



LEADING THROUGH AI RISK

A Practical Guide for Engineering Leaders

About This Guide

Artificial intelligence is rapidly changing engineering practice. While much of the discussion surrounding AI focuses on technology, the ACEC Research Institute's *Leading Through AI Risk: The Enterprise Framework for Engineering Firm Leaders* found that the risks associated with AI extend across virtually every aspect of an engineering organization, including technical quality, professional responsibility, data governance, workforce development, ethics, cybersecurity, financial performance, and organizational leadership.

The research combined an extensive literature review with in-depth interviews involving 21 leaders representing engineering firms, public infrastructure owners, technology providers, AI consultants, insurance and legal professionals, and the engineering licensing community. One of the study's central findings was that managing AI risk is fundamentally an organizational challenge rather than simply a technology challenge.

The Eight Domains of AI Risk

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| 1 Technical Reliability and Model Risk | 2 Professional Liability and Standard of Care Risk |
| 3 Data Governance, Privacy and Intellectual Property Risk | 4 Organizational and Workforce Risk |
| 5 Ethical, Regulatory and Reputational Risk | 6 Operational and Cybersecurity Risk |
| 7 Financial and Business Model Risk | 8 Strategic Leadership and Enterprise Governance Risk |

Although each domain represents a distinct category of risk, AI risks do not remain within individual departments. Workforce training affects technical reliability, data governance influences cybersecurity and intellectual property protection, and weak organizational oversight can create legal liability. Effective AI risk management therefore requires coordinated governance across the enterprise.

What This Means for Engineering Leaders

Engineering leaders have a central role in ensuring that AI strengthens rather than weakens professional practice. Their responsibilities span engineering judgment, professional review, QA/QC, responsible charge, documentation, mentoring, workflow design, and technical accountability.

Engineering leaders do not own every AI risk. They should work closely with executive leadership, project delivery leaders, technology professionals, human resources, and risk management and legal professionals to ensure AI governance remains aligned with engineering practice.

How to use this guide: Each question below is a direct translation of an Engineering Leaders action identified in the published report.

1. Technical Reliability and Model Risk

AI-generated technical information requires professional verification and review. Engineering leaders define where human review is required, how QA/QC should evolve, and how accountability is maintained.

Questions Engineering Leaders Should Ask

- Are we requiring human review of AI-generated engineering work before it influences project decisions?
- Have we updated QA/QC procedures to explicitly address AI-assisted workflows?
- Have we defined engineering activities requiring mandatory professional review regardless of AI involvement?
- Are we reinforcing that engineers remain accountable for all technical decisions?

2. Professional Liability and Standard of Care Risk

Professional responsibility remains with engineers regardless of AI involvement. Engineering leaders must preserve standards of review, responsible charge, licensed oversight, and understanding of AI limitations.

Questions Engineering Leaders Should Ask

- Are we maintaining existing standards of professional review regardless of AI involvement?
- Have we defined engineering activities requiring licensed oversight?
- Are we reinforcing responsible charge throughout AI-assisted workflows?
- Are we ensuring engineers understand both the capabilities and limitations of AI tools?

3. Data Governance, Privacy and Intellectual Property Risk

Reliable AI depends on accessible, well-documented engineering knowledge. Engineering leaders influence whether assumptions, decisions, lessons learned, and technical knowledge are consistently captured and reusable.

Questions Engineering Leaders Should Ask

- Have we standardized documentation practices across projects?
- Are we preserving engineering assumptions, lessons learned, and technical decisions in searchable formats?
- Are we encouraging consistent documentation that supports future knowledge reuse?
- Are we reinforcing that engineering knowledge should remain accessible beyond individual project teams?

4. Organizational and Workforce Risk

AI may automate work that historically helped engineers develop judgment. Engineering leaders must preserve mentoring and supervised development while redesigning professional development for AI-enabled practice.

Questions Engineering Leaders Should Ask

- Are we preserving mentoring opportunities even as AI automates routine work?
- Have we redesigned professional development programs to emphasize engineering judgment, systems thinking, and critical evaluation?
- Are we encouraging engineers to validate AI outputs rather than accept them uncritically?
- Are we providing supervised opportunities for younger engineers to develop technical competence?

5. Ethical, Regulatory and Reputational Risk

Engineering firms depend on transparent, defensible decisions and public trust. Engineering leaders reinforce ethical discussion, quality assurance, accountability, and professional rigor in AI-assisted work.

Questions Engineering Leaders Should Ask

- Are we ensuring engineering decisions remain transparent and professionally defensible?
- Are we encouraging open discussion regarding ethical questions arising from AI use?
- Are we continuing to emphasize engineering judgment, quality assurance, and accountability?
- Are we reviewing AI-assisted work with the same professional rigor applied to traditional engineering processes?

6. Operational and Cybersecurity Risk

AI should be integrated into established engineering operations rather than create parallel processes. Engineering leaders help maintain workflow consistency, QA/QC, and organizational learning.

Questions Engineering Leaders Should Ask

- Have we integrated AI into existing engineering workflows rather than creating parallel processes?
- Are we monitoring AI-assisted work for operational consistency?
- Are we reinforcing established QA/QC procedures as AI adoption expands?
- Are we sharing operational lessons learned across project teams?

7. Financial and Business Model Risk

AI may change where engineers create value. Engineering leaders identify where AI can enhance value, redesign workflows, share successful applications, and preserve engineering quality as a differentiator.

Questions Engineering Leaders Should Ask

- Have we identified engineering activities where AI enhances value rather than simply reducing effort?
- Have we redesigned workflows to allow engineers to focus on higher-value activities?
- Are we sharing successful AI applications across business units?
- Are we continuing to emphasize engineering quality as the firm's primary differentiator?

8. Strategic Leadership and Enterprise Governance Risk

Enterprise AI governance must remain aligned with professional engineering practice. Engineering leaders ensure engineering judgment, quality assurance, and project delivery remain central to governance.

Questions Engineering Leaders Should Ask

- Are we ensuring AI governance aligns with professional engineering practice?
- Are we reinforcing engineering judgment throughout AI-assisted workflows?
- Have we integrated AI into quality assurance and project delivery processes?
- Are we sharing successful practices across business units?

The Role of Engineering Leaders in Managing AI Risk

Taken together, these questions show that engineering leaders are a critical link between enterprise AI governance and day-to-day professional practice. They determine how AI is incorporated into technical workflows while preserving engineering judgment, quality, accountability, and professional standards.

The full study concludes that AI does not diminish the engineer's responsibility to protect health, safety, and welfare or the importance of professional judgment. Engineering leaders therefore play a central role in translating enterprise governance into defensible engineering practice.

For engineering leaders, the objective is to use AI to improve engineering work without allowing efficiency, automation, or new capabilities to weaken professional review, mentoring, documentation, quality assurance, or accountability.

For the complete AI Risk Framework, research findings, and recommendations for engineering firms, read

[**Leading Through AI Risk: The Enterprise Framework for Engineering Firm Leaders.**](#)