

Critical Thinking - Tools for Bias Recognition and Mitigation

Sofema Aviation Considers Techniques for Reducing Mental Mistakes & Creating Virtual Speed Bumps

Introduction

The biggest problem with human safety training is the gap between knowing you have a mental blind spot and stopping a mistake as it happens.

- Traditional training is good at teaching people how to spot mistakes *after* they happen. For example, workers can easily point out mental traps while sitting in a classroom or reviewing an old accident.
- However, this classroom knowledge does not help much when workers get overwhelmed, run out of time, and develop "tunnel vision" on the job.

To truly lower risk, companies must stop relying on workers simply "being careful." Instead, they need to build mandatory check-ins and pauses directly into the work process.

Why Knowing Better Isn't Enough

Workers fail to use their safety training in real-time because of the way the brain works under stress:

- The "I Know Better" Trap: Thinking you understand a mental mistake (like sticking to a bad plan for too long) makes you feel overly safe. Workers mistakenly believe that because they know about the problem, they will notice themselves doing it.
- Running on Autopilot: Deep, careful thinking takes a lot of energy. When workers are tired, rushed, or overwhelmed, their brains take shortcuts to save energy. Abstract safety rules are the first things forgotten when the brain gets overloaded.
- The Social Cost of Speaking Up: Stopping a fast-moving team requires a worker to challenge bosses or fit in with peers. If a worker does not have an official, mandatory reason to stop the line, the fear of awkward social tension usually beats out a vague worry about safety.

How Hidden Problems and Real-Time Mistakes Line Up

In complex workplaces, hidden problems, like rushed schedules or poor instructions, sit quietly in the background. They only cause trouble when they line up with a bad human decision.

If a company does not build mandatory pauses into the workday, a dangerous chain reaction happens:

- **Hidden Problems Exist:** The company has rushed schedules, poor instructions, or tight deadlines.
- **The Mental Gap Occurs:** Workers know the risks, but there is no forced pause to stop their momentum.

- **A Real-Time Mistake Happens:** This leads to bad choices, flawed execution, or tasks being signed off too early.

The Danger Loop: Finishing a Plan at All Costs

Constant pressure to finish a job on time makes people stick to a plan even when things go wrong. When a technical glitch happens, teams often skip safety rules just to keep moving. This happens because the system does not have a forced checkpoint to break their focus and make them stop.

Stopping Mistakes Before They Happen

To stop mistakes, we cannot just rely on people being careful or staying calm under pressure. Instead, we need to build strict rules directly into the workspace that stop everything automatically when things go wrong.

- **Clear, Simple Rules to Trigger a Stop:** Do not let people guess how risky a situation is. Instead, set clear, unchangeable rules. For example, a team must stop and get help if:
 - They try to fix a technical problem three times and it still fails.
 - They are running out of time and are within 30 minutes of handing over their shift to the next crew.
- **Built-in Speed Bumps (Cognitive Forcing Functions):** These are steps built directly into the job that force you to stop and think. You cannot skip them without making a deliberate, conscious choice.
- **Using Standard Code Words:** When teams use pre-set, professional phrases to call out danger, it removes personal emotion. It makes speaking up feel like a standard safety step rather than a personal argument.

Why Standard Checklists Often Fail

When paperwork is too generic, it creates a big problem: people start checking boxes automatically without actually paying attention. This mechanical routine makes people less alert and more likely to push ahead with a bad plan.

- Instead of generic paperwork, companies should use short, targeted checkpoints that are specific to each person's job role and are required before moving ahead with high-risk tasks.

The Operational Toolkit: Better Tools and Better Phrasing

Many companies fall into a checklist trap: adding more paperwork just causes people to mindlessly check boxes without actually paying attention.

- When people do this on autopilot, safety checklists become completely useless against mental blind spots.
- Instead of adding more paperwork, high-stress teams use smart, brief pauses that force people to stop and think clearly.

Premortem Analysis

- **Operational Mechanics:** Prior to executing a final release, the team operates under the explicit assumption of failure: "It is tomorrow morning, and this component has failed catastrophically. What technical oversight caused this?"
- **Targeted Cognitive Bias:** Overconfidence & Optimism Bias

The Independence Rule

- **How it works:** The person reviewing the work must have absolutely nothing to gain from the project's timeline or schedule. They should feel zero pressure to rush it out the door.
- **What it fights:** The urge to push forward just because you have already spent a lot of time and money on it.

Verbal Triggers for Different Situations

Using generic "what's wrong?" phrases typically does not work during final sign-offs.

- At this stage, people aren't usually making simple technical mistakes, they are just rushing to finish.
- You need to use specific phrases depending on the exact mental roadblock the team is facing.

When Stuck Trying to Fix a Problem (The Diagnostic Phase)

- **What to say:** "We have been trying to fix this same specific cause for 45 minutes. If this exact problem were actually being caused by something completely different, what would it be?"
- **The Goal:** To break **Anchoring Bias** (when the mind gets stubbornly stuck on its first guess).

When Rushing to Approve a Release (The Sign-Off Phase)

- **What to say:** "*If we were inspecting this equipment during a regular, low-stress checkup three weeks from now, would we pass it without making changes?*"
- **The Goal:** To fight **Production Pressure and Plan-Continuation Bias** (the urge to ignore risks just to stay on schedule).

How Managers Can Implement This

To make sure teams actually use these tools instead of just checking a box, focus on the real-world friction they will face:

- **Handle the Awkwardness:** Stopping a project feels uncomfortable.
 - Teams need to be trained on how to hear these challenge phrases without taking them personally.
 - An operational pause is a tool to protect the system, not an attack on anyone's work.

- **Make Short Pauses Mandatory:** Enforce a strict 60-second timeout whenever a team hits a major decision point.
 - This brief, physical pause breaks "tunnel vision" and forces the brain to stop acting on autopilot and start thinking critically.

Bridging the Gap: Why Knowing About Bias Isn't Enough to Stop a Crisis

The hardest part of safety training isn't teaching people that these mental traps exist, it is giving teams the actual tools and habits needed to pause and catch themselves before making a critical mistake.

Why "Knowing" Fails Under Pressure

When high-stress hits, our brains switch to autopilot. While calm thinking is slow and analytical, stress forces us to rely on fast, subconscious mental shortcuts.

Three main things make it incredibly hard to use what we know when a crisis hits:

- **The "Not Me" Illusion:** Because we understand how a mental trap works in theory, we mistakenly think we will notice it happening to us in real life. We won't.
- **Brain Overload:** When you are stressed, tired, or juggling too many tasks, your brain starts to shut down its deep thinking mode. To save energy, abstract safety rules are usually the first things your brain throws out the window.

The Awkwardness of Speaking Up: Stopping a fast-moving team means dealing with peer pressure and speaking up to bosses. The social discomfort of causing a delay feels real and immediate, while the actual safety risk can feel distant and abstract.