Safety Management: Avoid or Approach

Erik Hollnagel, Ph.D.
Senior Professor, Jönköping Academy, Sweden
Visiting Professorial Fellow, AIHI, Macquarie University, Sydney
Email: sensei@safetysynthesis.com

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Purposes of safety management

SAFETY-I

Purpose: To avoid something you don't want.
Safety management is managing business activities and applying principles, framework, processes to help prevent accidents, injuries and to minimise other risk.

Australian Government
Civil Aviation Safety Authority

SAFETY-II

Purpose: To approach something you want
Safety management is managing business activities and applying principles, framework, processes to help ensure that work goes well under expected and unexpected conditions alike.

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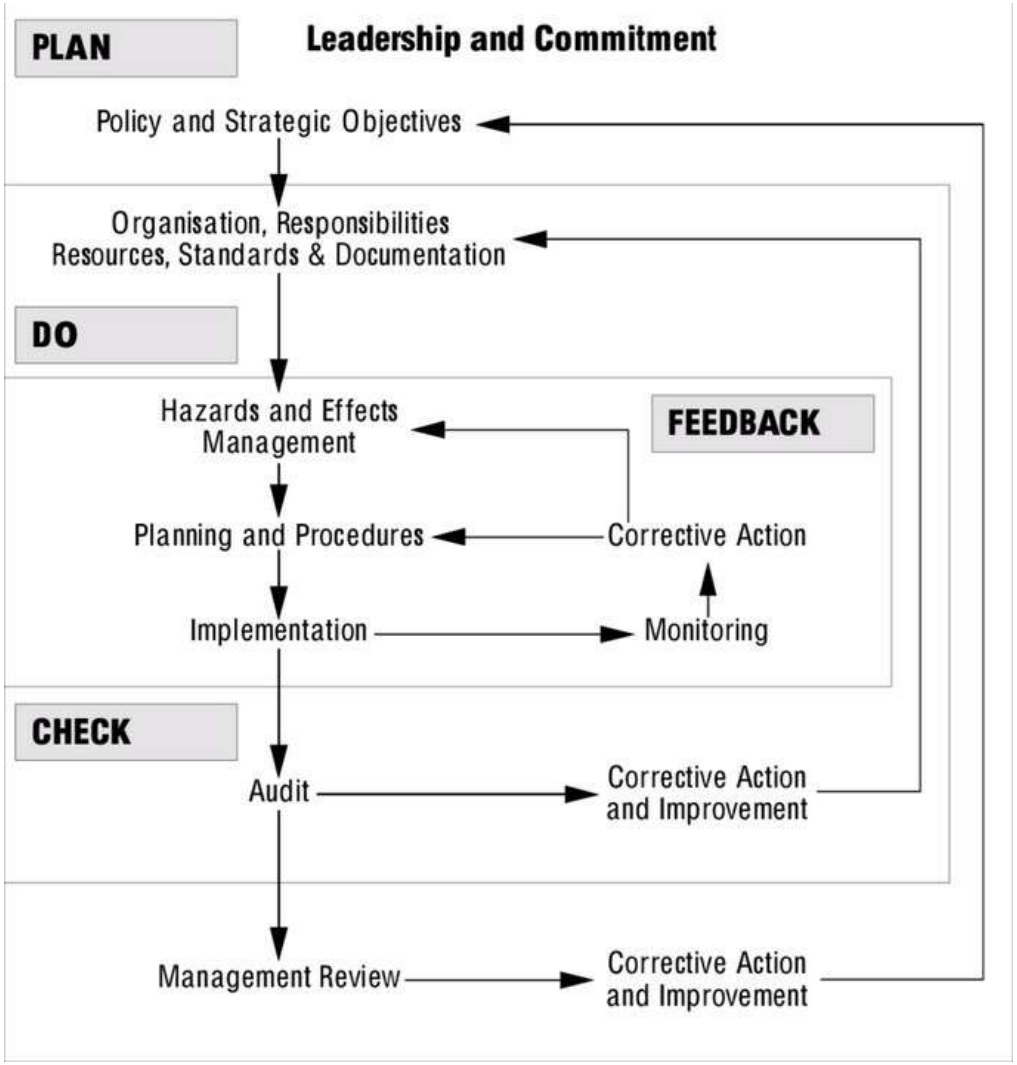
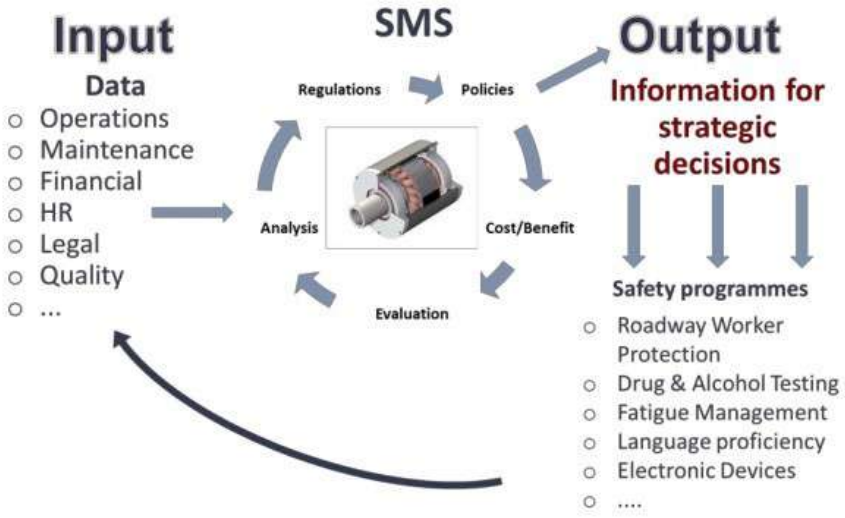
Safety Management Systems



A safety management system is a systematic approach to managing safety, including organisational structures, accountabilities, policies and procedures.



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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.

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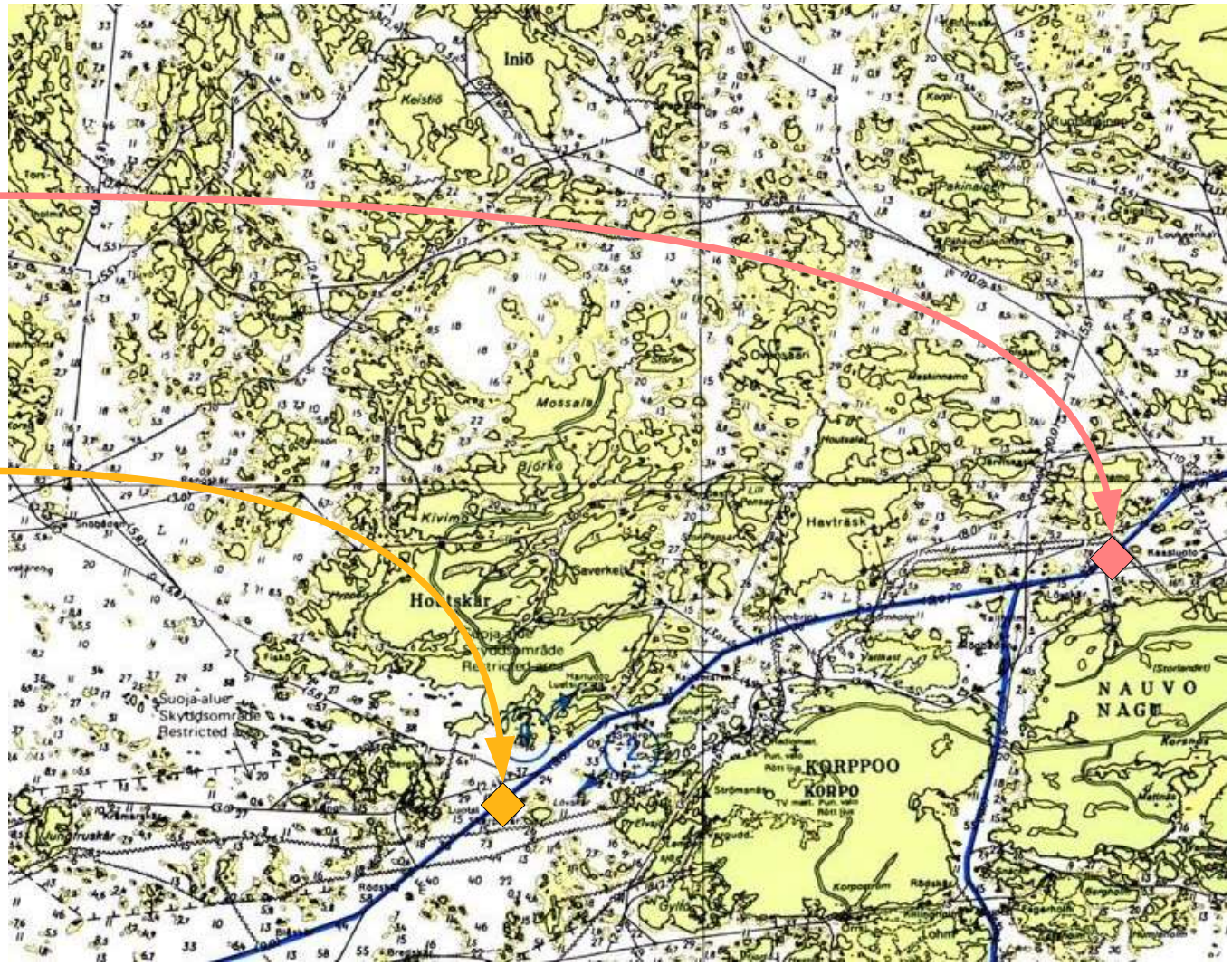
Management is like travelling

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")?



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Management requires knowledge (1)

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?*

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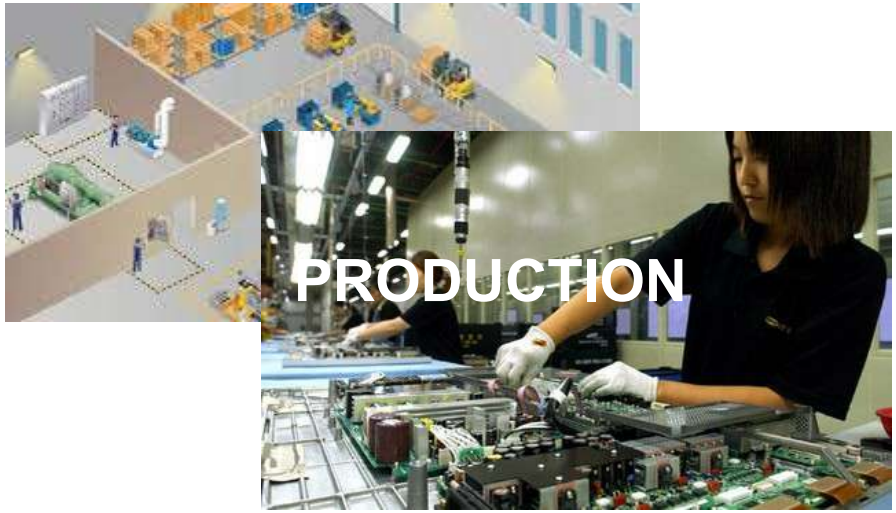
Managing something tangible



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

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

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

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Managing something intangible

Goal: Defined by negation (no accidents)

Position: Vaguely known or unknown

Means / Process: Partly unknown, based on tradition rather than knowledge.

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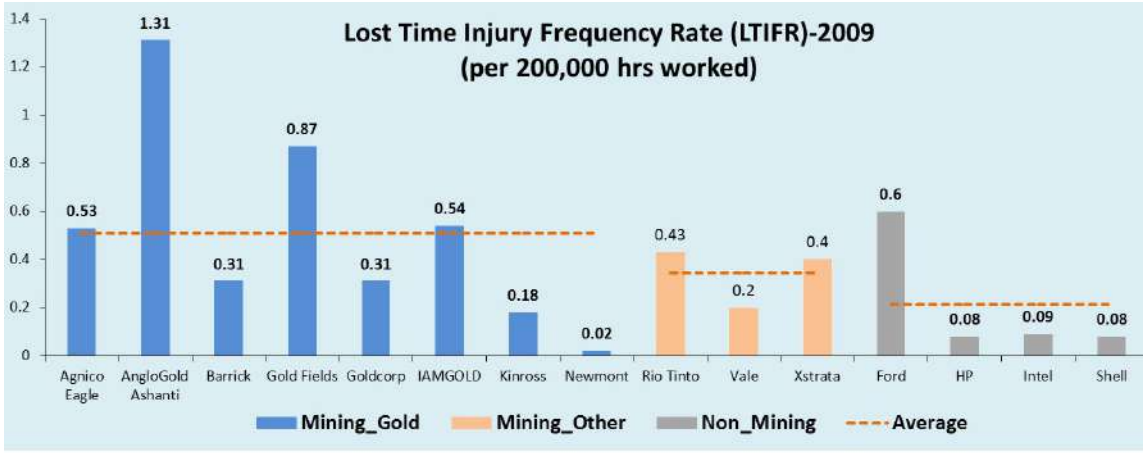
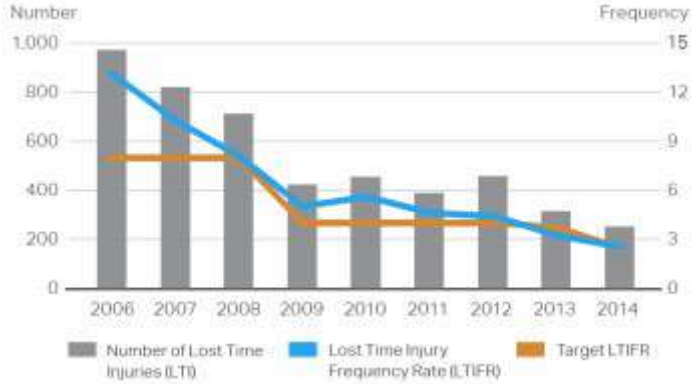
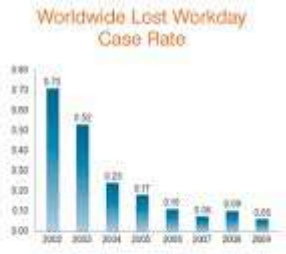
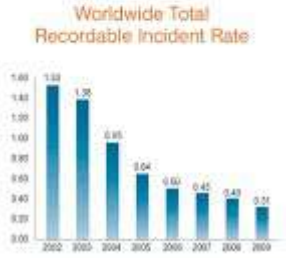
Safety: What is the position?

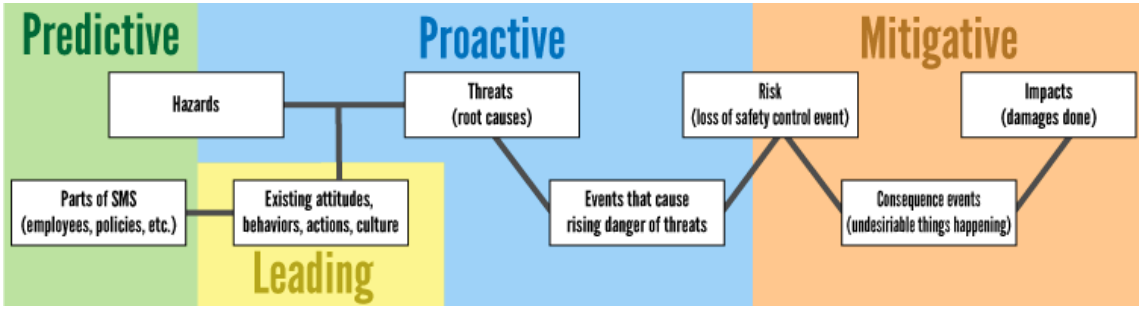








Most, if not all, safety measures refer to negative outcomes (accidents, etc.)



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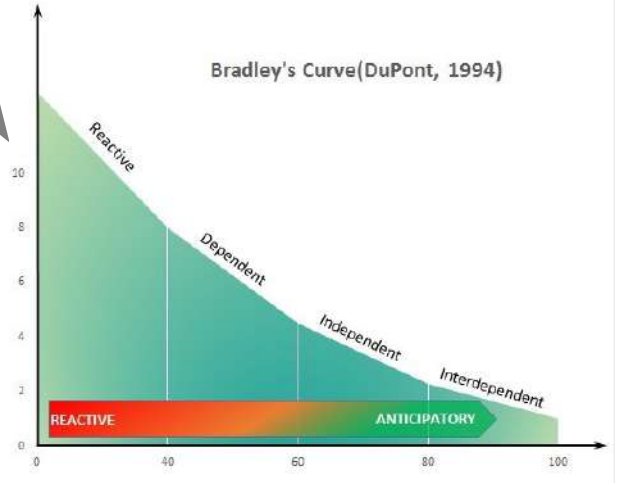
Safety: What is the goal?

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

Safety goals are rarely described explicitly



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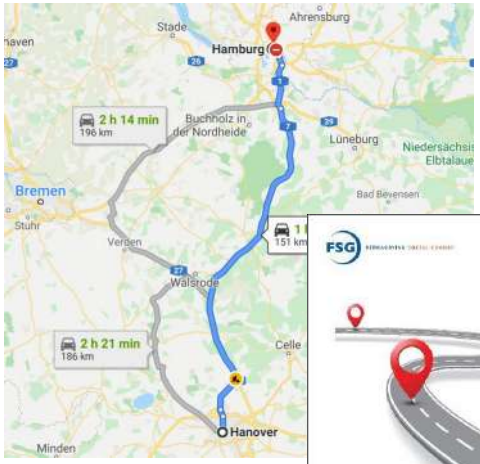
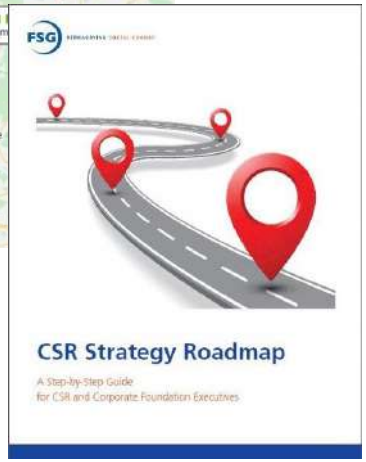
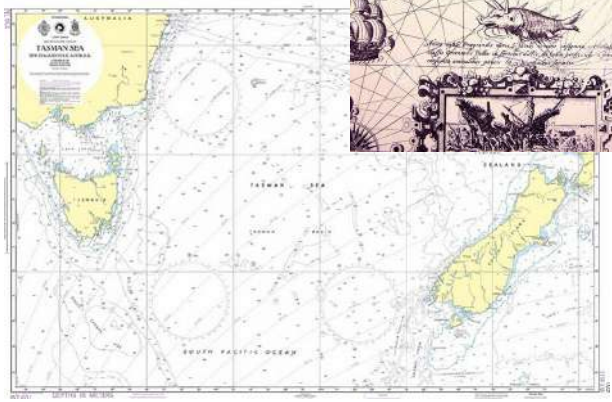
Roadmap versus sea-chart







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

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How to change an organisation?

We know how to change the direction and speed of a vehicle.

Managers should monitor and regulate how efficiently and effectively an organization and its members are performing the activities necessary to achieve organizational goals.

But how can we change the "direction" and "speed" of an organisation?

Why is it necessary to change?

- To approach ...
- To maintain ...
- To avoid ...

- Establish standards of performance, goals & targets.
- Measure actual performance (output, behaviour, culture).
- Compare actual performance against standards.
- Evaluate results and take corrective action if needed.

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Management requires knowledge (2)

Position:	How (well) do you know the current position? Are there any delays? What happens around the organisation?
Goal:	How have goals been defined and targets set? Are there priorities or conflicting interests? What is the time window / time horizon?
Means:	Are the means appropriate for the goals? How much effort will be required and by whom? Is there any "noise" that may drown the "signals"?

Three assumptions:
Everything will go according to plans.
Conditions will be stable during the change.
Nothing else will happen.

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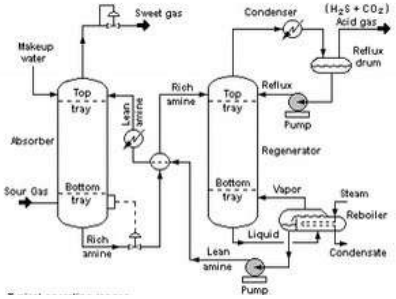
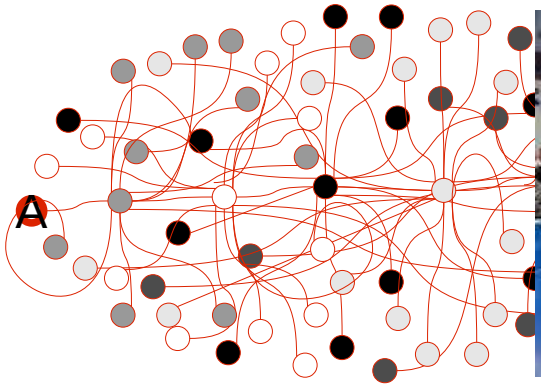
Means: Understanding systems

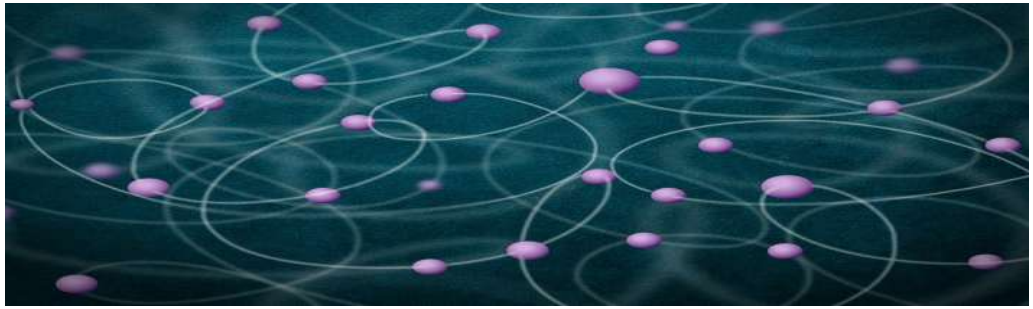
Tractable system
(technical)



Intractable system
(socio-technical)



Entangled system
(synergistic and self-
regulating)



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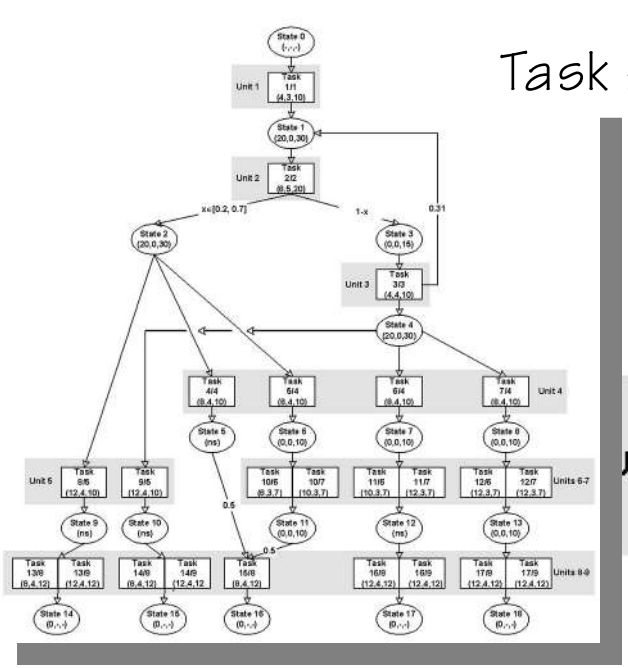
Understanding how something is done



Task networks

The connectors (arrows) represent temporal (or logical) order.

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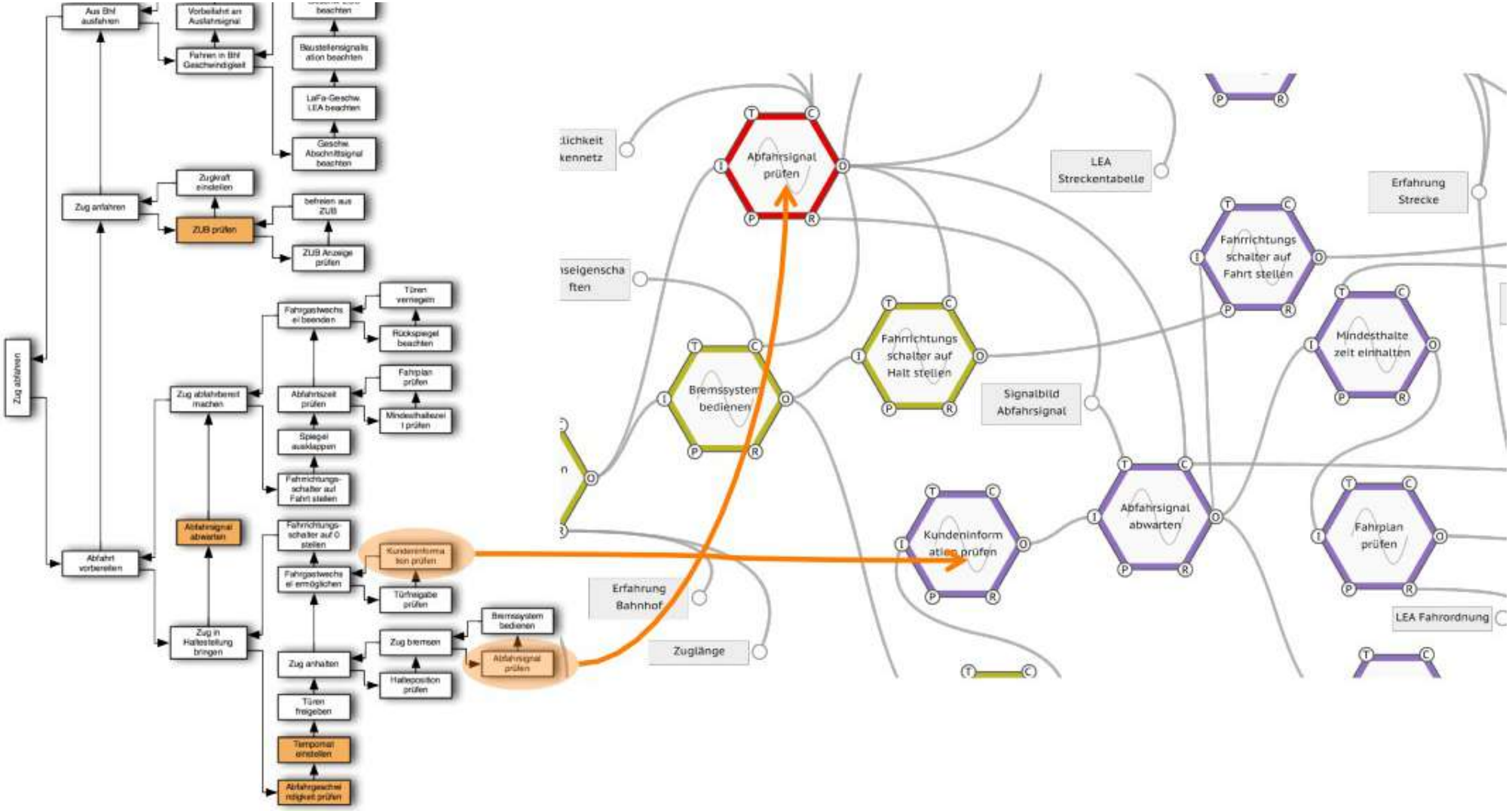
From HTA to FRAM



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Tasks and activities

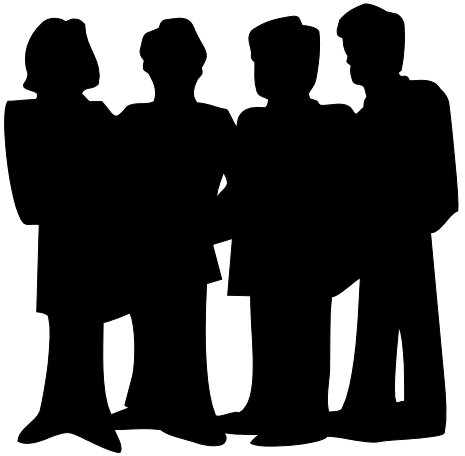
Tasks - describe work as designed or as imagined, e.g., by managers.

Tasks represent Work-as-Imagined (WAI)

≠

Activities – describe work as it is actually performed or done.

Tasks represent Work-as-Done (WAD)



The Functional Resonance Analysis Method can describe both tasks and activities but is especially useful for the latter.

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Safety is about WAD, not about WAI

Design (tools, roles, environment)

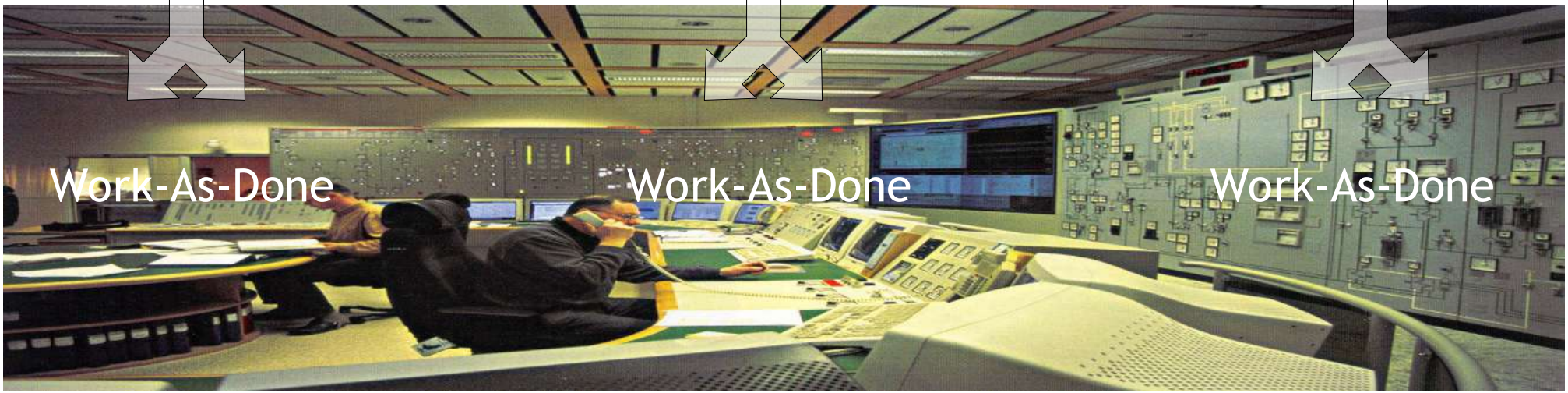
Work-As-Imagined

Work & production planning ("lean" - optimisation)

Work-As-Imagined

Safety management, investigations & auditing

Work-As-Imagined



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What is FRAM and what does it do?

THE DESIGN, management, and analysis of work tacitly assumes that we know how things are done or should be done.

IN REALITY work is never completely regular or orderly. Work-as-done (WAD) will always be different from work-as-imagined (WAI) because it is impossible to know in advance what the actual conditions of work will be, not least what the demands and the resources will be.

THE FRAM is a method to analyse how work activities take place either retrospectively or prospectively. This is done by analysing work activities in order to produce a model or representation of how work is done.

THE FRAM is based on four principles:

the equivalence of failures and successes,
the necessity of approximate adjustments,
the reality of emergence, and
functional resonance as an alternative to causality.

The FRAM focuses on describing what happens in terms of the functions involved.

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FRAM analysis (model building) steps

1. Define the scope of the model, i.e., the purpose and duration of the activity that is being analysed. The defined duration of the activity being studied – when it begins and when it ends – helps to distinguish foreground functions from background functions..

2. Make a list of the essential functions that are needed for the activity/event. Possible sources are event report, procedures/instructions, design specifications, story-telling, field observations & interviews, experience, etc.

3. Describe each function using the FMV. Describe the relevant aspects of each function using breadth-before-depth. Define additional functions needed; designate foreground and background functions.

4. Refine the model through discussions and iterations. When finished, calibrate the model using subject matter experts.

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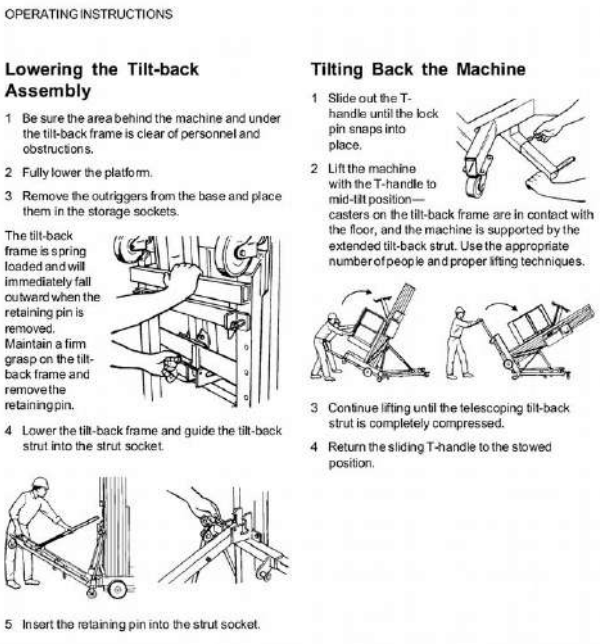
A linear description of work



OPERATING INSTRUCTIONS

Lowering the Tilt-back Assembly

1 Be sure the area behind the machine and under the tilt-back frame is clear of personnel and obstructions.

2 Fully lower the platform.

3 Remove the outriggers from the base and place them in the storage sockets.

The tilt-back frame is spring loaded and will immediately fall outward when the retaining pin is removed. Maintain a firm grasp on the tilt-back frame and remove the retaining pin.

4 Lower the tilt-back frame and guide the tilt-back strut into the strut socket.

5 Insert the retaining pin into the strut socket.

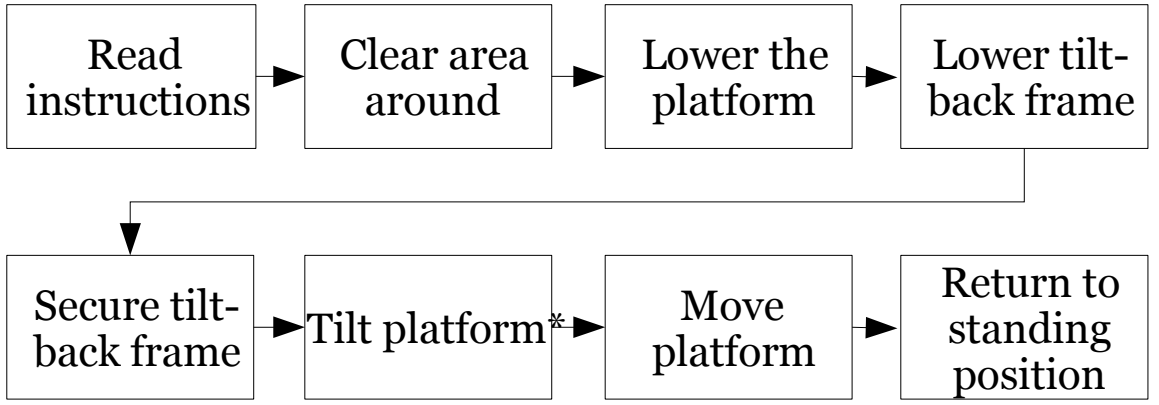
Tilting Back the Machine

1 Slide out the T-handle until the lock pin snaps into place.

2 Lift the machine with the T-handle to mid-tilt position—casters on the tilt-back frame are in contact with the floor, and the machine is supported by the extended tilt-back strut. Use the appropriate number of people and proper lifting techniques.

3 Continue lifting until the telescoping tilt-back strut is completely compressed.

4 Return the sliding T-handle to the stowed position.



*Use the appropriate number of people and proper lifting techniques.

Manual is 35 pages long
Diagrams are small and complicated
Different steps for DC, AC, and air (pneumatic)
Rental company drops lift early outside and leaves.
Rainy season

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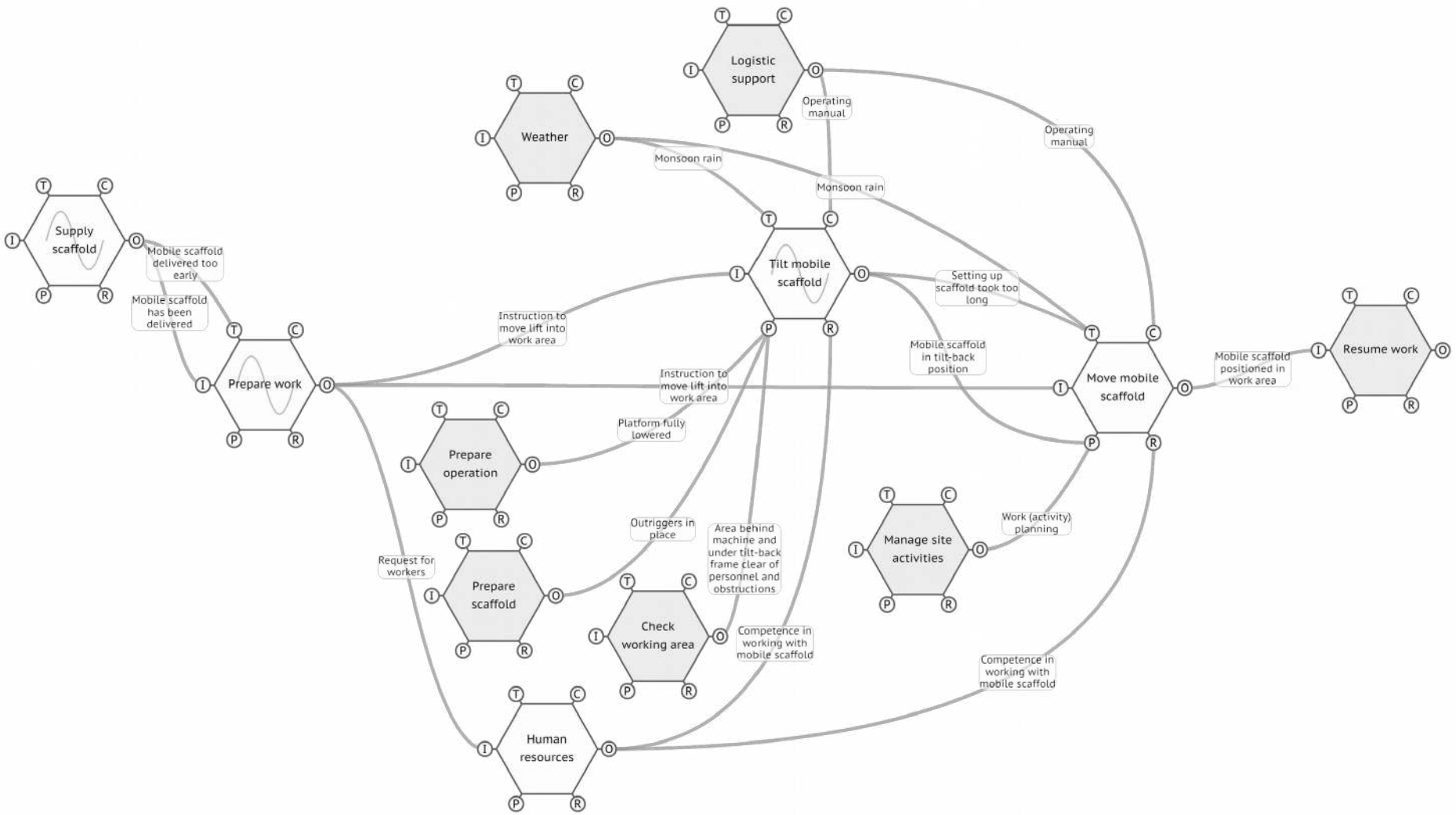
A non-linear description of work



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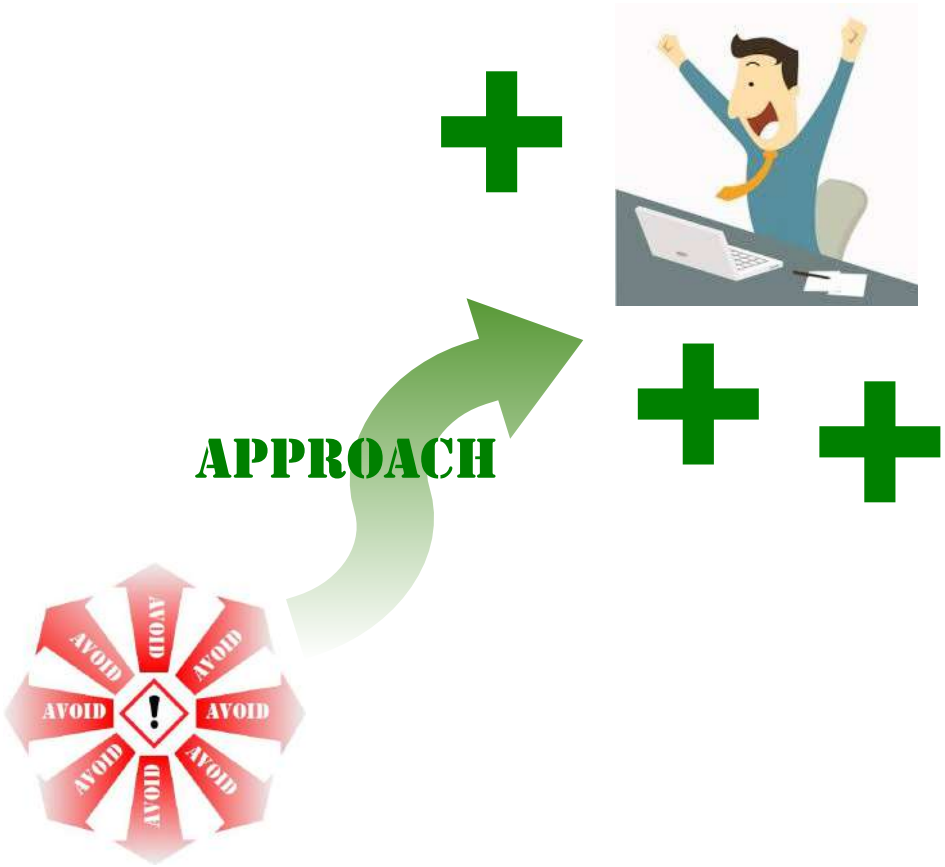
Safety-II: With wanted outcomes

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!

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Different ways to manage safety

SAFETY-I

Goal:

Prevent accidents, injuries and minimise other risk.

Means:

Understand why things go wrong, find causes of failures.

Eliminate causes, reduce hazards, remove variability by standardisation and norms

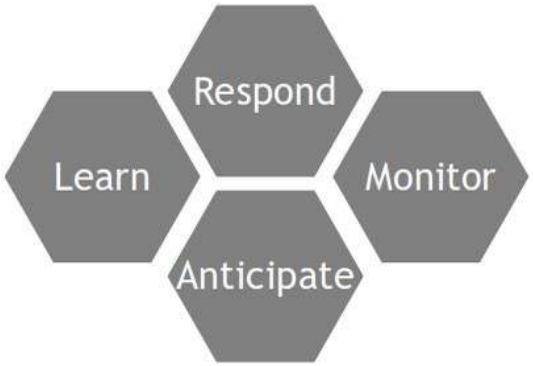
SAFETY-II

Goal:

Ensure that work goes well under both expected and unexpected conditions.

Means:

Understand why things go well, manage and sustain the systemic potentials:



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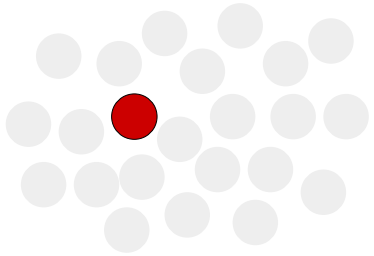
Different ways of looking

A Safety-I perspective:



What went wrong?

↓

What was the cause?

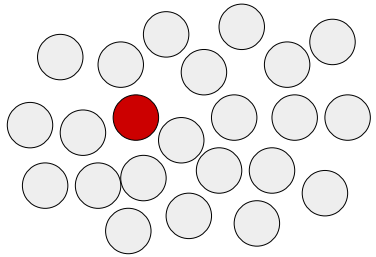
↓

How can it be prevented?

⇣

What else can go wrong?

A Safety-II perspective:



What happened? Has it happened before?

↓

Why did it work the other times?

↓

How can we make sure it works next time?

⇣

What else happens in the same way?

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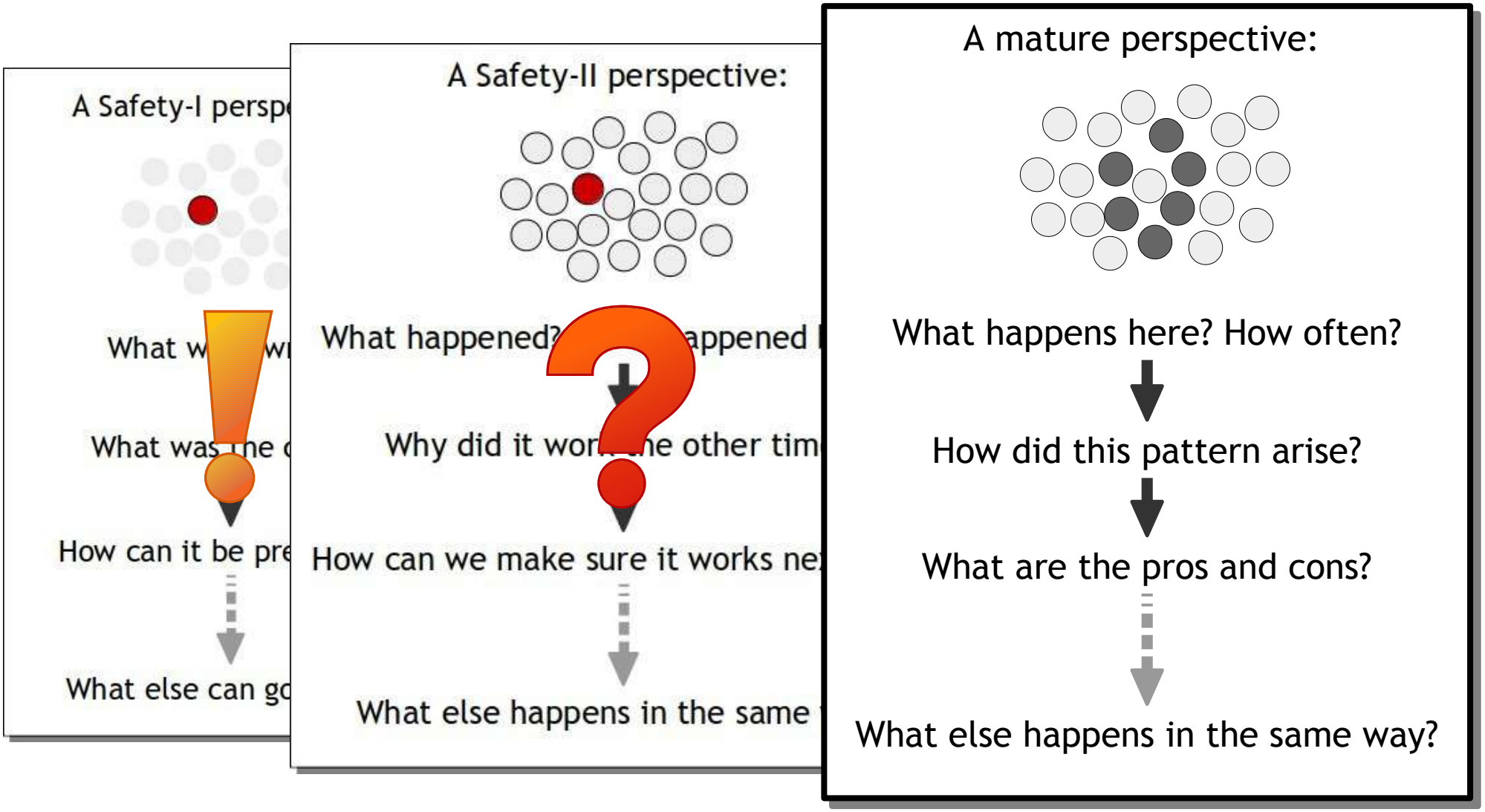
Different ways of looking



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Thank you for your attention

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