LOCK-OUT /
TAG-OUT

BE SAFE TARANAKI

BE ALIGNED TARANAKI

PURPOSE

To protect workers from hazardous energy (electrical, mechanical, hydraulic, pneumatic, etc.) while working in and around machinery or servicing or maintaining equipment.

Machine lockouts are a safety procedure used to ensure that machines are completely shut down, isolated and cannot be started up again before maintenance or repair work is completed and ALL personnel and equipment are removed from the danger-zone. This process is commonly referred to as Lockout/Tagout.

WHY IT MATTERS

▸ Is critical to the safe management and operation of machinery in any industrial or commercial environment.

▸ Prevents accidental **start-up** of machinery.

▸ Helps avoid **serious injury or fatality** due to moving parts, electric shock, or stored energy release.

▸ Is a **legal requirement** under WorkSafe NZ workplace safety regulations

Worksafe NZ Regulations ❯

KEY POINTS OF MACHINE LOCKOUTS

How it works:

▸ The machine is **turned off.**

▸ A **lock** (usually a padlock or a Lock Clasp (for multiple locks) with a Padlock attached) is placed on the machine's power source (e.g., breaker, valve) to physically prevent it from being turned on.

▸ A **tag** is attached with details of the person performing the lockout, date, and reason, warning others not to operate the machine.

▸ The person installing the Lock-out **retains the key** for the duration of the work-scope.

▸ **Only the person who applied the Lock-out can remove it** once the work is done and the machine is safe to use.

SO WHY IS IT THAT SO OFTEN 'LOCK OUT SYSTEMS' **FAIL** AND PEOPLE GET SERIOUSLY INJURED, OR WORSE, THERE IS A FATALITY?

Not following procedures can never be attributed to a single factor

Complacency often ranks high among the causes — becoming so familiar with the machinery and work environment that the risks are overlooked.

Other contributing factors include:

▸ Ineffective or inefficient SOP's

▸ Tight deadlines

▸ Production quotas

▸ Rushing tasks

▸ Frustration from constant breakdowns

▸ Bypassing safety precautions to save time
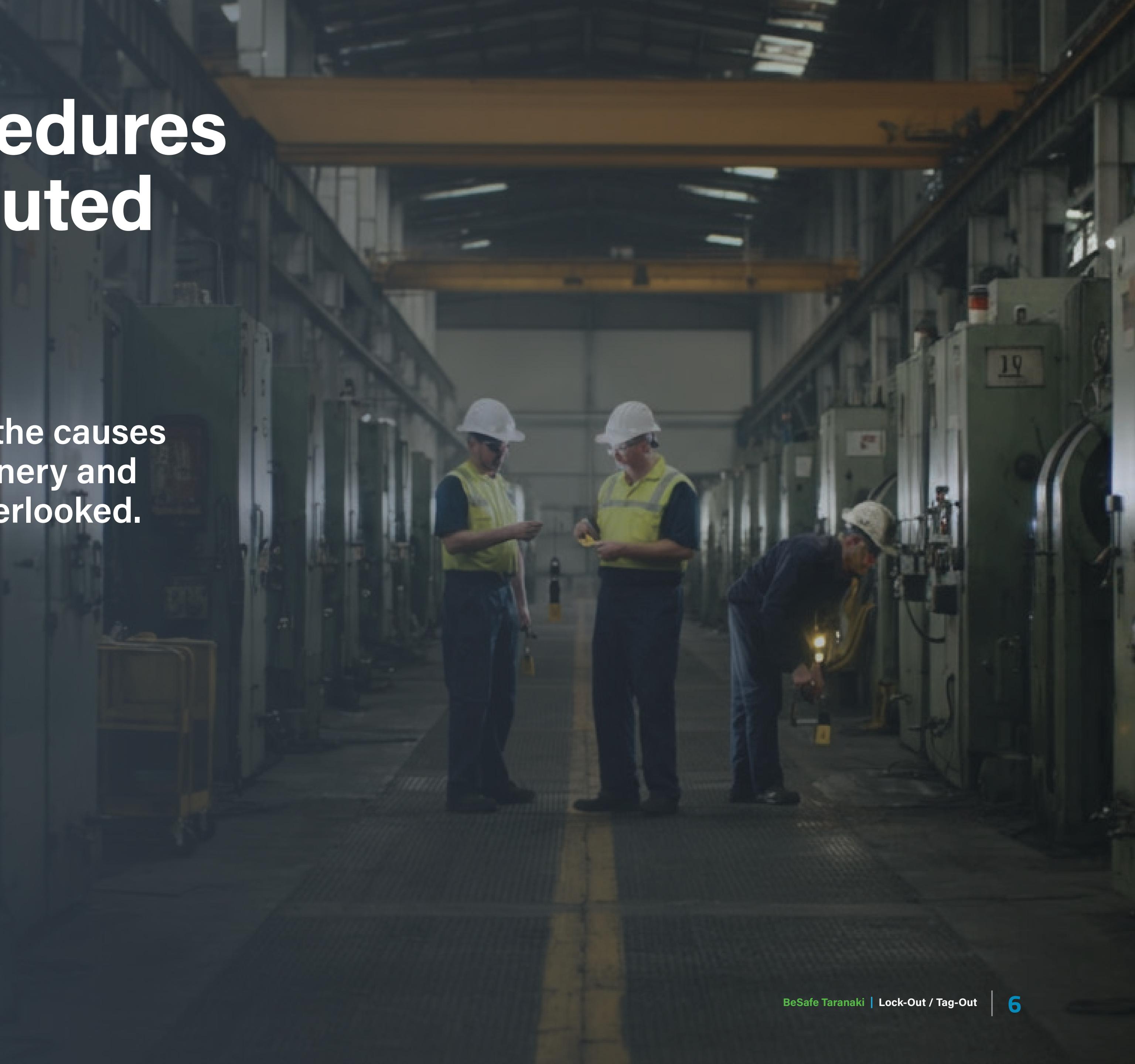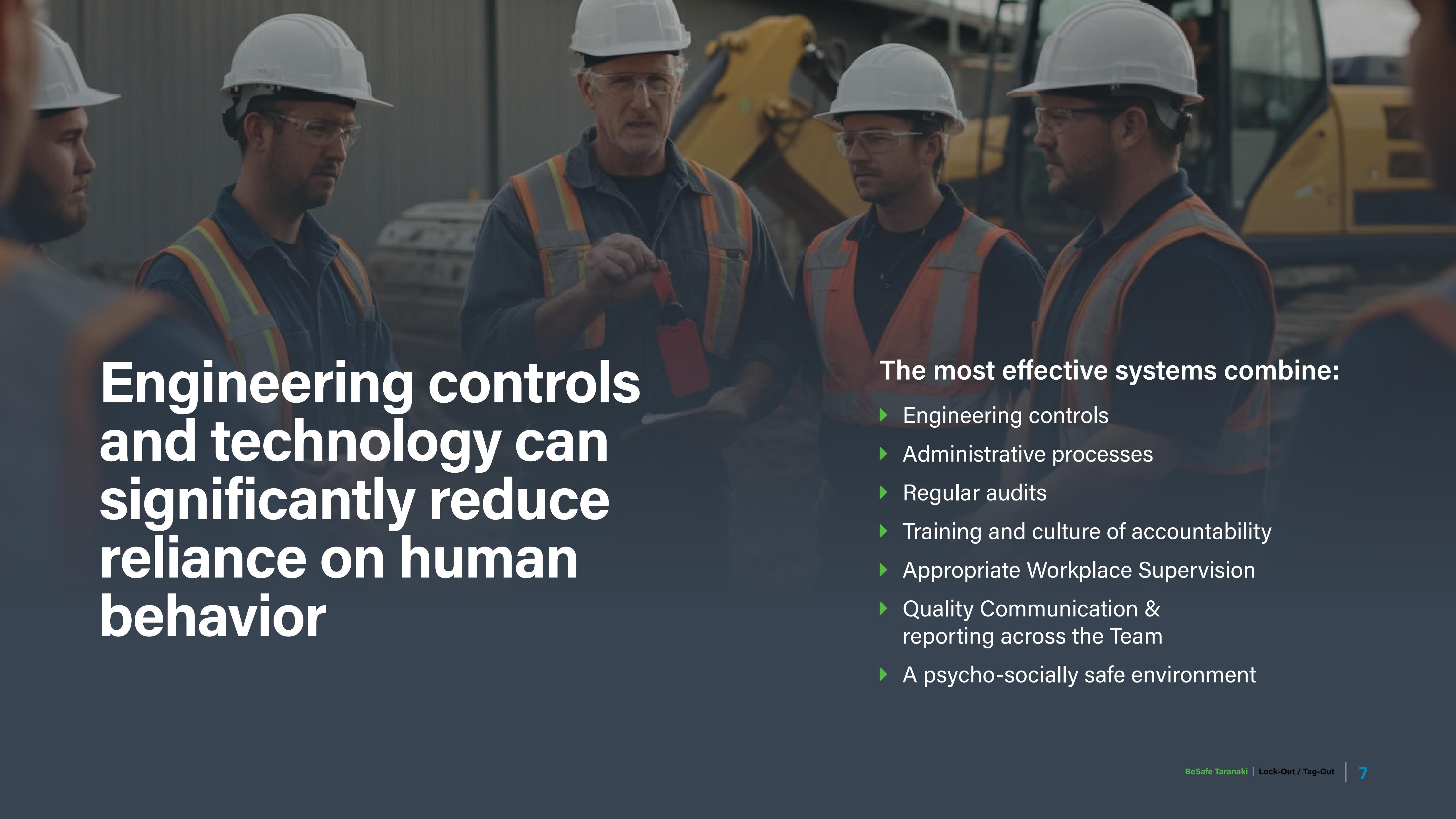
Engineering controls and technology can significantly reduce reliance on human behavior

The most effective systems combine:

- Engineering controls
- Administrative processes
- Regular audits
- Training and culture of accountability
- Appropriate Workplace Supervision
- Quality Communication & reporting across the Team
- A psycho-socially safe environment

Interlock Systems (Engineering Controls)

What it is: Machines are designed so they cannot operate unless certain physical or safety conditions are met.

Examples:

▸ Doors (accessways) that must be closed and secured before machinery starts.

▸ Safety interlocks that prohibit associated machine operation when guards are removed.

Limitation: Can still be bypassed or disabled if not designed well or if poorly maintained.

Automated Lockout Systems

Workers swipe a card or enter a code; system logs the action and applies electronic locks.

- System won't release power until all conditions are safely met and logged.

- Can be programmed to dump stored energy from various components of the machine before entry is permitted

- Use programmable logic controllers (PLCs) or IoT systems to automate the lockout.

Limitation - All of which relies on robust component functionality. When any component is damaged or fails the system becomes untrustworthy unless "Fail To Safe" is inbuilt.
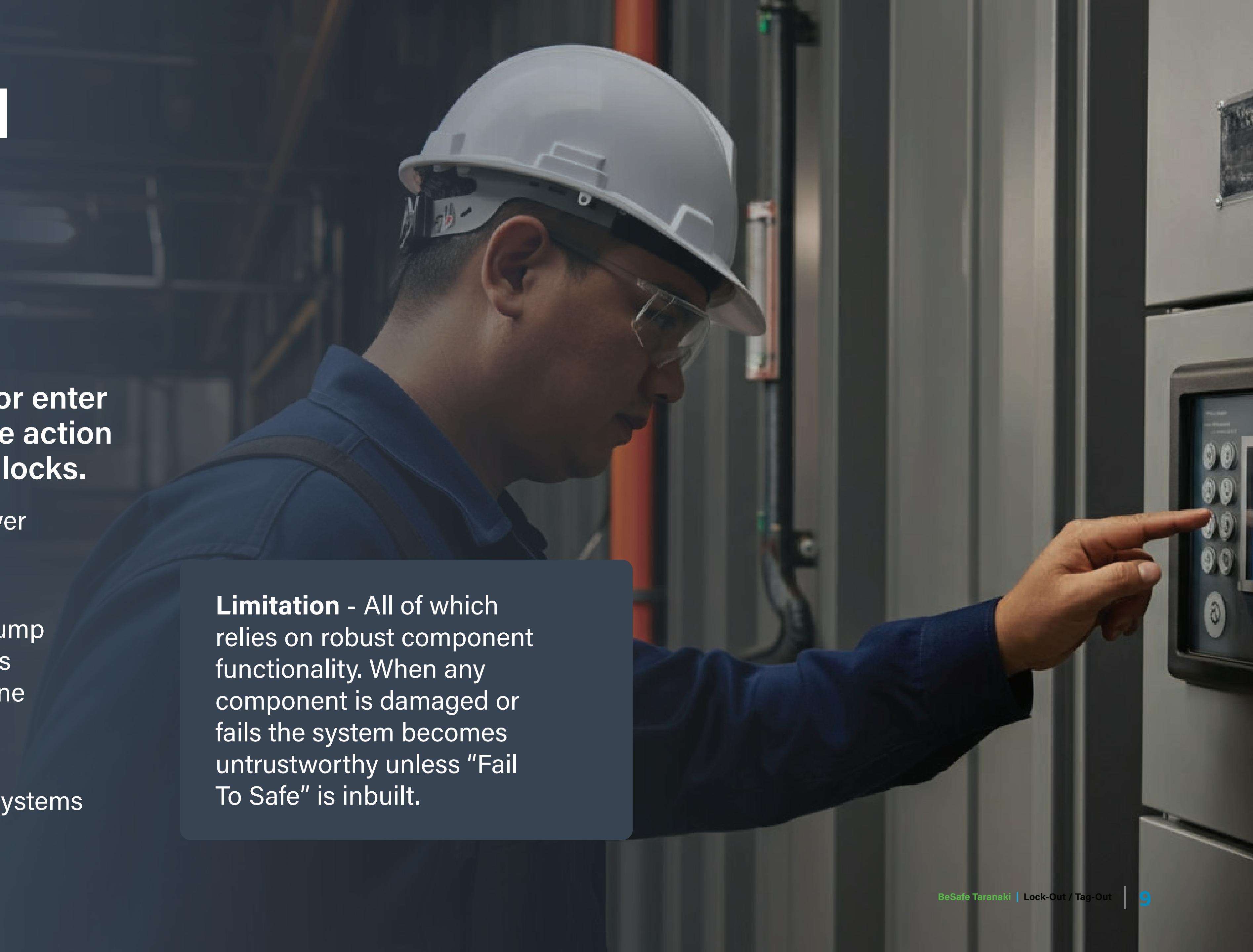
Group lock boxes with digital access logs

Keys to the equipment are locked in a box.

▶ Each worker attaches their personal lock to the box, so power can't be restored until all locks are removed.

▶ Modern versions track this digitally with access logs and real-time alerts.

Visual & audible confirmation systems

▸ Equipment has visual (e.g. flashing lights) and audible indicators when in lockout mode.

▸ These can reduce mistakes by giving **clear status feedback**

# Human-Machine Interface (HMI) integration

▸ Maintenance panels require confirmation (via touchscreen or mobile device) that a lockout is active.

▸ May include **checklists or risk acknowledgments** before proceeding.
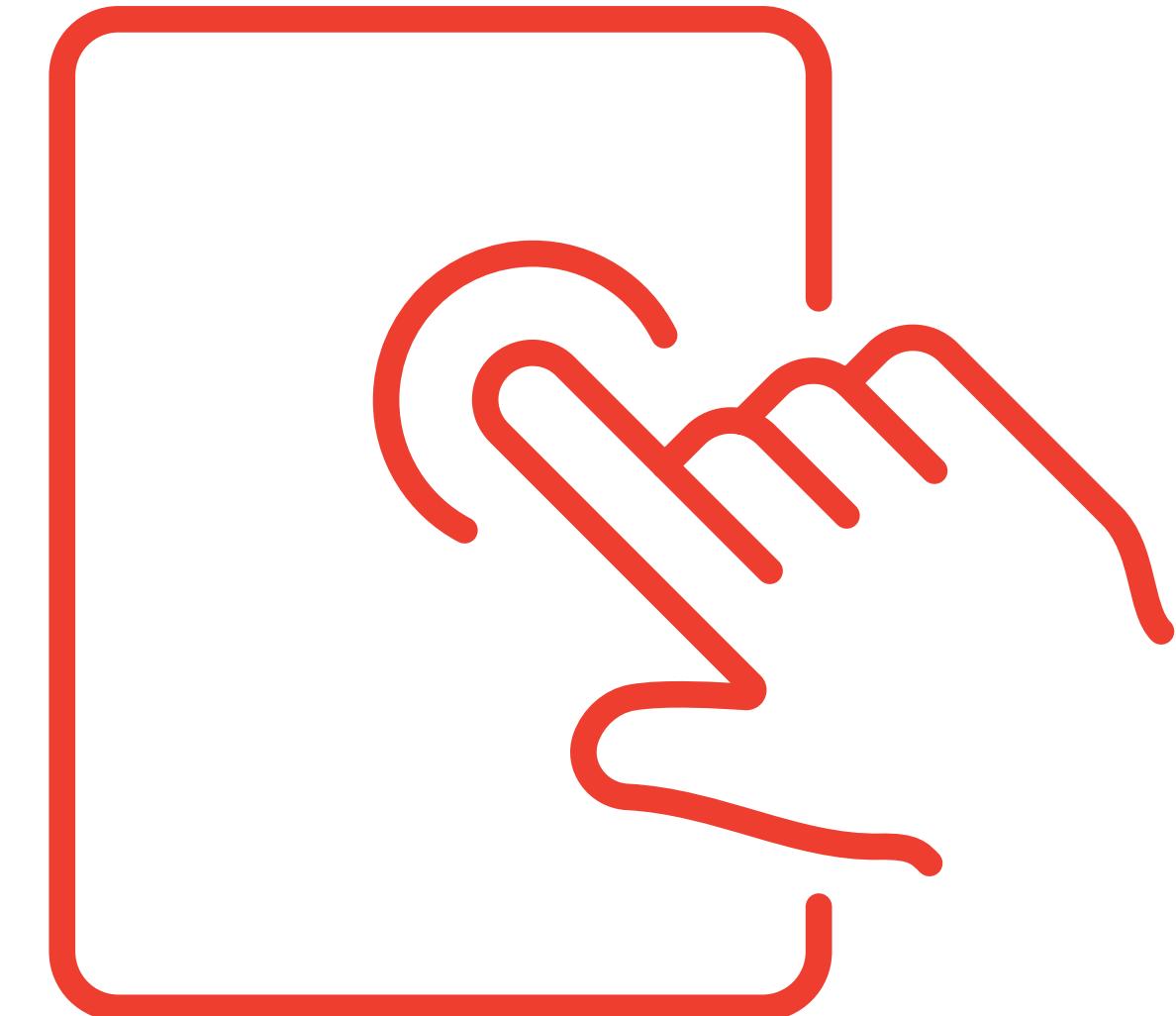
Visual monitoring

Visual monitoring, such as installed cameras, can help ensure machinery is not inadvertently started as people can identify activity around the machines, especially important when required lockout procedures have not been followed.
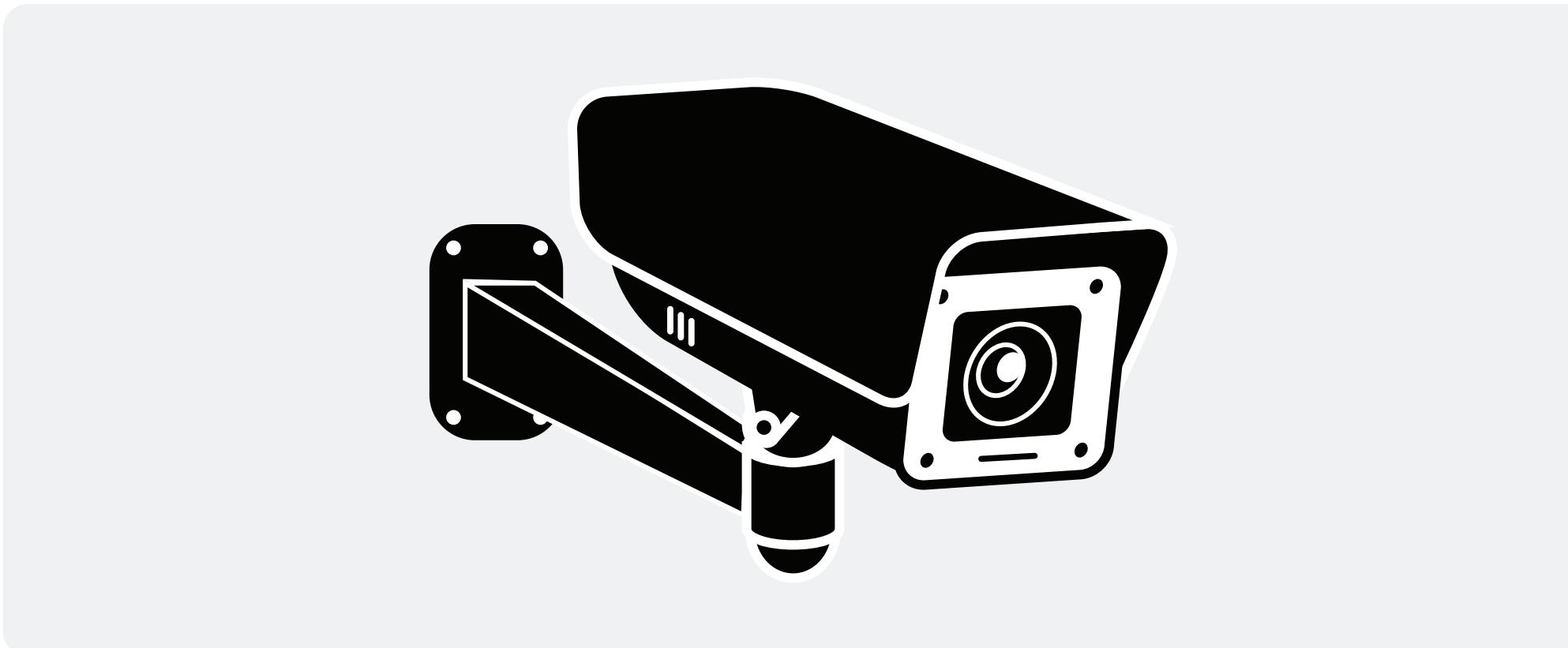
Limitation - Only valid if someone is monitoring the cameras. Evidence suggests that once the 'novelty' has worn off, cameras become invisible only until AFTER an event has occurred.

Machine guarding

Machine Guarding is still the most effective form of risk mitigation and should be implemented wherever possible.


Limitation - All form of Machine Guarding are only valid when machinery is operating. Lock-out / Tag-out is intended to safeguard those who are working in and around machinery that is not intended to be operating.

Video processing

Video processing, especially when powered by AI and computer vision, can play a key role in identifying whether someone is in danger. By analyzing live or recorded footage, systems can detect hazardous situations such as:

▸ **Unsafe zones:** Recognising if a person has entered restricted or high-risk areas (e.g., near heavy machinery, rail tracks, or construction hazards).

▸ **Behavior detection:** Spotting unusual movements like a fall, sudden collapse, or erratic motion that may signal distress.

▸ **Object proximity:** Identifying when a person is too close to dangerous equipment, vehicles, or other moving hazards.

▸ **PPE compliance:** Determining if workers are missing essential protective gear (hard hats, high-visibility vests, harnesses) in risky environments.

▸ **Crowd and aggression detection:** Monitoring for rising tensions, fights, or overcrowding that could escalate to harm.

Combined with alerts, this allows organizations to respond quickly—sometimes even before an incident occurs.
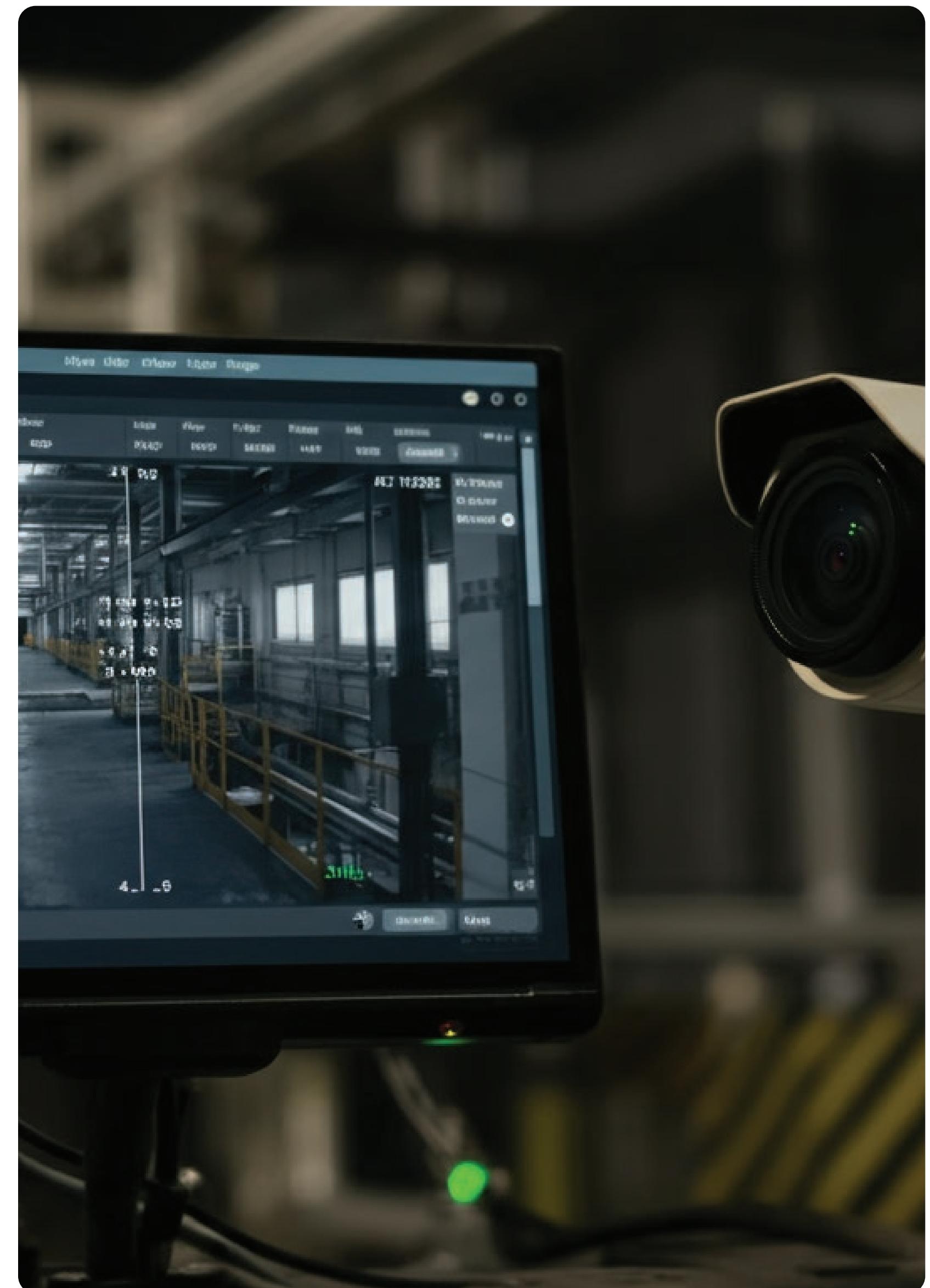
HOW YOUR COMPANY HEALTH & SAFETY CULTURE CAN HELP...

Clear expectations and accountability

- Everyone understands their role in safety.
- Procedures and responsibilities are well defined.
- People are held accountable for following safety protocols.

Visible and consistent leadership

- Leaders consistently model safe behavior and act with integrity.
- They treat safety as a priority, not an afterthought.
- Safety conversations are regular and authentic—not just "tick-box" exercises.

How your Company Health & Safety Culture can help...

Open Communication and Psychological Safety

▸ Workers feel safe speaking up about hazards, near misses, or mistakes.

▸ Reporting is encouraged and not punished.

▸ Frontline feedback is actively sought and valued.

Learning Culture, Not Blame Culture

▸ Mistakes and incidents are treated as opportunities to learn.

▸ Investigations focus on "what went wrong" not "who's at fault".

▸ Systemic issues are prioritised and addressed, not just individual behaviors.

How your Company Health & Safety Culture can help…

Regular training and refreshers

▸ Workers are regularly trained and refreshed on procedures and hazard awareness.

▸ Refresher training helps address complacency and "auto-pilot" thinking.

▸ Practical, scenario-based training connects policy to real work.

Simplicity and clarity of procedures

▸ Safety procedures are easy to understand and follow.

▸ Complexity is reduced to lower the chance of errors under pressure.

How your Company Health & Safety Culture can help…

Engaged workforce

▶ Workers are involved in identifying risks and solutions and formulating SOP's.

▶ When workers help build and modify procedures, they are more likely to follow them.

Strong focus on risk awareness

▶ Daily conversations and briefings build awareness of potential hazards.

▶ Job Safety Analyses (JSAs) or pre-start checks become meaningful, not routine.

▶ Limitation - Evidence suggests that Machinery Operation JSA's and Pre-Start Checks quickly turn into a pre-written form that rapidly devolves into a tick-box form. This initiative requires some innovation to be routinely successful.
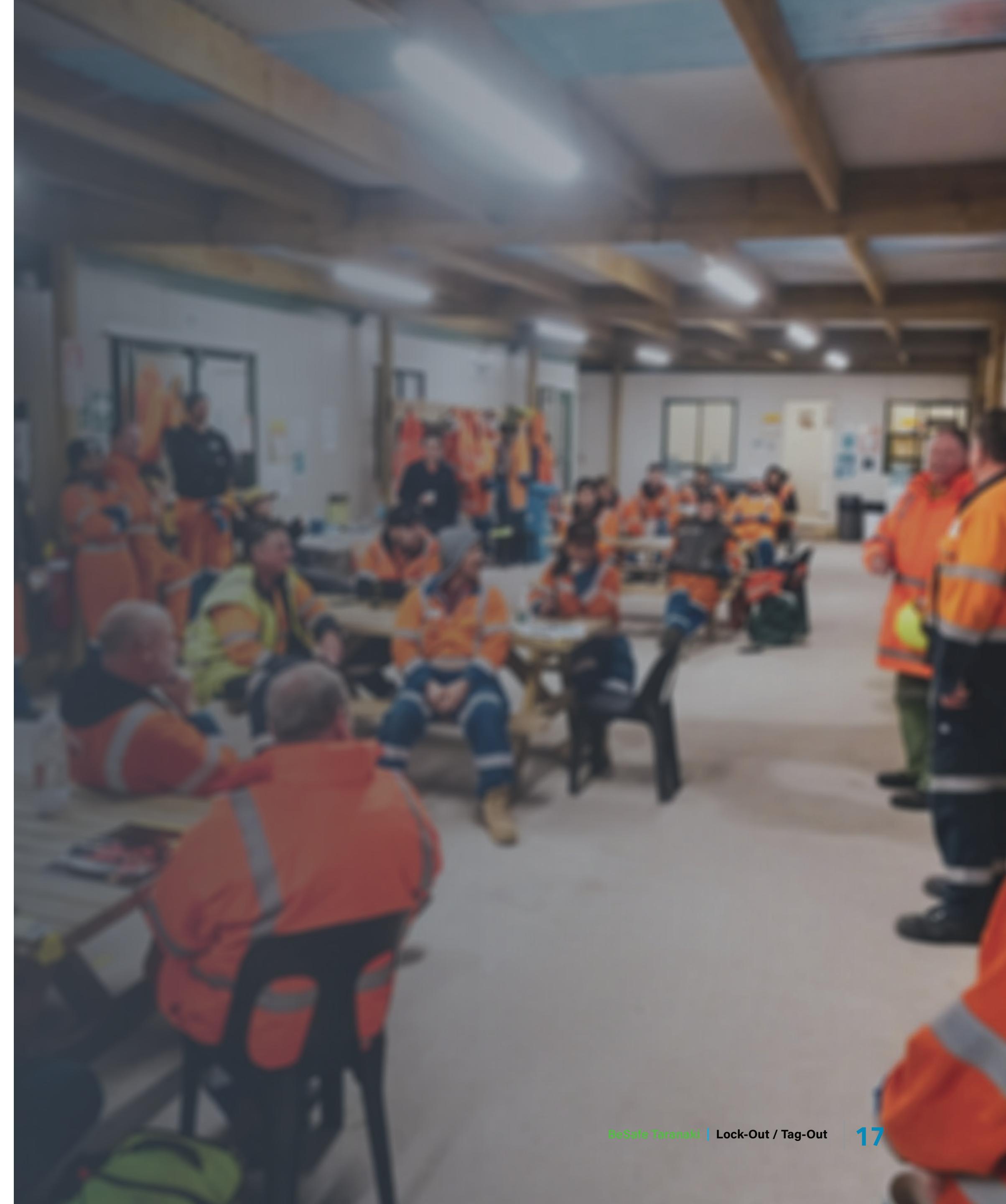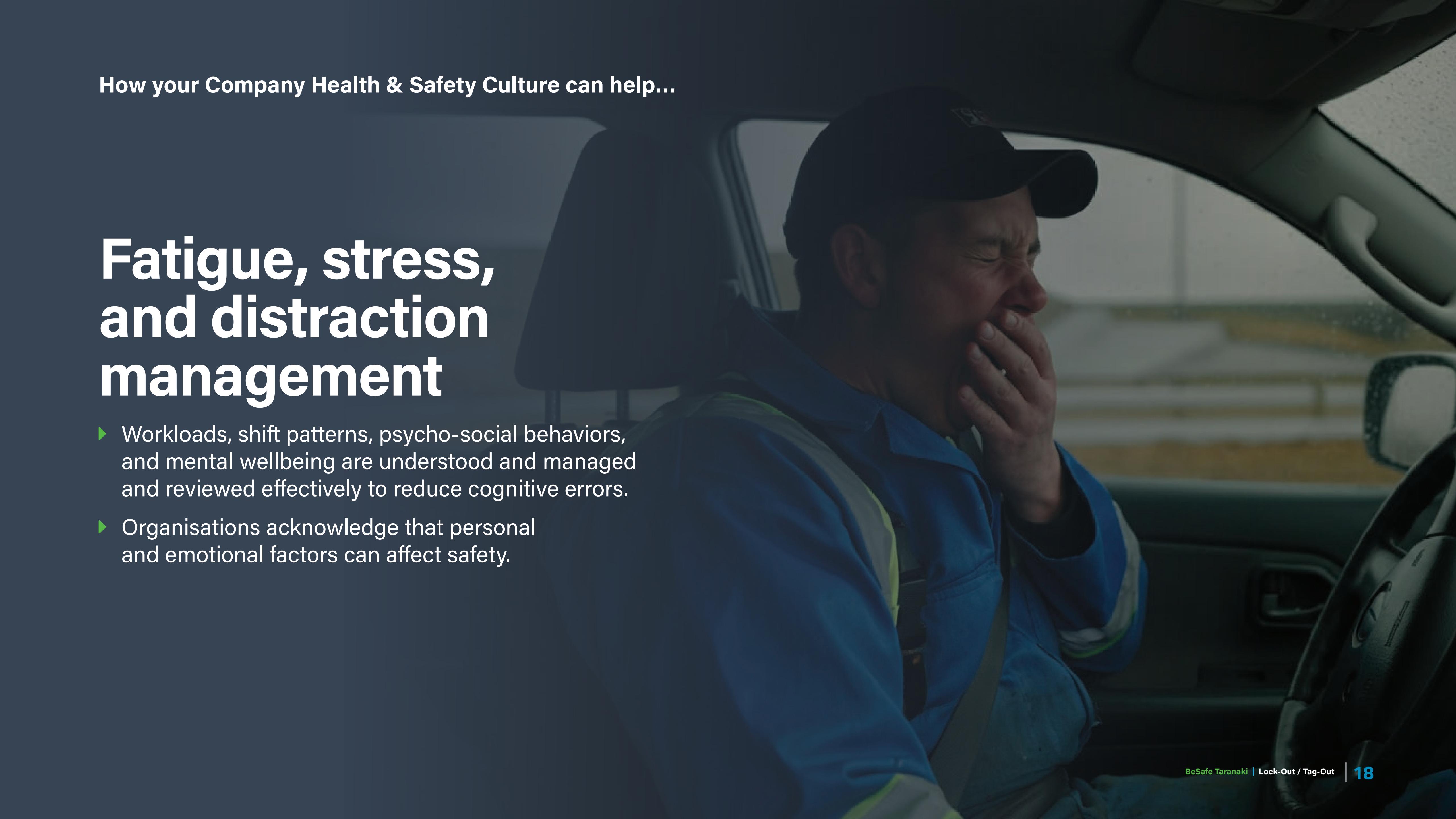
Fatigue, stress, and distraction management

▶ Workloads, shift patterns, psycho-social behaviors, and mental wellbeing are understood and managed and reviewed effectively to reduce cognitive errors.

▶ Organisations acknowledge that personal and emotional factors can affect safety.

Effective workplace design is a key component of safety culture.

By creating environments that are logical, ergonomic, and free of unnecessary hazards, we help people make the right decisions, even under pressure.

GOALS TO HELP STRENGTHEN 'LOCKOUT SAFETY SYSTEMS'

Reinforce the limitations of traditional lockout/ tagout methods

Promote integration of engineering controls with safety culture and good work design

Translate high-risk scenarios into simple, actionable practices