30

2026

MAINSTREAM

CELEBRATING 30 YEARS

The State of ASSET MANAGEMENT in Australia & New Zealand

Research Partner | KPMG

Executive Summary

For thirty years, the MAINSTREAM research programme has tracked the ambitions, frustrations, and hard-won progress of asset management, maintenance, and reliability professionals across Australia and New Zealand. In that time the profession has weathered privatisation, globalisation, the mining investment cycle, a pandemic, and repeated waves of digital promise. Each year, the research has captured a profession simultaneously advancing and struggling with obstacles that prove stubbornly durable.

The 2026 edition marks a turning point. Not because any single challenge is new, but because multiple transitions are converging at a speed and scale the profession has not previously faced. The workforce cliff that has been predicted for a decade is now arriving. The data revolution that was supposed to enable better decisions has, for most organisations, produced more noise than signal. Artificial intelligence has moved from conference speculation to operational reality, but the conditions for it to succeed remain absent in the majority of organisations. And the energy transition is rewriting the rules of asset strategy faster than maintenance teams can adapt.

This year's research draws on twelve facilitated roundtable discussions with 153 senior practitioners across mining, utilities, manufacturing, transport, energy, defence, and infrastructure; a dedicated survey of 715 maintenance and reliability professionals; and extensive analysis of industry data from Engineers Australia, the Institute of Asset Management, CSIRO, Safe Work Australia, and leading global research firms.

The findings tell a consistent story. The profession's challenges are no longer separable. Workforce shortages exacerbate data quality problems. Poor data foundations stall AI initiatives. Organisational silos prevent the strategic alignment that would unlock budget support. And a persistent gap between knowing what good looks like and executing it at scale remains the defining feature of the field.

We have organised this year's report around five fundamental transitions shaping the profession, followed by twelve specific obstacles that emerged most powerfully from the research. The transitions describe the broad shifts the profession must navigate. The obstacles identify where the profession is stuck. Together, they provide both the strategic context and the operational specificity that leaders need to act.

Report Highlights

The profession knows what good looks like and consistently fails to execute it at scale. The gap is not in knowledge. It is in organisational discipline.

715

Maintenance and reliability professionals surveyed.

No amount of advanced analytics can compensate for poor execution of basic maintenance tasks.

85%

Of practitioners are concerned about younger engineers over-relying on AI outputs.

Every organisation could provide detailed data on asset condition, failure rates, and maintenance costs. Almost none could provide equivalent data on workforce fatigue, burnout risk, or workload sustainability.

23%

Of organisations believe their asset management strategy is fully aligned with corporate strategy.

153

Senior practitioners participated across 12 industry roundtable sessions.

Middle management is where transformation goes to die. Senior leadership endorses change, frontline workers understand the need for it, but the layer in between is where things stall.

78%

Of organisations collect more maintenance and reliability data than they can effectively analyse.

Lessons-learned processes in shutdowns are near-universal yet rarely drive improvement.

25–60%

Of annual maintenance budget consumed by shutdown and turnaround costs, yet only 32% of projects successfully implemented.

The knowledge most at risk cannot be written down. It is the engineer who knows what a healthy bearing sounds like, or the planner who remembers a supplier's gaskets failed under specific conditions fifteen years ago.

About the Research

The findings presented in this report are drawn from four complementary research streams:

- Twelve facilitated roundtable discussions with 153 senior maintenance, reliability, and asset management professionals across diverse industries and geographies
- A structured online survey of 715 asset management and maintenance professionals, conducted in early 2026
- Twenty-one one-on-one interviews with heads of asset management, maintenance, and reliability
- Analysis of industry data, global benchmarks, and published research from Engineers Australia, the Institute of Asset Management, GFMAM, CSIRO, Safe Work Australia, ARC Advisory Group, Verdantix, McKinsey, MIT Sloan Management Review, Deloitte, and other credible sources

Methodology and Acknowledgements

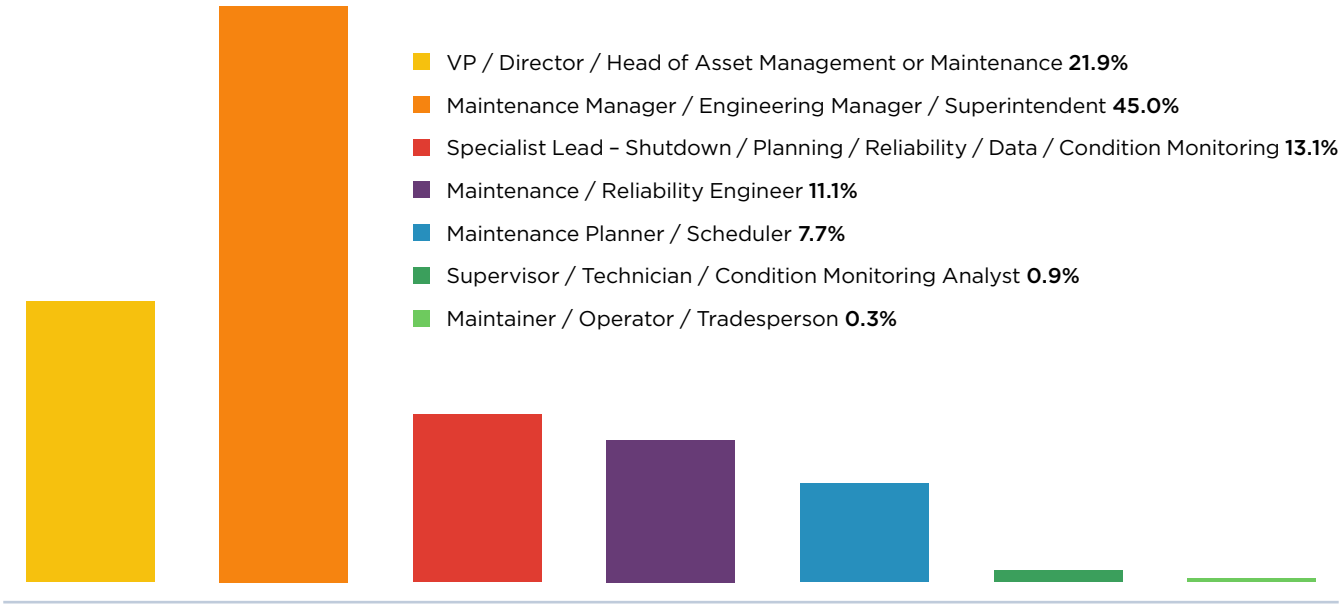
The comprehensive content presented in this report was meticulously designed, developed, and authored by the MAINSTREAM research team, drawing upon extensive expertise in market analysis and industry insights across Australia and New Zealand. As a leading research authority in the ANZ region, MAINSTREAM brings three decades of collective experience and methodological rigour to this analysis. The authors acknowledge KPMG for their invaluable partnership and support throughout this research initiative.

About MAINSTREAM

Founded in 1996, MAINSTREAM is an award-winning B2B community serving asset-intensive industries with research, information, events, training courses, and digital communication solutions that celebrate the successes, accelerate the careers, and optimise the performance of Asset, Reliability, and Maintenance professionals.

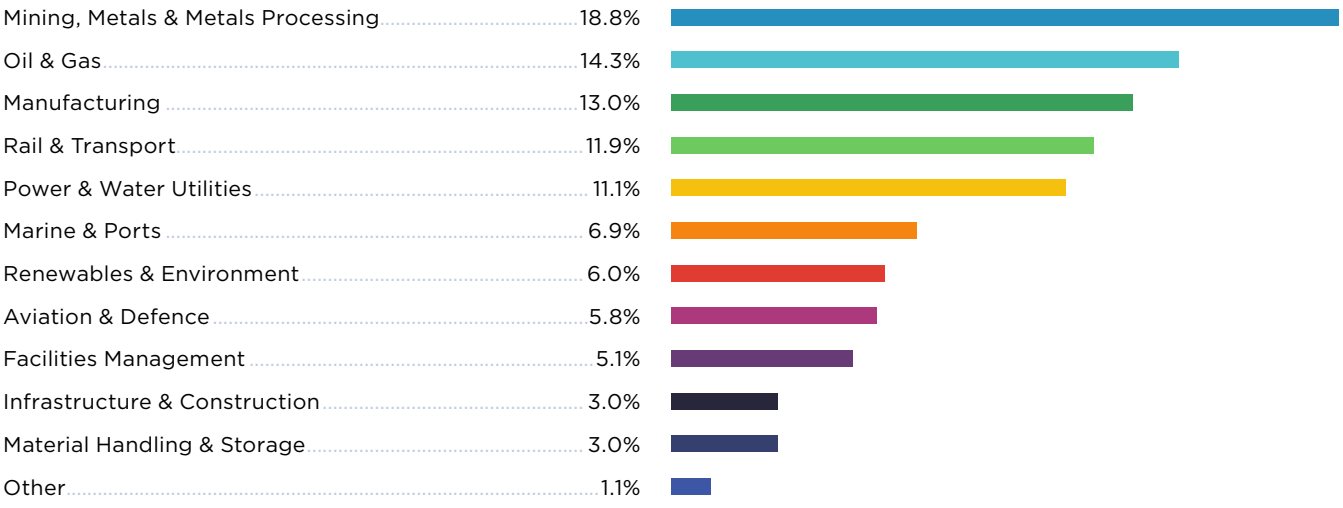
Respondent Profile by Role

The strong representation from management and leadership roles (67 per cent at manager level or above) ensures the findings reflect decision-makers with direct influence over asset management strategy and practice. The inclusion of specialist leads, engineers, and planners provides grounded operational perspective.



Respondent Profile by Industry

This is the thirtieth edition of the MAINSTREAM State of Asset Management report. Over three decades, this research programme has become the longest-running study of its kind in the region, providing an unmatched longitudinal view of how the profession has evolved, where it has advanced, and where persistent challenges remain.



FIVE TRANSITIONS DEFINING 2026

This year's research reveals a profession in motion. Beneath the twelve specific obstacles examined in the chapters that follow lies a deeper story: five fundamental transitions that the asset management community in Australia and New Zealand is being asked to navigate, simultaneously and at speed. None of these transitions is entirely new. What distinguishes 2026 is that they have arrived together, and that the strategies that worked when each could be managed in isolation no longer suffice.

The first transition is from people to systems. For most of the past three decades, asset management has functioned as an apprentice trade, carried in the heads of long-tenured experts whose judgement was the operating layer of the profession. As that generation steps away, the question is no longer how to retain individuals but how to design organisations that can perform without depending on them. Documentation alone has never sufficed, and never will. What is now demanded is a redesign of how know-how is created, refreshed, and transmitted in an era of shorter tenures and faster turnover.

The second transition is from gathering to deciding. A decade ago, the limiting factor was visibility: organisations did not have enough information to make confident maintenance decisions. That constraint has flipped. The flow of sensor readings, inspection records, work orders, and condition data is now constant and, in many places, overwhelming. The bottleneck has moved downstream into governance, interpretation, and trust. The organisations advancing furthest are those that have stopped chasing more data and started asking harder questions about whether the data they already hold is accurate, current, and worthy of being acted on.

The third transition is from a technical service to a strategic conversation. Asset management has spent thirty years arguing for a seat at the executive table. The seat now exists in many organisations, yet the conversation often fails to translate. The vocabulary of reliability and risk does not move smoothly into the vocabulary of capital allocation and shareholder return. The transition under way is less about whether asset management belongs in the boardroom and more about who is willing to learn the second language and act as the bridge between them.

The fourth transition is from technological optimism to operational realism. Few professions have been promised more by emerging technology, and few have been more disappointed by what was actually delivered. The mood in 2026 is neither sceptical nor naive. It is sober. Practitioners have learned that the new generation of tools – predictive, generative, automated, autonomous – produces value only on top of foundations that most organisations have not yet built. The shift underway is from buying tools to building the conditions in which tools can succeed.

The fifth transition is from treating people as a resource to treating them as a strategic priority. Maintenance organisations have always measured their assets with care. The same attention has not historically been paid to the human beings who keep those assets running. In 2026, the cost of that asymmetry has become visible: in turnover, in the difficulty of attracting new entrants, in the slow erosion of the cultures that once made the work attractive, and in the personal toll borne by professionals who have been asked to do more with less for too long. The shift from headcount to humanity is the most personal of the five transitions, and arguably the most overdue.

These five transitions are the connective tissue of this report. They do not replace the twelve obstacles that follow; they explain why those obstacles look different in 2026 than they did even one or two years ago. Read in isolation, each obstacle is a familiar challenge. Read together, against the backdrop of these transitions, they describe a profession at an inflection point – one in which the choices made over the next two to three years will shape the next decade of asset management practice in this region.

2025 vs 2026:
How the Landscape Has Shifted

The following snapshot maps this year's twelve obstacles against the eleven obstacles identified in the 2025 edition of this report. It shows which challenges have risen in urgency, which have been reframed to reflect new understanding, and which are entirely new to the research.

2026	Obstacle	2025	Movement	
1	The Knowledge Exodus	1	—	Intensified
2	Data Abundance Without Insight	2	—	Reframed
3	AI Pilot Purgatory	8	↑ 5	
4	The Execution Discipline Gap	5	↑ 1	Reframed
5	The Middle Management Bottleneck		NEW	
6	Workforce Wellbeing & People Metrics Gap	9	↑ 3	
7	Strategic Misalignment & Language Barrier	3	↓ 4	
8	System Fragmentation & Data Trust Deficit	4	↓ 4	Reframed
9	Apprenticeship & Training Pipeline Crisis		NEW	
10	Safety, Risk, and Asset Management Silos	10	—	
11	Decarbonisation and the Asset Transition Challenge	7	↓ 4	Expanded
12	Shutdown and Turnaround Excellence		NEW	
—	Reliability Engineering Capability	6		Absorbed into various
—	Diversity and Inclusion	11		Folded into #6 and #9

Intelligent Asset Management with KPMG

KPMG's Asset Performance Platform combines SAP Asset Performance Management with KPMG Asset Operations Core to enable better, data-driven decision-making.

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01

The Knowledge Exodus

The asset management profession is losing its institutional memory at a rate that no documentation programme, AI tool, or training initiative can fully replace. This is not a forecast. It is a description of the present.

The Crisis of Experience

Engineers Australia estimates that 25,000 engineers will retire within five years, with annual attrition of 3,200 leaving for other sectors. Mean time to repair has increased from 49 to 81 minutes due to skills gaps. Apprentice numbers have fallen from 485,440 in 2012 to 267,385 by 2024. Mining skills shortage intensity has escalated from 34 per cent in 2021 to 63 per cent. The clean energy workforce must triple from 21,500 to 59,300 in five years. One major water utility reported 60 per cent workforce turnover over the past decade. The demographic cliff is not approaching; it is here.

The knowledge at greatest risk is contextual judgement – the engineer who knows a bearing sounds different below twelve degrees, or the planner who remembers a supplier's gaskets failed under specific conditions fifteen years ago. This is not the kind of knowledge that can be documented in a procedure manual. It emerges only when prompted by a specific situation, and it is as much about understanding what not to do as what to do.

Knowledge Hoarding and Organisational Culture

Knowledge hoarding is not obstinacy. It is rational self-preservation. When systematic knowledge capture feels like a precursor to obsolescence, experienced staff resist sharing what gives them their unique value. One major engineering firm found that 37 per cent of technical knowledge remains undocumented, locked in individual heads rather than organisational systems. Organisations that have reframed knowledge sharing as professional contribution rather than replacement are seeing better results, but they remain the minority.

> "Some of these senior guys, they've been around so long they don't know what they know. You can't sit them down and say, write down everything you know. It might be the sort of problem you get once every twenty years. You're going to refurbish some piece of kit and then they go, oh yeah, back in 1985, and out comes the story and all the reasons why those decisions were made."
>
> Engineering Manager, Power Distribution

One major water utility has begun a shadowing programme to capture knowledge before it departs. But as their operations manager acknowledged, there is a cultural component: knowledge is often seen as power. Success requires organisations to fundamentally redesign how they value and reward knowledge sharing, moving from a model where secrecy creates job security to one where contribution to collective capability defines professional identity.

The Generational Discontinuity

The knowledge transition is complicated by a fundamental mismatch between generational expectations. Our roundtable partic-

ipants from a major rail transport operator described track inspectors in their sixties with forty years of experience, working alongside a generation for whom two to three years in any role has become the norm. This is not simply a difference in career expectations; it reflects fundamentally different relationships with institutional knowledge.

> "The forty years of experience that we're probably going to struggle to replace when these people retire – if the future reality is we're not going to have people in roles for forty years, then we need to support the people that are coming through much more, connected and supported in their decision making."
>
> Asset Management Lead, Rail Transport

The younger generation's approach is not inherently worse; it is different. Younger maintenance professionals expect digital access to information, want to understand the reasoning behind procedures rather than simply follow them, and are drawn to technology-enabled problem solving. The challenge is that organisations have largely failed to redesign their knowledge management systems around these preferences. Training programmes still assume a linear, time-served model of expertise development that no longer reflects how careers actually unfold.

The apprenticeship pipeline, which historically provided the foundation for trades-based knowledge transfer, is in crisis. Multiple roundtable participants described a twenty-year gap in apprenticeship investment driven by boom-bust cycles that discouraged long-term workforce planning. South Australia's establishment of five new technical colleges, driven partly by AUKUS requirements, represents a promising structural response, but the lag between training investment and operational capability remains measured in years, not months.

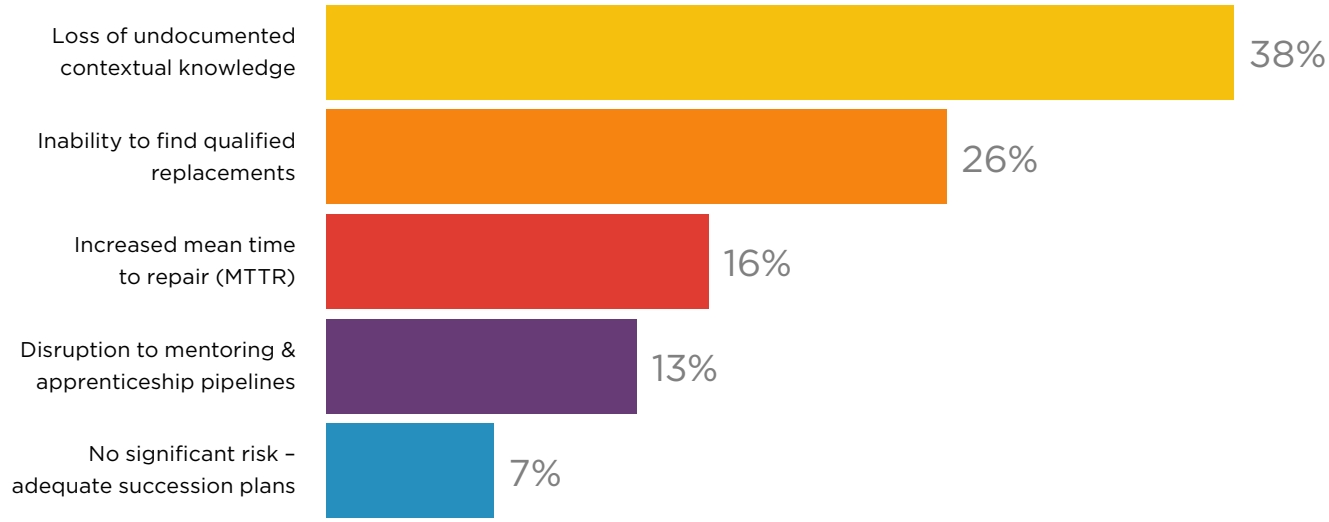
Technology as Bridge, Not Replacement

The most encouraging finding in this area is the emerging recognition that technology, particularly generative AI, may offer a partial bridge across the knowledge gap. Our AI survey found that 52.5 per cent of respondents are already using tools such as ChatGPT, Copilot, Claude, or Gemini for knowledge management tasks. More significantly, 35.8 per cent of respondents identified capturing and transferring expert knowledge as one of AI's greatest opportunities.

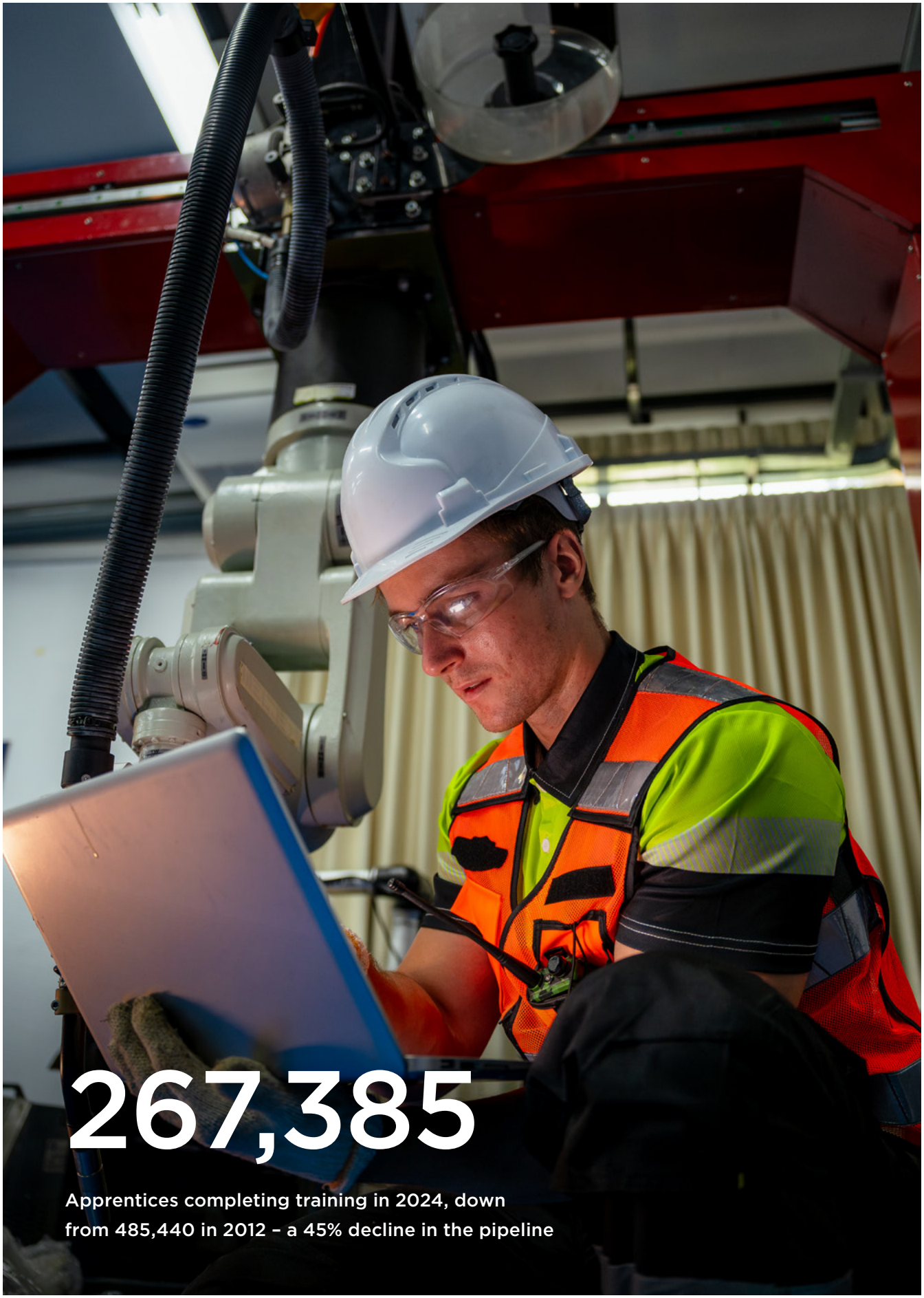
The connection is straightforward: if the most widely adopted AI application is knowledge management and one of the top perceived opportunities is knowledge capture, then organisations are already beginning to see how these pieces fit together, even if most have not yet implemented systematic approaches. What this transition demands is not more documentation projects. It demands a fundamental rethinking of how institutional knowledge is created, stored, accessed, and transmitted.

Survey Response

When asked about this challenge, the 715 survey respondents provided the following perspective:



What is the single greatest risk to your organisation from the retirement of experienced maintenance and reliability personnel?



267,385

Apprentices completing training in 2024, down from 485,440 in 2012 – a 45% decline in the pipeline

02

Data Abundance Without Insight

Organisations across every sector are drowning in data and starving for insight. They have solved the problem of data collection and comprehensively failed at the problem of data conviction.

The Scale of the Paradox

78 per cent of organisations collect more maintenance data than they can effectively analyse. 64 per cent identified poor data quality as their biggest analytical challenge. 67 per cent don't trust their own data enough to make critical decisions. Professionals spend an average of 14.6 hours per week – 38 per cent of available work hours – searching for, validating, or reconciling data across multiple systems. One major road infrastructure operator found 90 per cent data coverage on a critical attribute, but organisational attention remained fixed on the missing 10 per cent. Meanwhile, experienced staff retained roughly 90 per cent of their inspection findings in their heads rather than entering them into formal systems.

The result is a parallel information economy: official systems contain incomplete data that few trust, while real operational knowledge exists informally and will vanish when its holders leave. This creates a vicious cycle: poor quality data means people don't trust systems, so they maintain parallel information, which further degrades data quality and erodes trust even further.

The Trust Gap and Cultural Resistance

The deeper problem is not volume but trust. Across our roundtable discussions, a consistent pattern emerged: organisations have invested heavily in dashboards, data warehouses, and visualisation tools, only to find that the people who need to make decisions based on that data do not trust it enough to act. This observation, echoed across multiple sessions, reveals a trust deficit that operates at several levels.

> "There's a difference between data and insights. We collect a lot of data, but we're not able to translate data into actionable intelligence. And in many cases where we do, and the decisions don't agree with what we've done historically, we say, oh, but that's not how we've done things in the past. So we go back to doing the things we used to do."
>
> Asset Data Systems Lead, Power Distribution

At the technical level, professionals question whether the underlying data is accurate, complete, and current. At the analytical level, they question whether the models and calculations applied to the data are appropriate. And at the cultural level, they question whether data-driven conclusions should override the intuition and experience that have guided their decisions for decades. This last element is critical: decades of experience creates path dependency, and changing course based on contradictory data requires both conviction in the data and trust in whoever presented it.

System Fragmentation and Integration Failure

The technical foundations of the data challenge remain stubbornly unchanged. Organisations operate an average of 8 to 12 separate systems

containing critical asset information, with only 26 per cent achieving meaningful integration between platforms. The EAM market is growing from $8.89 billion to $19.68 billion by 2030, yet most organisations are still manually collecting 70 per cent of their operational data.

One major power distribution utility reported having 100 per cent of their finance data integrated, 80 per cent of asset data, but only 30 per cent of work data. This asymmetry is characteristic: the operational data that matters most for maintenance decisions is consistently the hardest to integrate. Post-merger integration creates particularly acute challenges. One major water corporation, brought back together from multiple alliances, described years of effort to consolidate legacy systems with areas still operating in alliance mode. The lesson, repeated across several participants, is that organisational mergers create a data integration debt that technical solutions alone cannot resolve and that is routinely underestimated in merger planning.

Data as a Continuous Operational Process

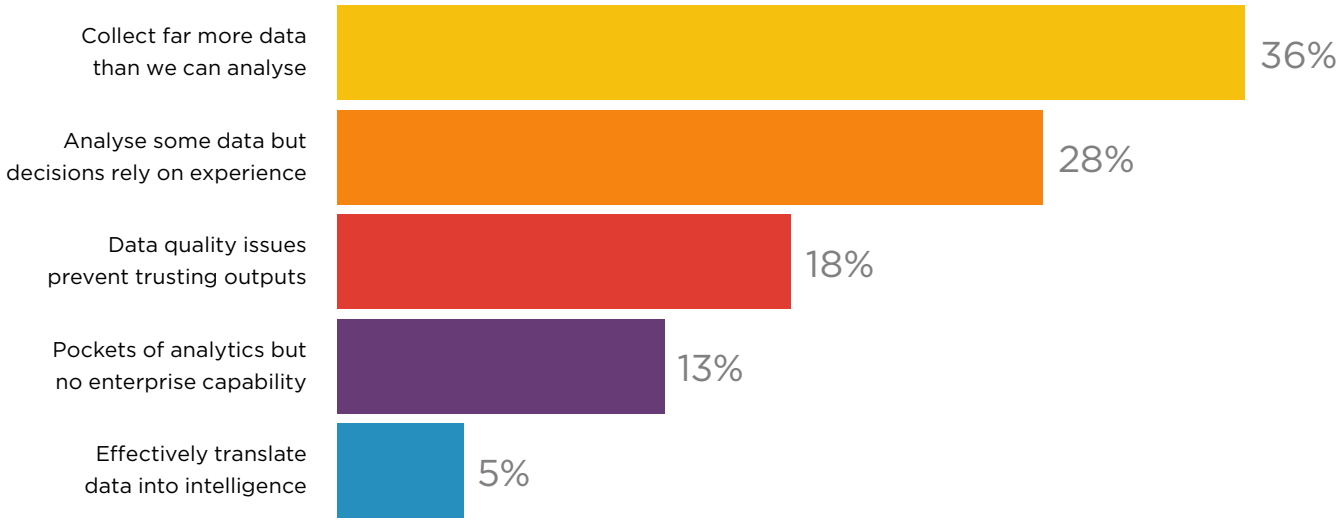
The most important conceptual shift emerging from this year's research is the recognition that data quality is a continuous operational process, not a one-off remediation project. You do not clean data and then walk away, because assets change, conditions change, materials rotate, and configurations evolve. Data quality degrades continuously and must be maintained continuously.

> "Analytics is like a factory. I'm providing the gas, the water, the timber, the steel – those foundational products that are shared across all those factories. I have to get that right, or everyone's just producing garbage."
>
> **Data Strategy Manager, Defence**

One defence organisation's approach to treating data with the same lifecycle management discipline applied to physical assets, from design through procurement, maintenance, and eventual retirement, represents a maturity of thinking that most organisations have not yet reached. The organisations that succeed with AI, predictive analytics, and digital transformation will be those that first succeed with the unglamorous work of data governance. This requires appointed data owners, standards aligned with frameworks such as ISO 14224, enforcement of data discipline at the point of entry, and systematic monitoring of data quality as an ongoing operational metric.

Survey Response

When asked about this challenge, the 715 survey respondents provided the following perspective:



How would you describe your organisation's ability to convert the maintenance data it collects into actionable decisions?


70%
Of manufacturers still manually collect operational data rather than automating collection from systems

03

AI Pilot Purgatory

Artificial intelligence has moved from conference speculation to operational reality, but for most organisations it remains trapped in an endless cycle of pilots and proofs of concept that never scale to production value.

The Adoption Reality

Nearly 45 per cent of organisations are still exploring or have not started with AI. A further 44 per cent are in pilot or early implementation. Only around 11 per cent have reached the point where AI is genuinely scaled or optimised. 72 per cent have explored AI, but 76 per cent fail to achieve expected returns. 70-85 per cent of AI projects globally fail; manufacturing specifically shows a 76.4 per cent failure rate.

The most widely adopted application is not predictive maintenance. It is generative AI, with 52.5 per cent of respondents using tools for knowledge management and everyday productivity. Predictive maintenance ranks second at 37.5 per cent, but roundtable discussion revealed a meaningful gap between evaluating predictive tools and having them running in production. Many organisations have invested significantly in vendor pilots only to find that integrating the system into operational workflows, addressing the change management challenges, and maintaining the data governance required for accuracy proves far more difficult than the initial proof of concept suggested.

The Skills and Readiness Gap

Data quality is the most frequently cited barrier, followed by workforce AI skills scored lowest of any readiness dimension at 2.69 out of 5. Leadership ambition (3.34) outpaces workforce readiness (2.69). 72 per cent of engineers report that their AI learning is self-directed, with organisations providing minimal formal training, yet 73 per cent recognise that AI-related skills will be essential within five years.

> **"We're still struggling to see value. Or significant value, because we seem to have a challenge in scaling AI across an asset management domain. We get stuck in pilot purgatory – endless proofs of concept that work in isolation but never make it to production."**
>
> **Maintenance and Reliability Manager, Mining**

The gap between leadership ambition and workforce readiness represents the core challenge: intent at the top is outpacing capability on the ground. Organisations investing in AI without first investing in the foundational capabilities – clean data, system integration, workforce literacy, and clear governance frameworks – are virtually guaranteed to underperform. The pilot typically works because it operates in a controlled environment with dedicated resources and concentrated attention. The moment it attempts to scale across operational systems with distributed responsibility, these advantages evaporate.

What Practitioners Are Worried About

The highest-rated concern, by a clear margin, was the risk of younger engineers over-relying on AI outputs. 85 per cent of respondents expressed at


76%
Of AI projects fail to achieve expected returns
despite organisation investment and pilot initiatives

least some concern, with 31 per cent rating it as very concerning. This reflects a profession where experience, judgement, and physical intuition are central to safe and effective operations.

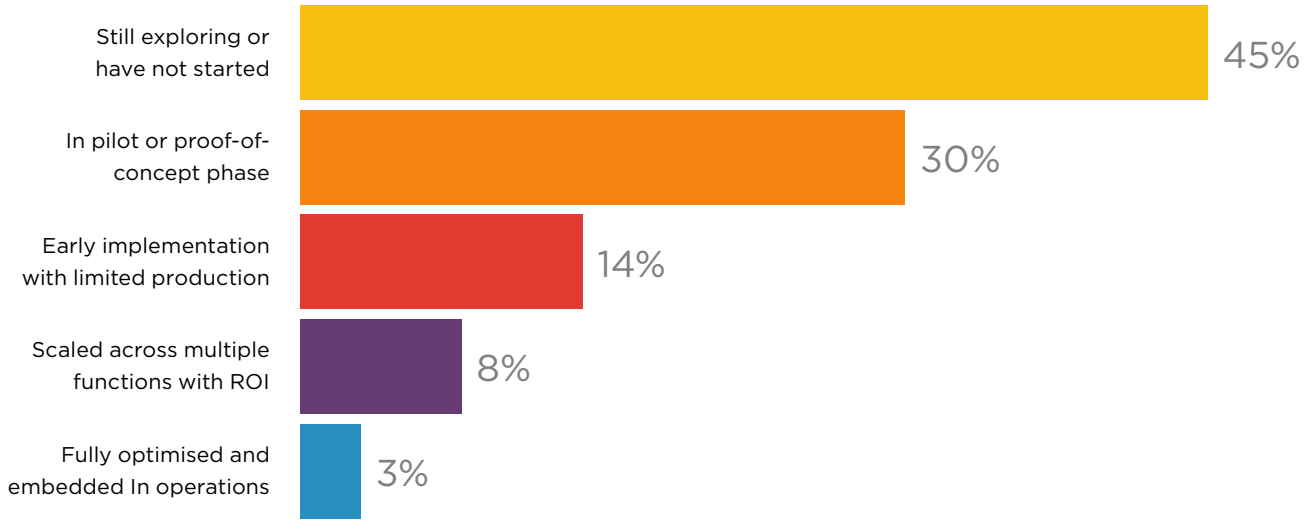
> **"AI doesn't know when it doesn't know – and that's what makes it dangerous. It can't signal uncertainty the way a human apprentice might. Without expert review, hallucinations get mistaken for insight."**
>
> **Maintenance and Reliability Expert**

Accountability and transparency concerns followed closely. More than three-quarters of respondents worried about the inability to explain or audit AI decisions, and 81 per cent expressed concern about unclear accountability when AI recommendations lead to harm. These are governance questions that most organisations have not yet answered.

The real opportunity, articulated clearly in the MAINSTREAM masterclass series, lies not in optimising an existing process (which delivers perhaps 10 per cent improvement) but in reinventing the process entirely to be dynamic, responsive, and tied to actual operating conditions. This requires organisations to first answer fundamental questions about how their maintenance processes should work if resources were unlimited and information perfect, then work backward to understand where AI and automation can help bridge the gap. Most organisations instead start by asking where existing processes have bottlenecks and try to smooth them with technology. The difference in outcome is profound.

Survey Response

When asked about this challenge, the 715 survey respondents provided the following perspective:



What best describes your organisation's current stage of AI adoption in asset management and maintenance?

04

The Execution Discipline Gap

The most important finding across thirty years of this research may be the simplest: the profession knows what good looks like and consistently fails to execute it at scale. The gap is not in knowledge. It is in organisational discipline.

The Wrench Time Reality

The fundamentals of effective asset management have not changed meaningfully in three decades. Yet Australian industrial organisations average only 29 per cent wrench time for maintenance personnel, significantly below the international best practice benchmark of 55 to 60 per cent. This means that the typical maintenance technician spends 71 per cent of their available time on non-value-adding activities: waiting for parts, searching for documentation, managing administrative tasks, or waiting for access to equipment.

According to our MAINSTREAM 2026 Survey, Maintenance teams spend an average of 31 per cent of their work time waiting for parts, documentation, or access to equipment due to planning and coordination deficiencies. Only 41 per cent report high compliance with established planning and scheduling procedures. 45 per cent cite lack of resources as the primary obstacle to compliance. When organisations measure actual compliance against their own documented processes, the gap between theory and practice becomes unmistakable.

The organisations making progress share a consistent pattern: simultaneous attention to process, technology, and behaviour, with explicit leadership accountability at every level. One major water utility's multi-year journey from reactive to planned maintenance required structured KPI definitions and accountability mechanisms – not new knowledge, but new discipline. Their success took four years to achieve stable planned maintenance rates above 70 per cent, a pace slower than many executives expect but faster than most organisations actually achieve.

Why Knowledge Doesn't Translate to Action

The root causes of execution discipline failure are not technical. They are organisational and cultural. Competing priorities create pressure to defer preventive activities in favour of reactive responses. Cost pressures incentivise cutting corners on planning and preparation. Accountability mechanisms are often diffused across multiple functions, making it unclear who is responsible for compliance. And perhaps most importantly, the benefits of good execution (fewer failures, lower costs, improved reliability) are often invisible because they are negative events that do not happen.

> "In my thirty-plus years involved in reliability and maintenance, I haven't actually seen much of a change in the fundamentals. That doesn't mean they're not a challenge to get right. The gap between our documented processes and actual practice is significant. We have detailed procedures for planning, scheduling, and job closure – but in the daily rush to keep production running, these disciplines often get compromised."
>
> Roundtable Facilitator


29%
Average wrench time for maintenance personnel vs 55–60% international best practice

The key to closing the execution discipline gap is making compliance visible and holding leaders accountable. Organisations that implement daily huddles focused on adherence to work management discipline, that track and measure wrench time and compliance metrics at the team level, and that tie leadership performance reviews to these operational metrics rather than only cost or availability metrics, report significant improvements. The change is not in what processes should be followed, but in how seriously organisations enforce them.

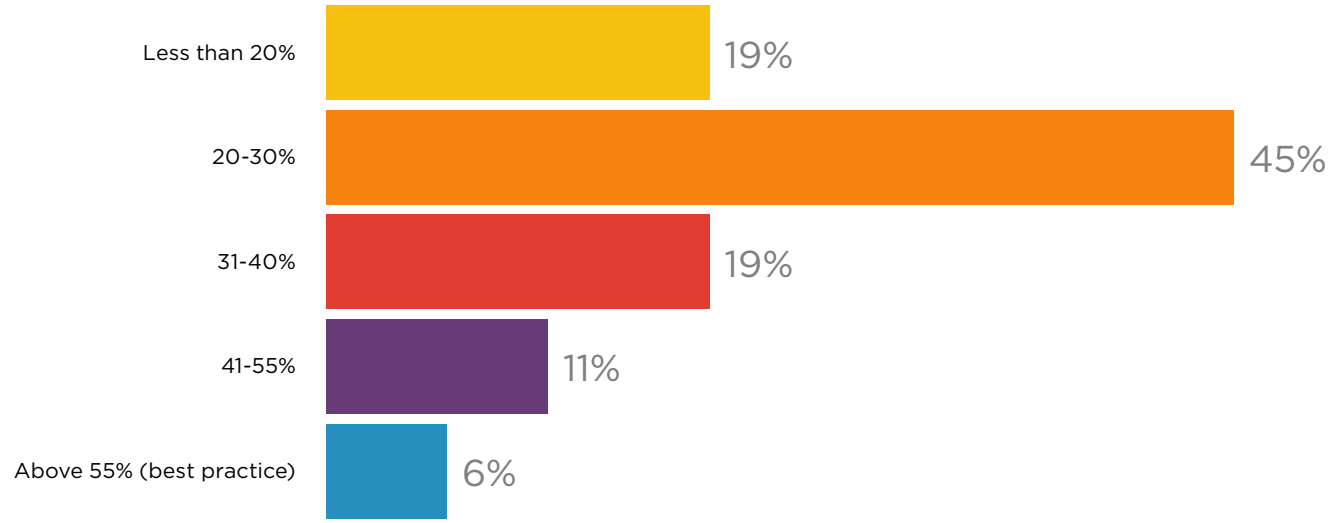
Technology Cannot Compensate for Discipline Failures

A critical insight from this year's research is that no amount of advanced analytics can compensate for poor execution of maintenance tasks or inadequate planning. Many organisations pursue digital solutions before establishing the foundational processes necessary for success, and they consistently report disappointing outcomes. Installing sophisticated work management systems on a foundation of poor planning discipline is like "installing a Formula One engine in a car with bald tyres"; the technology cannot compensate for the underlying failure.

The organisations with the highest compliance rates, paradoxically, often have simpler systems than those with poor compliance. What distinguishes them is not the sophistication of the technology but the consistency of application. They have leaders who review compliance metrics regularly, who hold teams accountable for adherence, and who ensure that execution discipline is rewarded and respected. That is the discipline that the technology must support, not replace.

Survey Response

When asked about this challenge, the 715 survey respondents provided the following perspective:



What percentage of available work time do your maintenance technicians spend on direct value-adding activities (wrench time)?

45%

Of organisations cite lack of resources as primary obstacle to compliance with planning procedures

05

The Middle Management Bottleneck

Across multiple roundtable sessions, a striking and largely unaddressed barrier to transformation emerged: middle management. Senior leadership endorses strategic change. Frontline workers understand the need for it. But middle management remains unconvinced, sceptical, or actively resistant.

The Structural Dilemma

This is not simple obstinacy. Middle managers face a genuine dilemma: they are accountable for operational performance under existing systems and processes, yet they are being asked to champion change that introduces uncertainty and disruption. Without clear articulation of how new approaches will make their roles more effective rather than more complicated, their scepticism is rational.

Our research found that 71 per cent of middle managers feel overwhelmed. The average span of control has increased from 10.9 to 12.1 direct reports. Managers are simultaneously expected to maintain current operations, implement new systems, mentor staff, and respond to crises. The bandwidth for transformation work is simply not there. When transformation initiatives are added as "additional responsibilities," middle management naturally prioritises the things they are accountable for and on which their performance is judged.

> "The only one problem, and the main blocker holding us from the top, is that old mindset, the backpack you carry from the past. We have executive buy-in. We have frontline teams ready to go. But the layer in between – that's where things stall."
>
> Asset Management Lead, Infrastructure

The pattern holds across workforce, data, technology, and strategy initiatives. The middle layer is consistently where transformation either gains traction or goes to die. Organisations that explicitly designed middle management engagement programmes, rather than assuming alignment would cascade naturally from executive buy-in, reported significantly better results. These programmes include training on why the change matters, involvement in design decisions that affect their roles, clear articulation of how the change makes their jobs easier or more rewarding, and explicit removal of conflicting accountability measures.

The Performance Metrics Problem

A critical barrier to middle management alignment is misaligned performance metrics. A maintenance manager who is held accountable for cost reduction will naturally resist initiatives that require investment. A production manager who is rewarded for equipment uptime will defer maintenance activities that reduce short-term availability to improve long-term reliability. A reliability engineer who is measured only on mean time between failures may not prioritise the preventive work that is necessary to achieve sustainable performance.

The solution is not simply to change the metrics but to engage middle management in designing the new metrics and helping them understand how the changes benefit their roles and careers.


71%
Of middle managers report feeling overwhelmed;
average span of control up from 10.9 to 12.1 direct reports

Organisations that approach this as a negotiation and problem-solving exercise with middle management, rather than a directive from above, report far better results than those that announce new systems and expect compliance.

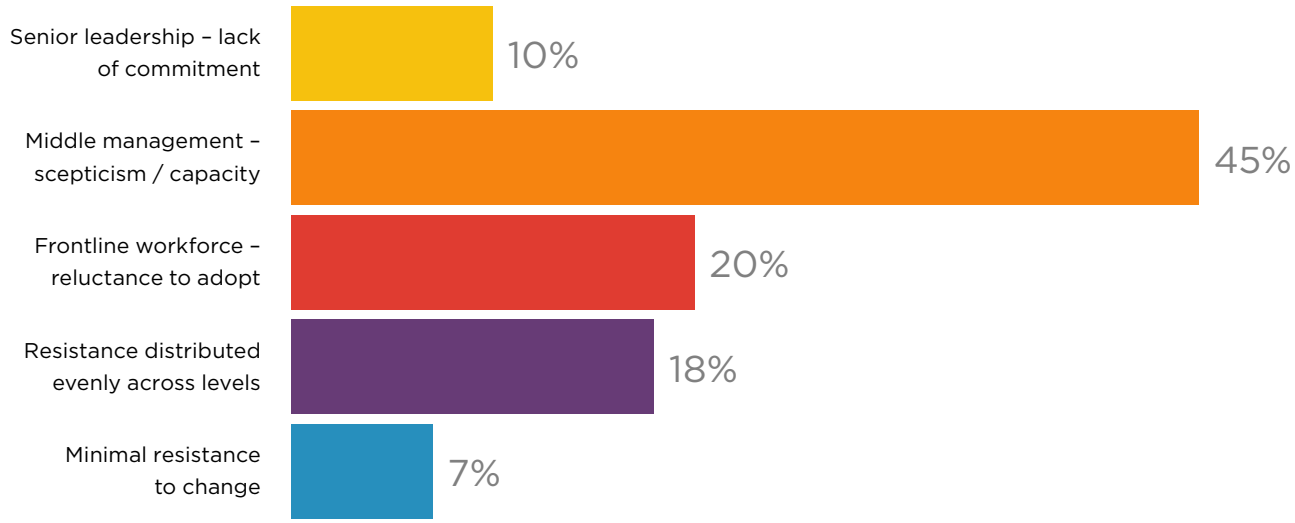
Creating Middle Management Champions

The most successful transformation initiatives treat middle managers not as obstacles to be overcome but as partners to be enrolled. This requires several explicit actions: involving them early in the design of new approaches, showing them how these approaches address the pain points they experience (unreasonable timelines, resource constraints, conflicting priorities), enlisting them to help design implementation approaches that actually work in the field, and most importantly, changing the metrics by which they are evaluated to reward the new behaviours rather than the old ones.

One major railway operator achieved breakthrough results in their operational transition from reactive to planned maintenance by bringing middle managers into the design of the new approach from the beginning, acknowledging the additional workload in the transition period and providing temporary staff support to absorb it, and explicitly changing how supervisors were evaluated to reward compliance with the new planning discipline rather than just cost management. The result was a transition that took three years instead of the initially planned one year, but achieved sustainable buy-in and sustained compliance.

Survey Response

When asked about this challenge, the 715 survey respondents provided the following perspective:



Where does resistance to change and transformation initiatives most commonly occur in your organisation?

06

Workforce Wellbeing and the People Metrics Gap

Every participating organisation could provide detailed data on asset condition, failure rates, and maintenance costs. Almost none could provide equivalent data on workforce fatigue levels, burnout risk, team cohesion, or workload sustainability. You cannot manage what you do not measure.

The Mental Health Crisis

64 per cent of organisations report increasing mental health challenges among maintenance and reliability personnel. Mental health now accounts for 10.5 per cent of serious workers' compensation claims, with a median time lost of 35.7 working weeks compared to 7.4 weeks for all claims, and median compensation of $67,400 compared to $16,300. For FIFO workers, 33 per cent experience depression or anxiety above clinical cutoff. Suicide rates in mining, construction, and energy are 80 per cent higher than the general population.

The economic cost is staggering, but the human cost is immeasurable. These are not soft issues. Mental health challenges directly affect decision quality, attention to detail, safety, and ultimately the reliability of the assets these professionals maintain. One roundtable participant noted the direct line from workforce wellbeing to safety and asset outcomes: when people are tired, stressed, or disengaged, they miss things. In maintenance, the things they miss can have serious consequences.

The Absence of People Metrics

Perhaps the most striking insight from this year's research is the absence of systematic people metrics in maintenance organisations. Every participating organisation could provide detailed data on asset condition, failure rates, and maintenance costs. Almost none could provide equivalent data on workforce fatigue levels, burnout risk, team cohesion, or workload sustainability. This represents a profound governance failure.

> **"I'm a great believer that family comes first. The job's always going to be there when you come back. But the reality is, we track every metric on our assets – uptime, downtime, mean time between failures – and we have nothing equivalent for our people. No measurement of burnout, fatigue, or workload sustainability."**
>
> **Maintenance Superintendent, Mining**

Organisations reporting high scores on Organisational Health Index assessments showed strong correlations with team performance, stability, and retention. This suggests that investment in workforce wellbeing, flexibility, and team cohesion may represent one of the highest-return investments available to maintenance organisations, yet it remains one of the least measured and least funded. The absence of metrics creates a double failure: first, the problem is invisible, so it cannot be managed; second, the invisible problem becomes someone else's responsibility, so no one feels accountable.

33%

Of FIFO workers experience depression or anxiety above clinical cutoff; suicide rates 80% higher than general population

Diversity as Capability, Not Compliance

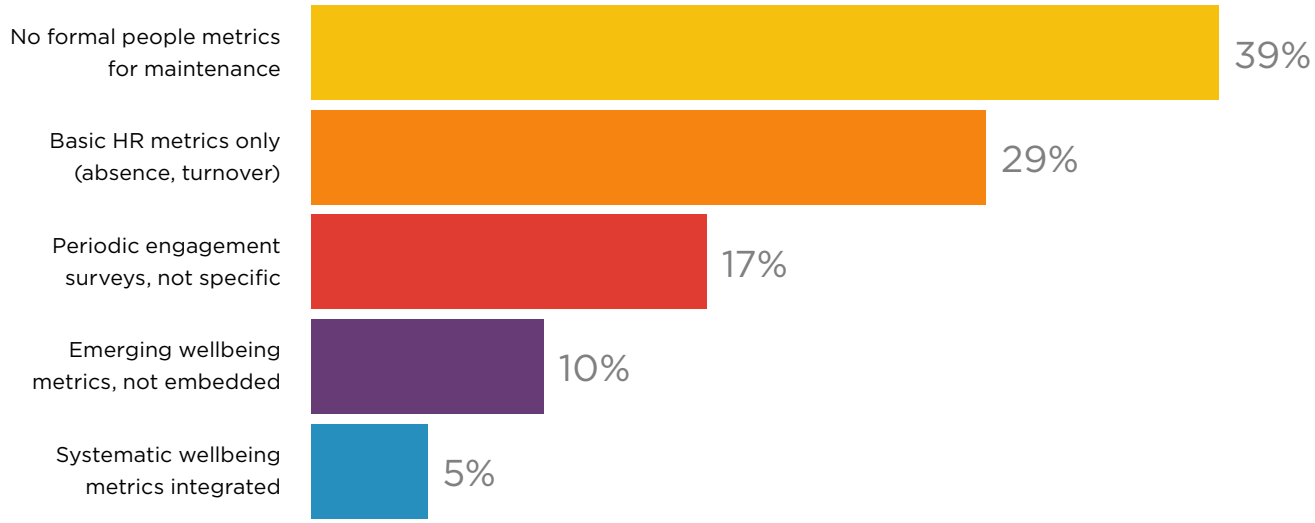
Women represent only 16.8 per cent of the maintenance and reliability workforce in Australian heavy industry, with even lower representation in leadership positions. Research from Engineers Australia shows that over 18% of engineering graduates in Australia are female, yet only 8% enter the engineering workforce after graduation. Within ten years, half of them leave the profession—meaning that after a decade, only 4% of engineers in Australia are female and Australian-educated.

Roundtable participants offered practical illustrations: one facilities management organisation found that changing the job title from "handyman" to "facilities technician" significantly increased female applicants. Another reported measurable quality improvements when women joined previously all-male maintenance teams. A third described diversity benefits extending to problem-solving approaches, safety culture, and customer interactions. Diverse teams achieve 19 per cent higher innovation revenue.

The implication is clear. The talent shortage in maintenance and reliability is partly self-inflicted. The industry is drawing from a limited talent pool because it has not created the inclusive workplace cultures, flexible work arrangements, and visible career pathways that would attract and retain diverse candidates. Reposition the profession to attract diverse talent requires reviewing job titles, work arrangements, career pathways, and workplace cultures through the lens of what would attract candidates currently excluded from the field.

Survey Response

When asked about this challenge, the 715 survey respondents provided the following perspective:



Does your organisation systematically measure workforce wellbeing metrics (fatigue, burnout risk, workload sustainability) for maintenance and reliability personnel?

07

Strategic Misalignment and the Language Barrier

Despite years of industry focus on strategic asset management principles, only 23 per cent of organisations believe their asset management strategy is fully aligned with and understood within the broader organisation.

The Communication Failure

Survey data indicates that 67 per cent of asset managers believe their organisations prioritise short-term cost reduction over long-term asset performance. Only 26 per cent have formal mechanisms to translate corporate strategy into asset management plans. Only 36 per cent of survey respondents indicate regular involvement in strategic business planning sessions. The most consistently cited barrier to strategic alignment is not resistance but incomprehension. Technical teams and executive leadership speak fundamentally different languages, and neither side has developed adequate translation mechanisms.

> "We're engineers – we speak the language of reliability, condition assessment, and risk mitigation. The executive team speaks the language of market share, profit margins, and shareholder returns. When we can't connect these worlds effectively, our initiatives don't get prioritised."
>
> Head of Maintenance, Manufacturing

This communication failure has measurable consequences, with asset failures often traced back to misalignment between corporate strategy and maintenance execution. The frustration is widespread: executives acknowledge that asset performance matters to business success while simultaneously treating maintenance primarily as a cost centre rather than a value driver. The resolution requires asset management professionals to develop the business communication skills necessary to frame technical requirements in terms that resonate with financial decision-makers: uptime translates to revenue, reliability translates to customer satisfaction, and maintenance strategies should be presented in terms of their contribution to these business outcomes.

Integrating Safety, Risk, and Asset Management

Nowhere is the cost of organisational silos more visible than in the relationship between safety, risk, and asset management functions. Our research indicates that only 28 per cent of organisations have achieved substantial integration between these inherently interconnected domains. These three domains are structurally separated: different functional areas use different risk languages, operate on different timeframes, and report through different organisational hierarchies. Asset managers think in terms of fifty-year asset lives; safety professionals respond to immediate incident risks; finance teams operate on quarterly cycles.

The consequences are serious. A recent National Safety Council's survey found that 28% of machinery-related accidents involved equip-


28%
Of serious incidents have maintenance factors; only 31% achieve integrated safety-asset management

ment that had not been properly maintained (National Safety Council, 2024). Without shared decision-making frameworks that accommodate these different perspectives, organisations default to optimising within silos rather than across the enterprise.

The Trade-off Framework Problem

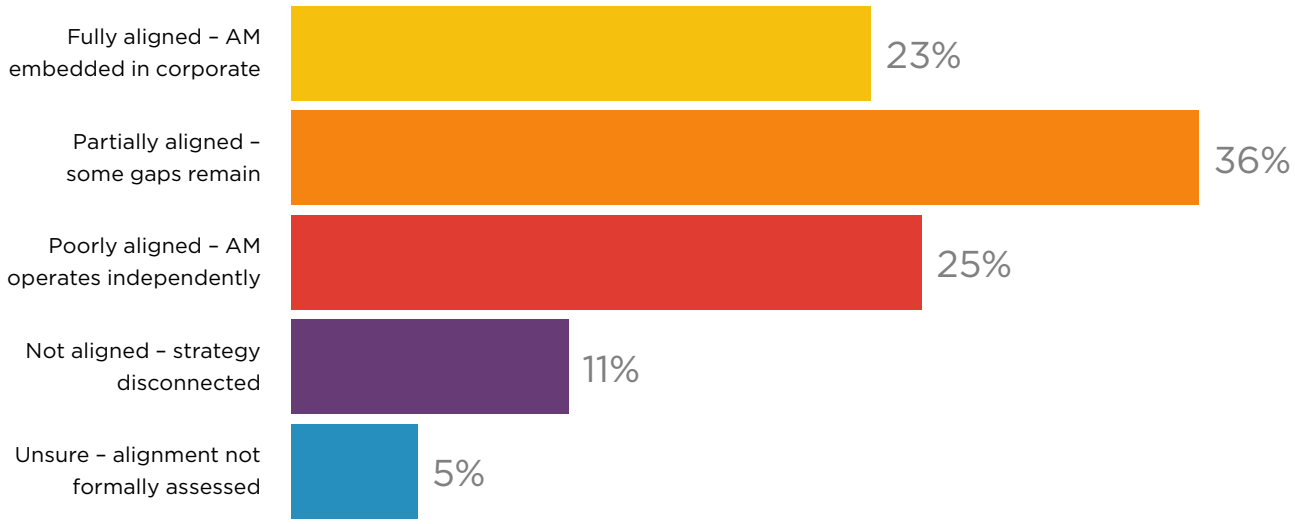
One major rail transport operator described evaluating $100 million in planned asset renewals against financial targets, requiring explicit trade-off analysis between cost savings and increased safety and reliability risk. The frameworks for making these trade-offs transparently, with proper governance and documentation, remain underdeveloped across the industry. When these frameworks are absent, one of two things typically happens: either safety or asset considerations are neglected in favour of cost, or cost overruns occur because trade-offs are discovered late in the process and require rework.

> **"We have safety management systems, asset management systems, and risk management frameworks – but they don't talk to each other effectively. The result is duplicate work, inconsistent decision-making, and missed opportunities to address risks holistically."**
>
> **Risk Manager, Water Utility**

The integration challenge is structural, not technical. It requires developing shared risk languages that bridge the different perspectives, creating common decision-making processes that bring these functions together early in the planning cycle, and establishing governance mechanisms that ensure all three dimensions are considered in major decisions. Organisations that have begun this work report lower overall risk, better resource allocation, and stronger defensibility when decisions are questioned.

Survey Response

When asked about this challenge, the 715 survey respondents provided the following perspective:



How well aligned is your organisation's asset management strategy with its broader corporate strategy?

08

System Fragmentation and the Data Trust Deficit

Organisations operate an average of 8 to 12 separate systems containing critical asset information, with only 26 per cent achieving meaningful integration between platforms. The result is a parallel information economy where the official record is incomplete and the real knowledge lives in people's heads.

The Integration Reality

One major power distribution utility reported 100 per cent of finance data integrated, 80 per cent of asset data, but only 30 per cent of work data. This asymmetry is characteristic: the operational data that matters most for maintenance decisions is consistently the hardest to integrate. Engineers rate the reliability of their asset data at just 5.8 out of 10, with inconsistency as the primary concern. While 91 per cent of organisations view data as a strategic asset, only 34 per cent have implemented formal data governance frameworks.

Post-merger integration creates particularly acute challenges. One major water corporation, brought back together from multiple alliances, described years of effort to consolidate legacy systems with areas still operating in alliance mode. The lesson, repeated across several participants, is that organisational mergers create a data integration debt that technical solutions alone cannot resolve.

System fragmentation creates what economists call a "separation of knowledge": the information exists, but it is scattered across systems that do not communicate, effectively hiding it from those who need to use it.

The Visualisation Problem

Many organisations invest in visualisation and dashboard tools expecting they will solve data problems. The result is often disappointing. Installing visualisation tools on poor-quality data merely scales the visibility of the problem: more people see inconsistent or incomplete data, and trust erodes faster. One asset-intensive organisation spent $3 million implementing a new business intelligence platform only to discover that the data quality was so poor that the dashboards were actively misleading decision-makers.

> "Analytics is like a factory. I'm providing the gas, the water, the timber, the steel – those foundational products that are shared across all those factories. I have to get that right, or everyone's just producing garbage."
>
> Reliability Manager, Oil & Gas

The fundamental insight is that technology is not the constraint on data integration. Organisations have the technical capability to integrate systems; what they lack is the governance discipline to enforce data standards, the process discipline to maintain data quality, and the cultural commitment to treat data as an asset that requires active management.


5.8/10
Engineers' confidence rating in asset data reliability;
only 34% have formal data governance frameworks

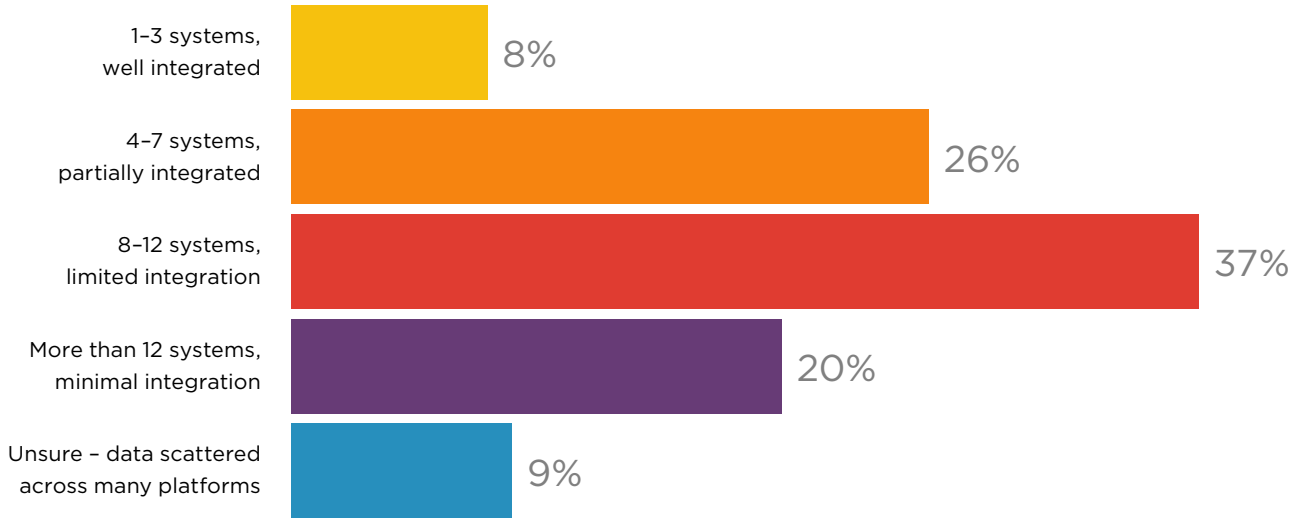
Building Data Maturity

Organisations that have begun to address the data trust deficit do so through a systematic approach that starts with governance, not technology. This includes appointing data owners with clear accountability, establishing standards aligned with frameworks such as ISO 14224, enforcing data discipline at the point of entry (because fixing data at source is far more cost-effective than cleaning it later), and systematically monitoring data quality as an operational metric.

One mining organisation's approach to treating data with the same lifecycle management discipline applied to physical assets – from design through procurement, maintenance, and eventual retirement – represents a maturity of thinking that most organisations have not yet reached. The organisations that succeed with AI, predictive analytics, and digital transformation will be those that first succeed with this unglamorous work of data governance and quality assurance.

Survey Response

When asked about this challenge, the 715 survey respondents provided the following perspective:



How many separate systems does your organisation use to manage critical asset information, and how well are they integrated?

09

The Apprenticeship and Training Pipeline Crisis

The industry left a twenty-year gap in apprenticeship investment, driven by boom-bust cycles that discouraged long-term workforce planning. That gap is now a chasm that cannot be closed quickly, and the workers needed for tomorrow's assets are not in the pipeline today.

The Demographic Discontinuity

Track inspectors in their sixties with forty years of experience work alongside a generation for whom two to three years in any role has become the norm. The younger generation's approach is not inherently worse – it is different. They expect digital access to information, want to understand the reasoning behind procedures, and are drawn to technology-enabled problem solving. But training programmes still assume a linear, time-served model that no longer reflects how careers unfold.

Trade commencement numbers have fallen 15.3 per cent year-on-year. Apprentice numbers have dropped from 485,440 in 2012 to 267,385 by 2024. Competition between electrical and mechanical trades limits supply. One mining company faces an electrical apprentice shortage two or more years before new infrastructure arrives. One state's establishment of five new technical colleges represents a promising structural response, but the lag between training investment and operational capability remains measured in years, not months. Modern youth often lack the hands-on foundation that previously fed trade careers.

The Pipeline vs Demand Mismatch

The fundamental problem is timing. Infrastructure investments are announced and implemented on cycles measured in years or decades. Training programmes require lead times measured in years. But apprentice commencement decisions are made by individuals and families on shorter cycles and are responsive to economic conditions and labour market signals. During downturns, apprenticeships decline sharply because neither employers nor potential apprentices see the opportunity. By the time economic conditions improve, the damage to the pipeline is done: the cohort that did not enter apprenticeships a few years ago is now too old to start. The skills shortage does not emerge smoothly; it suddenly appears as a crisis when organisations discover they cannot hire the workers they need.

> "We've left a 20-year gap where we should have had lots of people coming through. When I come to retire, there'll be a generation missing – and we'll be saying, sorry, we should have spent more time with apprentices. The 40 years of experience that we're probably going to struggle to replace when these people retire."
>
> **Maintenance & Reliability Superintendent, Rail Transport**

The industries facing the most acute shortages are those where boom-bust cycles have been most pronounced. Mining, construction, oil and


15.3%
Year-on-year decline in trade commencements;
Australia needs 83,000 additional tradespeople

gas, and energy have all experienced periods where they aggressively reduced apprenticeships followed by periods where they desperately needed workers but had no pipeline to draw from. The lesson is clear: apprenticeship investment must be counter-cyclical and structural, not responsive to immediate labour market conditions.

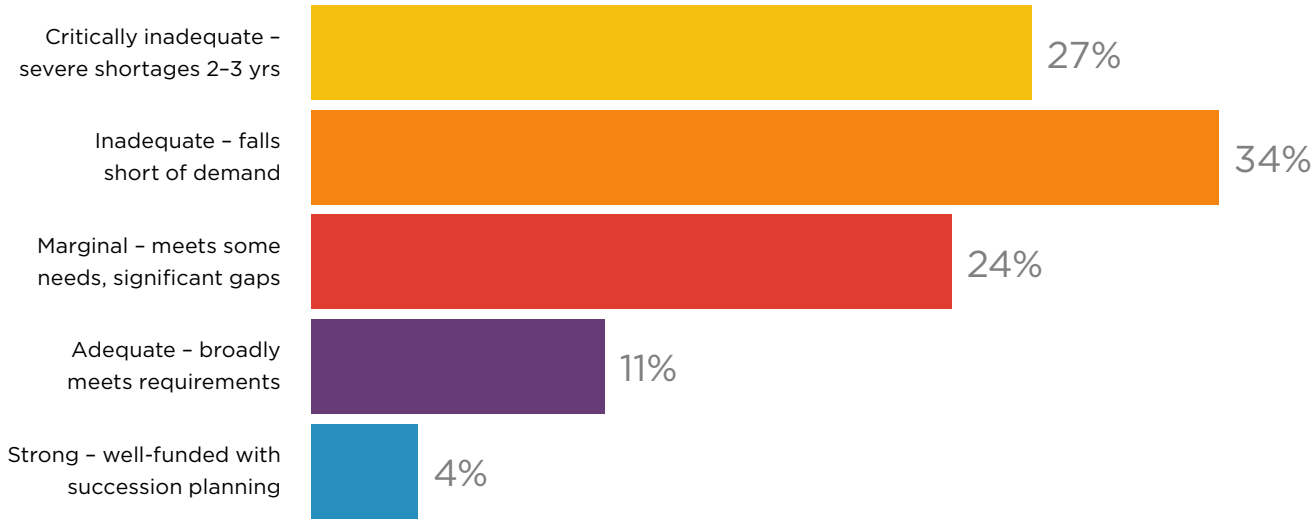
Addressing the Gap: Structural Solutions

Several structural solutions are beginning to emerge. South Australia's technical college initiative and AUKUS-driven infrastructure investment in defence-related trades represent government intervention aimed at resetting the apprenticeship pipeline. Universities are creating pathways that allow younger workers to enter technical fields while continuing to develop theoretical knowledge. And some organisations are experimenting with accelerated apprenticeships and competency-based progression rather than time-served models to reduce the time to productive employment.

But these solutions take years to produce results. The skills shortage affecting organisations in 2026 is largely determined by training and apprenticeship decisions made five to seven years ago. Organisations facing acute skills shortages must therefore pursue parallel strategies: immediate actions to retain and motivate existing staff (increasing pay, improving conditions, offering training), medium-term actions to accelerate training for people already in the workforce, and long-term actions to address the pipeline deficit through partnership with educational institutions and structured apprenticeship programmes.

Survey Response

When asked about this challenge, the 715 survey respondents provided the following perspective:



How would you rate the adequacy of your organisation's trade apprenticeship and technical training pipeline to meet future workforce needs?

10

Safety, Risk, and Asset Management Silos

Only 28 per cent of organisations have achieved substantial integration between safety, risk, and asset management functions. These three domains are inherently interconnected, yet they operate in separate systems, speak different risk languages, and report through different organisational hierarchies.

The Siloed Reality

The consequences are serious. The Australian Safety and Compensation Council estimates that 27 per cent of serious workplace incidents in heavy industry have maintenance-related contributing factors. Only 31 per cent of organisations achieve integrated safety-asset management. Different functional areas operate on fundamentally different timeframes: asset managers think in terms of fifty-year asset lives; safety professionals respond to immediate incident risks; finance teams operate on quarterly cycles.

An equipment failure that occurs due to maintenance deferral may not be formally recorded as a safety incident, even if it could have resulted in injury. A safety near-miss that is addressed through procedural change may not trigger a review of asset condition, even if the underlying cause was equipment degradation. And planned maintenance deferrals to meet financial targets may increase safety risk without anyone explicitly evaluating the trade-off.

The Trade-off Framework Deficit

One major rail transport operator described evaluating $100 million in planned asset renewals against financial targets, requiring explicit trade-off analysis between cost savings and increased safety and reliability risk. The frameworks for making these trade-offs transparently, with proper governance and documentation, remain underdeveloped across the industry. When these frameworks are absent, one of two things typically happens: either safety or asset considerations are neglected in favour of cost, or cost overruns occur because trade-offs are discovered late in the process and require rework.

> **"We have safety management systems, asset management systems, and risk management frameworks – but they don't talk to each other effectively. The result is duplicate work, inconsistent decision-making, and missed opportunities to address risks holistically."**
>
> **Asset Manager, Water Utility**

The integration challenge is structural, not technical. Different functional areas use different risk languages: asset managers talk about reliability and failure modes; safety professionals talk about incident likelihood and consequence; finance teams talk about cost and return on investment. These languages are not inherently incompatible, but translating between them requires frameworks that most organisations have not developed.

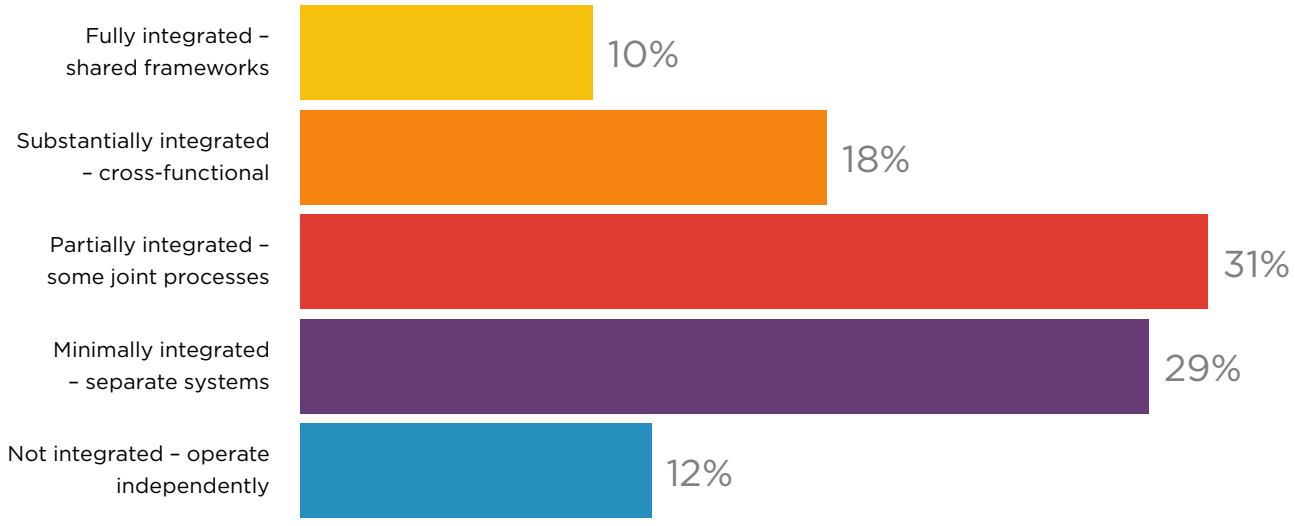
Building Integrated Governance

Organisations that have begun to integrate these functions do so through several mechanisms: developing shared risk languages that bridge the different perspectives, creating common decision-making processes that bring these functions together early in the planning cycle (not after decisions are made), establishing governance mechanisms that ensure all three dimensions are considered in major decisions, and most importantly, changing measurement systems so that success is defined in terms of managing across all three dimensions rather than optimising within silos.

One defence organisation established a quarterly risk review process that brings together asset management, safety, and reliability functions to evaluate major decisions against integrated risk criteria. The result was not just better risk management but also more efficient resource allocation, because decisions that appeared necessary from a single functional perspective often became unnecessary when viewed from the integrated perspective. Organisations that implement similar integrated governance mechanisms report lower overall risk, better resource allocation, and stronger defensibility when decisions are questioned.

Survey Response

When asked about this challenge, the 715 survey respondents provided the following perspective:



To what extent are safety management, risk management, and asset management functions integrated in your organisation?

11

Decarbonisation and the Asset Transition Challenge

The energy transition is rewriting asset strategy faster than most organisations can adapt. Maintenance and reliability professionals are being asked to manage increasingly complex hybrid portfolios of traditional and low-carbon assets simultaneously, often without the skills, knowledge, or planning frameworks to succeed.

The Scope and Urgency

Australian industrial organisations are facing unprecedented demands for decarbonisation. 84 per cent of large industrial companies have established emissions reduction targets. 62 per cent are targeting net-zero by 2050. Yet 38 per cent have net-zero commitment with a specific date, while 27 per cent are unsure of any commitment. Team understanding of decarbonisation averages only 3.1 out of 10. The emotional response from staff reflects the uncertainty: 34 per cent report being cautiously optimistic, 30 per cent are uncertain and anxious, 12 per cent are disengaged, and 12 per cent are resistant.

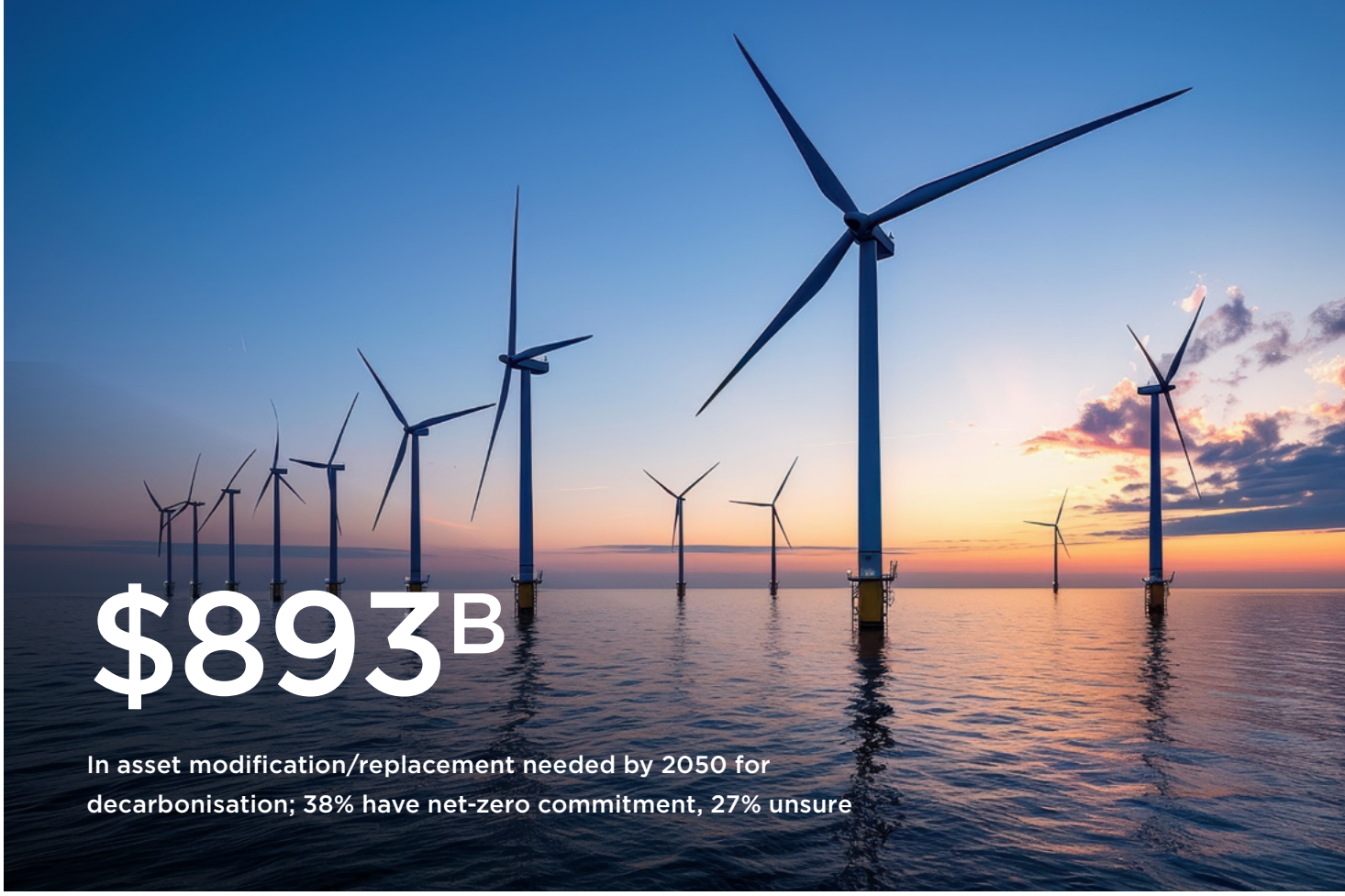
Only 7 per cent of respondents have Marginal Abatement Cost Curve (MACC) fully embedded in planning; 55 per cent are not sure about it. The integration of new technologies with existing assets is cited as the top barrier (67 selections), followed by budget and cost concerns (63), skills gaps (43), change management (35), and supply chain challenges (31). 48 per cent rate decarbonisation pressure on maintenance at 3 out of 5; 27 per cent rate it at 4 out of 5. These are not abstract strategic pressures; they are operational pressures affecting how maintenance work is prioritised and resourced today.

The Hybrid Portfolio Challenge

The fundamental challenge is not decarbonisation itself but managing the transition. Organisations cannot simply shut down existing assets and replace them with low-carbon alternatives overnight. Instead, they must maintain complex hybrid portfolios where traditional and low-carbon assets operate simultaneously, often with different failure modes, maintenance requirements, and staffing needs.

> **"Our fleet manager is now asking us to maintain electric drivetrains, battery storage systems, and hydrogen fuel cell equipment alongside diesel engines and combustion-based power generation. Our team spent thirty years learning how to maintain combustion engines. Now they're being asked to maintain technologies that didn't exist a decade ago, without adequate training or knowledge transfer."**
>
> **Fleet Maintenance Manager, Mining**

A fleet manager in transport described the practical challenge: maintenance teams experienced with combustion engines are now being asked to maintain electric drivetrains, battery storage, and hydrogen fuel cells. The failure modes are different. The diagnostic tools are



different. The maintenance intervals are different. And the supply chains for parts are nascent and unpredictable. The same is true for energy utilities managing the transition from coal and gas to renewables, nuclear, and grid storage.

Skills and Knowledge Gaps

82 per cent of large industrial companies anticipate significant workforce capability gaps in low-carbon technologies. Skills gaps are particularly acute in regional areas where organisations lack access to training facilities and specialist knowledge. Existing maintenance professionals often have five to ten years until retirement; investing in their retraining is necessary but provides limited time to recoup the investment. Younger workers bring digital literacy that may help with complex control systems, but they lack the deep experience necessary for safe operation and troubleshooting.

The decarbonisation challenge intersects directly with the knowledge exodus obstacle. Organisations losing experienced staff with deep knowledge of existing systems simultaneously need to build expertise in entirely new systems. The timing is punishing. One coal-based power station operator is managing the simultaneous transition of a fifty-year-old coal fleet while building capability in grid-scale battery storage. Their maintenance workforce is simultaneously running out (retirement) and being asked to learn new technologies for which global expertise is still developing.

Planning and Decarbonisation Integration

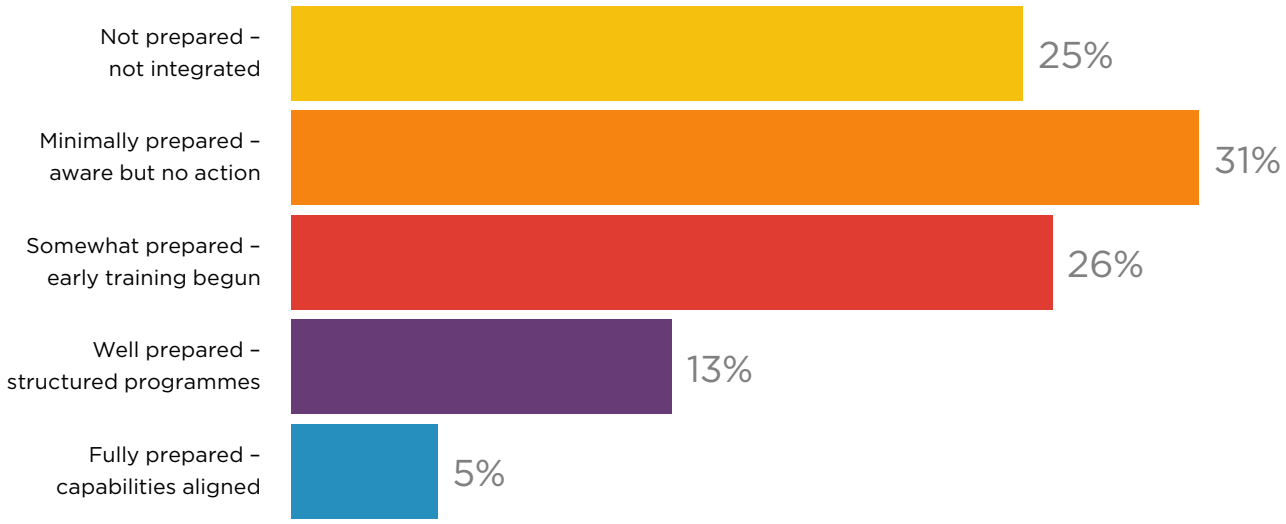
Organisations with early success in managing the decarbonisation transition share common characteristics: they involve maintenance and reliability professionals early in decarbonisation planning rather than presenting it as a fait accompli, they invest in training well before the new assets arrive rather than waiting until they fail, they develop transition plans that explicitly manage the hybrid period of old and new technology simultaneously, and they reframe decarbonisation not as a cost burden but as an opportunity to reset asset strategy and operational approach.

> "The biggest opportunity is to use decarbonisation as a catalyst to redesign how we think about asset management. Rather than just replacing diesel with electric, we can rethink maintenance strategies, work patterns, and team structures to adapt to the new technologies. But this requires involving operations from the beginning, not telling them what's coming and asking them to adapt."
>
> **Asset Strategy Lead, Energy Utility**

The organisations struggling most with decarbonisation are those treating it as a strategic initiative separate from asset management, rather than as a fundamental redefinition of the asset strategy itself. The path forward requires integrating decarbonisation targets into asset lifecycle planning, resetting maintenance strategies to align with different failure modes and operating characteristics, investing in training and knowledge transfer well in advance of technology transitions, and explicitly planning for the hybrid period where old and new assets operate simultaneously.

Survey Response

When asked about this challenge, the 715 survey respondents provided the following perspective:



How prepared is your maintenance and reliability team to manage the transition to low-carbon assets and technologies?


82%
Anticipate workforce capability gaps in low-carbon tech; skills gaps acute in regional areas

12

Shutdown & Turnaround Excellence

Shutdowns and turnarounds represent 60 to 80 per cent of annual maintenance budgets, yet only 32 of 100 shutdown projects are successfully implemented. Scope creep, planning failures, poor contractor management, and lessons-learned processes that generate insight but not change remain endemic.

The Scale and Stakes

One iron ore operation reported losing $2 million per hour in revenue during downtime; a 10-day shutdown costs $480 million. Power station shutdowns range from 45 to 85 days. Steel mill kiln outages run 15 to 30 days. Shutdown costs represent 25 to as much as 80 per cent of annual maintenance budgets. Yet 80 per cent of turnarounds exceed budgets by at least 10 per cent. 82 per cent do not meet performance expectations. 90 per cent experience scope creep, typically 10 to 50 per cent of total work.

62 per cent of refinery operators report difficulties sourcing skilled workers for turnarounds. The financial impact compounds: scope creep on a $50 million shutdown adds $5 to $25 million in unplanned costs. A 20 per cent cost overrun on a 10-day shutdown represents $96 million in lost revenue plus the cost overrun itself. This is not a peripheral issue; it is a material threat to financial performance.

The Scope Creep and Planning Problem

The most consistent theme across shutdown discussions was scope creep and lack of control. One consultant described going into a shutdown with 500 identified defects and discovering 1,200 more during the work. By day three, the shutdown had lost control of scope and was operating in reactive mode. Another described scope creep as driven by contractor incentives: "When a contract changes, it's usually the same people in different shirts," meaning contractors seek to place labour for work beyond the original scope.

> **"Scope freeze is a unicorn – we think it exists, we talk about it, no one's actually seen a proper scope freeze. The moment you start a shutdown, you find things you didn't expect, and the question becomes not whether to do them but how to manage them without losing the entire project."**
>
> **Shutdown Manager, Steel Manufacturing**

One Shutdown Superintendent from coal operations noted that "Planning is always blamed 78 per cent of the time," yet the real problem often lies earlier, in the distinction between planning and preparation. Planning defines what will be done. Preparation ensures the resources, information, and approvals are in place to do it. When these phases are conflated, what appears to be a planning failure is often a preparation failure discovered too late.

Operational Excellence Mechanisms

Organisations achieving successful shutdowns employ several mechanisms: the 30/30 rule (after 30 minutes of problem-solving, escalate to supervisor; after another 30 minutes, escalate to shutdown coordinator) delivered more than

10 per cent uplift in tool-time per shift. Clear expectations for work-front start times (6:45 arrival) create discipline and predictability. Commercial controls ensure management overhead does not exceed 15 per cent of total shutdown cost, and supervision/fixed costs do not exceed 20 per cent. Digital workforce assurance is replacing spreadsheet-based contractor management, improving visibility and accountability.

Data-driven performance frameworks, applied to shutdowns across rail infrastructure and coal terminal operations, are enabling optimisation in real time. One rail operator reduced shutdown duration by tracking work completion rates, contractor performance, and resource deployment through a real-time dashboard, allowing course corrections within the shutdown rather than finding problems during post-shutdown review.

Lessons Learned as a Consistent Failure

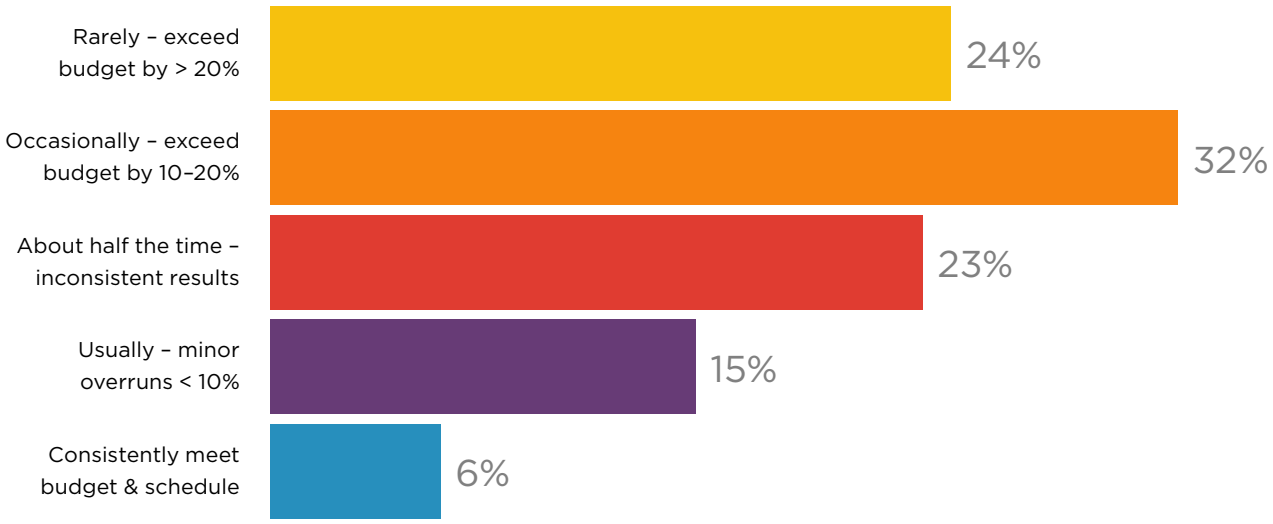
A striking finding across all shutdown discussions was that lessons-learned processes, while nearly universal, rarely drive improvement. One superintendent described lessons as "watermelons – green on the outside, red on the inside," meaning KPIs look good but aren't driving actual improvement. Organisations that conduct extensive post-shutdown debriefs often find themselves repeating the same errors in the next shutdown because the lessons are documented but not systematically implemented.

> **"There is no silver bullet... but it starts from the top down. Leadership has to own the discipline of execution, setting clear expectations, removing obstacles, and holding people accountable for adherence to plans. When that discipline exists, everything else becomes possible."**
>
> **Shutdown Consultant**

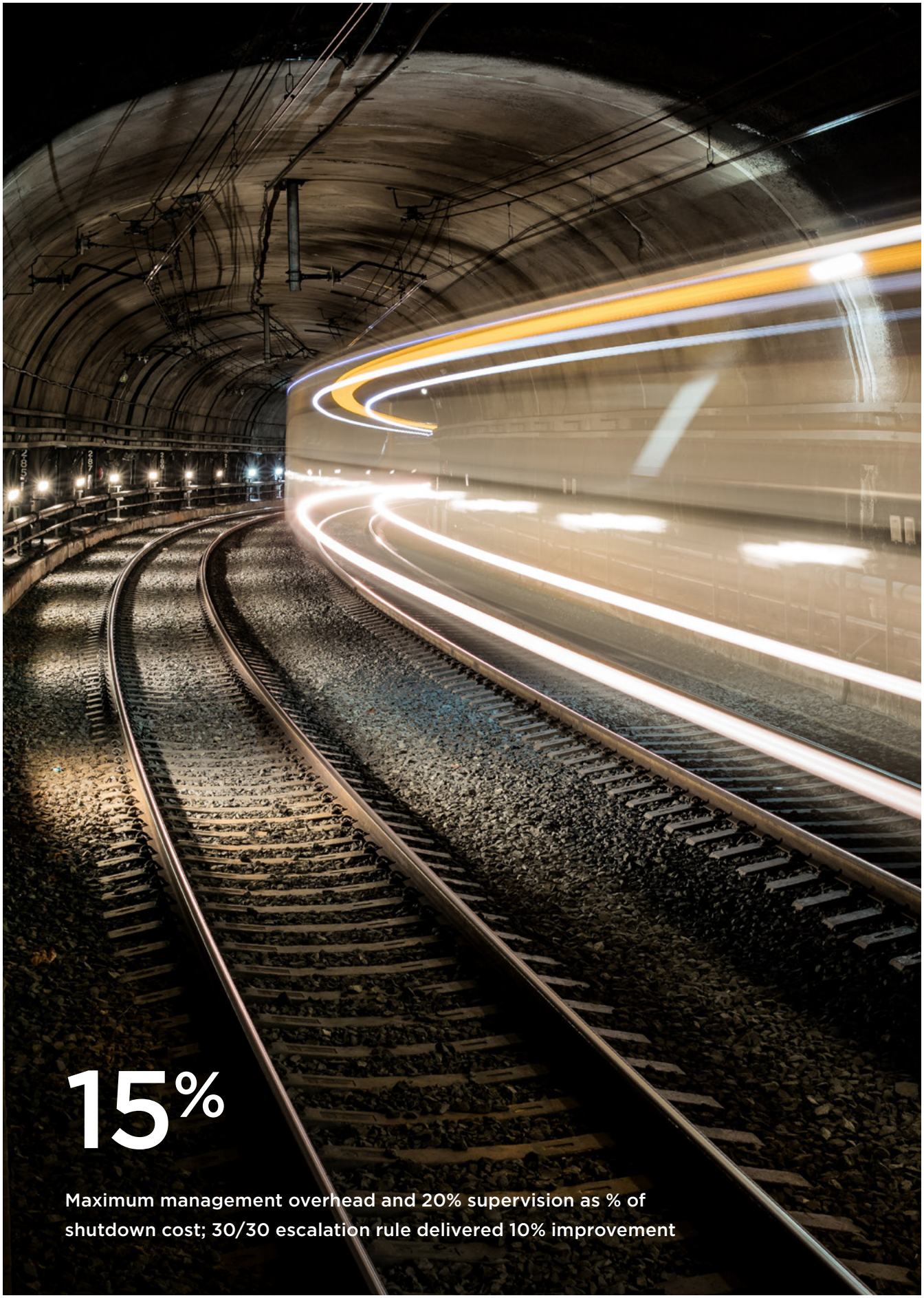
The path forward requires several elements: treating shutdowns as critical operational events that deserve executive-level attention and accountability, explicitly distinguishing between the planning phase (deciding what will be done) and the preparation phase (ensuring readiness), building in contingency for scope discovery (which is inevitable) while maintaining control mechanisms to prevent unlimited expansion, establishing clear commercial controls including the 15 per cent management overhead limit, and most importantly, creating systematic mechanisms to ensure that lessons are not just documented but implemented in the next shutdown.

Survey Response

When asked about this challenge, the 715 survey respondents provided the following perspective:



How frequently do your organisation's shutdowns and turnarounds meet their planned budget and schedule targets?


15%
Maximum management overhead and 20% supervision as % of shutdown cost; 30/30 escalation rule delivered 10% improvement

The Path Forward:
What 30 Years of Research Tells Us

Three decades of sustained engagement with the asset management profession in Australia and New Zealand provide a vantage point that no single year of research can match. The patterns are clear. Some challenges recur because they reflect genuine structural constraints that are difficult to resolve. Others recur because the profession has repeatedly failed to act on its own insights with sufficient commitment and discipline.

The Enduring Challenges

Certain themes have appeared in this research programme for most of its thirty-year history. The struggle to secure adequate investment in maintenance. The difficulty of translating technical requirements into business language. The tension between short-term production pressures and long-term asset health. The persistent gap between documented procedures and actual practice. These are not challenges that will be solved definitively; they are tensions that must be managed continuously, and the organisations that manage them best will outperform those that do not.

What Has Changed

What distinguishes 2026 from previous years is the speed and simultaneity of change. The energy transition is creating new asset classes with unfamiliar failure modes and limited operating history. AI is introducing decision-support tools that require new skills, governance frameworks, and trust mechanisms. The workforce transition is removing institutional knowledge at a rate that outpaces any realistic capture programme. And the infrastructure investment pipeline of billions over five years is creating demand for asset management capability that the current workforce cannot meet.

The organisations that will thrive in this environment are not necessarily those with the most advanced technology. They are those with the organisational discipline to execute fundamentals consistently, the cultural flexibility to adapt to changing workforce expectations, the data governance maturity to support increasingly sophisticated analytical tools, and the strategic alignment to ensure that asset management activities connect directly to enterprise objectives.

Recommendations for the Profession

Based on the full body of evidence assembled for this report, we offer the following recommendations for maintenance, reliability, and asset management leaders:

- Treat knowledge capture as an urgent, time-bounded programme. The window for systematic extraction of institutional knowledge from retiring experts is closing. Invest now in structured approaches that combine scenario-based interviews, video documentation, AI-assisted knowledge platforms, and reverse mentoring programmes. This is not a five-year initiative; it is a two-year imperative.

- Invest in data governance with the same rigour applied to physical asset maintenance. Data foundations determine the success or failure of every analytical capability built upon them. Appoint data owners, establish standards aligned with frameworks such as ISO 14224, enforce data discipline at the point of entry, and treat data quality as an ongoing operational process.
- Close the execution gap by investing in middle management capability and accountability. The persistent gap between strategy and execution is not a frontline problem; it is a middle management problem. Design explicit engagement programmes, clarify roles in transformation initiatives, and create accountability mechanisms that motivate improvement rather than breed defensiveness.
- Build AI literacy before building AI systems. The workforce skills gap is the binding constraint on AI adoption. Structured, role-specific training programmes that focus on understanding outputs, recognising limitations, and working effectively alongside AI tools are prerequisites for successful deployment. Self-directed learning is not a sufficient strategy.
- Integrate safety, risk, and asset management decision-making. The continued separation of these inherently connected functions creates duplicated effort, inconsistent decisions, and unmanaged risk. Develop shared risk languages, common decision-making frameworks, and integrated assurance processes.
- Measure people with the same discipline used to measure assets. The absence of systematic workforce wellbeing metrics in maintenance organisations is a governance failure. Implement Organisational Health Index assessments, monitor workload sustainability, and treat team cohesion as a leading indicator of asset performance.
- Reposition the profession to attract diverse talent. The skills shortage is partly self-inflicted. Review job titles, work arrangements, career pathways, and workplace cultures through the lens of what would attract candidates who are currently excluded. The evidence shows that diverse teams deliver measurably better outcomes.
- Develop decarbonisation as a core asset management capability. Integrate decarbonisation targets into asset lifecycle planning, reset maintenance strategies to align with different failure modes and operating characteristics of emerging technologies, and invest in training well in advance of technology transitions.
- Establish shutdown and turnaround excellence frameworks. Implement the 30/30 escalation rule, enforce commercial controls (15% management overhead, 20% supervision), establish clear scope governance mechanisms, and create systematic processes to ensure lessons learned drive improvement in subsequent shutdowns.

The State of Asset Management in Australia & New Zealand

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