

MINNESOTA ASPHALT PAVEMENT ASSOCIATION

HOW TO USE AI IN YOUR ASPHALT PAVING & PRODUCTION BUSINESS

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TODAY'S JOURNEY



THE INTRODUCTION

Demystifying AI. Understanding what it is, where it came from, and why privacy is the foundation.



PRACTICAL APPLICATION

Real-world examples for NOW. From analyzing specs and job costs to mix optimization and safety.



THE FUTURE ROAD

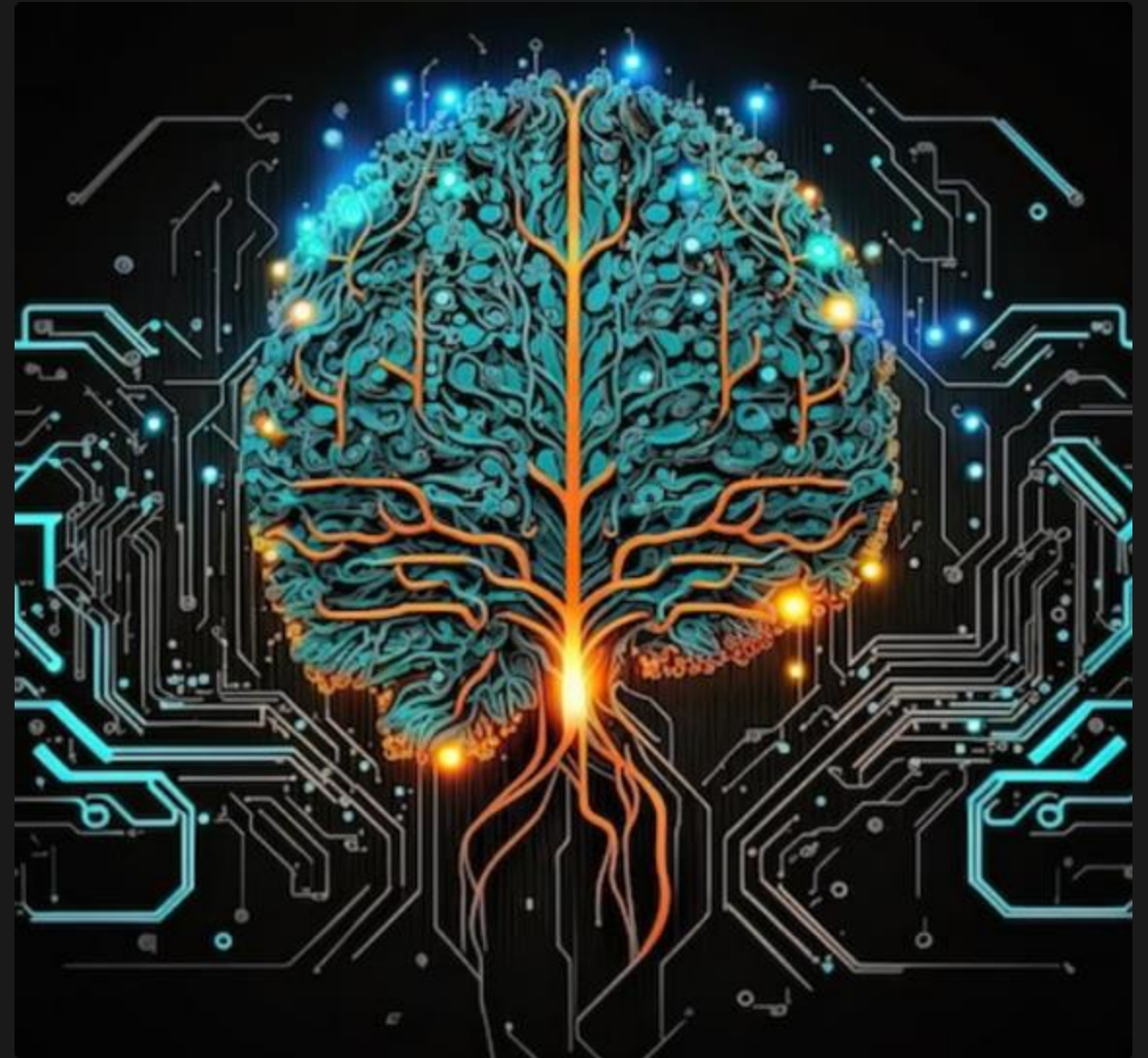
What's next? Autonomous equipment, predictive logistics, and where the industry is heading.

WHAT IS AI?

MORE THAN JUST ALGORITHMS

AI isn't just "if this, then that" logic. It is the ability of a machine to perform cognitive functions we associate with human minds.

- **Pattern Recognition:** Finding trends in massive datasets (like QC results) that humans miss.
- **Prediction:** Forecasting outcomes based on historical data.
- **Learning:** Improving over time without being explicitly programmed for every scenario.



A BRIEF HISTORY OF AI

1950s

THE BIRTH

Alan Turing asks "Can machines think?" Symbolic AI begins.

1980s

MACHINE LEARNING

Systems start learning from data rather than just rules. Neural networks emerge.

2017

TRANSFORMERS

Google publishes "Attention Is All You Need," unlocking the modern era of LLMs.

Now

GEN AI

Tools like GPT-4 and Gemini democratize access to intelligence.

THE ELEPHANT IN THE ROOM: PRIVACY



CAN I TRUST AI WITH MY DATA?

This is a valid concern. However, professional enterprise tools offer "Sequestered Data."

HOW IT WORKS:

Your data is used for thinking, but NOT for training the public model. It stays in your private instance.

Example: *HeyNapa* uses a sequestered database. Source docs stay private and aren't shared back to ChatGPT.

THE MENTAL MODEL

THE SMARTEST EMPLOYEE

Treat AI like a superpower team member sitting next to you. It is the smartest person you know, capable of anything except physical tasks.

CONTEXT IS KING

Don't use it like Google (keywords). Use it like a Consultant (narrative).

Bad: "Fix my knee."

Good: "My knee hurts when I run downhill. It started 2 weeks ago. I have a history of ACL issues..."

PRACTICAL TIP: TALK, DON'T TYPE

OVERCOME "LAZY PROMPTING"

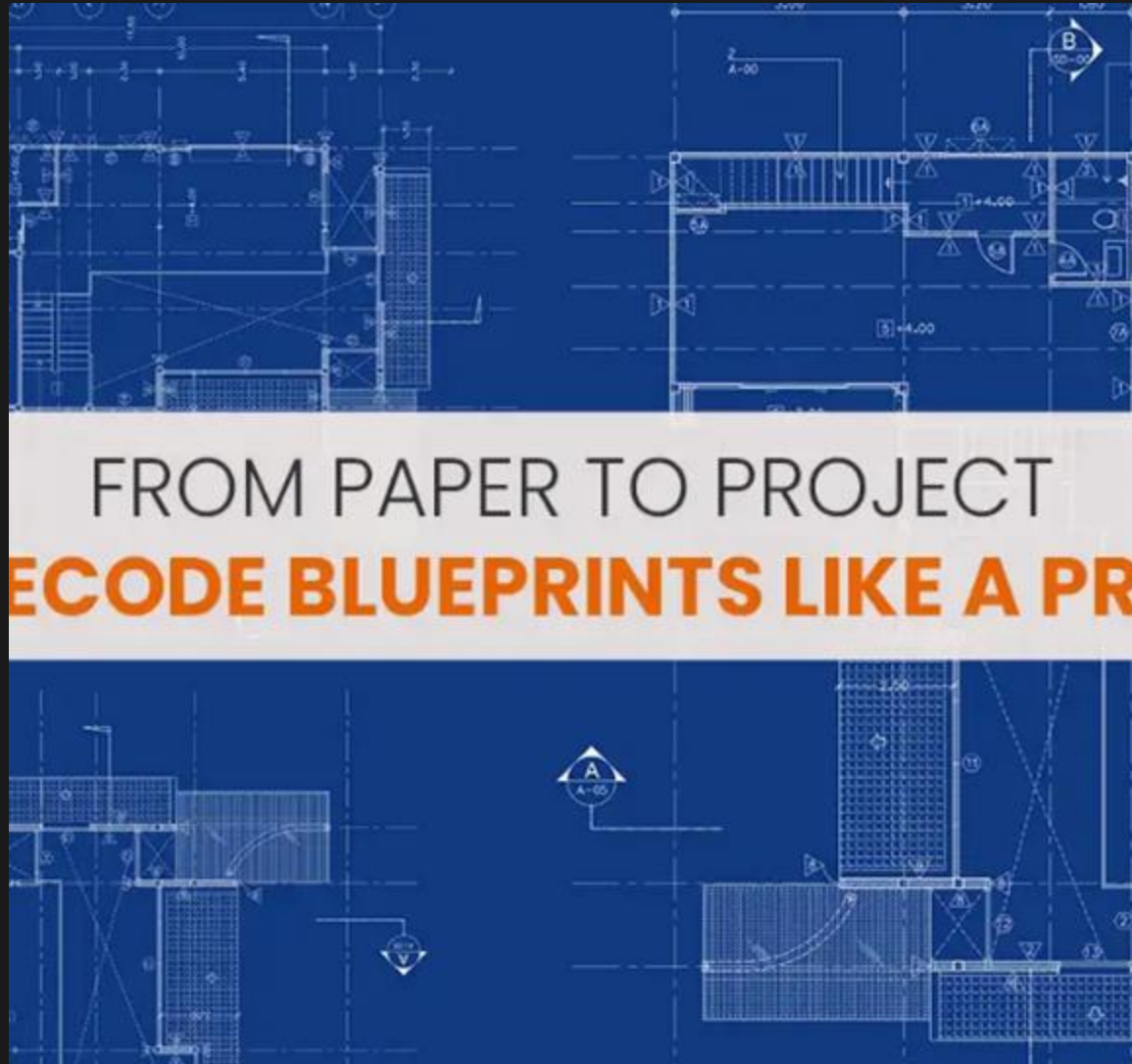
Most people are constrained by typing speed. We speak faster and with more detail than we type.

- Use the microphone button on mobile apps.
- Ramble! Give color, context, and nuance.
- "Dictate" your email draft instead of writing it.

Result: 10x better output because you provided 10x more context.





APPLICATION 1: UNDERSTANDING DENSE INFO




THE "UNIVERSAL TRANSLATOR"

AI excels at reading dense material and summarizing it instantly.

 **Upload:** Specs, Contracts, Engineer Letters.

 **Query:** "Summarize the changes to the smoothness spec."

 **Action:** "Create a checklist for the project manager based on this."

EXAMPLE: MN DOT SPEC ANALYSIS

Prompt: "Analyze the MN DOT Asphalt Pavement Spec. Highlight inconsistencies in testing frequency vs ASTM standards."

Parameter	MN DOT Spec (Current)	AASHTO / ASTM Standard	Identified Variance
Specimen Prep	Gyratory @ 600 kPa	Gyratory @ 600 kPa	Consistent
Void Analysis	Field Core Density	Lab Molded Voids	Methodology differs significantly
Testing Freq	1 per 500 tons	1 per 1000 tons	MN requires 2x frequency
Tolerances	+/- 1.5% Air Voids	+/- 1.2% Air Voids	MN allows wider variance

*Hypothetical data for demonstration purposes.

APPLICATION 2: CONTENT GENERATION



WRITTEN COMMS

Turn a 30-second voice rant into a polished, professional email to a GC or owner.



DOCUMENTATION

Generate daily reports, RFI drafts, or change order justifications based on bullet points.



INTERNAL MEMOS

Draft company-wide announcements or policy updates with the right tone and clarity.

APPLICATION 3: DATA ANALYSIS

YOUR PERSONAL DATA ANALYST

You don't need to be an Excel wizard. AI tools (ChatGPT, Gemini in Sheets) can ingest CSV/Excel files and answer questions.

- **Job Costing:** "Where did we bleed margin on the I-35 project?"
- **Bid History:** "Show me our win rate against Competitor X."
- **Production:** "Compare estimated vs actual tonnage for last month."



EXAMPLE: JOB COST VARIANCE ANALYSIS

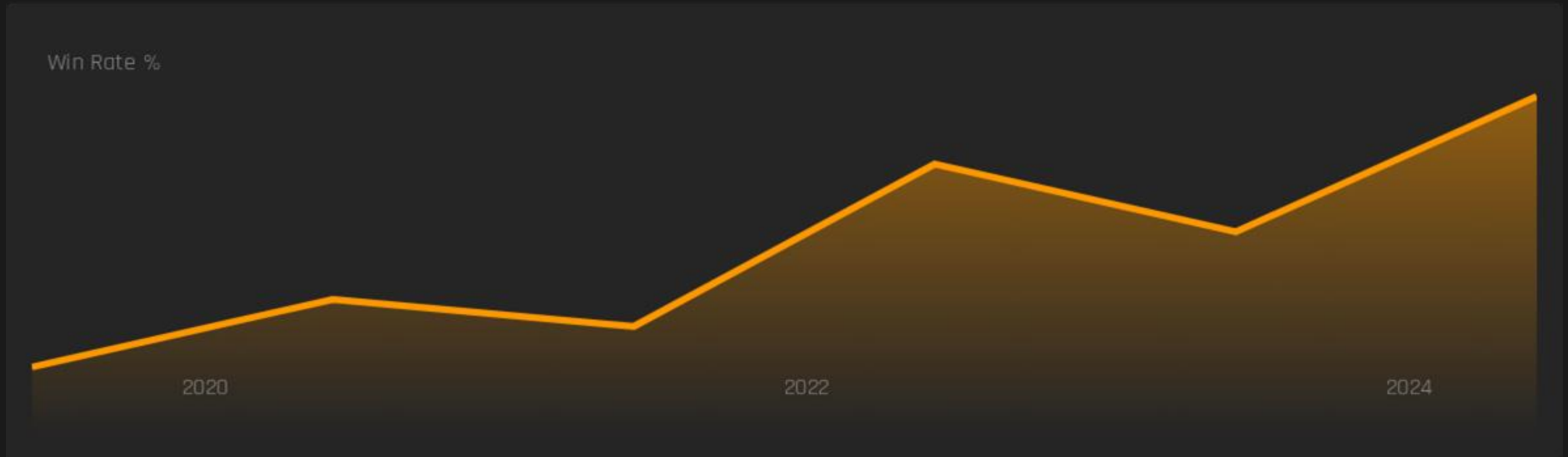
Comparing Estimated Costs vs. Actuals on Project 24-105.



Insight: Trucking overruns were the primary driver of margin fade, despite material savings.

EXAMPLE: BID TAB ANALYTICS

Query: "Analyze historical bid tabs for County Road projects. Are we trending up or down in win rate?"



Result: While overall win rate is increasing (trend line), margins on successful bids have compressed by 2% since 2022.

QC & MIX DESIGN OPTIMIZATION

UNLOCK YOUR LAB DATA

Upload JMFs, QC results, and material costs to find hidden correlations.

- **Best Bang for Buck:** Which JMFs meet spec with lowest material cost?
- **Plant Performance:** Does Plant A struggle with AC drift on 12.5mm mixes?
- **Crew Variables:** Is field density correlated to a specific roller operator or paver speed?



EXAMPLE: MIX & PLANT ANALYSIS

Query: "Compare AC Content deviations across all 3 plants for the 12.5mm Superpave Mix."

PLANT 1 (NORTH)

0.12%

Avg Deviation

Excellent control. Consistent production.

PLANT 2 (SOUTH)

0.35%

Avg Deviation

Struggles with AC content stability.
Action: Check Pump Calibration.

PLANT 3 (MOBILE)

0.18%

Avg Deviation

Acceptable, but trends high in afternoons.

SAFETY & OPERATIONS



INCIDENT ANALYSIS

Upload your safety logs. Ask AI: "Where should we spend our safety training budget to reduce the most risk?"



TOOLBOX TALKS

Generate site-specific talks based on tomorrow's weather (e.g., "Heat Stress") and job hazards (e.g., "Live Traffic").



ROI ON SAFETY

Quantify the impact of production breakdowns vs. preventative spend.

EXAMPLE: INCIDENT PRIORITIZATION



WHERE TO FOCUS TRAINING?

- 45% Slips, Trips, Falls (Highest Frequency)
- 30% Equipment Struck-By (Highest Severity)
- 25% Other

AI Recommendation: Prioritize "Struck-By" training immediately as it accounts for 80% of insurance claim costs despite lower frequency.

EQUIPMENT MAINTENANCE

SMARTER PM SCHEDULES

Don't just rely on the binder in the shop.

- **Upload Manuals:** Feed the AI the PDF manual for your new Cat AP1055.
- **Generate Schedule:** "Create a 500-hour inspection checklist based on the manual."
- **Compare History:** "Compare manufacturer recommendations vs. our actual breakdown history. Should we grease more often?"



EXAMPLE: AI-GENERATED PM SCHEDULE

Component	OEM Rec. (Hours)	Actual Failure Avg (Hours)	AI Adjusted Plan
Auger Flight Wear	1000 hrs	850 hrs	Inspect @ 800 hrs
Conveyor Chains	500 hrs	600 hrs	Keep @ 500 hrs
Screed Plates	Seasonally	Mid-Season	Monthly Check

LOGISTICS & TRUCKING



OPTIMIZING THE HAUL

Trucking is often the largest variable cost. AI helps rein it in.



Intelligent Routing: Avoid traffic before it happens.



Truck Count Optimization: Match plant rate to paver speed exactly.



Invoice Rec: AI validates tickets against GPS breadcrumbs automatically.

THE FUTURE: AUTONOMY

It's not science fiction. It's happening now.

- **Intelligent Compaction:** Rollers that know pass counts and temperature zones.
- **Autonomous Operation:** Equipment that can hold a line without an operator.
- **Plant Controls:** Systems that auto-tune burner controls for max efficiency and min waste.



EXAMPLE: TRUCK COUNT OPTIMIZATION

THE INPUTS

- Paver Speed: 35 ft/min
- Haul Distance: 45 mins (Round trip 100 mins)
- Plant Rate: 300 TPH

AI Recommended Truck Count:

14

Trucks to Maintain Continuous Paving

(Previous Human Estimate: 16
Trucks)

POLICY & COMPENSATION

DESIGNING FAIR SYSTEMS

Use AI to draft policies that align incentives with company health.

- **Bonus Programs:** Create profit-sharing models that require minimum EBITDA hurdles.
- **SOPs:** Draft clear standard operating procedures for



EXAMPLE: FOREMAN BONUS STRUCTURE

Goal: "Create a bonus program for foremen. Fund it only after \$3M EBITDA is reached. Base it on job profitability."

Tier	EBITDA Hurdle	Profit Pool Funding	Distribution Metric
Base	< \$3 Million	0%	None
Tier 1	\$3M - \$4M	5% of excess	Job Profitability %
Tier 2	\$4M - \$5M	10% of excess	Job Profitability + Safety Score
Tier 3	> \$5M	15% of excess	Job Profitability + Safety + Retention

QUESTIONS?

"AI is a journey. Start small, use your voice, and treat it like your smartest employee."

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Tools to Try

HeyNapa

ChatGPT Enterprise

Gemini for Google Workspace