## COMMENTARY

# Daily planning conversations and AI: Keys for improving construction culture, engagement, planning, and safety

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## Abstract

The construction industry is known for its inherent risks, contributing to ~170,000 workplace injuries and illnesses annually in the United States. Engaging in prejob safety discussions presents a crucial chance to safeguard workers by proactively recognizing hazards and ensuring that crews are well-oriented with safety protocols before commencing work each day. However, research shows prejob meetings are often conducted hastily without the depth required to fully uncover risks. This study examines the characteristics that distinguish high-impact, high-quality prejob safety conversations from lower- quality counterparts. Strategies are provided for improving engagement, psychological safety, hazard analysis, accountability, and leadership support to transform safety talks into dynamic interactions that empower employees to operate safely. Additionally, this study reviews leading-edge artificial intelligence techniques, enabling construction firms to capture, analyze, and optimize their daily planning conversations at scale to drive safety excellence. Implementing the evidence-based strategies discussed allows organizations to realize the immense potential of prejob conversations for preventing injuries and fatalities.

**KEYWORDS**
change management, construction safety, employee engagement, leadership, prejob safety meetings, safety culture

## 1 | DAILY PLANNING CONVERSATION IN CONSTRUCTION

Construction work is inherently hazardous, with over 1000 worker fatalities annually in the United States alone.[1] Prejob safety conversations represent a vital opportunity to protect workers by proactively identifying hazards and aligning crews on the scope of work to be completed before beginning each workday. Research shows that high-quality prejob meetings can significantly improve safety outcomes when executed effectively.[2-4] However, studies also reveal that learning from experience is crucial, but many construction prejob conversations lack substantive engagement,

psychological safety, thorough hazard analysis, accountability, nor the culture needed to maximize their impact.[3-5] Olson[4] found that 25% of the crews surveyed never conducted pretask plans.

Prejob safety talks, such as Job Hazard Analyses or Tailgate Meetings, are a frequently used technique in construction for reinforcing expectations, reviewing hazards, and agreeing upon precautions before starting work. Van Kampen[6] found that these daily start of work conversations were rated as one of the top three most effective safety interventions out of 48 types surveyed. These daily conversations are typically facilitated by frontline supervisors and involve bringing the crew together to discuss the planned job steps, associated risks, and agreed-upon controls. However, research

shows prejob meetings are often conducted hastily without the depth required to fully identify hazards and activate the workforce.[3,7,8] For instance, a study of over 300 construction prejob meetings found fewer than half involved collective discussion of hazards or controls.[5] Such superficial conversations represent missed opportunities to uncover risks, improve planning, and empower employees to operate safely.

This study examines the characteristics that distinguish high-impact, high-quality prejob safety conversations from their lower quality counterparts. Evidence-based strategies will be provided for improving speaker engagement, fostering genuine crew participation, cultivating psychological safety, and driving accountability. Additionally, this study will review leading-edge artificial intelligence (AI) techniques enabling construction firms to capture, analyze, and optimize their daily planning conversations at scale.

# 2 | WHAT ARE CHARACTERISTICS OF HIGH IMPACT PREJOB CONVERSATIONS?

Although prejob conversations are common in the construction industry, truly high-impact safety meetings are comparatively rare. However, leaders who create the environment for impactful conversations and use language that can facilitate better team learning, can positively impact organizations effectiveness. What distinguishes typical safety talks from transformational prejob engagements? High-impact safety conversations exhibit several key characteristics.

First, they foster genuine engagement from both the facilitator and the participating employees. The speaker brings energy and passion while soliciting active involvement through dialogue, demonstrations, and participation. Crews are invested contributors, not passive listeners.

Second, psychological safety enables open, candid conversations where attendees feel safe talking about concerns, asking questions, identifying hazards, and suggesting improvements without fear of embarrassment or retaliation. Trust and respect cultivate authentic dialogue.

Third, discussions focus in-depth on hazards specific to the upcoming job and corresponding control measures. The meeting facilitates critical thinking versus reciting generic safety rules. Employees gain insights they can apply immediately after the talk, rather than vague warnings.

Finally, high-impact conversations drive accountability into prejob planning and postjob follow-up. Specific action items are assigned to individuals and revisited. Feedback is sought for continuous improvement. While most construction firms hold prejob safety meetings, truly transforming these conversations requires embracing the elements of engagement, psychological safety, creating value, and accountability. This activates the workforce, improves productivity, uncovers hazards, and drives safety ownership.

## 2.1 | The role of leadership language in creating the environment for impactful conversations

Construction leadership plays a crucial role in cultivating high-impact prejob conversations across the organization. Leaders must make prejob meetings a visible priority by setting clear expectations that these conversations are crucial and not just a "checkbox" activity. They must provide frontline supervisors with first-hand examples of what quality conversions look like, standardized tools for capturing the details, and adequate time to conduct effective dialogues, not sacrificing conversations for production pressures.[9,10]

As organizational experts like David Marquet and Sandy Pentland have studied, the language used by leaders profoundly influences organizational culture, mindsets, and behaviors. As Marquet[9] explained in his book "Leadership is Language," the vocabulary, narratives, and questions leaders use indicate what is truly valued and prioritized in an organization. Asking thought-provoking questions spurs engagement, while inclusive, authentic language fosters psychological safety and care.

The language leaders choose when engaging crews profoundly impacts psychological safety, priorities, and norms. The words a leader uses in their conversations become their culture.[9] Construction safety leaders should thoughtfully harness inclusive, caring, and empowering language to foster impactful planning conversations and a strong safety culture.

Influential Massachusetts Institute of Technology researcher Alex "Sandy" Pentland has extensively studied the crucial role that language and communication patterns play in effective leadership and shaping organizational culture. As Pentland contended, the words, ideas, and narratives leaders use in their conversations are one of their most impactful tools for influencing their culture.[10,11] Through mechanisms like signaling priorities, establishing cultural norms, and driving implementation, the language leaders choose has an immense impact.

Pentland's research utilizing sociometric badge sensors to track real-world communication found that language exposing organizational priorities was a key predictor of productivity outcomes. Teams where managers' speaking focused on action items and accountability rather than just aspirations (i.e., stay safe) exhibited 18% greater productivity. Furthermore, the groups who had better conversations (i.e., equal turn-taking), versus only a few people dominating the communication, had better group performance. Thus, morning prejob briefs where a single individual is primarily relaying information will be less effective than conversations where there is more participation and engagement from the craft.

In Pentland's view, it is not simply the smartest who have the best ideas; it is those who are best at gathering ideas from others. Construction leaders can apply these evidence-based insights on leadership language by engaging crews more effectively, better gathering ideas from crews, and strengthen safety culture so conversations and problem solving are more likely to occur during morning preplanning meeting.

Developing skilled leaders requires investing in showing and not telling them what good leadership language and engagement looks like, having mentors to observe and provide feedback on conversational skills, and sharing of prejob facilitation best practices. By equipping frontline leaders with robust capabilities and support, construction executives enable a culture shift toward substantive, caring, and impactful daily planning dialogues. Their visible commitment establishes prejob conversations as a strategic priority and motivates workforce safety engagement.

## 2.2 | Employee engagement: Creating two-way conversations versus one-way data dumps

For prejob conversations to reach their full potential, construction crews must be actively engaged participants rather than bystanders. Prejob safety meetings often fail when crews are passive listeners rather than active participants.[3,10] By soliciting ideas and input from employees, incorporating interactive demonstrations, encouraging peer sharing, and varying discussion formats, leaders can stimulate true engagement from their teams.[2,12] Engaged crews who collaboratively problem solve around safety challenges, share lessons learned, ask questions without fear, and have accountability for key action items, are invested in the prejob conversation's success.[13,14] They feel empowered to speak up about hazards or concerns and will begin their work with an agreed upon precaution.[4] Fostering genuine employee engagement transforms safety meetings from hollow, check-the-box exercises into dynamic interactions that activate workforce commitment to operating injury-free.

## 2.3 | The role of caring and psychological safety in prejob conversations

At the heart of impactful safety conversations is a sense of authentic human caring and compassion. As safety culture expert E. Scott Geller explains, when people feel genuinely cared for, they reciprocate with caring behaviors like looking out for coworkers' well-being.[15] However, when care seems lacking, apathy and distrust arise. Leaders demonstrate caring in prejob talks through empathy, active listening, personalized recognition, and speaking with passion about protecting people.[16] Sincere, specific praise for safety excellence and heartfelt stories of preventing injuries build emotional connections. Leaders should model caring behaviors versus treating employees as expendable labor.

Crews reciprocate caring when safety becomes a shared team priority versus an imposed management rule. Peer coaching, hazard identification, and speaking up to talk about risky behavior become social norms. Prejob conversations build unity when all members feel respected and know their lives matter.[15] Psychological safety arises from interpersonal care and concern.[17]

Psychological safety, or an environment where people feel comfortable speaking up without fear of retaliation, is vital to creating impactful prejob conversations.[13,17] Studies demonstrate that teams are far more willing to raise concerns, ask questions, report hazards, share ideas, and learn (within the team and organization) when they trust leaders will not react negatively.[4,13,17–19] Leaders can foster psychological safety by soliciting input from all team members, expressing gratitude for contributions, admitting knowledge gaps, maintaining confidentiality, and following up on worker suggestions.[20] These behaviors signal that speaking up is valued. By cultivating mutual trust and respect, leaders lay the groundwork for candid, substantive prejob safety dialogues where employees actively participate without fear.[18]

A lack of psychological safety can significantly decrease the effectiveness of prejob brief processes. When psychological safety is low, individuals may withhold their ideas or concerns due to fear of being judged or ridiculed.[14] This silence can prevent critical information from being shared during prejob briefs, potentially leading to oversights in identifying hazards and establishing appropriate safety measures. Moreover, low psychological safety can also negatively impact team outcomes,[21] increase stress levels,[14] lead to higher turnover rates,[22] and are typically 80% more likely to have been hurt on the job.[19]

By fostering psychological safety, prejob conversations can become more open, caring, and productive, leading to more effective identification of risks, and establishment of safety controls. Also, with greater psychological safety comes an increase in job satisfaction and productivity, which in turn improves organizational profitability.[23]

## 2.4 | Effectively identifying and facilitating conversation on hazards and controls

Thoroughly identifying job hazards and planning proper control measures is the crux of an impactful prejob conversation.[3] Rather than generically reviewing common safety rules, an effective meeting focuses in-depth on unpacking the specific hazards anticipated for the upcoming work and collaboratively discussing how to mitigate risks.[24]

The facilitator should guide the team through systematically spotting potential hazards across categories such as struck-by, fall, caught-in/between, electrical, hazardous substances, and other site-specific risks.[2] For each hazard, the group explores root causes, past incidents, and why that particular job makes exposure likely.[20] The conversation shifts from "what could happen" to "what will happen if we don't manage this."

With strong safety leadership, hazards are analyzed more effectively. The team then develops, evaluates, and agrees upon control measures to implement, engineering controls, administrative controls, proper equipment, and personal protective equipment.[25] Responsibilities are assigned for enacting controls. Alternative options are discussed if the first choice proves inadequate. Workers feel empowered to have conversations and report issues when their leadership value safety.[26] This diligent hazard hunt distinguishes superficial safety talks from prejob meetings that uncover real risks and drive proactive mitigation.[13] It builds a plan of action for staying safe.

In summary, prejob conversations enable construction teams to proactively identify hazards, error-likely situations, serious

incident/fatality precursors, and align on safety procedures/countermeasures to control the issues identified. However, their impact is often diminished by poor facilitation, lack of engagement, and an unsafe environment for open dialogues. By implementing the strategies discussed, organizations can enhance speaker engagement, crew participation, psychological safety, hazard analysis, and leadership support to transform their prejob meetings into dynamic, high-quality conversations that powerfully activate work teams to operate safely. This requires continuous effort but pays dividends in lives saved and injuries prevented.

## 3 | METHODOLOGY FOR CAPTURING CONVERSATIONS

Until recently, organizations have never been able to objectively record characteristics of conversations beyond the casual observations of supervision. However, even those simple observations could not capture the complexity of conversations across an entire organization. Alex Pentland pioneered techniques for gathering granular conversation data using badges with built in sensors capturing over 100 data points every minute. Using these custom sociometric badges, Pentland tracked attributes like speech patterns, body language, turn-taking, and more in real-world teams.[10] He then correlated these metrics to outcomes like productivity to derive insights. Pentland found groups with higher conversational engagement through practices like equal participation were more effective than those dominated by one or two extroverts. However, capturing those same conversations in the construction industry may seem impractical due to the cost of the sensors and transient nature of craft workers.

To make capturing conversation metrics more cost effective and practical, Barry Nelson recently used mobile devices to capture over 5000 on-site prejob planning conversations for analysis.[27] In his research, Nelson trained site leaders to consistently record their daily pretask planning meetings using their mobile devices. Via video and audio recordings, these mobile devices easily gathered key conversations characteristics like engagement, caring, question quality, and hazard identification.[28] Nelson then analyzed these planning conversations across 74 construction projects, scoring each on key conversation characteristics. Results showed projects with average conversation scores below 2.5 (out of 3) experienced almost four times more injuries than those above 2.5.[27] These results indicate the predictive power of using conversation metrics and the scalability of using readily available mobile devices to capture critical communication components.

Daily planning conversations between frontline leaders and work crews offer invaluable visibility into leadership effectiveness and safety system health.[28] As organizational experts have found, high-quality interactions positively correlate with engaged employees, strong safety cultures, and reduced incidents.[29] Conversation quality provides a proxy for leadership's impact on the frontlines. Leaders who encourage thoughtful planning sessions tend to demonstrate other sound safety practices like hazard recognition, transparent communication, and caring for crew welfare.[12] Weak conversations can signal cultural problems.

Additional research has reinforced using crew-level conversations as proxies for organizational health. For example, Pandit[30] found frequent informal discussions critically enable effective safety information flow. Crews who regularly talk openly about hazards and concerns demonstrate higher mutual trust in tackling risks collaboratively. When crews do not sufficiently communicate relevant safety hazards and controls, injuries can follow.

Monitoring the quality of daily field conversations with readily available mobile devices provides construction executives an invaluable window into leadership effectiveness, safety culture deployment, and system resilience.[28,29] Combined with leading indicators like training and safety audit performance, analysis of planning dialogues helps pinpoint where leadership support and coaching are most urgently needed.

## 4 | USING AI AND DEEP LEARNING MODELS FOR ASSESSING CONVERSATION IMPACT

Data science has helped create solutions to some of industry's great challenges, including increasing productivity, overcoming cost/schedule overruns, risk mitigation, and making quantum advances in worker safety. But limitations persist when it comes to leading indicators and actionable incident precursor metrics. There is a growing appreciation of unstructured information as a complement to safety observation processes. As experts better understand how to harness this, we can refine current practices to eliminate the collection of data of little value.[31] AI applications are starting to get the attention of CEOs to address these complex problems. A recent analysis by data and media analytics firm IDG predicts digital data will grow from 33 billion terabytes in 2018 to 175 billion terabytes by 2025.[32] This growth in digital data will not be in highly structured form, but in unstructured formats like in video conversations. Video, audio, and text free will be 80 percent of the gains and 75% of work activities will require natural language understanding. This will be achieved through automated methods such as natural language processing (NLP) and Deep Learning models.

### 4.1 | Assessing pretask planning conversations

The pretask planning process is typically accomplished by the foreman filling out the required paperwork, communicating the plan, hazards/controls to their crew, having a group conversation, and finally the crew signing the paperwork verifying their understanding of the plan. Even thorough prejob planning discussions play a pivotal role in ensuring the safe and efficient execution of tasks, several issues can impact their effectiveness. Time constraints often pressure project managers to rush or even skip these discussions, potentially compromising safety. Insufficient or inaccurate information can lead

to inadequate planning and increased risks. Communication challenges, such as language barriers or poor communication skills, can result in misunderstandings and misinterpretations. Craft engagement and a lack of foreman training in conducting or participating in these discussions severely limit their perceived value and effectiveness. Furthermore, the tendency to view prejob planning discussions as a requirement rather than a risk assessment and planning tool can result in scripted discussions. Inconsistent documentation of these discussions can also hinder the crew's assessment and learning from past experiences. Often pretask planning is seen as a "pencil-whipped" process by the craft and by organization alike. Furthermore, what was written on the planning form is seldom what was actually discussed in the meeting.

Trying to improve the effectiveness of the pretask planning process can be challenging. If organizations cannot trust what was written, then evaluating the effectiveness of the planning meeting would require talking with or observing multiple foremen over many crews. This method can be highly ineffective, time consuming, and may still not give organizations a clear measure of process effectiveness. However, through recent innovations in mobile technology, these preplanning conversations can now be captured in the field, in real-time as they naturally occur, using video recording. The leadership team can then watch these recorded planning conversations to assess their effectiveness. This method could provide easier access to a great number of conversations and perhaps a more realistic portrayal of how the actual meetings are taking place. However, with hundreds of these conversations taking place every morning, there is a limited number of meetings that can be reviewed, assessed, and followed up on by single individuals. This human limitation is where AI and NLP can help assimilate, assess, and provide evaluative data on thousands of conversations in real-time. Through a transcription process, these recorded planning conversations can be analyzed using Deep Learning models for characteristics critical to highly impactful conversations.

## 4.2 | Using NLP and deep learning to analyze prejob conversations

NLP and deep learning techniques offer promising methods for gathering data and assessing the quality of prejob safety conversations at scale. Machine Learning can transcribe large volumes of spoken conversations into text transcripts quickly.[33] Deep learning algorithms can then analyze these transcripts to classify conversations based on critical dimensions like psychological safety, hazard analysis, and engagement.[27]

For instance, Nelson[28] utilized NLP and bidirectional long short-term memory (LSTM) deep neural networks to categorize over 5000 transcribed prejob conversations across various engagement metrics. The LSTM model achieved 82% accuracy in classifying conversations compared to human expert ratings. This demonstrates AI's capability to replicate human assessments of unstructured conversational data.

Automated analysis enables assessing thousands of natural conversations efficiently to baseline quality and track improvements over time.

AI assessment can also deliver real-time conversational insights to site leaders as prejob meetings occur. However, human oversight remains important when utilizing AI for such qualitative evaluation.[34]

## 5 | THE IMPORTANCE OF CHANGE MANAGEMENT FOR AI IMPLEMENTATION

The integration of new AI-enabled safety tools like automated prejob conversation analysis into the construction industry has the potential to revolutionize various aspects of the sector, from safety, design, and planning to project management and execution. However, construction firms often face challenges adopting new AI driven technology[35] Thus, the successful implementation of AI in construction requires a well-structured change management strategy[36] to overcome potential challenges and ensure a smooth transition.

## 5.1 | Challenges of AI implementation in construction

### 5.1.1 | Workforce resistance

The construction industry has traditionally relied on skilled labor and manual processes. Introducing AI systems may face resistance from workers who fear job losses or disruptions to established workflows and fear from an industry that does not see themselves taking part in a digital evolution.[37]

### 5.1.2 | Data quality and availability

AI algorithms require large amounts of high-quality data to function effectively. The construction industry often lacks standardized data collection and management practices, which can hinder the development and deployment of AI solutions.[38]

### 5.1.3 | Regulatory and legal concerns

The use of AI in construction raises potential legal and regulatory issues, such as liability for AI-generated designs or decisions, data privacy, and intellectual property rights.[39,40]

## 5.2 | Change management strategies for AI implementation

### 5.2.1 | Stakeholder engagement and communication

Involve all stakeholders, including workers, managers, and clients, in the AI implementation process. Clear communication about the benefits and implications of AI can help address concerns and build trust.[41]

### 5.2.2 | Training and skill development

Provide comprehensive training programs to upskill the workforce and equip them with the necessary skills to work alongside AI systems. This can help mitigate resistance and enhance adoption.[42]

### 5.2.3 | Data management and governance

Establish robust data management practices, including data collection, storage, and governance protocols. This ensures the availability of high-quality data for AI systems and addresses privacy and security concerns.[38]

### 5.2.4 | Pilot projects and phased rollout

Start with pilot projects to test and refine AI solutions in a controlled environment before scaling up. A phased rollout approach allows for iterative improvements and gradual adaptation to the new technologies.[41]

### 5.2.5 | Collaboration and partnerships

Foster collaborations with technology providers, research institutions, and industry associations to leverage expertise, share best practices, and align AI initiatives with industry standards and regulations.[37]

By implementing effective change management strategies, construction companies can navigate the challenges of AI implementation and unlock the potential benefits of improved productivity, cost savings, and enhanced project outcomes.

## 6 | REAL-WORLD IMPLEMENTATION: A CONTRACTOR'S JOURNEY TO EXCELLENCE

The strategies and recommendations outlined in this study for enhancing daily prejob safety conversations may seem aspirational. However, pioneering construction firms are already realizing substantial safety and operational benefits by leveraging innovative AI technologies to activate their frontline workforce. The experience of one crane contractor provides a compelling case study in successfully implementing AI-enabled analysis to optimize this critical safety process.

The contractor initially adopted a mobile AI-powered platform for capturing and analyzing prejob conversations, with the goal of fostering a stronger prevention-focused safety culture. As their Safety Director explained, "The objective was to move attention away from backend, retrospective metrics to what was actively taking place in the field in terms of safety conversations and observations that would spur key preventative actions."

The platform's real-time analytics and performance scoring of the prejob conversations immediately provided unprecedented visibility into the company's safety processes and engagement levels. Leaders now had a unique opportunity to listen to remote planning conversations from across multiple crews, over many projects, from across several states. From the AI's analysis of the conversations, leaders could now easily identify strengths and gaps across factors like psychological safety, participation rates, hazard analysis quality and more. The Safety Director noted, "Suddenly, the company had actual data around culture—and a tool that placed ownership in the hands of those carrying out important safety practices."

This empirical insight enabled targeted coaching and incentives to drive continuous improvement in prejob conversation quality. The AI platform facilitated more efficient yet substantive planning dialogues as "teams improved using it, they also gained efficiencies in carrying out key safety processes. Highly effective planning conversations could happen in <5 min." Simultaneously, the data highlighted emerging safety leaders worth developing as force multipliers based on their standout communication skills.

Perhaps most importantly, the AI analytics clearly illustrated the tangible benefits of investing in prejob engagement and hazard analysis. As a result, the organization achieved an incident reduction of 20% in the first year, and a 50% reduction in the second year. The Safety Director recalled, "Leaders could easily quantify and demonstrate all the improvements crews had made according to high-impact safety indicators. This information helped the organization negotiate insurance premiums and made other departments more aware of the intrinsic value of an engaged safety culture."

This contractor's experience vividly demonstrates how innovative AI technologies can activate the strategies outlined in this study for optimizing prejob conversations. By arming leaders with objective, scalable insights into field realities, companies can strategically strengthen engagement skills, psychological safety, hazard analysis, accountability, and leadership commitment. Although change management remains essential, their success shows the immense potential of modern AI solutions to finally unlock the immense potential of daily safety meetings as a catalyst for operational excellence.

## 7 | CONCLUSION

Prejob safety conversations represent a vital daily opportunity for construction leaders to activate work teams, align on hazards, and prevent injuries. However, research reveals many prejob meetings lack engagement, psychological safety, in-depth hazard analysis, and accountability. This study outlined specific strategies for transforming conversations into high-impact interactions that drive safety and operation excellence.

Key recommendations include improving speaker skills through facilitation, knowledge sharing, and authenticity. Fostering genuine crew participation rather than passive listening is also critical. Leaders must cultivate environments where people feel safe surfacing concerns and ideas. Thoroughly unpacking anticipated hazards and

controls is the crux of impactful prejob talks. And driving accountability before and after the conversation is essential.

Prejob conversations represent an overlooked opportunity to drive safety excellence from boardroom visions to on-the-ground realities. However, emerging AI technology shows potential to enhance prejob meetings through automated transcription, analysis, and feedback at scale. Thoughtful implementation and change management will be key to user adoption. When combined with human expertise, AI assessment can provide invaluable insights to strengthen safety culture, develop leaders, and proactively identify serious incident precursors.

## AUTHOR CONTRIBUTIONS

Both authors contributed to the design, writing, editing, and approval of the final version of this article submitted for publication.

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The authors declare no conflicts of interest.

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John Meyer declares that he has no conflict of interest in the review and publication decision regarding this article.

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Data sharing is not applicable to this article, as no new data were created or analyzed in this study.

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