

# Artificial Intelligence in Asphalt

New Jersey Asphalt Pavement Association



**Sean Devine**  
Founder & CEO, XBE





# POLL

Have you ever used ChatGPT?





# POLL

Do you use ChatGPT every day?





# POLL

Do you pay for ChatGPT Plus?





Let me convince you.



# Agenda

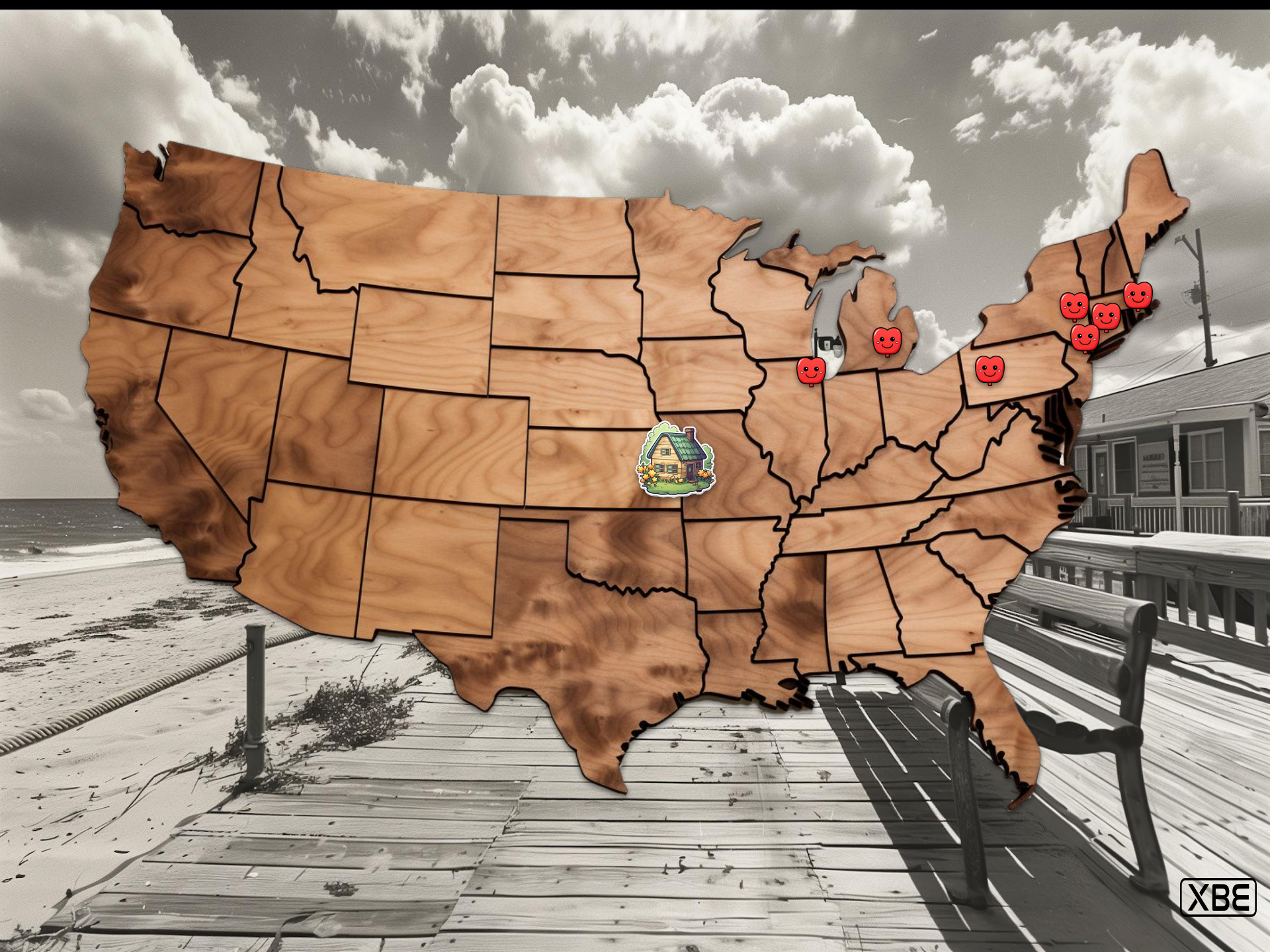
- Personal Introduction
- XBE Introduction
- Artificial Intelligence Experience
- Live Examples, Tips, and Tricks
  - **Please!** Ask questions throughout this section





# Personal Introduction

















# XBE Introduction



# About XBE

- Operations management for the horizontal construction industry
- bid it, **BUILD IT**, bill it
- Tailored for vertically-integrated, growth-focused leaders
- Tackles planning, execution, analysis, and improvement challenges
- Continual innovation through industry collaboration
- Seamless integration with existing systems
- Specialized features for all user levels and segments
- Dedicated customer success team
- Community of 33 industry leaders
- Consistently increases profit and reduces risk








# Artificial Intelligence Experience



# Artificial Intelligence Experience

- Developer of multiple innovative AI-based XBE features
  - Support Chatbot - Hey Kayla 
  - Time Card Approval Auditing - Kathy! 
  - Safety Risk Identification and Communication
  - Variety of other features automating analysis, communication, and decision support
- Developer of Hey NAPA 
  - [www.heynapa.com](http://www.heynapa.com)
- Regular speaker on artificial intelligence topics
  - NAPA Midyear Keynote
  - ACIG Fall Risk Management Panel
  - EmberFest AI Speaker
  - Smart Friends Podcast
  - Utah APA, Minnesota APA, Michigan APA, New Jersey APA, California APA, Illinois APA, Maryland APA



# Focus on the Intelligence

- Effectiveness and efficiency of existing models is incredible
  - Digital Data Design Institute study
  - Measured impact on Boston Consulting Group management consultants
  - 25% faster work, 40% better work, 12% increase in task capabilities
  - Jagged frontier best navigated by consultants that stayed in charge
- Intelligence drives job performance
  - 26% of performance variation due to intelligence
  - #1 driver of performance difference
- Intelligence drives health
  - 15 IQ point (1 sigma) difference decreases mortality by 24%
  - For someone my age, that's an extra 2.5 years of life
  - Same impact as 3 alcoholic drinks a day, 35 lbs, or 30 minutes of daily exercise





# Live Demonstration



# Give Me A Pep Talk





# Hey NAPA by XBE

Hey NAPA is a specialized chatbot developed by XBE in partnership with the National Asphalt Pavement Association (NAPA). It's designed to serve as a virtual committee of experts, providing detailed and accurate information on the subject of asphalt pavements, asphalt paving, and related business and manufacturing processes. It's particularly useful for individuals and organizations in the asphalt industry seeking knowledge or advice on these topics. Hey NAPA is highly recommended for its ability to provide clear, step-by-step answers to complex questions, its adherence to professional standards, and its capacity to explore multiple possible answers, all while maintaining a positive and professional demeanor.





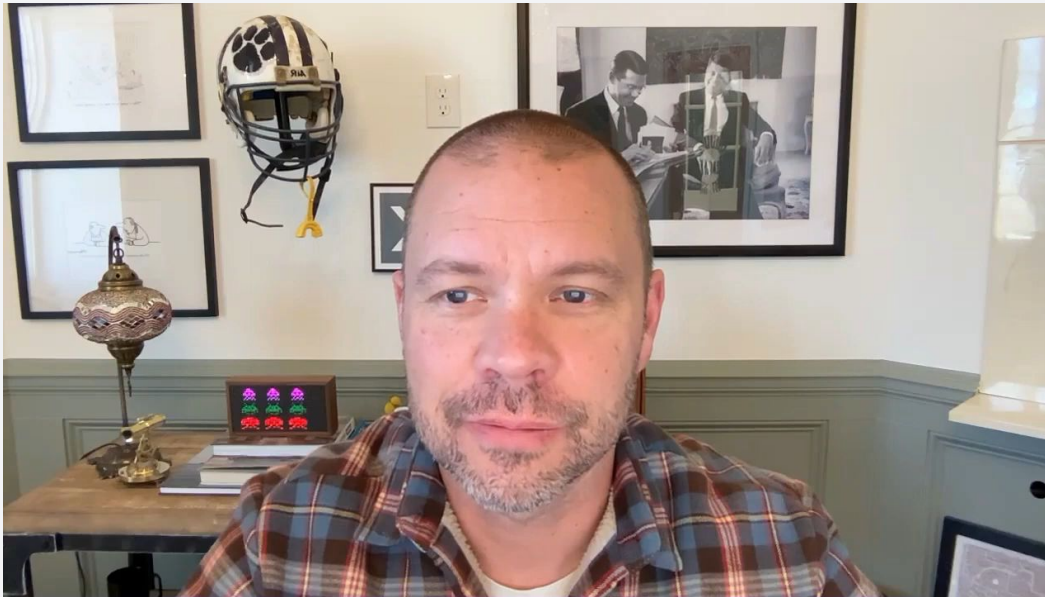
# Hey NAPA by XBE

Hey NAPA es un chatbot especializado desarrollado por XBE en asociación con la Asociación Nacional de Pavimentación de Asfalto (NAPA, por sus siglas en inglés). Está diseñado para funcionar como un comité virtual de expertos, proporcionando información detallada y precisa sobre el tema de los pavimentos de asfalto, pavimentación y procesos de negocios y manufactura relacionados. Es particularmente útil para individuos y organizaciones en la industria del asfalto que buscan conocimiento o consejo sobre estos temas. Hey NAPA es altamente recomendado por su capacidad de proporcionar respuestas claras y paso a paso a preguntas complejas, su adherencia a los estándares profesionales, y su capacidad de explorar múltiples respuestas posibles, todo mientras mantiene un comportamiento positivo y profesional.





Hey NAPA by XBE





# Hey NAPA by XBE

Explain to an asphalt foreman the impact to cost and quality of mixing asphalt at too hot a temperature. Be precise and concise.







Hey NAPA here. Mixing asphalt at temperatures that are too high can have several cost and quality implications:

1. **Binder Degradation:** Overheating can cause the asphalt binder to age prematurely, leading to a reduction in its long-term durability. This can result in a stiffer mix that is more susceptible to cracking and may shorten the pavement's lifespan.
2. **Increased Fuel Consumption:** Higher temperatures require more fuel to maintain, which can significantly increase production costs.
3. **Emissions:** Excessive temperatures can lead to higher emissions of greenhouse gases and pollutants, potentially leading to environmental compliance issues and associated fines.
4. **Mix Workability Issues:** Overheated asphalt may become too fluid, which can cause difficulties in achieving proper compaction and can lead to a tender mixture that is unstable under compaction efforts.
5. **Material Waste:** If the mix cools down to an unusable temperature before compaction, it may be wasted, increasing project costs.
6. **Equipment Wear and Tear:** Consistently running the asphalt plant at higher temperatures can accelerate equipment degradation, leading to increased maintenance costs and potential downtime.

In summary, mixing asphalt at excessively high temperatures can lead to increased operational costs and can compromise the quality and longevity of the asphalt pavement. It's crucial to follow the specified temperatures to optimize both cost efficiency and pavement performance.





# Hey NAPA by XBE

We're paving on a neighborhood street, and some of the residents are a bit upside about the disruption. Give me a plan for how to sooth them proactively while costing us as little as possible.





Certainly, managing community concerns during a paving project is crucial for maintaining a positive relationship with the residents and ensuring the project proceeds smoothly. Here is a plan to address the residents' concerns proactively while being cost-conscious:

1. **Advance Communication:** Before the project begins, distribute clear and concise information to the residents. This can include door hangers, flyers, or letters detailing the schedule, duration, purpose, and benefits of the project. Be sure to include NAPA's contact information for any questions or concerns.
2. **Host a Meeting:** Arrange a pre-construction meeting with the residents to explain the project and its benefits, such as improved road safety and property values. Use simple language to describe the process and answer questions. This meeting can be conducted virtually to save costs and facilitate participation.
3. **Regular Updates:** Keep the community informed about the progress of the work and any changes to the schedule via email or a dedicated project website, which is a cost-effective way to disseminate information widely.
4. **Minimize Disruption:** Plan the construction phases to minimize disruption during peak hours. This may involve scheduling work during daytime when most residents are at work or school, thereby reducing the impact on their daily routines.
5. **Safety Measures:** Reassure residents by implementing and communicating safety measures, such as proper signage, barriers, and traffic management to protect both the workers and the community.
6. **Cleanliness and Order:** Maintain a clean and orderly work site, ensuring that at the end of each workday, the area is as tidy as possible, with equipment and materials neatly stored.





7. **Noise Control:** Be mindful of noise levels, especially in the early morning and evening hours. Use noise-reducing practices where possible and comply with local noise ordinances.
8. **Responsive Point of Contact:** Provide a direct line of communication where residents can report issues or concerns and receive timely responses. This could be a phone number or email address dedicated to the project.
9. **Good Neighbor Policy:** Instruct your crew to be courteous and respectful to residents. Small gestures, such as waving to homeowners or stopping machinery to let pedestrians pass, can go a long way in building goodwill.
10. **Community Benefits:** If possible, look for opportunities to provide community benefits, such as improved sidewalks or planting trees, which can be seen as a positive trade-off for the inconvenience.
11. **Post-Construction Follow-Up:** After the project is complete, follow up with a thank-you note to the community for their patience, possibly accompanied by an invitation to a ribbon-cutting ceremony to celebrate the completion of the paving project. This can foster a sense of community pride and achievement.

By following this plan, you demonstrate that you value the community's well-being and are taking steps to minimize the impact of the paving project while maximizing the benefits. This proactive approach is an investment in community relations that can pay dividends in terms of reduced opposition and increased support for current and future projects.













# Hey NAPA by XBE

How can I validate the specific performance characteristics of the liquid asphalt cement that I receive from my supplier so that my understanding of its capabilities is more precise than the binder grading? How could that matter?





Validating the specific performance characteristics of the liquid asphalt cement you receive from your supplier involves going beyond the binder's Performance Grade (PG) and examining its rheological properties and behavior under various conditions. Here's a step-by-step explanation of how this can be accomplished and why it matters:

### **Step 1: Obtain a Certificate of Compliance**

Initially, request a Certificate of Compliance or a Certificate of Analysis from your supplier for each shipment. This document should confirm that the asphalt binder meets the PG specified and provide basic information on its properties.





## Step 2: Conduct Additional Testing

While the PG system gives a general idea of the binder's performance capabilities, additional tests can offer a more nuanced understanding of its behavior:

- **Dynamic Shear Rheometer (DSR) Test (AASHTO T 315):** This test measures the binder's complex shear modulus and phase angle at high and intermediate temperatures. It can indicate the binder's resistance to rutting and its viscoelastic properties.
- **Bending Beam Rheometer (BBR) Test (AASHTO T 313):** Conduct this test to determine the binder's flexural creep stiffness at low temperatures and evaluate its ability to resist thermal cracking.
- **Direct Tension Test (AASHTO T 314):** This test assesses the low-temperature relaxation properties of the binder, providing insights into its potential for thermal cracking.
- **Pressure Aging Vessel (PAV) Test (AASHTO R 28):** Use this test to simulate long-term aging and evaluate how the binder's properties change over time, affecting durability and potential for fatigue cracking.
- **Multiple Stress Creep Recovery (MSCR) Test (AASHTO T 350):** This test evaluates the binder's creep and recovery behavior at high temperatures, giving a better understanding of its rutting resistance.





### **Step 3: Analyze Test Results**

Review and analyze the test results to determine if the binder's properties align with your project's specific needs. Consider factors such as climate conditions, traffic loads, and mix composition.

### **Step 4: Consider the Impact of Recycled Materials**

If your mix includes Recycled Asphalt Pavement (RAP) or Recycled Asphalt Shingles (RAS), the aged binder in these materials can significantly affect the overall binder blend's performance. You may need to adjust the virgin binder grade accordingly.

### **Step 5: Field Validation**

Correlate laboratory findings with field performance. Monitor pavements over time to see if the binder's performance matches laboratory predictions.





## Why It Matters:

Understanding the specific performance characteristics of the asphalt binder is critical for several reasons:

- **Customization:** Different projects have unique requirements based on traffic levels, environmental conditions, and desired pavement lifespan. Detailed knowledge of the binder's properties allows for more tailored mix designs.
- **Quality Assurance:** By validating the binder's properties, you can ensure the quality and consistency of the asphalt cement, reducing the risk of premature pavement failures.
- **Cost-Effectiveness:** Knowing the binder's limitations and strengths helps in making cost-effective decisions regarding the use of modifiers or the need for binder grade adjustments.
- **Performance Optimization:** Detailed binder characterization can lead to improved pavement performance by optimizing properties such as rutting resistance, fatigue life, and thermal crack resistance.
- **Risk Mitigation:** Understanding the binder's behavior helps mitigate risks associated with material variability and potential non-compliance with specifications.

In summary, while the PG system provides a standardized classification for binders, validating specific performance characteristics through additional testing offers a more comprehensive understanding of how the binder will behave in the field. This information is crucial for ensuring that the asphalt pavement meets or exceeds performance expectations, ultimately contributing to longer-lasting roads.





- **Hot Mix Asphalt Materials, Mixture Design and Construction - Chapter 2**

- Hot Mix Asphalt Materials, Mixture Design and Construction - Chapter 2 - Page 13 86%
- Hot Mix Asphalt Materials, Mixture Design and Construction - Chapter 2 - Page 74 86%
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# **CHAPTER 2. ASPHALT REFINING, USES, AND PROPERTIES**

## **HISTORICAL BACKGROUND AND REFINING**

### **Historical Background**



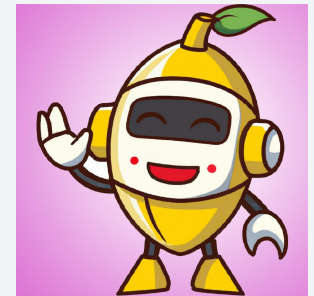


# Hey Kayla by XBE

As your assistant, I can help you with a multitude of tasks relevant to XBE's software. This includes but is not limited to:

1. Explaining how to use XBE's features and tools: For instance, I can show you what you can do on "The Board", a comprehensive tool in the XBE software designed to manage job scheduling and job management.
2. Assisting with troubleshooting issues: If you're having problems with the software, I can help you understand why you're facing those issues and guide you with solutions.
3. Guiding you through features if you're a driver using XBE: I can explain how the timesheet and line items work so that you can correctly log your time and activities.
4. Any questions related to XBE's services: I can explain in detail XBE's offerings for contractors in the horizontal construction industry, including scheduling, planning, dispatching, monitoring, analysis, and more.

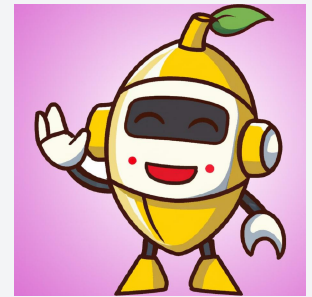
Remember to rely on XBE's customer support via Slack or email at [help@x-b-e.com](mailto:help@x-b-e.com) for more complex queries or issues. They are ready to help you promptly!





# Hey Kayla by XBE

I'm a driver. Tell me three reasons why sharing my GPS location with you will help me. Make it quick.







**Listen!** I read all of the release notes, glossary terms, and newsletters, but **I may answer incorrectly.** Be careful, and check the source material. My answers are being monitored and improved in the background.

Absolutely! Sharing your GPS location data brings multiple benefits that can enhance your experience as a driver:

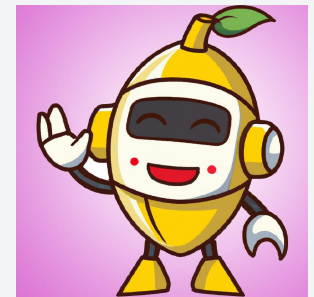
1. **Better Coordination and Communication:** Real-time location tracking enables dispatchers and managers to monitor your progress and send updates or instructions based on your current position. This leads to better coordination and helps avoid any confusion, particularly during complex operations or unexpected situations.
2. **Accurate Check-in/out System:** GPS data aids in ensuring the accuracy of your time card start and end times. This is advantageous when it comes to logging your work hours and verifying you're correctly compensated for your time.
3. **Safety:** Sharing your location helps ensure a safe work environment, as it allows real-time monitoring during your shifts. This is vital for effective incident management and safety planning. If an emergency occurs, your real-time position can help with a quick response.

By sharing your GPS location, you're enabling a smoother, safer, and more efficient working experience on the job every day!

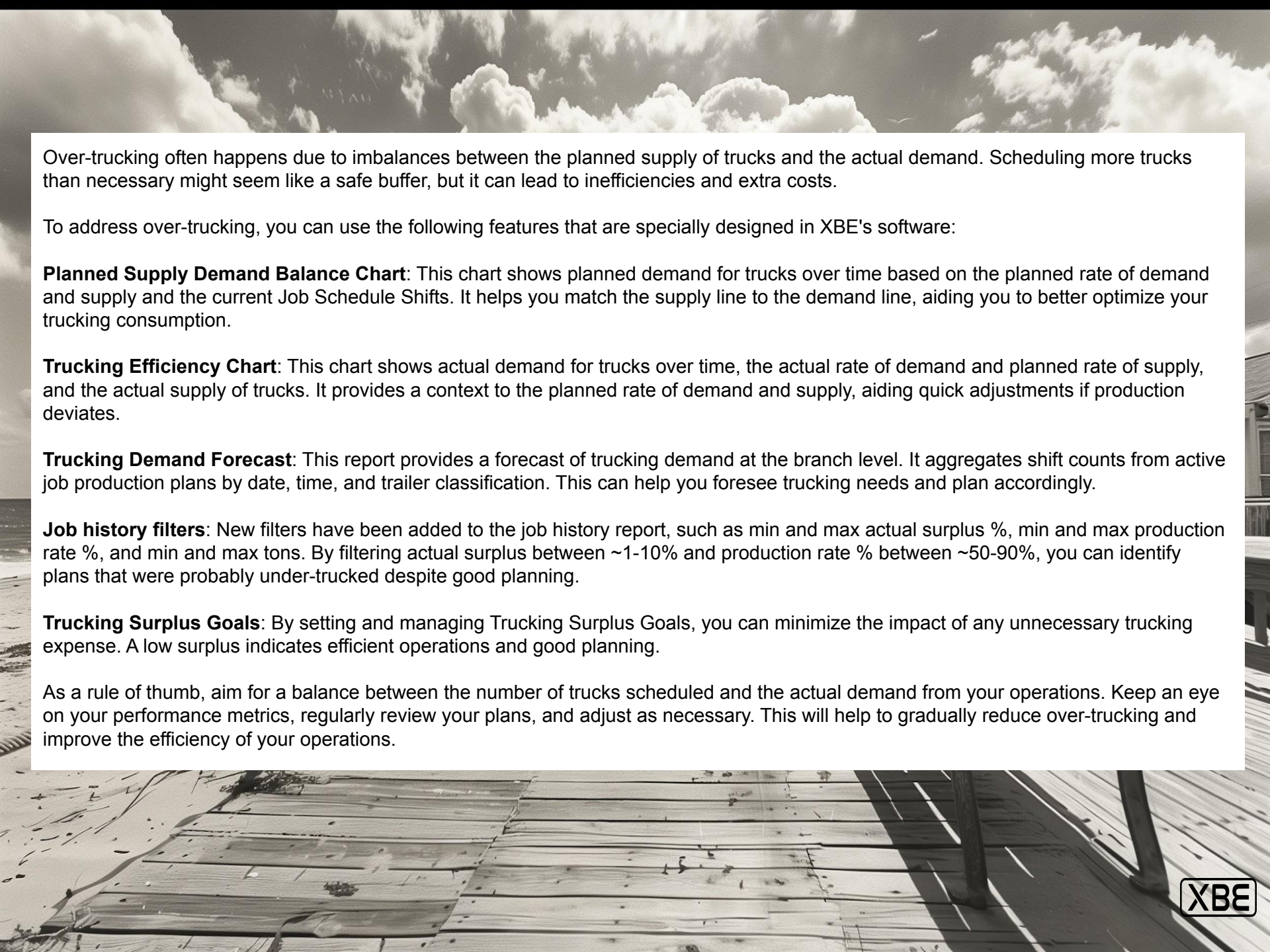


# Hey Kayla by XBE

Why are we always over-trucked?  
How do I fix that?







Over-trucking often happens due to imbalances between the planned supply of trucks and the actual demand. Scheduling more trucks than necessary might seem like a safe buffer, but it can lead to inefficiencies and extra costs.

To address over-trucking, you can use the following features that are specially designed in XBE's software:

**Planned Supply Demand Balance Chart:** This chart shows planned demand for trucks over time based on the planned rate of demand and supply and the current Job Schedule Shifts. It helps you match the supply line to the demand line, aiding you to better optimize your trucking consumption.

**Trucking Efficiency Chart:** This chart shows actual demand for trucks over time, the actual rate of demand and planned rate of supply, and the actual supply of trucks. It provides a context to the planned rate of demand and supply, aiding quick adjustments if production deviates.

**Trucking Demand Forecast:** This report provides a forecast of trucking demand at the branch level. It aggregates shift counts from active job production plans by date, time, and trailer classification. This can help you foresee trucking needs and plan accordingly.

**Job history filters:** New filters have been added to the job history report, such as min and max actual surplus %, min and max production rate %, and min and max tons. By filtering actual surplus between ~1-10% and production rate % between ~50-90%, you can identify plans that were probably under-trucked despite good planning.

**Trucking Surplus Goals:** By setting and managing Trucking Surplus Goals, you can minimize the impact of any unnecessary trucking expense. A low surplus indicates efficient operations and good planning.

As a rule of thumb, aim for a balance between the number of trucks scheduled and the actual demand from your operations. Keep an eye on your performance metrics, regularly review your plans, and adjust as necessary. This will help to gradually reduce over-trucking and improve the efficiency of your operations.



# Spot Safety Risks



This is a photo from the apartment building of one of XBE's team members in India. They sent it to us to see what we thought of the safety risks.

I asked ChatGPT:

"Analyze the attached picture of a construction job site. Find the top 5 safety risks. Rank them by severity descending. For each, give me a mitigation plan. Be very concise."





### ChatGPT

Upon examining the image provided, here are the top five safety risks ranked by severity:

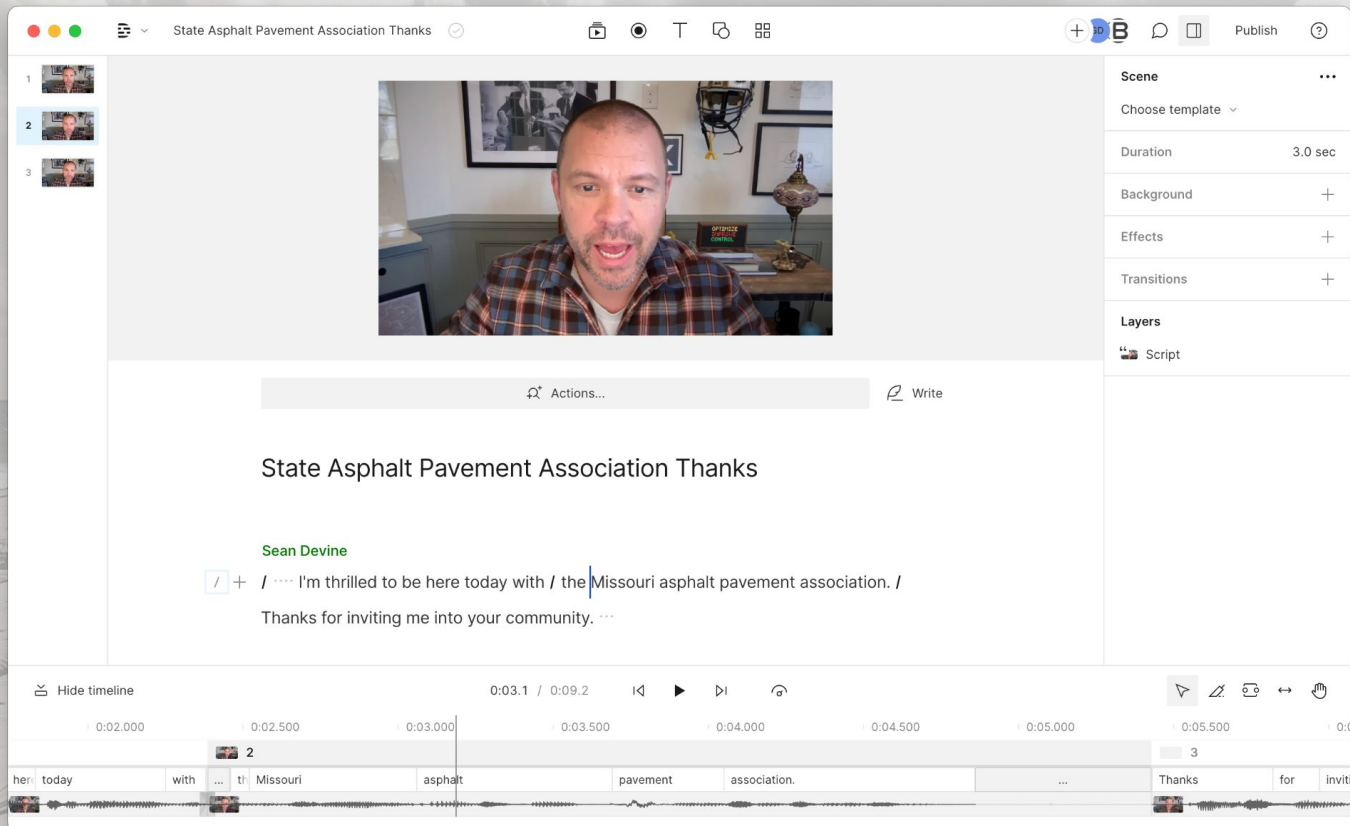
1. **Improper Scaffolding Construction:** The scaffolding appears to be made of bamboo, which may not be constructed according to regulated safety standards. This could lead to a collapse.  
*Mitigation:* Ensure that the scaffolding is constructed by a competent person and meets the safety standards for the materials used.
2. **Lack of Fall Protection:** Workers are at height without any visible fall arrest systems such as safety nets or personal fall arrest equipment.  
*Mitigation:* Provide full-body harnesses and ensure that there are lifelines or safety nets installed below the work area.
3. **Lack of Personal Protective Equipment (PPE):** The worker appears to be without a hard hat, which is essential for protecting against head injuries from falling objects.  
*Mitigation:* Require all personnel on site to wear appropriate PPE including hard hats, safety boots, and high-visibility clothing.
4. **Electrical Safety:** There are electrical lines near the scaffolding which could pose a risk of electrocution.  
*Mitigation:* De-energize and ground electrical lines if possible, or maintain a safe distance from them. Use non-conductive materials for scaffolding near electrical hazards.
5. **Unsecured Scaffolding Base:** The base of the scaffolding does not appear to be secured or braced properly, which can lead to instability.  
*Mitigation:* Secure the scaffolding base with adequate bracing and ensure it is level and stable on solid ground.

For each of these risks, it is crucial that a thorough hazard assessment is conducted by a qualified safety professional, and all mitigation plans are implemented before work continues. Regular safety inspections and training should also be part of the ongoing safety protocol on the job site.





# Regenerate Sections of Audio



The screenshot shows a video editing software interface. The main video preview window displays a man in a plaid shirt speaking. Below the video, there is a text overlay that reads "State Asphalt Pavement Association Thanks". The text is attributed to "Sean Devine" and includes a timestamp "0:03.1 / 0:09.2". The interface also features a timeline at the bottom with a playhead and various editing tools. On the right side, there is a panel with settings for the video, including "Scene", "Duration", "Background", "Effects", "Transitions", and "Layers".

State Asphalt Pavement Association Thanks

Sean Devine

0:03.1 / 0:09.2

I'm thrilled to be here today with / the Missouri asphalt pavement association. /

Thanks for inviting me into your community. ...



# Create Communication Campaigns



**Don't double  
down on delay.**

The second best time is now.

**XBE**

**XBE**



# Clever Communication

XBE Davis-Bacon Advisor ▾



**You**

Create an backronym to remember the important changes to the Davis-Bacon act.



**XBE Davis-Bacon Advisor**

To create a memorable backronym for the important changes to the Davis-Bacon Act, I will use the word "CHANGES" as the basis, with each letter representing a key aspect of the modifications:

- Coverage Expansion
- Higher Liability
- Administrative Impact
- New Calculation Methods
- Greater Enforcement
- Employer Responsibilities
- Subcontractor Compliance

This backronym encapsulates the significant areas of change within the Davis-Bacon Act, emphasizing the expansion in coverage and liability, the impact on administrative processes, the introduction of new methods for calculating prevailing wages, enhanced enforcement measures, increased responsibilities for employers, and the need for subcontractor compliance.





# Daily GPTs

- **Grammar Hawk:** Proofreads documents and communication for grammatical errors.
- **Digital Twins:** Clones of real people that I regularly interact with that I can practice communicating with to avoid mistakes or misunderstandings.
- **Remedial Worldly Wisdom:** Charlie Munger teaches a wide variety of topics from his imagined class in his singular style.
- **XBE Marketer:** Generates marketing content and strategies based on a detailed understanding of XBEs value proposition.
- **One-by-One:** Asks a list of questions one-by-one and then combines all answers into a single response.



# What Should You Do Today?

- Subscribe to ChatGPT Plus for \$20/month.
- Add custom instructions to ChatGPT.
- Be comprehensive in your prompts.
- Don't pigeonhole the models.
- Keep your identity small.
- Stay up-to-date on new capabilities
- Tell it who you want it to be in any conversation.
- Build your stamina.
- Have real conversations.
- Model behavior from the top.
- Build some Custom GPTs.





# POLL

How about now?





Contact Me About AI or XBE

[sean-devine@x-b-e.com](mailto:sean-devine@x-b-e.com)

XBE