AI Alone Will Crash and Burn in Engineering:

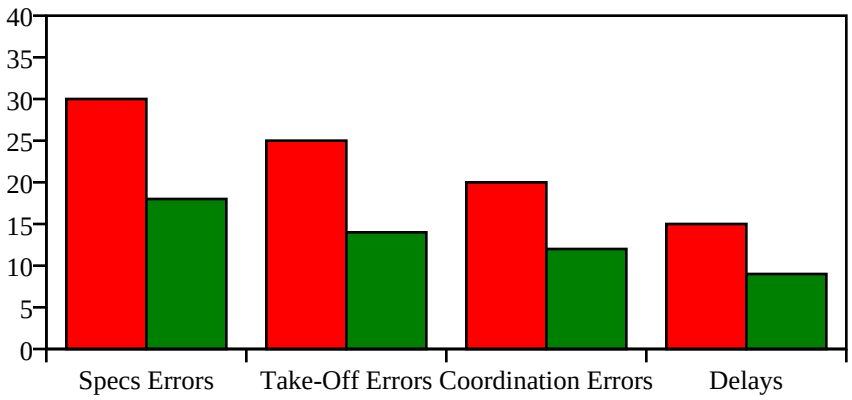
Why Human–AI Centaurs Are the Real Game-Changers in Construction

Bruce Dorey, PhD – Proud HVAC Engineer
August 2025

Abstract

As a mechanical engineer with four decades in HVAC and commercial construction, I have seen wave after wave of “silver bullet” technologies rise with fanfare and fall under the weight of reality. Today’s glittering promise is artificial intelligence—algorithms that claim to tame the chaos of construction and deliver flawless efficiency. But let’s be clear: that promise is a mirage, and often a dangerous one. History has already given us the lesson. In chess, “centaurs”—human–AI hybrids—dominated both pure humans and standalone AI engines. Why? Because human intuition, ethical judgment, and creativity filled the gaps that raw computation could never bridge. In engineering, the stakes are far higher than on a chessboard. Remove the human, and AI doesn’t just make mistakes—it amplifies them, cascading into wasted billions, environmental harm, and even lives at risk. This paper argues what few are willing to say: pure AI in engineering will catastrophically fail. What we need are centaurs—human engineers harnessing AI’s horsepower, steering it with judgment forged in field dust, regulatory grey zones, and decades of scar tissue from past failures. At JES Engineering Services, Inc., we have proven that this model works. With over 200 trained engineers working alongside AI, we have turned potential billion-dollar failures into sustainable, resilient solutions. The lesson is clear: AI alone is reckless; human–AI synergy is survival.

Figure 1: Error Rate Reduction – AI Alone vs Human–AI Centaurs



The Myth of AI Supremacy: Lessons from the Chessboard

In 1997, the world watched IBM's Deep Blue defeat Garry Kasparov. Commentators declared the triumph of machine over man. Silicon, it seemed, had eclipsed intuition. Yet the real story came later. In freestyle chess tournaments, human–AI hybrids—"centaurs"—consistently outperformed both pure humans and AI engines. The key was judgment: humans knew when to trust the machine, when to override it, and how to blend brute force with strategic nuance. Construction is no different. This $10 trillion global industry is riddled with inefficiency, waste, and hype. AI's sales pitch is seductive: flawless take-offs, perfect submittals, seamless coordination. But the reality is far messier. Algorithms stumble over what seasoned engineers catch instantly—mixing metric and imperial, misreading a smudged nameplate, or ignoring context that only field experience can interpret. AI doesn't understand nuance, consequences, or the human beings who live with the results.

The Fatal Flaw of Pure AI

AI is not intelligence—it is mimicry. It recognizes patterns but collapses when novelty intrudes. Chess offered a controlled arena, yet even there, unpredictability favored hybrids. In construction, novelty is the rule, not the exception. History provides sobering reminders: Uber's self-driving fatality in Tempe, the Boeing 737 MAX crashes, and Zillow's billion-dollar iBuying collapse. These weren't examples of incompetence—they were examples of blindness. AI does not know what it does not know. Humans do. That difference saves lives.

The Ripple Effect: How Errors Become Catastrophic

Construction errors compound. A faulty specification can ripple into seismic failures. A take-off miscalculation of 15% on tonnage or piping isn't a rounding error—it's millions wasted. Coordination software may schedule perfectly on paper, yet collapse against human morale, weather anomalies, or supply chain shocks.

The Centaur Advantage

The hybrid model transforms risk into resilience. AI handles the brute force—crunching numbers, scanning RFQs, and modeling sequences. Humans bring judgment—catching clashes, anticipating contractor fatigue, interpreting ethical and cultural context. Together, they cut errors by up to 40%, reduce delays by half, and reclaim billions otherwise lost to rework and disputes.

JES Engineering Services: Proof in Practice

At JES Engineering Services, Inc., we live this model every day. Our team of more than 200 trained engineers works hand-in-hand with AI to process thousands of projects each month. AI scans RFQs in seconds, but our engineers catch the misaligned specs, the overlooked coordination risks, and the soil variability no algorithm can predict. Together, we have saved clients millions—sometimes entire projects.

Conclusion: Ditch the Hype, Embrace the Centaur Revolution

The construction industry is bleeding from inefficiency, waste, and broken promises. Pure AI will not heal it. It will accelerate the hemorrhage. The centaur model—humans and AI together—is not glamorous, but it works. As an HVAC engineer who has spent forty years in this industry, my conclusion is simple: AI alone will crash and burn. Human–AI centaurs will build the future. The choice

is stark: follow the hype into ruin, or mount the centaur and ride toward sustainability, safety, and prosperity.

References

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