



MAINSTREAM

A practitioner-driven research report
by the MAINSTREAM Research Team

The State of **ASSET MANAGEMENT** in Western Australia

Obstacles to Achieving Asset, Maintenance and Reliability Excellence

Research
Partner





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Obstacles to Achieving Asset, Maintenance & Reliability Excellence

For three decades the MAINSTREAM research team has sat down with the people who keep Western Australia's assets running and asked them one question in many forms: what is stopping you from doing this work the way you know it should be done?

This report is the answer for 2027. It draws only on what practitioners said in the roundtables and interviews, wrote in the survey and chose in live polling. We have not padded it with global statistics or vendor forecasts. Where a number appears, it came from the people who took part.

The fifteen obstacles in this report will shape the program of the MAINSTREAM WA Summit in Perth in March 2027: the speakers, the case studies, the workshops and 12 months of masterclasses.

About the Research

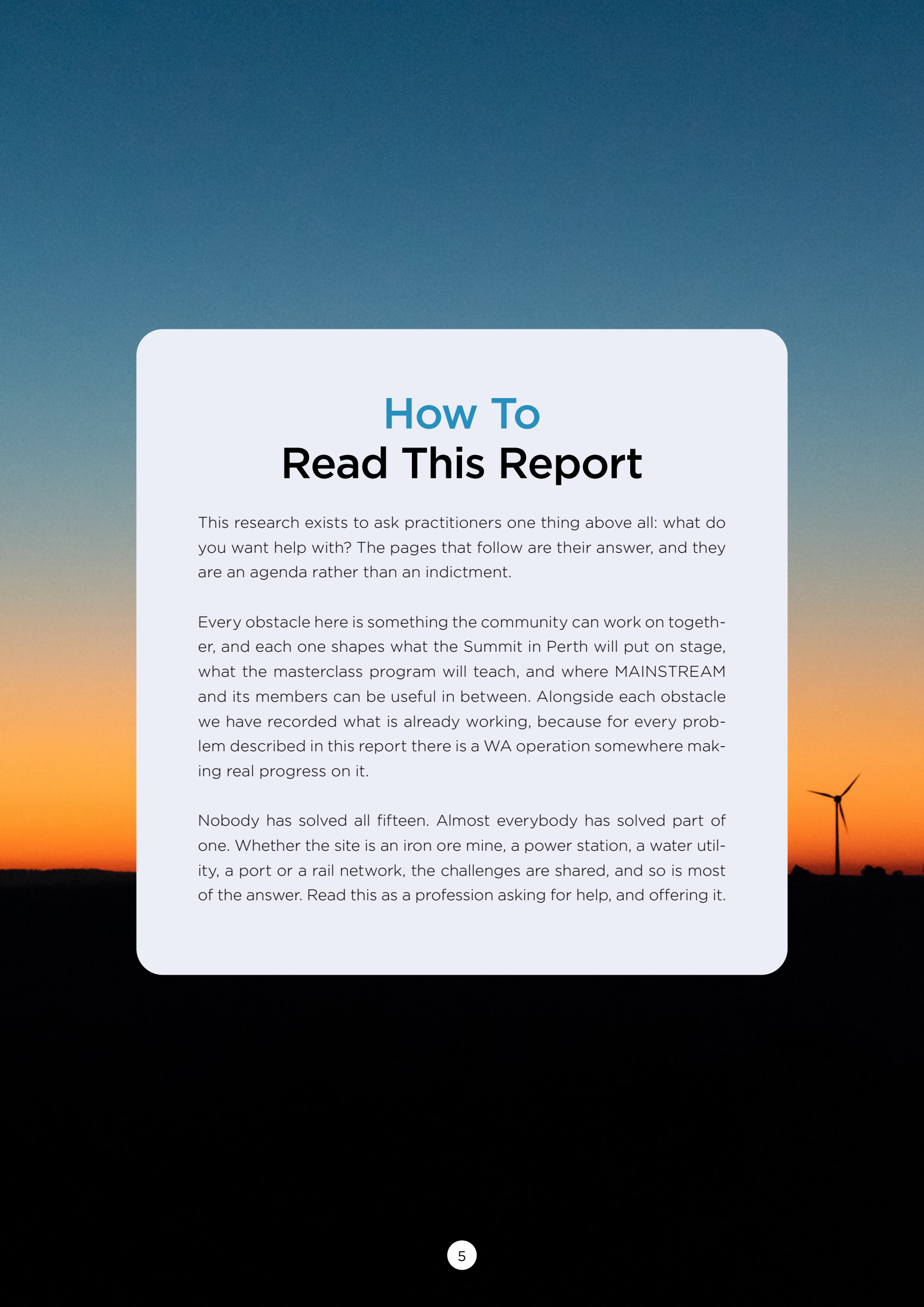
In total, 342 asset, maintenance and reliability practitioners contributed to this year's research, through four complementary streams, weighted in this order:

- Five facilitated roundtables with 76 senior asset, maintenance, reliability, planning and data practitioners from Western Australian organisations, each ninety minutes, held between 9 and 18 September 2026. These are the primary evidence and the voice of the report. Live Mentimeter polling inside each roundtable tested how widely a view was held before it was discussed.
- Fifteen one-on-one interviews with heads of asset management, maintenance and reliability, used to test and sharpen the themes emerging from the roundtables.

- An online survey completed by 251 practitioners, who named the one challenge they most wanted solved, ranked their top two obstacles from a list of twelve, and explained in their own words what they wanted discussed.
- Sixteen Xchange session transcripts from MAINSTREAM's 2026 national conference program, which drew practitioners from across Australia including a number of Western Australian contributors. They are used to corroborate and deepen themes, never to create them.

Three benchmark reports provide the comparisons: The State of Asset Management in West Australia 2026 (last year's WA report), the East Coast report, The State of Asset Management in Australia and New Zealand, published in April 2026, and The State of Maintenance and Reliability in the UK, published in May 2026.

Polling and survey results are reported as percentages, and every percentage is a share of the people who answered that particular question rather than of the whole research population. Where a question allowed more than one answer, the percentage shows the share of all selections made, and the chart says so. The value of these numbers is in convergence: where a poll, a survey result and an unprompted story in a different roundtable all point the same way, we say so.



How To Read This Report

This research exists to ask practitioners one thing above all: what do you want help with? The pages that follow are their answer, and they are an agenda rather than an indictment.

Every obstacle here is something the community can work on together, and each one shapes what the Summit in Perth will put on stage, what the masterclass program will teach, and where MAINSTREAM and its members can be useful in between. Alongside each obstacle we have recorded what is already working, because for every problem described in this report there is a WA operation somewhere making real progress on it.

Nobody has solved all fifteen. Almost everybody has solved part of one. Whether the site is an iron ore mine, a power station, a water utility, a port or a rail network, the challenges are shared, and so is most of the answer. Read this as a profession asking for help, and offering it.

The Authors and Organisations Behind This Research

The Authors

The roundtable program, the survey instrument and the live polling used in this research were designed by the MAINSTREAM research team. The findings have been correlated, interpreted and written by the MAINSTREAM research team. They inform the program of the MAINSTREAM WA Summit in Perth in March 2027, the masterclasses that run alongside it, and the roundtable series that continues through the year.

The authors acknowledge Technology Enhanced Asset Management (TEAM) for their invaluable partnership and support throughout this research initiative. We also thank the roundtable facilitators for drawing out the conversation, and the members of the MAINSTREAM WA advisory group for their guidance.

Our Thanks to the Organisations That Took Part

Practitioners from the organisations below gave their time to this research through the roundtables, the one-on-one interviews and the online survey. In keeping with the terms on which the roundtables were held, no comment in this report is attributed to an individual or to any of these organisations. Quotes are identified by role and sector, or by role alone where naming the sector would identify the speaker. We are grateful to all of them.

AGL
Alcoa
Anglo American Australia
APA Group
Aurizon
Australian Gas Infrastructure Group
BHP WA Iron Ore
CBH Group
CITIC Pacific Mining
Downer
DP World
Enco Group
Evolution Mining
Fortescue
Fremantle Ports
Gold Fields
Hancock Iron Ore
MACA

Macmahon
Mid West Ports Authority
Mineral Resources
Newmont
Northern Star
Pacific Energy
Piacentini & Son
Pilbara Ports
Public Transport Authority of WA
Rio Tinto
South32
Synergy
Thiess
Virgin Australia Regional Airlines
Water Corporation
WesCEF
Western Power
Woodside Energy



About MAINSTREAM

For three decades the MAINSTREAM research team has engaged with maintenance, reliability and asset management leaders and their teams to understand their challenges, their pain points and the opportunities that exist as they work towards asset management excellence and better business performance. These findings help leaders, teams and individuals understand current practice, compare their own organisation's performance and working environment with others inside and outside their industry, and make better-informed decisions.

Executive Summary

Western Australia's asset management community does not have a knowledge problem. Across five roundtables, nobody asked what good looks like. Every room already knew. What they described instead was a set of systems, habits and incentives that make it very hard to do the known right thing twice in a row.

The single loudest signal in this year's research was about information that nobody trusts. Fragmented systems were the most common first choice in the survey, dominated four of the five roundtables and won the polling outright: 60 per cent of practitioners in one room named disconnected systems as the biggest barrier to trusted asset information, and not one blamed people and behaviours. When a facilitator asked a room of senior practitioners whether anyone had data they fully trusted, no hand went up. The story that followed was the same in every session. Engineers re-validate dashboards against source reports before they will sign off a decision. Meetings open with an argument about whose number is right. And at scope freeze for a major shutdown, after millions of dollars of risk-based prioritisation, someone still walks out and asks the fitter.

What is new in 2027 is where the mess is coming from. Last year the complaint was too much data and too little insight. This year practitioners described data that has escaped. Self-service access, cloud data platforms and AI tools that can build a dashboard in minutes have put analysis in everyone's hands, and every team is now producing its own version of the truth. The large miners have started to respond by locking data down and treating it as a liability. Most organisations have not yet decided who owns it.

The second signal was quieter and, for many readers, will be more uncomfortable. Asked where the gap between the maintenance pro-

cess and what happens in the field is widest, one roundtable put a single answer at twice the share of anything else: feedback from the field does not improve the job plan. That finding recurred everywhere. Maintainers write the same correction on the same work pack for years and watch it come back unchanged. Businesses switch off work arising from inspections, then wonder why defect reporting dries up. A contractor hands over a superb rebuild report on one engine; the internal team rebuilds the next one, closes the work order and records almost nothing. The work order in Western Australia is still a one-way instrument. It sends instructions out and brings very little back.

Around those two signals sit the other obstacles in this year's top fifteen. Three of them are about the work itself. Planned work that does not survive the week. Fixed-plant shutdowns every few months, where scope floods back the moment the equipment is opened and every operator fights over the same fly-in labour. A business case that loses the room because it was never translated into the language of risk, revenue and production.

Three more are about technology and the transition. AI tools already in daily use that save hours on retrieval and summary but deliver confident mistakes on data nobody has governed. Decarbonised fleets and a variable energy supply arriving faster than the maintenance strategies and skills to support them. Record tonnes and record harvests that are quietly being paid for with deferred maintenance.



The rest are about people. Supervisors promoted for technical skill and left without the leadership support to hold a standard across four crews and a FIFO roster. A reward system that still celebrates the fitter with the magic part in his locker over the one whose equipment never broke. Maintenance leaders who turn over every fifteen months. Trade certificates that no longer guarantee trade capability. And squirrel stores worth hundreds of thousands of dollars, built one “just in case” at a time, because nobody trusts the supply chain.

Some of this is familiar from the East Coast report published in April and the UK report published in May. Much of it is not. Western Australia’s version of these problems is shaped by the scale of its resources operations, by FIFO rosters that break teams into crews who rarely meet, by a labour market in which smaller operators and government enterprises cannot compete on pay with the majors, and by a boom-cycle mindset in which running above nameplate is celebrated long before its cost appears. Government trading enterprises face a further layer: election cycles, economic regulators and Treasury gateways that turn a \$50 million asset renewal into a three-level translation exercise.

Artificial intelligence was placed in the top two by just 4 per cent of survey respondents, yet it surfaced unprompted in all but one of the rooms.

Shutdowns drew the same 4 per cent and decarbonisation 8 per cent, yet both came up as immediate, practical maintenance problems. Each now has its own chapter, and the decarbonisation chapter draws on MAINSTREAM’s 2026 national decarbonisation sentiment report, in which 304 practitioners rated their teams’ day-to-day understanding of the transition at just 3.26 out of 5 and their contractors’ readiness at 2.89.

The encouraging news is that the fixes practitioners described were rarely expensive. A port authority that now tells every fitter at interview that quality data is as much a part of the job as the trade ticket. An alumina refinery that got honest breakdown hours back into its system by showing maintainers that accurate data was how they would get the resources they needed. Operations and maintenance managers who share KPIs and bonuses. A passenger rail operator that advertised mid-level roles and got nine applications, then advertised trainee roles with no tickets required and got 410. A supervisor who stopped asking “When would you be finished?” and started asking “How are you going to guarantee that’s not coming back?”

None of these are technology stories. They are stories about what leaders choose to measure, reward, tolerate and listen to. That is where the research points, and that is where this report ends.

Report Highlights

342

Asset, maintenance and reliability practitioners contributed to the 2027 WA research.

“Ask the fitter”

What still happens at scope freeze on a major shutdown, after millions of dollars of risk-based prioritisation. The most trusted source in the room is the person who works on the equipment.

60%

Of practitioners in one room named fragmented systems as the biggest barrier to trusted asset information. None chose people and behaviours.

2x

“Feedback from the field does not improve the job plan” drew twice the share of any other answer on where process and practice part company.

62%

Said important asset proposals fail because the case was never translated into business outcomes. Only 8% blamed a weak technical case.

5min

How long it took a maintainer to load a folder of OEM manuals into an AI tool and get back every lubrication point and specification, for every piece of equipment.

62%

Said planned maintenance work is most often derailed by competing priorities.

52%

Of survey respondents put a data topic in their top two challenges.

4%

Put AI in their top two challenges, yet it surfaced unprompted in four of the five roundtables.

1.3yrs

Average tenure of maintenance leaders at one major WA fixed-plant operation, as reported by a practitioner there.

410v9

Applications for trainee track inspector roles with no tickets required, against nine for comparable mid-level roles.

1in4

Apprentices lost before completion at one WA operation.

Five Transitions Defining 2027

From more data to trusted decisions. The constraint has moved again. WA organisations are no longer short of data, and many are no longer short of tools. They are short of a single version of the truth, of clear ownership, and of the discipline to decide what they need before they collect it. AI raises the stakes in both directions: it can compress hours of searching into minutes, or multiply confident errors across data nobody has governed. The organisations moving fastest have stopped asking “what can this data tell us?” and started asking “what decision are we trying to make, and what is the least information we need to make it well?”

From work orders to learning loops. The work management system in most WA operations was designed to push work out to the field. It was not designed to learn from what comes back. Practitioners described maintainers who have stopped writing feedback because nothing changes, systems that make feedback hard to capture, and organisations that do not value it when it arrives. Nowhere is that more expensive than in the shutdown, where WA’s fixed plant stops every few months and lessons are captured on paper, if at all. Closing that loop is the difference between a maintenance plan that improves every cycle and one that repeats its mistakes.

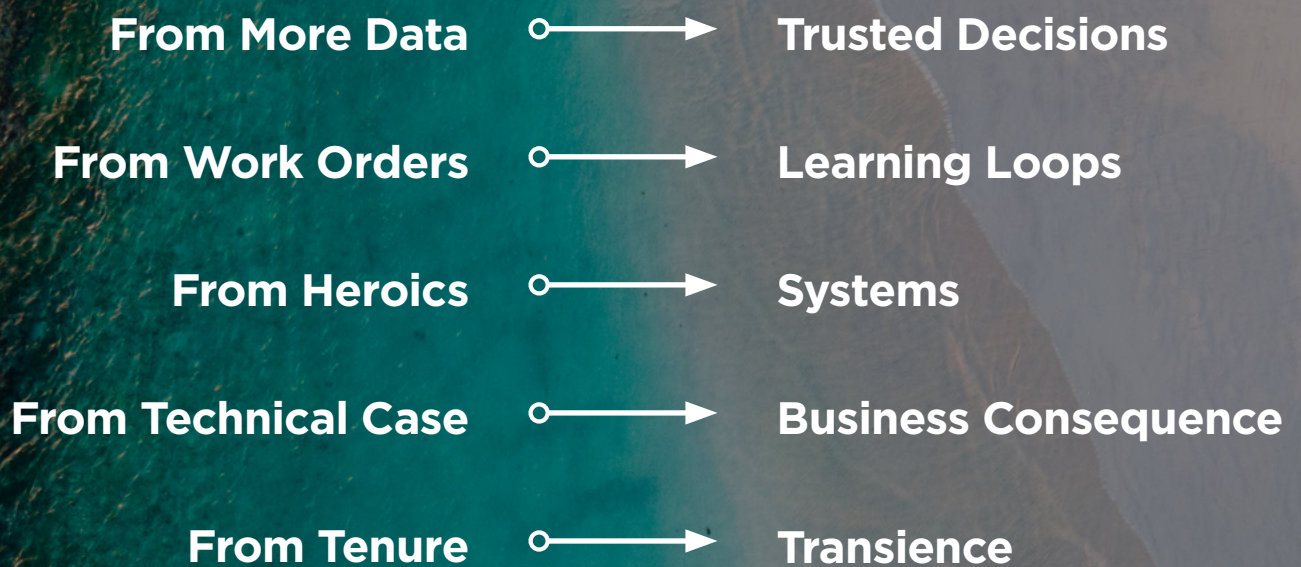
From heroics to systems. In a stretched operation, informal heroics keep the plant running. The fitter with the spare in his locker. The supervisor who knows which job can slide. The crew that recovers a breakdown at 2 a.m. These people deserve credit. But a system that relies on them rewards the wrong behaviour, hides its own failures and falls over when they leave. WA practitioners are asking how to recognise

prevention as loudly as recovery, and how to build supervision and supply chains that do not depend on heroes.

From technical case to business consequence. Asset managers in WA are not being ignored because their cases are technically weak. They are losing because the case arrives in the wrong language, at the wrong altitude, and against incentives that reward this quarter’s tonnes. In a state where boom pricing can make maintenance debt invisible for years, and where many practitioners work for government enterprises answerable to Treasury and regulators, the ability to translate asset risk into money, production and safety exposure has become a core professional skill.

From tenure to transience. Both the people and the assets are turning over. The WA workforce has always been mobile. What has changed is that the mobility now reaches the top of the maintenance function as well as the bottom. Maintenance leaders turn over every fifteen months or so. Change champions leave and their programs collapse. New managers reverse decisions whose rationale was never written down. At the same time, trade certificates no longer guarantee trade capability, smaller operators cannot outbid the majors for experienced people, and decarbonised fleets are arriving that almost nobody in the labour market has maintained before, while the legacy fleet they replace must be kept safe until the day it retires. The response practitioners described is to stop relying on tenure and start designing for turnover: strategies owned by boards rather than individuals, deliberate capability frameworks, and knowledge capture that records the why as well as the what.

The fifteen obstacles in this report are specific. Beneath them the research shows five broader shifts that WA's asset management community is being asked to make at the same time. None is new in isolation. What marks 2027 is that practitioners now see them as connected, and see that progress on any one stalls without the others.



The 2027 Top Fifteen

The following fifteen obstacles are ranked by the frequency, intensity and breadth with which they appeared across the roundtables, the live polling, the interviews and the survey, with Xchange session session evidence used to test and deepen them. Each carries the transition it belongs to.

Obstacle	Transition	In Brief
1 The Data Trust Deficit	Trusted decisions	Fragmented systems and competing versions of the truth mean practitioners re-check every number before they act. The loudest signal in the research.
2 The One-Way Work Order	Learning loops	Field feedback does not improve the job plan, and the data that does come back is guessed, padded or missing because capture is treated as admin.
3 Plans That Do Not Survive the Week	Learning loops	Competing priorities, poor scoping and tolerance of scope cuts mean planned work is interrupted, trimmed and quietly left incomplete.
4 Asset Management Lost in Translation	Business consequence	Asset proposals are never translated into risk, revenue and production, and strategies are too technical to guide the front line. Asset health alone wins no attention.
5 Everyone Has the Data, Nobody Owns It	Trusted decisions	Self-service data and new systems multiply faster than governance, and data is collected before anyone defines the decision it should support.
6 Navigating AI Without Losing the Fundamentals	Trusted decisions	AI is already in use, often informally. It saves hours on retrieval and summary, but produces confident mistakes on data nobody has governed.
7 The Maintenance Judgement Drain	Tenure to transience	The knowledge most at risk is the rationale behind past decisions and the judgement to make new ones. Neither lives in the CMMS.
8 The Frontline Leadership Gap	Heroics to systems	Execution discipline is set by what leaders tolerate and held by supervisors who are promoted for technical skill and left unsupported.
9 The Revolving Door and the Leader's Shadow	Tenure to transience	Maintenance leaders turn over every fifteen months, and programs die with their champions. What outlasts them is what the leader modelled: the fundamentals they held to, the behaviour they tolerated and how safe their people felt to speak up.
10 Record Output, Deferred Consequences	Business consequence	Boom pricing, throughput KPIs and short planning horizons reward running assets hard today and leave the bill for later.
11 Shutdown Scope, Labour and the Lessons That Never Land	Learning loops	Fixed-plant shutdowns every few months, with scope that will not stay locked, a shared fly-in labour pool and a feedback loop still on paper.
12 Decarbonisation and the Energy Transition	Tenure to transience	Low-carbon fleets and variable energy supply are arriving faster than the maintenance strategies, data, spares and skills to support them.
13 Rewarding the Breakdown	Heroics to systems	Recovery is celebrated, prevention is invisible, and the incentive system teaches both.
14 Trade Certificates Without Trade Capability	Tenure to transience	Technical competency has not been institutionalised the way safety training has, and smaller operators cannot outbid the majors for skill.
15 The Squirrel Store Economy	Heroics to systems	Distrust of the supply chain drives hidden inventory, double-counted spares and parts that never come back to stores.

How the Landscape Has Shifted Since 2026

Last year's WA report organised the evidence into twelve challenge domains. The table below maps this year's fifteen obstacles against them. Several 2027 obstacles are sharper, more specific versions of a broad 2026 domain. Five are new to the WA research.

2027 Obstacle	Closest 2026 WA Domain	Movement
1 The Data Trust Deficit	1 Data Governance, Quality and Utilisation 2 System Integration	Intensified. The complaint has moved from quality to trust.
2 The One-Way Work Order	9 Maintenance Planning and Execution Excellence	Elevated. Now a headline finding in its own right.
3 Plans That Do Not Survive the Week	3 Work Management Standardisation 9 Planning and Execution	Persistent
4 Asset Management Lost in Translation	4 Financial Justification 5 Business Alignment	Intensified, and now includes strategy that fails to reach the front line
5 Everyone Has the Data, Nobody Owns It	1 Data Governance, Quality and Utilisation	Reframed. Self-service data has changed the problem.
6 Navigating AI Without Losing the Fundamentals	6 AI Integration and Adoption Barriers	Reframed. From adoption barriers to governance of AI already in use.
7 The Maintenance Judgement Drain	7 Workforce Capability and Knowledge Preservation	Persistent, more precisely defined
8 The Frontline Leadership Gap	3 Work Management Standardisation (accountability)	New as a distinct obstacle
9 The Revolving Door and the Leader's Shadow	- No direct equivalent	New. Covers the leader's own behaviour, wellbeing and change
10 Record Output, Deferred Consequences	4 Financial Justification and Resource Allocation	Reframed
11 Shutdown Scope, Labour and the Lessons That Never Land	9 Planning and Execution (shutdown planning)	New as a distinct obstacle
12 Decarbonisation and the Energy Transition	11 Decarbonisation and Sustainability Pressures	Persistent, now operational rather than strategic
13 Rewarding the Breakdown	- No direct equivalent	New
14 Trade Certificates Without Trade Capability	7 Workforce Capability and Knowledge Preservation	Persistent
15 The Squirrel Store Economy	- No direct equivalent	New
-	8 Reliability Function Positioning	Absorbed into obstacles 4 and 8
-	10 Wellbeing and Inclusivity	Never raised as a topic of its own. Addressed this year through the leadership behaviours in obstacle 9
-	12 Safety, Risk and AM Integration	Reframed as the overplayed "safety card" in obstacle 4

Western Australia, the East Coast and the UK

Three MAINSTREAM research reports in six months give an unusual view of what is national, what is global and what belongs to the west.

The East Coast report, The State of Asset Management in Australia and New Zealand, was published in April 2026 and drew on twelve roundtables and a survey of 715 professionals. The UK report, The State of Maintenance and Reliability in the UK, was published in May 2026. Read alongside this report, they show three communities describing the same underlying failure in very different landscapes. A fourth MAINSTREAM study, the 2026 decarbonisation sentiment report, adds a national view from 304 practitioners across Australia and New Zealand, and is used here where the energy transition is concerned.

Three landscapes

The UK conversation came from a dense, old industrial base: food and beverage plants, cement works, automotive and aerospace manufacturing, water utilities running Victorian sewers, and highways authorities managing ageing structures. Production and maintenance there often share a building, a canteen and a daily argument. The East Coast conversation spanned the whole of Australia and New Zealand, from rail and water to oil and gas, manufacturing and defence, and was shaped by an ageing workforce and an energy system in transition. Western Australia's conversation is dominated by a small number of very large, remote, capital-intensive operations. Iron ore, gold and alumina, the ports and railways that move their product, the networks that power them, and the fly-in fly-out workforce that keeps them running. A single Pilbara fixed-plant shutdown can bring 900 to 1,500 contractors to site. That difference in scale, distance and money explains most of what follows.

Starved of capital, or flush with demand

The UK's central asset story is one of scarcity. Maintenance budgets were slashed after 2008 and never recovered, control systems run beyond their supported life, spare parts are bought wherever they can be found, and the dominant risk is obsolescence overtaking age. Western Australia's story runs almost the other way. Demand is strong and assets are being run harder and above nameplate because the market will take every tonne. Capital is flowing, but to growth, throughput and automation rather than to renewal. The UK is paying for a debt it could not afford to avoid. WA is building a debt it could afford to avoid but chooses not to see, because on every production dashboard it looks like success. The East Coast sat between the two, with a profession that knew what good looks like but could not get the discipline or the budget to deliver it at scale.

The same data problem at three stages of maturity

Every report has a data chapter, but each describes a different point on the same curve. The UK located the problem at source: work orders closed with minimal information, inconsistent failure codes and CMMS histories full of gaps. The East Coast described abundance without insight: organisations collecting more than they could analyse and not trusting what they had. Western Australia's large operators have gone further. Many have already built enterprise data platforms, and the complaint in Perth was proliferation. Self-service access and AI tools have allowed every team to build its own dashboard from the

same raw tables, and the result is competing versions of the truth. The biggest WA miners are now locking data down and treating it as a liability, a step the other reports barely anticipate.

What separates the people doing the work

In the UK, the operations-maintenance divide was the most discussed topic of the year: maintenance treated as a “necessary evil”, priorities inflated to jump the queue, and a reactive culture that rewards the breakdown hero. The East Coast named the middle-management layer as the place where transformation stalls. In Western Australia, practitioners described something structural. Four crews on a four-panel roster maintain the same equipment four different ways under four supervisors who rarely overlap. Twelve-hour process controllers make decisions that five-day planners must live with. Maintenance leaders change every fifteen months or so. The WA divide is less about attitude between departments and more about rosters, distance and turnover that stop the right people ever being in the same room.

Who can afford the skills?

All three regions face a skills shortage. The UK described a retention war in manufacturing and apprentices absorbed into breakdown culture before they learn anything else. The East Coast described a twenty-year gap in apprenticeship investment and a knowledge exodus as its number one obstacle. Western Australia adds an unequal market. The pay premium in iron ore draws skilled people from ports, transport, utilities and agribusiness within the state, and from other states too. Smaller operators and government enterprises cannot compete on salary and are forced to grow their own. At the same time, WA practitioners were less concerned with apprentice numbers than with what happens after the ticket: whether a certified tradesperson can fault-find, and whether anyone can maintain the



battery-electric and decarbonised equipment already arriving in the Pilbara.

Procedures, or judgement

The East Coast ranked the knowledge exodus as its number one obstacle and the UK placed it tenth, both framed around retirements and undocumented know-how: the valve that sticks in the cold, the modification nobody recorded. WA practitioners accepted all of that and then moved past it. What they said they fear losing is not the procedure but the reasoning: why a strategy was set this way, what was tried before, and the judgement to weigh a condition report against a production target at two in the morning. One WA room went further and questioned whether the exodus is the real problem at all, arguing that some of the behaviours being preserved are the ones holding the industry back. That is a more uncomfortable version of the finding than either comparison report reached.

Technology: pilots, confusion or accelerant

The East Coast ranked AI third, a technology trapped in pilots that never scale. The UK described confusion over what AI even is, and vendors selling machine learning under a new label. WA practitioners gave it only 4 per cent of their survey votes, yet it came up unprompt-

ed in nearly every room. It was already in use, often informally, summarising breakdown chats, stitching systems together, building dashboards. Their concern was not adoption but governance: what AI does to data quality, confidentiality and the number of versions of the truth.

Energy transition and shutdowns

The East Coast report treated decarbonisation as a strategic challenge of hybrid portfolios, still largely ahead. In WA it is operational now: half-decarbonised mobile fleets, grid-scale batteries whose data disagrees with the manufacturer, and life-extension studies buying time while boards choose between diesel-electric and full electrification. The UK barely mentioned it. MAINSTREAM's national decarbonisation research puts numbers around that gap: budget and integrating new technology with existing assets are the top two challenges nationally, teams rate their own day-to-day understanding at 3.26 out of 5, and the contract workforce that performs most major maintenance rates lowest of all for readiness. WA's operators are simply further along the same road, which makes their experience the preview for everyone else. Shutdowns ranked twelfth on the East Coast as a problem of scope creep and lessons learned. In WA, where fixed plant is shut on sixteen – to eighteen-week cycles with a thousand work orders and hundreds of contractors per event, the shutdown is where almost every other obstacle in this report becomes most expensive.

Leadership churn, change fatigue and the human side

The UK report named change management capability as a distinct obstacle for the first time in 2026, with practitioners citing formal frameworks by name and describing themselves as “part politician and influencer”. It put the average tenure of a senior maintenance leader at 3.2 years and found that 83 per cent of improvement initiatives fail to sustain beyond eighteen months. Western

Australia runs the same cycle at roughly twice the speed: maintenance leaders changing every 1.3 years, programs that die with their champion, and decisions reversed by newcomers who never saw the reasoning. The other difference is what WA practitioners talked about instead of change management. They talked about the leader's own behaviour: the standard you walk past, the psychological safety between supervisors at hand-over, the crews holding an operation together by working too hard. Workforce wellbeing ranked sixth on the East Coast and drew just 4 per cent of WA's survey votes, yet it surfaced repeatedly inside descriptions of leadership and effort. In WA it is not yet a topic. It is a symptom being described in another language.

Government as asset owner

A distinctly WA feature is the weight of state-owned ports, networks and transport operators. Their practitioners translate asset risk through boards, economic regulators and Treasury, on election-cycle horizons. The UK has its own regulated utilities, and its water companies must make their case to a regulator, but the WA roundtables brought the government enterprise perspective forward more strongly than either comparison report.

Where the three agree

The most important finding is shared. In the UK, on the East Coast and in Perth, practitioners said the knowledge of what good looks like already exists and the failure is in sustaining it. The UK called it the culture bottleneck. The East Coast called it the execution discipline gap. WA's version is the one-way work order and the plan that does not survive the week. Knowledge loss, the language barrier with executives and the undervaluing of prevention look much the same in all three places. The WA versions have local colour, but not a different cause. Where the data does not support a regional distinction, this report does not invent one.

Availability, cost and risk are connected.

The people, processes and systems behind them should be too.

When they aren't connected, a good decision in one area can become a problem in another.

TEAM's asset management advisors, data scientists and developers connect your data, models and systems, so every decision reflects the whole operation.

01 – FOUNDATIONS

Get the basics right

Data you can trust, processes people follow and clear ownership.

**TRUSTED DATA · TAXONOMIES ·
KNOWLEDGE GRAPHS**

02 – DECISIONS

Know your options

See the cost, risk and reliability of each option before the work starts.

**DATA SCIENCE · SIMULATION ·
RISK & COST MODELLING**

03 – OPTIMISATION

Automate routines

Repetitive tasks run themselves, so your people can focus on what matters.

**OPTIMISATION · AUTOMATION ·
AI ENABLEMENT**



In Their Own Words

The survey asked practitioners one open question: if this roundtable existed to solve one challenge for you in asset management, maintenance or reliability, what would it be? Many then explained what they wanted discussed. A selection of their responses is reproduced below exactly as written. We have not corrected spelling or grammar.

Data, and the Decisions It Should Support

“Easy Data for quick decisions”

“Having many data points does not mean the business is actually making better decisions. It is often creating many more noises than helping. Instead of making decision, people often drifted talking about the data itself which is not helpful to the organisation”

“Leaders sometimes seem stuck in a vicious cycle of ‘the data/process is wrong so I don’t trust/use it’ and ‘I don’t focus on better quality data/processes because we don’t use them properly’. How do we break this cycle?”

“For us, there is so much data, but cutting it, finding it and interpreting it takes a lot of time. Then trusting it is the next challenge, who is doing it well? How does all data for AM come together to tell a story?”

“System fragmentation is not fundamentally a technology problem. It is a governance, ownership and decision-making problem.”

“Base system knowledge of the ‘why’ is lacking leading to either false positives or decline in proactive reaction. A poor oil sample first action is to resample (zero trust)”



Getting the Work Right

“Bread and Butter simple and effective Work Instructions and PMI's.”

“Reliability engineers pulled into reactive work by maintenance neglecting strategy, optimisation and long-term risk mitigation.”

“Planner and schedulers working in a transactional manner. Used as admin support, not using their insight to balance reliability and cost through the maintenance plan.”

“We are great at inspection compliance, but poor at work identification.”

Language, Value and the Business Case

“How do you get an organisation from wanting and thinking they understand ‘Good’ Maintenance’ to actually appreciating what is involved to be ‘Good’”

“It is difficult to communicate if one only speaks English, the other half is talking in Japanese. We almost need a bible of analogy as a reference.”

“‘Too technical’ comes up far too often, however there is arguably a need to know, and to understand. Is it language or other?”

“How do we align people to the asset management strategy while building a common understanding of what good looks like? The gap isn't resistance, it's capability, maturity, and language.”

“Maintenance is still largely thought of as a cost centre, rather than a lever for value creation. Maintenance practitioners largely engage in behaviours that reinforce this perception. The challenge is creating the environment in which the belief changes as a collective, accountants won't change 1st.”



Technology, AI and What Comes Next

“For Inventory & Logistics, the challenge is getting involved early enough in the asset transition. We need visibility of the asset roadmap before new equipment arrives”

“Less AI slop.”

“People are becoming more stressed around AI implementation, training to keep up and worried about their jobs”

People, Skills and Knowledge

“Our Maintenance leaders changes ~ 1.3 yrs on avg, difficult to ensure plant criticality & risk is understood to prioritise work.”

“We lose 1 in every 4 apprentices before they have completed their apprenticeships. What other methods do we need to consider to lock people in through to completion or reviews of the apprenticeship pathways.”

“We have the older workforce departing which are not technologically savvy so there is no easy way for them to transfer their knowledge for us, and the new programs we run are too technical for them to use.”

“I’m not sure the exodus is actually as big a deal as we think. I’ve seen retention of those ‘behaviours’ actually hold us back.”

“Retaining the trade skill knowledge-base in the face of an industry actively deskilling via reliance on computer diagnostics (corporate amnesia)”

“Management is quick to say ‘yes, no worries, make it happen’ but the systems they have in place or approvals required turn a half day job into several weeks of approvals and justifications.”



The Data Trust Deficit

TRANSITION FROM MORE DATA TO TRUSTED DECISIONS

WA organisations have more asset data than ever and less confidence in it. The result is a profession that checks every number twice, argues about data before it argues about decisions, and still trusts the fitter over the system when the stakes are high.

Nobody Trusts the Number

This was the loudest signal in the 2027 research by some distance. System fragmentation and data trust was the most common first choice in the survey. It was discussed in four of the five roundtables, more than any other topic. And when practitioners were asked directly what stands between them and trusted asset information, the answer was not close: 60 per cent named fragmented systems, 27 per cent data quality and 13 per cent governance and ownership. Nobody chose people and behaviours.

That last result matters. A few years ago, a room like this might have blamed the workforce for poor data. In 2027, WA practitioners placed the fault in the architecture and the governance around it, not in the people at the keyboard.

When one facilitator asked whether anyone in the room had a system they fully trusted, nobody answered. When a participant asked whether anyone treated data as an asset, no hand went up either; one practitioner could point only to a single colleague who did. The words practitioners used to describe their data were blunt and consistent across sessions: inconsistent, disconnected, unreliable, poor quality.

The polling option they chose, by 60 per cent to nothing, described the problem exactly: the information exists, but it sits across too many systems that do not communicate effectively.

The Hidden Tax of Re-Validation

The cost of distrust is paid in time. Practitioners described a standing habit of checking dashboards against their source before anyone will act. Engineers become data reconcilers. Decisions slow down. Teams on rotating rosters wait for the right crew to come back on shift to confirm what a number means.

“I’m always like, hey, can you go and check with the data source itself, like, for example, go check in SAP, or go where exactly it’s coming from ... which of course is counterproductive.”

Inventory and logistics lead, iron ore

“When that data is available at every level of the organisation, you find you’re spending more time explaining why you’re not doing something ... half the time you’re spending cleansing the data to do the right thing, but then the other half is you’re explaining why you’re not doing the other work.”

Reliability and planning manager, iron ore

One participant described a critical shutdown decision on whether to defer a pulley change. Two systems gave conflicting condition readings. The participant asked for neither the data nor the dashboard, but for the last condition monitoring report written by a technician in the field, and made the call from that. It was

the right decision. It also took far longer than it should have. Asked by a peer whether they would still check the source report if both systems agreed, the answer was yes: “hand on my heart, I will still go and check”.

“I reverted back to a very simple condition monitoring report done by a technician in the field to make that decision.”

Inventory and logistics lead, iron ore

A senior leader in another session put a price on the habit: the first part of too many meetings, in every industry he had worked in, is spent arguing over whose data is credible.

“There’s so much time sometimes that goes to waste just arguing what the source of the data or credibility of the data is, at the start of a meeting.”

Senior asset management leader

Workarounds as a Way of Life

Where the system cannot give practitioners what they need, they build around it. A digital lead at a major iron ore operation described pulling risk-based prioritisation data out of SAP into a separate tool, adjusting it, and pushing the result back in, “like a filter, and then back”. A mining data lead explained that a corporate decision to run SAP S/4HANA “very vanilla”, with no modifications to suit local processes, had forced a crop of external workarounds that now introduce their own inconsistencies. At a regional port, the maintenance lead described younger technicians reading temperatures off the PLC while older hands still walk out with a temperature gun and write the result on paper.

The workaround culture is visible in the system itself. One practitioner said a major miner he knows well has spent fifteen years trying to



stamp out prefixes typed into work order short text, a manual way of forcing priority.

“We’ve been trying to stamp that type of behaviour out now for 15 years ... And it’s still, you know, your top 20 work orders in a shutdown revision will have some form of prefix in the short text.”

Asset leader, bulk port operations

The integration map at one large operation was described as looking “exactly the same as the Tokyo subway map”. The deeper problem there was not complexity but ownership: finance and supply changes made in the same ERP flow downstream into maintenance data with nobody on the maintenance side consulted. “We just react to it.”

When the Stakes Are High, Ask the Fitter

The most telling story came from a practitioner who had run shutdown scoping at scale. The organisation had built risk architecture, asset criticality ratings, asset health feeds and risk-based prioritisation scores, all flowing into the work management system to set the scope of a major shutdown. And then, at scope freeze, the question still went to the people on the tools.

“You’ve got this perfectly prioritised based on all these different data feeds, list of work that you’ve got to do. And inevitably, you still end up asking the fitter, the electrician, you know, the conveyor splicing technician ... what should I or shouldn’t I be doing? ... because there’s more accurate data in a couple of people’s heads than there is ... And it’s more trustworthy, than what’s inside the system.”

Asset leader, bulk port operations

Some data sources are trusted. The same practitioner pointed to oil analysis: consistent sampling, an accredited laboratory, a known method. But those trusted islands rarely connect to anything else, so they inform a conversation rather than a decision.

“You could have something that is telling you, you need to change that gearbox, but you won’t, because it’s not talking in well enough.”

Asset leader, bulk port operations

Data Quality Is Not a Project

Several practitioners argued that the profession misrepresents this work to the business. Improving data is treated as a project with an end date, so leaders ask why it is still going. It is closer to maintenance.

“We, as maintenance professionals, do a poor job of representing it to the organisation, as you’ll often get asked the question, why are we still working on this? ... getting it better is actually business as usual, rather than a one-and-done type exercise.”

Asset leader, bulk port operations

The Xchange sessions said the same thing in almost the same words. “Data is a process, not a project,” one participant said. “You can’t... can’t wait till your data is right because it never will be.”

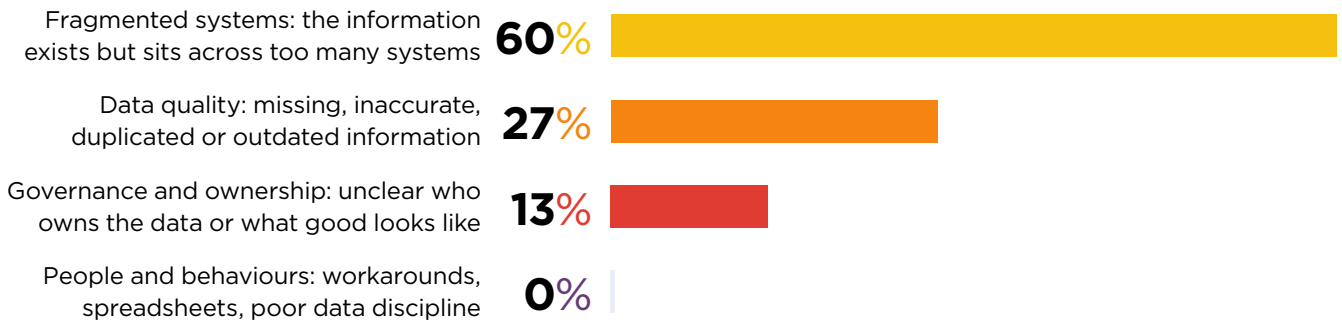
Why Trust Matters More Than Volume

The maintenance decisions that matter most rest on a surprisingly small set of information: a clean asset hierarchy and master data, a failure history coded consistently for failure, cause and remedy, condition data from the monitoring program, and the cost of each intervention. Criticality rankings, PM interval changes, RCM and FMEA reviews, bad actor analysis and capital renewal cases all draw from that same well. When those pieces sit in different systems, keyed differently, the chain from symptom to decision breaks at every join. A truck is one thing in the delay accounting system and another in the CMMS. A pump’s condition report lives in a document store that the work management system cannot see.

Trust, in practice, is close to binary. A reliability engineer who has been burned once by a wrong number will check every number after it. That habit carries a real cost. Every hour spent confirming what a dashboard says is an hour taken out of the P-F interval, the window between detecting a developing failure and the failure itself. In an organisation where the data is trusted, a condition alert becomes a work order. In one where it is not, it becomes a conversation, then a verification task, then a work order, if the window has not already closed.

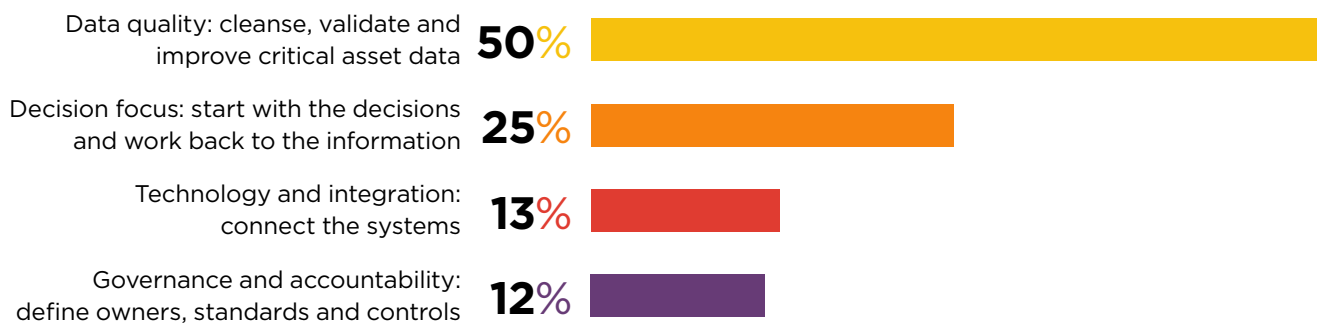
Integration alone will not fix this. The organisations furthest ahead are those that designed their master data and metric definitions carefully enough that clunky connections between systems do not matter. The trusted islands practitioners described, such as oil analysis, share three features: a defined collection method, an accountable owner and a known standard of quality. That is the pattern the rest of the asset information landscape needs to copy. It is also the foundation every predictive maintenance and AI ambition in WA will stand or fall on.

The biggest barrier to trusted asset information



Live roundtable polling, single choice.

Given \$1 million to improve asset information, where would you invest first?



Live roundtable polling, single choice. Percentages rounded.

WHAT'S WORKING

A reliability and planning manager mapped every system his teams touch. It came to twelve main systems, most connected to at most one other, and the exercise itself uncovered people doing manual transfers that could have been automated. One global miner is prioritising the master data that delivers the most value first, because fixing everything at once is “just too big”. A maintenance performance lead at a major miner enforces what gets into the shared data platform and refuses spreadsheets that cannot be governed. And the facilitator in one session left the room with a question worth putting on every data program's wall: are you trying to create perfect asset data, or sufficiently trusted information to make the decision?

The One-Way Work Order

TRANSITION FROM WORK ORDERS TO LEARNING LOOPS

WA maintenance systems are very good at sending work out to the field and poor at learning from what comes back. Field feedback is not captured, not valued or not acted on, and the data that does come back is guessed, padded or missing. Every analysis, business case and AI ambition in WA rests on that record.

The Clearest Result in the Polling

Asked where the greatest gap lies between the intended maintenance process and what actually happens in the field, one roundtable gave 22 per cent of all votes to a single answer: feedback from the field does not improve the job plan. No other answer drew more than 11 per cent. Practitioners chose up to three answers each, so the figures below are shares of all the selections made in that room. When the same room was asked which execution foundation would create the greatest improvement if strengthened, the top answer was post-work feedback and learning.

The finding did not stay in that room. It surfaced unprompted in a data roundtable, where a practitioner said systems are not designed to capture frontline feedback. It dominated the fifth roundtable, where a maintenance performance lead at a major miner said the real issue was the feedback loop rather than the data itself. And it appeared in the Xchange sessions, where a Pilbara shutdown leader described still printing a thousand paper work orders per event in 2026.

The winning answer, at twice the share of any other, was a single sentence: feedback from the field does not improve the job plan.

Why Maintainers Stop Writing It Down

The explanation practitioners gave was not laziness. It was experience. Maintainers learn

quickly whether their feedback goes anywhere. When it does not, they stop.

“If the culture doesn’t support continuous improvement, they’ll put comments in, not be heard, and go, bugger this, I won’t do that next time.”

Asset leader, public transport

“I just get the same shop paper again that says the wrong thing that it said, you know, for the last 10 years, and it never gets improved.”

Maintenance performance lead, major miner

A maintenance manager at a regional port authority described the same uphill battle from the other side. Some of his team see feedback as part of the job, and some see it as admin. The ones who see it as admin are not wrong about what happens to it.

“If the feedback is, you know, they go and do the same job for 3 years, and there’s no changes made. You’re fighting an uphill battle.”

Maintenance manager, regional port authority

A senior maintenance leader in mining told the story that should worry any organisation that measures inspection compliance. Maintainers at one business spent real effort identifying de-

fects on service documentation. The business had switched off work arising from inspection. Nothing happened with what they found.

“The maintainers would go to the effort. To identify these defects, but ... Nothing would happen, and it was pretty demoralising for them.”

Senior maintenance leader, resources

Systems That Imprison

Culture explains part of the gap. The systems explain the rest. A practitioner who builds shutdown applications for a mining enterprise described the process as it still works in many places: plan, schedule, print, hand out, get paper back with handwritten notes, load a fraction of it into the system, and start the next cycle from the same unchanged plan.

“So it’s a one-way stream that is actually not coming back ... I think that feedback loop, our systems also imprison us.”

Enterprise maintenance improvement lead, mining

Another practitioner said the tools given to maintainers rarely even ask for the most valuable information: how they actually diagnosed and fixed the fault. And when they do record it, the organisation’s response to unexpected feedback, for example a workaround that was not the endorsed method, can teach them not to bother next time.

“I don’t really necessarily think we design our systems to capture frontline feedback in an effective way ... we just need to make Systems more receptive to that frontline feedback. And then also change our organisational response when ... we get feedback that we might not initially like.”

Asset leader, bulk port operations

Not everyone accepted that the system is the barrier. A mining systems specialist said updating a task list or bill of materials in SAP is simple. What stops people is the belief that it is hard, and the fact that nobody has shown them otherwise. When his site ran roadshows with maintenance, operations and lubrication teams on how easy changes were, feedback started arriving in a steady stream. The shutdown team, reporting through a different line, still told him it was “not my job”.

The Contractor Paradox

One of the sharpest observations came from a general manager now running remote power generation, who had spent a decade at a major miner. Contractors routinely give better feedback than internal teams, because the contract requires it.

“When you enter the contractors, when they gave you the feedback in their closeout reports, they’ve got the data, they’ve got the pictures, they’ve got the photos ... because it was put into the contract that they had to do that.”

General manager, remote power generation

The week before the roundtable, an OEM rebuilt one of his engines and handed over an excellent report. His own team rebuilt the second engine and closed the work order.

“We got a brilliant report from Engine 1, but we didn’t do anything. We just closed our work order and went to the next engine.”

General manager, remote power generation

The Half-Hour Breakdown

A maintenance improvement superintendent at a southwest alumina operation described a pattern many recognised. Breakdowns were

booked at half an hour, whatever they took. The analytics built on that data concluded, reasonably, that breakdowns were not a problem.

“When there was a breakdown, it was only ever half an hour booked against it. And so, from a labour utilisation point of view, our breakdowns only ever took half an hour to fix. And so, we could have spent 3 days doing something, and then there was half an hour booked to it.”

Maintenance improvement superintendent, alumina

The distortion runs in both directions. An asset management group manager at a major iron ore producer described the opposite problem: people treating the work order as a timesheet and padding hours to fill a shift, a habit she traced to how resources had been allocated and cut in the past.

“People think it’s like a timesheet ... instead of it’s a 4-hour job, I’ll put 6, because, you know, I need to have captured 10 hours in a shift.”

Asset management group manager, iron ore

Either way, the data no longer describes the work. A maintenance manager at a regional port authority explained how inspection regimes that serve no purpose make it worse.

“They soon cotton on that they’re just wandering around doing checks and balances for the sake of checks and balances, so you start to get... guys recording hours to fill their day sheets ... Eventually, you’re going to get crappy data at the end, because he’s going to get sick of doing it.”

Maintenance manager, regional port authority

Data That Never Arrives

In seasonal and remote operations, data often never enters the system at all. A maintenance engineer in grain handling described harvest.

“In the thick of harvest, when you’ve got, you know, 20 angry farmers trying to drop their grain in one of our grids, and something’s gone wrong ... someone going out and just ... doing reactive work and fixing it immediately, and then it never sort of coming back into the system.”

Maintenance engineer, agribusiness

The consequence is that when farmers complain about an asset, the maintenance system shows it as healthy. “The data’s clean in a way that there’s not much failure data.” A maintenance manager at the same organisation described asking every zone to capture every breakdown in SAP, after a multimillion-dollar migration, and being told by some areas that it was too much work. At year end he could not calculate mean time between failures.

What’s in It for Me?

Practitioners were clear that the problem is not the maintainers’ character. It is that capture is framed as admin, is hard to do, and returns nothing visible to the person doing it.

“We need to move away from that being seen as admin, and being seen as the way the system ... uses that data to constantly target and improve across the board.”

Maintenance performance lead, major miner

“The question is, what’s in for me? Like, what’s the value for me? Because their... their primary task is to execute a job.”

Asset management strategy principal, iron ore



A maintenance performance lead acknowledged the limits of the message from head office. She could tell maintainers that better data means fewer failures and a calmer working life, but she knew how that sounded “from my ivory tower”. A people readiness manager working on a decarbonisation portfolio framed it as a matter of setting people up to succeed.

“A lot of what it sounds like asset management needs is data, and the people that we are relying on are the workforce, so if we don’t set them up for success, you’re not going to get what you need.”

**People readiness and skills manager,
decarbonisation portfolio**

Fixing It at the Point of Hire

The most concrete fix came from a regional port authority. It now makes data capture part of the role description and the interview.

“A core part of your role now is providing us quality data ... then, is this really the right job for you?”

Maintenance manager, regional port authority

He acknowledged this is easier for a smaller organisation than for a major with hundreds of

fitters. A general manager who has moved from a 2,000-person mine site to a 500-person business agreed: in a small team, one or two new hires can shift the culture.

The Loop Every Reliability Program Depends On

Every mature maintenance strategy assumes a closed loop. A task is planned, executed and reported, and what the maintainer found is used to improve the next iteration. Job plans, task lists, bills of materials, standard durations and parts kits are hypotheses. They start life as OEM recommendations or an engineer’s best judgement, and only the field can tell whether they are right. Living RCM programs, PM optimisation and defect elimination all run on that feedback. Without it, a maintenance plan is frozen on the day it was written.

The costs of a broken loop are rarely attributed to it. Wrong durations break the weekly schedule. Incomplete parts kits send crews back to stores, and eventually into building their own. Inspections that find nothing year after year consume labour and credibility, while the failure mode nobody wrote a task for keeps recurring. Each of these shows up somewhere else in the numbers, as low schedule compliance, poor wrench time or repeat failures, and is treated as its own problem.

Where is the greatest gap between the intended maintenance process and the field?



Practitioners chose up to three answers; the chart shows each answer's share of all selections.

WHAT'S WORKING

Acknowledgement matters as much as action. A public transport asset leader said not every piece of feedback will be actioned, but every piece should be acknowledged, with a reason if it is declined. A southwest alumina team stopped asking for accurate hours as compliance and showed maintainers that accurate data was how they would win the business case for the upgrades and resources the crews themselves wanted; data quality improved significantly. A WA reliability lead recalled a fertiliser operation in Queensland that budgeted administrative staff alongside its contractors after shutdowns to load work-pack notes into the system, with gains in job safety and duration. Others argued that this treats the symptom: a maintenance performance lead pointed out that most maintainers can order food on a phone and asked why capturing work history should be harder than that. And language matters: an Xchange session heard that recording "travel between work orders" was accepted where "unproductive time" would have "set the unions on a war path".



There is also a human signal in this finding. Feedback from the field is a form of engagement. When maintainers stop writing it, they are telling the organisation that they no longer believe it is listening. That is an early warning of disengagement and of knowledge walking out the door. Closing the loop needs three things WA practitioners described as missing: clear ownership of each task list, a visible response to every piece of feedback, and capture tools designed for the person holding the spanner rather than the person reading the report.

Data Capture Is Part of the Repair

The close-out of a work order is where reliability data is born. The failure code, the cause, the remedy, the actual hours and the parts consumed are the raw material for mean time between failures, bad actor lists, Weibull analysis, PM optimisation and the business case for capital. If they are missing or wrong, every one of those analyses is wrong with them, and usually in the direction of making problems look smaller than they are.

Both distortions practitioners described have predictable effects. Under-booking breakdown hours makes reactive work look cheap and fast, so the case for prevention never stacks up. Over-booking planned hours inflates standard durations, overloads schedules and hides true wrench time. Neither is a character flaw in the workforce. Both are rational responses to how the data has been used, or is believed to have been used, in the past: as a surveillance tool or a timesheet rather than as a way to fix problems.

The fix is to design capture into the job rather than onto the end of it. That means mobile tools at the asset, a small number of well-defined codes rather than long free-text fields, supervisors who review close-outs as part of quality, and a visible link between what crews record and what changes as a result. Language matters as much as technology. Recording travel between work orders as evidence for better planning is accepted in a way that recording “unproductive time” never will be.

Plans That Do Not Survive the Week

TRANSITION FROM WORK ORDERS TO LEARNING LOOPS

WA practitioners are not short of plans. They are short of plans that survive contact with the operation. Competing priorities, poor scoping and a quiet tolerance of cut scope mean planned work is regularly interrupted, trimmed and reported as done when it is not.

Interrupted by Everything Else

A second roundtable was asked the same question as the one in chapter two, and answered it differently. Counted as a share of the practitioners in the room rather than of all selections, 62 per cent chose “planned work is interrupted by competing priorities”. Poor scoping and inconsistent supervision were each named by 46 per cent. In a separate roundtable on strategic alignment, competing priorities and short-term thinking tied as the biggest communication challenge. The competing priority is not a surprise to anyone. What struck the facilitators was how rarely organisations have a disciplined way to manage it.

A rail network planner described the pattern clearly. Long-term planning builds a twelve-month look-ahead of available tool time against track access windows. By the time the window arrives, frontline teams may complete half of it. And the reasons never make it back to the people who built the plan.

“As it creeps down to, T-0 execution, you’ll have frontline teams maybe only executing 50% of the work ... we don’t end up getting that feedback back to long term.”

Long-term planning lead, rail network

“It All Looks Good. But It’s Not.”

The most uncomfortable admission came from a maintenance leader at an alumina refinery.

When competing priorities hit, the work order still gets closed. The scope does not.

“The bad answer is the jobs get done. The scope is not even close to 100% of what originally was planned to bring the asset back to the condition it needs to be to deliver its capability, so it all looks good. But it’s not.”

Maintenance leader, alumina refining

He added a detail that captures a WA-specific structural tension. The process controllers who decide when equipment comes on and off line work twelve-hour rotating shifts, and their measure of success is the production they held that shift. The planners work a five-day week and think in weeks and months.

“They do their 12 hours, they go, phew, I’m glad I kept that production up. They’re not the guys doing the 5-day week, doing the planning ... so we’ve now got two different groups with completely different priorities. Trying to do the best thing for one company.”

Maintenance leader, alumina refining

Scope Creep Starts at the Top

A senior asset management leader argued that execution discipline is usually discussed as a frontline problem when it is a leadership one. The question an operations manager asks when equipment is down shapes everything that follows.



“It’s so easy to ask, okay, how long to ... How long will it take before the equipment is back? What can you cut from scope? That discipline... Execution discipline actually starts right at the top.”

Senior asset management leader

He described the drift: end-of-year milestones, shipping schedules and dispatch targets create pressure to stay online, the plan cut at the start of the week changes daily, and the front line draws its own conclusion about how much the plan matters. Worse, when equipment is pushed to a higher performance level, the maintenance strategy is rarely updated to sustain it. The gain becomes the new baseline and the asset quietly degrades.

“We very seldom allow and enable our reliability engineers to go and review the asset activities to lock in the gains.”

Senior asset management leader

Scoping: The Weak Link Upstream

Poor scoping was the second most common answer in the polling and the subject of much of the discussion. One practitioner said scoping tends to fail at one of two extremes: so technical it is disconnected from how the job will physically be done, or so vague it gives the crew nothing to work with. An electrical maintenance lead added that scoping needs planned time of its own, and that bringing contractors in to scope before a shut-down carries a cost many budgets will not absorb.

The Schedule as a Contract

Good work management separates planning, deciding what will be done, how and with what, from scheduling, deciding when and by whom. The weekly schedule is in effect a contract between operations and maintenance: operations commits the equipment, maintenance commits the labour and parts. When that contract is broken routinely, the costs are real but rarely visible. Deferred jobs age into backlog. Backlog ages into breakdowns. Crews lose confidence that the plan means anything, and planners lose confidence that the effort of planning is worth it.

The practice practitioners found most troubling is the work order closed with incomplete scope. It is worse than a deferral. A deferred job stays visible in the backlog. A job closed as complete when half the scope was cut disappears from view, and the CMMS then tells reliability engineers that the asset received maintenance it never got. That corrupts the failure history, the PM compliance figures and every analysis built on them. It links this obstacle directly to the data trust deficit.

WHAT THE POLLING AND SURVEY SHOWED

- Greatest gap between intended process and the field (share of practitioners, up to three answers each): planned work interrupted by competing priorities 62%; work poorly identified or scoped 46%; supervisors apply standards inconsistently 46%; job plans lack detail 31%; procedures not followed 31%.
- Biggest communication challenge when maintenance tries to influence a business decision (a separate roundtable): competing priorities and short-term thinking, 23% of selections each, well ahead of any other answer.

WHAT'S WORKING

Operations and maintenance sharing accountability. A mining maintenance manager who moved his function into operations, reporting to the same general manager as the production managers, now shares year-end KPIs with them. "They're responsible for allowing the maintenance to happen, and I'm responsible for production as well." It is not perfect, he said, but it has people singing from the same hymn sheet. A passenger rail operator spent more than a year building shared definitions of what operations and maintenance each measure, and found it the only thing that has worked.

Asset Management Lost in Translation

TRANSITION FROM TECHNICAL CASE TO BUSINESS CONSEQUENCE

WA asset managers are not losing the argument because their technical case is weak. They are losing it because the case never arrives in the language decision makers use, and because the strategy that should guide the front line is too technical, too remote or effectively secret. Asset health, on its own, wins no attention at all.

The Problem Is Translation, Not Engineering

When one roundtable was asked why important asset management proposals struggle to gain executive support, 62 per cent chose the same answer: we understand the asset problem, but we have not translated it into business outcomes such as risk, cost, revenue, service or value. Just under a quarter chose competing priorities. Only 8 per cent said the technical case was weak.

The practitioners in the room were not surprised. Several said the profession's training is almost entirely technical and almost never about structured communication. One said the people who choose asset management tend to enjoy complexity, and that the enjoyment shows in their proposals.

“We actually just overcomplicate it sometimes ... a lot of our ... the people that work in our department. Enjoy the detail, and enjoy the complexity of it.”

Asset management practitioner, iron ore

A senior practitioner explained how the chain breaks. If the pitch is too technical, the audience does not fully understand it. If they do not understand it, they do not fully believe it. And a proposal nobody believes loses by default to one that is easier to follow.

“Otherwise it does become a case of... Too technical, don't fully understand, therefore don't fully believe you, therefore another priority will be far more interesting and far more important by default.”

Senior asset management practitioner

Nothing Asset Health Can Buy

The most striking number in the strategic alignment polling was a zero. Asked which forms of information are most likely to gain senior leadership attention, safety exposure drew 23 per cent of all selections, financial impact 20 per cent and production impact 17 per cent. Asset health indicators drew 0 per cent. So did long-term asset sustainability.

That result should change how WA asset managers build their cases. The profession's native language of condition, criticality and remaining life does not, on its own, move a leadership table. It has to be converted.

The same room was asked how senior leaders view maintenance. The most common answer, at 44 per cent, was “a service supporting production”. The second, at 33 per cent, was “it varies significantly between leaders”. Nobody chose “a source of competitive advantage”, which is how a public transport asset leader said it should be seen.

“It unlocks production, unlocks cost. Saves risk, but yeah, it isn’t viewed that way at the moment.”

Asset leader, public transport

Telling the Story Four Ways

The best example in the research came from a mining fleet manager replacing thirty-eight large wheel loaders with a different manufacturer’s machines, a program of close to \$90 million over two years. The same decision was told four different ways. To the chief executive: material movement, net present value and return on investment. To the mining team: travel speed, cycle times and operator feedback. To the environmental team: why moving from a Tier 4 to a Tier 3 emissions system made sense for remote operations. To the fitters: where the filters are, how often the machine needs servicing, and what it would mean to them when they were in the belly guards.

“It’s changing the story based on the value driver of the audience, which I think we sorely missed ... We’ll take something off of a CAPEX review that’s gone to a CEO, and then try and implement it on a PowerPoint presentation for a group of fitters.”

Fleet asset manager, mining

An electricity network leader offered a simple test that others adopted on the spot.

“Can a 12-year-old understand what I’m saying? If not, it may not be simple enough to cut through.”

Asset management leader, electricity network

Playing the Safety Card

If safety exposure is what wins attention, the temptation is obvious. Practitioners in one round-table were frank about it, and about the damage.

“It always helps if... if you’re trying to get something up, and then you can add a little bit of safety ... Unfortunately, sometimes the safety card gets probably played a little bit too much, and we’re becoming more and more risk averse.”

Maintenance manager, mining operations

“If everything is safety, then nothing is safety.”

Enterprise maintenance improvement lead, mining

Reputation is also climbing the list of what leaders care about, driven in mining by engagement with Aboriginal communities and, in WA specifically, by growing union activity that affects an already stretched workforce.

When the Business Case Disappears Upward

A practitioner working at enterprise level in a major miner described a problem that grows with company size. A site-level business case that would make a real difference to cost or risk becomes a rounding error by the time it reaches the enterprise, and the budget it would improve is already allocated.

“When you’re thinking from an enterprise level, it’s so diluted that it actually doesn’t shift the dial ... it becomes quite difficult when it comes to maintenance and having these breadcrumbs to the CEO and what he cares about.”

Enterprise maintenance improvement lead, mining

A mining systems specialist added the budget trap every maintenance manager knows: a case built on savings is a case to cut your own budget next year.

“Ultimately, if you spend less, you’re going to get less the following year.”

Maintenance systems specialist, mining

Three Levels of Translation

For practitioners in government trading enterprises the translation burden is heavier. An asset manager at a regional port authority is preparing a strategic asset plan that must pass the executive committee, then the board and chief executive, then state infrastructure and Treasury. A berth that is fit for purpose today will need a rebuild costing more than \$50 million within five years. He can run it to failure and ask for the money later, or begin now and replace it on a plan. Both options have to be told at three altitudes, to people with different questions, about taxpayers' money.

An electricity network leader added the economic regulator, which sets how much revenue the business can earn and "is full of economists". A public transport leader added the electoral cycle.

"Being a government organisation, everything is inherently short-term, because it's all linked to election cycles."

Asset leader, public transport

Lost on the Way Down: The Strategy Nobody Can See

When one roundtable was asked where responsibility lies for the widespread lack of understanding of asset management strategy, 80 per cent chose the same answer: many asset management strategies are too technical and disconnected from the corporate strategy. None chose the executive. None chose the asset leaders' translation skills.

An asset management manager at a regional port authority, who has spent nearly three years building an asset management system to state government requirements, argued the profession focuses on the part it finds easy.

"People still don't understand what asset management is. We're still focused at the grassroots... That's the 'doing' part of asset management. Businesses today do not understand where asset management starts at."

Asset management manager, regional port authority

Hidden in the Corporate Structure

He described his time in mining. The strategy existed, somewhere, owned by people frontline teams had never met.

"It's hidden away somewhere in the corporate structure. And if you go... if you went to, like, an FMG, Rio, BHPs, all those, they'll have that. But it's somewhere that is well and truly out of reach and isn't cascaded or spoken about to the actual people that are out there on the sites executing the work."

Asset management manager, regional port authority

The facilitator added the image most practitioners recognised: asset management documents sitting in lever arch folders on a shelf, "gathering dust", not usable, useful or used.

When the Why Is Missing, Run-to-Failure Looks Like Neglect

The strategy matters most when it asks the front line to do something that looks wrong. The port authority manager tied it directly to the run-to-failure decisions described in chapter ten.

"The poor people out there that are executing the work, put their pride on the line every day with executing their job to the best of their ability, not understanding what the company actually wants, or needs, or the why behind it."

Asset management manager, regional port authority



“For some reason, it’s either not... well, it’s either not there, or if it is there, it’s a secret, or people think it’s a secret.”

Asset management manager, regional port authority

A maintenance supervisor in another roundtable said the same from below: frontline teams are rarely told what the company’s goals are or what data it is chasing, so they sometimes find out they have been heading the wrong way.

The Missing Line of Sight

An electricity network leader said most of the proposals that fail in his experience lack a line of sight from the work in the field, through the plan and the strategy, to what the business and its stakeholders require. Building that line is hard work for technical people. One practitioner said strategy is often misread as it passes down through levels, and suggested AI tools might help asset professionals close the language

gap. Another reminded the room that the fitters need their own version of the story.

Why Reliability Needs a Second Language

The value maintenance and reliability create is mostly invisible: failures that did not happen, production that was not lost, a safety incident that never occurred. That makes the case harder to make than almost any other investment, because the benefit is a non-event. Condition, criticality and remaining life are the profession’s native language, and they are essential for deciding what to do. They are not, on their own, an argument for why the business should fund it.

Translation means converting failure modes and risk into consequence. Production at risk, expressed in tonnes or revenue. Safety and regulatory exposure. The cost of unreliability, including the secondary damage and the extended outage when a deferred job becomes a breakdown. Life

cycle cost over the period the business actually plans for. The polling result that asset health indicators won no senior attention is not a reason to stop measuring asset health. It is a reminder that condition data is an input to the case, not the case itself.

The mechanics of funding matter too. Many maintenance cases fail not because the logic is weak but because they collide with how budgets work: maintenance savings do not free up money already allocated, opex and capex sit in different buckets, and a saving demonstrated this year becomes a smaller budget next year. The strongest cases practitioners described presented options side by side, did nothing, did the minimum or did what was recommended, each with its risk and cost, and let decision makers choose with their eyes open.

What the Front Line Actually Needs to Know

ISO 55000 describes a line of sight from organisational objectives, through asset management objectives, the strategic asset management plan and asset management plans, down to the

work done in the field. In principle it tells every planner and supervisor why each piece of work matters. In practice, as WA practitioners described it, the chain breaks somewhere between the corporate document and the site.

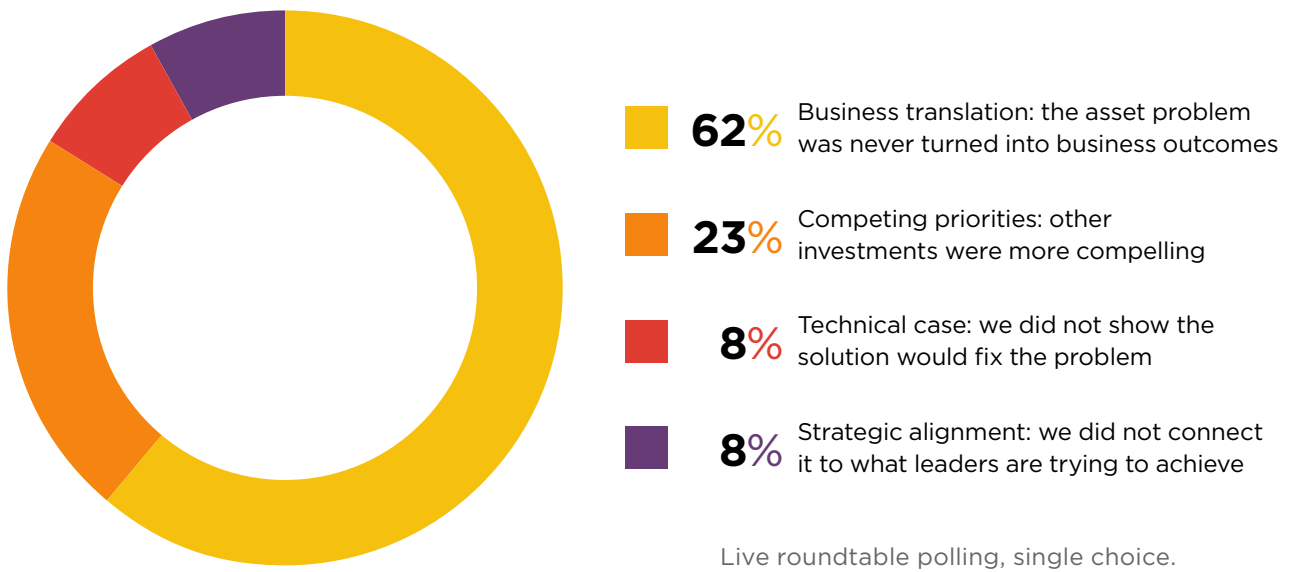
The front line does not need the whole framework. It needs a short, plain answer to a few questions: which assets are critical and why, which are deliberately run to failure, what the business is protecting this year, and what will change over the next few years. Planners, supervisors and maintainers make thousands of small trade-offs every week. A strategy they can explain lets them make those trade-offs in the same direction. One they have never seen leaves each of them to guess.

This matters most when the strategy asks for something that looks wrong on the ground: running a chute to failure, deferring a repair to the next shutdown, or not refurbishing an asset due for replacement. Without the reasoning, those decisions read as neglect and erode the pride of the people asked to carry them out.

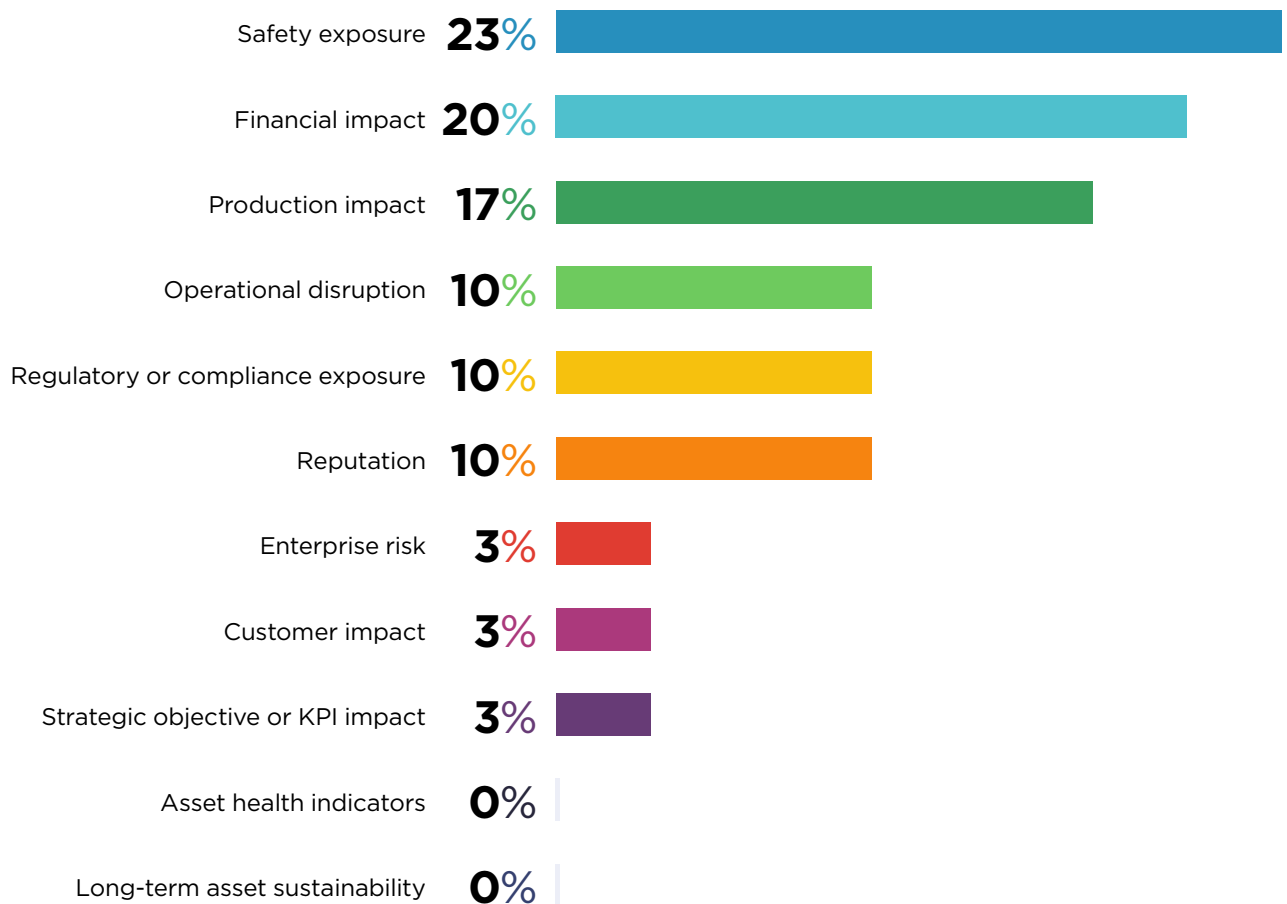
WHAT'S WORKING

A mining maintenance leader gets operations to measure loss, not just output: the shift that beat target, and the four shifts afterwards that did not. A long-tenured maintenance leader reframes maintenance for finance as “the long-term preservation of revenue”, with mixed but real success. One enterprise improvement team deliberately delivers low-value, visible quick wins alongside its long-term work, because going silent for nine months is how a program loses its sponsor. A central asset management team in a global miner found its integrity and risk program landed with the executive because a recent incident was fresh in their minds. And the facilitator in one room left practitioners with a test: could you pitch this to your CFO in five minutes, Shark Tank style? At the other end of the chain, a regional port authority manager's advice was to invest in the asset management framework and improvement plan, whatever the policy says, because that is where technology, strategy, planning and execution connect.

When an important asset management proposal struggles, what is most often the reason?



Which forms of information are most likely to gain senior leadership attention?



Practitioners chose several answers; the chart shows each answer's share of all selections.

Everyone Has the Data, Nobody Owns It

TRANSITION FROM MORE DATA TO TRUSTED DECISIONS

Self-service data platforms have put maintenance analysis in everyone's hands, and organisations keep adding systems, sensors and dashboards before deciding what each is for. Governance has not kept pace. WA's larger operators are producing competing versions of the truth faster than they can reconcile them, while frontline crews record data nobody has told them the purpose of.

From Scarcity to Free Fall

Five to ten years ago, a small central team controlled the asset performance data in most large WA operations. That has changed, and the people responsible for that data described the change with some alarm.

“5, 10 years ago, it would be very limited people that had access to that data, and the reporting of the data. Now it's a free fall. Everybody's got access to everything, and they can do it... do everything they like with the data. And AI is probably accelerating that as well.”

Asset performance data lead, iron ore

The effect is multiple answers from the same data. A mobile plant engineer at another iron ore operation said so many teams now analyse the same numbers that they reach different conclusions, and two reports say two different things. A practitioner from a port and resources background was more cynical about why.

“Most of those interpretations, are usually trying to prove someone's existing hypothesis around what might be driving the macro ... it's really just a preconceived view that's a bit of a self-licking ice cream and a self-fulfilling prophecy.”

Asset leader, bulk port operations

The Cost Lands on Site

A new maintenance manager at an ore processing site described how the sprawl turns into conflict. A central team in Perth analyses a data set, identifies savings, and sells them to general managers. The site team looks at the same data, finds it inaccurate, and is left chasing targets that were banked on bad numbers.

“They've banked those savings, so then they're chasing these unrealistic targets, and just creates, really, a lot of tension between support roles ... And then they're proving themselves that their data sets more reliable than the other data sets. You're just wasting time.”

Maintenance manager, ore processing

Locking It Down

The largest operators are starting to respond, and not always in the direction data enthusiasts would like. A practitioner with long experience in a major miner said the era of free access there has almost ended.

“We treat data a little bit more as a liability and a risk these days ... if you haven't gone through that transition yet, you probably will at some point where what you had access to, or what



you could draw as insights, might become significantly more restricted.”

Asset leader, bulk port operations

A maintenance systems lead at another iron ore producer, whose culture prizes agility, said the organisation had reached the point where it must close off back-end access before it grows further, because people were capturing data and then rewriting it.

“We like to be agile, jump in, get it done, but that’s then hindering us now.”

Maintenance systems lead, iron ore

Ownership Before Everything

When the final roundtable was asked for the highest-leverage fix if fragmentation is a governance and trust problem rather than a technology one, the most common answer, at 44 per cent, was clear ownership and accountability for data across its life cycle. Several practitioners argued the order matters: governance defines the standards, and ownership follows. An asset management lead preparing for an S/4HANA transition described how hard even the first step is.

“Where we’ve had challenges is agreeing who owns you know, all the master data ... there’s many different functional groups or parties that could own it, and then there’s conflict between that.”

Asset management lead

Collecting Before Deciding: Magic Beans

A maintenance leader who had recently joined a new organisation described what he found there.

“It’s almost like we don’t know what we want, we just don’t want what we’ve got, and so we’re keen to run away from what we’ve got, but we’re not quite sure what we’re running towards ... I call it Magic Beans, you know, where people just keep going down the market and buying more Magic Beans to bring back to the organisation.”

Maintenance leader, resources

At a previous organisation he had found 4,500 separate software applications. When he asked how many the approval process had rejected along the way, the answer was none.

The final roundtable's polling showed the same problem from three angles. Asked what stops data becoming trusted, actionable insight, 36 per cent said data is re-contextualised for every use case, 36 per cent said there is no consistent process to turn data into prioritised action, and 27 per cent said the business has never defined what data it actually needs to see.

The Dashboard That Disappeared

The sharpest story came from a maintenance manager in agribusiness. His organisation installed telematics on its mobile equipment, including accelerometers that register impacts when a loader hits a wall in a storage shed. It built a dashboard. Then the dashboard showed something leadership did not want to see.

“We spent all the money installing the technology, and we built a dashboard, and then the dashboard tells us stuff that we don’t want to know, and therefore, that dashboard just disappears again.”

Maintenance manager, agribusiness

He went further: the organisation is reluctant to build reports that would highlight non-compliance, because that would demand accountability, and it does not report operational damage at all.

Nobody Tells the Front Line Why

A maintenance supervisor described the view from the shop floor. Her team puts data into a new platform that was meant to join everything up. It is clunky, and nobody has explained what the data is for.

Asked by the facilitator whether her tradespeople could say which information they record is used for which decisions, she answered without hesitation.

“No, no, I don’t think so. I think the information and the data for them is all there, but I think we’ve missed a huge gap in not actually showing them properly, and not discussing with them properly what’s required out of them.”

Maintenance supervisor

The facilitator added an observation from long experience: new data requirements are always additions. “It’s always an add, it never seems to be a subtract.”

Technology First, Process Later

Several practitioners said the order of work is backwards. An iron ore maintenance systems lead said the organisation had overlaid a system without fully understanding the process, and the front line paid for it. A general manager about to begin an SAP implementation described the pattern he wants to avoid.

“Generally we’ll bring the technology in, and then try and work everything else out backwards ... then we say that technology’s no good, or our people are no good, but I mean, we haven’t trained them, we’ve got no structure, framework, etc.”

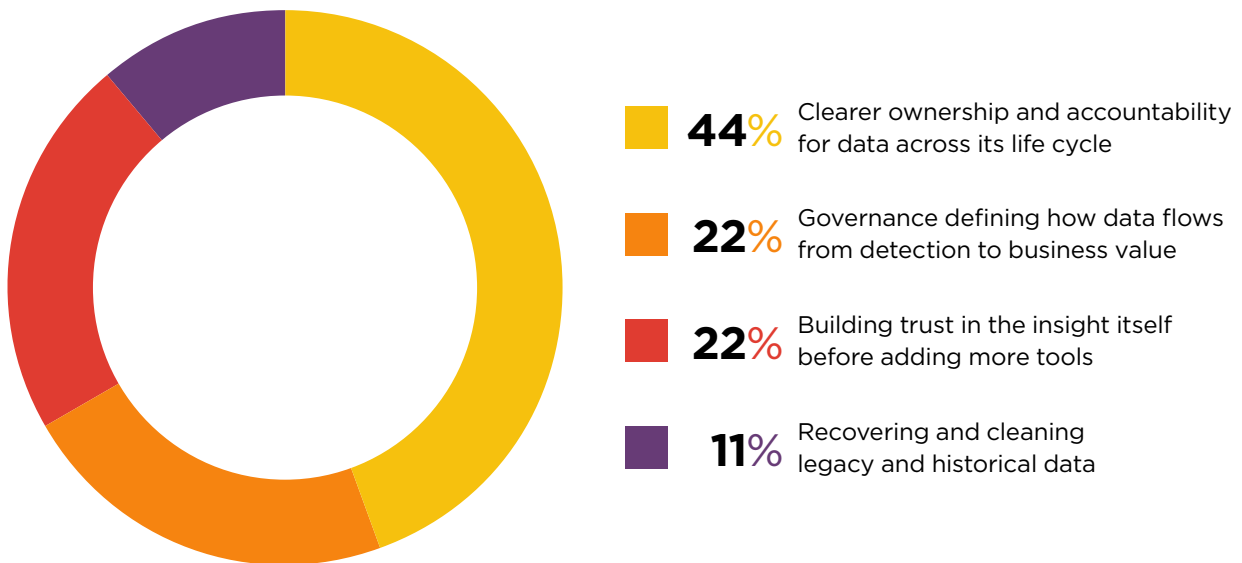
General manager, remote power generation

The Xchange sessions added a detail from a large operation that tracked who actually opened its dashboards. Executives did. The frontline decision makers the dashboards were built for did not, and still ran their meetings off whiteboards.

Governance Is a Maintenance Discipline

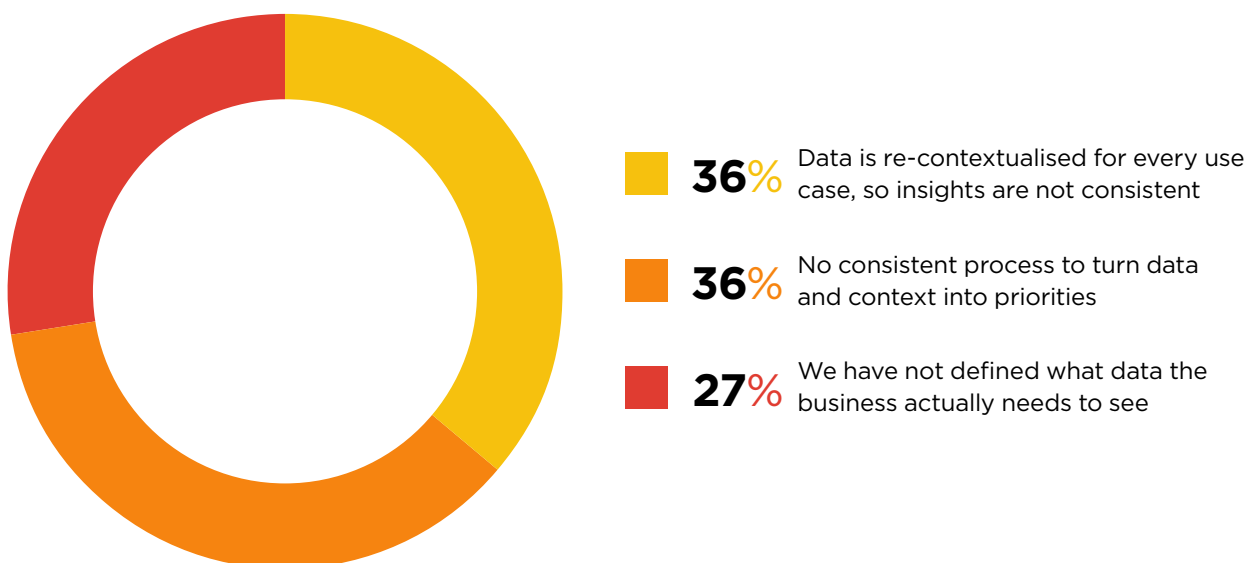
Asset managers know how to look after assets: give each an owner, define the standard it should meet, monitor its condition and intervene when it degrades. Data needs exactly the same treatment, and in most WA organisations

If fragmentation is a governance and trust problem, what is the highest-leverage fix?



Live roundtable polling, single choice.

What most often stops the data you already collect from becoming trusted insight?



Live roundtable polling, single choice. Nobody chose 'something else entirely'.

it has not had it. The master data that underpins the CMMS, the metric definitions behind MTBF and availability, and the business rules used to cleanse raw telemetry are all assets. Without an owner, they drift.

The most practical governance step practitioners described is to define key maintenance metrics once, in a shared business layer, so that every report and every AI tool calculates availability, MTBF or schedule compliance the same way. When each team writes its own logic against the same raw tables, disagreement is guaranteed, and the argument moves from the asset to the spreadsheet.

AI magnifies whatever it is given. Used on governed data, it can compress hours of manual aggregation into minutes and free technicians to find faults rather than information. Used on ungoverned data, it produces wrong answers faster and presents them with more confidence than any junior analyst would. The balance WA's larger operators are now trying to strike is to keep frontline innovation alive while ensuring that the numbers used to make maintenance and capital decisions come from one controlled source.

Start With the Decision

Every field on a work order, every sensor and every dashboard has a cost, and most of that cost is carried by the front line. The discipline that separates mature asset management organisations is working backwards: for each asset class, identify the decisions that matter, such as PM intervals, repair or replace, spares holdings and shutdown scope, then define the minimum information needed to make each one well and at what level of detail. Anything that supports no decision is a candidate for removal.

Dashboards follow the same rule. A dashboard survives when it is built into a routine, the daily production meeting, the weekly schedule review, the monthly reliability review, where somebody is expected to act on what it shows. Dashboards built without that routine are looked at by executives and ignored by the people they were built for.

The telematics story in this chapter is also a governance and culture story. Data that reveals operator damage or non-compliance is only valuable if the organisation is willing to act on it. Collecting it and then switching it off sends a clear message to the workforce about what leaders actually want to know.

WHAT'S WORKING

Start with the decision. The facilitator of one data roundtable described the organisations that do this best: they begin with the decisions that will move the dial, work back to the data needed to make them, and only then design the transactions that capture it. One iron ore organisation is centralising its data lakes and standardising ingestion so that every report and tool starts from the same governed set. A performance lead at a major miner acts as gatekeeper for shared shutdown reporting and will not accept ungoverned spreadsheets into the platform. And a mining systems lead noted most WA operators run largely the same SAP data and rebuild the same reporting logic separately, and asked whether a shared, repeatable model could be deployed instead.

Navigating AI Without Losing the Fundamentals

TRANSITION FROM MORE DATA TO TRUSTED DECISIONS

Artificial intelligence is already inside WA maintenance organisations, often informally: summarising breakdown chats, stitching systems together, building dashboards in minutes. Practitioners are less worried about whether to adopt it than about what it does to trust, to data they never governed and to the skills of the people who will rely on it.

Already in the Room

AI did not arrive in WA maintenance through a strategy. It arrived through the side door, in the hands of engineers and data teams trying to get around fragmented systems. Asked whether anyone had used AI to pull their data together, several practitioners in one roundtable already had.

A mining data team has built an AI agent over its cloud data platform and document stores. Engineers can ask a question in plain language about a tag, its process trends and its SAP history, and get a single answer drawn from tables that would previously have taken a data engineer days to connect.

“The other really good thing ... it enables us to put, like, a bit of a business layer on top of it ... So if someone’s reporting mean time between failure, there really is different ways to cleanse that data to get that metric. So what this tool enables us to do is actually put a business layer much faster.”

Data and reliability lead, mining

A port practitioner described an AI-assisted tool built to aggregate delay accounting, SCADA and work management data. On its own, he said, “it really did nothing”. What it did was save technicians two hours of hunting across

systems before their first job of the day, so they could get straight into fault-finding. A mobile plant engineer uses an AI assistant over Teams and Outlook to summarise the previous 24 hours of breakdown chats and emails for the morning meeting. An Xchange session heard of a maintainer who loaded a folder of OEM manuals into an AI notebook tool and asked for every lubrication point and specification.

“Came up with a table on every piece of equipment, five minutes.”

Maintenance participant, national Xchange session

Fast Answers, Confident Mistakes

The same practitioners who described the gains described the risks in the same breath. The breakdown summaries are useful, the engineer said, “but sometimes it does make up things”, which sends the team straight back to checking. An asset management engineer who had “dabbled” found the same: anything AI pulls together still has to be validated before anyone will trust it.

A senior asset management leader put an AI tool through a multi-criteria analysis with a full set of supporting documents. The answer came back complete, persuasive and wrong. Only when he interrogated it did the tool admit it had not read one of the appendices.

“The conviction that AI came back with. To actually saying, oh, this is the final outcome ... was so flawed and skewed that when I interrogated AI, how it got there, then it confesses up.”

Senior asset management leader

“It just has such a huge conviction when it provides certain answers to us that I, I’m fearful of... If we don’t have a governance model ... we may make very wrong decisions going forward, at the enterprise level.”

Senior asset management leader

A reliability and planning manager whose team used AI to connect its twelve systems found something more serious than a wrong answer.

“In doing so, with AI being able to just go everywhere, it’s actually found some ... false data. Some very confidential data as well that should not be available in the first place.”

Reliability and planning manager, iron ore

Everyone Is Now an Expert

AI has also changed the conversation around the leadership table. A senior practitioner described a growing impatience with technical nuance, compounded by colleagues who arrive having asked a chatbot and believe they already have the answer.

“All of a sudden everyone’s becoming an expert because they put it through ChatGPT and think they have the answer”

Senior asset management practitioner

An inventory and logistics lead compared what is happening inside organisations to what happened in the wider world: the technology spread faster than the rules for using it.

“AI exploded without giving a chance to the world leaders or the bigwigs in the technology world to come up with the governance and legislations around it, right? ... now with Codex or ChatGPT, you can build those dashboards as well, so there’s a growing need for that governance to be put in place.”

Inventory and logistics lead, iron ore

Garbage In, Faster

Practitioners were clear that AI does not fix the data problem described in chapters one and five. It inherits it. An asset performance data lead said the organisation wants to use more advanced AI models to take over report generation and manual analysis, but that depends on data structured so a machine can read it, which for fleets of hundreds of units streaming telemetry is a design problem in its own right. His survey response was blunter: “One of the key challenge for AI adoption is machine readable quality data, and this is not in place yet.” An electrical maintenance lead pointed out that the field instrumentation now feeding AI tools rarely has a maintenance strategy of its own. A data lead asked how to get the whole workforce to “capture the right data, at the right time, with the right details” so that AI has something to work with.

The opportunity is real. A senior leader described an engineer who had to navigate and re-key information across eleven systems to produce one report, and argued that once the source data is assured, AI could do that replication for him. But the order matters: assure the data first, then automate.

Task Lists, Judgement and the Human in the Loop

The deepest questions practitioners raised were about maintenance itself. A fixed plant digital lead described a vendor demonstration of AI

built into the ERP that challenged the idea of the task list altogether.

“The new world in SAP’s vision is AI looks at the area you’re trying to raise a maintenance notification in, looks at all your previous history, suggests this is the fix to your problem. Would you like to adopt it, yes or no?”

Fixed plant digital lead, iron ore

He liked the thinking. The facilitator pointed out the catch: it only works if the history is accurate, which returns the conversation to chapter two. Others worried about what reliance on AI does to the skills of the next generation. One survey response called for “Upskilling technicians in understanding and recognising reliability and asset management on the coal face rather than complete reliance on AI and automation”. Another warned of “an industry actively deskilling via reliance on computer diagnostics”. A third noted that people are “becoming more stressed around AI implementation, training to keep up and worried about their jobs”. And one simply asked for “Less AI slop.”

An Xchange session offered a more useful framing: use AI as a challenger rather than an oracle, and understand the assumptions it is making.

“In a way or approach asking it what am I missing here? You know is there anything that considered getting AI to Question you on things.”

Participant, national Xchange session

Proving the Value

Where AI has been tried, practitioners struggled to bank the benefit. A data lead’s survey response asked how organisations measure return company-wide when individual productivity is rising, and “where does the human stay in the loop?” An

Xchange session put the value problem starkly.

“If you do a business case on planning and scheduling and you improve productivity by 70%; does that mean we actually let people go? Probably not anyway, right.”

Participant, national Xchange session

“I think the consensus really is that we’re sort of dabbling. Right. But we don’t know how to scale.”

Participant, national Xchange session

Where AI Earns Its Place in Maintenance

The pattern across the WA evidence is consistent. AI earns its place in maintenance where the task is aggregation, summarisation and retrieval: pulling a fault history together, summarising what happened overnight, finding the specification in a manual, drafting the first version of a report. In those tasks it saves real hours and the human can check the output quickly. It is weakest where it is asked to make a judgement on data nobody has validated, because it presents a guess with the same confidence as a fact.

For maintenance and reliability leaders, that suggests three disciplines. Treat AI outputs that influence a maintenance or capital decision the way a good reliability engineer treats a vibration alarm: as a prompt to verify, not a verdict. Build AI on governed data, with defined metrics and controlled access, so that it accelerates one version of the truth rather than multiplying many. And protect the development of human judgement, especially fault-finding and root cause skills, so that the people checking the machine still know what right looks like.

The WA conversation is past the hype and not yet at the value. The organisations that get there first will be those that fixed their data foundations, not those that bought the most tools.



WHAT THE POLLING AND SURVEY SHOWED

- AI was placed in the top two challenges by just 4% of survey respondents, yet it came up unprompted in all but one of the roundtables, almost always in the context of data trust and governance.
- Given a hypothetical \$1 million to improve asset information, only 13% of practitioners would start with technology and integration; half would start with data quality.

WHAT'S WORKING

Start with retrieval and summary, not decisions. The AI-assisted fault aggregation tool that freed two hours of technician time each morning worked because people still validated the output before acting. One iron ore organisation is designing its data for machine readability before scaling AI across its fleet telemetry. A senior leader builds explicit limits into his prompts and requires the tool to report what it has not considered. And a mining data team uses AI to apply consistent business rules to raw data, so that every report calculates mean time between failures the same way.

The Maintenance Judgement Drain

TRANSITION FROM TENURE TO TRANSIENCE

WA's knowledge exodus is not mainly about procedures. The knowledge practitioners fear losing most is the reasoning behind past decisions and the judgement to make new ones. Neither is in the CMMS, and much of it is not even in the heads of the people staying.

What Is Actually at Risk

When the knowledge exodus roundtable was asked what type of knowledge is most at risk when experienced people leave, the top answer was knowledge of past decisions and their rationale. The second was professional judgement developed through experience. Asked for the greatest organisational risk, the room chose lost experience, knowledge loss and repeated mistakes, and more than half rated the issue as major. In the survey the knowledge exodus was the second most common first choice.

A track inspection manager at a passenger rail operator described the problem precisely.

“We have processes and procedures, and then we have the unwritten rules. It's the unwritten rules that, tend to be... forgotten about ... It's difficult to teach judgement to people.”

Track inspection manager, rail network

An engineering leader described what happens when fault-finding skill goes: downtime rises and whole units are replaced instead of a failed component, which raises operating cost. “You can't document all your fault finding.”

The Hard Drive in the Drawer

One story travelled between sessions. A digital lead at a major iron ore operation described a colleague of thirty to forty years' service handing

him an old external hard drive on his last day. It held, in effect, the engineering history of an entire processing plant, much of it redlined drawings that had never been updated through the proper process because the process was too slow.

“He goes, oh, there you go, mate, see you later. I'm like, what's that? He goes, well, that's pretty much the whole Benny plant at Newman.”

Fixed plant digital lead, iron ore

“The actual process to get some of the master data objects updated can be a bit confusing and... you know, take a lot of time and approval steps, workflows that they just go, oh, stuff it, I'll just save it on my desktop.”

Fixed plant digital lead, iron ore

We Only Write Down What Worked

A mobile plant engineer at an iron ore operation named a blind spot most organisations share.

“We are all guilty, we only document our success stories, no one writes around the mistakes we've made, so that is the biggest problem. We all know what works, but we don't know what doesn't work.”

Mobile plant engineer, iron ore

He gave an example: bucket sizing for excavators that move both waste and dense ore,

where the textbook method leads to either overloading on ore or inefficiency on waste. The lesson was learned the hard way and written into a procedure. Many lessons, he said, cannot be written down at all.

Knowledge That Is Recorded and Still Lost

The loop can fail even when the information is captured. Root cause analyses that sat in systems for years while the same failure recurred, or that were undone by newcomers who did not know why a change had been made.

“Someone pulls out an RCA from 15 years ago and says, oh, this happened 15 years ago, and we knew it was going to happen again ... I could probably think of half a dozen examples of going through that, where we should have known.”

Asset leader, bulk port operations

“Couple of years later, someone new joined, and they were like, hey, there’s a cost saving here, let’s go back to whatever we were doing previously, and ... We repeat the cycle.”

Mobile plant engineer, iron ore

The Decarbonisation Twist

The same engineer described a knowledge problem that is new and specifically WA. Around half of his site’s mobile fleet has already been decarbonised, and when someone who knows those machines leaves, there is nobody in the market to replace them. For the low-carbon fleet, the knowledge is not draining away. It was never there to begin with. Chapter twelve looks at that challenge in detail.

The Older Generation Wants to Share

The research also produced a finding that challenges a familiar assumption. Knowledge hoarding by long-serving staff is a staple of

the knowledge exodus story elsewhere. WA leaders who had run large frontline teams described the opposite.

“The older generation, in my absolute experience, has loved passing on 100% of their knowledge. Particularly because if someone else has their knowledge, it means that they’re not the one person that has to do every single activity ... they view it as the monkey off their back.”

Asset leader, bulk port operations

The track inspection manager said the same, adding that his veteran inspectors are now being taught computer skills by the trainees: “it’s two-way street”.

A Dissenting Voice

Not everyone accepted the premise. One senior maintenance leader wrote in his survey response that he was not sure the exodus is as big a deal as the industry thinks.

“I’ve seen retention of those ‘behaviours’ actually hold us back. A bit like the way sport was played decades ago was as good as it could possibly be, yet no-one really thinks a team from back then could compete with the best from today.”

Senior maintenance leader, resources, survey response

It is a fair challenge. Some of what leaves with retiring staff is judgement worth keeping. Some is habit the organisation should be glad to lose. The practitioners who manage this best are clear about which is which.

What the CMMS Cannot Hold

Maintenance knowledge comes in two kinds. Explicit knowledge, such as procedures, drawings and task lists, can be written down, however imperfectly. Tacit knowledge, such as how

a machine sounds when a bearing is starting to go, which isolation point sticks, or why a PM interval was changed after a failure in 2011, lives in people. The WA polling identified the second kind, and specifically the rationale behind past decisions, as the knowledge most at risk.

Rationale is the most expensive knowledge to lose because it is the easiest to undo. A modification without a recorded reason looks like an unnecessary cost to the next engineer. A PM task with no stated failure mode looks like over-maintenance. Management of change records, RCAs and FMECAs are supposed to hold the why. Too often they record what was

decided and not why, and they are filed rather than reviewed.

There is a paradox in fault-finding skill. As equipment becomes more reliable and more modular, maintainers see fewer failures and replace whole units rather than diagnosing components. Both are good things for reliability and cost. Both also reduce the opportunities to build the diagnostic judgement that is needed when something unusual goes wrong. Organisations that want to keep that judgement have to create the learning deliberately, through shadowing, structured failure reviews and records of what did not work as well as what did.

WHAT THE POLLING AND SURVEY SHOWED

- Type of knowledge most at risk when experienced people leave: knowledge of past decisions and their rationale ranked first; professional judgement developed through experience second.
- Greatest organisational risk: lost experience, knowledge loss and repeated mistakes, with more than half of the room rating it major.
- Survey: The Knowledge Exodus was placed in the top two by 28% of respondents, and was the first choice of 20%.

WHAT'S WORKING

Write down the why and the failures, not just the procedure. The Xchange sessions heard of a utility rewriting its procedures to explain the reasoning behind each step, because procedures do not drift but understanding does. A rail operator pairs veteran inspectors with trainees and treats it as a two-way exchange. An engineering leader sets coaching and mentoring as an explicit expectation of every experienced engineer and subject-matter expert. Several practitioners argued that root cause analyses and FMECAs should be treated as live documents with scheduled review, not filed once and forgotten.

The Frontline Leadership Gap

TRANSITION FROM HEROICS TO SYSTEMS

Execution discipline in WA is set by what leaders tolerate and held, or lost, by frontline supervisors. Those supervisors are usually promoted for technical skill, buried in admin, spread across crews that never meet, and given little help to lead.

What Leaders Tolerate Becomes the Standard

When one roundtable was asked what comes to mind when they hear “execution discipline”, the top answers were quality and accountability. In another, consistency and accountability. The discussion that followed moved almost immediately from the front line to the people leading it.

“What happens in the field is what we tolerate as leaders, or what we condone, or what we endorse as decisions on a day-by-day, a month-by-month, year-by-year basis.”

Senior asset management leader

“If leadership doesn’t hold the line in terms of operating discipline, which includes execution discipline ... then why should I deliver, you know, my work to a high quality when it doesn’t matter to my leaders?”

Senior asset management leader

Four Crews, Four Ways of Working

WA’s roster structures multiply the problem. On a four-panel roster, the same equipment is maintained by four crews under four supervisors who may barely overlap. 46 per cent of practitioners in one roundtable named inconsistent supervision as a top gap between process and practice.

“You’ve got four crews, you’ve got a mid-level management team of four coordinators. What I’ve seen is 4 different departments, 4 different egos, 4 different ways of working.”

Lead reliability specialist, gold mining

A maintenance manager at a large gold operation said supervisors on his site tend to think their team is the crew below them. His aim is to make them see that their primary team is the other supervisors.

“When you’re trying to improve crew by crew, shift by shift, it just doesn’t work.”

Maintenance manager, gold mining

Promoted for the Wrong Reasons

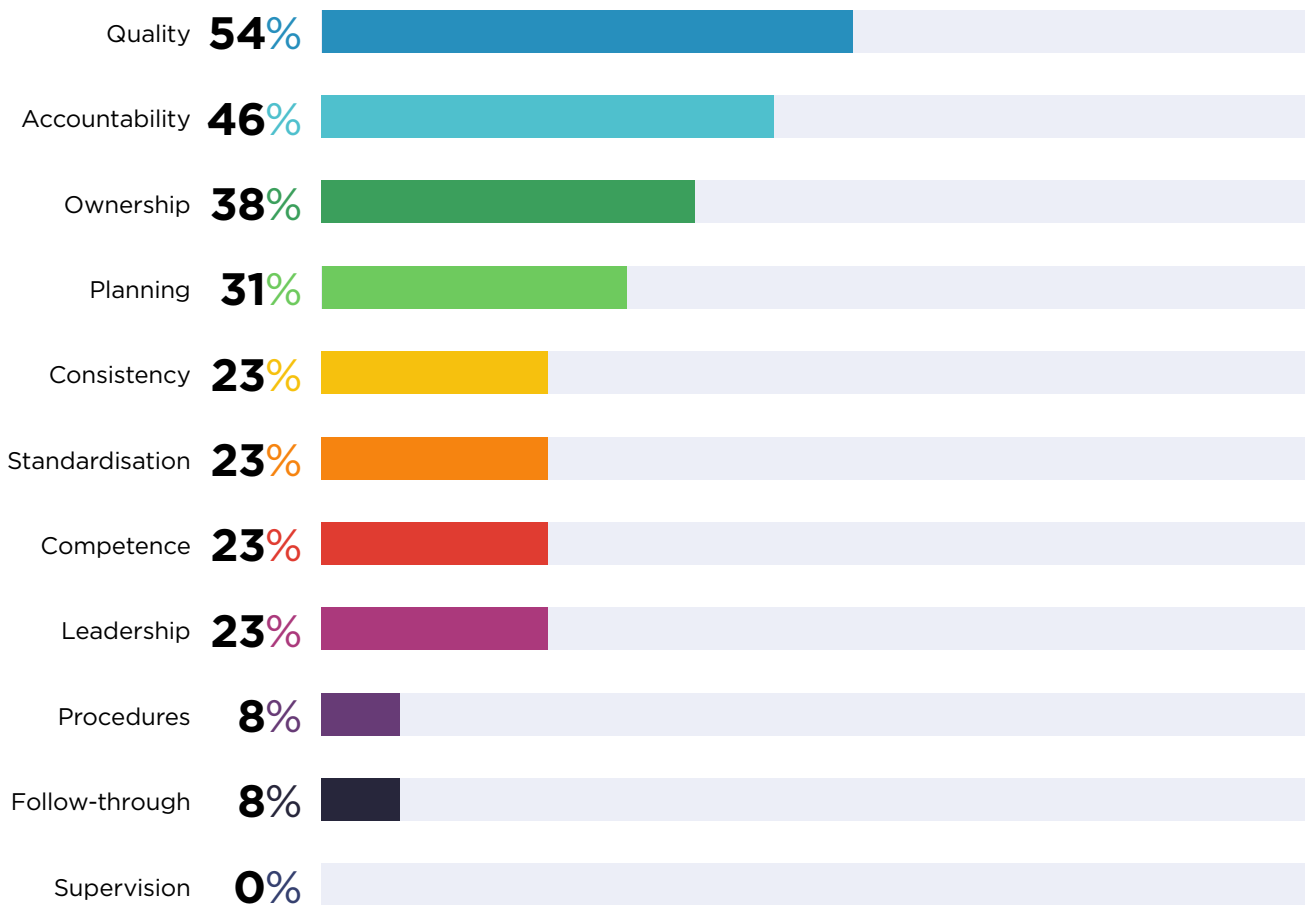
Practitioners were direct about how supervisors are chosen and prepared.

“We tend to... yeah, promote people who are... who are technically competent, but not the... the... the EQ skills.”

Lead reliability specialist, gold mining

A senior leader described two opposite failure modes. New supervisors promoted from within a crew who are not yet confident or trained, and long-serving supervisors who have become “the smartest in the room” and cannot be taught. He cautioned against appointing a new supervisor to lead the crew they came from, advice echoed in

When you hear “execution discipline”, what are the first words that come to mind?



Live roundtable polling. Practitioners chose several words each; supervision was chosen by nobody.

WHAT'S WORKING

A small processing site runs leadership training on the fundamentals of setting expectations, holding people to account and giving timely feedback, then removes admin so leaders can be in the field. A grid-scale battery operator publishes each crew's work management results side by side, with no new instructions attached, and lets healthy competition between crews lift performance. A gold operation is digitising documentation and setting “tight-ish guardrails” for standard work, deliberately leaving room for tradespeople's judgement: “if you take a little bit of creative... creativity away from them, they'll get bored”.

an Xchange session where a maintenance services manager who spent a decade in the Pilbara said leading your former crew is ten times harder.

Supervisors are also pulled away from the field. The reliability specialist described corporate, safety and other functions all placing demands on the same operational leaders. A new maintenance manager at a small processing site said the most effective thing her business had done was take admin off supervisors so they could be present in the field.

Maintenance Is a Behaviour

A senior maintenance leader with a long career in resources argued that the conversation about accountability misses the point. The best maintenance organisation he ever worked in did not have an electronic scoreboard.

“They had supervisors that were heavily engaged. They had maintainers that had a lot of pride in what they did ... There’s a lot of reports that come out, a lot of KPIs ... There’s not so much of the hearts and minds.”

Senior maintenance leader, resources

He described one small change that made a difference: changing the question supervisors ask at the end of a job.

“How are you going to guarantee that’s not coming back? It’s just a subtle bit of the question to get that quality and true maintenance.”

Senior maintenance leader, resources

Supervision Is Where Standards Live

The frontline supervisor is the point where the maintenance system meets the day. Supervisors translate the schedule into work, decide what happens when priorities collide, check that the torque was right and the work area left clean, and close the loop on what was found. In a WA operation running four crews across a two-week roster, the same asset may pass through four sets of hands and four different standards in a month. Consistency depends less on procedures than on whether those four supervisors work as one team, share the same expectations and hand over properly.

Most supervisors are appointed because they were the best tradesperson on the crew. The skills that got them the job are not the skills the job now needs: setting expectations, holding a standard with people who used to be their peers, coaching, and managing the pressure from operations when equipment is down. Admin and safety paperwork then pull them away from the field, which is where the standard is actually held.

Leaders above them set the tone with the questions they ask. An operations manager who asks how quickly equipment will be back, and what can be cut, is telling the whole chain what matters. One who asks how the crew will make sure the failure does not return is telling them something different. Over months, the front line learns which question is real.

The Revolving Door and the Leader's Shadow

TRANSITION FROM TENURE TO TRANSIENCE

WA's workforce has always moved. In 2027 the movement has reached the leaders of the maintenance function. When maintenance managers change every fifteen months or so, programs die with their champions and decisions are reversed by newcomers. What survives a leader is not their program. It is what they held to, what they tolerated and whether their people felt able to speak.

Fifteen Months at the Top

The clearest number came from a survey response. A fixed-plant digital lead at a major iron ore operation wrote that maintenance leaders in his business change every 1.3 years on average, a little over fifteen months, which makes it difficult to ensure plant criticality and risk are understood well enough to prioritise work. A Pilbara planning leader told a national Xchange session almost the same thing.

“About one and a half years and they’ll change. So the cohort I look after and the managers, 80% of my team are brand new maintenance managers.”

Planning and asset health manager, Pilbara iron ore, national Xchange session

He added that reliability engineers are even harder to hold. One vacancy took nine months to fill, and the reliability engineers he does recruit tend to stay about a year.

The next generation, he said, does not want to fly in and fly out, and will take the same pay for a city-based role without it.

For comparison, MAINSTREAM's UK research put the average tenure of a senior maintenance leader

at 3.2 years and still called it shorter than most transformation programs. WA is turning its maintenance leaders over more than twice as fast.

When the Champion Leaves

In a state built on a transient workforce, change programs are often carried by one person. When they go, so does the program.

“With the transient workforce that we have, when a change champion leaves, the whole project or idea or methodology falls in a hole, because we’ve put all our eggs in the one basket with that particular individual.”

Maintenance systems specialist, mining

A mining practitioner whose improvement team was deliberately separated from business-as-usual warned that big programs in mining “come and go”, and that a team created for a purpose does not necessarily survive for the time it was meant to.

The cost is paid twice: once when the program stops, and again when the next one starts. The UK research, where 83 per cent of improvement initiatives fail to sustain beyond eighteen months, recorded what that does to the people asked to change again.

“This is the fourth iteration of change that they’ve seen.”

Maintenance manager, food processing, UK research

Crews who have watched three previous programs launch and lapse do not resist the fourth because they are difficult. They resist because experience has taught them to wait it out. Breaking that pattern takes consistency rather than enthusiasm, and it takes listening to the people who object.

“The only reason they were kind of resisting change is because I think they felt like they weren’t listened to.”

National maintenance manager, cement, UK research

Decisions Unmade

Churn does not only lose knowledge. It actively reverses it. The mobile plant engineer quoted in chapter seven described new starters finding an apparent cost saving and reverting a change that had been made for a reason nobody recorded. The Xchange sessions heard a sharper version from a participant who described seventeen role changes in ten years and called the resulting decision quality “suboptimal at best”.

A practitioner in agribusiness described a different turnover problem: leadership teams made up of people who worked on the grain receival sites thirty-five years ago and now run the business from that experience. Tenure and transience can fail in opposite directions.

The Shadow a Leader Casts

So far this chapter has been about what happens when leaders leave. The rest of it is about what they do while they are here, because the WA evidence puts as much weight on that as on the turnover itself.

Between the arrival and the departure, something else is happening. Practitioners returned repeatedly to the idea that a maintenance leader’s own behaviour, not their program, is what the organisation actually copies. A lead reliability specialist in gold mining named it directly.

“I look at it from a lens of culture, and the leadership shadow, so what I’ve observed. It’s the work that you walk past is the work level you’re setting as a leader. I see a lot of that happening, and you might do it at a micro level.”

Lead reliability specialist, gold mining

He gave the smallest possible example: a job finished but the area left uncleaned. The job ends, he said, when the area is clean, because that is what prevents the next hazard. Standards are transmitted in increments that size, and so is their absence.

This is why practitioners were sceptical about generic leadership training. One asked the room whether anyone had seen a frontline leadership program that genuinely landed.

“There’s a lot... a lot of initiatives, in my experience around frontline leadership that tend not to hit the mark ... it’s not the domain of traditional HR representatives, in my experience. It’s... it needs another level of specialist Knowledge to deal in... In the local, in the technical, in the contextual.”

Asset management practitioner

The honest answer from the room was “mixed bag”. Leadership development that works in a maintenance organisation has to be built on maintenance ground: the shutdown that is slipping, the crew that will not close out a work order, the operations manager who wants the equipment back now.

Safety to Speak, and the Conversation Nobody Has

The same leadership shadow determines whether people say anything. A maintenance improvement lead described handovers between supervisors at shift change, a legislative requirement, and made the link between the standard applied and the psychological safety underneath it.

“And given the psychological safety between the different supervisors, right? Because the supervisor is doing the level best to make sure the right level of detail is provided on JHAs, the right level of detail is handed over to the next supervisor. And that handover is done to set our next crew up for success.”

Maintenance improvement lead, mining

Where that safety is absent, the first casualty is the truth about how the work is really going. A senior practitioner described the version he sees most often: an operation that looks stable from above because the people inside it are absorbing the strain.

“That’s all really held together by the maintainers working bloody hard and doing a really good job, probably working too hard. So we’re not really giving them the voice and the opportunity to improve in that feedback loop, or do things easier.”

Asset management practitioner

Workforce wellbeing was placed in the top two by just 4 per cent of survey respondents and was never raised in the roundtables as a subject of its own. It appeared instead exactly where this quote puts it: inside descriptions of effort, feedback and leadership. We do not read that as evidence that wellbeing is under control in WA. We read it as evidence that it is still treated

as an HR topic rather than an asset management one, and that the person best placed to notice a team running on goodwill is the maintenance leader standing in front of it.

Psychological safety does not mean the difficult conversation is avoided. Practitioners were emphatic that accountability is what execution discipline rests on. The two belong together: people need to be able to raise a problem without cost, and to be held to a standard once it is raised. A leader who delivers only the second is feared, and stops hearing anything useful. A leader who delivers only the first is liked, and changes nothing.

Fundamentals, Not the Next System

Leadership churn has a technical consequence as well as a cultural one. Each new leader arrives with something to prove, and the fastest way to look decisive is to buy something. Practitioners described the pattern without prompting: another platform, another dashboard, another pilot, while the fundamentals they are meant to serve remain unfinished. One survey response was blunt about the order of operations.

“Without the basic fundamentals of maintenance in place, nothing else will add value. How to guarantee the basics are in place”

Survey response

The instinct is understandable. Fundamentals are slow and undramatic, and their results arrive after the leader who started them has moved on. Moving an organisation from reactive to planned work, then to condition-based and predictive maintenance, is a progression measured in years. There is no version of it that can be skipped, and no technology, AI included, that delivers lasting value on foundations that are not ready. Chapter



six makes the same point from the other direction: the organisations getting value from AI are the ones that fixed their data first.

The UK research reached the conclusion that WA's evidence keeps circling.

“We’re not implementing reliability. What we’re trying to do is build cultures that can sustain it.”

Roundtable facilitator, UK research

What the Senior Maintenance Leader’s Job Has Become

Taken together, the evidence describes a role that has changed faster than the development available for it. A senior maintenance or asset leader in WA is now expected to set a strategy that connects maintenance to enterprise value, translate it for a board, an operations manager and a fitter in three different languages, and build a culture of ownership across four crews who rarely meet. They are expected to hold a standard without being present for most of the

work, carry a change program through the resistance of people who have seen three of them fail, notice when a team is running on goodwill, and keep enough of themselves intact to still be there in two years. Almost none of that is technical, and almost none of it appears in the training that got them the job.

Practitioners described the components in pieces across every roundtable: self-awareness about the shadow they cast, the emotional intelligence to read a crew and a boardroom, the patience to hold to fundamentals that will not pay out during their tenure, and the willingness to develop a successor who will get the credit. The profession has treated these as soft skills sitting beside the real work. The evidence in this report suggests they are the real work, and that the technical problems described in the other fourteen chapters are mostly downstream of them.

Designing for Turnover

Moving a maintenance organisation from reactive to planned work typically takes years, not

months. Planning and scheduling disciplines, reliability improvement programs and data quality initiatives all need consistent sponsorship through several cycles before the results appear. A maintenance leader's tenure of around fifteen months is shorter than the improvement cycle itself. Each new leader arrives with different priorities, and the organisation risks resetting to zero every time the role changes.

The organisations that manage this well do not try to stop turnover. They design for it. The asset management strategy and improvement roadmap are owned by the executive or the board, not by the incumbent. Decisions and their rationale are recorded in a form the next

person can read. Key measures persist across leadership changes, so progress stays visible. Succession is planned before the role is vacant. And change management is treated as a capability the maintenance function is expected to hold, not a service it borrows from elsewhere when a program is launched.

The FIFO dimension makes this harder in WA. Practitioners described reliability engineers who will not stay in remote roles and a next generation that wants city-based work for the same pay. Remote operations therefore need operating models that keep engineering capability connected to site without relying on one long-serving person in the camp.

WHAT THE POLLING AND SURVEY SHOWED

- Maintenance leaders at one major WA fixed-plant operation change every 1.3 years, a little over fifteen months; a Pilbara Xchange participant reported around eighteen months, with 80% new managers in his cohort.
- Workforce wellbeing and the people metrics gap was placed in the top two by 4% of survey respondents and never raised in the roundtables as a topic in its own right.
- In MAINSTREAM's UK research, 83% of improvement initiatives fail to sustain beyond eighteen months, and the average senior maintenance leader tenure is 3.2 years.

WHAT'S WORKING

Make the strategy belong to the board, not the person. An Xchange session heard how a former iron ore executive who became chief executive of a WA agribusiness framed its asset management improvement program as the board's strategy, so that it would continue under a new chief executive. It did. Others described sound governance and a clear, communicated strategy as the only real protection against turnover: "otherwise you are just the knowledge comes in and walks out the door". And a shutdown team that brings back the same contract crews described the value of continuity in five words: "they're bloody good at it".

Record Output, Deferred Consequences

TRANSITION FROM TECHNICAL CASE TO BUSINESS CONSEQUENCE

WA's operators are shipping record tonnes and record harvests. In several rooms, practitioners described assets running above nameplate, capital diverted to throughput, planning horizons shortened and a leadership team celebrating the result. The bill has not arrived yet. They are sure it will.

Make Hay While the Sun Shines

A maintenance manager at a grain export business described a crop that has grown by close to 100 per cent over five years through infrastructure that was never designed for it. Some of the silos date from the 1960s, built without cost-of-ownership modelling or replacement strategies. The business's headline KPI is tonnes moved per labour hour.

“Our infrastructure is... is not capable of being able to handle without running way above nameplate production, and we're burning people out.”

Maintenance manager, agribusiness

Running above nameplate is not a one-off response to a bumper season. It is how the business now meets its plan, and the cost lands on equipment and people at the same time. His second question is the one this chapter exists to answer.

“How do you quantify that... the cost of inaction? ... How do you quantify that and communicate that to a leadership team that's celebrating success because we're receiving record harvest and we're shipping record tonnes?”

Maintenance manager, agribusiness

He described capital increasingly going to throughput enhancements, new rail facilities and autonomous trucks, rather than reinvestment in the network. “If your port falls to bits,” he said, “that stuff's not going to help you.”

Short Life of Mine, Short Horizons

An asset management practitioner in iron ore described how commodity prices shape maintenance thinking. When ore is selling at \$200 a tonne on a short life of mine, the operation runs on firefighting, with no appetite for long-term strategy. When the market turns and mine life is extended, the business suddenly needs the strategic asset management it did not invest in.

An asset manager at a port authority described what that looks like once the bill comes due.

“We think we're doing good because we're delivering targets. We're out there, we're doing the targets, we're putting tonnes on ships ... But as our assets degrade ... once it starts getting into the millions of dollars worth of repairs, no one knows how to execute that.”

Asset management manager, regional port authority

A shutdown lead at an iron ore port described the pressure from inside a 300-million-tonne target and a program of automation projects.



Where a risk assessment shows a component can run to failure without harming people or production, it will. The engineering logic is sound. The cultural cost is real.

“I can’t help but look at that chute and know that it’s not 100% perfect anymore, but it is fit for purpose.”

Shutdown lead, iron ore port

“It definitely does have an impact on people’s values towards their roles.”

Shutdown lead, iron ore port

The facilitator named it as an unintended consequence of conscious run-to-failure strategies: the engineering may not matter, but the culture does.

Incentives That Pull the Other Way

Practitioners in the strategic alignment roundtables kept returning to what individual leaders are paid and measured for.

“If you’re incentivised to only look to the next week to the next month. And there’s not really any... I guess,

benefit to you doing long-term value-add work ... I think that’s always going to be a bit of a challenge.”

Asset management practitioner

“Maintenance is a bit of a long-term game, and production is a short-term game, so you’ve got that initial competing priority start off the bat.”

Reliability practitioner, mining

“If my bonus is not linked to your bonus, and vice versa, then you’re always going to do what’s going to be your best first priority to line your pockets.”

Maintenance manager, mining operations

The Xchange sessions added a WA data point on planning horizons. A Pilbara planning leader described his business moving from five-year to two-year business planning to make the process easier, and discovering that maintenance horizons shrank with it. The team is now building a strategic asset management plan to push major and end-of-life decisions back out to five years.

“We thought that was great, but it made our horizons come into two years.”

Planning and asset health manager, Pilbara iron ore, national Xchange session

Nobody Notices Until It Fails

A department lead whose area had caused no operational problems in fifteen years described the flip side. The assets are now ageing, and a failure would be serious, but nothing will happen until one does.

“It’s sort of like... no one’s doing anything about it until that major issue happens. They go, oh, that’s right, we probably shouldn’t look at you now.”

Department lead, operations

Maintenance Debt Is Real Debt

Deferred maintenance behaves like borrowed money. Running equipment above nameplate accelerates wear, moves assets further along their failure curves and shortens the warning time before failure. The interest is paid later: in unplanned outages, in longer and more expensive shutdowns, in secondary damage, and eventually in capital renewal that arrives sooner and costs more than it would have. Throughput KPIs, whether tonnes per labour hour or tonnes

shipped, capture the benefit of running hard. They do not capture the debt.

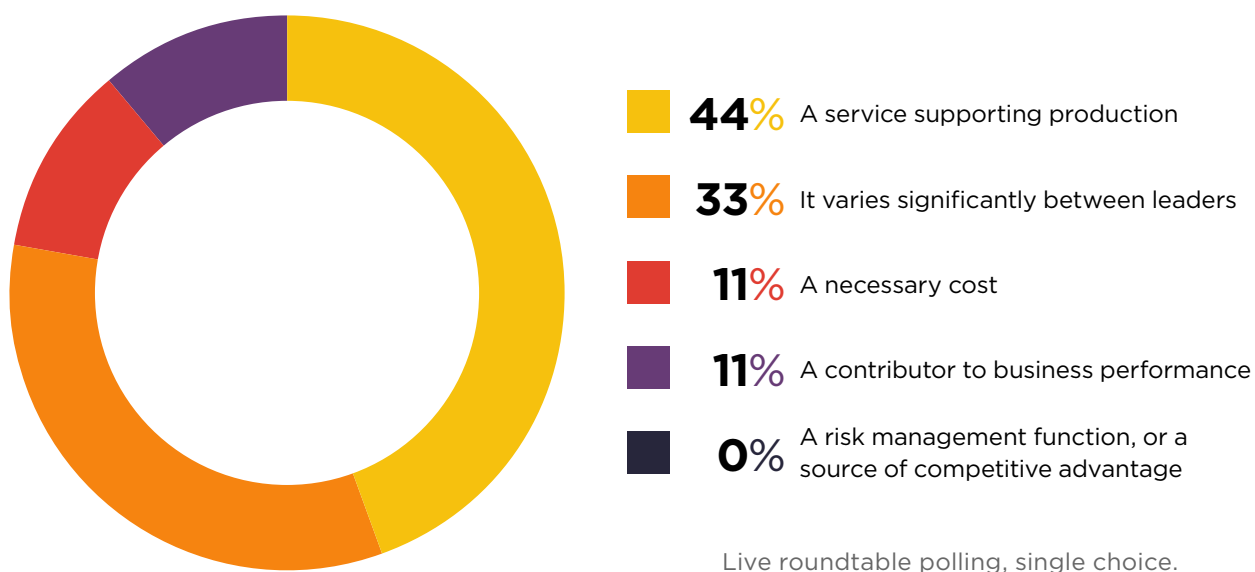
Run-to-failure is a legitimate maintenance strategy. Reliability-centred maintenance recognises that for some failure modes, where the consequence is low and the failure is not hidden, letting the asset fail is the most economic choice. The problem practitioners described is not the strategy but the way it is arrived at. A run-to-failure decision that is deliberate, risk-assessed and documented is asset management. One that happens because the budget or the window ran out is neglect wearing the same label, and the front line can usually tell the difference.

There is a sustainability dimension here that WA practitioners rarely named but consistently described. Long-term asset sustainability drew 0 per cent as information that wins leadership attention. Yet the grain silos from the 1960s, the berth that will need a \$50 million rebuild and the ageing mobile fleet being life-extended while the business decides how to decarbonise are all questions of whether today’s asset base will still be serviceable in ten or twenty years. Short planning horizons, sometimes only two years, sit poorly beside assets that last fifty.

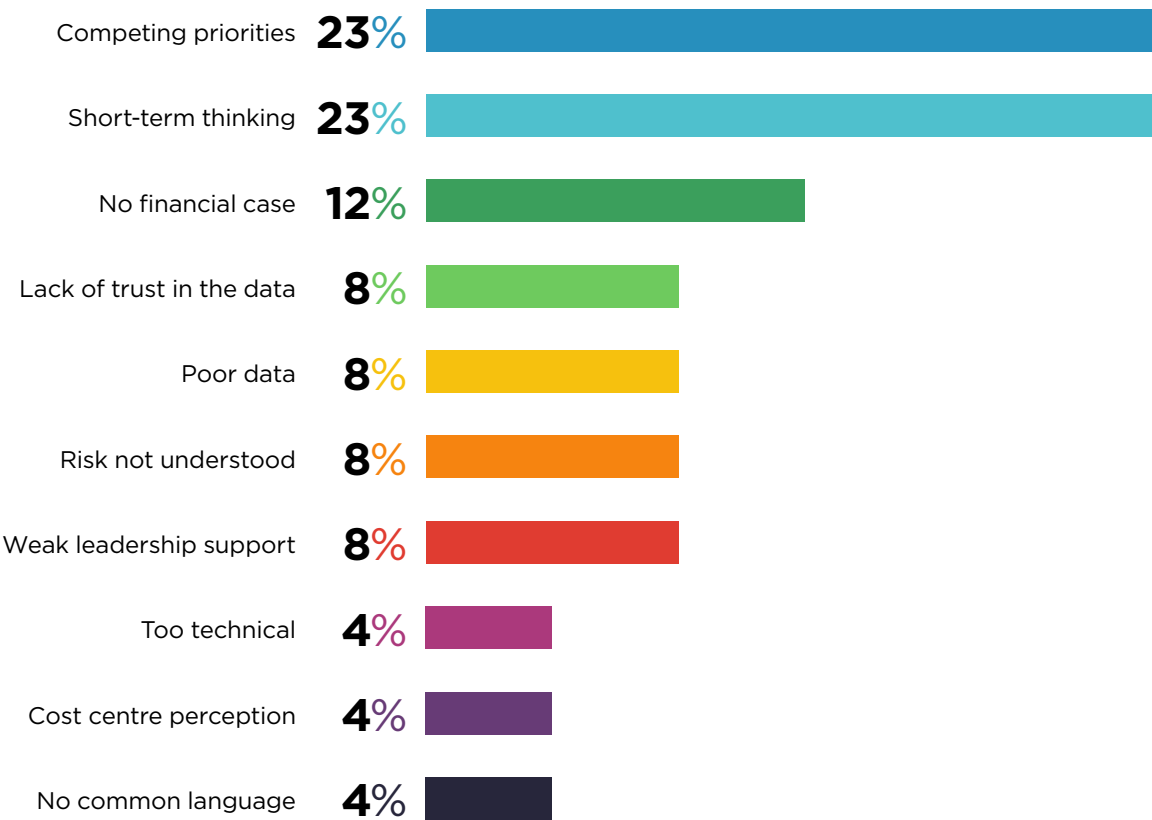
WHAT’S WORKING

The grain business has begun master planning its ports, including shiploader replacement, which forces the question of how to take a port out of service while volumes keep growing. A global miner’s central team has used life extension studies on its ageing mobile fleet to defer capital while the business decides between diesel-electric and full electrification, and found the executive receptive because it was framed as options and budget impact. The port authority asset manager is presenting his berth as scenarios: run it to failure and ask for \$50 million-plus in five years, or begin now and replace it on a plan.

How do senior business leaders predominantly view maintenance in your organisation?



When maintenance tries to influence a business decision, what is the biggest communication challenge?



Practitioners chose several answers; the chart shows each answer's share of all selections. Percentages rounded.

Shutdown Scope, Labour and the Lessons That Never Land

TRANSITION FROM WORK ORDERS TO LEARNING LOOPS

In WA's fixed plant, shutdowns are not occasional events. They are a rhythm, every sixteen to eighteen weeks, with a thousand work orders and as many as 1,500 contractors flown in for a single event. Scope that will not stay locked, a labour pool every operator is fighting over and a feedback loop still running on paper make the shutdown the most expensive place for maintenance discipline to fail.

A Rhythm, Not an Event

Shutdown and turnaround excellence was placed in the top two by only a small share of survey respondents. Yet every roundtable that discussed execution returned to the shutdown, because it is where the same failures become most expensive. A Pilbara planning and asset health manager described the scale to a national Xchange session.

“Our shutdowns every 16 weeks at the five mines, 900 to 1500 contractors per event. That’s about 27,000 ish contractors. We fly up every year and spend about 800 million just in the fixed plant mines per year in maintenance.”

Planning and asset health manager, Pilbara iron ore, national Xchange session

Other WA iron ore operations run on seventeen – and eighteen-week cycles. At that frequency, a shutdown is barely finished before the next one is being scoped, and any weakness in the process repeats three times a year. A fixed plant digital lead summed up the pressure in his survey response: a strong shutdown standard and digital tools, but “increasing production demands, ageing assets & constrained maintenance budgets creating growing pressure”.

Scope Locked, Scope Reopened

At this scale, scope discipline is financial discipline. The Pilbara manager described scope churn that had reached 15 to 27 per cent of the work orders in an event.

“And our scope churn was going up to around 15, 26, 27% per event of a thousand work orders out of control. So we needed to do something.”

Planning and asset health manager, Pilbara iron ore, national Xchange session

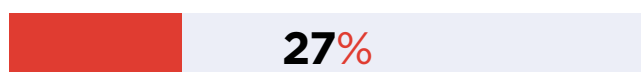
A standard risk-based prioritisation and scope identification process has since brought churn down to around 12 to 15 per cent, which he described as better but not solved. A power generation manager in the same Xchange session described why locking scope is not enough.

“We lock the scope and then as soon as we open the box, it all goes back in as contingent work ... That’s a people thing, not a process thing.”

Power generation participant, national Xchange session

The WA roundtables added their own evidence. A practitioner who had run shutdown

What a standard scoping process did to scope churn at one Pilbara operation



Scope churn before a standard scoping process



Scope churn after a standard scoping process

Share of the work orders in a single shutdown event, before and after the change.
Source: national Xchange session.

scoping at scale described building risk-based prioritisation from asset health, criticality and condition feeds, and still asking the fitters at scope freeze what should and should not be done, because their knowledge was more trusted than the system's. A shutdown lead at an iron ore port described scoping fixed plant work in competition with a 300-million-tonne target and automation projects, deliberately running some components to failure where it was safe to do so.

Two more described the same pressure from the other end. An inventory and logistics lead decided mid-shutdown whether a pulley change could safely be deferred when the window came under pressure, and went back to a technician's condition report to make the call. An enterprise maintenance improvement lead said shrinking windows have turned prioritisation into the front line's top concern.

“It's usually the squeaky wheel. That gets into the shutdown, so now we are starting to ... the prioritisation has become a huge one.”

Enterprise maintenance improvement lead, mining

Supply chains add another layer. Xchange participants described components whose lead times have stretched from around eighteen months to three years, so that by the time a need is identified, the part will not arrive in time for the shutdown it was meant for.

The Shutdown Starts Before the Plant Stops

Two practitioners in the Xchange sessions described the same false economy. The Pilbara manager's business cut pre-shutdown mobilisation from about a week to 48 hours before feed off to save money, and concluded that it was the wrong call.

A power generation participant described the safety version of the same mistake.

“One of the mistakes we regularly made is we don't think the shut started until the unit's off. But we can have you know, 100 people on site the week before and the safety mindsets we start next week.”

Power generation participant, national Xchange session

The Pilbara manager also described shortening business planning horizons from five years to two, which pulled shutdown and major maintenance planning in with it, and a strategic asset management plan now being built to push end-of-life decisions back out to five years.

Fighting for the Same Labour

Labour is the most WA-specific shutdown pressure. Every major operator draws on the same pool of trades, flown in from the same places, on overlapping cycles.

“It's the labour everybody's after in the Pilbara. They're all fighting. We're all fighting for the same labour. There's only so much labour in WA and so much we can fly over.”

Iron ore participant, national Xchange session

The instinct is to compete on money. The Xchange sessions heard why that backfires: one site that introduced shutdown bonuses to counter no-shows was on the phone to a competitor's manager within a month, each accusing the other of taking their labour. What keeps good crews coming back, participants said, is conditions and respect.

“It’s not about the salary, it’s about the working conditions. They got to feel safe. They’ve got to have good crib outs, they’ve got good access. Just a couple of bucks won’t swing most tradecraft.”

Participant, national Xchange session

A power generation manager went down to thank a contract crew for an outstanding job and was told, “we never get feedback”. Most of those work groups came back for the next outage. A gold mining reliability lead in the WA roundtables described bringing back the same crews and business partners for high-risk, critical jobs, and walking them through the work packs before the shutdown, so that experience accumulates.

The Paper Trail

The shutdown is also where the one-way work order described in chapter two is most visible. The Pilbara manager was blunt about his own operation.

“At the mines we’re still paper based, so we still print a thousand work orders. It’s 2026. We still print a thousand work orders out.”

Planning and asset health manager, Pilbara iron ore, national Xchange session

Time confirmations, he said, are “absolute crap” and closed a week after the event. A gold mining reliability lead described the

same gap with contractors: feedback reaches supervisors, but is not logged properly, so task lists, procedures and parts kits are not updated before the next event. Lessons learned are documented and then lost to defensiveness, turnover and the next shutdown arriving sixteen weeks later.

Front-End Loading and the Cost of Churn

The economics of a shutdown are unforgiving because almost everything is fixed. The window is set, the cranes and scaffolding are booked, and hundreds of contractors are on site and paid whether or not the work is ready. Every job that enters late, every part that is missing and every hour lost to a poorly prepared work pack is paid for at the most expensive rate the business has. That is why mature shutdown practice invests heavily up front: scope identified from risk and condition, frozen at a defined milestone, planned in detail, with materials staged and kitted before mobilisation.

Contingency exists for genuine discovery, the defect nobody could see until the equipment was opened. When it is consumed instead by work that should have been identified earlier, the shutdown loses control of both cost and schedule. Scope churn is therefore less a planning metric than a measure of how well the organisation knows its assets before it stops them.

The WA evidence points to three distinct disciplines. Scope discipline, held by a clear process and single-point accountability rather than good intentions. Labour discipline, built on continuity, conditions and feedback rather than bidding wars. And learning discipline: getting time confirmations, work-pack notes and lessons into the system while the event is fresh, so that the next shutdown starts from what this one taught.



WHAT THE POLLING AND SURVEY SHOWED

- Shutdown and Turnaround Excellence was placed in the top two by 4% of survey respondents, yet shutdown scope, labour and feedback surfaced in every roundtable that discussed execution.
- Planned work interrupted by competing priorities was named by 62% of practitioners in one roundtable as a top gap between process and practice, and poorly identified or scoped work by 46%.

WHAT'S WORKING

A standard, risk-based scope identification and prioritisation process cut scope churn at one Pilbara operation from as high as 27 per cent to around 12 to 15 per cent. Another operation incentivises daily time-sheeting accuracy as part of its KPI suite and completes work packs before permits are issued. Giving contract crews feedback, good crib facilities and safe access proved more effective than bonuses at bringing the best of them back. And a fertiliser operation recalled by a WA reliability lead funded administrative support alongside its contractors so that work-pack notes were loaded into the system after every shutdown, with safer and faster jobs as the result.

Decarbonisation and the Energy Transition

TRANSITION FROM TENURE TO TRANSIENCE

For some WA operators, the low-carbon transition is no longer a strategy document. It is equipment in the workshop. Decarbonised fleets, grid-scale batteries and a variable energy supply are arriving faster than the maintenance strategies, data, spares and skills needed to look after them, while the legacy fleet still has to be kept safe and reliable until the day it retires.

Already in the Workshop

Decarbonisation was placed in the top two challenges by 8 per cent of survey respondents. In the roundtables it was rarely discussed as a strategy. It came up as something practitioners are already maintaining, or about to.

A mobile plant engineer at an iron ore operation described a fleet that is already around half decarbonised. A people readiness and skills manager joined the roundtables from a decarbonisation portfolio whose job is to prepare the workforce for it. A facilitator from a WA iron ore producer told a national Xchange session that some of the assets now in their operations “didn’t exist a year or two ago”. And a grid-scale battery operator described its batteries dispatching each afternoon to support the network across much of southern WA.

The shape of the challenge is clear from what practitioners asked for before the roundtables. One wanted help “readying in the business and AM for new assets, while maintaining performance”, listing the transition of the workforce to support decarbonised operations and “asset readiness for machines we have no history on”. Another, from inventory and logistics, described the timing problem precisely.

“For Inventory & Logistics, the challenge is getting involved early enough in the asset transition. We need visibility of the asset roadmap before new equipment arrives so we can design the spares, repair, and inventory strategy while also managing the rundown and obsolescence risk of the legacy fleet”

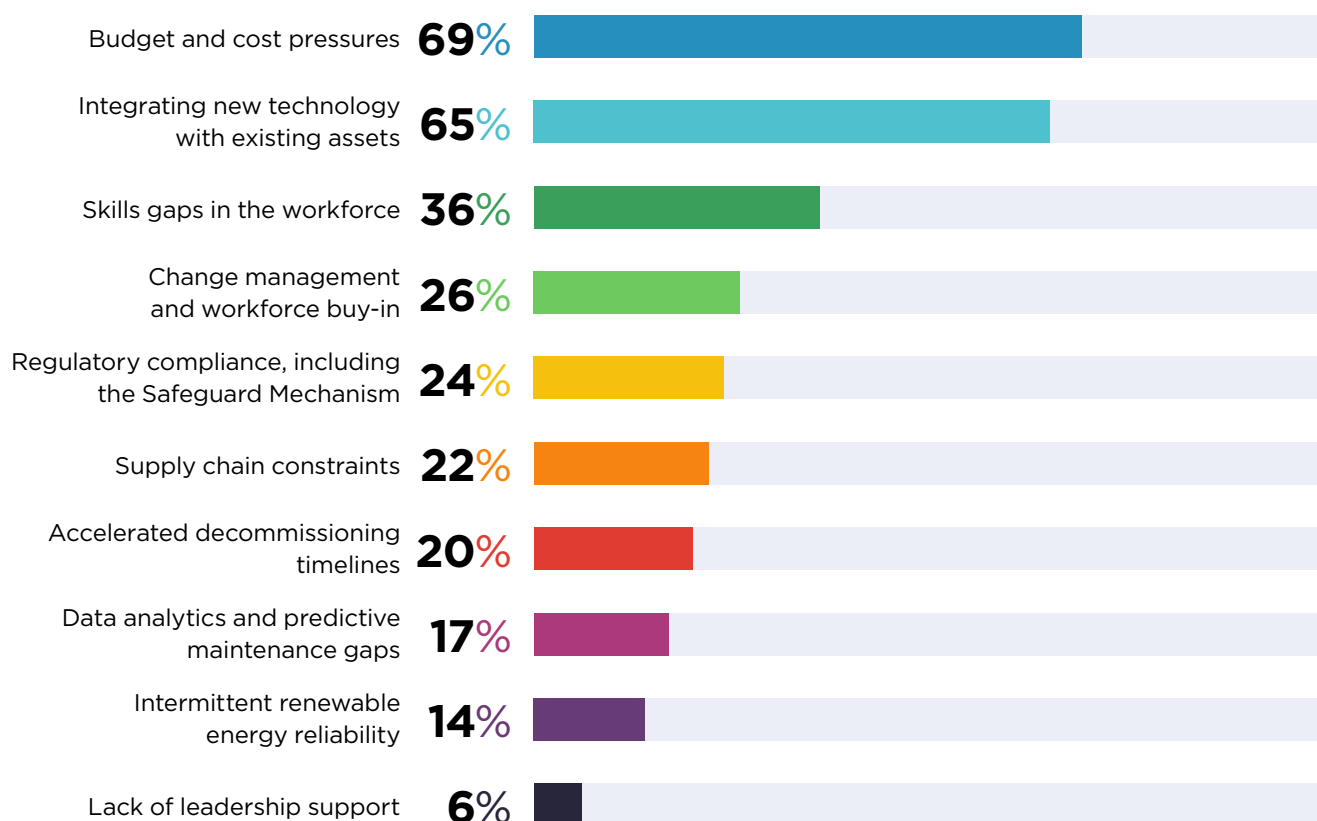
Inventory and logistics lead, survey response

The National Picture Behind the WA Rooms

WA’s evidence does not stand alone. MAINSTREAM’s 2026 decarbonisation sentiment report, the second edition of that research, surveyed 304 maintenance, reliability and asset management professionals across Australia and New Zealand, more than a quarter of them in mining and metals. Its findings describe the ground WA operators are standing on.

The commitments are made. Two-thirds of respondents’ organisations (66 per cent) have publicly committed to net zero or an emissions target, up from 58 per cent in 2024. The message has not travelled. One in five experienced maintenance professionals did not know whether their organisation had made any commitment at all, and teams rated their understanding of what decarbonisation means for day-to-day maintenance at just 3.26 out of 5. The report’s cover quote came from a mining superintendent.

The biggest operational challenges from decarbonisation



Share of respondents naming each among their leading challenges. Source: MAINSTREAM, The Impact of Decarbonisation on the Asset Manager, sentiment report 2026, Australia and New Zealand.

“Our net-zero targets are better understood by our investors and shareholders than by our maintainers and operators.”

Major projects superintendent, mining, 2026 decarbonisation sentiment report

Asked for their top three operational challenges from decarbonisation, respondents put money and integration well ahead of everything else.

The second bar is the one that matters most for maintenance. Integrating new technology with existing assets is the hybrid-fleet problem in another form, and it is exactly what the WA roundtables described. The national report also found that 37 per cent of respondents already feel increased operational pressure from decarbonisation, and called that group a preview of what the rest of the

industry will face within three to five years. On the evidence of the roundtables, a good part of WA’s iron ore sector is already in that group.

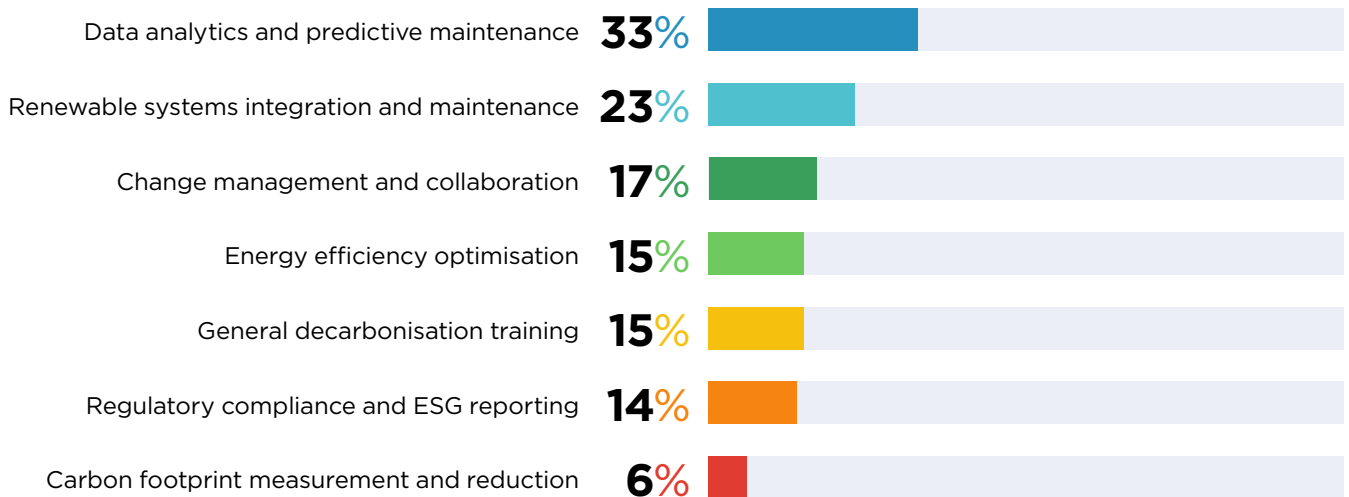
Knowledge You Cannot Hire

Every other chapter on people in this report describes knowledge draining away. For low-carbon assets, the knowledge was never there to drain. The mobile plant engineer explained what that means when someone who knows the new fleet leaves.

“If someone leaves, we lose the knowledge, and we can’t recruit someone out from the market, we have to train them again from the scratch ... there’s no plug-and-play solutions for us.”

Mobile plant engineer, iron ore

The most critical new skills for maintenance teams



Share of respondents naming each skill as a priority. Respondents could choose more than one. Source: MAINSTREAM, The Impact of Decarbonisation on the Asset Manager, sentiment report 2026, Australia and New Zealand.

Training a fitter or electrician up on the new equipment takes around three months, he said. That is the time to get someone working on it. The national report puts the time to full competence on a new technology platform at twelve to twenty-four months, which is why organisations that start training only after the equipment arrives guarantee a capability gap at the worst possible moment. The view from the tools is blunter.

“I’ve got 22 years maintaining diesel haul trucks. They’re telling me in three years we’re going battery-electric. I don’t even know what I don’t know yet, and nobody’s given me a training plan.”

Maintenance supervisor, iron ore, 2026 decarbonisation sentiment report

The labour market will not fill the gap. The Powering Skills Organisation projects a national shortfall of 42,000 qualified energy trades workers by 2030. Contractors, who carry out most shutdown and major maintenance work in WA, were rated the least ready of all: an average readiness score of 2.89 out of 5, with nearly a quarter of respondents rating their contract workforce essentially unprepared.

One WA response has been to stop competing for the same people and start making them. Fortescue, facing a peak requirement of around 1,800 electricians for its decarbonisation program, concluded it could not hire its way there. In June 2026 it opened a dedicated training centre in Perth with two metropolitan TAFEs, training electrical apprentices and upskilling fitters in battery-electric vehicle maintenance.

Respondents also said which new skills their teams most need over the next three years. Data and prediction still lead, but the rise of change management, from last place in 2024 to third, says the harder barriers are organisational rather than technical.

When the Data Disagrees With the Manual

New asset classes also arrive with a question the old ones settled long ago: who knows best how to maintain them? A grid-scale battery operator described its data scientists reaching conclusions that contradict the manufacturer’s instructions, and the difficulty of shifting an organisation that has always followed the OEM.

“I know that’s what the manual says, but that’s not what our asset’s telling us.”

Asset leader, grid-scale battery storage

A mining reliability engineer in the national research described the same vacuum from the other direction.

“The failure modes on a battery-electric loader are completely different to diesel. We don’t have the predictive models, we don’t have the condition monitoring baselines, and we don’t have OEM documentation in language our tradespeople can actually use.”

Reliability engineer, mining, 2026 decarbonisation sentiment report

An oil and gas participant at a national Xchange session described the other side of OEM dependence: once new equipment is delivered, the owner often does not hold the data or source files, and has to go back to the vendor for every change. For assets with no independent operating history, that makes the owner’s own condition data more valuable, and its governance more important, than it has ever been. It is the ownership problem of chapter five with higher stakes.

Buying Time: Life Extension and the Electrification Decision

Not every operator is ready to commit to a technology. A central asset management team in a global miner described an ageing diesel mobile fleet and a business not yet ready to decide how to replace it.

“There’s been some really good work done by members of our team around life extension to, to stem off that capex in the short term and give more options in regards to whether they want to replace the fleet with diesel electric, or go pure electric.”

Central asset management lead, global mining

The executive responded well, he said, because the work was framed as options and budget impact. It is an example of sustainability in its practical asset management sense: extending the useful life of what already exists, deliberately and on evidence, while the right replacement is decided.

It is also rarer than it should be. Only 15 per cent of national respondents reported meaningful use of a marginal abatement cost curve to sequence decarbonisation investment, barely changed since 2024, and 46 per cent did not know whether their organisation had one. Without that kind of sequencing, and without the condition evidence that life extension depends on, capital risks being spent in the wrong order.

Energy as a Variable Input

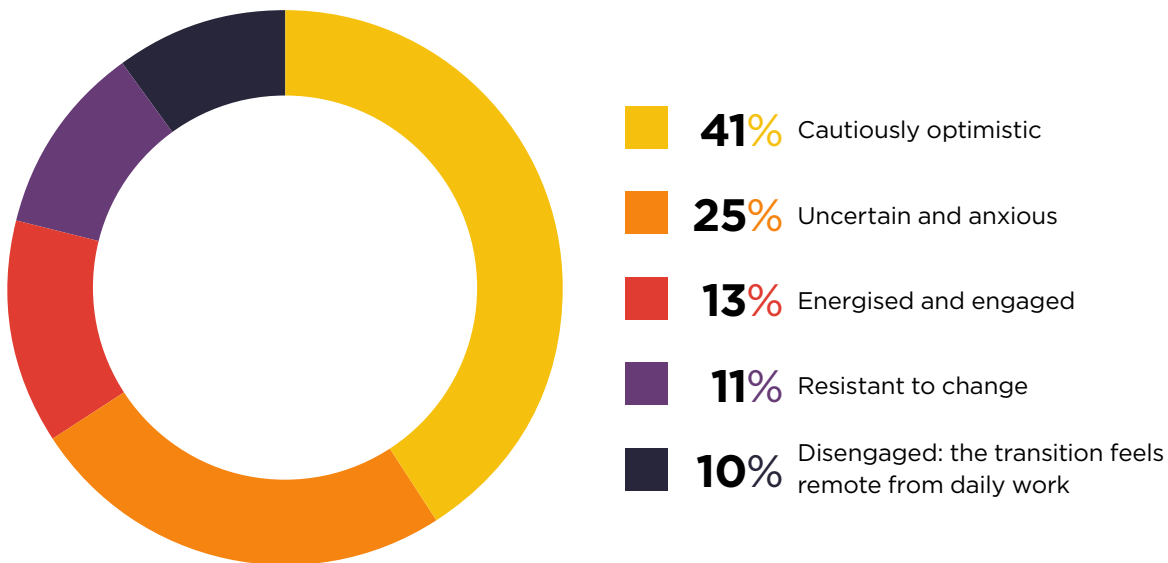
The most far-reaching comment came from an asset performance data lead whose survey response looked beyond individual assets to how operations themselves must change when energy supply fluctuates with renewable generation.

“Energy has become a variable input not just a stable input like the past. We need to radically unlearn how we used to operate and learn totally new ways of running operations and maintenance with constant cycles of over and undersupply of energy”

Asset performance data lead, iron ore, survey response

For maintenance, that raises questions few organisations have started to answer. If production follows the availability of cheap renewable power, maintenance windows may follow it too. Shutdown planning, equipment duty cycles and failure modes may all change. The long-standing assumptions behind operating and maintenance practice were built for a steady energy supply. Nationally, 14 per cent of respondents already count intermittent renewable supply

How respondents describe their team's sentiment towards the transition



Source: MAINSTREAM, The Impact of Decarbonisation on the Asset Manager, sentiment report 2026, Australia and New Zealand.

among their top operational challenges, and an open-cut mining planner put the scheduling consequence plainly.

“Our shutdown schedule was built around diesel service intervals but none of that applies to electric. We need to rethink everything from first principles.”

Maintenance planner, open cut mining, 2026 decarbonisation sentiment report

Infrastructure is the other unanswered question. A ports asset management head in the national research had been told to replace cranes, reach stackers and terminal tractors by 2032, and had asked several times who was funding the grid upgrades needed to charge them, without an answer.

How the Teams Feel

The national sentiment data explains why readiness matters as much as technology. Maintenance

teams are not opposed to the transition. But nearly half are not yet with it.

The report's reading is that in 2024 the transition felt distant, and in 2026 it has begun to land, with anxiety rising among those who do not feel prepared. The group causing most concern is the one WA can least afford to lose: mid-career trades and engineers with fifteen or more working years ahead of them, embedded in diesel and mechanical systems, too young to retire out of the change and too experienced to be treated as apprentices. That group is also the backbone of the judgement described in chapter seven.

Maintaining the Old Fleet and the New One at Once

The maintenance challenge in the energy transition is specific. New asset classes arrive without failure histories, without proven maintenance strategies, often with data and

source files held by the OEM, and without a local labour market that already knows them. Battery-electric equipment brings high-voltage systems, battery management and thermal management into workshops built around diesel engines, hydraulics and mechanical drivetrains. Failure modes are different, diagnostic tools are different and the safety risks are different.

At the same time, the legacy fleet must be kept safe and reliable until it is retired, usually by the same people and often with reduced investment because it is being phased out. The national report describes this hybrid period as lasting twenty to thirty years, not a single changeover. That creates a double squeeze. Too little maintenance on the outgoing fleet and reliability collapses before its replacement is ready. Too much and capital is wasted on assets with a short remaining life. The run-down of spares,

the obsolescence of parts and the retention of the people who know the old equipment all need to be managed deliberately.

Operational readiness for low-carbon assets therefore has to start before delivery, not after the first failure. That means developing maintenance strategies from first principles and OEM input, negotiating access to data and technical knowledge in procurement contracts, building spares and repairables strategies for new and legacy fleets in parallel, and training people ahead of the equipment arriving. It also means treating the energy transition as a redefinition of asset strategy, not a separate project run by someone else. The most useful reframing the national research found is the simplest: reducing energy waste is the same instinct as reducing unplanned downtime, and monitoring an emissions hotspot is the same discipline as monitoring a vibration signature.

WHAT'S WORKING

Life extension used as a deliberate strategy, backed by condition evidence and framed for the executive as options and budget impact, bought one global miner time to make the right electrification decision. A battery operator is building the confidence to trust its own asset data over the manual. Fortescue's Perth training centre applies the principle that capability development must lead procurement, not follow it. And the organisations the national research found handling the transition best involve maintenance and reliability leaders before the contract is signed, so that failure modes, spares, data access and training are settled before the equipment reaches site.

Rewarding the Breakdown

TRANSITION FROM HEROICS TO SYSTEMS

Every WA practitioner knows prevention is worth more than recovery. Almost every operation described in this research still rewards recovery. The incentive teaches the culture, and the culture teaches the next generation.

Heroes and the Invisible

The theme surfaced in every roundtable, usually unprompted, and usually with a note of frustration.

“We always recognise, oh, there’s a breakdown, the team did a great job getting that back up and running, but the guy who’s been maintaining his asset, and it hasn’t failed, where’s his recognition for a job well done?”

Maintenance manager, ore processing

“We reward that fitter, or that electrician, that has in their locker that magical part that gets the plant running again, so it’s a perpetuating circle as well.”

Maintenance performance lead, major miner

A general manager in remote power generation pointed out the irony: the team rewarded for the recovery is often the team whose work produced the failure.

The facilitator of the fifth roundtable offered the version every maintainer has heard: it takes one failure to undo ten pats on the back. People remember the day a part was not there. They do not remember the hundred days it was.

Held Together by Effort

The flip side of hero culture is that it hides how much effort the system is absorbing. A public transport asset leader said leadership often cannot see the problem, because the work gets done.

“That’s all really held together by the maintainers working bloody hard and doing a really good job, probably working too hard. So we’re not really giving them the voice and the opportunity to improve.”

Asset Management Practitioner, public transport

That effort is itself a risk. When the people carrying it leave, the organisation discovers how much was never in the system.

Measuring the Wrong Thing

A senior maintenance leader argued that some common KPIs actively reward the wrong behaviour. Mean time to repair, in his view, pushes crews to get equipment back fast rather than fix it properly.

“People were getting all bent and bent and twisted about them. MTTR, it’s, like, one of the most worthless measures. Don’t worry about that. Just get the job fixed. Do it once, do it well.”

Senior maintenance leader, resources

In his experience, a relentless focus on quality brought pride back to the workforce. The Xchange sessions echoed him. A precision maintenance session heard that good installation practice is “not rewarded, it’s not recognised, it’s undervalued and it’s hard to measure”, and floated a simple idea: send your best maintainer to the conference because they did good maintenance, not because they fixed a good breakdown.



Recognition Does Not Have to Cost Money

Several practitioners said what frontline people want most is to know their contribution mattered.

“It’s often when you collect data, we don’t always circle back to showcase how that information was used ... it’s like a thankless job, right? ... even if it’s just a simple thank you, and this is the outcome, hopefully that adds a bit of value.”

**People readiness and skills manager,
decarbonisation portfolio**

The facilitator of another roundtable put the same point to a maintenance supervisor: most organisations celebrate the crew that recovers a breakdown and are “dead silent” about the crew whose data has been preventing one for ten years.

The Incentive Behind the Hero

Prevention produces non-events, and non-events generate no data point, no story and no recognition. Leading indicators exist to make prevention visible: PM and schedule compliance, defects eliminated, repeat failures avoided, mean time between failures improving on critical assets, the ratio of corrective work to planned work on those assets. None of them is new. What is rare is using them for recognition rather than only for reporting.

The link to the other obstacles is direct. The hero culture that celebrates the fitter with the part in his locker is the same culture that produces squirrel stores, thin failure histories and knowledge held by a few individuals. Changing what is celebrated is one of the cheapest levers available to a maintenance leader, and one of the most powerful.

Trade Certificates Without Trade Capability

TRANSITION FROM TENURE TO TRANSIENCE

WA has institutionalised safety training. It has not done the same for technical competence. Practitioners described tradespeople certified but not capable, fault-finding skills thinning, root cause analysis stopping one level down, and smaller operators forced to grow their own because they cannot outbid the majors.

A Ticket Is Not a Skill

A practitioner who led a maintenance team of around 300 frontline technicians made the distinction that framed the discussion.

“We’ve been very good at institutionalising and making safety training quite good ... But from a technical competency perspective, we’ve done a really poor job of it, so I believe, like, you know, we give people trade certificates, but we don’t give them the capabilities to be able to be good tradespeople.”

Asset leader, bulk port operations

After losing many senior people who chose to retire after COVID, his operation went “back to square zero” and built a capability framework for electrical and mechanical workers to follow after they receive their trade certificate. He described it as basic and valuable.

A central planning supervisor at a mining contractor said the depth of skill is thinning at every level. People move on from a component failure after drilling one or two levels into the cause, and the pool of people who can go deeper is shrinking.

“Just try and recruit someone now with a skill level from, you know, 10 years ago,

where there may have been a lot more of that skill set around. Now, I believe the pool is a lot smaller, and getting smaller.”

Central planning supervisor, mining contractor

A survey response named the risk bluntly: an industry “actively deskilling via reliance on computer diagnostics”, which it called corporate amnesia.

Losing Apprentices Before the Finish Line

A senior maintenance practitioner’s survey response gave the pipeline figure: his operation loses one in every four apprentices before they complete. Another survey response called for more life-skills preparation in schools and better support for businesses to understand the challenges of training young people today.

Smaller Operators Grow Their Own

WA’s labour market is not a level field. A work management lead at a passenger rail operator described the reality.

“We can’t go out to industry and compete with the miners’ big bucks, so we have to... We have to, I suppose, create our own, next generation of signals and track inspectors.”

Work management lead, public transport



Her colleague described the trainee track inspector program the organisation launched shortly before COVID. Advertised mid-level roles had drawn nine responses. Trainee roles, open to people with no tickets, drew 410, including people laid off from aviation and graduates with degrees.

“Not many of the companies now offer you, will train you up from scratch. They want the finished product.”

Track inspection manager, rail network

The Xchange sessions put WA's pay advantage in national context. A participant from a major interstate hydro scheme said his organisation “just can't get people” when “competing with the West”. A former WA maintenance leader described an iron ore operation that justified twenty new Certificate II service-person roles for routine truck servicing, freeing fitters for skilled work and opening an entry pathway for people from other careers. The same session warned about the other side of accelerated programs: a shortened

apprenticeship at a major miner had produced tradespeople without fault-finding depth.

The Next Generation Learns Differently

An engineering leader running graduate and intern programs said new starters will not sit through three hours in a training room, and that capability has to be built through the phones and tablets they already use. The rail inspection manager's experience of trainees teaching veterans computer skills suggests the exchange can run both ways.

Competence After the Ticket

Across both the legacy and the low-carbon fleet, the capability gap practitioners described is the same: what a tradesperson can do after they receive their certificate. Precision skills such as alignment, tensioning and correct installation, diagnostic skills on increasingly electronic equipment, and the ability to follow a root cause beyond the first or second level are built through experience and deliberate development.

WHAT'S WORKING

Post-trade capability frameworks. Trainee programs that hire for attitude and train from scratch. Rotations that bring workshop staff into planning for three months at a time, as one Queensland generator described in an Xchange session. And one participant's test for whether a capability program is real: it is funded, timetabled and audited, or it is a poster.

The Squirrel Store Economy

TRANSITION FROM HEROICS TO SYSTEMS

When maintainers do not trust the supply chain, they build their own. WA practitioners described hidden inventory running from hundreds of thousands of dollars to more than a million, spares expensed to jobs and never returned, and a “hand on part” culture that doubles stock and corrupts the data it depends on.

Hand on Part

The facilitator of the fifth roundtable, a materials management specialist who once ran warehouse inventory for a major miner, described auditing an iron ore supply chain from Perth through the central stores to a Pilbara mine. At the mine, parts were not delivered to maintenance. They were delivered to a maintenance warehouse, which turned out to be a large unofficial store. The crews would not start a job until they could see and touch every part. They drew from their own store, did the work, and then raised a work order to replenish it. Half the inventory was expensed. The other half was on the books. When he reported it, a senior executive thanked him and told him to leave it alone because it worked.

Practitioners from that operation confirmed the pattern had not gone away. “Still battling that change of mindset,” one said.

Bowerbirds and Unreturned Spares

A maintenance manager at a regional port authority found the same thing when he started.

“The three superintendents we had were old-school superintendents, and we had Bowerbird Yards. All over the place. There’s this little shiny things stuck everywhere, just in case something happened, and you start adding all that up, and that was, you know, half a million dollars worth of gear.”

Maintenance manager, regional port authority

It took three years of constant conversation to change. The facilitator described finding \$1.2 million of unreturned spares sitting in containers after shutdowns at a fertiliser operation. A reliability lead at a gold miner said unreturned spares remain a problem at his current site, and an opportunity to feed actual consumption back into task lists and parts kits.

Trust Is the Root Cause

Practitioners were clear that squirrel stores are a symptom.

“I think the biggest issue, though, is that there’s no trust in the supply chain ... why people want to be able to touch and feel it before they actually pull that machine in.”

Asset management group manager, iron ore

“If you don’t trust the inventory system, then how do you possibly trust the insight?”

Maintenance performance lead, major miner

The port authority manager said his supply function is still more a store than a supply chain, and he is working to change that. Survey responses from inventory and logistics practitioners asked for earlier involvement in the asset roadmap, so spares, repairables and obsolescence of the legacy fleet can be planned before new equipment arrives. One practitioner who has worked on parts improvement for four years said getting the



right parts into maintainers' hands is something every frontline team struggles with.

Xchange sessions added the pressure behind the distrust: the lead times described in chapter eleven turn a routine order into a missed shutdown.

Why Hidden Inventory Is a Reliability Problem

A squirrel store is a rational response to an unreliable supply chain, and it makes the supply chain less reliable. Parts held informally never appear in stock levels, so reorder points are set on false demand, and the next crew finds the shelf empty. Capital is tied up twice, once on the books and once in the container behind the workshop. Parts consumed from a private store are rarely recorded against the work order, so the parts history that tells reliability engineers which components are failing, and how often, goes missing.

The cure is to make the official supply chain trustworthy for the work that matters. That means criticality-based spares strategies for the components whose absence would stop production, kitting and staging of parts as part of planning so that crews see every part before a job starts, and returns processes that credit unused parts back to stock after shutdowns. It also means involving supply chain early in asset changes, so that spares for new equipment and run-down of old equipment are planned rather than improvised.

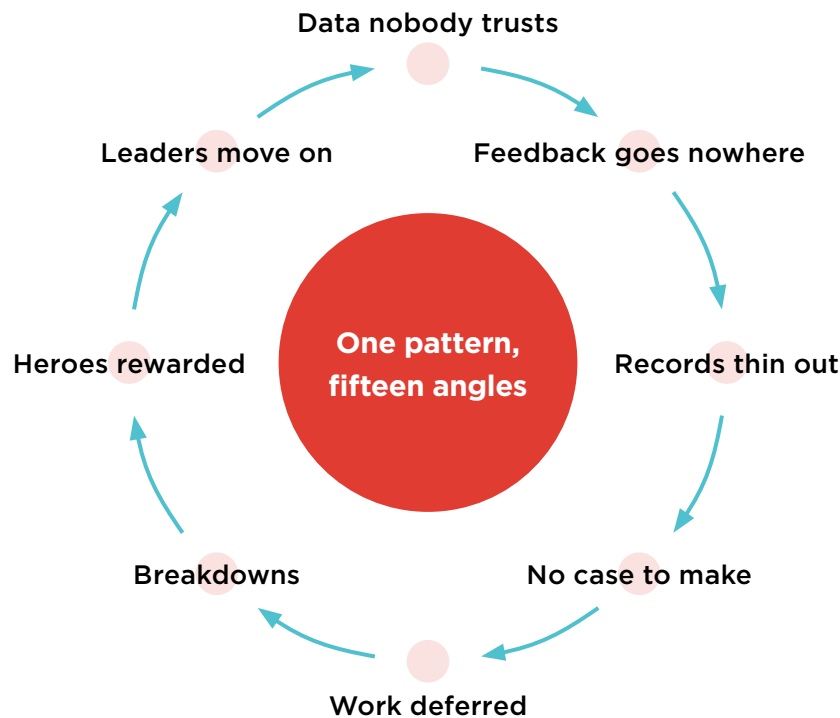
Lead times make this harder. When components that once arrived in months now take years, the temptation to hold a spare "just in case" is stronger than ever. The answer is not to prohibit it, but to replace informal insurance with a formal, visible critical spares holding that everyone trusts.

WHAT'S WORKING

Patience and transparency. The port authority's three-year campaign moved gear out of informal yards and back into stores or off the books entirely, by asking whether it was really needed or could be bought locally. Several operations use OEM partnerships and service exchange for major components, where a specialist carries the risk and the knowledge. And the facilitator's reminder applies to every chapter in this report: systems and tools are easy; people will find a workaround unless the system earns their trust.

The Path Forward

The fifteen obstacles in this report are not fifteen separate problems. They are one pattern seen from fifteen angles. Fragmented, ungoverned data means the front line's feedback has nowhere reliable to go. Feedback that goes nowhere teaches maintainers that recording is admin. Poor records produce data that says the problem does not exist. That data cannot support a business case. A weak business case loses to this quarter's tonnes. Deferred work produces the breakdowns that heroes then recover and are rewarded for. And the leaders who might break the cycle move on before it breaks.



The cycle practitioners described, in which each obstacle feeds the next.

The chain runs through the rest of the report as well. Thin records are what a shutdown scope is built from, which is why scope churn is a knowledge problem before it is a planning one. The same records are the failure history a low-carbon fleet does not yet have, so the organisations with the weakest data foundations will find the energy transition hardest. Judgement fills the gaps in both, and judgement is what leaves

first. And when crews stop believing the supply chain, they build their own, which takes the last reliable consumption data out of the system.

What distinguishes the WA practitioners who are making progress is not technology. It is that they have chosen to change one of the links in that chain deliberately, and have stayed with it long enough to see a result.

Fifteen Recommendations

Each recommendation answers the obstacle of the same number.

- 1.** Decide what the data is for before you collect more of it. Name the decisions that matter, define the minimum information needed to make them well, and retire data and dashboards that no decision uses. Treat data quality as a maintained process with owners, not a cleansing project with an end date.
- 2.** Close the feedback loop and prove it. Make it easy to capture what was actually done, acknowledge every piece of feedback, and show crews what changed because of it. Write quality data into role descriptions and interviews, as one port authority now does, and then give maintainers a reason to believe in it by showing them the business case their accurate hours won.
- 3.** Protect the plan from the people who can break it. Give operations and maintenance shared KPIs and shared incentives. Make scope cuts visible, not silent. When performance is pushed to a new level, update the maintenance strategy to sustain it.
- 4.** Translate every case three ways. Frame asset risk as safety exposure, financial impact and production impact, because the polling shows asset health on its own wins nothing. Then test the plain-language version: if it cannot be explained to an intelligent twelve-year-old in a minute, it is not ready for the board. And tell the fitters their own version of the story.
- 5.** Settle data ownership before the next platform or AI tool. Agree who owns master data across its life cycle, who may publish a metric, and where the single governed version lives. The empowerment of self-service and AI is real; so is the cost of five versions of the truth.
- 6.** Use AI to retrieve and summarise before you use it to decide. Point it first at aggregation, search and reporting, where people can check the output quickly. Build it on governed data with defined metrics and controlled access, treat its conclusions as prompts to verify, and protect the development of human fault-finding and root cause judgement.
- 7.** Capture the why, not just the what. The knowledge most at risk is the reasoning behind decisions. Record why a strategy was set, what was tried before and what was learned when something failed. Treat RCAs and FMECAs as live documents, protect the time for deep fault-finding, and pair experienced people with newer ones deliberately rather than hoping it happens on shift.
- 8.** Develop supervisors as leaders, not senior tradespeople. Train them in the fundamentals, remove admin so they can be in the field, avoid appointing them over their former crew, and build the supervisor group on each roster into a team of its own.

9. Design for turnover, and develop the leader as well as the strategy. Make strategies belong to boards rather than individuals, record the rationale behind decisions, and plan succession before the role is vacant. Alongside that, build senior leaders in what the job now demands: setting direction, translating it three ways, coaching, carrying change through people who have seen programs fail before, and noticing when a team is holding the operation together on goodwill. Generic leadership programs miss; development built on maintenance ground does not.
10. Measure the debt, not just the tonnes. Put the cost of inaction beside record output. Present run-to-failure decisions as explicit, reasoned scenarios, and explain the reasoning to the people asked to live with them.
11. Treat every shutdown as a scope contract. Lock scope with a clear process for contingent work, protect mobilisation time, get time confirmations and work-pack feedback into the system while the event is fresh, and give contract crews the feedback and conditions that bring the good ones back.
12. Get ready for the low-carbon fleet before it arrives. Build the maintenance strategy, spares holdings, data access and trade capability for new asset classes ahead of delivery, negotiate access to OEM data and knowledge, and treat life extension of the legacy fleet as a deliberate, evidence-based decision.
13. Recognise prevention as loudly as recovery. Retire measures that reward speed over quality. Celebrate the crew whose equipment did not fail. It costs almost nothing.
14. Build capability after the ticket. Create post-trade competency frameworks, protect time for fault-finding and deep root cause work, and consider hiring for attitude and training from scratch. Fund, timetable and audit capability development the way the industry learned to do with safety training.
15. Earn the supply chain's trust back. Bring inventory and logistics into the asset roadmap early, feed actual consumption back into task lists, and replace squirrel stores with a supply chain crews believe in.

What Happens Next

This research exists to be used, not filed. Every obstacle in it came from practitioners naming what they want help with, and each one now has somewhere to go: the program of the MAINSTREAM WA Summit in Perth in March 2027, the masterclasses that run through the year, and the roundtables where these conversations continue.

The request practitioners made most often was not for another framework. It was to hear from people like them who have made one of these links work, on one site, with one crew. That is the standard this year's program will be held to.



MAINSTREAM

The State of Asset Management in Western Australia

The MAINSTREAM WA Summit • Perth • March 2027

The content and conversations at the MAINSTREAM Summit taking place in March 2027 are designed to help overcome the 15 obstacles identified in this report.

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