Beyond compliance: Thinking about safety, differently

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What is safety?

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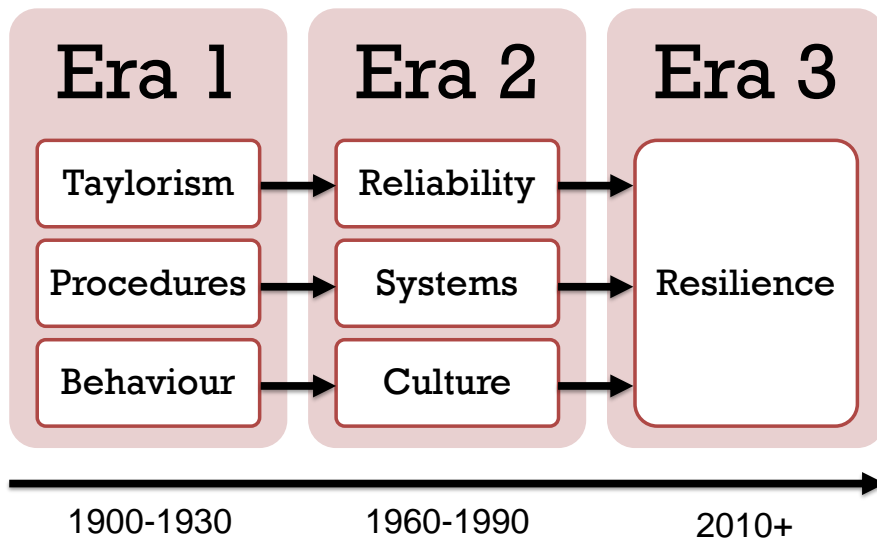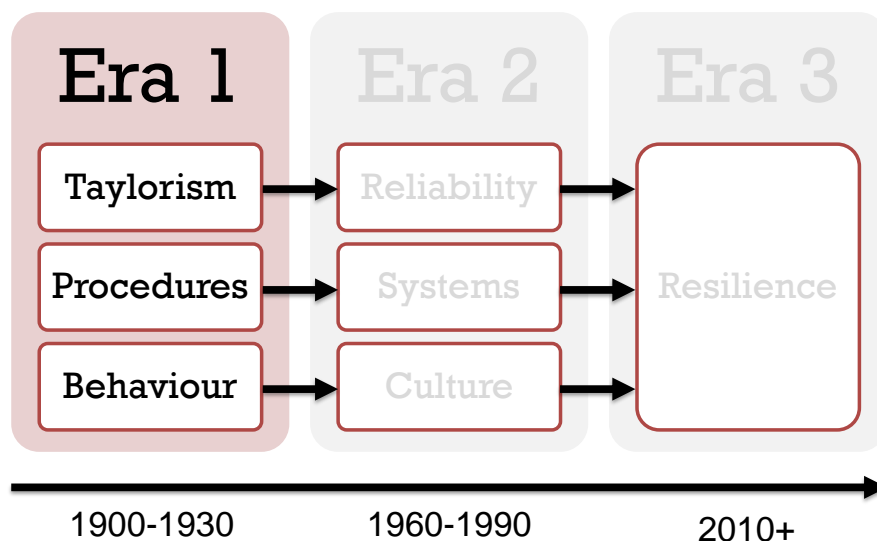# How do you 'get' safety?

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How do you know you have safety?

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Are there any other ways we can define, get, and measure safety?

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Era 1	Era 2	Era 3
Taylorism →	Reliability →	
Procedures →	Systems →	Resilience
Behaviour →	Culture →	

1900-1930   1960-1990   2010+

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Taylorism

- Taylorist principles:
    - Do not allow people to work by heuristic or habit; human judgment cannot be trusted to generate efficiency
    - Match workers to jobs based on their skill and motivation.
    - Monitor performance and ensure compliance with the most efficient methods
    - Managers plan and train; workers do the work

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Problems with Taylorism

- Machines and humans are interchangeable
- Departure from craftsmanship, people no longer seen as creative, innovative, and internally motivated
- Encouraged task-focussed relationships between management and workers, with minimal human interaction
- Workers must carry out work exactly as instructed (inflexibility)

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Procedures

- Rationalist, top-down approach, procedures are rules to follow
- Procedure-following is a mechanistic IF-THEN-DO
- Safety results from procedure following, better safety requires more procedures and closer compliance
- Giving workers discretion to act outside the procedures is unsafe
- Assumption:
  - People are problematic and error prone, and need to be controlled

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Problems with Procedures

- Rules can be put in place to satisfy external requirements
- Rules can lead to excessive bureaucracy
- Compliance with all rules can stall productivity
- Reduces innovation as rules are hard to change once established
- Assumes that stability in systems is achieved through constraints on workers
- People are seen to behave as if programmed

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Behaviourism

- Three key ideas:
    - Incidents are the result of cause/effect
    - There is a fixed ratio between safety events
    - Worker acts are responsible for 88% of accidents

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Problems with Behaviourism

- Much evidence exists that BBS 'works', however, the science is questionable (e.g., lack of control groups).

- The term 'human error' has serious flaws:
    - It's a broad label that is meaningless
    - Political, as it hides causes further up the chain
    - It's the starting point for investigations, not the end point
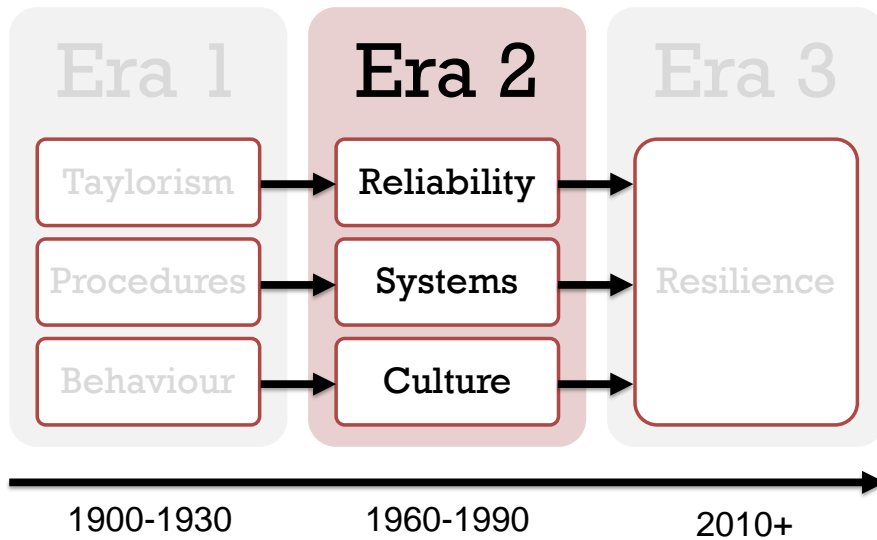
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Summary

1. Taylorism, scientific management, and Model 1 of procedures
    1. People are treated like machines
    2. Safety is achieved through compliance with procedures
    3. There is a gap between work as imagined and work as done

2. The accident triangle, and behaviour-based safety
    1. Unsafe acts cause most incidents
    2. The term 'human error' has limited value

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Era 1 — Taylorism → Era 2 — Reliability → Era 3
Era 1 — Procedures → Era 2 — Systems → Resilience
Era 1 — Behaviour → Era 2 — Culture →

1900-1930   1960-1990   2010+

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High Reliability Organisations

- Design and management of hazardous organisations that achieve very high levels of reliable and safe operations. US Air Traffic, US Navy aircraft carriers.
- Five key features:
  - Constantly worried
  - Reluctant to simplify
  - Keeping touch with operations
  - Expect the unexpected
  - Respect for expertise

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Problems with High Reliability

- Effortful and requires constant investment of resources and attention
- Redundancy is not always practical
- Redundancy can add complexity and cause incidents
- May not be suitable outside original environments (nuclear and military)

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System safety

- Trial and error approach no longer feasible -> move to design-based approach
- Both proactive and reactive
- Risk-based (critical risks and controls)
- Evidence based (audits)

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Problems with system safety

- The less there is to measure, the less information we have to control the activity.
- Up to a certain point, negative events can provide information about how to improve, but once the frequency of occurrence drops below the threshold of meaningfulness, we need a new approach.
- In the case of complex systems, the frequency of negative events has decreased below meaningful levels, so the approach should switch to improving/increasing positive capacities (e.g., a 'safety case' becomes a 'resilience case').

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Safety culture

Culture can be reduced to the attitudes and behaviors of **individual people**
Culture can be **controlled**.
Quantitative methods such as **surveys, measurements, questionnaires**
Assumes that everyone has to **think the same way** ('vision zero,' 'safety first')
Leads to **safety campaigns**, behavior modification programs, posters

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Problems with safety culture

- No tolerance for even small injuries, belief that all incidents are and should be prevented
- Zero harm can 'work' (under certain organizational cultures), but largely hides incidents and drives poor safety performance
  - Enables risk secrecy and disables learning
- Attitudes about zero harm: Public conformity, nothing can be done to change the program, cynicism (the program makes others look good)
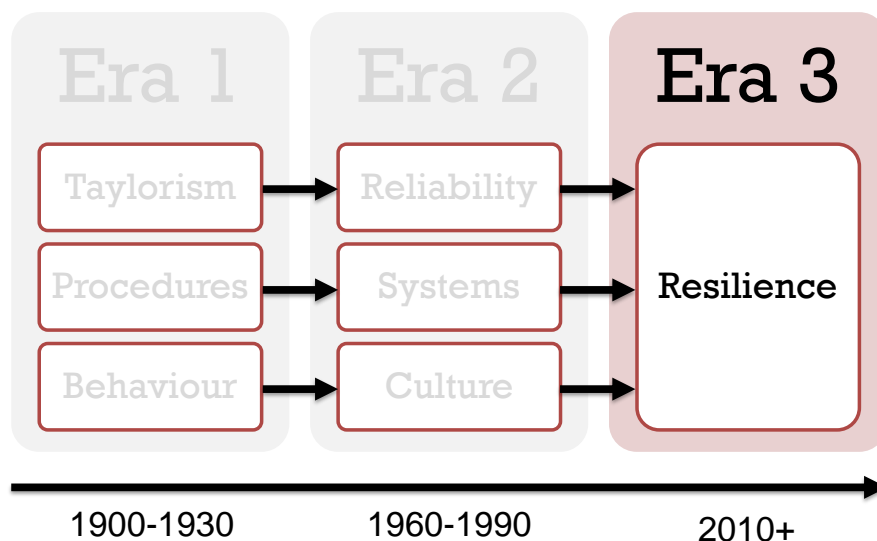
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Summary

1. High reliability organisations
   1. 5 characteristics
   2. Focus on building redundancy and overlap
   3. Dynamic structures

2. System safety
   1. Deals with increasing complexity – proactive and reactive
   2. Requires evidence of safety – the basis of auditing

3. Safety culture

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What is resilience?

- **Resilience is (loosely) defined as "the capacity to achieve successful operation under a range of conditions"**

- It is the variability of operators that results in both success and failure.
- Further gains in safety can only be made by understanding this variability:
  - What causes it?
  - How is it managed?
 - How can we mitigate the effects of poorly-managed variability?

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	Safety-I	Safety-II
Definition of safety	That as few things as possible go wrong.	That as many things as possible go right.
Safety management principle	Reactive, respond when something happens or is categorised as an unacceptable risk.	Proactive, continuously trying to anticipate developments and events.
View of the human factor in safety management	Humans are predominantly seen as a liability or hazard.	Humans are seen as a resource necessary for system flexibility and resilience.
Accident investigation	Accidents are caused by failures and malfunctions. The purpose of an investigation is to identify the causes.	Things basically happen in the same way, regardless of the outcome. The purpose of an investigation is to understand how things usually go right as a basis for explaining how things occasionally go wrong.
Risk assessment	Accidents are caused by failures and malfunctions. The purpose of an investigation is to identify causes and contributory factors.	To understand the conditions where performance variability can become difficult or impossible to monitor and control.

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The 'Safety-I' approach

Work as Imagined → **Compliance & Prevent Failures** → Work as Done
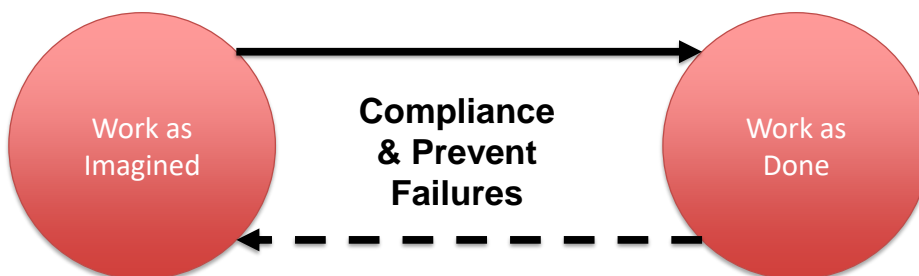
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Procedures as a resource

- Following procedures completely can stall work
- Some of the safest and complex work is done without procedures
- Following procedures can be unsafe (emergency situations)
- Procedures will never match work 100% due to uncertainty
- Safety 1 cannot describe what is actually going on with work
- **Safety 2 values:**
  - Autonomy
  - Expertise
  - Responsibility

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The 'Safety-II' approach

Work as Imagined → **Understanding & Promote Successes** ↔ Work as Done

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When there are opportunities to pursue	When things go wrong
Focus on creativity and flexibility	Focus on learning and improvement
Achieved through empowerment, inspiration, and creating opportunities for the growth of expertise	Achieved through reflection on practice, encouraging voice/speaking up, and anticipating adverse outcomes
Safety-II	Safety-I
During 'business as usual'	When high-risk work is undertaken
Focus on efficiency and stability	Focus on protection and risk-aversion
Achieved through clarity of roles and tasks, reinforcing successful practices, and close coordination of work activities	Achieved through encouraging vigilance and unease, monitoring performance, and fair/just accountability practices
Safety-II	Safety-I

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Conclusions

- Safety-I is focussed on reducing negative outcomes (failures)

- Safety-II is focussed on promoting positive outcomes (success)

- Key difference is how each method treats variability/deviation

- In reality, both forms of safety are needed to advance further:

  - **This is safety, differently.**

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Thank you!

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