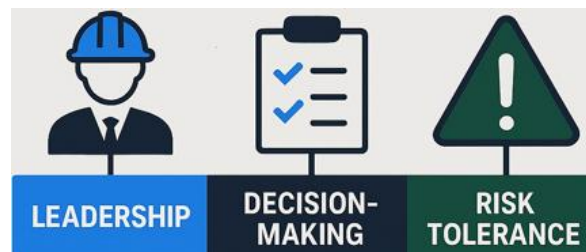




Improving Frontline Supervision for Safer Construction Sites: A Review of Leadership, Risk Tolerance, and Safety Culture (Summary of Literature)

Introduction and Background

Construction work is dangerous. Most construction site accidents stem from human behavior and decision-making such as losing focus, taking shortcuts, or ignoring hazards. As a result, safety programs emphasize guiding workers how to think and act. Leaders at all levels play a role, but frontline supervisors have the greatest influence. Their leadership style, decisions, and risk tolerance directly shape whether workers follow safe practices. Supervisors who model safety encourage safe behavior, while those who overlook hazards increase risks. As the link between management and daily work, supervisors are essential to building safety culture. Effective leadership assessment and training are key to improving safety and reducing workplace accidents.



Leadership

Leadership is one of the most important factors in keeping construction workers safe. The way supervisors lead effects whether workers follow safety rules, avoid risks, and feel comfortable raising concerns. Strong leadership builds trust, encourages safe behavior, and reduces accidents, while weak leadership often results in unsafe shortcuts and higher risks. Frontline supervisors such as foremen and superintendents are especially important because they connect company management to workers. They enforce safety policies, monitor hazards, correct unsafe actions, and act as mentors for less experienced employees. Their daily actions make them role models who shape the culture of safety on site.

Different leadership styles influence safety in different ways. Transformational leaders inspire workers, model safe behavior, and encourage innovation, which strengthens awareness and teamwork. Transactional leaders focus on rules, monitoring, and rewards or punishments, keeping workers compliant but not always motivated. Supportive leaders show empathy and build trust, making it easier for workers to report hazards. Authoritarian leaders rely on strict enforcement, and while less popular, can reduce unsafe behavior quickly in high-risk situations. In practice, many supervisors use a blend of styles depending on circumstances.

Measuring current and future potential leadership ability is complex because it includes technical knowledge, emotional intelligence, decision-making, and influence on others. Tools such as the Leadership Quality Index, Safety Leadership Effectiveness Assessments, surveys, and feedback help identify strengths and areas for improvement. Developing leadership takes time and

works best when training is ongoing and widely available. Mentoring, coaching, rotating assignments, and continuous evaluation ensure supervisors strengthen their skills and create safer worksites.

Risk Tolerance

Risk tolerance is the degree to which workers are willing to accept danger or uncertainty on the job, and it has a direct impact on safety outcomes. In construction, workers often face choices between following safety rules or taking shortcuts, and their willingness to accept risk depends on many factors. Personal traits, work experience, job conditions, and company culture all influence these decisions. For example, repeated exposure to hazards without injury can make workers more comfortable taking risks, while experiencing or witnessing an accident may lower their tolerance.

Risk tolerance is not fixed; it changes with the situation, the crew, and workplace pressures. Traits like conscientiousness and agreeableness are linked with lower risk tolerance, while extraversion and openness can lead to greater risk-taking. Other influences include deadlines, production demands, peer behavior, and management's commitment to safety. These shifting factors show that both individuals and organizations shape how much risk workers accept.

Measuring risk tolerance requires more than asking questions. Researchers use surveys, scenario-based tests, personality assessments, and climate surveys to understand both perceptions of risk and actual behavior. Improving safety means targeting both workers and systems. Training that focuses on hazard recognition and decision-making helps individuals, while strong leadership, better task design, and predictive tools support safer environments. Tracking incident rates and near misses, conducting surveys, and soliciting feedback over time helps companies determine if tolerance for risk is truly decreasing or if further guidance and training are needed.

Influences on Safety Culture

Safety culture in construction is shaped by many factors, including the background of the workforce, age, trade, type of construction work, and position in the company. Together, these elements influence how safety is understood, valued, and practiced on site. Migrant workers, especially Hispanic laborers, make up a large part of the construction workforce and bring important cultural considerations. Language barriers and cultural norms can affect communication, hazard recognition, and willingness to report problems. Workers from collectivist cultures, for example, may avoid speaking up to maintain group harmony. Cultural awareness training for supervisors can help strengthen safety culture for these crews.

Age also matters. Older workers often bring strong experience and hazard recognition but may face physical limits such as fatigue or slower reaction times. Younger workers are more physically resilient but sometimes take more risks due to inexperience or sensation-seeking. Safety programs should account for both groups, combining ergonomic support and refresher training for older workers with mentorship and hazard awareness training for younger workers.

The type of industry sector and trade also influences safety culture. Large infrastructure projects often have stricter safety systems compared to smaller residential projects. High-risk trades like roofing and electrical workers can normalize risk when hazards are faced daily, while

lower-risk trades may attract more cautious personalities. Finally, position in the company plays a role. Frontline workers face hazards directly and every day, and their behavior depends, in large part, on supervisor guidance. Supervisors act as the link between management and workers, making their leadership critical in building and maintaining strong safety cultures.

Tools for Enhancing Safety Performance

Improving safety in construction requires more than rules, it depends on tools that measure current conditions, identify risks, and provide training to close gaps. These tools are especially valuable for frontline supervisors, who directly influence how safety is carried out on the jobsite. The two main categories are assessment tools and training tools, and together they create a cycle of measurement, feedback, and improvement.

Assessment tools help organizations evaluate safety culture, leadership, and worker behavior. Safety climate surveys capture how workers view management's commitment to safety, communication, and enforcement. Structured observations monitor whether crews are following critical procedures, while risk tolerance questionnaires and leadership effectiveness assessments measure individual and supervisory capabilities. Some industry guides, such as those developed by the Construction Industry Institute (CII), provide structured ways to evaluate whether supervisors have the skills needed for hazard recognition, communication, and adapting to new technologies. Combining surveys, observations, and supervisor evaluations gives a complete picture of safety performance.

Training tools then turn these findings into improvement. Traditional classroom learning, paired with scenario-based exercises, simulations, and virtual or augmented reality modules allow workers to practice hazard recognition in safe environments. Multilingual and culturally tailored training helps ensure diverse crews understand and retain information. Behavior-based safety programs reinforce positive actions, while leadership training strengthens supervisors' communication, cultural awareness, and risk management skills.

When assessment and training tools are used together, they create a feedback loop where weaknesses are identified, training is targeted, and progress is measured. This continuous cycle helps improve safety performance and prepares supervisors for future industry demands.

Gaps in Knowledge and Practice

While research has advanced understanding of leadership, risk tolerance, and safety culture, important gaps remain. There are no standard tools to measure risk tolerance across different trades and cultures, making comparisons difficult. Predictive data tools show promise but are not widely used in daily safety management. Most studies are short-term, so the lasting impact of leadership training is unclear. Cultural and personality differences are often overlooked in safety programs, and many rely too heavily on self-reported data. Future research should create universal measures, integrate predictive analytics, and test long-term, culturally adaptable training methods for frontline supervisors.