When Safety Regulation Enters the Bid

How Federal Compliance Risk Shapes Construction Estimating, Pricing, and Market Participation

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Abstract

Construction safety regulation is usually evaluated at the point of compliance or enforcement. The discussion centers on what a standard requires, what condition existed on the jobsite, which employer was responsible, and whether the requirement was followed. Contractors begin dealing with the economic and operational effects much earlier.

Before a bid is submitted, an estimator must determine what the requirement means to the work. That decision can affect crew production, supervision, equipment, employee training, site access, subcontractor scope, documentation, schedule, insurance, and contingency. When the obligation is clear, it can generally be planned and priced. When the obligation is uncertain, the contractor must carry the exposure as risk.

That risk may be included in the price, transferred through the contract, addressed through a qualification, absorbed in the contractor's margin, or avoided through a decision not to pursue the work. Each response affects a project differently. Some support better planning and stronger safety execution. Others create disputes, reduce bidder participation, push responsibility toward contractors with fewer resources, or leave field personnel trying to recover a cost that was never included in the estimate.

Federal regulatory analyses properly examine compliance cost, economic feasibility, recordkeeping, and effects on small entities. The analyses reviewed for this paper, however, do not separately model how uncertainty enters an individual construction bid through production assumptions, contingencies, subcontract pricing, proposal qualifications, or bid/no-bid decisions.

This paper proposes a construction-specific pre-bid impact review for significant safety rules and enforcement policies. The review would identify the responsible project participant, distinguish direct compliance costs from operational and uncertainty costs, examine the effects of project type and contractor size, and establish a method for determining whether the policy moves resources toward hazard control. The purpose is not to weaken worker protection. It is to improve the likelihood that regulatory requirements can be understood, funded, assigned, and implemented before the work reaches the field.

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1. Introduction

Anyone who has been responsible for closing a construction estimate understands that the final price is built on more than quantities and unit costs. The estimator is making decisions about how the project will be performed. Those decisions include crew size, production, supervision, equipment, access, material handling, schedule, subcontractors, temporary protection, and risk.

Safety requirements are part of that operating plan.

They are sometimes treated as a separate compliance category, but that is not how they affect the job. A fall-protection requirement can change access and production. A training requirement can affect when employees begin work. A competent-person responsibility consumes supervisory time. A site-specific documentation process adds project-management or administrative hours. A heat-protection plan can affect crew scheduling, recovery periods, water distribution, and the productive time available during a shift.

Each of those decisions eventually reaches the estimate.

When a requirement is known before bid day, the estimator can address it. The contractor can identify the equipment, calculate the labor, include the supervision, adjust the production rate, and explain the cost to the owner. The requirement may be expensive, but it can be incorporated into the plan.

Uncertainty creates a different problem.

When the contractor cannot determine who is responsible, how broadly a requirement will be applied, how frequently an activity must occur, or whether one jurisdiction will interpret an obligation differently from another, there is no single cost to calculate. The estimator must make an assumption.

A contractor can carry that assumption as contingency. The contractor can add supervision, reduce expected production, seek clarification, qualify the proposal, place responsibility in the subcontract, or decide that the exposure is not worth pursuing.

The contractor can also overlook it.

That may produce the lowest number on bid day, but it does not remove the cost. Costs omitted from an estimate have a way of returning during production. They appear as lost labor hours, extended general conditions, unplanned equipment, additional administration, change-order disputes, or margin erosion. In the worst cases, the field team is expected to meet a production target that never accounted for the time needed to perform the work properly.

That is why estimating belongs in the policy discussion. It is not simply where contractors calculate what regulation costs. It is where regulatory expectations become operating commitments.

Federal procurement policy provides a useful parallel. A firm-fixed-price contract places maximum cost risk and responsibility for the resulting profit or loss on the contractor.[1] The operational implication is straightforward: a contractor can responsibly accept fixed-price risk only to the extent that material performance requirements can be identified and evaluated before award. That conclusion is an inference from the contracting structure, not a statement that the Federal Acquisition Regulation addresses OSHA risk specifically.

Construction safety regulation serves an essential purpose. In 2024, private-sector construction recorded 1,034 workplace fatalities, more than any other private-industry sector.[2] An examination of

compliance cost must begin with that reality. Preventing injuries and fatalities is not an optional business consideration.

Neither is accurate planning.

A requirement that is misunderstood, assigned to the wrong party, or introduced after the price is fixed does not become easier to implement because its purpose is important. It becomes harder to fund and harder to manage. Good policy must address both the intended protection and the way that protection will be delivered through a construction project.

OSHA's formal analyses examine regulatory costs, feasibility, recordkeeping, familiarization, training, equipment, and effects on small entities. The agency's 2024 Hazard Communication Standard analysis, for example, evaluated annualized compliance costs by affected industry and compared those costs with revenues and profits.[3] The 2024 construction personal protective equipment rule examined employer familiarization, research associated with obtaining properly fitting equipment, and replacement costs.[4]

Those are necessary analyses. They help determine whether a requirement is economically feasible at an industry or establishment level.

They do not fully answer the question an estimator faces:

What must be included in this project, under this contract, in this jurisdiction, using this crew and this schedule, before a fixed price is submitted?

That is the gap examined in this paper.

2. Methodology, Sources, and Limits

This paper combines primary regulatory and government sources with practitioner analysis based on more than four decades of construction estimating, project management, field operations, and executive responsibility.

Primary sources include the Occupational Safety and Health Act, applicable provisions of Title 29 of the Code of Federal Regulations, OSHA rulemaking records, economic analyses, State Plan information, small-business review materials, federal procurement requirements, and government construction and labor data.

The paper also examines how regulatory requirements are handled inside a construction estimate. That part of the analysis is practical rather than econometric. The research conducted for this paper did not identify a publicly available national dataset that isolates regulatory uncertainty as a separate component of construction bids.

Contractors do not manage that uncertainty in one standard way.

One contractor may include an allowance. Another may reduce expected production. Another may increase supervision or subcontractor requirements. A contractor working under a negotiated agreement may raise the issue with the owner before the price is finalized. A hard-bid contractor may have no practical option other than carrying a contingency, qualifying the proposal, or accepting the exposure.

Those differences make it difficult to calculate one national percentage representing the cost of regulatory uncertainty. This paper does not attempt to do so.

It also does not claim that every safety requirement increases project cost, that every contractor responds to regulation in the same manner, or that safety spending is economically harmful. Properly selected and implemented safety investments can reduce injuries and associated costs. A NIOSH-supported study involving engineering-control interventions at 468 employers found post-intervention reductions in workers' compensation claim frequency and costs among the employees affected by the interventions. Results varied by employer size, industry, and intervention type and should not be treated as a universal return-on-investment guarantee.[5]

The distinction made throughout this paper is between money directed toward protection and money spent managing uncertainty.

Both are real costs. They do not produce the same result.

For purposes of this analysis, project-level effects are organized into three categories:

1. **Direct compliance costs**, including protective equipment, training, monitoring, and dedicated safety resources;
2. **Operational costs**, including production, supervision, coordination, schedule, and administration; and
3. **Uncertainty costs**, created when responsibility, application, or enforcement exposure cannot be determined reliably before pricing.

A fourth category, **market impact**, develops when project-level decisions influence competition, contractor participation, or the structure of the contracting market.

The observations in this paper explain how construction businesses make those decisions. They are not offered as legal advice and do not replace a project-specific review of the applicable standard, contract, or jurisdiction.

3. What an Estimator Does with Regulation

An estimate is often reduced to quantities multiplied by unit costs. That may describe the arithmetic, but it does not describe the work.

A professional estimator must understand how the project will be built. Labor cannot be estimated correctly without considering access, sequencing, crew composition, material movement, equipment, supervision, weather, site congestion, and interaction with other trades. Safety requirements are part of every one of those considerations.

The estimate is the first operating plan.

That does not mean every detail is known. Construction documents are rarely perfect, and site conditions change. The estimator's responsibility is to separate what is known from what must be assumed and what remains unresolved.

A known requirement is manageable. If the contract requires a full-time safety professional for 24 weeks, the cost can be calculated. If employees must complete an eight-hour project orientation, that time can be carried. If the project requires a particular perimeter-protection system, the estimator can determine the quantity, rental period, installation labor, and relocation plan.

An assumption requires judgment. The contractor may not know the precise number of times a warning-line system will be moved, but the roof area, phasing, schedule, and crew plan may support a reasonable estimate. That assumption should be documented and reflected in the production rate.

An unresolved exposure is different.

The contractor may not know whether site-wide monitoring will be supplied by the construction manager or required independently from every subcontractor. The project documents may incorporate a safety manual that can be modified after award. A state requirement may be more stringent than the federal standard, but the bid documents may not identify the difference. A contract may require the subcontractor to comply with every later-issued rule without providing a mechanism for time or cost adjustment.

That is where a compliance obligation becomes a business risk.

Estimators do not have unlimited room to cover risk. Construction bidding is competitive, and every contingency affects the final number. A contractor that carries additional cost for an unclear obligation may lose the project to a bidder that interpreted the requirement differently or did not identify it at all.

That creates a difficult incentive. The more carefully one bidder studies the obligation, the less competitive that bidder may appear.

This does not mean the lowest bidder is careless or the highest bidder is complete. It means the owner may be comparing prices built on materially different assumptions.

Good policy should reduce that gap. Contractors should compete on purchasing, production, planning, field leadership, and execution. They should not be forced to compete on who makes the most aggressive assumption about an unclear safety responsibility.

Construction research supports that conclusion. Bid/no-bid decisions have been modeled as multi-factor judgments involving the project, client, market, competitors, and the contractor's own capability. Separate research on risk pricing found that contractors may identify risks during bid preparation and still reduce or remove the associated price from the final offer to remain competitive.[12,13] That behavior does not prove that every bidder underprices risk. It does show why the final bid may not reveal everything the estimating team identified.

4. The Three Cost Layers of Safety Compliance

4.1 Direct Compliance Cost

Direct costs are the most visible and normally the easiest to calculate. They may include personal protective equipment, guardrails, warning lines, scaffolds, lifts, respiratory protection, exposure monitoring, training, medical evaluations, safety personnel, and temporary protective systems.

When these requirements are defined, they can be measured.

The purchase is not always the full cost. Equipment must be selected, delivered, inspected, stored, maintained, relocated, and eventually removed. Employees must be trained to use it. Supervisors must verify that it is being used properly. Damaged or missing equipment must be replaced.

These are still identifiable obligations. The estimator can build a cost path.

OSHA's economic analysis of the construction PPE-fit rule illustrates this type of review. The agency evaluated familiarization with the revised requirement, research time potentially needed to obtain nonstandard sizes, and the cost of replacing improperly fitting PPE.[4]

A construction estimate takes the next step. It determines where that cost belongs in the project.

The PPE may be included in company overhead, labor burden, a project safety line item, or a unit price. None of those approaches is automatically incorrect. What matters is that the cost is recognized and funded.

4.2 Operational Cost

The second layer is the effect on how the work is performed.

This is where small time requirements become significant. Ten minutes may not look important when one activity is reviewed in isolation. Ten minutes repeated across a crew, several work areas, multiple shifts, and a six-month project becomes a production issue.

Construction cost is built through repetition.

A safety requirement may add setup and breakdown time. It may restrict the number of employees allowed in an area, require a separate access route, change material staging, prevent trades from working simultaneously, or add an inspection before production can begin.

None of this means the requirement should be removed. It means the production effect must be recognized.

Consider a roofing crew required to install, inspect, and relocate a temporary protection system as work progresses. The direct cost includes the equipment. The operational cost includes unloading it, setting it up, moving it, inspecting it, adjusting the work sequence around it, and removing it at completion.

The equipment may cost less than the labor needed to manage it.

That is not unusual. In construction, the cost of handling an item can exceed the cost of the item itself.

Operational effects commonly appear in crew productivity, supervisory time, mobilization, equipment duration, work sequencing, restricted work areas, material movement, project scheduling, and general conditions.

A regulation can be economically feasible on an annual industry basis while still having a substantial effect on a particular short-duration or labor-intensive project. Both statements can be true.

4.3 Uncertainty Cost

The third layer develops when the contractor cannot determine the obligation with enough confidence to build a direct or operational cost.

This is not the cost of the protection itself. It is the cost of not knowing exactly what will be expected.

Uncertainty may involve:

- The responsible employer;
- The limits of project control;
- Inspection frequency;
- Required documentation;

- State Plan differences;
- Changing project rules;
- Overlap among contractors;
- An owner's site-specific requirements; or
- The possibility that an enforcement interpretation will be broader than the contractor anticipated.

There is no standard method for pricing that uncertainty.

Some estimators add contingency. Others lower the expected production rate or include additional project-management time. Some move the obligation to a subcontractor. Some submit a written qualification. Some decide not to bid.

A contractor may also accept the risk without adding anything.

That choice does not make the project less expensive to perform. It moves the financial consequence from the estimate into production.

The policy question is not whether safety costs money. It is whether uncertainty is creating avoidable cost without improving protection.

5. When Uncertainty Reaches the Contract

Construction contracts define scope, allocate responsibility, and assign risk. That is necessary. No contractor controls every condition on a complex project.

The contract becomes less effective when it attempts to transfer an obligation that the parties have not clearly defined.

Broad clauses commonly require contractors and subcontractors to comply with all applicable laws, all owner safety rules, all general-contractor policies, all later-issued procedures, and requirements incorporated through higher-tier agreements. These clauses may be accompanied by indemnity obligations, additional-insured requirements, responsibility for lower-tier subcontractors, and liability for shutdowns, citations, or delays.

A contract can assign responsibility. It cannot create the resources required to perform that responsibility.

The subcontractor must still include labor, supervision, equipment, and administration in the price. If the obligation is buried in general language or introduced after the bid, the subcontractor may not have carried enough cost to perform it.

The risk then moves downstream.

A construction manager may assign site-control responsibilities to the general contractor. The general contractor may flow them to each trade. A specialty contractor may flow them to a lower-tier labor subcontractor. By the time the requirement reaches the employer closest to the work, that party may have the least administrative capacity and the least financial room to respond.

The contract may protect the upstream parties. The hazard remains.

This is the difference between risk transfer and risk reduction.

Construction risk-allocation research reaches a similar conclusion: risk should be identified and evaluated before it is assigned, and the contract should place it with the party best able to manage it.[14]

When an obligation is shifted without that analysis, the document may allocate liability without improving the project's ability to control the underlying condition.

Proper allocation begins with control. Which party has access to the information? Who controls the schedule and work area? Who can stop the activity? Who can direct correction? Who is supplying the protective system? Who supervises the employee?

Those questions should be answered before the price is fixed.

When they are not, the parties can spend more time protecting their contractual positions than solving the original problem. Letters are written. Notices are issued. Responsibility is debated. The field waits.

Clear regulation does not eliminate the need for contract language, but it improves the quality of that language. The parties can assign a known duty instead of shifting an undefined exposure.

6. Jurisdictional and Enforcement Variation

Construction contractors do not operate under one completely uniform safety system.

OSHA currently recognizes 22 State Plans covering private-sector and state and local government workers, along with seven plans covering only state and local government employment. State Plans must remain at least as effective as federal OSHA, but they may adopt different or more stringent standards and maintain their own enforcement, penalty, review, and appeal procedures.[6]

State authority is an established part of the Occupational Safety and Health Act. The estimating concern is not that differences exist. It is whether a contractor can identify material differences early enough to plan the work and price the obligation.

A regional contractor may learn one system and build company procedures around it. A contractor working across several states must determine whether the same program, training, documentation, and equipment satisfy each jurisdiction.

That review takes time. It may involve safety personnel, legal counsel, project managers, estimators, insurers, and outside consultants. The cost may be manageable for a large contractor and more difficult for a small specialty company crossing a state line for one project.

Enforcement variation can create similar uncertainty even when the regulatory text remains unchanged. Inspectors must apply standards to actual conditions, and construction conditions are rarely identical. Some judgment is unavoidable.

The difficulty develops when a material project obligation depends on an interpretation that cannot be reasonably anticipated before bidding.

The estimator needs answers to practical questions:

Who is expected to inspect the condition? How often? Must the contractor document each inspection? Is the employer responsible only for its employees, or does its contractual role create broader obligations? Can the employer correct the condition directly, or must it request action from another party? Is the owner's program more demanding than the regulatory minimum? Will the additional requirement be treated as part of the original scope?

When those answers vary by jurisdiction or project representative, the contractor has three broad choices: carry more cost, accept more exposure, or avoid the work.

A more accessible comparison of material State Plan differences would not eliminate state authority. It would allow contractors to identify their obligations before committing to a price.

7. Small and Specialty Contractors

Construction is largely an industry of small establishments. BLS data for March 2025 identify 940,139 private construction establishments. Approximately 91.3% had fewer than 20 employees, including 638,473 establishments with fewer than five.[7]

The term *establishment* is important. One company can operate more than one establishment. The figures do not establish the exact number of independent construction firms. They do demonstrate the prevalence of small operating locations within the industry.

These establishments are not all unsophisticated, and larger contractors are not automatically better managed. Size does, however, affect how fixed compliance and administrative costs are absorbed.

A large contractor may employ safety directors, trainers, preconstruction personnel, in-house counsel, project executives, risk managers, and technology administrators. The cost of those resources can be spread across many projects.

In a small specialty company, the owner may estimate the work, manage the customer, oversee safety, purchase material, resolve field problems, and collect payment. The company has the same duty to protect its employees, but it does not have the same administrative structure.

That distinction should not be used to lower the required level of protection. It should be considered when selecting the method of implementation.

A written company program can improve consistency. Requiring a contractor to reproduce substantially the same plan for dozens of short-duration projects may add paperwork without changing the protection. A detailed daily reporting system may be reasonable on a major project but difficult to apply to a technician moving through several service calls.

The hazard should determine the protection. Project size and duration should help determine how that protection is documented and administered.

The federal heat-rulemaking record illustrates why operational review matters. During OSHA's 2023 small-business panel process, representatives with mobile, short-duration, or isolated workforces raised concerns about monitoring, supervision, rest periods, and additional recordkeeping. Some stated that contemplated recordkeeping could require additional staff or draw time from existing safety initiatives. The panel recommended flexibility and scalability, clearer treatment of mobile employees, and reconsideration of administrative requirements that did not demonstrably improve worker protection.[8]

Those comments were stakeholder concerns raised during development of a proposed standard. They were not findings that a final rule would be infeasible.

OSHA published the proposed federal heat standard in August 2024. The informal public hearing concluded on July 2, 2025, and the post-hearing comment period ended on October 30, 2025. The rule remains at the proposed-rule stage as of July 2026.[9]

The distinction matters.

Small contractors should not be excused from planning, training, inspection, or correction. They should be given requirements they can understand and implementation tools they can use.

Model plans, mobile forms, standard training materials, short-duration guidance, and clear distinctions between company-level and project-level documentation can improve compliance without reducing protection.

Prequalification also deserves attention. Owners and general contractors commonly review safety records, insurance, written programs, training capacity, technology, and administrative systems before permitting a contractor to compete.

Prequalification can remove contractors that are not prepared to perform the work safely. Depending on the criteria used, it can also place greater weight on administrative infrastructure than on the contractor's demonstrated ability to identify and control the hazards associated with its work.

Paperwork is necessary. Paperwork is not protection.

The strongest process evaluates both.

8. Procurement, Competition, and Project Delivery

Regulatory uncertainty affects an owner even when the owner never sees a separate compliance line item.

It affects the number of bids, the spread between them, the qualifications attached to them, and the contractors willing to participate.

Federal-aid highway procurement provides one documented example of the relationship between competition and price evaluation. FHWA guidance calls for construction bids to be reviewed for the degree of competition, the reasonableness of the low bid compared with the engineer's estimate, potential bid unbalancing, and evidence of bid rigging.[10]

Those reviews focus primarily on bids received.

The harder number to identify is the contractor that reviewed an opportunity and decided not to submit. A qualified contractor may conclude that the safety requirements are unclear, the contract places too much undefined responsibility on the bidder, or the schedule does not provide enough time to resolve the issue.

That decision does not appear on the bid tabulation.

The effect still reaches the owner.

Fewer bidders can reduce competition. Contractors that remain may increase pricing to carry the exposure. A project may have to be rebid, redesigned, or awarded above the estimate. In other cases, the low bidder may have carried a materially different assumption from the other bidders.

This paper does not claim that regulatory uncertainty is a primary cause of low bidder participation across public construction. Available procurement data generally do not isolate that issue. The point is that bid/no-bid decisions are a plausible market pathway that current rule-level compliance estimates do not consistently capture.

Project delivery method changes how this risk is addressed.

FHWA's project delivery selection guidance treats risk allocation, competition, owner control, level of design, and cost certainty as connected decisions. The guidance notes that poorly allocated risk can produce high contingencies, while unresolved design and third-party risks in design-bid-build can lead to contingency pricing, change orders, and claims.[15] The context is transportation procurement, but the operating principle applies more broadly: the delivery method and the point at which risk is defined affect how contractors price it.

8.1 Hard-Bid Work

On a traditional hard-bid project, the contractor has limited opportunity to discuss assumptions with the owner and design team. Questions must be submitted before the deadline, and answers may arrive through an addendum shortly before bid day.

When the answer remains incomplete, the estimator still has to make a decision.

The contractor can carry cost, qualify the proposal, or accept the exposure. None is ideal when competing bids may be based on different assumptions.

8.2 Negotiated Work and Construction Management

Negotiated delivery provides more opportunity to discuss safety expectations, access, sequencing, and responsibility before the price is finalized. Preconstruction services can identify cost earlier and allow the owner to make an informed decision.

That does not guarantee clarity, but it creates a better process for resolving uncertainty.

8.3 Design-Build

Design-build can give the contractor more influence over constructability and safety planning, but it may also require pricing before design completion.

The team should identify which safety assumptions are included and which remain subject to development. A general requirement to comply with all applicable laws is not a substitute for clarifying major project responsibilities.

8.4 Service and Short-Duration Work

Service, maintenance, emergency repair, and short-duration work create a different operating environment.

A four-hour repair is not simply a smaller version of a two-year construction project. The hazard may be serious, but the mobilization time, site access, workforce, documentation, and customer coordination are different.

A contractor responding to an emergency leak may have limited information before dispatch. That does not remove the obligation to protect the crew. It makes clear and scalable requirements especially important.

Policy that assumes every construction activity operates like a major project will create implementation problems at the service level.

9. When Compliance Activity Does Not Improve Safety

The cost of regulation is justified when it produces meaningful worker protection. The analysis becomes more difficult when compliance activity increases without a clear improvement in field performance.

Effective safety investments can provide measurable benefits. The NIOSH-supported engineering-control study discussed earlier reported reductions in claim frequency and costs among affected employees, although outcomes varied by intervention and employer characteristics.[5]

The concern is not the cost of effective prevention.

The concern is the cost of activity that exists primarily to manage uncertainty or defend against liability.

OSHA's leading-indicator guidance makes a related distinction. Proactive measures should help an employer determine whether safety activities are preventing incidents, while lagging measures record what has already occurred.[16] A policy review should therefore ask not only whether an activity was completed, but whether it improved the employer's ability to identify and control the hazard.

9.1 Documentation Without Execution

Training rosters, inspection records, pre-task plans, competent-person reports, and corrective-action logs all serve legitimate purposes. They create consistency and provide evidence that required activities occurred.

A document becomes a problem when completing it replaces thinking.

A signed training sheet does not establish that the employee understood the material. A completed inspection form does not establish that the hazard was corrected. A written plan does not protect anyone if the foreman and crew cannot apply it to changing conditions.

The document should support the work. It should not become the work.

9.2 Duplicated Oversight Without Authority

Multiple levels of inspection can strengthen a project. A subcontractor may inspect its work, the general contractor may review the area, and the owner may conduct an independent audit.

Problems develop when everyone can document the condition but no one is certain who must correct it.

The project can produce several notices and still leave the hazard unresolved.

Accountability should identify the party expected to act. It should also give that party enough authority, information, and time to act.

9.3 Reduced Cooperation

Uncertain responsibility can create a perceived disincentive for one contractor to provide another employer's workforce with equipment, training, or direct supervision.

A general contractor may be able to provide better training, equipment, or technical assistance than a small subcontractor. A specialty contractor may identify a hazard created by another trade. A project-wide protection system may be more efficient than requiring every employer to purchase and manage separate controls.

The extent to which contractors reduce assistance because of liability concerns has not been reliably quantified. The incentive nevertheless deserves consideration when policy assigns responsibility partly through evidence of practical control.

Policy should encourage contractors to share hazard information and corrective resources while maintaining accountability for employers that create, ignore, or fail to correct conditions within their authority.

9.4 Production Pressure Created Before Mobilization

One of the least discussed safety problems begins with an incomplete estimate.

Assume an estimator carries eight productive hours per employee per shift. The actual work requires repeated setup, inspection, access control, documentation, and relocation of protective equipment. The crew has only six and one-half productive hours available.

The field begins behind.

The superintendent or foreman is then expected to recover labor that was never realistically available. When required setup, inspection, supervision, or documentation time is omitted from the labor plan, the field team works under a production target that may not reflect the time available to perform the work.

That condition can create pressure to shorten or defer necessary activities. Whether shortcuts occur will depend on project leadership, workforce behavior, and the strength of the contractor's safety system.

The underlying estimating problem remains.

Accurate estimating supports safety because it gives the field enough time and resources to follow the plan.

10. Economic Impact and an Illustrative Estimate

A complete project-level analysis must go beyond the purchase price of safety equipment.

The total effect can include direct cost, operational cost, administrative cost, schedule exposure, and uncertainty.

Consider an illustrative specialty-trade proposal valued at **$4.8 million**. The example is not an industry average. It shows how the cost path can develop on one project.

Cost component	Amount
Protective equipment and project-specific training	$38,000
Project safety coordination and supervision	$52,000
Labor-production adjustment for setup, inspection, and relocation	$61,000
Project documentation and administrative review	$14,000
Defined implementation cost	**$165,000**
Allowance for unresolved site-wide responsibility	$35,000
Total estimated effect	**$200,000**

The total estimated effect is approximately **4.17%** of the proposed contract value.

Only $38,000 is represented by the equipment and training initially associated with the requirement. The remaining cost comes from supervision, production, administration, and uncertainty.

Another bidder might carry the $38,000 equipment and training cost and the $14,000 administrative cost but assume that existing supervision can absorb the additional responsibility, that production will remain unchanged, and that no uncertainty allowance is needed.

That proposal would be $148,000 lower.

The difference could reflect greater efficiency, a different interpretation of the requirement, or costs that have not been recognized. The owner cannot determine which explanation is correct from the bid total alone.

This example also demonstrates why industry-wide feasibility tests and project-level pricing answer different questions. An annualized compliance cost may be small in relation to total industry revenue. A concentrated cost can still change the economics of an individual project, particularly when the contract is short, labor-intensive, competitively bid, or operating on narrow margins.

That does not make the rule economically infeasible. It means implementation deserves project-level review.

11. Principles for Better Policy Design

A construction safety requirement should meet seven practical tests.

11.1 Clarity

The contractor should be able to determine what activity triggers the requirement, which employer is responsible, what action is expected, and what records must be maintained.

11.2 Responsibility Based on Practical Control

Contract language matters, but actual authority also matters. The responsible party should have the ability to direct, prevent, or correct the condition.

11.3 Pre-Bid Evaluability

Not every cost can be known precisely. The contractor should nevertheless have enough information to develop a reasonable assumption before committing to a fixed price.

11.4 Operational Fit

The required level of protection should not change based solely on company size. The method of administration can recognize differences in duration, workforce mobility, project complexity, and available infrastructure.

11.5 Collaboration

Contractors should be encouraged to share training, equipment, hazard information, and corrective resources. Assistance should not automatically create undefined responsibility.

11.6 Complete Economic Review

The analysis should consider labor production, supervision, schedule, subcontracting, and project delivery rather than stopping at equipment and recordkeeping.

11.7 Field Measurement

The final question is not how many forms were completed. It is whether the hazard was controlled and workers were protected.

12. Policy Recommendations

12.1 Add a Construction Pre-Bid Review to Significant Rulemaking

For significant construction rules and major enforcement policies, OSHA should examine how the obligation will enter a project estimate.

The review should identify the responsible contractor tier, anticipated labor and equipment, likely effects on production and schedule, and whether the obligation can be understood before award.

This review would supplement OSHA's existing economic analysis. It would not replace feasibility, benefit-cost, small-business, or paperwork analysis.

12.2 Separate the Cost of Protection from the Cost of Uncertainty

Regulatory analysis should distinguish among:

- Direct compliance cost;
- Operational implementation cost; and
- Cost created by unclear responsibility or application.

This distinction matters. A costly protective measure may be justified by the benefit it delivers. A costly ambiguity can often be reduced through better drafting, guidance, or coordination.

12.3 Include Estimators and Operations Leaders

Safety professionals, attorneys, labor representatives, technical experts, employers, and trade associations all have important roles in rulemaking.

Estimators and construction operations leaders should also be included.

They can explain how proposed language will affect crew production, subcontract pricing, general conditions, schedules, bid qualifications, and participation. They can also identify requirements that appear straightforward in regulation but become difficult to assign on a multi-employer project.

12.4 Publish Role-Based Construction Examples

Significant rules should be accompanied by practical examples involving:

- Owners;
- Construction managers;
- General contractors;
- Specialty subcontractors;
- Lower-tier subcontractors;
- Staffing employers;
- Service contractors; and
- Mobile workforces.

The examples should identify who must act, what control is expected, and which party would normally carry the cost.

12.5 Improve Access to State Plan Differences

OSHA should maintain a current, construction-focused comparison of material State Plan requirements that exceed or differ from federal standards.

The comparison should be searchable by subject and identify effective dates, training differences, written-program requirements, reporting obligations, and major procedural distinctions.

Contractors should not have to discover a material state difference after mobilization.

12.6 Develop Scalable Compliance Tools

OSHA should expand model plans, electronic forms, short-duration guidance, mobile-workforce examples, and standard templates.

The goal is not to reduce worker protection. It is to prevent administrative design from becoming an unnecessary barrier to compliance.

12.7 Examine Bid-Market Effects After Implementation

Post-implementation review should consider whether a significant rule changed:

- Bidder participation;
- Bid spread;
- Proposal qualifications;
- Subcontractor prequalification;
- Project cost;
- Project duration;
- Small-business participation; and
- Injury and illness outcomes.

A rule can be justified even when it increases project cost. Policymakers should still understand where that cost entered and whether the expected safety result occurred.

12.8 Favor Direct Hazard Control

Where alternatives provide comparable protection, policy should favor methods that move resources toward the field.

Engineering controls, effective training, competent supervision, practical planning, and prompt correction should take priority over documentation that exists mainly to establish a defense after an incident.

13. The Construction Pre-Bid Impact Review

Federal agencies already conduct regulatory analyses addressing costs, benefits, alternatives, economic impacts, and uncertainty. In February 2025, OMB revoked the November 2023 revision of Circular A-4 and reinstated the September 2003 version.[11]

The proposed construction pre-bid review would supplement that general framework with a project-delivery analysis. It would not create a separate regulatory system.

The review can be organized around five questions.

13.1 What Work Creates the Obligation?

The analysis should identify the activity, exposure, condition, or employer action that triggers the requirement.

A broad description is not enough. The contractor must be able to recognize when the obligation applies.

13.2 Who Must Perform It?

The review should identify the responsible project participant and explain how responsibility changes with actual control, contract tier, and project delivery method.

When more than one party has a duty, the relationship should be explained.

13.3 Can It Be Reasonably Priced?

The agency should identify expected equipment, employee time, supervisory time, training, documentation, frequency, and duration.

Where exact cost cannot be determined, the agency should identify the assumptions a reasonable contractor would need to make.

13.4 How Could It Affect Bidding and Contracting?

The review should address likely effects on contingency, subcontract pricing, insurance, schedule, qualifications, and bid/no-bid decisions.

The review need not predict every contractor's response. It should identify reasonable paths through which the requirement may affect the market.

13.5 How Will the Result Be Measured?

The agency should define the intended safety outcome and the evidence that will be used to evaluate it.

The review should distinguish between increased compliance activity and improved hazard control.

The completed pre-bid impact statement should contain:

1. A project-role matrix;
2. A direct-cost assessment;
3. An operational-cost assessment;
4. A small-entity review;
5. A State Plan comparison;
6. A project-delivery review;
7. An uncertainty assessment; and
8. A post-implementation measurement plan.

14. Implementation Roadmap

Phase I: Framework Development

OSHA should convene a working group representing safety professionals, labor, estimators, operations leaders, general and specialty contractors, owners, insurers, State Plans, attorneys, and researchers.

The group should select several existing rules that create different project-level effects and apply the proposed framework retrospectively.

This first phase would test the method before it is incorporated into new rulemaking.

Phase II: Pilot Application

The framework should be tested during the development or review of selected construction policies.

The pilot should determine whether contractors can:

- Identify the obligation;
- Assign the responsible party;
- Develop a reasonable cost assumption;
- Distinguish direct protection from administrative or uncertainty cost; and
- Apply the requirement across different project delivery methods.

Phase III: Public Review and Integration

The pre-bid analysis should be published with proposed significant construction rules or policies. Contractors, employees, owners, and other stakeholders should be permitted to challenge project assumptions and provide supporting data.

After the pilot is evaluated, the process should be integrated into qualifying construction rulemaking and major enforcement-policy development.

Phase IV: Post-Implementation Evaluation

OSHA should compare predicted effects with actual implementation.

The review should examine employer cost, contractor participation, project practices, compliance, and worker outcomes. Material differences should lead to clarification, revised implementation tools, or formal reconsideration where necessary.

15. Conclusion

Construction safety regulation begins before anyone arrives on the jobsite.

It begins when the estimator decides how the work will be performed, what equipment will be required, how much production the crew can reasonably achieve, who will supervise the activity, and what responsibility the contractor is accepting.

That is where policy becomes an operating commitment.

When the requirement is clear, the contractor can plan for it. Equipment can be purchased, training can be scheduled, supervision can be assigned, and the cost can be carried in the price.

When the requirement is unclear, the contractor must make another kind of decision. The exposure may be priced, transferred, qualified, absorbed, or avoided.

The strongest construction policy recognizes that reality. It defines the required protection, assigns responsibility to a party with practical control, accounts for how the requirement affects production and project delivery, and gives contractors enough information to include it before they accept a fixed price.

This is not an argument for less safety. The industry's fatality record does not support that position.

It is an argument for regulation that reaches the field with the resources required to make it work.

A contractor should not gain a bidding advantage by overlooking a safety obligation. A responsible contractor should not become uncompetitive because a requirement is too unclear to price consistently. A foreman should not be asked to recover labor that was lost before the project began because the estimate failed to include the time needed to perform the work properly.

Policymakers do not need to become construction estimators. They do need to understand what happens when a regulation affects an estimate.

A requirement that cannot be understood, assigned, and reasonably evaluated before bid day will influence the contract, the price, the contractor selected, the project resources, and the conditions under which the crew eventually performs the work.

The earlier that effect is considered, the better the opportunity to improve both safety and project performance.

Appendix A - Construction Regulatory Cost Taxonomy

The following taxonomy is intended to help agencies, owners, contractors, and researchers distinguish the cost of the protective requirement from the operational and market effects associated with its implementation.

Cost category	Definition	Construction examples	Typical estimate location	Primary policy question
Direct equipment cost	Purchase, rental, replacement, or maintenance of required protective systems	PPE, guardrails, warning lines, scaffolds, monitoring equipment, ventilation, temporary barriers	Material, equipment, safety line item, labor burden, overhead	Is the required equipment clearly identified and reasonably available?
Direct labor cost	Employee time required to perform a specific compliance activity	Training, inspection, installation of protection, exposure testing, medical evaluations	Direct labor, labor burden, separate allowance	Has the agency included all employees and all repetitions of the activity?
Supervisory cost	Time required to plan, observe, coordinate, verify, and correct	Competent-person inspections, project safety coordination, subcontractor oversight, meetings	General conditions, indirect labor, project management	Who is expected to perform the duty, and is that person already assigned other production responsibilities?
Production cost	Effect of the requirement on output per labor hour	Setup, relocation, restricted work areas, access limitations, rest periods, sequencing changes	Unit cost, labor production factor, crew-day calculation	Has the analysis considered how often the activity occurs during actual production?
Schedule cost	Added time or delay affecting project duration	Additional mobilizations, limited work windows, shutdowns, extended equipment rental, weather exposure	General conditions, schedule contingency, escalation	Can the requirement change critical-path work or extend jobsite overhead?
Administrative cost	Planning, preparation, review, retention, and transmission of required information	Written programs, logs, training records, subcontractor submissions, corrective-action tracking	Project management, office overhead, safety administration	Does the documentation directly support hazard control, and can it be scaled to the work?
Coordination cost	Time required because responsibility crosses employer or contractual boundaries	Multi-employer meetings, owner approvals, trade coordination, shared protection systems	General conditions, project management, subcontract pricing	Are roles clear enough to avoid duplicate or conflicting efforts?
Legal and contractual cost	Cost of reviewing, negotiating, and managing responsibility or potential liability	Contract review, indemnity language, qualifications, notices, disputes	Overhead, legal expense, contingency	Is the cost driven by the protection or by uncertainty over responsibility?
Insurance and bonding cost	Changes in premiums, limits, deductibles, reserves, or surety requirements	Higher limits, additional insured status, claim reserves, bonding review	Insurance burden, overhead, subcontract price	Has the requirement changed the contractor's insurable or bonded exposure?
Uncertainty allowance	Amount carried because application, scope, frequency, or responsibility cannot be reliably determined	Contingency for site-wide monitoring, undefined inspection requirements, changing owner rules	Contingency, risk reserve, qualification	Could clearer language or role assignment reduce this cost without reducing protection?
Bid-preparation cost	Additional effort required to interpret and price the requirement	Legal review, safety review, jurisdiction research, subcontractor clarification	Estimating overhead	Are bidders likely to reach materially different interpretations?
Market-participation effect	Effect on whether qualified contractors or subcontractors compete	Bid withdrawal, reduced bidder pool, failed prequalification, refusal of contract terms	Not normally visible in the submitted bid	Could the requirement affect competition or exclude contractors for reasons unrelated to field capability?

Cost category	Definition	Construction examples	Typical estimate location	Primary policy question
Post-award correction cost	Cost created when the obligation is clarified after price commitment	Change orders, rework, added personnel, schedule extension, disputed scope	Project cost report, claim, margin erosion	Could the requirement reasonably have been clarified before award?

Use of the Taxonomy

The categories should not be treated as automatically additive. A contractor may carry supervisory time through production rather than as a separate line item, and an uncertainty allowance may already include some anticipated legal or administrative expense.

The purpose is to prevent a regulatory analysis from identifying one visible cost and treating that figure as the complete project effect.

Appendix B - Construction Pre-Bid Impact Worksheet

Proposed companion implementation tool

Purpose

This worksheet is intended for use during the development, review, or implementation of a significant construction safety rule, directive, or enforcement policy. It can also be adapted by project owners and contractors when evaluating a major project-specific compliance requirement.

Part 1 - Requirement Identification

Rule, standard, directive, or policy: _____

Regulatory citation or authority: _____

Hazard or worker-protection objective: _____

Work activity or condition that triggers the requirement: _____

Industry sectors or construction trades likely to be affected: _____

Effective or proposed implementation date: _____

Part 2 - Project Roles and Responsibility

Complete the table for each project participant potentially affected.

Project participant	Creates or controls triggering condition?	Has authority to correct?	Performs required action?	Maintains documentation?	Expected to carry cost?	Responsibility clearly stated?
Owner						
Construction manager						
General contractor						
Specialty subcontractor						
Lower-tier subcontractor						
Staffing employer						
Service contractor						
Other						

Unresolved overlap among project participants: _____

What authority accompanies each assigned responsibility? _____

Part 3 - Direct Compliance Cost

Cost item	Unit	Quantity or frequency	Unit cost or time	Total estimated cost	Basis of estimate
Equipment or PPE					
Installation or setup labor					
Employee training					
Medical evaluation or testing					
Exposure monitoring					
Dedicated safety personnel					
Other					

Can these costs be determined before bid day? ☐ Yes ☐ Partially ☐ No

Explanation: _____

Part 4 - Operational Impact

Production

- Does the requirement add setup or breakdown time? ☐ Yes ☐ No
- Must equipment or protection be relocated? ☐ Yes ☐ No
- Does the requirement restrict simultaneous work? ☐ Yes ☐ No
- Does it reduce usable work area or access? ☐ Yes ☐ No
- Does it affect expected crew output? ☐ Yes ☐ No

Estimated production adjustment: _____

Supervision and Coordination

- Additional competent-person time required? ☐ Yes ☐ No
- Additional foreman or superintendent time? ☐ Yes ☐ No
- Multi-employer coordination required? ☐ Yes ☐ No
- Owner or agency approval required before work? ☐ Yes ☐ No

Estimated supervisory or coordination hours: _____

Schedule

- Potential critical-path effect? ☐ Yes ☐ No
- Additional mobilization or remobilization? ☐ Yes ☐ No
- Longer equipment rental period? ☐ Yes ☐ No
- Weather or seasonal exposure increased? ☐ Yes ☐ No

Estimated schedule effect: _____

Part 5 - Administrative Impact

Administrative requirement	Frequency	Responsible role	Estimated time	Can company-level documentation be used?
Written plan				
Employee training record				
Daily inspection				
Exposure or environmental record				
Subcontractor submission				
Corrective-action record				
Record retention				
Other				

Does each documentation requirement support a defined field action or decision? ☐ Yes ☐ Partially ☐ No

Requirements that may be simplified without reducing protection: _____

Part 6 - Project-Type Review

Rate the difficulty of implementation for each setting.

Project type	Low	Moderate	High	Not applicable	Principal concern
Long-duration major project					
Hard-bid project					
Negotiated project					
Design-build project					
Public infrastructure					
Occupied facility					
Service and maintenance					
Emergency repair					
Mobile workforce					

Does the rule require different implementation examples for these settings? _____

Part 7 - Small-Entity and Specialty-Contractor Review

- Can a contractor with fewer than five employees understand and implement the requirement without specialized staff? ☐ Yes ☐ No
- Is dedicated technology required? ☐ Yes ☐ No
- Is legal or outside technical review likely? ☐ Yes ☐ No
- Can the requirement be completed through a standard model plan or template? ☐ Yes ☐ No
- Can administrative requirements be scaled by project duration or complexity? ☐ Yes ☐ No
- Could the requirement create a prequalification barrier unrelated to field hazard-control capability? ☐ Yes ☐ No

Estimated fixed administrative cost: _____

Recommended scalable compliance method: _____

Part 8 - Jurisdictional Review

Federal standard or policy: _____

Known State Plan differences: _____

Different effective dates: _____

Different training or documentation requirements: _____

Different penalty, appeal, or enforcement procedures affecting implementation: _____

Can a multistate contractor readily identify these differences before bidding? ☐ Yes ☐ Partially ☐ No

Part 9 - Uncertainty Assessment

Rate each issue from 1 to 5.

1 = Clearly defined
5 = Materially uncertain

Issue	Rating
Triggering condition	
Responsible employer	
Required action	
Frequency	
Duration	
Required staffing	
Documentation	
Corrective authority	
Treatment of subcontractors	
State Plan variation	
Cost recovery after award	
Enforcement interpretation	

Total uncertainty score: _____ / 60

Suggested Interpretation

- **12-20:** Requirement is generally capable of direct pricing.
- **21-35:** Assumptions and role clarification are needed.
- **36-48:** Material contingency, qualifications, or additional guidance likely.
- **49-60:** Requirement is not reasonably ready for consistent pre-bid application.

The score is an analytical aid, not a legal or economic conclusion. A high score should trigger additional review rather than automatic rejection of the requirement.

Part 10 - Bid-Market Effects

Could the requirement reasonably affect:

- Bid price? ☐ Yes ☐ No
- Bid spread? ☐ Yes ☐ No
- Use of proposal qualifications? ☐ Yes ☐ No
- Subcontractor pricing? ☐ Yes ☐ No
- Insurance or bonding requirements? ☐ Yes ☐ No
- Number of qualified bidders? ☐ Yes ☐ No
- Participation by small or specialty contractors? ☐ Yes ☐ No
- Project schedule? ☐ Yes ☐ No

Expected market pathway: _____

Available data for post-implementation comparison: _____

Part 11 - Field-Outcome Measurement

Intended worker-protection result: _____

Field measure demonstrating hazard control: _____

Administrative measure, if required: _____

How will the review distinguish completed paperwork from effective execution? _____

Proposed review period after implementation: _____

Conditions that should trigger clarification or revision: _____

Part 12 - Final Pre-Bid Impact Determination

Requirement Status

☐ Ready for consistent pre-bid application

☐ Ready with additional role-based guidance

☐ Ready with scalable small-entity tools

☐ Requires further cost or operational analysis

☐ Requires clarification of responsibility

☐ Not reasonably capable of consistent pricing in current form

Required Actions Before Implementation

Review Sign-Off

Regulatory or policy analyst: _____ Date: _____

Construction safety representative: _____ Date: _____

Estimator or preconstruction representative: _____ Date: _____

Construction operations representative: _____ Date: _____

Small-entity representative: _____ Date: _____

Endnotes

1. Federal Acquisition Regulation, 48 C.F.R. § 16.202-1 (2026), "Description,", stating that a firm-fixed-price contract places maximum risk and full responsibility for costs and resulting profit or loss on the contractor.

2. U.S. Bureau of Labor Statistics, "Fatal Work Injuries Declined in 2024,", The Economics Daily, April 28, 2026, reporting 1,034 workplace deaths in the private-sector construction industry.

3. Occupational Safety and Health Administration, "Hazard Communication Standard; Final Rule,", 89 Fed. Reg. 44144 (May 20, 2024), including the final economic analysis of annualized costs, cost savings, feasibility, and small-entity impacts.

4. Occupational Safety and Health Administration, "Personal Protective Equipment in Construction; Final Rule,", 89 Fed. Reg. 100321 (Dec. 12, 2024), effective Jan. 13, 2025, including the final economic analysis of familiarization, research, and replacement costs associated with properly fitting PPE.

5. Steven J. Wurzelbacher et al., "The Effectiveness of Insurer-Supported Safety and Health Engineering Controls in Reducing Workers' Compensation Claims and Costs,", American Journal of Industrial Medicine 57, no. 12 (2014): 1398–1412. The study analyzed interventions affecting employees at 468 employers and reported reductions in claim frequency and costs, with variation by employer size, industry, and intervention type.

6. Occupational Safety and Health Administration, "State Plans,", identifying 22 State Plans covering private-sector and state and local government workers and seven covering only state and local government workers (accessed July 24, 2026).

7. U.S. Bureau of Labor Statistics, "Number of Business Establishments by Size of Establishment in Selected Private Industries, March 2025,", Quarterly Census of Employment and Wages, reporting 940,139 private construction establishments, including 638,473 with fewer than five employees, 137,140 with five to nine, and 82,539 with ten to nineteen (accessed July 24, 2026).

8. Occupational Safety and Health Administration, Report of the Small Business Advocacy Review Panel on OSHA's Potential Standard for Heat Injury and Illness Prevention in Outdoor and Indoor Work Settings (Nov. 2023), executive summary at ii–iii, recording concerns and recommendations regarding flexibility, scalability, recordkeeping, mobile workforces, rest breaks, and cost and time assumptions.

9. Occupational Safety and Health Administration, "Heat Injury and Illness Prevention in Outdoor and Indoor Work Settings Rulemaking,", noting publication of the proposed rule on Aug. 30, 2024, completion of the informal public hearing on July 2, 2025, and the end of the post-hearing comment period on Oct. 30, 2025 (accessed July 24, 2026).

10. Federal Highway Administration, "Bid Analysis and Award of Contract—Construction,", identifying degree of competition, reasonableness of the low bid compared with the engineer's estimate, bid unbalancing, and evidence of bid rigging as bid-review considerations (accessed July 24, 2026).

11. Office of Management and Budget, Memorandum M-25-15, "Rescission and Reinstatement of Circular A-4," Feb. 12, 2025, revoking the Nov. 9, 2023 revision and reinstating the Sept. 17, 2003 version of Circular A-4.

12. Mohammad S. El-Mashaleh, "Empirical Framework for Making the Bid/No-Bid Decision,", Journal of Management in Engineering 29, no. 3 (2013): 200–205. The study developed a bid/no-bid framework from contractor interviews and 39 bids, incorporating project, client, market, competitor, and contractor-related factors.

13. Samuel Laryea and Will Hughes, "Risk and Price in the Bidding Process of Contractors,", Journal of Construction Engineering and Management 137, no. 4 (2011): 248–258. The research found that contractors identify and process risk during bid preparation, but competitive pressures may cause priced risks to be reduced or excluded from the final bid.

14. Awad S. Hanna, Greg Thomas, and Justin R. Swanson, "Construction Risk Identification and Allocation: Cooperative Approach,", Journal of Construction Engineering and Management 139, no. 9 (2013): 1098–1107. The authors developed a cooperative process for identifying, assessing, and allocating construction risk and selecting contract language suited to the identified responsibility.

15. Federal Highway Administration, Project Delivery Selection Matrix: Instructions and Forms, at 17, explaining that fair risk allocation supports successful delivery and that unresolved or poorly allocated risk can produce contingency pricing, change orders, and claims (accessed July 24, 2026).

16. Occupational Safety and Health Administration, "Leading Indicators,", distinguishing proactive measures that indicate whether safety activities are preventing incidents from lagging measures that record events after they occur (accessed July 24, 2026).