Forge Works.

The Forge Works blueprint for improving the safety of work

Break through the performance plateau with a successful safety strategy

forgeworks.com

Break through the performance plateau with a successful safety strategy

Every day our world is becoming more complex – and the potential for harm in our organisations is increasing. Fatality rates in many industries around the world are no longer decreasing and haven't been for at least a decade. In some industries, fatalities are *increasing.*

We're simply not innovating the way we think and act when it comes to creating safety in our organisations. But we could be. With a well-planned strategy and a whole-of-organisation approach, it is possible to reliably achieve positive and meaningful safety outcomes.

We've evidence to prove it.
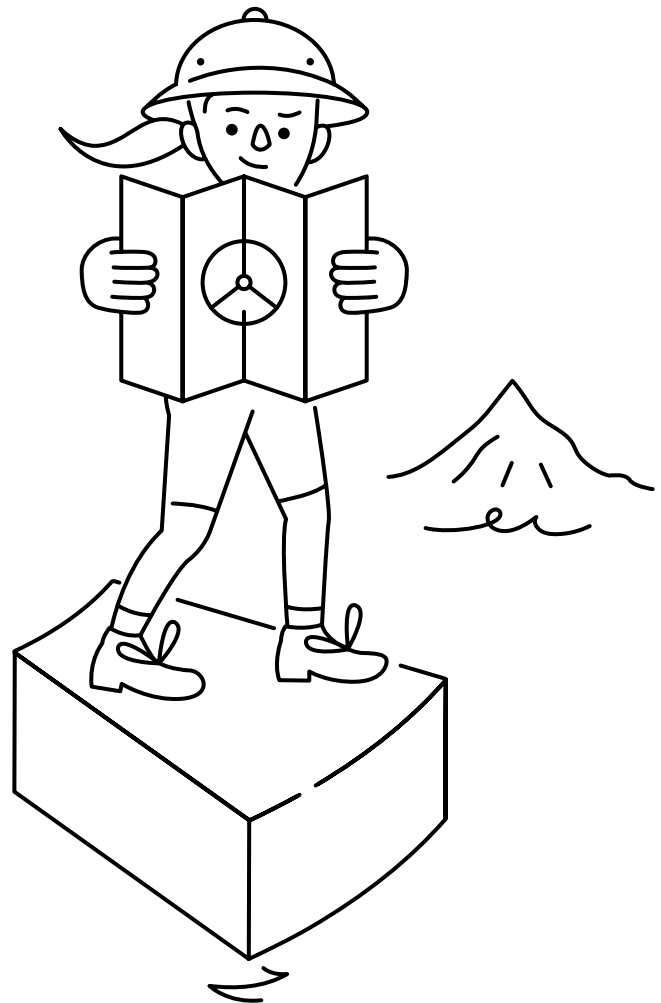
Organisations are as different from one another as the people who work within them. They often have different approaches when it comes to improving safety management. This is as it should be – there's no cookie-cutter answer when it comes to improving the safety of work.

But in the last sixty years, organisations have been somewhat united in how they've tackled safety management. Whether applying a compliance-heavy risk-management approach or investing in safety leadership and safety culture, each approach has had its merit for that time.

Today we've an opportunity to adapt and move beyond current safety paradigms. We know what's not working when it comes to safety management. We can even name it – see the next page for today's top five safety management problems – and we'll show you a better alternative.

Our evidence-based methodology has enabled companies large and small to recover and refocus their safety efforts. We're here to help more organisations evolve their approach to safety management.

This blueprint is an opportunity to rethink and re-set your course around the safety of work.
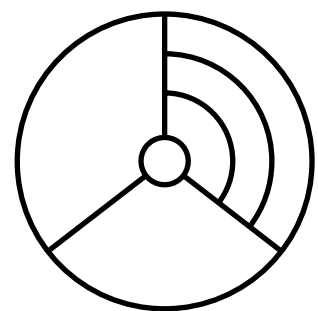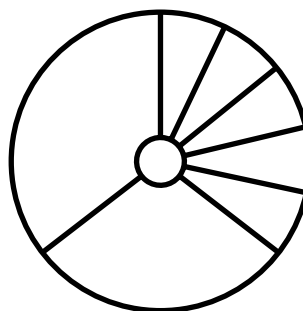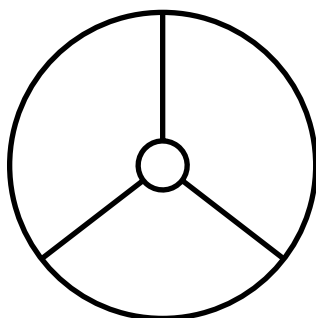
Top five problems in safety management today

① Safety culture

– leads organisations to worry more about how much individuals know and care about safety, rather than how to enable conditions in their *work* in order to be safe.

② Safety performance measures

– lagging indicators lead organisations to worry more about responding to accidents as they happen, rather than how to prevent the next one from happening.

③ Safety communication

– flows top-down from management to the workforce through a one-to-many broadcast model of communication, leading to a lack of trust between leaders and workers, and an out-of-touch management team.

④ Safety work

– activities are managed in isolation in organisations with no clear link between the safety management practices and the safety outcomes of work.

⑤ Safety professionals

– focus on low-value tasks that waste an organisation's time and safety expertise tackling low-value administrative tasks that don't generate safety risk reduction.

The consistent problem with this approach to managing safety is that it focuses on the wrong thing. Safety is not about safety, it's about work, the organisational system that attempts to control it and the local conditions that surround and influence how it is done.

Safety is an emergent property of work — to have an impact, you have to change work not safety.
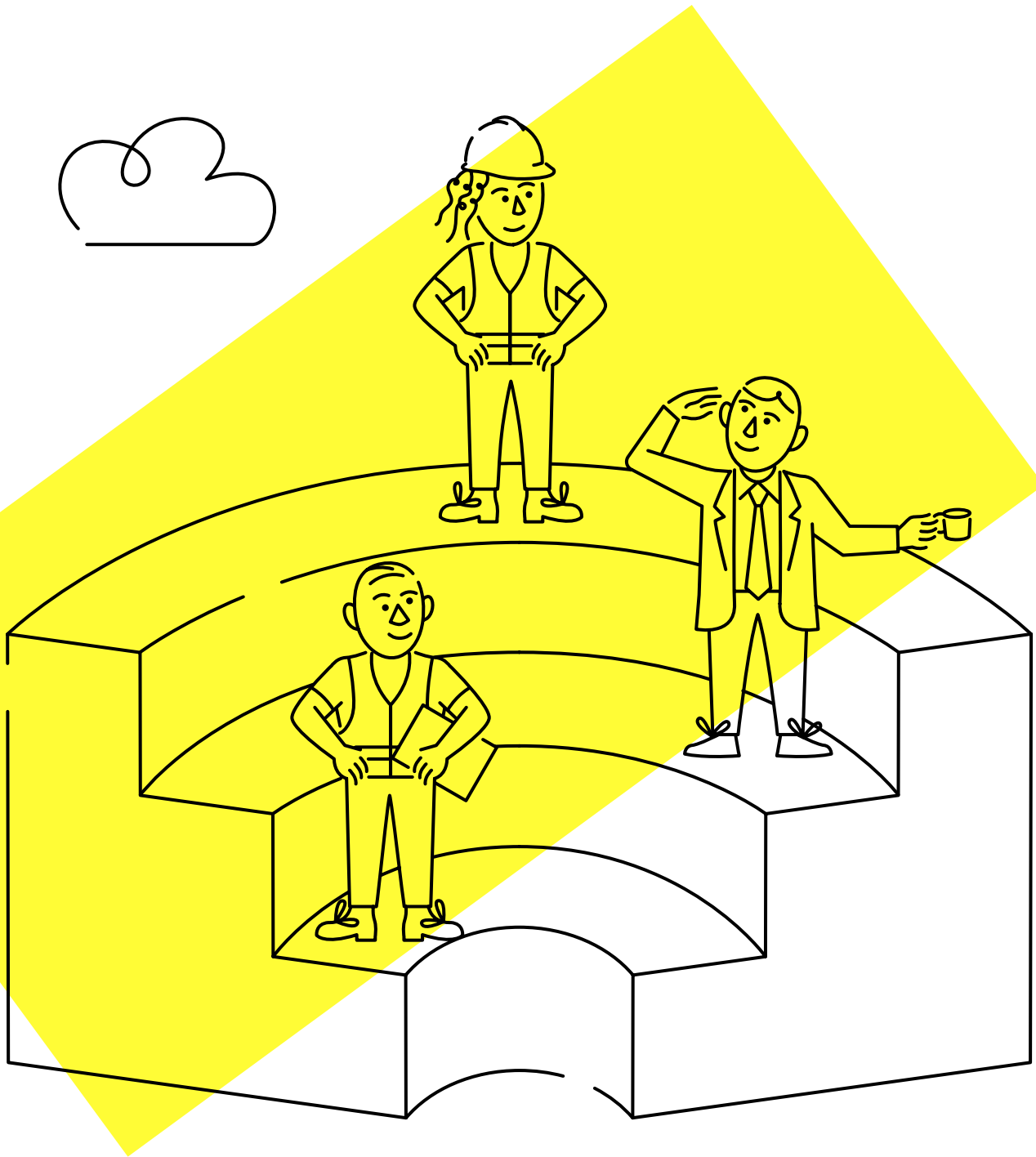
The evolution of safety management practices

Most organisations operate within a spectrum of safety management principles and approaches, which is understandable given the differences between geographies, industries and each organisation's goals.

Since the 1960s we've seen an evolution of sorts – when it comes to safety management.

While globally there has been a significant reduction in reported work-related injuries over the last 50 years, recent research suggests the rate of fatalities has plateaued and, in some industries, increased in the past 30 years.

The International Labour Organisation estimates more than two million workers lose their lives at work every year, that's more than 5000 people every day, and more than three million suffer life altering injuries. While we are all focused on reducing the tragic impact of work on people's lives, ideas about how best to achieve this have evolved and diverged over the past century.
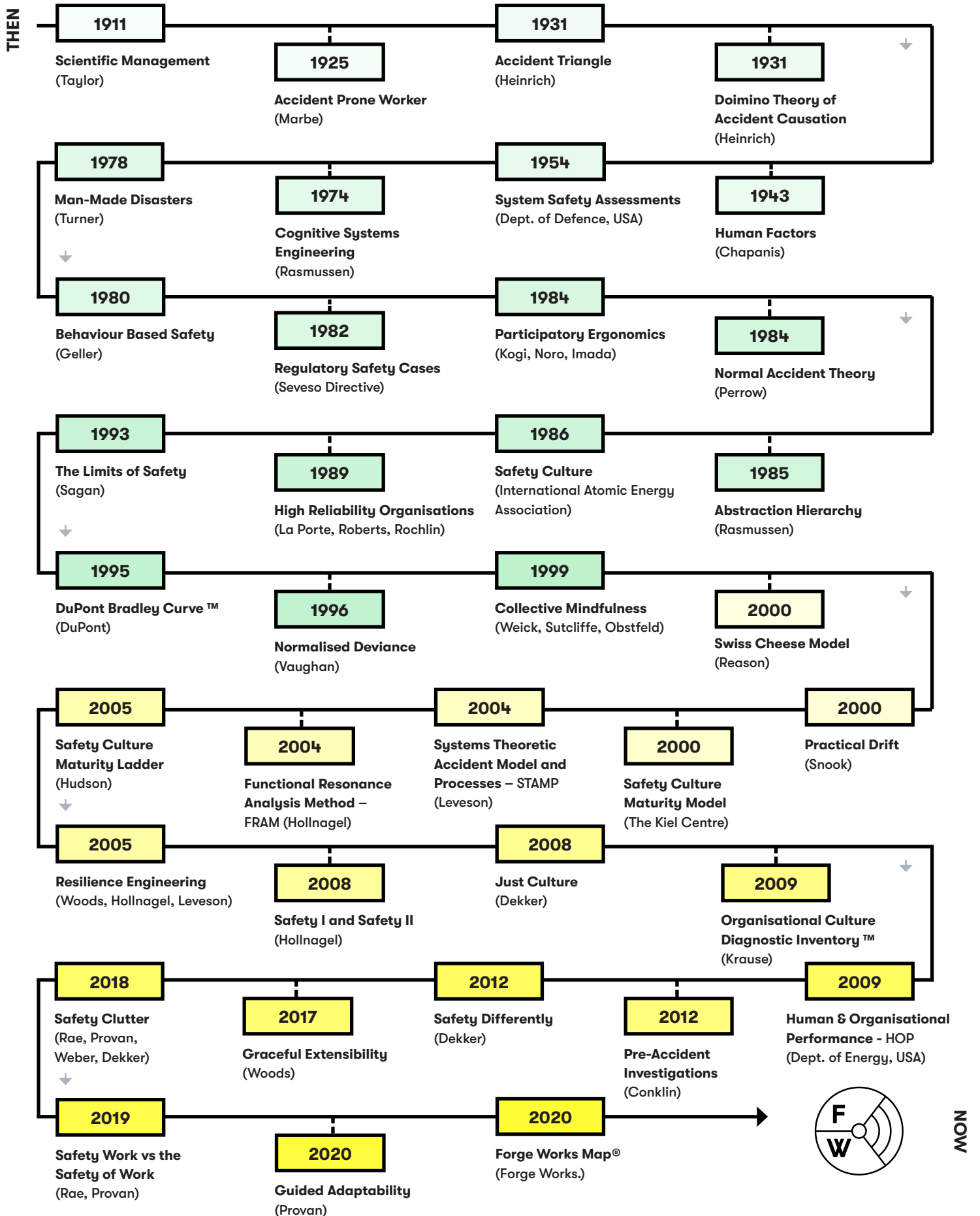
ESTIMATED LIVES LOST

2^M+

EVERY YEAR

5^K

EVERY DAY

LIFE ALTERING INJURIES

3^M

EVERY YEAR

100 years of selected safety theory, techniques and accident causation models

THEN

1911
Scientific Management
(Taylor)

1925
Accident Prone Worker
(Marbe)

1931
Accident Triangle
(Heinrich)

1931
Doimino Theory of
Accident Causation
(Heinrich)

1978
Man-Made Disasters
(Turner)

1974
Cognitive Systems
Engineering
(Rasmussen)

1954
System Safety Assessments
(Dept. of Defence, USA)

1943
Human Factors
(Chapanis)

1980
Behaviour Based Safety
(Geller)

1982
Regulatory Safety Cases
(Seveso Directive)

1984
Participatory Ergonomics
(Kogi, Noro, Imada)

1984
Normal Accident Theory
(Perrow)

1993
The Limits of Safety
(Sagan)

1989
High Reliability Organisations
(La Porte, Roberts, Rochlin)

1986
Safety Culture
(International Atomic Energy
Association)

1985
Abstraction Hierarchy
(Rasmussen)

1995
DuPont Bradley Curve ™
(DuPont)

1996
Normalised Deviance
(Vaughan)

1999
Collective Mindfulness
(Weick, Sutcliffe, Obstfeld)

2000
Swiss Cheese Model
(Reason)

2005
Safety Culture
Maturity Ladder
(Hudson)

2004
Functional Resonance
Analysis Method –
FRAM (Hollnagel)

2004
Systems Theoretic
Accident Model and
Processes – STAMP
(Leveson)

2000
Safety Culture
Maturity Model
(The Kiel Centre)

2000
Practical Drift
(Snook)

2005
Resilience Engineering
(Woods, Hollnagel, Leveson)

2008
Safety I and Safety II
(Hollnagel)

2008
Just Culture
(Dekker)

2009
Organisational Culture
Diagnostic Inventory ™
(Krause)

2018
Safety Clutter
(Rae, Provan,
Weber, Dekker)

2017
Graceful Extensibility
(Woods)

2012
Safety Differently
(Dekker)

2012
Pre-Accident
Investigations
(Conklin)

2009
Human & Organisational
Performance - HOP
(Dept. of Energy, USA)

2019
Safety Work vs the
Safety of Work
(Rae, Provan)

2020
Guided Adaptability
(Provan)

2020
Forge Works Map®
(Forge Works.)

NOW

In developing this blueprint, we have reviewed and worked with all of these theories and techniques. Today, organisations tend to fit within one of three different approaches to safety management, depending on their capacity to adapt and re-think the safety of work.

We're not condemning earlier practices. Instead, we want to suggest where improvements lie. These three approaches in safety understanding and practice have been characterised in the safety science literature as moving from **rules to culture to resilience.**

RESILIENT

LEADING

COMPLIANT

At Forge Works, we describe these approaches as Compliant, Leading and Resilient.

Approaches

Compliant organisations

Compliant organisations create safety processes and practices to meet legislative and organisational requirements. They believe safety compliance leads to fewer injuries. Companies focus on standardising safety requirements and practices, building workforce competency and monitoring compliance. This systemic approach to safety management creates alignment between processes and requirements.

Leading organisations

Leading organisations create safety leadership capability in their management and work to create a positive safety climate for all workers. They believe safety culture leads to fewer risks and incidents. Companies focus on leadership behaviours, safety communication, risk management and assurance. This cultural approach to safety management creates alignment between people.

Resilient organisations

Resilient organisations take a holistic approach and create seamless integration in which safety management is simply work management. They believe safety is an emergent property of how an organisation functions, as well as the planning and execution of work. Companies focus on open communication, understanding how work is done, anticipating future operational scenarios and minimising goal conflict. This integrated approach to work management creates alignment between safety and work.
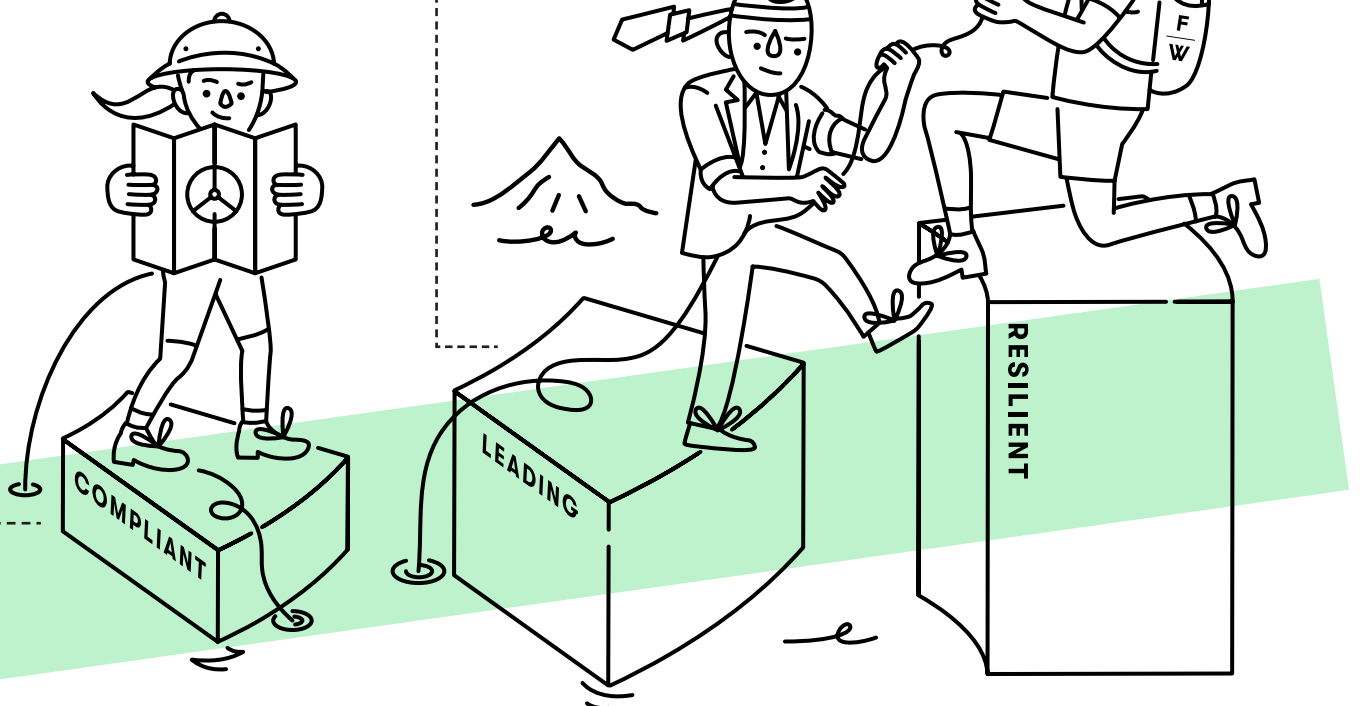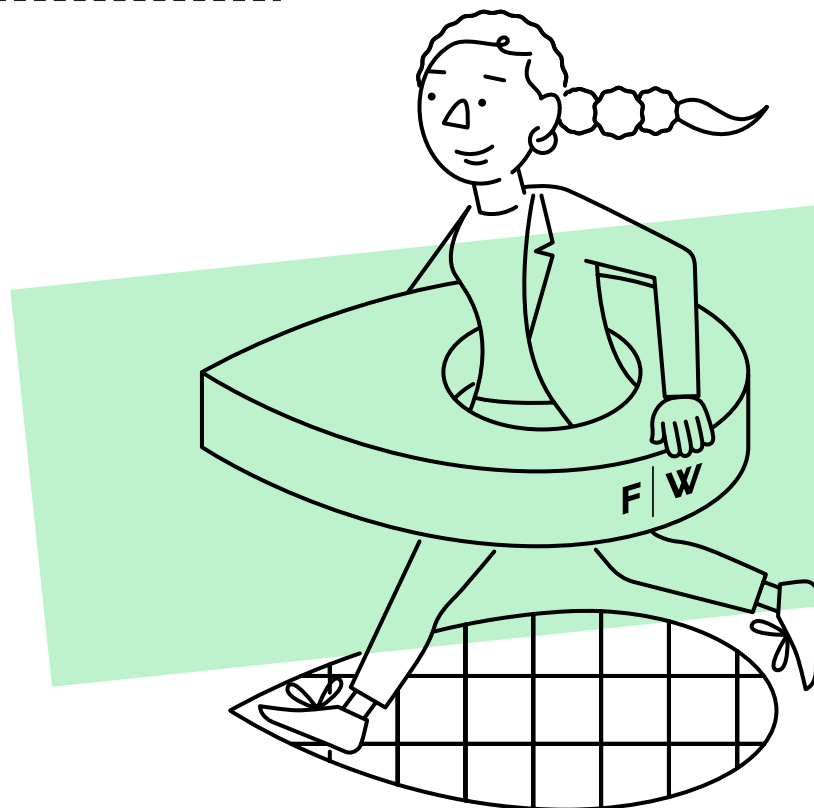
Approaches

In many organisations, a systemic management (compliance) approach is dominant, whether due to existing practices, the regulatory environment or a lack of a perceived need, or autonomy, to change.

But working with big and small organisations worldwide, Forge Works. has seen first-hand that companies achieve better operational and safety outcomes when they deliver their objectives through an integrated management approach.

This blueprint is a way for your organisation to move beyond safety compliance and safety culture, to redefine what safety management means to your organisation and how this might best be achieved.

It's time to act differently. Here's how.

Theoretical Perspectives – Safety I and Safety II

Earlier approaches to safety management, such as compliance and safety culture models, stem from an era referred to as Safety I. A complementary integrated approach to safety management – which this blueprint is designed to guide you towards – comes from theoretical perspectives and research within the disciplines of Safety II, Safety Differently, Resilience Engineering, High Reliability Organisations and Human and Organisational Performance.

Safety II is a term coined by Professor Emeritus Dr Erik Hollnagel in the 2000s. Following the tradition of Resilience Engineering, he implored organisations to examine safe operation – as opposed to the existing focus on unsafe operation, which he labelled Safety I.

Safety I traditionally focused on the opposite of safety by preventing the unsafe.

Safety II looks at normal work and tries to understand how safety is created every day, rather than reactively focusing on incidents and problems as they occur.

To be clear, Safety II is an expansion of Safety I: they're not opposites, but compliments of a whole. Today, most organisations continue to operate with a Safety I mindset for a number of reasons. But if we want to see real change in safety management, we must create a bridge between the two.

An integrated approach to safety management is essential to achieving better safety and operational outcomes because it looks holistically and how the organisation functions and how successful work is enabled.

It's also an opportunity to refine and dare we say it, get rid of, the deluge of processes, practices and compliance-for-compliance-sake safety work that keep safety teams busy, but far from effective when it comes to achieving better safety outcomes.

When organisations focus on a Safety I approach, safety professionals tend to sit on the side lines, forming conclusions and driving safety procedures at a distance, only to leap into action when people don't follow the prescribed processes or there's an incident at work.

Whereas Safety II asks safety professionals to actively engage in understanding day-to-day work, bringing insight about the changing shape of safety risk in the organisation and facilitating proactive decisions that create safe and successful daily work outcomes.

While Safety I and Safety II may sound worlds apart, it's possible to move between them as you evolve your understanding and practice of creating safety of work.

Here's what you need to get right

With this blueprint, our goal is for leaders and safety professionals to think critically:

→ about what they're currently doing in their organisations

→ the ways they're planning to improve safety

→ within a framework that encourages holistic thinking and a strategic vision.

In all organisations, there are three organisational capacities that need to be in place to create successful outcomes:

Guide

Companies need to frame and set the direction, priorities and aligned understanding of how the safety of work will be created. The guiding factors provide this direction and context for the organisation.
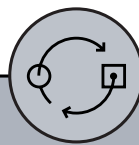
Enable

Companies need to enable their direction and objectives in relation to the safety of work to be achieved. The enabling factors provide the necessary resources, capability and business processes for the organisation.
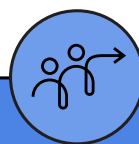
Execute

Companies need to create the safety of work, day-in and day-out in their operations. The executing factors provide the understanding of the work context, the reliable work practices and the real-time risk understanding.

Daniel Pink says that workers are motivated by purpose, mastery and autonomy, which Sidney Dekker connected to contemporary safety management. Dave Woods says that verbs are more important than nouns, in his theory of Graceful Extensibility, and Erik Hollnagel talks about potentials for resilient performance.

The Forge Works Map® incorporates these concepts to provide a comprehensive model of how successful outcomes are created through the capacity to:

- **guide work towards a common purpose**
- **enable work to ensure mastery**
- **execute work through entrusted autonomy.**

Where you are   Where you could go

Here's what you need to get right

We use these three capacities and the 15 factors that sit within them to help companies understand where they're at in terms of their approach to managing work and the opportunities to create the safety of work.
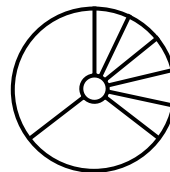
Many people have been talking about how they can move their organisation from where they are today towards the contemporary theoretical perspectives. **Until now, this has been somewhat of a mystery.**

3 CAPACITIES
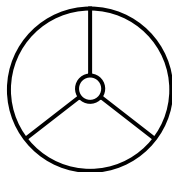
- GUIDE
- ENABLE
- EXECUTE

5 FACTORS PER CAPACITY

1. SENIOR LEADERSHIP
2. STRATEGY
3. RISK MANAGEMENT
4. SAFETY ORGANISATION
5. WORK UNDERSTANDING
6. OPERATIONAL MANAGEMENT
7. RESOURCE ALLOCATION
8. MANAGEMENT SYSTEMS
9. GOAL CONFLICT AND TRADE-OFFS
10. LEARNING AND DEVELOPMENT
11. FRONTLINE WORKERS
12. COMMUNICATION AND COORDINATION
13. DECISION-MAKING
14. CONTRACTOR MANAGEMENT
15. MONITORING AND METRICS

3 MANAGEMENT APPROACHES
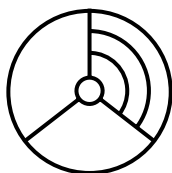
- COMPLIANT
- LEADING
- RESILIENT

For the first time, Forge Works have set out and made freely available this comprehensive roadmap to breakthrough organisational and safety performance.

How to use this blueprint

Scan the organisational capacities in the table below.
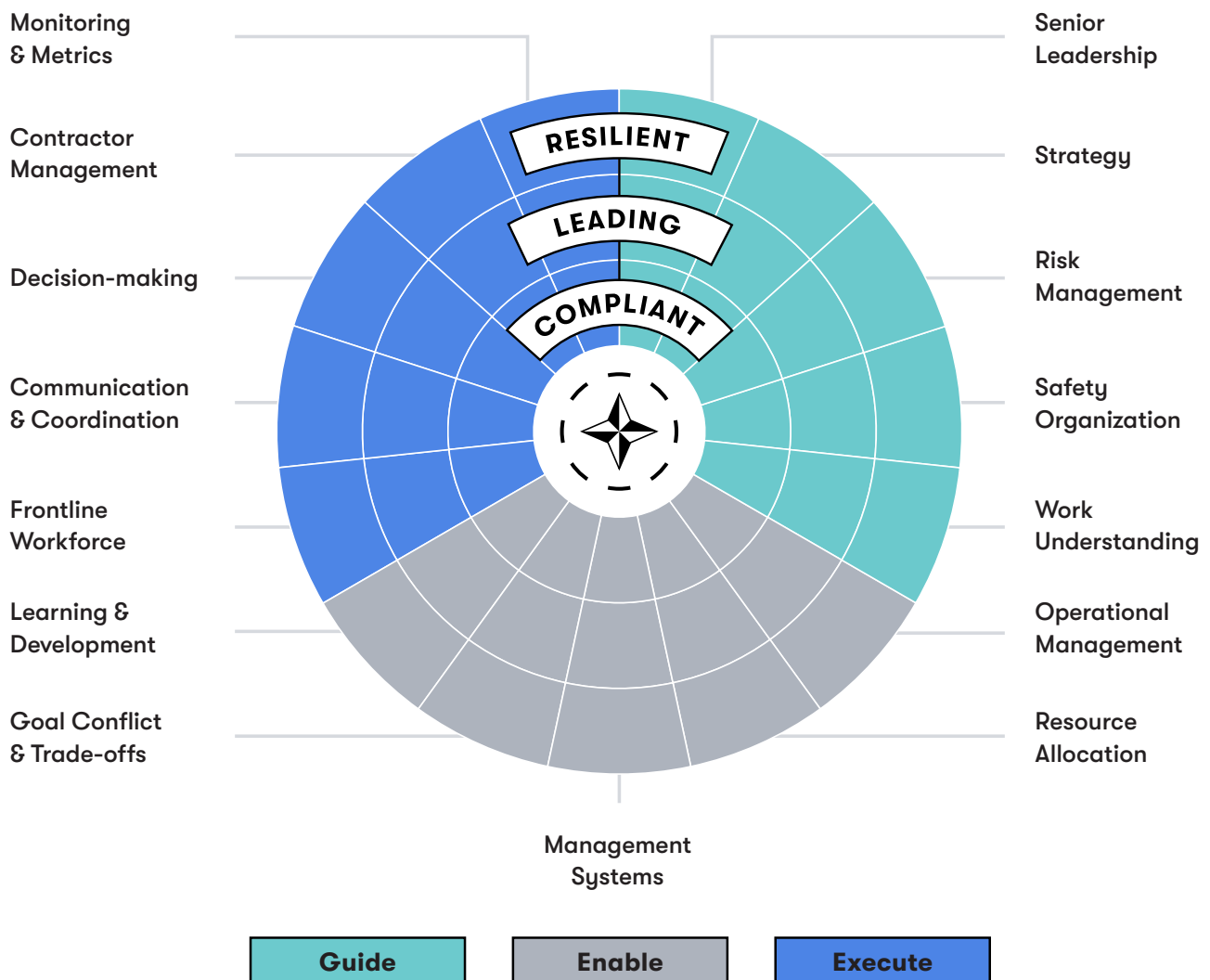
FOR EACH OF THE CAPACITIES:

1. Ask yourself and your team the question
2. Read the 3 descriptions
3. Determine which best describes the approach taken by your organisation
4. Decide where you want to be
5. Create a cohesive strategy to get there

Of course, we can also help you to do this.

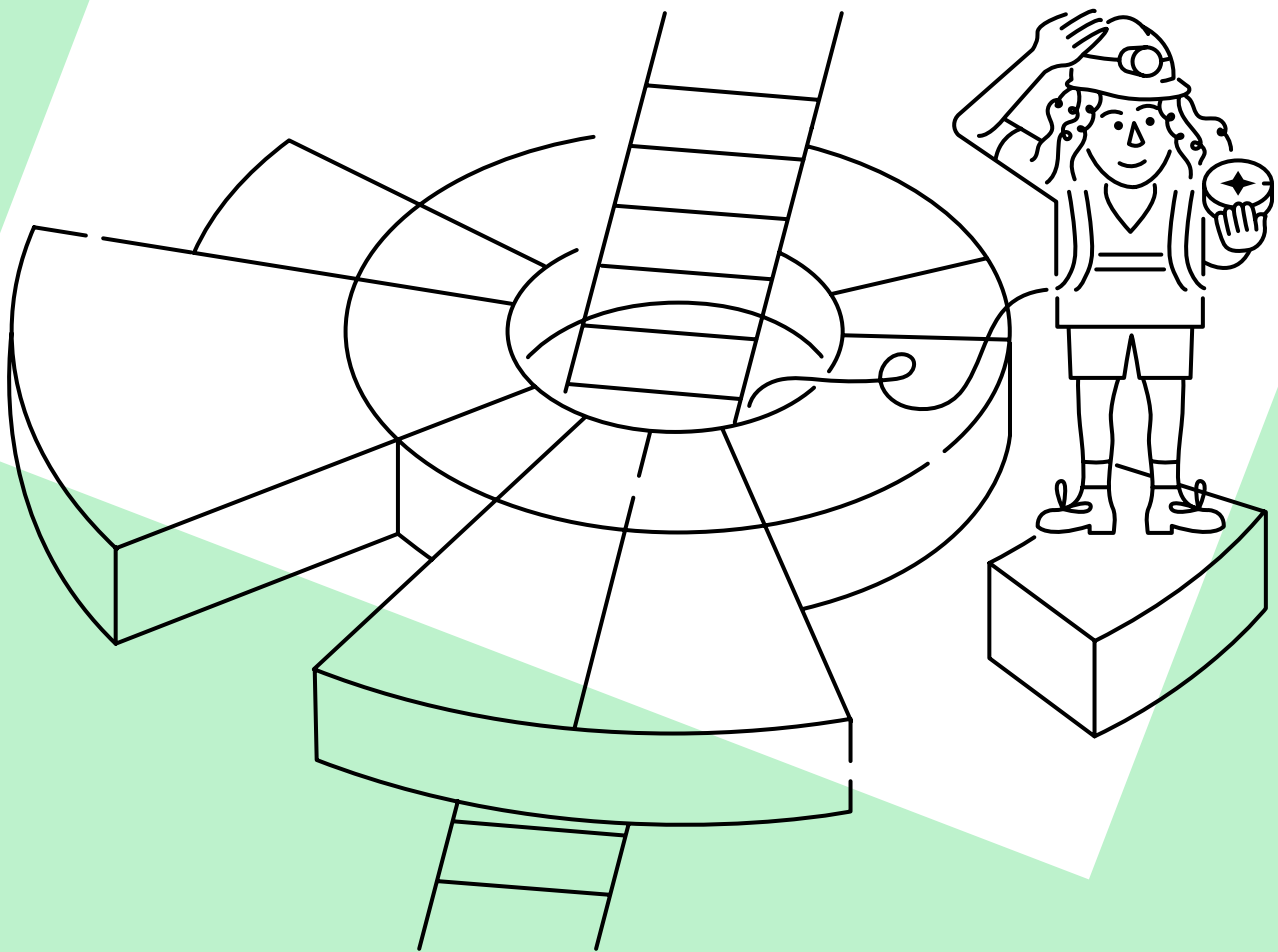|		Capacities	Systemic Management (Compliant)	Cultural Management (Leading)	Integrated Management (Resilient)
Guide		Senior Leadership	Transactional leadership	Transformational leadership	Servant leadership
		Strategy	Reactive safety work	Clear goals & strategies	Proactive safety of work
		Risk Management	Risk assessments	Risk information	Risk foresight
		Safety Organization	Compliance tasks	Risk reduction	Building operational capacity
		Work Understanding	Procedures prescribe work	Organizational factors drive work	Workers manage emergent risk
Enable		Operational Management	Delegate safety work	Participate in safety work	Facillitate safety through operations
		Resource Allocation	Compliance budget	Investment in known issues	Investment in operational slack
		Management Systems	Regulatory compliance	Specific safety needs of work	Processes to support work as done
		Goal Conflict & Trade-offs	Production & injuries	Known issues sacrifice production	Budgets reset on weak signals
		Learning & Development	Competency management	Benchmarking & 'best practice'	Sense-making processes
Execute		Frontline Workers	Comply with safety processes	Active contribution to safety	Co-design work
		Communications & Coordination	One-way communication	Two-way communication	Open communication
		Decision-making	Management decision-making	Safety advisory support	Deference to expertise
		Contract Management	Manage by contract	Delivery partnerships	Client in service role
		Monitoring & Metrics	Lagging indicators	Leading indicators	Predictive information

How to use this blueprint

The Forge Works Map® provides a comprehensive roadmap that has guided several organisations small and large to identify opportunities for safer outcomes and provides a basis for a more successful strategic approach to work and safety management. This benefits each member of the workforce and the organisation as a whole.

Monitoring & Metrics

Contractor Management

Decision-making

Communication & Coordination

Frontline Workforce

Learning & Development

Goal Conflict & Trade-offs

Senior Leadership

Strategy

Risk Management

Safety Organization

Work Understanding

Operational Management

Resource Allocation

Management Systems

RESILIENT
LEADING
COMPLIANT

Guide   Enable   Execute

GUIDE:
the factors relating to the capacity to guide work

Q. How do senior leaders talk about safety and how are their actions perceived by others?

TRANSACTIONAL LEADERSHIP:

☐ Senior management focuses on safety work activities in the organisation. Leaders promote compliance through rewards and discipline, directing their attention towards safety incidents, safety audit findings and operational safety risks and issues. Safety is seen as a compliance requirement to mitigate the regulatory risk and personal legal liability for management. The Chief Executive rarely attends safety specific meetings and safety incident reports are tabled at scheduled leadership meetings. Leaders communicate the importance of following rules and procedures, reporting hazards and reducing injuries. Senior leaders are perceived as caring about compliance.

TRANSFORMATIONAL LEADERSHIP:

☐ Senior management creates a vision for safety to motivate and guide the organisation to improve. Leaders drive change with the support of a committed team. Safety-related issues are considered by the Chief Executive at high-level meetings on a regular basis, not just after a significant incident. Leaders respond decisively to known safety issues and champion the positive aspirations of 'zero harm', 'all injuries are preventable' and 'safety first'. Senior leaders are perceived as caring about people.

SERVANT LEADERSHIP:

☐ Senior management is connected to all levels of the organisation. They view their role primarily as providing service and support to people who execute the work. Leaders are humble and ask people what they need to be successful, then facilitate and enable the creation of that environment. Safety is seen as a moral obligation. Leadership is focused on understanding and serving the needs of their workers. Senior leadership engages with and offers help to people at all levels. Workers are seen as local experts and partners in creating safe outcomes. Leaders engage others in the importance of being sensitive to operations, and building a just culture. Senior leaders are perceived as caring about making work better for each worker.

2. Strategy

Q. What triggers safety improvements and what
   is the focus of plans and actions?

REACTIVE SAFETY WORK:

Improvement effort is focused on corrective action in response to incidents, non-conformances and complying with regulatory requirements. Plans and actions target the creation or improvement of safety work practices and processes by increasing requirements in the safety management system and other administrative processes. Actions are directed towards frontline supervisors and workers, and priority is given to adopting safety-related practices that are common across industry.

CLEAR GOALS AND STRATEGIES:

There are clear goals, strategies and programs at all levels of the organisation to reduce safety risk. Programs of work relate to both improving the effectiveness of safety work activities and creating the organisational conditions to enable the reliable execution of work. The organisation proactively undertakes pre-accident safety investigations, in relation to key risks and business processes, to proactively identify issues. Improvement action is directed towards middle and frontline leadership, the safety organisation and the safety management system.

PROACTIVE SAFETY OF WORK:

Safety is created through the organisational strategy and becomes an emergent property of the way that the organisation functions. All strategic organisational decisions relating to growth, people, budgets, objectives and operations are made with a clear view of safety. The strategy identifies and balances goal conflicts between different parts of the organisation and the balancing of different risks – erring on the side of safety. The organisation explores normal work to understand how work happens and how to make it more reliable and successful. Improvements for safety are realised through improvements to work. Safety-specific risk reduction improvement programs are targeted, evidence-based and have rigorous governance processes.

3. Risk management

Q. What is the quality of risk information generated in the organisation and how is it used?

RISK ASSESSMENTS:

☐ Safety risk assessments are performed as required by legal regulations and the organisation's safety management system, based on frequency and consequences of events. Focus is on completing paperwork, rather than driving change to the safety of work. Risk assessments document decisions that may have already been made and are rarely used actively in decision making processes to shape the safety of work. Risk information is captured and stored in risk assessments, risk registers, safety management plans, safety cases and control of work systems for individual sites and projects. Risk information has limited influence on strategy, decision-making and resource allocation.

RISK INFORMATION:

☐ Risks are known and communicated well throughout the organisation and information is updated in real time, as information and context changes. Safety risk information is integrated with other operational risk information, allowing risk aggregation and understanding of dependencies and conflicts between risks of different type, for example commercial and safety. Systemic risk information is known to those who are exposed, as well as the managers responsible for providing resources to mitigate them. Risk assessments are used to inform how work is planned and executed, while risk management activities generate useful and reliable risk information that proactively influences strategy, decision-making and resource allocation.

RISK FORESIGHT:

☐ The organisation is continually looking beyond what is in the risk register and the risk management system. It monitors work and anticipates future operational scenarios based on current real-time information, and proactively plans and adjusts the operation to respond. Diverse groups, including frontline workers, come together with deep knowledge of the way the organisation operates to probe and revise the organisation's understanding of risk. The shared model of risk and work is easily and continuously updated immediately, as new, subtle information becomes known. The organisation expects failure to occur and, therefore, invests in its commitment to resilience for unknown and unknowable risks.

4. Safety professionals

Q. How capable is your safety organisation and
   what is the focus of their activities?

COMPLIANCE TASKS:

☐ Safety professionals continually advocate for safety to be improved in priority. They are regularly marginalised and often left out when the organisation is dealing with important operational and strategic decisions, issues and risks. Safety professionals are responsible for monitoring and ensuring compliance with regulatory requirements and the safety management system. Their work is predominately administrative. They perform and support risk assessments, audits, incident investigations, training and communication. Safety professionals educate leaders about compliance requirements and educate the frontline workforce in the completion of safety-related processes.

RISK REDUCTION:

☐ Safety professionals identify and drive risk reduction in the organisation. Safety professionals prioritise work tasks directed toward physical risk reduction on the frontline, using the hierarchy of controls. They de-prioritise administrative work and other activities that do not reduce risk or do not create a constructive safety climate. Safety professionals have a formal senior status with dedicated, qualified and experienced resources. The activities of the safety organisation are directed by leadership to drive organisational outcomes. Safety professionals coach leaders to improve their safety leadership and coach the frontline workforce to assess risk, identify controls competently and conduct in-field assurance of critical controls.

BUILDING OPERATIONAL CAPACITY:

☐ Safety professionals are an integral link in the strategic and operational management of the organisation. They explore everyday work to understand the gap between work-as-imagined and work-as-done and update the organisation's model of risk. Sensitive to operations, their work focuses on supporting the safe execution of operational work, rather than safety work. They facilitate the flow of information across organisational boundaries, generate action to reduce goal conflict and drive decisions that sacrifice other goals to mitigate safety risks as required. Safety professionals facilitate processes for leaders to learn how work is done, identify future operational scenarios, assess external threats and understand the organisation's vulnerabilities. They support the frontline workforce to balance operational demands, build capacity for resilience and facilitate learning from normal work and unexpected events.

5. Work understanding

Q. What model of accident causation does your organisation use to set its direction and effort towards managing operational work and safety?

PROCEDURES PRESCRIBE WORK:

☐ The organisation believes accidents are caused by technical and operational failures at the point of risk. Incident investigations identify unsafe or at-risk behaviours and follow linear causation models where accidents are caused by an unplanned sequence of events and failures (e.g. domino model, swiss cheese model). The organisation focuses on creating more rules and detailed procedures in an attempt to prescribe and control work, reduce adverse outcomes and reduce variation. People working outside of procedures are seen as a source of failure and non-compliance is dealt with swiftly using employment consequences. Compliance effort focuses on what should be avoided and the balance of safety energy is directed toward frequent failures of occupational safety like slips, trips and falls, at the expense of less frequent, but higher consequence, risks (e.g. process safety). People in the organisation regularly use terms like deviation, non-compliance, breach and human error.

ORGANISATIONAL FACTORS DRIVE WORK:

☐ Safety outcomes and risk are driven by underlying organisational factors upstream of conditions or behaviours involved in actual work. Incident investigations follow multiple causation models where accidents are caused by systemic failures that include direct causes and contributing factors (e.g. ICAM, 5-whys, Taproot). After an incident, the primary aim is to identify the failed defences and organisational factors to enhance barriers and defences along the timeline of events. Enhancing the system of work is as important as requiring compliance to established procedures. Individuals may be held accountable for actions contributing to safety incidents. People in the organisation regularly use terms like root cause, fair and just culture, defence in depth and organisational factors.

WORKERS MANAGE EMERGENT RISK:

☐ Safety outcomes are seen as an emergent property of work which is always complex and dynamic. Therefore, the organisation understands it has to support workers to have the capacity to identify and safely adapt to the emerging situations they face. Incident investigations follow complex, non-linear causation models to understand how incidents were the result of a combination of mutually interacting variables of the system, rather than just individual events (e.g. STAMP, FRAM, CAST). Learnings are implemented as global reforms not local fixes. Individuals are rarely held accountable retrospectively for their involvement in incidents, instead the organisation focuses on developing error-tolerant operations and technology supported by flexible procedures (e.g. critical steps) that enable autonomy. Performance variability is accepted, encouraged and seen as essential when managing complexity. The organisation understands the performance boundaries of its people and technology and works to extend these capacities. People in the organisation regularly use terms like performance variability, complexity, normal work, adaptation and initiative.

ENABLE:
the factors relating to the capacity to enable work
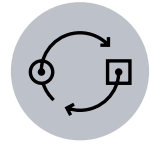
6. Operational managers

Q. What is the role of middle and frontline managers in delivering operational and safety outcomes?

DELEGATE SAFETY WORK:

☐ Operational managers delegate safety work activities to safety professionals. They communicate the importance of preventing incidents and injuries and they engage with frontline workers to reinforce the need to comply with rules and procedures. While they have professional working relationships with the frontline workforce, they do not comprehensively understand their needs, competencies or current situations. Operational managers are involved in managing serious incidents and in responses to regulatory compliance incidents, as well as safety issues with the potential to compromise industrial relations, financial or production goals.

PARTICIPATE IN SAFETY WORK:

☐ Operational managers actively participate in several forms of safety work, including leadership visits, inductions, training, risk assessments, incident investigations and audits. Managers at all levels are accountable for safety and genuinely committed to the goals of safety. They engage with the frontline to reinforce their commitment to safety through field safety leadership activities. Operational managers are proactively involved in identifying safety issues in consultation with frontline workers. They monitor compliance with rules and the effectiveness of safety processes. Operational managers drive action and as required request additional resources from senior leaders to resolve identified safety issues.

FACILITATE SAFETY THROUGH OPERATIONS:

☐ The organisation deeply integrates planning and execution of work with the management of safety risks. Operational and frontline managers, together with the workforce and safety organisation, actively contribute their needs and processes into a seamless workflow to plan, start and monitor work. Managers at all levels internalise safety as a moral responsibility and actively search for weak signals where risk might be emerging. Operational managers perform minimal safety work activities and instead drive operational processes with a clear safety lens to improve work-as-done (WAD). They understand that their response to an incident matters – for creating trust with the frontline and the ability to learn and improve.

ENABLE
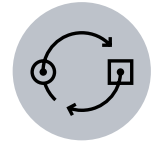
7. Resource allocation to reduce risk

Q. How are safety needs identified and resources allocated to reduce risk?

COMPLIANCE BUDGET:

The organisation invests minimal resources in safety work to comply with regulations and its safety management system. Safety professionals do not have the authority to invest in safety without Senior Leadership approval. The organisation focuses on optimising resource allocation through deliberate efficiency programs (e.g. lean, six-sigma). Excess safety resources and capital investment for safety are seen as negatively impacting cost and production performance.

INVESTMENT IN KNOWN ISSUES:

The organisation invests in making improvements to address known safety risks and issues as identified. The safety department is staffed with competent professionals and there is an approved and resourced safety improvement program. A well understood investment review process allocates the capital and non-capital resources outside of planned budget cycles to meet the organisation's safety risk appetite. Considerable resources are invested in safety work practices and safety risk reduction projects.

INVESTMENT IN OPERATIONAL SLACK:

The organisation invests significant resources supporting operations to deliver on production and safety objectives. Spare capacity, or operational slack, is viewed as essential. Spare operational resources are deliberately designed into the management system, so that the organisation has the ability to respond to unplanned and unforeseen emergent situations. Managers and frontline workers are skilled at re-planning and re-allocating resources to address emergent issues and maintain safety and production. The organisation continually builds the capacity for operational resilience by developing and improving the available resources, including personnel and equipment.

ENABLE
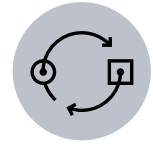
8. Management systems

Q. What is the focus and effectiveness of safety and work management systems?

REGULATORY COMPLIANCE:

☐ Safety management practices are separate to work management systems and other business processes and are based on safety regulatory requirements and industry standards. The management system is designed and maintained by safety professionals: its effectiveness is determined through compliance to legislation and surveillance audit results. The organisation has a behavioural safety program to support compliance with safety rules and procedures. Operational managers and frontline workers are held accountable for audit non-conformances and incidents resulting from a failure to adequately implement safety processes. The management system is supported by core IT infrastructure, including an incident management system, learning management system, document control system and a corrective action tracking system.

SPECIFIC SAFETY NEEDS OF WORK:

☐ Safety and work management systems are effective and reliable: they target specific needs of the work and known safety risks. These management systems are widely known and monitored for usefulness and impact. The needs of the safety management system are identified though consultation with the frontline. Non-compliance with safety requirements is investigated and corrective actions are identified to make operational work comply with pre-existing safety requirements. The organisation implements values and mindset programs to support compliance. External certification (i.e. ISO 45001) is viewed as the benchmark for safety management system design and effectiveness. The system is supported by core IT infrastructure, including an integrated control of work system, in-field electronic devices (e.g. tablets) and deployment of field safety technology (e.g. simulators, drones).

PROCESSES TO SUPPORT WORK AS DONE:

☐ The organisation understands work-as-done and together with frontline workers co-designs the necessary work processes and requirements to support the safe completion of work. It sets performance standards for safety, and local units have autonomy to design safety processes that meet organisational requirements. Plans and processes for work are known, but the organisation defers to expertise and experienced workers/operators over protocol and requirements. When work deviates from expected processes and requirements, the organisation inquires deeply with objective curiosity to understand and learn from, and with, the people involved. The management system is supported by core IT infrastructure, including real-time risk information systems, customised operational technology and augmented reality systems, at the point of risk.
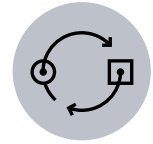
9. Goal conflict

Q. How are safety goals balanced with other business objectives?

PRODUCTION AND INJURIES:

☐ The organisation's primary objective is to optimise production and cost performance. Safety objectives set out to ensure injury rates are at a tolerable level and there are no fatalities. Safety issues are prioritised over production following an incident or when there is a clear and present risk to life. Frontline workers have authority to stop work/operations, with their manager's permission when unacceptable risks are present. They believe business goals and safety goals are not incompatible and have a stated goal of 'safety first' or 'safety is our number one priority'.

## KNOWN ISSUES SACRIFICE PRODUCTION:

☐ The organisation balances safety and other business goals – including cost and production – by prioritising safety over significant known issues in the business. It invests considerable costs in safety management activities. Safety issues are prioritised over production when there is a clear and present safety risk. Frontline workers have authority to stop work and exercise it routinely when facing clear challenges with the work process or equipment. The organisation is committed to zero fatalities, zero injuries or zero harm as well as other goals related to improving its safety culture. They believe good safety and good business are directly related.

BUDGETS RESET ON WEAK SIGNALS:

☐ The organisation invests significantly in operational capacity and safety risk reduction. As far as practicable, goal conflicts are identified and addressed before work starts, so that those exposed to risk are not faced with incompatible goals and trade-offs. Cost and production objectives are sacrificed based on weak signals and budgets: production targets and project schedules are re-set when the organisation is behind and goal conflict increases. Frontline workers stop and adjust their work to adapt to emerging risk and changing context and are enabled and supported to do so. The organisation understands that commercial goals (faster, better, cheaper) and safety issues can be in conflict. Mechanisms exist to identify and resolve such conflicts in an effective and transparent manner.

ENABLE
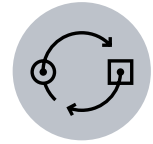
10. Learning and development

Q. What is the approach to developing capability, operational learning and knowledge management?

COMPETENCY MANAGEMENT:

☐ An established worker competency development program focuses on technical skill and knowledge requirements for each role. Workers sustain knowledge through periodic, formal training that teaches role-specific expertise based on pre-defined skills. Safety professionals spend time ensuring course content is correct and meets regulatory requirements. Operational learning is largely reactive and focused on learning from incidents, audits and exercising processes (e.g. emergency response drills). The organisation has limited absorptive capacity for learning and change.

BENCHMARKING AND BEST PRACTICE:

☐ An established worker capability program combines both the technical and non-technical skills and the knowledge required for each role. It focuses on ensuring workers have practical knowledge about how to perform their role safely though a range of media, including formal training, workplace-based learning and management feedback. Safety professionals spend time supporting operational learning activities based on incidents and issues in the workplace. The organisation seeks to understand safety management practices of peer organisations to adopt industry recognised practices. Safety leadership programs are conducted for frontline managers. The organisation seeks to learn proactively from audits, leadership visits, critical risk control effectiveness reviews and a suite of leading safety indicators.

SENSE-MAKING PROCESSES:

☐ Dedicated processes are implemented across all levels of the organisation to make collective sense of normal work and events that occur – as well as any potential future circumstances. These team-based learning processes (e.g. learning teams) drive alignment in understanding normal work and generate targeted organisation-wide improvements. The organisation understands blame fixes nothing. Active learning dominates the organisation's approach to capability development, including work simulation and micro-experimentation. Learning processes are built into planning, preparing, executing and reviewing work. Debriefing activities (e.g. after-action review) update the organisation's knowledge about work. Proactive learning is facilitated through horizontal coordination with peer roles, and team-based review and problem-solving processes.

EXECUTE:
the factors relating to the capacity to execute work
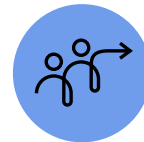
11. Frontline workers

Q. What is the role of frontline workers in contributing to work and safety outcomes?

COMPLY WITH SAFETY PROCESSES:

☐ Frontline workers maintain technical competence and comply with the organisation's safety rules and procedures. Workers participate in safety processes and decisions through formal consultation processes. They manage safety by performing frontline safety processes, including pre-start risk assessments, work permits and job safety analyses. Workers are encouraged to stop work when there is a serious safety risk and to report hazards and incidents as identified through their work.

ACTIVE CONTRIBUTION TO SAFETY:

☐ Frontline workers are actively engaged in identifying and developing safety programs, processes and improvements. This creates a collective ownership environment where the experience and expertise of workers is sought and valued by the organisation. Workers are enabled to develop beyond role boundaries and actively contribute to the design of safety processes. They are expected to stop work or to abandon production goals when there is a safety risk and they are involved in the resolution of issues. Workers are encouraged to raise suggestions for improving safety and rewarded for doing so through formal processes.

CO-DESIGN OF WORK:

☐ Frontline workers are engaged in the co-design of work to create the desired operational and safety outcomes. They are valued for their experience and viewed as local experts and partners in creating safe outcomes. The frontline educates management in how work is done, how the organisation functions and what they need to be successful. Management creates a climate of psychological safety and sees the frontline as a solution to operational problems. Workers express initiative and adapt to emerging situations supported by flexible procedures. The organisation understands frontline work is complex and dynamic, and that it is normal for work to be highly variable. Frontline workers value achieving production objectives by resolving operational challenges, and raising concerns and opportunities openly with managers and safety professionals.

12. Communication and coordination

Q. How does information flow through the organisation and how coordinated are teams and activities?

ONE-WAY COMMUNICATION:

☐ Information flows strongly from senior leaders to operational management to the frontline workforce via a one-to-many broadcast style of communication. Formal mechanisms for the frontline workforce provide feedback on work and safety issues (e.g. committee meetings, consultation processes, hazard and incident reporting systems). Senior leaders and operational managers drive consistent and standardised messaging. Peer relationships between roles and teams are left by the organisation to naturally develop. Teams focus on individual objectives, and may work at cross-purposes in fast-paced situations, but do not include others when assessing risks, troubleshooting or diagnosing difficult cases.

TWO-WAY COMMUNICATION:

☐ Information flows strongly from senior leaders to operational management to the frontline workforce and back in the opposite direction. Senior leaders and operational managers drive engaging and context dependent messaging that considers the issue and audience, while formal and informal ways allow frontline workers to raise and resolve their issues. Peer relationships between roles and teams are encouraged to facilitate learning and sharing across organisational boundaries. Leaders and managers operate as one team; however, the organisation measures the performance of individual operating units, which can limit collaboration.

OPEN COMMUNICATION:

☐ As a psychologically safe workplace, employees share incidents, issues, insights and ideas with each other. This environment is created through trust, care and transparency at all level of leadership and management. Information about work issues and safety risks flow freely and constructively up, down and across the organisation. Peer relationships between roles and teams are purposefully developed through multiple processes and mechanisms for groups to come together to learn and collaborate. Leaders create cross-department collaboration opportunities where relationships can be formed around common and dependent interests, for example engineering and procurement. Teams focus on the organisation's objectives and anticipate the needs of others to demonstrate reciprocity and synchronicity in fast-paced situations. Individual parts of the organisation sacrifice their own objectives for the needs of other groups or the organisation.

EXECUTE

13. Decision-making

Q. How are decisions made in relation to the management of work and safety?

MANAGEMENT DECISION-MAKING:

☐ Safety decisions are made by management and referred to a safety professional to meet legal compliance or organisational management system requirements. Work management decisions rarely involve safety professionals, unless there is a clear safety impact. Significant safety improvement ideas and plans are referred to the responsible senior leader for approval.

SAFETY ADVISORY SUPPORT:

☐ Safety decisions are made by the appropriate level of line management with the trusted and professional input and advice of a safety professional. Safety professionals combine technical knowledge with an understanding of good industry safety practices to recommend effective safety solutions. Work management decisions sometimes involve a safety professional when there is the possibility of a safety risk or issue. Significant safety improvement ideas and plans are referred to the responsible operational manager for endorsement, while safety improvement investments and decisions are made proactively when there is a clear risk-based justification. The organisation defers to protocol and safety requirements. Decision-making processes seek confirming evidence.

DEFERENCE TO EXPERTISE:

☐ Work management decisions are made by the most appropriate person or team and endorsed by the manager responsible as required. Leaders understand that, in complex work, complete control over the work cannot be achieved, so they 'let go' and create the capability and trust for their teams to make good decisions. Safety professionals provide effective and reasonable solutions by combining their technical knowledge and real-time work context information with a broad understanding of the business. Work management decisions involve safety professionals throughout the work planning and execution lifecycle and follow the precautionary principle. Risk assessment, troubleshooting and diagnostic practices draw in diverse perspectives. Significant safety improvement ideas and plans are made by local, impacted teams with support and resources provided by operational management. Safety improvement investments are made predictively based on weak signals and incomplete justifications. Deference to expertise is appropriately balanced with deference to protocols. Decision-making processes seek disconfirming evidence.

EXECUTE

14. Contractor management

Q. How are contractors engaged and managed?

MANAGE BY CONTRACT:

❑ Contractors are pre-qualified in accordance with a standard set of questions and requirements, in a largely desktop review process with site audits, as applicable. There are terms and conditions in the contract that specify the contractor's safety obligations and compliance requirements. The organisation periodically performs reactive audit and assurance processes on their contractors, typically following incidents and non-conformances. Issues and challenges with the contractor's work and/or safety performance are managed formally in accordance with the contractual requirements and processes.

DELIVERY PARTNERSHIPS:

❑ All scopes of work to be contracted are risk assessed. Contractors are pre-qualified based on safety requirements specific to the scope of work. The capability of contractors is well understood and verified against the work activities. Formal mechanisms and processes mobilise contractors and create alignment in expectations prior to work commencing. The organisation performs scheduled assurance activities. Issues and challenges are dealt with informally and followed-up formally, in accordance with contractual requirements and processes. The organisation seeks to build a mutually-beneficial partnership with contractors to continuously build relationships, alignment and integration.

CLIENT IN SERVICE ROLE:

❑ Internal and external advisory resources ensure the organisation is an informed buyer of all procured services. Guided collaborative pre-qualification processes seek to understand strengths and weaknesses of contractors in relation to safely delivering work. Extensive formal and informal mechanisms build alignment, integration and trust prior to work commencing. Shared goals and objectives are agreed: contractors have flexibility and autonomy in their work delivery and are seamlessly integrated into the organisation. Work is actively supervised and dynamic assurance processes respond to emerging risks and weak signals. Issues and challenges are collaboratively resolved. The organisation understands that it cannot meet its objectives without contracting companies, so they focus their efforts on ensuring contractors are successful.

EXECUTE

15. Monitoring and metrics

Q. What sources of information are used to monitor
and influence work and safety performance?

LAGGING INDICATORS:

☐ Lagging and compliance indicators are monitored to understand safety performance trends and issues. These include incident metrics (e.g. fatalities, lost time injuries, recordable injuries), near miss incident metrics and safety compliance metrics (e.g. training compliance, audit action completion). Compliance metrics focus on the frequency of safety work activities (e.g. number of risk assessments completed). Managers measure safety by incident rates and safety compliance: they consider their operations safe when there is an absence of negative events.

LEADING INDICATORS:

☐ A suite of quantitative and qualitative lagging and leading indicators provide information and insight into current operations and management of known safety risks. These metrics may include activities that assure critical risk control effectiveness, a positive safety climate and safety management plan implementation. Indicators complement information on incidents and measure safety work effectiveness and other relevant organisational information around people, production, profit, projects and procurement. Workers' perceptions of safety are gleaned from employee engagement data in safety culture surveys. Managers measure safety through leading and lagging metrics and they consider operations safe when controls are assured to be effective, in the absence of negative events and when they observe a positive climate for safety.

PREDICTIVE INFORMATION:

☐ Operational work data and qualitative insights provide information into current operations and management of known and unknown safety risks. This includes real-time information from procurement, production, finance, human resources and engineering to explore how operational performance, resourcing and goal conflict might potentially erode safety margins within the operation. The organisation deeply explores the relationship between planned and actual operational data, and implications for the safety of work. It understands that performance indicators raise questions and do not provide answers, so formal discovery processes are implemented to progress from monitoring and responding to learning and anticipating. Managers do not consider their operations safe and are pre-occupied with failure. Managers and Safety Professionals deeply understand and are sensitive to operations and provide a strong response to weak signals. The organisation combines big data (numbers) with thick data (experiences and stories) to form rich data (through analytics), which provides the necessary intelligence to understand the real-time and evolving shape of operational risk.
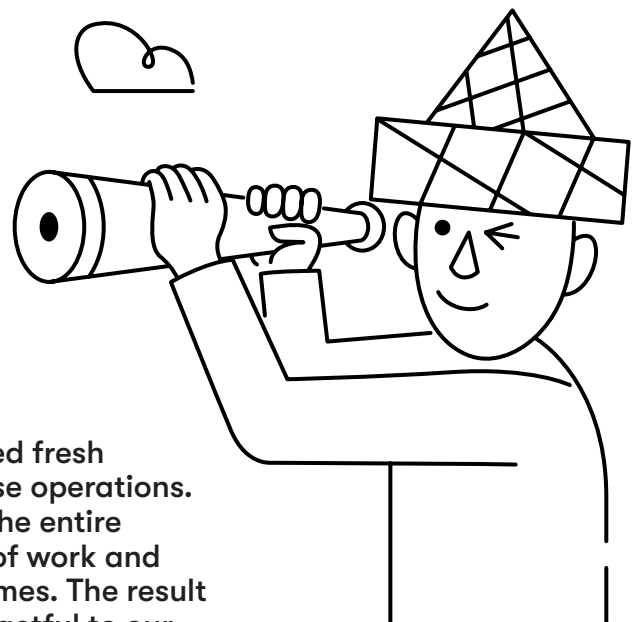
Forge Works.

Here's how the blueprint has helped organisations like yours.

Tronox Holdings PLC (NYSE: TROX) is a vertically integrated producer of titanium dioxide and inorganic chemicals. Tronox mines and processes titanium and zircon bearing minerals and manufactures titanium dioxide pigment, specialty-grade titanium dioxide products and high-purity titanium chemicals. Tronox employs nearly 7,000 people across six continents.

As part of it's uncompromising focus on safety, sustainability, environmental stewardship and governance, Tronox partnered with Forge Works to diagnose their current safety management arrangements at 16 operations across Australia, USA, Brazil, China, Kingdom of Saudi Arabia, South Africa, France, Netherlands and the United Kingdom.

Forge Works conducted targeted interviews with more than 100 personnel at all levels of the organisation from the Executive team to front-line operators at every site. These interviews were conducted by experienced consultants in English, Portuguese, French and Mandarin considerate of the different cultures and operating contexts.

With a comprehensive and reliable diagnosis of their current safety management approach, Tronox were able to confidently map out a global improvement strategy to achieve their objective of 'Inspiring world class safety and sustainability'.

Application of the Forge Works Map has provided fresh direction and possibilities for our globally diverse operations. The focus on business processes has engaged the entire organisation, resulting in a deeper exploration of work and new avenues to achieve and sustain safe outcomes. The result is a strategy that is regionally relevant and impactful to our operations, which will deliver not just safety, but operational excellence and sustainability.
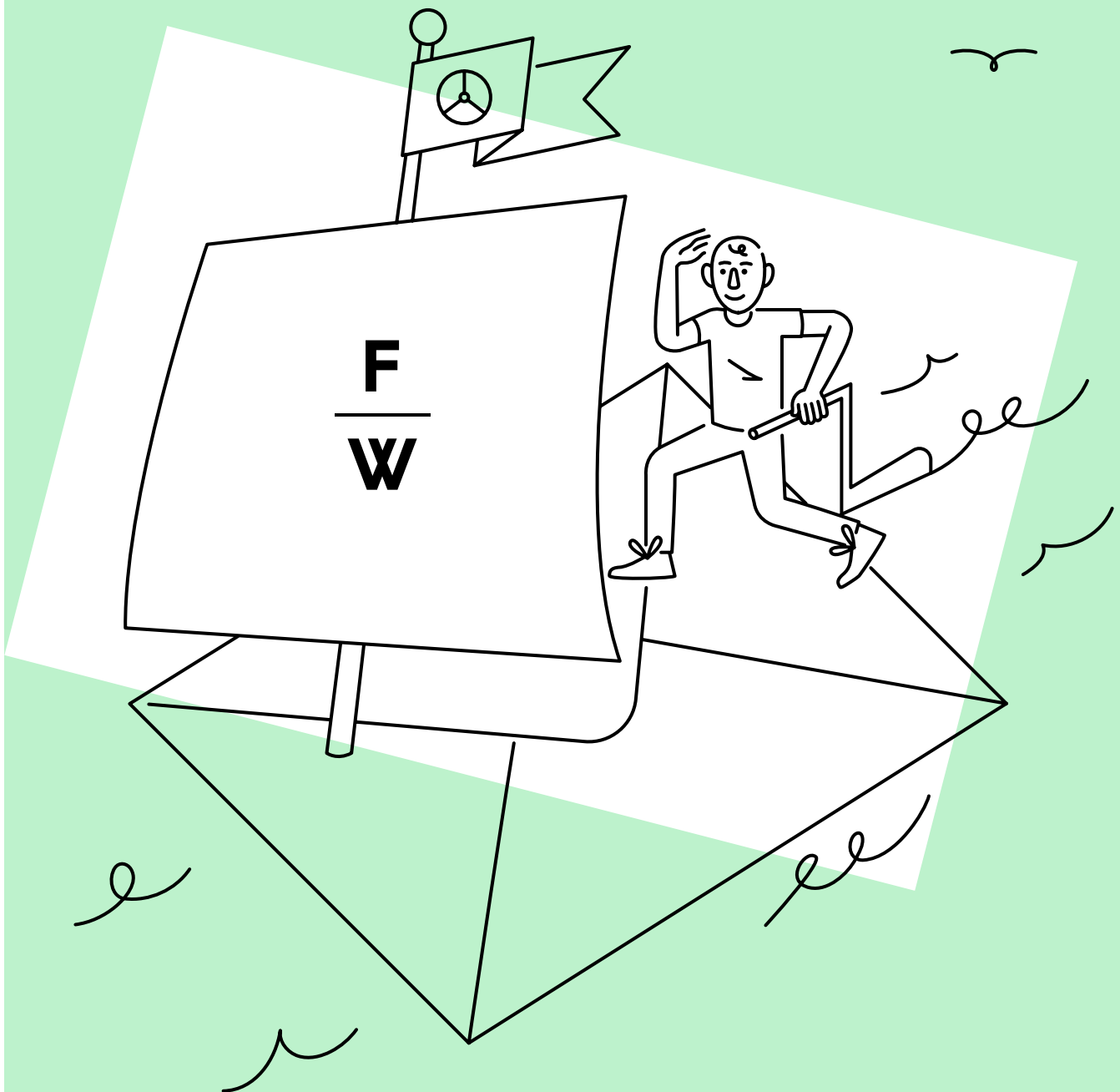
Dylan Audeyev, Vice President - Safety Health Environment & Quality

TRONOX

Forge Works.

References

Bye, R. J., Hollnagel, E., Aalberg, A. L., & Røyrvik, J. O. D. (2020). What we talk about when we talk about HSE and culture – A mapping and analysis of the academic discourses. Safety Science, 129, 104846.

Lingard, H., Hallowell, M., Salas, R., & Pirzadeh, P. (2017). Leading or lagging? Temporal analysis of safety indicators on a large infrastructure construction project. Safety Science, 91, 206-220.

Kath, L. M., Magley, V. J., & Marmet, M. (2010). The role of organizational trust in safety climate's influence on organizational outcomes. Accident Analysis & Prevention, 42(5), 1488-1497.

Rae, A., & Provan, D. (2019). Safety work versus the safety of work. Safety Science, 111, 119-127.

Provan, D. J., Rae, A. J., & Dekker, S. W. (2019). An ethnography of the safety professional's dilemma: Safety work or the safety of work? Safety Science, 117, 276-289.

Dekker, S., Cilliers, P., & Hofmeyr, J. H. (2011). The complexity of failure: implications of complexity theory for safety investigations. Safety Science, 49(6), 939-945.

Cooper, M. D. (2019). The efficacy of industrial safety science constructs for addressing serious injuries & fatalities (SIFs). Safety Science, 120, 164-178.

International Labour Organization. (2002). InFocus Programme on Safety and Health at Work and the Environment – ILO/02/23. XVIth World Congress on Occupational Safety and Health at Work. 27 May 2002.

Dekker, S. (2019). Foundations of safety science: A century of understanding accidents and disasters, Routledge.

Borys, D., Else, D., & Leggett, S. (2009). The fifth age of safety: the adaptive age. Journal of Health and Safety Research and Practice, 1(1), 19-27.

Pink, D. H. (2009). Drive: The surprising truth about what motivates us, Riverhead Hardcover.

Dekker, S. (2018). The safety anarchist: relying on human expertise and innovation, reducing bureaucracy and compliance, Routledge.

Woods, D. (2018). The theory of graceful extensibility: basic rules that govern adaptive systems. Environment Systems and Decisions. 10.1007/s10669-018-9708-3.

Hollnagel, E. (2017). Safety-II in practice: developing the resilience potentials. Routledge.

Acknowledgments

Forge Works.

forgeworks.com