



THE HUMAN ELEMENT

The Compliance Illusion: Why Technology Alone Cannot Make Construction Safer

Technology does not create a safety culture. It reveals, amplifies and sometimes disguises the culture that already exists.

A UK construction research and consulting insight paper
Arco Safety Ltd | 2026

SAFETY IN THE RIGHT HANDS

Executive Summary

Construction has more safety information available than at any point in its history. Digital permit systems, connected plant, AI-assisted cameras, proximity detection, wearables, drones, dashboards and increasingly sophisticated reporting platforms can all strengthen risk control. The problem is not technology; the problem begins when an organisation assumes that more information automatically means more control.

In Great Britain, **25** construction workers were **killed in work-related accidents in 2025/26**. The long-term direction of travel in workplace safety has improved, but construction remains a high-risk industry. Technology therefore matters - but it must sit inside a system that understands people, work and organizational pressure.

THE CENTRAL PROPOSITION

Compliance establishes the minimum standard. Culture determines what happens when the plan meets operational reality.

This paper argues that organizations can create a compliance illusion: dashboards, surveys, audit scores and digital records provide reassurance that the system is working while everyday work gradually moves away from the system management believes is in place.

Arco Safety describes the growing separation between intended controls and operational practice as **Organizational Drift**. The Drift is not simply 'workers breaking rules'. It can emerge as people adapt to changing conditions, programme pressure, access restrictions, equipment availability, subcontract interfaces and procedures that do not fully reflect the task.

The implication for construction leaders is significant. HSE does not own safety culture. The safety department does not own it either. The organization creates it - through design, procurement, planning, resourcing, supervision, commercial decisions and the way leaders respond when safety and production appear to compete.

The question is not: 'Do our systems say we are safe?' The question is: 'How closely do our systems reflect the work taking place today?'

Key conclusions

- Technology is most effective when it supports good work rather than attempting to police poor organizational conditions.
- Safety climate surveys and dashboards are valuable indicators, but they are snapshots and data sources - not proof of operational reality.
- Work as imagined and work as performed will never be perfectly identical; the leadership task is to understand the gap and decide whether adaptations are safe, necessary or creating hidden exposure.
- Organisational Drift becomes dangerous when repeated adaptations are normalised but remain invisible to decision-makers.
- Technology should be introduced with workforce involvement, clear data governance, operational testing and a mechanism for learning from unintended consequences.

1. Construction Has More Safety Data Than Ever

Modern construction organisations can measure almost everything: training completion, inspections, close-outs, near misses, behavioural observations, access events, plant movements, permit status and, increasingly, biometric or location data. This creates a powerful opportunity for prevention. It also creates a new management risk: confusing the visibility of data with the visibility of work.

HSE's human factors guidance takes a wider view. It identifies the job, the individual and the organisation as interacting influences on behaviour. Workload, procedures, equipment, leadership, resources, communications and culture all shape what people actually do. Technology can strengthen this system, but it cannot substitute for understanding it.

EVIDENCE POINT

HSE defines human factors broadly, including environmental, organisational, job and individual characteristics. Its guidance explicitly notes that people often adapt to poor job, equipment or environmental design - adaptations that can affect safety and system performance.

The technology paradox

The more sophisticated a reporting system becomes, the easier it can be for senior leaders to believe that risk is being controlled because risk is being measured. A green dashboard may show completed inspections and closed actions while supervisors tolerate workarounds, temporary arrangements become routine, and teams adapt methods to meet the programme.

The issue is not digitalisation. The issue is assurance without sufficient contact with operational reality.

On a dashboard in a head office, risk can look managed.

2. The Compliance Illusion

Arco Safety uses the term Compliance Illusion to describe the false confidence that can arise when documented compliance is treated as evidence that risk is fully controlled.

Compliance is essential. UK construction cannot operate safely without legal duties, competent planning, suitable controls, effective supervision and disciplined execution. The error is treating compliance as the finish line rather than the foundation.

An organisation can have current RAMS, completed briefings, digital sign-offs and strong audit scores while the task is being performed differently in the field. The records may be accurate in the narrow sense that an activity was completed; they may still fail to describe the conditions under which the work is actually being done.

ARCO POSITION

Measure compliance. Verify controls. But never assume that a completed record tells you the whole story.

3. Work as Imagined vs Work as Performed

Every organisation has a version of work as it is intended to happen. It exists in design decisions, construction phase plans, RAMS, permits, procedures, programmes, training, drawings and management expectations. Arco Safety refers to this as the Intended System.

Then there is operational reality: weather changes, deliveries are late, access is constrained, another trade occupies the planned workspace, the specified tool is unavailable, a sequence changes, a supervisor is stretched, or the programme becomes compressed. People adapt.

The distinction between work as imagined and work as done is well established in human factors. The practical value is not academic terminology; it is the recognition that safe management requires leaders to understand how the task actually unfolds.

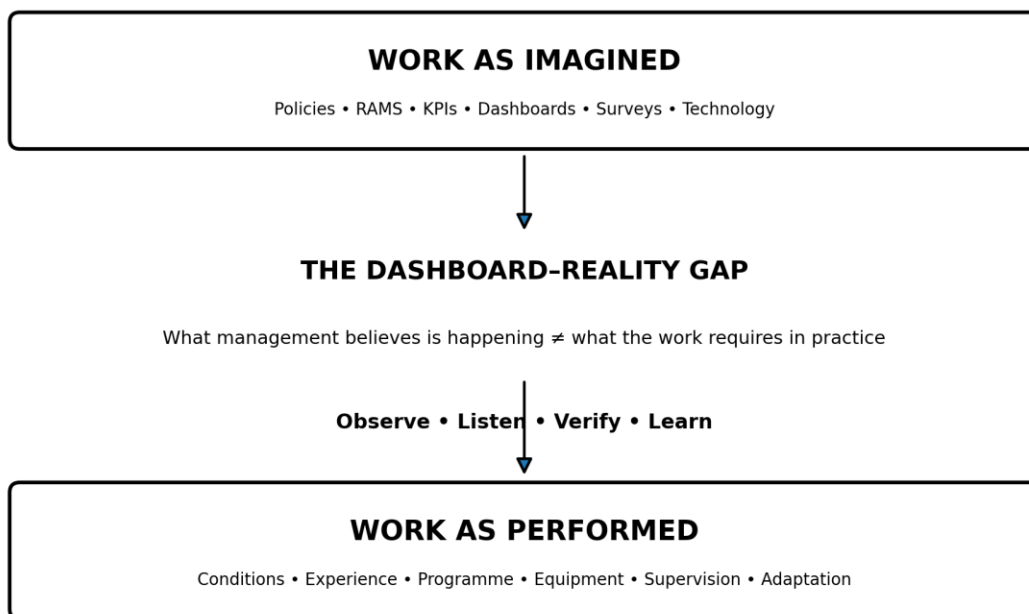


Figure 1. Arco Safety - The Dashboard-Reality Gap.

The gap is not automatically evidence of failure. Some adaptation is inevitable in complex work. Experienced teams frequently solve problems safely and effectively. The risk emerges when adaptations alter the control strategy, become routine, or accumulate without the organisation recognising what has changed.

A Better Question

***Instead of asking 'Why did the worker bypass the system?',
ask: 'What conditions made this way of working appear to
be the sensible way to get the job done?'***

That question does not excuse unsafe behaviour. It broadens the investigation from the final action to the system that shaped it. Accountability remains important, but accountability without understanding can leave the underlying conditions untouched.

4. Why People Adapt

Construction is variable by nature. Work is delivered through temporary organisations, changing teams, multiple subcontractors and constantly evolving physical environments. Procedures cannot anticipate every combination of conditions.

People may adapt because a procedure is difficult to apply, because two requirements conflict, because access has changed, because the programme creates competing priorities, because the equipment is unsuitable, or because an experienced worker believes a different method is more effective.

HSE guidance is particularly relevant here: people commonly try to adapt to poor job, equipment or environmental design. The management challenge is therefore to identify whether adaptation is strengthening the system, compensating for a weakness, or introducing unacceptable exposure.

5. Organisational Drift: How Exceptions Become Normal Work

A single adaptation may be harmless. Repeated adaptations can become the unofficial method. Once the unofficial method becomes normal, new starters learn it, supervisors become accustomed to it and the original control may remain intact only on paper.

Arco Safety calls this **Organisational Drift**: the gradual movement between the organisation's intended way of controlling risk and the way work has evolved in practice.

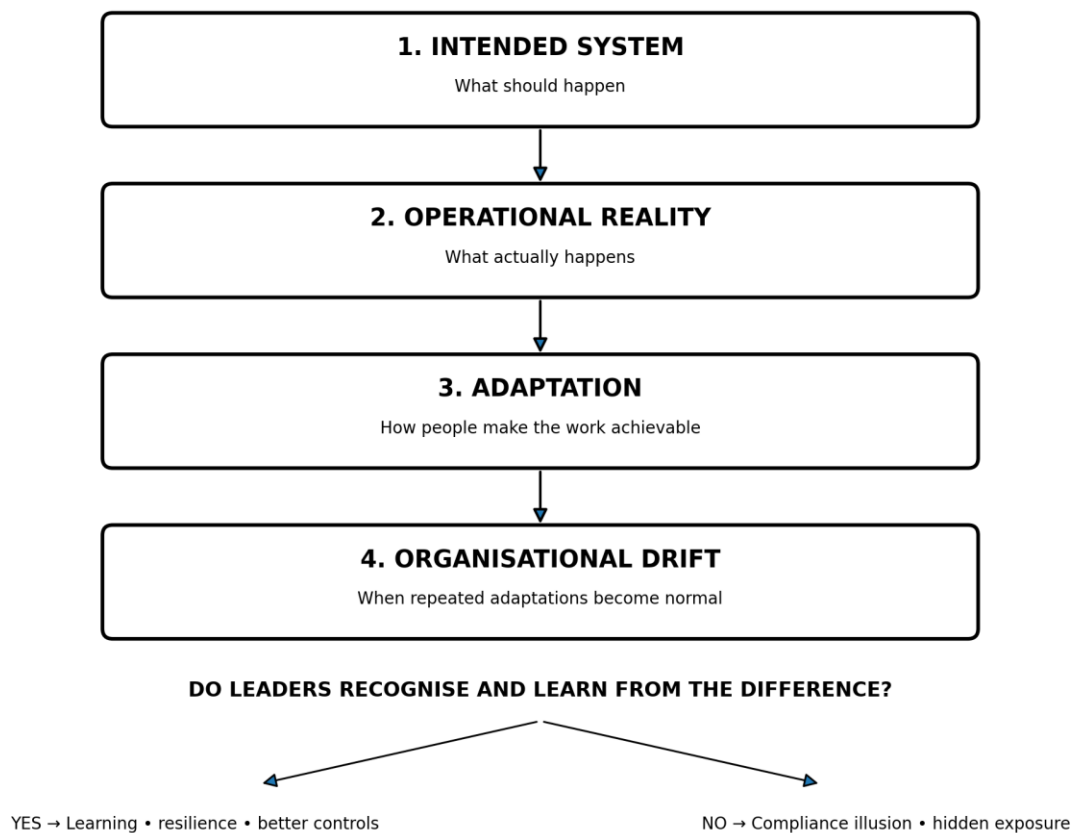


Figure 2. Arco Safety - Operational Safety Reality and Organisational Drift.

Drift is particularly difficult to detect when lagging indicators remain good. Nothing has happened yet. The adaptation may have 'worked' hundreds of times. That success can itself create confidence. The absence of an incident is then interpreted as evidence that the adaptation is safe, rather than evidence that the organisation has so far avoided the conditions required for failure.

WEAK SIGNAL

The most valuable information may be the difference between the formal method and the method people have learned they need to use.

6. The Dashboard-Reality Gap

Dashboards are valuable. They allow leaders to identify trends, allocate attention and monitor performance across complex projects. But every metric is a representation of reality, not reality itself.

The Dashboard-Reality Gap appears when management information becomes progressively detached from field conditions. Common warning signs include retrospective paperwork, repeated close-outs of similar findings, high completion rates with low-quality engagement, unreported near misses, temporary arrangements that persist, and work methods that differ from approved controls.

The response should not be to abandon measurement. It should be to triangulate it: data, documentation, interviews, observation and physical evidence should be tested against one another.

7. Arco Field Insight: When a Strong Culture Score Met Operational Reality

ANONYMOUS FIELD OBSERVATION

The following example is drawn from Arco Safety's site assurance experience. Identifying client and project details have been deliberately excluded.

A client had undertaken a behavioural profiling exercise and was confident that its safety culture was strong. Management regarded the findings as evidence that the organisation had a positive culture and that expected ways of working were understood.

During an independent Arco Safety site audit, however, workers were observed modifying their methods of work. The changes were visible in the field but were not understood by management as part of normal operations.

When Arco raised the issue, the initial response was disbelief. The client requested photographs or video evidence. That evidence had been gathered. Once it was presented, the difference between the organisation's confidence in its reported culture and the work actually taking place became difficult to dispute.

The lesson is not that behavioural profiles or safety climate assessments have no value. HSE itself uses safety climate measurement as a useful way of assessing attitudes and perceptions. The lesson is that a survey or score is a snapshot and one source of evidence. It cannot replace observation of work.

Measure culture - but never confuse measurement with reality.

A questionnaire may tell you what people say they believe. An audit may tell you whether documented controls exist. Technology may tell you what a sensor detected. Interviews may tell you what people think happens. Observation shows what work looks like when it is actually being performed.

8. HSE Does Not Own Safety Culture

The health and safety function can advise, challenge, investigate, measure, coach and facilitate. It cannot independently create organisational culture.

Culture is produced every day by operational decisions. A program manager is deciding whether a deadline move can affect the culture. Procurement deciding how a package is scoped affects culture. A supervisor's response to bad news affects culture. A director deciding whether to stop production affects culture. A design team deciding whether buildability concerns are genuinely addressed affects culture.

***Health and safety is not something that sits alongside operations.
Operations create the conditions within which safety succeeds or fails.***

HSE describes safety culture as a subset of wider organisational culture and highlights management commitment and style, worker involvement, competence, communication, procedural compliance and organisational learning as major influences. That supports a critical conclusion: safety culture cannot be delegated to the HSE department.

Culture is revealed under pressure

An organisation's culture is not best understood when everything is going to be planned. It becomes visible when objectives compete.

- The concrete wagon is waiting and the pour is already late.
- A crane or specialist team is costing money while work is stopped.
- The subcontract package is behind programme.
- A temporary access solution would save hours.
- A supervisor is told that missing today's target will affect the wider sequence.

The decision made at that moment teaches the workforce more about the organisation's real priorities than a poster, value statement or annual safety campaign.

LEADERSHIP TEST

When production and safety appear to compete, what does the organisation actually reward, tolerate and challenge?

9. Technology as an Amplifier

Arco Safety is not anti-technology. The opposite is true. Well-selected technology can provide earlier warning, improve visibility, reduce exposure and give teams information that would otherwise be unavailable.

The distinction is between technology that supports a functioning safety system and technology that is expected to compensate for a dysfunctional one.

When technology strengthens safety

- It solves a clearly defined operational problem.
- Users understand its purpose and limitations.
- Frontline workers are involved in selection, testing and calibration.
- Data use is transparent and proportionate.
- Supervisors act consistently on meaningful alerts.
- The organisation learns from false alarms, workarounds and unintended consequences.
- Engineering and organisational controls remain primary; technology complements them.

When technology can deepen the illusion

- Success is measured by deployment or data volume rather than risk reduction.
- Technology is introduced primarily to police behaviour.
- Poorly designed alerts create alarm fatigue.
- Workers do not understand how personal or location data will be used.
- The technology conflicts with the realities of the task.
- Leaders receive more dashboard data but spend less time understanding work.

Research on construction wearables supports this human-centred approach. Studies have found that perceived usefulness, social influence and privacy risk influence workers' intention to adopt wearable devices. Other research has similarly highlighted ease of use, data security and perceived performance benefits.

TECHNOLOGY PRINCIPLE

A safety tool that people do not trust, cannot practically use, or believe will be used against them is unlikely to deliver its theoretical value.

10. Culture Across Contractor and Subcontractor Boundaries

Major construction projects do not operate with one homogeneous culture. They contain overlapping cultures: client, Principal Contractor, designers, specialist contractors, labour suppliers, plant operators, agency workers and short-duration trades.

A corporate culture statement does not automatically transfer across those boundaries. Each organization brings its own norms, pressures, supervision standards, language, competence and commercial incentives.

Technology can complicate this further. A system procured by the Principal Contractor may be unfamiliar to a specialist subcontractor. Data expectations may not be understood. Alarm settings may not reflect a particular activity. A worker may receive a digital induction but still not understand how the technology interacts with the actual method of work.

The answer is not simply more enforcement. Contractors must be set up to succeed. That means clear expectations, competent coordination, understandable controls, meaningful engagement and a mechanism for subcontractors to challenge arrangements that do not work in practice.

Shared ownership

A mature project asks not only whether subcontractors comply, but whether the project environment enables them to comply. This is especially important where programme, logistics, design interfaces or simultaneous operations create conditions that no single contractor controls.

11. The Arco Technology & Culture Readiness Test

Before introducing a new safety technology, leaders should be able to answer five questions.

- 1 **PURPOSE** What problem are we actually trying to solve?
- 2 **REALITY** How is the task really performed today?
- 3 **PEOPLE** Have the people doing the work shaped the solution?
- 4 **PRESSURE** What operational pressures could undermine it?
- 5 **LEARNING** How will we detect workarounds and unintended effects?

Figure 3. Arco Safety - Five questions before introducing safety technology.

If these questions cannot be answered confidently, procurement may be premature. A pilot should test not only technical performance but also how the tool changes work, supervision, communication and decision-making.

12. What Construction Leaders Should Do Next

1. Establish the problem before selecting the technology

Define the hazard, exposure or decision problem in operational terms. Do not begin with a product and search for a problem it can solve.

2. Observe work before redesigning it

Spend time where the work happens. Compare; RAMS, permits and plans with actual task delivery. Ask what has changed and why.

3. Look for drift, not just violations

Identify repeated adaptations, temporary arrangements and informal methods. Determine which are sensible responses and which weaken controls.

4. Involve the workforce early

Operators, trades, supervisors and subcontractors should influence trials, calibration and implementation. Participation improves both design quality and ownership.

5. Define data governance before deployment

Be explicit about what is collected, who sees it, how long it is retained and whether it can be used for performance or disciplinary purposes. Trust is an operational control.

6. Align leadership incentives

Do not ask project leaders to prioritise safety while rewarding only programme and cost. What gets rewarded becomes a cultural signal.

7. Triangulate assurance

Use documents, metrics, interviews, observations and physical evidence together. No single data source should be treated as proof of culture.

8. Learn from normal work

Do not wait for an incident. Study successful adaptations, recurring friction, false alarms and weak signals while the system is still functioning.

9. Reassess after implementation

Technology changes the work system. Review whether new behaviours, dependencies or workarounds have emerged.

A leadership diagnostic

ASK THIS AT BOARD AND PROJECT LEVEL

How confident are you that the work taking place across your organisation today matches the work your systems tell you is taking place?

Conclusion: People First, Technology Alongside Them

Construction technology can prevent harm, improve visibility and strengthen decision-making. It deserves investment. But technology cannot decide what an organisation truly values when time, cost, production and safety come into tension.

The goal is not to create an organisation in which people never make mistakes or adapt. That is unrealistic, the goal is to create an organization capable of seeing, understanding and responding to how work really happens before normal adaptation becomes unacceptable exposure.

This requires compliance, competent engineering, leadership, worker involvement, learning and technology to operate as one system. When those elements are aligned, technology becomes a force multiplier. When they are not, more data can simply make an organisation more confident in a version of work that no longer exists.

HSE does not own safety culture. The organisation creates it.

For leaders, the challenge is therefore not to ask whether the organisation has a good safety culture score. It is to maintain enough curiosity, field visibility and organisational honesty to test whether the system they believe they have is the system their people are actually working within.

ARCO SAFETY

Safety in The Right Hands

Research-led health, safety and organisational assurance for UK construction.

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NOTE ON TERMINOLOGY

Work-as-imagined / work-as-done and related resilience concepts have an established academic history. Arco Safety's client-facing terms - Operational Safety Reality, Organisational Drift, Compliance Illusion and Dashboard-Reality Gap - are used here as a practical consulting framework for UK construction.

This paper is intended as professional insight and does not replace project-specific legal, engineering or health and safety advice.