations.
- Owner participates in daily pre-task analysis program.
- Owner participates in safety recognition programs.
- Contractor submits a safety policy signed by its CEO.
- Project manager has offices at project site with project management team (PMT).
- Top management participates in injury and significant near-miss investigations.
- Project management team incentive program exists for both leading and trailing metrics.
- Senior management reviews safety performance reports.
- Owner describes need for Road to Zero Roadmap and where it should fit.
- 2. **Risk Management:** Documented processes or procedures should be implemented and

maintained to identify, assess, and manage existing and/or potential areas of health and safety over which the construction project can be expected to have influence. The scope of assessment(s) should include contractor selection, evaluation and management, activities, operations, project, and products from the inception of the design and front-end planning through project execution, handover, commissioning, and start-up. The assessment should consider normal, abnormal, and emergency operating conditions. Assessment results and resulting action plans should be documented. A process should be in place to periodically review and, if necessary, update risk assessments. Examples showing effective risk management include:

- Comprehensive, project-specific hazard analysis occurs, including description of development methodology and scheduled reviews of analyses by the project team so that key inherent risks associated with the various tasks conducted during the project phases are understood (risk list by phase).
- Impact of working multiple shifts is assessed.
- Impact of extended work week is assessed.
- Daily pre-task review (utilizing event free tools such as Job Safety Analysis (JSA), Safety Basics, and others) occurs between workers and supervisors before work begins.
- Job Safety Analysis is performed prior to the task and followed during the execution of the task. If conditions or situation changes, the work should be paused until

the JSA is revised and re-communicated to all involved in the task.

- Supervisors schedule for workplace and condition inspections and observations.
- Supervisor and worker observation and coaching process is implemented and aimed at identifying safe and risky behaviors, as well as commending safe behaviors observed and coaching for elimination of risky behaviors.
- Facility Logistics safety assessment is conducted for temporary PMT/contractor offices/buildings.
- Due diligence studies have been performed where required.
- List of known designated and/or hazardous substances is provided to workers before the work begins.
- Chemical material safety data sheets and handling and storing procedures have been reviewed.
- Security procedures are established.
- Contractors are prequalified (where laws allow).
- Experience modification rates (EMRs) are not used as the sole criterion for contractor selection.
- 3. Legal Requirements and Standards of Operation: A documented process should be in place to identify, interpret, implement, and document all regulatory requirements and standards of operation applicable to the construction project. Some examples are:

- Contract requires a full-time safety professional on site, including additional safety staff, as workforce levels increase.
- Contract requires the contractor to submit the résumés of key safety personnel for the owner's approval.
- Formal contract administration procedure exists.
- 4. Strategic Planning, Goals, and Objectives: A strategic planning process for setting health and safety values, culture, goals and objectives, and for establishing contracts and work plans for accomplishing these goals and objectives, should be included in the system and should be incorporated into both the contracting process and the routine project planning/execution planning and goal-setting process. Employee involvement and stakeholder consultation in the establishment of objectives, and periodic feedback on progress in achieving them, should be incorporated into the system. Goals, objectives, and work plans should be consistent with policy, lead to continuous and measurable improvement, and support the creation of additional value and growth for the project. Significant issues identified from risk assessments, incident history, audit findings, legal requirements, stakeholder communication, standards of operation, and management reviews should be incorporated into this process. Examples of good strategic planning include:
 - Requirements for safety as a core value and for the desired safety culture are an integral part of the contracting process.
 - The project goal for Total Recordable Incidence Rate is set at zero.

- Contractors submit a site-specific safety plan.
- The contractor safety manager is exposed to the client health and safety (H&S) management system in advance of having a site presence.
- The H&S management system is incorporated into the written safety plan.
- Safety is a line item within the budget.
- Subcontractors are required to submit site-specific safety plans.
- 5. Structure and Responsibility: Roles,

responsibilities, accountabilities, and relations necessary to implement and maintain the system and facilitate H&S management should be defined and documented, with an established, effective means of communicating them. Both the owner and the contractor must understand what it will take to meet expectations. Project management should provide resources essential for implementation of the system and foster employee ownership at all levels of the project/construction organization, including subcontractors. The system should also provide for managing change in personnel and organizational structure. Examples of effective structure and responsibility include:

- Supervisor area of accountability designation is in the project Roles and Responsibilities
- Personnel qualifications are reviewed and approved for contractor staff safety experience.
- The project safety manager reports to at least the project manager level.

- The contractor has a competent safety representative on the project.
- A safety professional is on the PMT staff in advance of having a site presence.
- Contractor PMT personnel qualifications are reviewed and approved.
- Line accountability of H&S management system implementation and review is established.
- Client assigns personnel to parallel respective PMT position(s).
- Contractor safety management has a dotted-line relationship to the PMT Safety Manager.
- Contractors provide the same H&S administration to all subcontractors.
- 6. Programs and Procedures: Documented processes, programs, and procedures should be established and maintained to provide controls for the significant risks, legal requirements, and standards of operation identified in the planning process. Programs, processes, and procedures should be made accessible to employees, contractors, and government entities as appropriate. Examples of effective programs and procedures include:
 - A substance-abuse program is in place.
 - An updated set of generic construction procedures is in place.
 - Compliance with appropriate personal protective equipment requirements is 100%.
 - Site-specific H&S procedures exist
 between generic construction and client to

identify differences, and the owner's and contractor's policies are reviewed and combined using the best from each for the specific job.

- 7. Asset and Operations Integrity: Processes should be implemented to help ensure that integrity and reliability issues with the potential to cause a health and safety impact on the construction project are properly considered at all stages of the project life cycle. These issues include any integrity or reliability issue that is likely to result in a loss of containment or injury and should consider and incorporate, as appropriate: procurement; pre-construction H&S assessment processes (e.g., design/execution considerations); process, mechanical instrumentation, and electrical system documentation; pre-startup review; structural integrity; safe work practices; operating procedures; mechanical procedures; and management of change. Some examples of processes are:
 - Mechanical inspection programs for all rolling/moving equipment and compressors.
 - Comprehensive schedule/system for piping tie-ins.
 - Lockout/tagout procedures.
 - Permits (e.g., hot work).
- 8. Emergency Preparedness: The system should include a process for identifying and reviewing potential emergency situations and the planning for mitigation and control of incidents. Emergency response plans should be developed and maintained that address potential situations in construction that would require emergency

action. Periodic drills and exercises are required to validate emergency response plan adequacy and effectiveness. Some requirements for emergency preparedness are:

- Complete project site emergency response plan that includes accounting for all personnel.
- First aid-qualified staff for the site.
- Medical treatment facilities on site or in near proximity (within 3-4 minutes).
- Assessment of types of plausible emergency scenarios, including scheduling of planned drills designed to deal with plausible scenarios.
- 9. Awareness, Training, and Competency: Each construction project should establish and implement a documented process that provides employees and contractors with the necessary skills, knowledge, and certification to perform work in a safe and environmentally sound manner. This training includes employee/contractor orientation, regulatory required training, and craft skills training. In addition, the process should address contractors by defining a method to communicate applicable site health and safety information. The level of training required should be based on the degree of inherent risk associated with the site and the complexities of the actions required to control or mitigate the particular risk. Measures should be in place to assess the competency of those trained and to determine the effectiveness of the training programs. The system should include processes to effectively maintain training records. Examples of awareness, training, and competency include:

- Contractor supervisors receive training (for example, 10-hour OSHA program, first aid, CPR).
- Incentive programs are in place that include "immediate reinforcement" as a structured element.
- Incentives are tied to leading metrics associated with the zero-injury objective set at the beginning of the project.
- Supervisors are evaluated and rewarded based on written safety leadership, participation, and performance criteria.
- Health and safety cultural alignment training takes place between owners and contractors.
- Mentors are used (experienced craft personnel are assigned to the less experienced).
- Contractors are required to provide regulatory required safety training to workers.
- A model scaffold is pre-built at project beginning to set an example for actual scaffolds.
- Workers receive training each month.
- Project managers and supervisors receive H&S training each month
- Orientations occur for visitors, contractors and subcontractors, and vendors.
- Zero-injury expectations are shared and explained to all site employees.
- Each individual worker receives safety training before performing any work on the job.

- Contractor personnel new to the site are readily identifiable during an initial period (for example, with blue hardhats, special stickers, or yellow jackets).
- Managers and supervisors receive behavior based safety training.
- 10. Investigation and Corrective Action: The system should include processes that address investigation of non-conformance items, near misses, and incidents. Investigations should focus on determining root causes and contributing factors, with the objective of correcting latent deficiencies, preventing recurrence, and broadly sharing lessons learned in a timely manner. Examples of good investigation and action include:
 - Safety rules are enforced from the very beginning of the project.
 - All incidents (injuries and near misses) are reported without reprimand.
 - Incident reports and or alerts are widely distributed and communicated shortly after the occurrence, including all actions taken.
 - Investigations include appropriate members of owner's and contractor's PMT personnel.
 - Root-cause analysis is implemented in investigations.
 - Sanctions are issued for contractor and subcontractor non-compliance with safety standards, with project-wide communication for full understanding.

- Actions are developed with recurrence control in mind, and their effectiveness is evaluated once implemented.
- 11. Communications: Construction projects should facilitate effective practices and communication of H&S-related issues, including the importance of compliance with regulations and policies, achieving H&S goals and objectives, and the consequences of deviating from policies and established site safety procedures. Procedures should also be in place to manage relations with stakeholders (workers, owners, labor unions, contractors, architects, engineers, and designers), in order to understand and respond appropriately to their diverse and evolving expectations via open communication. The public reporting of progress on economic, environmental, and social issues pursuant to sustainable development should be considered as part of the system. Examples of effective communications include:
 - Weekly safety meetings take place.
 - Daily craft/task toolbox meetings take place.
 - Weekly project and safety management meeting reviews take place.
 - Workers are involved in meetings.
 - Written communication tool consolidates meeting information for dissemination to all project personnel on weekly basis.
 - Project-wide radio communication net is in place for all contractors on the project site.
 - Weekly meeting of project/contractor safety managers takes place.

- Subcontractors hold weekly safety meetings.
- Craft workers submit safety observations on a regular basis as part of a formal program.
- 12. Document Control and Records: Documentation should describe the H&S system core elements and links to other elements, documents, plans, and processes. A process or procedure should be in place to maintain H&S-related documents and records. The process should include a means to ensure that documents and records are accessible and can be identified and retained. Documents should be reviewed periodically and revised as necessary. Current versions should be made available, and obsolete documents should be removed or identified as being retained for legal use. Examples of good document control and record-keeping include:
 - Contracts that list good practices where applicable (usually a list attached as a minimum).
 - Safety meeting minutes.
 - Project health and safety communication bulletin with a system of confirmation to ensure supervisors share it with workers.
 - Documents retained in accordance with regulatory requirements.
 - Confidential medical records and documents.
- 13. Measuring and Monitoring: A process should be in place to measure and monitor the construction project's operations and activities. The process should assess the implementation and effectiveness of its operation controls, track H&S

performance, and evaluate the achievement of H&S goals and objectives. Performance measures should be generated on a periodic basis appropriate for the project to provide project management with the tools to understand trends and impacts and establish future direction. Health and safety metrics for the project should include both leading and lagging indicators. Examples of effective measuring and monitoring include:

- Health and safety metrics are included as part of an "Owner's Scorecard" for project and business deliverables.
- The project maintains incident and injury statistics for each contractor on site.
- Contractor incident and injury statistics are included in the owner's safety performance.
- Owner requires testing after project safety orientations.
- Owner representatives regularly check project near misses.
- Owners regularly check safety inspection records to monitor contractor safety performance.
- Maintenance of training qualification is monitored. Multiple leading indicators are used
- Incident severity and Recordable Incidence Rate (RIR) are used to evaluate contractor safety performance.
- Formal worker-to-worker behavior-based safety program exists on the project.
- Safety perception surveys are conducted on the project.

- Supervisors and managers observe safety behavior during work, and the results are tracked to determine areas at risk for injury.
- A requirement is established regarding the number of workers per full-time safety professional.
- 14. Audits: The construction project should establish and maintain a documented procedure for auditing H&S compliance with its legal requirements and standards for construction. The program should encompass all levels of contractors and subcontractors on site and should include client interface where potential health and safety impacts exist. In addition, periodic audits of the project H&S management system should be performed to verify that the H&S management system is understood and has been properly implemented. Examples of good auditing include:
 - Quality of the contractors' and subcontractors' overall safety programs has been reviewed and approved.
 - A tiered auditing process is used, with compliance, individual system effectiveness, and appropriate systems in place.
 - Contractor/owner team safety inspections are conducted frequently on the project.
 - Formal weekly scheduled audits take place with PMT/contractor management and worker participation.
- 15.**Owner Review and Redirection**: During project execution, owners should implement a process for conducting periodic self-assessments to

gauge the level of H&S compliance and performance. Reviews by safety committees or other review bodies should be at regular, documented time intervals, developed to ensure timely action on health and safety issues. Such reviews should be documented and should include assessment of H&S metrics, incident statistics, safety observation statistics, perception survey results, audit findings, incident investigations (including lessons learned), and (good) user practices. Provision should be included for ad-hoc reviews of critical items. In addition, management reviews of the system and its effectiveness should be included and used as a tool for driving continuous improvement. The reviews should be carried out periodically by the Project Manager. The reviews should assess system strengths and weaknesses and should include any need for changes in policy, objectives, goals, or work plans based on changing circumstances and commitment to continuous improvement; resource allocation for system implementation and maintenance; performance measures; audit results; significant issues from risk assessments; and changing regulatory requirements. Indicators of a good review system include:

- Formal subcontractor evaluation and selection processes are in place.
- Contractor and owner policies are reviewed and updated to incorporate findings and provide for continuous improvement.
- The H&S management system is updated to incorporate findings and learning's from measures, assessments, audits, and other related reviews.

- At project end, project management systems are reviewed and user practices captured and/or reinforced for use in future projects.
- 16. Innovative Safety Practices: CURT strongly supports the development and implementation of new and innovative safety practices. Once successfully implemented on a project, these practices join the list of best practices and should be shared and utilized on all applicable project locations. Innovative practices should be captured and reported through the CURT Safety Committee and are requested as part of each CISE award submittal. Innovative practices are defined as safety-related activities that improve the safety culture, lead to improvement of performance along the road to zero, lead to increased craft involvement, and improve participation in safety-related activities.

Glossary

Co-employment – When a party other than the employer exercises or has the apparent right under contract to exercise control over the activities of the employer's employees, including their work methods or activities.

Experience modification rate (EMR) – An insurance term representing the ratio of an insured's expected losses to actual losses. The ratio is used as a multiplier to calculate (modify) the insured's current premium.

Front-end planning – The process that employs a company's resources (financial, facilities, human, and organizational) to translate market and technological opportunities into a capital project that is sufficiently defined to minimize changes during the production engineering, construction, and start-up phases.

Job Safety Analysis (JSA) – A process of analyzing a job or task for its inherent risks, and then creating a document that identifies the risk at each stage of the task and the steps necessary to avoid injury/illness associated with the risk.

Leading metric/indicator – A type of metric that captures proactive and forward-looking safety improvement supporting the "road to zero" mentality.

Near miss – Any work-related incident that had the potential to cause harm to an employee or to damage equipment or machinery, but did not, merely by chance.

Road to Zero – A concept that promotes the establishment of a safety culture that will drive continuous safety improvement within the industry and promote behavior change at the shop-floor level, with the primary focus on injury prevention. **Root-cause analysis** – A process used to analyze an unplanned event such as an injury, illness, property damage, or near miss for its underlying causes.

Safety culture – The shared beliefs, values, attitudes, institutions, and behavior patterns of the members of an organization or group, which are reflected by what workers do even when no one is watching.

Safety observation – An observation of a safety issue or a positive action or activity that is documented as part of a site's safety culture.

Construction Users Roundtable Publications

The purpose of developing CURT publications is to disseminate recommendations, guidelines, and reports developed by the Construction Users Roundtable. CURT is focused on improving the cost effectiveness of the U.S. construction industry. These publications have been developed from the point of view of owners or users of construction services. Efforts by all segments of the industry, however, are vital to major improvements.

This publication is one of a series from committees or study teams addressing a problem area.

Findings and recommendations of CURT are included in publication series classified as White Papers (WP), Reports (R), or User Practices (UP). In addition to these classifications, CURT publications are numbered based on the category of the topic:

Category	Number Code
Constructability	011 to 099
Contractor Management	101 to 199
Cost	201 to 299
Interface Management	301 to 399
Workforce/Industrial Relations	401 to 499
Material Control	501 to 599
Purchasing	601 to 699
Quality	701 to 799
Safety	801 to 899
Security	901 to 999
Strategy	1001 to 1009
Work Planning and Scheduling	1101 to 1199
Technology/E-Sourcing	1201 to 1299
Construction Productivity	1301 to 1399
Special Projects	2001 to 2099

Examples:

- WP-1201: A CURT White Paper on Reverse Auction
- R-402: A CURT Report on Tripartite Initiatives
- UP-801: A CURT User Practice on Construction Safety in Contractor and Craft Worker Prequalification

Available CURT Publications

White Papers

WP-401, Confronting the Skilled Construction Workforce Shortage WP-409, Construction Labor: Workforce Crisis in

WP-409, Construction Labor: Workforce Crisis in Construction.... Finding the Solution

WP-410, CURT | CWDC Joint Workforce Initiative

WP-413, Construction Labor: Contractors' Workforce Development Assessment

WP-414, Labor Risk Mitigation

WP-415, Attracting & Retaining Talent

WP-416, CYP Knowledge Transfer

WP-810, Co-Location and Connection: Managing the Risks

WP-813, Construction Safety: Managing by Leading Indicators

WP-814, Construction Safety: Human Construction Traffic Interface (HCTI)

WP-1003, Construction Strategy: Optimizing the Construction Process

WP-1004A, Construction Strategy: CURT's Path toward LEAN Project Delivery

WP-1101, Skilled Labor Shortage Risk Mitigation

WP-1201, Guidelines on the Use of Reverse Auction Technology

WP-1202, Collaboration, Integrated Information and the Project Lifecycle in Building Design, Construction and Operation

WP-1301, Managing Construction Productivity

Reports

R-402, CURT Tripartite Initiative (CTI) Executive Summary R-402A, CTI Study on Extended Overtime on Construction Projects

R-402B, CTI Study on Absenteeism in Construction R-402C, CTI Report: Eliminating Work Disruptions & Jurisdictional Disputes

R-405, CTI Report: Project Stakeholder Responsibilities R-411, Construction Workforce: Building Comprehensive Labor Market Information (digital copy only)

R-807, Construction Owners' Safety Blueprint (OSB) R-807A, Construction Owners' Safety Blueprint | China Supplement

User Practices

UP-101, Construction Measures: Key Performance Indicators

UP-201, Construction Project Controls: Cost, Schedule, & Change Management

UP-301, CYP What do Owners and Contractors Really Want From Each Other?

UP-403, Construction Labor: Managing the Construction Workforce

UP-408, Construction Workforce: Improving Productivity on Union Projects

UP-601, Construction Purchasing: Capital Purchasing & Contracting

UP-701, Construction Quality: Achieving Quality on Capital Projects

UP-801, Construction Safety: Contractor and Craft Worker Prequalification

UP-802, Construction Safety: The Owner's Role

UP-803, Construction Safety: Prebid and Bid Clarification Meetings

UP-804, Construction Safety: Contract Terms and Conditions

UP-805, Construction Safety: Monitoring Contractor Performance

UP-806, Construction Safety: Improving Safety Programs UP-815, Construction Safety: Culture for Short Duration Projects & Shutdowns

UP-1203, BIM Implementation: An Owner's Guide to Getting Started



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