Safety-II as a management principle
Implications for managing and developing an organization

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Managing Safety-I

Safety-I is a condition where the number of adverse outcomes (accidents / incidents / near misses) is as low as possible.

The belief in causality (Causality Credo)

1. Adverse outcomes happen because something has gone wrong (cause-effect thinking + value congruence between cause and effect).
2. Causes can be found and treated (rational deduction).
3. All accidents are therefore preventable (zero harm principle).

We are safe if there is as little as possible of this

Prevent, eliminate, constrain. Safety, quality, etc. are different and require different measures and methods.
Safety-I: Avoid unwanted outcomes

Safety is the condition of being **without** harm or other non-desirable outcomes.

Negative outcomes are caused by failures and malfunctions.

Find and eliminate causes of accidents and incidents

If you want to avoid or get away from something, then any direction you take will work!
Managing Safety-II

Safety-II is a condition where as much as possible goes well.

1. Care about what happens all the time rather than what happens rarely. *We always count the number of times something fails, but rarely the number of times it just works.*

2. Look for ‘work-as-done’ - the habitual adjustments and why they are made. *When something is done, as a part of work, it has usually been done before and gone well before.*

3. Learning should be based on the frequency of events rather than their severity. *Small improvements of everyday performance may be more important than large improvements of rare performance.*
Safety-II: With wanted outcomes

Safety is the condition of being with intended and wanted outcomes.

All outcomes involve some performance variability.

Study everyday performance in order to support what goes well.

If you want to approach or get close to something, you need to move in the right direction!
What is management?

Management is a process of planning, decision making, organising, leading, and controlling the resources (human, financial, physical, and information) of an organisation to ensure that it can reach its goals efficiently and safely.

The purpose of management is either to **maintain** the current state, to **approach** a new and desirable state, or to **avoid** or evade an unwanted state.

To maintain … requires the ability to change in order to compensate for external (and internal) influences, degradation, and variability.

To approach … requires the ability to change, in order to move from the current to a new position or state in an orderly manner.

To avoid … requires the ability to change, in order to steer clear of a temporary or permanent hazard or risk.

Management is the purposeful control of change.
Management requires knowledge

Position: A need to know where you are: the current position / condition(s) / state. Indicators (KPI)? Measurements? Dashboards? Benchmarks? *Predictions about how the current situation will develop in the short term.*

Goal: A need to know where you want to be: the new or future position / condition / state. *Criteria for success – approach or avoidance? Stakeholders, consensus or conflict? Costs and benefits?*

Means: A need to know how to get there where you want to be: how to move the system from the current position to the resulting position. *What are the effective means for change? How long will it take? Are there any side-effects? Will outcomes be temporary or permanent?*
Management is like travelling

GOALS or TARGETS:
Where do we want to be?
When should we arrive?

POSITION:
Where are we now?
How well are we doing?

MEANS or PROCESS:
How can we change position (“speed” and “direction”)?
Managing different processes

**DRIVING**

- **Goal:** Well defined
- **Position:** Known
- **Means / Process:** Well known, transparent

**MANAGING PRODUCTION**

- **Goal:** Well defined
- **Position:** Known
- **Means / Process:** Well known, transparent

**FLYING**

- **Goal:** Well defined
- **Position:** Known
- **Means / Process:** Well known, transparent
Managing safety

Goal: Defined by negation (no accidents)

Position: Vaguely known or unknown

Means / Process: Partly unknown, based on tradition rather than knowledge.
Safety: What is the goal?

Safety goals are rarely described explicitly.

Global Aviation Safety Roadmap

Goals and Objectives:
- Provide a common frame of reference for all stakeholders
- Coordinate and guide safety policies and initiatives worldwide to reduce the accident risk
- Avoid duplication of effort and uncoordinated strategies
- Encourage close industry and government cooperation on common safety objectives

Bradley's Curve (DuPont, 1994)
Goal: The “zero accident” approach

OUR PURPOSE
To produce [X] safely, securely and profitably - without harm to people or the environment.

OUR BELIEFS and GUIDING PRINCIPLES

1. Safe production is our most important goal.
2. All injuries and environmental incidents are preventable.
3. Any task that can’t be done safely without harm to the environment will not be done.
4. Each person is accountable for his or her own safety, the safety of their coworkers and protecting the environment.
5. Each person is expected to identify hazards and manage risks to people and the environment.
6. Each person must have the necessary skills to work safely and protect the environment.
7. Working safely with respect for people and the environment is a condition of employment.
Safety: What is the position?

Most, if not all, safety measures refer to negative outcomes (accidents, etc.)
Roadmap versus sea-chart

Position: Easy to establish
Direction: Clearly indicated
Routes: Well marked
Conditions: Stable

Position: ?
Direction: ?
Routes: ?
Conditions: ?

Position: Can be uncertain
Direction: Must be worked out
Routes: Course must be set
Conditions: Unpredictable
How does an organisation function?

In order to manage something it is necessary to know how it functions!
Different ideas about solutions

This will solve your problems

Why are there different ideas about what actually goes on?

Will this solve our problems?

And how can they be reconciled?

This doesn't solve our problems

Macro

Meso

Micro

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How do we understand what happens?

Design (tools, roles, environment)

Work & production planning ("lean" - optimisation)

Safety management, investigations & auditing

Work-As-Imagined

Work-As-Imagined

Work-As-Imagined

Work-As-Done

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Means: Understanding systems

- Tractable system (technical)
- Intractable system (socio-technical)
- Entangled system (synergistic and self-regulating)
Tractable systems

Simple descriptions with few details (technology, people)

Principles of functioning are known

System does not change while being described
Intractable systems

Elaborate descriptions with many details

Principles of functioning are partly unknown

System changes before description can be completed
Entangled systems

Systems have exceedingly many parts requiring elaborate descriptions.

Parts and functions are intrinsically linked.

Multiple interconnections means that more things happen at the same time.

No function can be described independently of other functions.
Goals, position and means

Legacy
Industry practice
Current trends

Indirect, lagging
“measures”

Control inputs
(management interventions)

Change management
Safety culture
QA / QM - Lean

Work-as-Done,
everyday practices.
(mostly unknown)

Tradition
Standards
Requirements

Outcomes
(products)

Accidents, losses
Performance indicators
Balanced Scorecards
No single or simple measures

Organisations today are complex socio-technical systems.

There are no simple ways of characterising complex systems, hence no simple ways of measuring them.

The path from A to B is never straight.

It is important how an organisation or a system, and the people in it, **performs** in general – not just with regard to safety. This requires an understanding of how an organisation functions.
Management requires measurements

Direct measures: Require that the process is known.

Proxy measures: Indirect but relevant for desired outcome

Outcome/product measures: Convenient and easy to get. But how meaningful are they?

Positive

Negative

Time

Limit of unacceptable performance

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An organisation should be able to function as required under expected and unexpected conditions alike (changes / disturbances / opportunities).

People, individually and collectively, quickly learn how to adjust what they do to the conditions and rely on this to cope successfully with everyday situations.

A potential to respond to threats as well as opportunities.

A potential to learn - both from what goes well and what goes wrong.

A potential to anticipate the effects of actions as well as long-term changes to demands and resources.

A potential to monitor what happens - externally and internally.
Why the four potentials are needed

Without the potential to respond, threats and opportunities will go unanswered.

Without the potential to learn, the system will always respond in the same way and rely on the same indicators.

Without the potential to anticipate the future is assumed to be a repetition of the past.

Without the potential to monitor, everything that happens will be a surprise.

Anticipate
Learn
Respond
Monitor
Potentials are scale-invariant.

Acceptable performance requires that the system can respond to threats and opportunities alike.

Acceptable performance requires that the system can monitor what happens - externally and internally.

Acceptable performance requires that the system can learn - both from what went well and what went wrong.

Acceptable performance requires that the system can anticipate long-term changes to demands and resources.
Assessing the performance potentials

For which events have responses been prepared?
What is the threshold of response?
Have enough resources been allocated?
...

What is learning based on
(succesess - failures)?
Is learning continuous or
event-driven?
How is learning verified
and maintained?
...

How have indicators been
defined?
How many are leading and
how many are lagging?
What is the delay between
measurement and
interpretation?
...

What is the implicit/explicit “model” of the future?
How far does the organisation look ahead (“horizon”)?
Which risks are the organisation willing to take?
...

Anticipate
Learn
Respond
Monitor
Anticipate
As high as reasonably practicable

Respond

For which events is there a response ready?
What is the threshold of response?
How many resources are allocated to response readiness?
...

Monitor

How have the indicators been defined?
How many indicators are leading and how many are lagging?
What is the delay between measurement and interpretation?
....

Learn

What is the learning based on (successes – failures)?
Is learning continuous or event-driven?
How are the effects of learning verified and maintained?
...

Anticipate

What is the implicit/explicit “model” of the future?
How far does the organisation look ahead (“horizon”)?
What risks are the organisation willing to take?
...
Comprises four sets of questions, one for each potential. The questions are:

**SPECIFIC** – address issues that are important for a concrete organisation.

**DIAGNOSTIC** – point to details of a potential that are meaningful to assess.

**FORMATIVE** – answers can be used to make decisions about how to improve potentials.
The SPM can be used to show position

Systemic Potentials Profile for the ability to respond (constructed example)
The role of the SPM in an organisation

The SPM can be used to assess how resilient performance is at all levels of an organisation. It can help people to look at what they do themselves, and also to look at what others do.
To compare or not to compare?

The SPM should not be used to compare different organisations ...

The only fair comparison for an organisation is the organisation itself - over time. Organisations can possible be compared in terms of distinct outcomes, but not in terms of the “internal” processes.

... but only to “compare” an organisation to itself over time.
The potentials are not independent

- The potential to respond
- The potential to monitor
- The potential to anticipate
- The potential to learn

... but the relations between them are not linear!
Systemic potentials are coupled

The potentials are coupled, i.e., they depend on each other.

The use of the SPM must refer to a model of these dependencies for a given context.

A functional model of an organisation can be developed using the FRAM.
A different perspective

In a Safety-I perspective, the focus on accidents hinders a view of work that goes well.

A Safety-II perspective considers all outcomes and provides a better understanding of how things happen.

A Safety-I perspective is limited in scope and applicability. It does not solve today’s problems.

A Safety-II perspective is a complement to a Safety-I perspective rather than a replacement.
Safety is not enough

It is not enough to look at safety. It is just one criterion for a system’s performance. We need to look at other criteria as well. Each criterion represents a special concern for the system’s performance, with its own tradition, methods, models, and vocabulary.

Productivity  Safety  Quality  Reliability  Sustainability  Custom

But we must look at them together. It is the system’s performance as a whole that we should be concerned with and manage.