

26TH ANNUAL



26TH LCI CONGRESS
OCTOBER 22-25, 2024

Gen-AI for Super Charging A3 Thinking

Eric Twigg SVP – Walbridge

LaShira Champion-King Director - Walbridge

SURFING THE WAVE OF LEAN DESIGN AND CONSTRUCTION

October 24, 2024

Problem Statement

Construction project managers and superintendents face limited time to complete A3 reports due to demanding project schedules and competing priorities, hindering their ability to effectively analyze and address root causes of problems.



Definitions



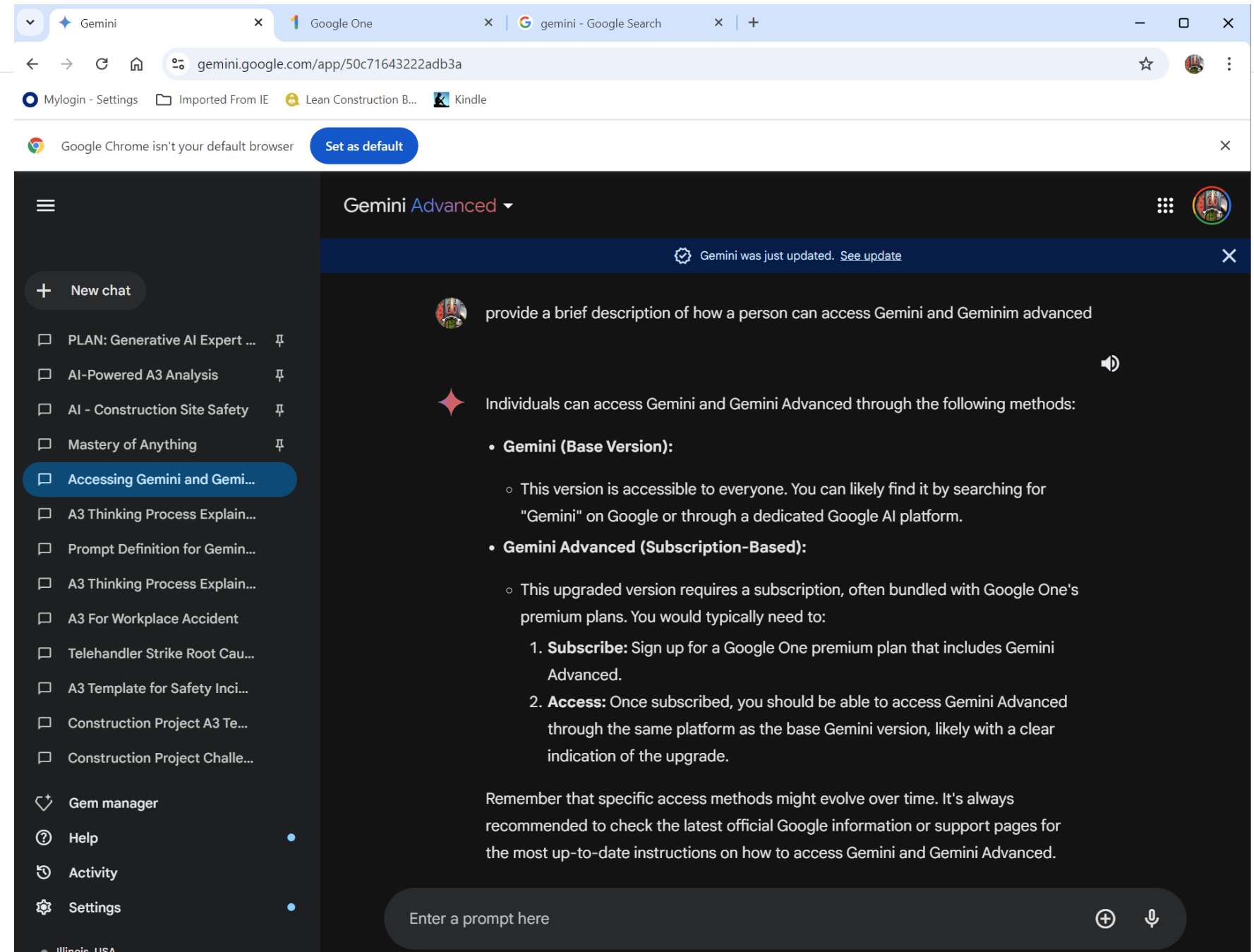
What is an A3?

- A structured problem-solving approach
- Guides teams through a structured process
- To achieve desired outcomes



How to access Gemini?

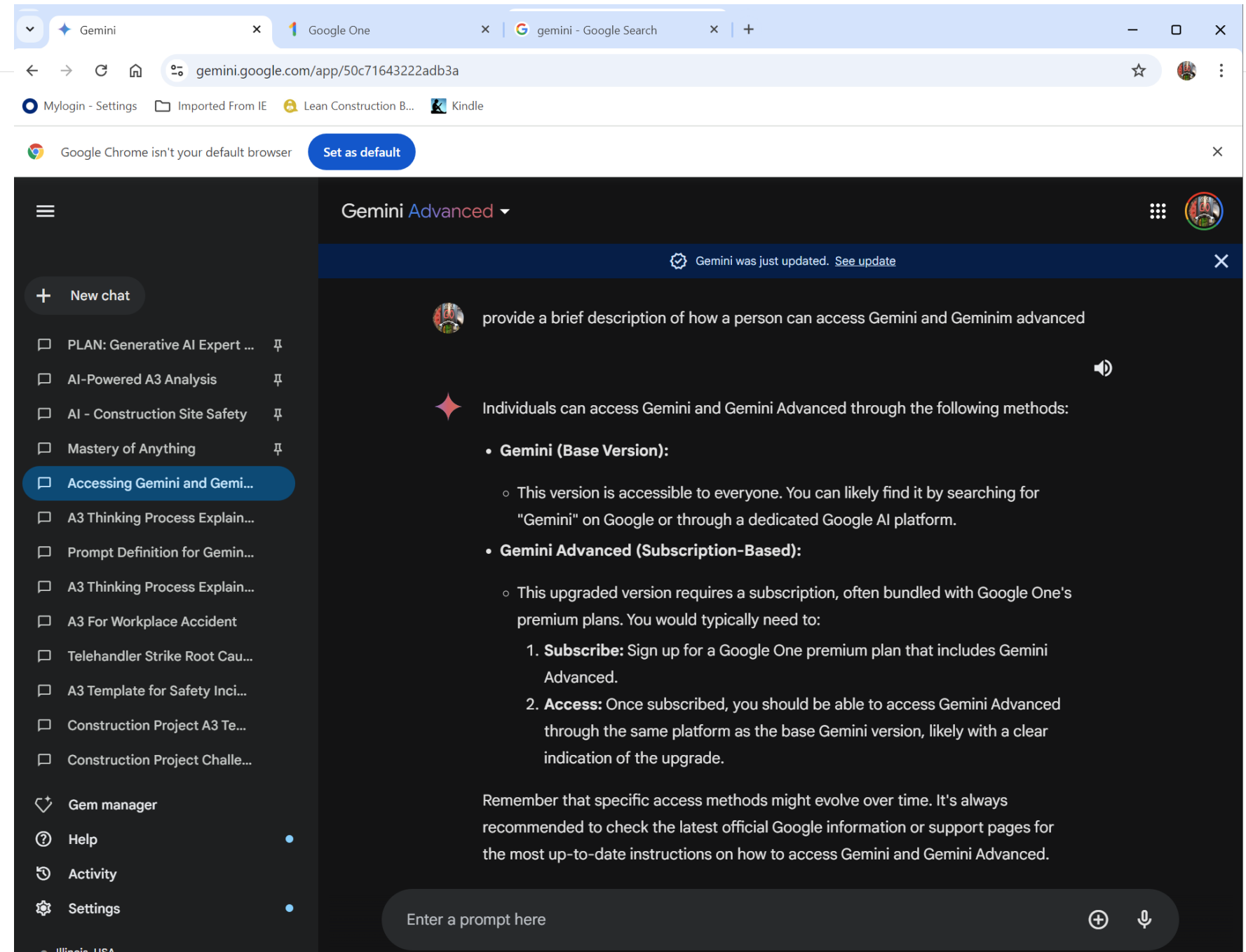
- Large Language Model (LLM)
- Search for “Gemini”
- Gemini = Free
- Need Gmail account
- Advanced = Subscription (\$20/mo)



How to access Gemini?

Gemini Advanced is generally safe, but it's important to exercise caution

Uploading files or data to Gemini that may be confidential is strongly discouraged



The anatomy of a Prompt

- Text input given to the AI model to generate a specific response.



Your Assignment



1) Struck-by safety incident

2) Identify root causes > A3



It's all about the prompt...

Role

Context

Instructions

Format

Constraints

Who is Gemini creating as?



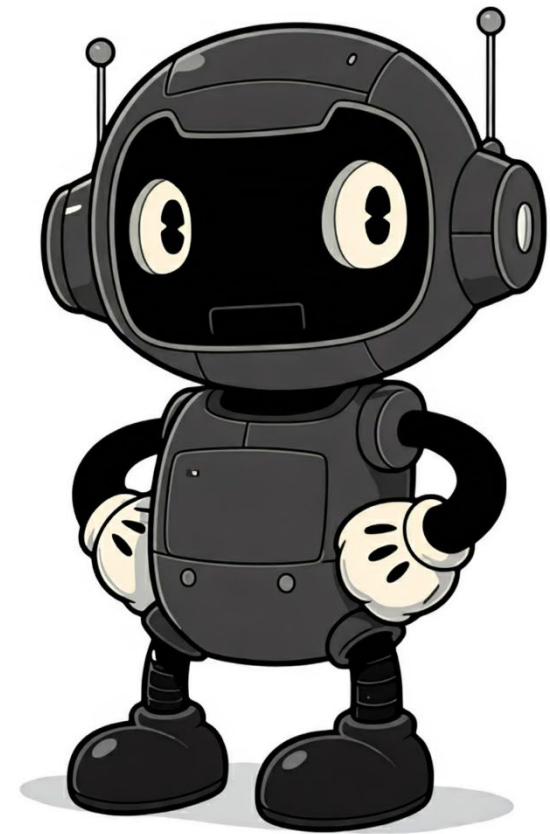
A conversation between you and...



Role

A3 Process Expert

Who is
Gemini
creating as?

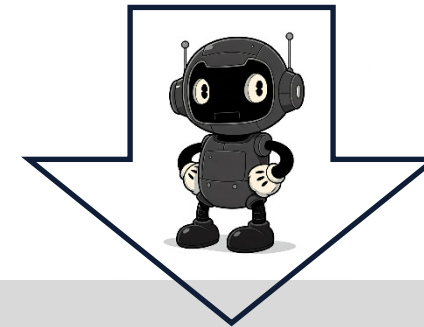


Gemini

It's all about the prompt...



*"From the perspective of an **A3 Thinking process expert**, what are the key considerations for developing an A3 template?"*



Key Elements to Include

- Problem Statement:** A clear and concise definition of the problem or opportunity.
- Current Situation:** A description of the current state, including relevant data and analysis.
- Root Cause Analysis:** A thorough investigation into the underlying causes of the problem.
- Target State:** A clear vision of the desired future state.
- Countermeasures:** Specific actions to address the root causes and achieve the target state.
- Implementation Plan:** A timeline and plan for implementing the countermeasures.
- Follow-up and Review:** A process for monitoring progress and making adjustments as needed.

It's all about the prompt...

Role

Context

Instructions

Format

Constraints

**Who is Gemini
creating as?**

**What is the
situation it is
creating for?**

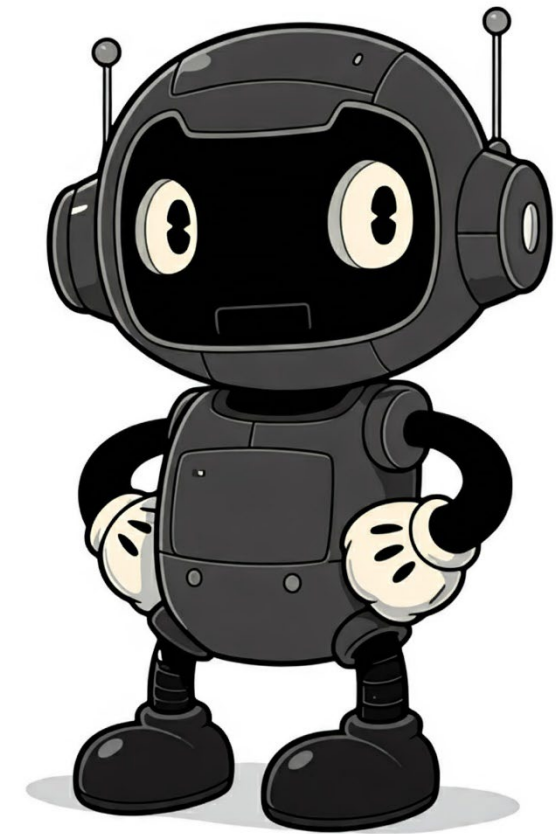
A conversation between you and...



Context

“that had a struck by mobile equipment safety incident...”

What is the situation it is creating for?

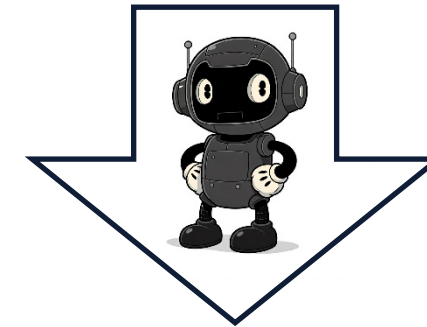


Gemini

It's all about the prompt...



*"From the perspective of a superintendent for a large construction company **that had a struck by mobile equipment safety incident** provide an example prompt that would results in a detailed A3 thinking analysis"*

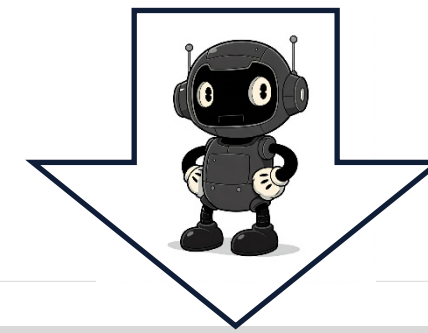


Background: Recently, we experienced a safety incident on our construction site where a worker was struck by a mobile equipment vehicle. This is a serious matter, and we need to thoroughly understand the root causes and implement effective countermeasures to prevent such incidents from happening again.

Please generate a detailed A3 thinking analysis that includes the following:

- Problem Statement:** Clearly define the problem, including the impact on safety, productivity, and morale.
- Current Situation:** Describe the current conditions and factors surrounding the incident, including equipment involved, work area layout, worker training, and existing safety protocols.
- Root Cause Analysis:** Utilize techniques such as the 5 Whys or Fishbone Diagram to

It's all about the prompt...



Add Specific Context?

Background: Recently, we experienced a safety incident on our construction site where a worker was struck by a mobile equipment vehicle. This is a serious matter, and we need to thoroughly understand the root causes and implement effective countermeasures to prevent such incidents from happening again.

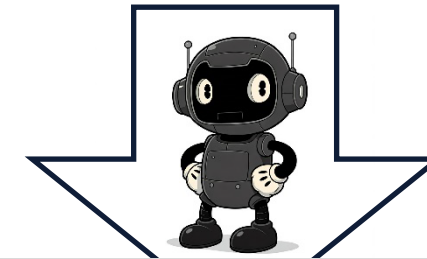
Please generate a detailed A3 thinking analysis that includes the following:

- Problem Statement:** Clearly define the problem, including the impact on safety, productivity, and morale.
- Current Situation:** Describe the current conditions and factors surrounding the incident, including equipment involved, work area layout, worker training, and existing safety protocols.
- Root Cause Analysis:** Utilize techniques such as the 5 Whys or Fishbone Diagram to identify the underlying causes of the incident. Dig deep to uncover both direct and contributing factors.
- Target Condition:** Outline the ideal state where such incidents are prevented, highlighting improvements in safety culture, training, communication, and site management.
- Countermeasures:** Propose specific, actionable steps to address the root causes and achieve the target condition. Consider improvements in equipment, processes, training, and technology.
- Implementation Plan:** Develop a clear plan for implementing the countermeasures, including timelines, responsible parties, and metrics for measuring success.
- Follow-Up:** Outline a process for monitoring the effectiveness of the countermeasures and making adjustments as needed.

It's all about the prompt...




*"From the perspective of a superintendent for a large construction company **that had a struck by mobile equipment safety incident** provide an example prompt that would results in a detailed A3 thinking analysis"*



Additional Tips for the Superintendent:

- Be specific:** Include as much detail as possible about the incident, the site conditions, and existing safety measures.
- Focus on root causes:** Encourage the AI to go beyond surface-level issues and identify underlying systemic problems.
- Emphasize practicality:** **Ask for actionable countermeasures that can be realistically implemented on the construction site.**
- Iterate:** Review the AI-generated analysis and refine the prompt if needed to get a more comprehensive and useful result.

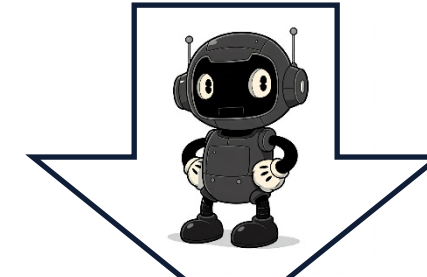
It's all about the prompt...



Actionable Counter-measures?

Blind Spot Tech?

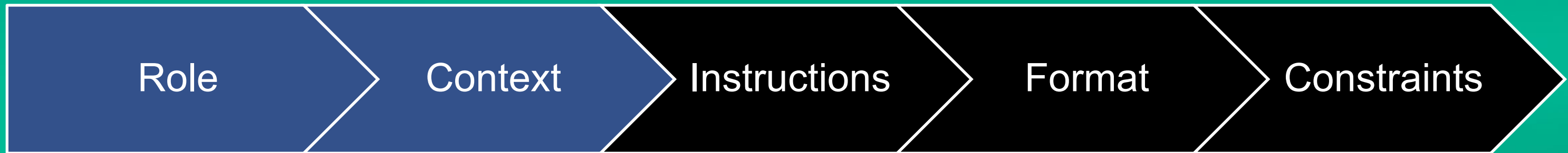
“ADD actionable countermeasures that can be realistically implemented on the construction site.”



Consider improvements in the following areas:

- Equipment & Technology:** Proximity sensors, cameras, blind spot mirrors, enhanced lighting, vehicle tracking systems
- Processes & Procedures:** Stricter traffic management plans, designated pedestrian walkways, improved communication protocols (hand signals, radios), mandatory spotters for certain operations
- Training & Awareness:** Comprehensive training on equipment operation, hazard recognition, and safe work practices; regular safety refreshers and toolbox talks; increased focus on situational awareness
- Site Management:** Clearer delineation of work zones, improved visibility, regular safety audits and inspections

It's all about the prompt...



Who is Gemini creating as?

What is the situation it is creating for?

What specifically do you want it to do?

How do you want it to return its response?

What specific needs and preferences do you want for output?

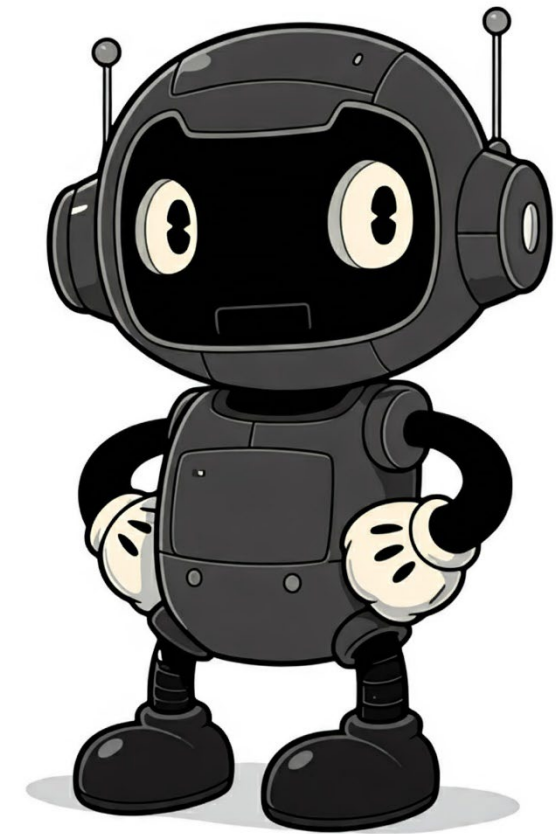
A conversation between you and...



Instructions

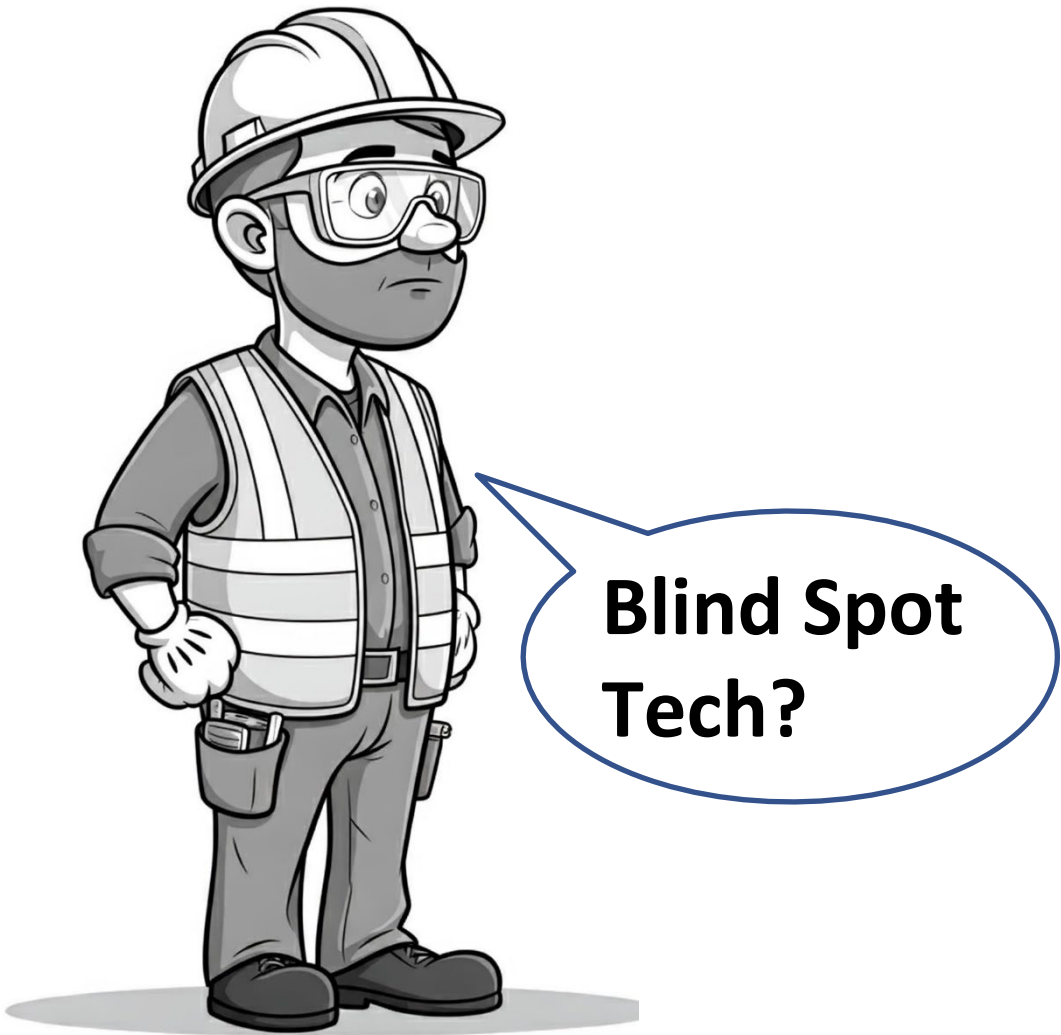
What
specifically
do you want
it to do?

***"Blind spot technology compare:
benefits, value, challenges..."***

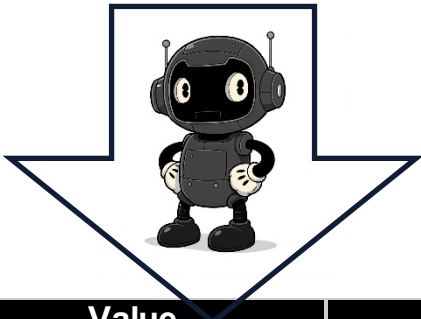


Gemini

It’s all about the prompt...



*“Provide a **detailed comparison table** for mobile equipment blind spot technology, including, **benefits, value, challenges, and other considerations**”*



Technology	Benefits	Value	Challenges	Other Considerations
Cameras	Increased visibility, reduced blind spots, real-time monitoring, wide field of view	Improved safety, reduced accidents, potential for cost savings, enhanced situational awareness	Image distortion, limited range in low light or adverse weather, potential for distraction	Proper installation and maintenance, driver training, integration with other systems
Radar	Detects objects even in poor visibility, provides distance and speed information, works in all weather conditions	Improved safety, reduced accidents, can be used in conjunction with cameras, potential for cost savings	Limited field of view, may not detect stationary objects, can be expensive	Installation and calibration, potential for false alarms, integration with other systems
Ultrasonic Sensors	Detects objects in close proximity, provides distance information, works in all weather conditions	Improved safety, reduced accidents, can be used in conjunction with cameras and radar, relatively inexpensive	Limited range, may not detect objects moving at high speeds, can be affected by dirt and debris	Installation and maintenance, potential for false alarms, integration with other systems

“Provide a detailed comparison table for mobile equipment blind spot technology, including, **benefits, value, challenges, and other considerations**”

Technology	Benefits	Value	Challenges	Other Considerations
Cameras	Increased visibility, reduced blind spots, real-time monitoring, wide field of view	Improved safety, reduced accidents, potential for cost savings, enhanced situational awareness	Image distortion, limited range in low light or adverse weather, potential for distraction	Proper installation and maintenance, driver training, integration with other systems
Radar	Detects objects even in poor visibility, provides distance and speed information, works in all weather conditions	Improved safety, reduced accidents, can be used in conjunction with cameras, potential for cost savings	Limited field of view, may not detect stationary objects, can be expensive	Installation and calibration, potential for false alarms, integration with other systems
Ultrasonic Sensors	Detects objects in close proximity, provides distance information, works in all weather conditions	Improved safety, reduced accidents, can be used in conjunction with cameras and radar, relatively inexpensive	Limited range, may not detect objects moving at high speeds, can be affected by dirt and debris	Installation and maintenance, potential for false alarms, integration with other systems
Artificial Intelligence (AI)	Combines data from multiple sensors, provides real-time alerts and warnings, can predict potential hazards, potential for autonomous operation	Improved safety, reduced accidents, potential for cost savings, enhanced situational awareness	High cost, complex installation and maintenance, potential for false alarms, reliance on technology	Ongoing development and updates, driver training, ethical considerations

It's all about the prompt...

Role

Context

Instructions

Format

Constraints

Who is Gemini creating as?

What is the situation it is creating for?

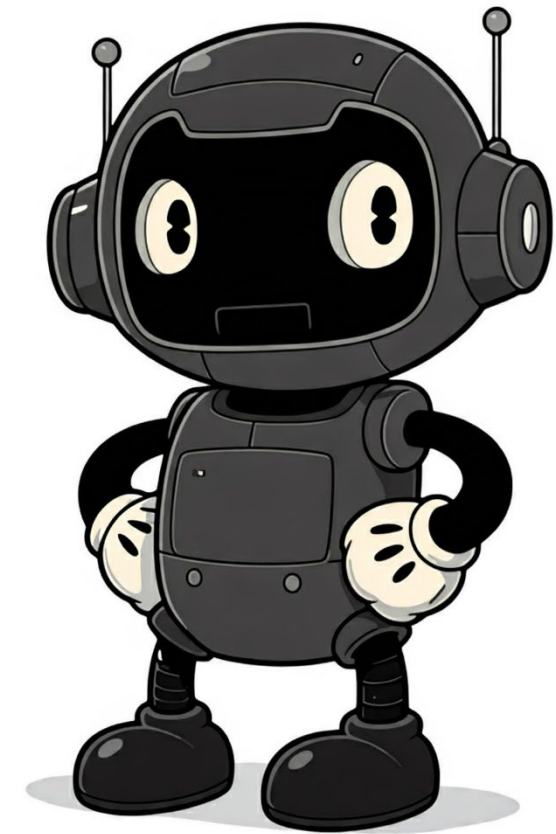
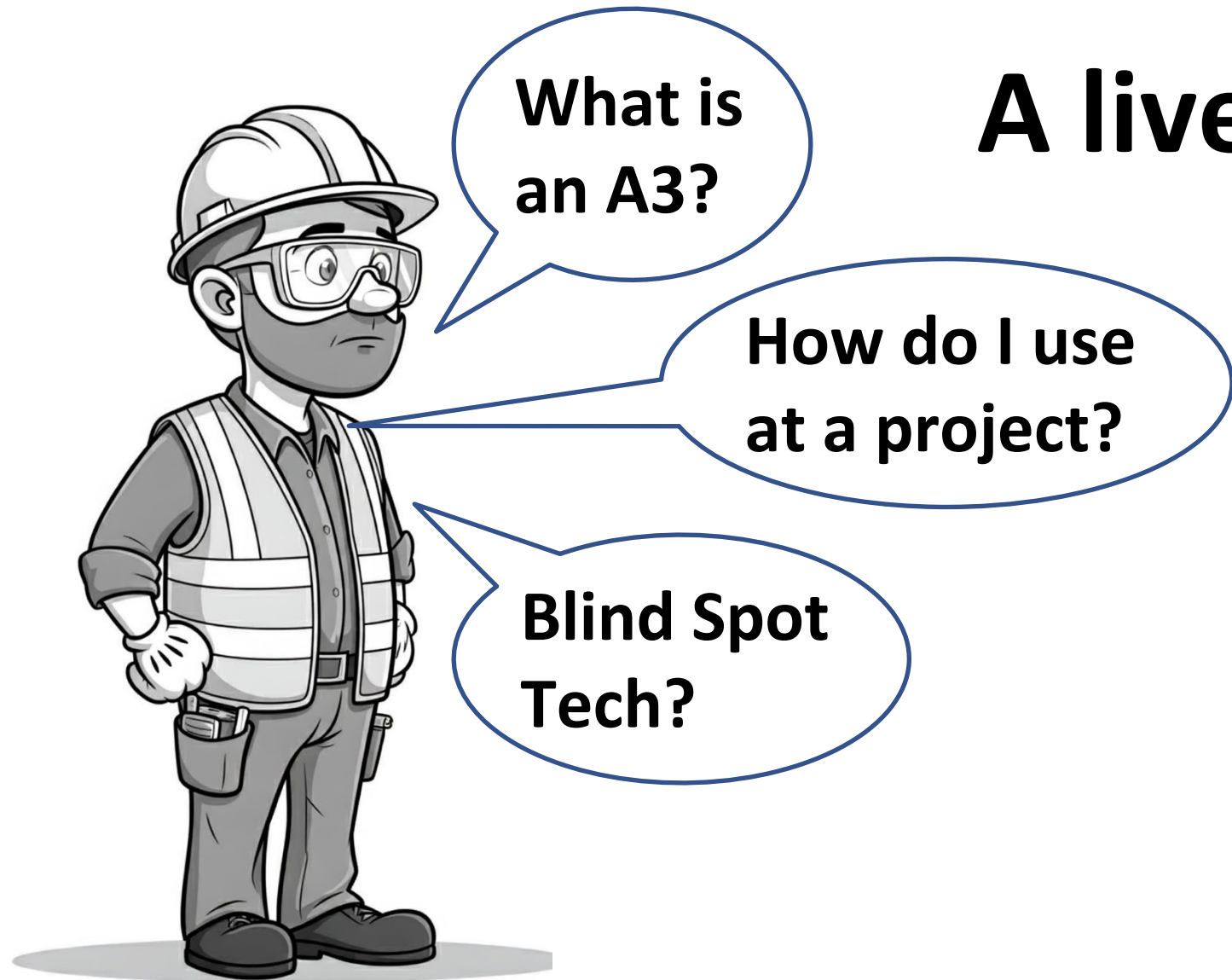
What specifically do you want it to do?

How do you want it to return its response?

What specific needs and preferences do you want for output?

A conversation between you and...

A live demonstration!



Gemini

Role

Context

Instructions

Format

Constraints

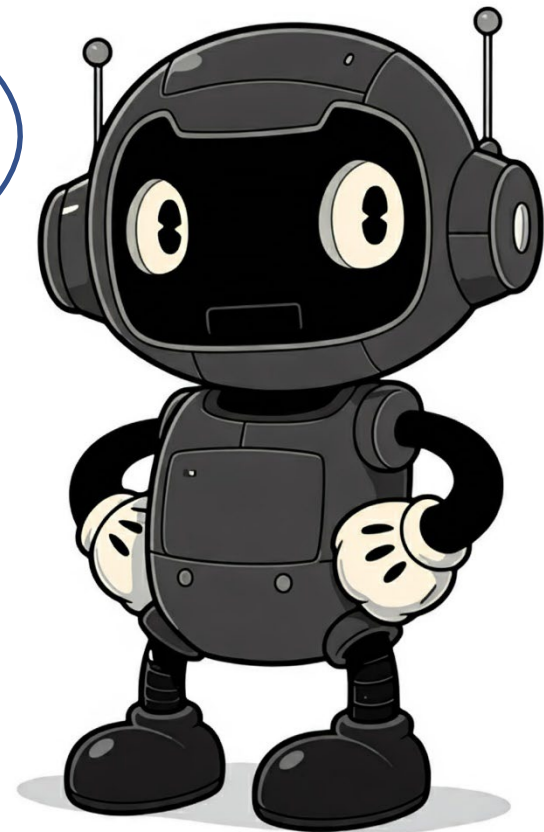
A live demonstration!



**Audience
Challenge?**

**A checklist or process
improvement you are
working on?**

**A comparison of several
alternatives to make informed
purchasing decision? (work or
personal)**



Gemini

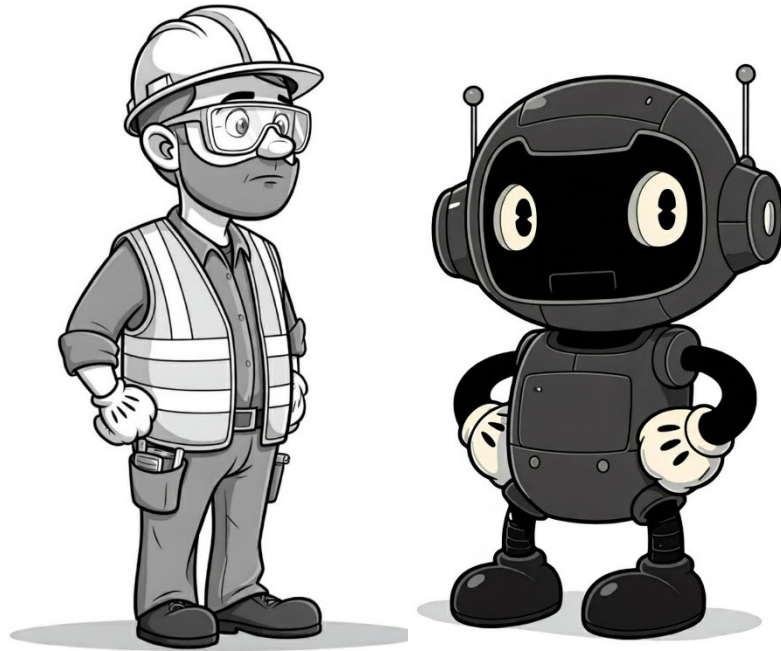
Role

Context

Instructions

Format

Constraints



Created with Gemini Advanced – Imagen 3

Guide and Resources



GUIDE Overview

You are searching for the best GEN AI options for a variety of uses. Provide a list of other GEN AI options including Gemini Advanced, and provide a comparison table of the best use case, benefits, challenges, and what each one does best

Absolutely! Here's a comparison table of various Generative AI options, including Gemini Advanced, highlighting their best use cases, benefits, challenges, and strengths:

Generative AI Model	Best Use Case	Benefits	Challenges	What It Does Best
Gemini Advanced	Complex tasks, research, creative writing	Large context window, multilingual, integrated with Google suite	Limited public access, potentially higher cost	Handling large amounts of information, research, and creative tasks
ChatGPT	Conversational AI, text generation	Versatile, user-friendly, creative	Can generate inaccurate information, limited context window	Natural language understanding, dialogue, and creative text generation
Bard	Information retrieval, creative writing	Integrated with Google Search, fast responses	Can hallucinate facts, less strong at logic	Quick answers, creative writing, and brainstorming
Bing AI	Search engine enhancement	Integrates with Bing search, provides citations	Less creative than other models, may oversimplify	Summarizing information, finding sources, factual responses

Other AI tools comparison
Plus (6) more AI Tools...



GUIDE Overview

Use your expertise to evaluate responses
Plus (4) more techniques...

In your role as a prompt engineer, provide a table of instructions on techniques on how to add to or modify GEN AI prompt results to get more focused, detailed results. Include how I should use my expertise on the subject of my prompt to evaluate the prompt results and then add or modify the prompt.

Absolutely! Here's a table outlining techniques to refine your prompts and leverage your expertise for more focused and detailed GEN AI results:

Technique	Description	Example	How to Use Your Expertise
Specify Output Format	Ask for a specific format (list, table, code, etc.) to structure the response.	"List the top 5 benefits of [topic] in a bullet-point format."	Assess if the format aligns with how you would naturally organize information on the topic. Modify the format if it doesn't match your expertise.
Set Length Parameters	Define a word or character limit to control the response's depth and conciseness.	"Summarize [topic] in no more than 200 words."	Determine if the length is sufficient to convey your expertise adequately. Adjust if you need more elaboration or a shorter, more focused response.
Use Iterative Prompting	Break down complex prompts into smaller steps. Start with a general query, then refine based on initial results.	"What are the key components of [topic]?" (Initial) -> "Explain [specific component] in more detail."	Evaluate each response against your knowledge. Guide the AI with follow-up prompts based on areas where you need more information or clarification.
Chain-of-Thought Prompts	Ask the AI to reason step-by-step before giving the final answer.	"Explain how [process] works. Then, identify the potential challenges in implementing it."	Analyze the AI's reasoning process. Does it match your understanding? Challenge or correct any inaccuracies based on your expertise.



GUIDE Overview

Example of Improving a Prompt:

Vague Prompt: "Tell me about climate change."

Improved Prompt: "Provide a concise summary of the causes and effects of climate change, focusing on the impact on global temperatures and sea levels. Include information about recent scientific findings and potential solutions."

1. Directly Address the Role:

- Start your prompt with a phrase like:
 - "As a [Role], how would you..."
 - "In your expertise as a [Role], can you explain..."
 - "From the perspective of a [Role], what are the key considerations for..."

2. Describe the Situation:

- Briefly outline the context of your request:
 - "I'm a beginner gardener looking to..." (Seeking advice from a horticulturist)
 - "I'm trying to understand the legal implications of..." (Asking a lawyer)
 - "I'm interested in the historical significance of..." (Consulting a historian)

3. Specify Desired Output:

- Clarify the type of information you're seeking:
 - "Could you provide step-by-step instructions on..."
 - "Can you give me an overview of the different approaches to..."
 - "Would you be able to analyze the pros and cons of..."

How can you apply this tomorrow?

1. *Check with your IT leader / policy – what AI search tools are approved for use?*
2. *Get started with anything you need help with getting a quick draft:*
 - Thank you note, checklists, compare alternatives, research, interview prep, A3
3. *Experiment, get creative, try different prompts to see the effect on output*
4. *Use the GUIDE*

It's all about the prompt...

*In problems we face, solutions to chase,
A3 thinking's embrace, leaves no space for waste.*

*Define the problem, clear and concise,
Goals set in sight, with focus precise.*

*Gather data, insights to glean,
Root cause analysis, the truth unseen.*

*Solutions tested, their impact assessed,
Against targets set, success addressed.*

*Best solutions chosen, actions defined,
Standardize and share, lessons enshrined.*

*A3's cycle complete, improvement's the gain,
Continuous learning, in every domain.*



26TH LCI CONGRESS
OCTOBER 22-25, 2024



In the spirit of continuous improvement, we would like to remind you to complete this session's survey! We look forward to receiving your feedback.

Contact Us

Eric Twigg

Walbridge

etwigg@walbridge.com

LaShira Champion-King

Walbridge

Ichampion@walbridge.com



26TH LCI CONGRESS
OCTOBER 22-25, 2024

Thank you for attending this presentation. Enjoy the rest of the 26th Annual LCI Congress!

