



Practical AI For Quality NCRs

Enhancing NCRs, Root Cause Analysis, and Corrective Actions
for Superior Outcomes.

Jim Lee, CEO

simple**QuE**



AI Is No Longer Optional

Where are you today with AI?

1. I use AI regularly at work.
2. I have tried AI, but only occasionally.
3. I use AI personally, but not for work.
4. I have not used AI yet.
5. My company restricts or prohibits AI use.

“Over the next three years, there’s going to be two types of companies: those who are great at AI and those who went out of business.”

Mark Cuban, Convergence AI Dallas 2026

“Mark Cuban: AI Hype vs. Reality”

<https://www.youtube.com/watch?v=CEz9RRg0Ffl>

AI is quickly becoming a practical business tool, not a future concept.
The question is no longer whether AI will affect quality, the question is how well we learn to use it.

Workshop Objectives

Participants will learn how to use AI as a practical support tool to:

- Improve the speed and quality of NCR writing, root cause analysis, and corrective action development
 - Write **stronger NCRs** based on objective evidence
 - Improve root cause analysis by challenging weak or incomplete conclusions
 - Look beyond “human error” to identify process and system contributors
 - Develop corrective actions that address root causes instead of symptoms and apparent causes, which prevents recurrence
- Evaluate whether **corrective actions are effective** and verifiable
- Apply AI responsibly while maintaining human judgment, validation, and accountability



AI Is Powerful, But Not Foolproof

AI-generated outputs require review by trained personnel due to inherent limitations:

- **Hallucinations:** AI may invent facts, requirements, evidence, causes, or conclusions that were not provided or verified.
- **False Confidence:** AI may present weak or incorrect answers in a polished, authoritative way.
- **Contextual Blindness – Missing Content:** AI may miss critical contextual factors like industry specifics, customer needs, regulatory requirements, contract flowdowns, or process risks.
- **Generic Solutions - Overgeneralization:** AI may give generic answers that sound reasonable but do not fit the actual process, product, risk, or evidence.
- **Bias:** Outputs can sound sophisticated but AI can be led to conclusions based on inputs:
 - **Confirmation bias:** AI can reinforce the conclusion you were already leaning toward, especially if the prompt is leading.
 - **Automation bias:** Users may trust the AI answer too quickly because it sounds complete and convincing, or because it came from technology.
- **Terminological Ambiguity:** AI may blur distinctions between problem-solving terms (symptom, cause, correction, corrective action, effectiveness).

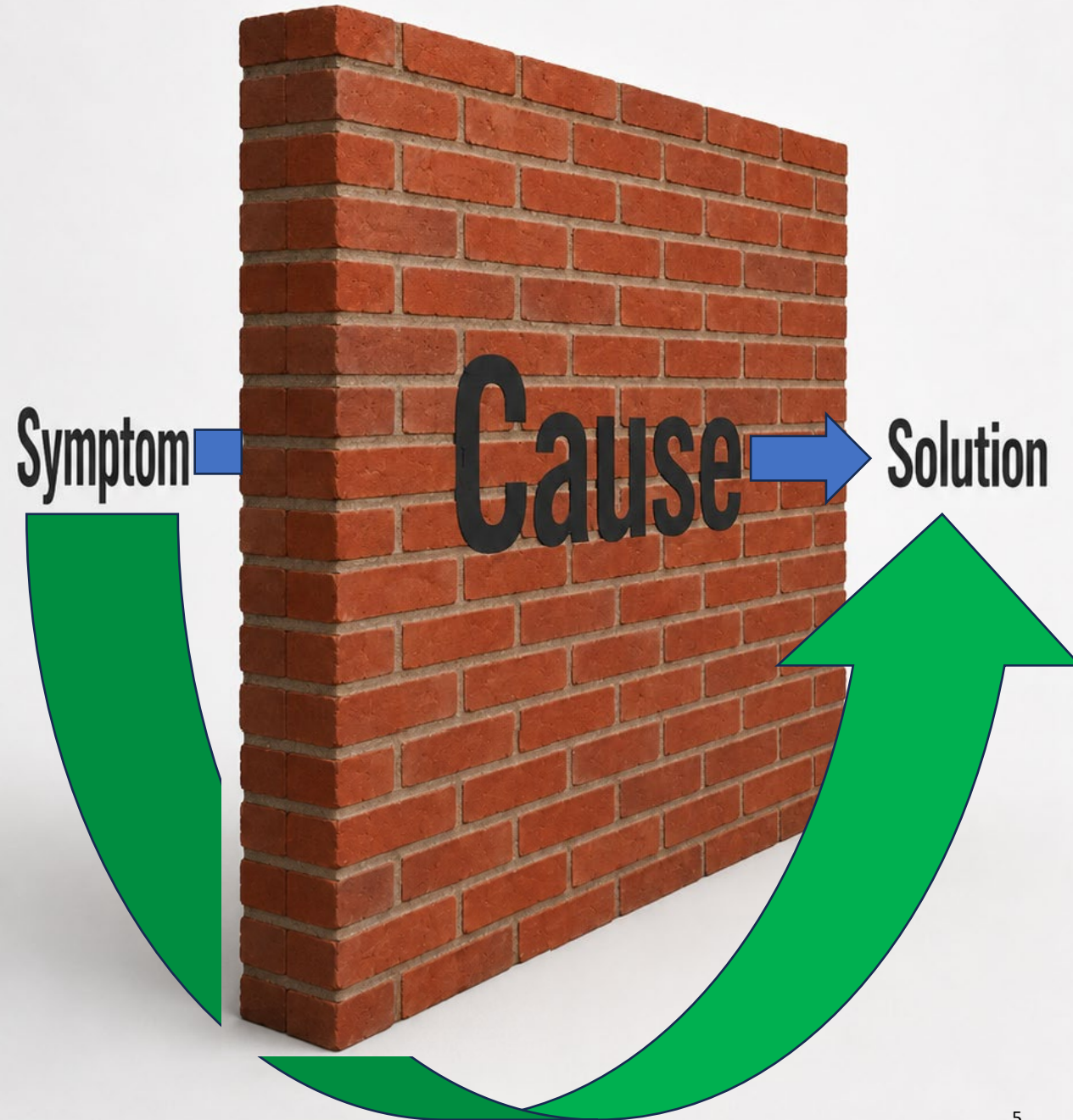


AI can support NCRs, RCA, & CA, but it can also produce answers that are incomplete, biased, or confidently wrong.

Rule of Thumb: Use AI to expand thinking, not to approve the answer.

Root Cause Analysis in Practice

Many organizations jump from symptom to solution, missing the opportunity to address the root cause.



Conventional RCA Has Its Own Blind Spots

Understanding common pitfalls in traditional Root Cause Analysis

Challenge	How It Manifests
Data	Evidence is incomplete, scattered, or not analyzed
Bias	Teams stop at the most obvious or convenient cause or symptom
Approach	The RCCA method is used mechanically instead of thoughtfully
Pressure	Teams feel pushed to close the issue quickly
Time constraints	Investigation is rushed
Stakeholder participation	The right people are not involved
Knowledge gaps	Teams may not know what questions to ask
Repeat findings	Prior history is not considered

The tools themselves are not the problem;
the issue often lies in “how” they are applied with weak or shallow RCA practices.



AI Support for Better Thinking

Where AI Can Help

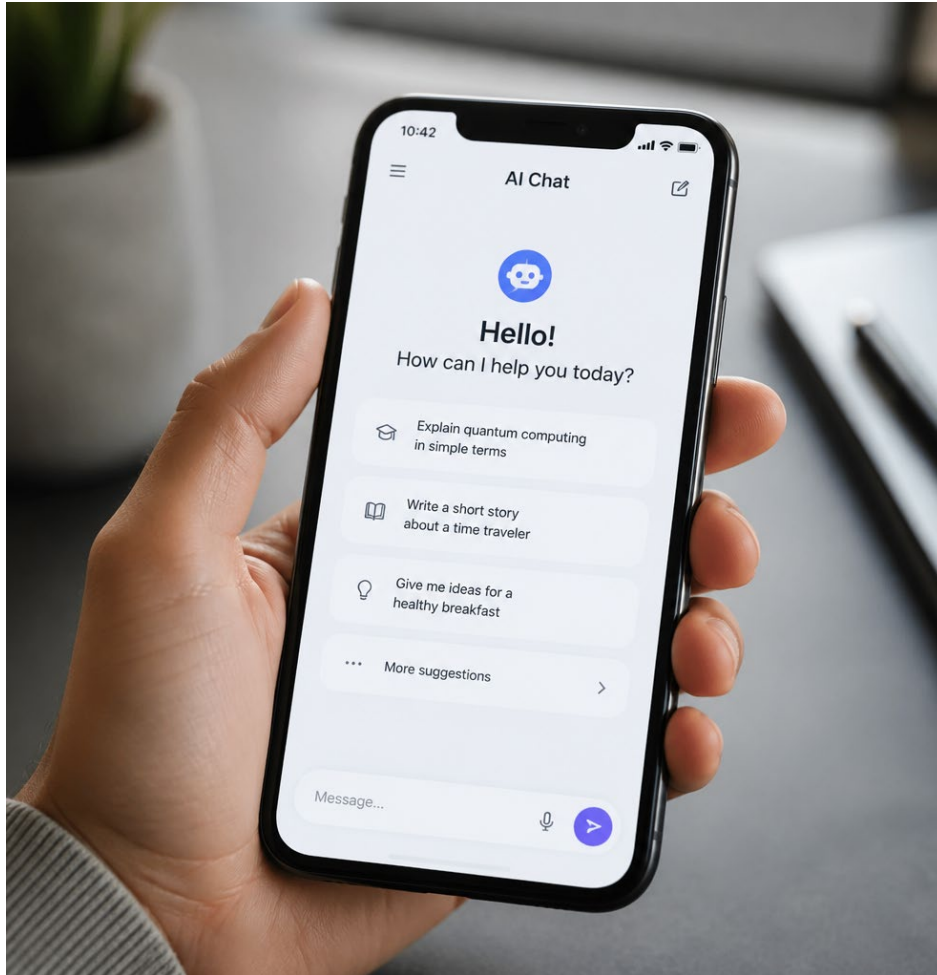
AI can support better thinking by helping teams:

- Clarify vague problem statements
- Identify missing objective evidence
- Suggest additional investigation questions
- Challenge “human error” conclusions
- Generate possible causes
- Build draft 3-Branch-5-Why or Five-Why paths
- Create fishbone categories and draft diagrams
- Review corrective actions for weakness
- Suggest effectiveness verification methods
- Summarize lessons learned

Important: AI does not determine the root cause. People with process knowledge and responsibility do.

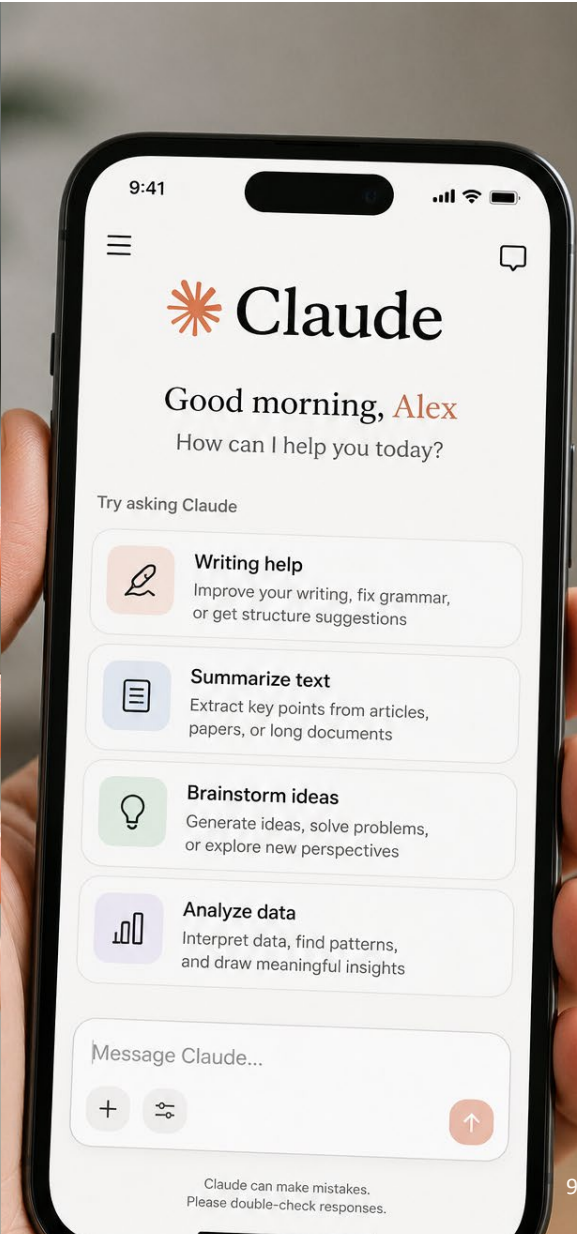
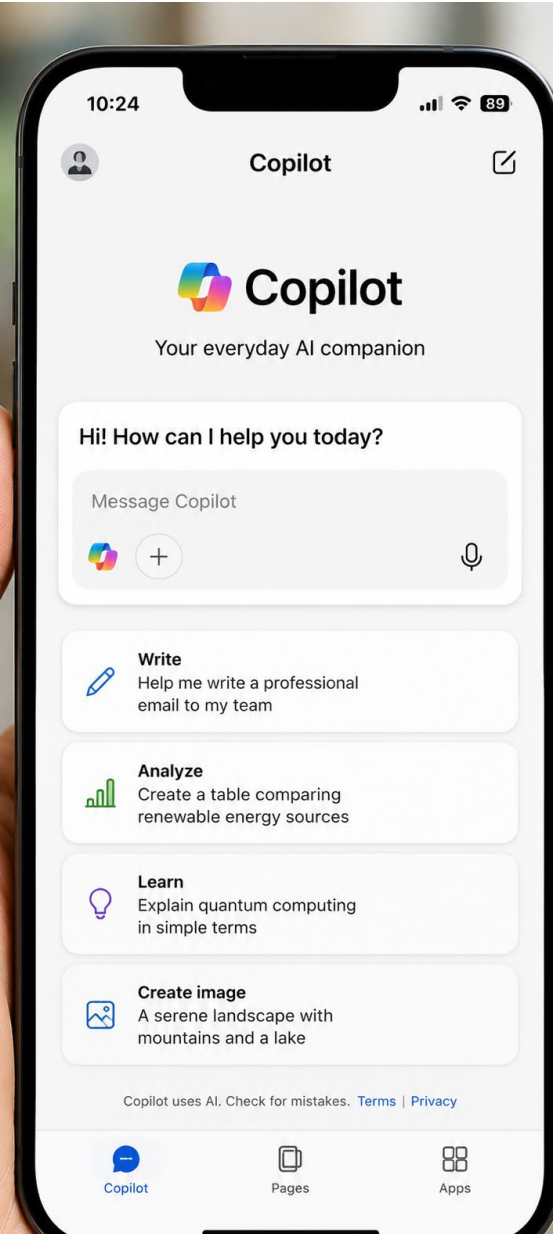
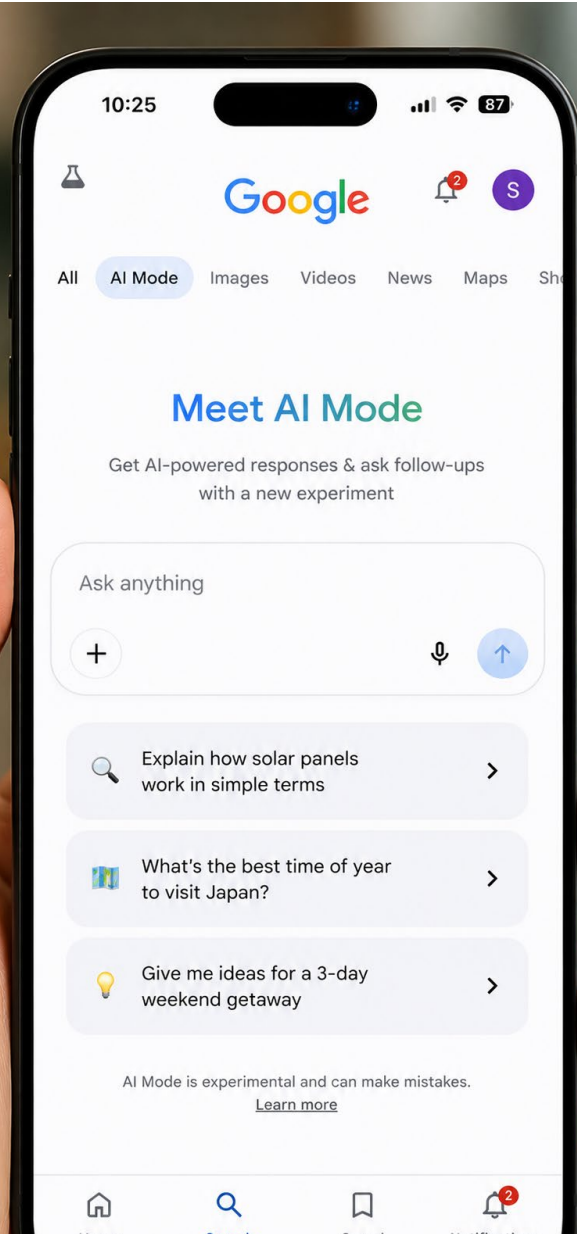
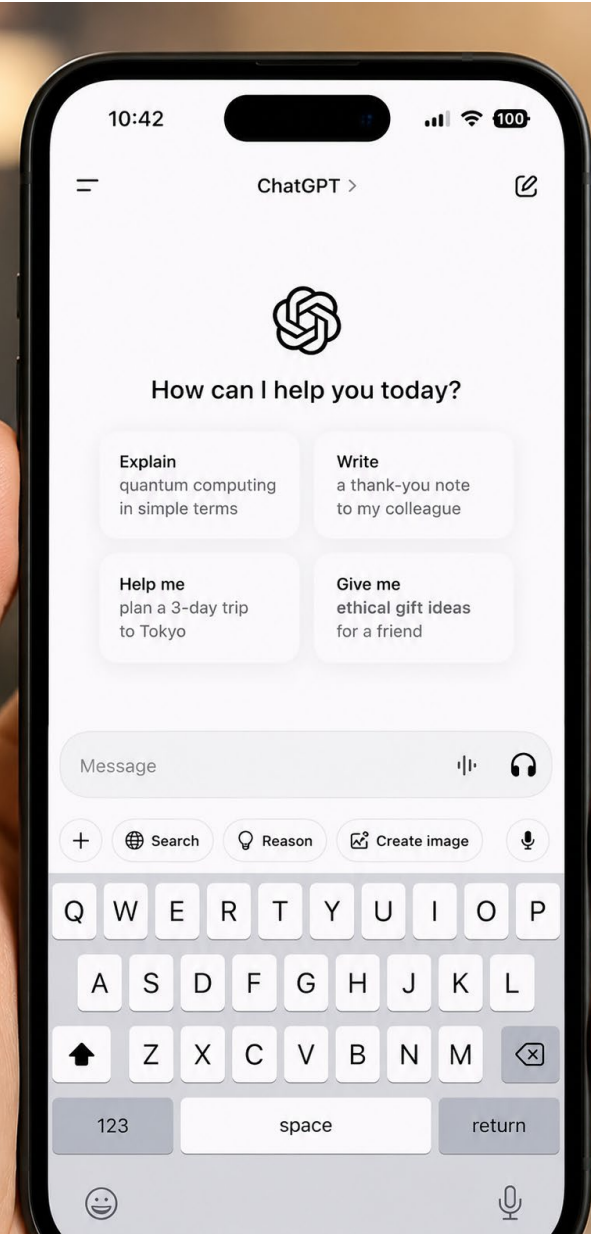
Using AI on Your Phone During This Workshop

Instructions & Guidelines



- **Focus on Prompts**
Craft effective prompts, not the specific AI tool.
- **Confidentiality CRITICAL**
DO NOT ENTER CONFIDENTIAL INFORMATION.
Utilize workshop examples or anonymized/sanitized data only.
- **Workshop Tools**
We'll showcase ChatGPT Mobile, Google AI Mode, Microsoft Copilot, and alternatives like Claude or Perplexity, highlighting key features such as prompt input, submit button, and conversation continuation.

Using AI on Your Phone During This Workshop



Hands-On Exercise 1: Improve the NCR

Leveraging AI to Clarify the Problem Statement Before RCA



- Objective

Utilize AI to refine a poorly written Nonconformance Report (NCR) statement or Finding. The goal is to have AI challenge the wording and expose what is missing before jumping into root cause.

- Weak NCR Example

“Operator did not follow the work instruction. Employee was retrained.”

- Group Task

Collaboratively improve the NCR problem statement by employing AI.

What questions should we ask AI to generate a better problem statement?

As we get AI answers, what are the next AI prompts?

Start adding a few bogus details that might apply. What, Where, When, Who, Why, How Discovered, How Many.

A weak problem statement often leads to weak root cause analysis. If the statement says, “operator did not follow the procedure,” the team may stop at human error or retraining. But a better statement may reveal deeper issues: unclear instructions, missing verification, poor process controls, inadequate training, workload pressure, outdated documents, or lack of supervision.

Hands-On Exercise 1: Improve the NCR

Weak NCR Example: “Operator did not follow the work instruction. Employee was retrained.”



- What information is missing?
 - Tell AI “Ask for clarifying questions before answering if any important facts are missing.”
- Review this problem statement as if you are a quality manager preparing for root cause analysis. Is it specific, objective, evidence-based, and clear enough to investigate? Identify what is missing.
- What factual information is missing from this finding that would be needed before starting root cause analysis?
 - Tell AI “Base your answer only on the facts provided. Clearly identify any assumptions.”
- What assumptions does this problem statement make that may not be supported by objective evidence?
- Rewrite this finding into a stronger NCR/problem statement using objective evidence only. Do not include root cause, blame, or corrective action.
 - Tell AI “Ask for clarifying questions before answering if any important facts are missing.”
- Based on this finding, what questions should a quality manager ask the process owner to understand the process failure without blaming the employee?

NCR Example Comparison

Improved NCR Example

Weak Version:

“Operator did not follow the work instruction.”

Your Results With Additional Bogus Information:

Why this is stronger:

A strong problem statement gives the team and AI a clear, factual starting point so the investigation stays focused on the real issue instead of assumptions or premature conclusions.

Scenario and Task

Hands-On Exercise 2: Better Root Cause Analysis

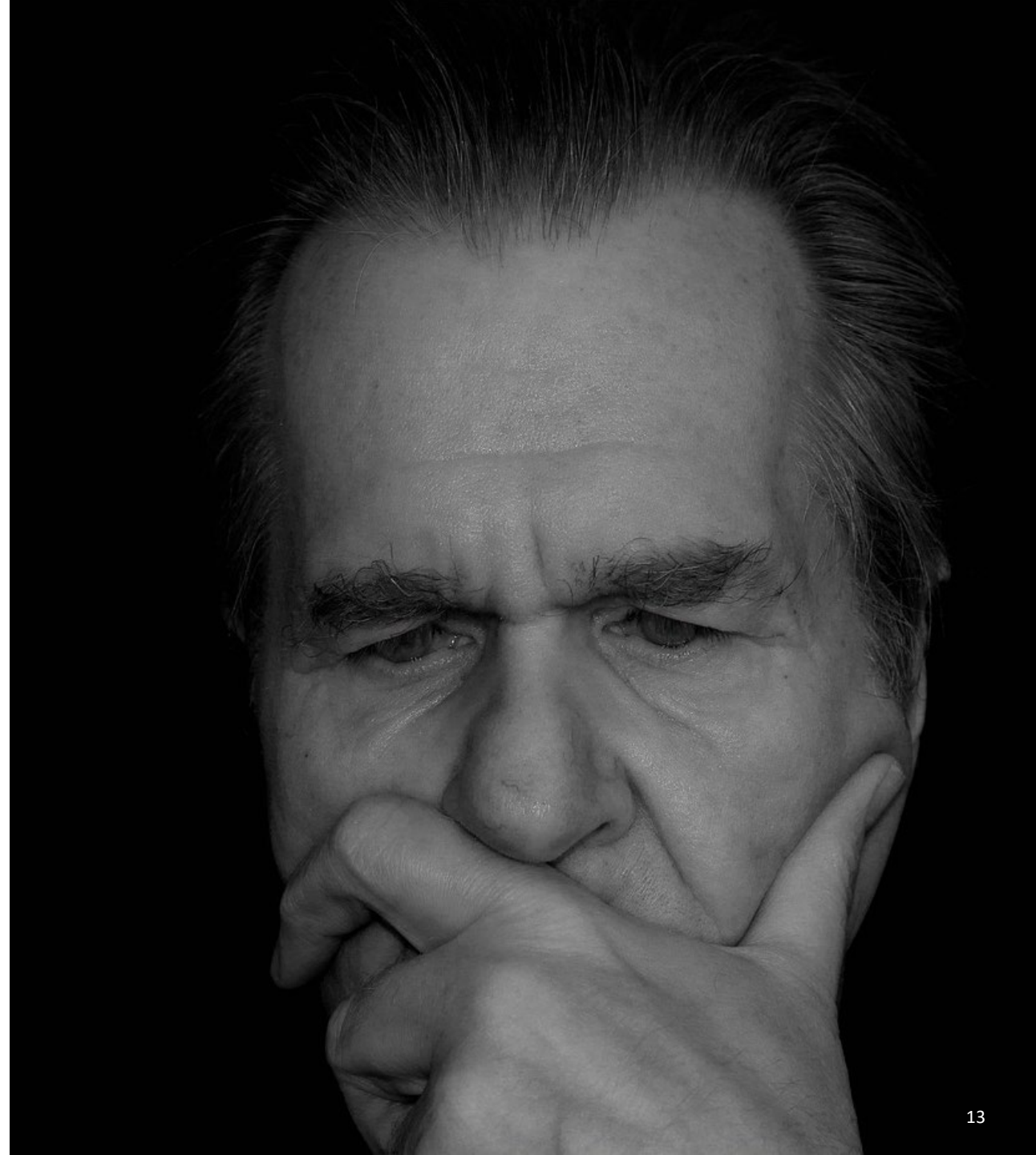
Scenario: Use your improved NCR problem statement, originally “An operator did not follow the work instruction.”

Superficial Root Cause: "Operator error."

Group Task:

Use AI to generate a wider list of potential root causes from the detailed problem statement containing enriched details.

Continue in the same AI prompt



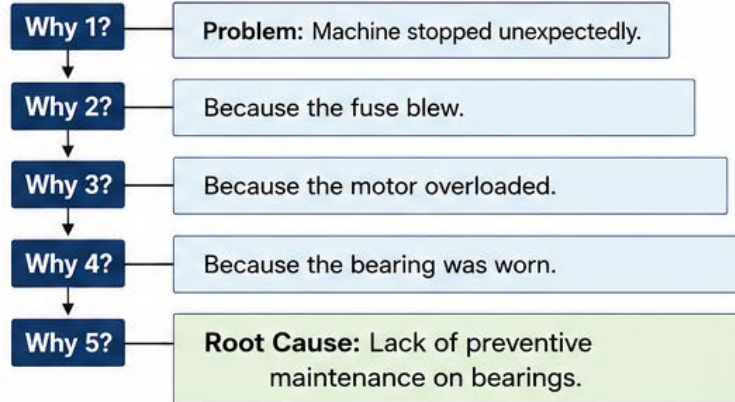
Common Root Cause Analysis (RCA) Tools

Which Tool(s) Did You Use?

Any Others?

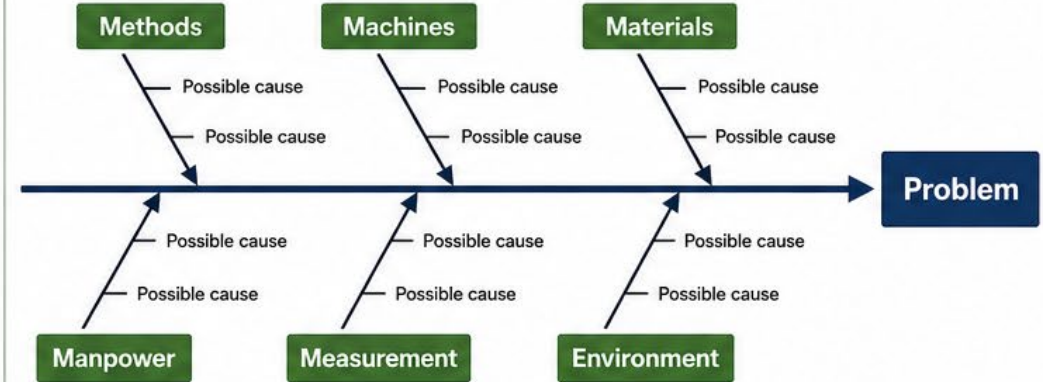
1. 5-WHY ANALYSIS

Dig down through a chain of "why" questions to get to the root cause.



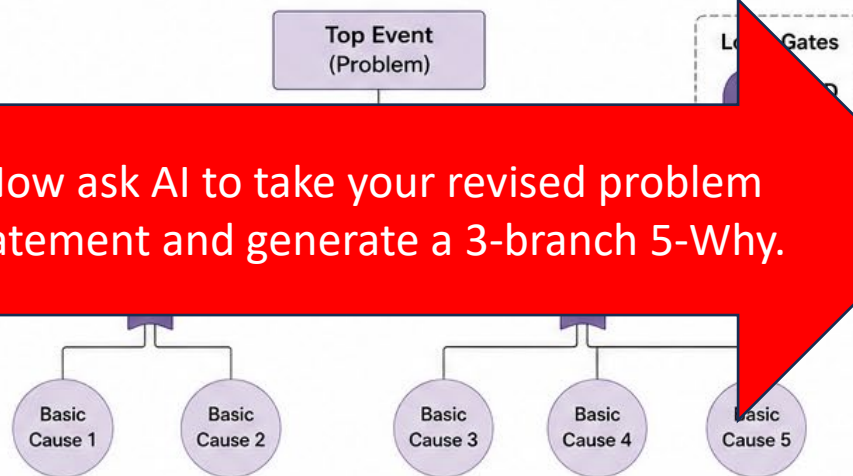
2. FISHBONE (ISHIKAWA) DIAGRAM

Identify and organize possible causes across major categories.



3. FAULT TREE ANALYSIS

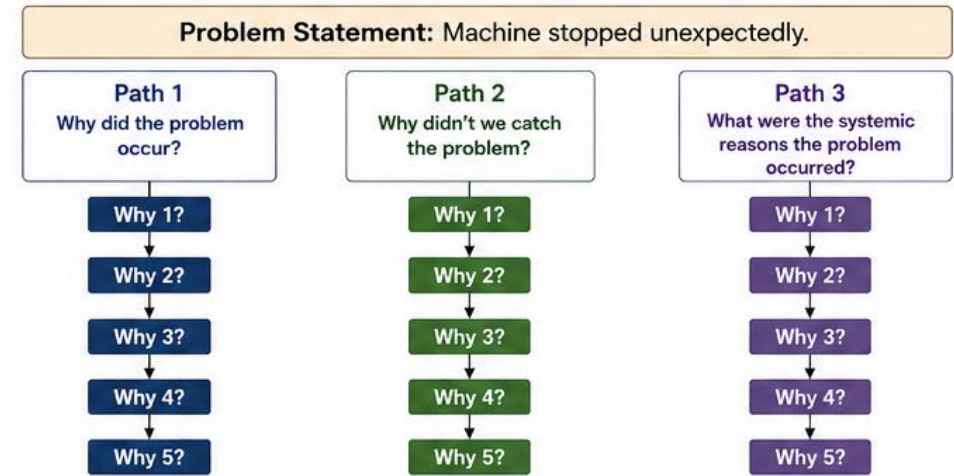
Use a top-down, logic-based diagram to identify how combinations of failures lead to the problem.



Now ask AI to take your revised problem statement and generate a 3-branch 5-Why.

4. 3x5 WHY ANALYSIS

Explore three perspectives by asking "why" five times down each path to uncover deeper root causes.



Why We Break RCCA Into Smaller AI Tasks

Lost-in-the-Middle + Terminological Ambiguity

AI's Lost-in-the-Middle Problem

When prompts become too large, AI may overlook or underweight important information buried in the middle.

Why It Happens

AI tends to focus more heavily on:

- the beginning of the prompt
- and the ending of the prompt

while important details buried in the middle may receive less attention.

Common RCCA Risks

- Missed customer requirements
- Ignored process details
- Weak connection to evidence
- Generic corrective actions
- Shallow root cause analysis

Terminological Ambiguity

AI may blur or confuse key RCCA terms when too many concepts are combined into one prompt.

AI may incorrectly confuse terms

- Symptom
- Problem Statement
- Containment
- Correction
- Apparent Cause
- Root Cause
- Corrective Action
- Preventive Action
- Effectiveness Verification

Have you noticed this in your results from the first two exercises?

AI struggles when RCCA information is too large, too complex, or contains multiple problem-solving concepts mixed together. Smaller, focused RCCA prompts produce clearer, deeper, and more reliable AI outputs.

Hands-On Exercise 3: Correction vs. Corrective Action

Understanding the distinction between addressing an immediate issue and preventing future occurrences.



Group Task: After human review of AI's multiple potential root causes, select those we believe are relevant and have AI help with possible Corrections and Corrective Actions.

- **Correction**

Action taken to fix the immediate problem or affected product.

Examples: Replace an obsolete work instruction with the current revision, replace defective part, rework product, update missing record, scrap NC material, correct data entry mistake.

- **Corrective Action**

Action taken to eliminate the cause and prevent recurrence.

Examples: Revise process controls, improve workflow sequencing, add poka-yoke/error proofing, improve supplier controls, clarify work instructions, address workload or training system gaps.

A correction fixes today's problem. A corrective action prevents tomorrow's recurrence.

Hands-On Exercise 4: Effectiveness Verification

Moving beyond 'Action Completed' to ensure true effectiveness.



Weak Verification Examples

These confirm implementation, not effectiveness.

Examples include: Procedure updated, Training completed, Form revised, Employees reminded.



Stronger Verification Questions

Questions focused on verified outcomes and ongoing compliance.

Examples include: Did the action prevent recurrence?

Is the revised process being followed?

Are affected areas using current documents?

Has the same issue occurred again?

Do audit results show improvement?

Are process owners maintaining the control?

Group Task: Ask AI to “Act as an internal auditor to create a corrective action effectiveness verification plan based on a root cause and corrective action plan, detailing sampling, interviews, records review, evidence collection, and effectiveness indicators.”

AI can help us focus on questions that confirm effectiveness and ongoing impact, not just task completion.

Strengthening AI Prompts for Better Results

Obtain better AI-generated outputs by adding these statements, as appropriate.

- **Hallucinations:** “Base your answer only on the facts provided. Do not invent facts, requirements, evidence, causes, or conclusions. Clearly identify anything that is an assumption or requires verification.”
- **False Confidence:** “Do not present conclusions as certain unless they are supported by evidence. Rate the level of your answer and explain what evidence is missing.”
- **Contextual Blindness – Missing Content:** “Before answering, identify what context may be missing, such as customer requirements, regulatory requirements, contract flowdowns, industry standards, product risk, process conditions, or internal procedures.”
- **Generic Solutions - Overgeneralization:** “Avoid generic recommendations such as retraining, reminders, procedure updates, or added inspection unless they are directly supported by the facts. Tailor the answer to the specific process, product, risk, and evidence provided.”
- **Bias:** “Challenge the wording of my prompt. Identify any leading assumptions, unsupported conclusions, or bias that may influence the answer. Provide alternative explanations before recommending a conclusion.”
 - **Confirmation bias:** “Do not simply validate my proposed conclusion. Challenge it and identify what evidence would support or disprove it. Provide other possible causes I may be overlooking.”
 - **Automation bias:** “Provide this as a draft for human review, not a final answer. List the checks a human should perform before accepting the response.”
- **Terminological Ambiguity:** “Clearly separate the symptom, problem statement, correction, apparent cause, root cause, corrective action, and effectiveness verification. Do not use these terms interchangeably.”
- **Lost-In-The-Middle:** “Identify any important information, contextual factors, requirements, or evidence that may have been overlooked or underweighted. Identify and summarize the most critical facts, requirements, evidence, and risks before answering.”



“Use facts. Identify assumptions. Challenge conclusions. Avoid generic fixes. Separate problem-solving terms. Require human verification.”

What is a “Closed AI Environment”?

Your AI stays inside your company’s walls instead of sending information out to the public internet



Instead of typing sensitive company information into a public AI website, the AI runs privately on your own computer or company server. That means:

- The AI can run without sending information to the internet
- Your data stays under your control
- Files stay local - not shared publicly
- Access can be restricted to approved employees
- The company decides what information the AI can see

It’s an AI system inside your company (“local/private AI”).

A closed AI environment helps reduce the risk of accidentally exposing sensitive information to external systems.

Personal local AI tools: LM Studio or GPT4II

It’s like having a private conference room instead of discussing company problems in a crowded coffee shop.

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 - Develop corrective actions that address root causes instead of symptoms and apparent causes, which prevents recurrence
- Evaluate whether **corrective actions are effective** and verifiable
- Identify AI shortcomings and learn proper prompts to minimize risk
- Apply AI responsibly while maintaining human judgment, validation, and accountability
- Taking AI local – closed AI environments



Practical AI For Quality

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