

RISK AND RESILIENCE

High-Reliability and Accidents

Perrow · Weick · Reason

PAPER 02 / 03

A Furtherance reference compendium on the intellectual traditions behind organisational design, leadership, execution, and culture.

IN THIS PAPER

Frameworks assume risk can be managed; this paper asks how complex systems actually fail, and why some avoid it. It covers the accident and high-reliability traditions. The question it answers: in tightly coupled, complex operations, are failures inevitable – and what lets some organisations stay astonishingly safe?

Perrow argues that in some systems accidents are “normal” and unavoidable; Weick shows how high-reliability organisations defy that through collective mindfulness; Reason reframes error as a property of systems, not just of people.

Charles Perrow Normal Accidents, 1984

Normal Accidents Theory · systemic risk

CORE THESIS

In systems that are both **interactively complex** and **tightly coupled**, serious accidents are **inevitable** – “normal.” Unforeseen interactions of small failures cascade faster than operators can understand them, and added safety devices can make the system more complex, not safer.

FRAMEWORK

Property	Effect
Interactive complexity	Failures interact in unexpected, hidden ways
Tight coupling	No slack – problems propagate fast, with no time to intervene
System accidents	Multiple small failures combine unpredictably
Safety paradox	New safety systems can add new complexity

METHODOLOGY

Sociological analysis of high-hazard systems, prompted by the Three Mile Island accident.

SIGNIFICANCE AND CRITIQUE

The foundational, sobering account of systemic risk. The critique: it can be read as deterministic – and the high-reliability tradition, next, argues some complex systems do stay safe.

Karl Weick Managing the Unexpected, 2001 (with Sutcliffe)

High-reliability organisations · mindful organising

CORE THESIS

Some organisations in hazardous conditions – aircraft carriers, air traffic control, nuclear operations – achieve remarkable safety through **collective mindfulness**: a shared, vigilant capacity to **anticipate** and **contain** the unexpected. A direct answer to Perrow's fatalism.

FRAMEWORK

Principle of mindful organising	Meaning
Preoccupation with failure	Treat small signals as warnings
Reluctance to simplify	Resist easy explanations; probe deeper
Sensitivity to operations	Stay attuned to the front line's reality
Commitment to resilience	Build capacity to recover and adapt
Deference to expertise	Let the most knowledgeable decide, not the most senior

METHODOLOGY

Study of high-reliability organisations and the sensemaking that keeps them safe.

SIGNIFICANCE AND CRITIQUE

The optimistic, actionable counter to Normal Accidents, applied widely in aviation and healthcare. The critique: mindfulness is hard to sustain, and HRO conditions may not generalise to every organisation.

James Reason Human Error, 1990 · the Swiss Cheese Model

Organisational accidents · system view of error

CORE THESIS

Most accidents stem not from individual carelessness but from **latent organisational conditions**. Defences are like slices of Swiss cheese – each has holes, and disaster occurs when the holes momentarily line up. Blame the system, not only the person.

FRAMEWORK

Concept	Meaning
Swiss Cheese Model	Layered defences, each with holes that can align
Active failures	Front-line errors with immediate effect
Latent conditions	Dormant organisational weaknesses awaiting a trigger
Just culture	Learn from error without reflexive blame

METHODOLOGY

Cognitive psychology of error, applied to aviation, medicine and nuclear safety.

SIGNIFICANCE AND CRITIQUE

Transformed safety thinking toward the systemic view of error. The critique: applied carelessly, the system view can under-emphasise genuine individual accountability.

Synthesis

Theorist	Stance	Key idea	Implication
Perrow	Accidents inevitable	Complexity + tight coupling	Some systems too risky
Weick	Safety achievable	Collective mindfulness	Anticipate and contain
Reason	Error is systemic	Swiss cheese; latent conditions	Fix systems, not just people

FOR THE OPERATOR

This tradition holds a real debate in tension – accidents may be “normal” in complex, tightly coupled systems (Perrow), yet mindful high-reliability organisations stay remarkably safe (Weick), and error is best understood as a property of systems and their latent conditions (Reason). For the operator: reduce coupling and complexity where you can, cultivate mindful vigilance and deference to expertise, and design layered defences while treating error as a system signal. The final paper turns to thriving amid the unpredictable – fragility and antifragility.