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

The safety focus should be accidents

Safety is the state in which the possibility of harm to persons or property damage is reduced to, and maintained at or below, an acceptable level through a continuing process of hazard identification and risk management.
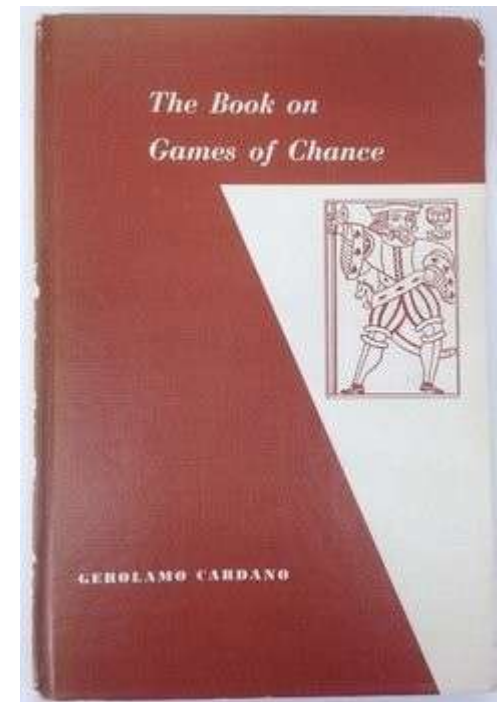
Foto: LARS NYBERG

Safety is the state of being "safe", the condition of being protected from harm or other non-desirable outcomes.

A need to be safe and to feel safe ...

At first, whatever happened was attributed to higher powers (gods, nature)

"Act of god?"

Alea iacta est

Black Death

The Book on Games of Chance

GEROLAMO CARDANO

Liber de ludo aleae
(Cardano, ca. 1564)

A need to be safe and to feel safe ...

Gradually adverse outcomes were seen as having <u>causes</u> – usually as technological failures.

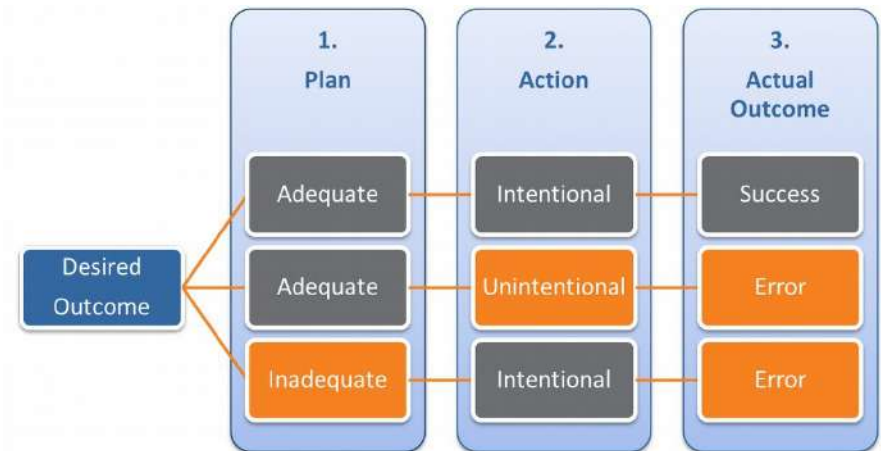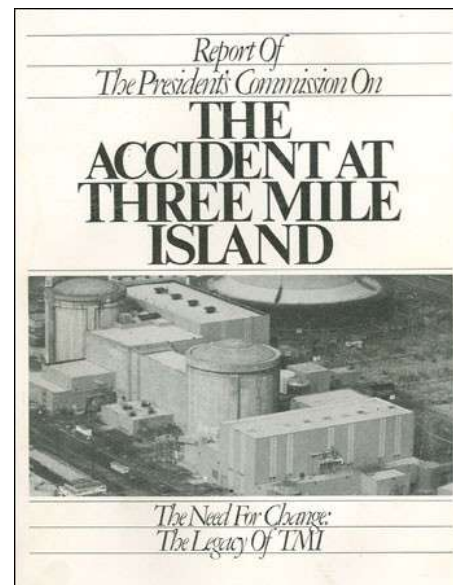Vasa (1628)
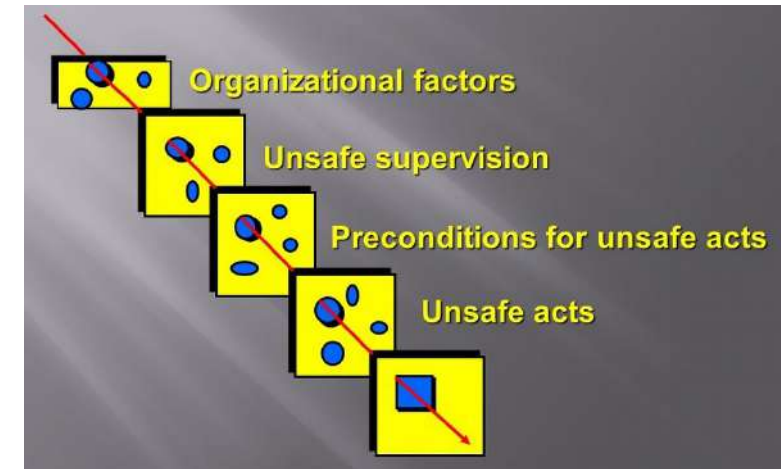
Meudon (F), May 8, 1849 (55 dead)

Technical failure!

A need to be safe and to feel safe ...

In the 1970s – especially after the TMI accident – accidents became linked to "human error" and human factors issues.

A need to be safe and to feel safe ...

In the late 1980s – following Chernobyl and Challenger – the search for causes turned to organisations and culture.

Organisational culture?

What You Look For Is What You Find

Looking back

What has gone wrong before, may go wrong again!

Look at all the things that went wrong in the past.
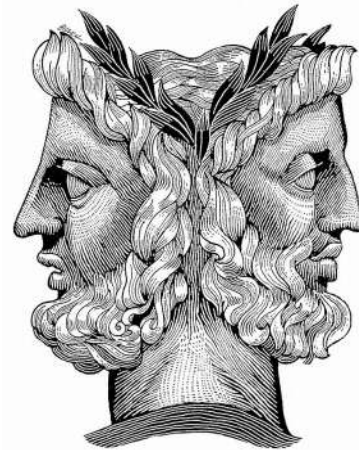
Deviations and violations
Non-compliance to guidelines
Errors and miscalculations
Noisy or confusing measurements
Inadequate ergonomic design
Organizational underspecification

When we look back, we tend to notice accidents and incidents — events that conflict with our intentions and expectations.

These events "prove" that our understanding was incomplete or incorrect. We therefore have to improve our understanding.
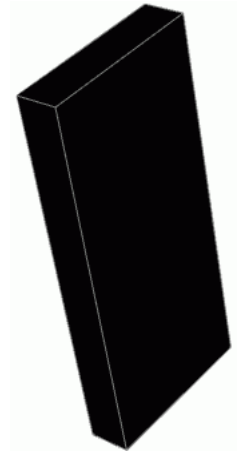
Preference for monolithic explanations

Humans prefer monolithic explanations that rely on a single concept or factor.

As social constructs, monolithic explanations are efficient (easily found and accepted) but lack in thoroughness and precision.

Monolithic explanations reinforce a linear, causal understanding of the world.

Monolithic causes:
- Technical failures
- Human error
- (Lack of) safety culture
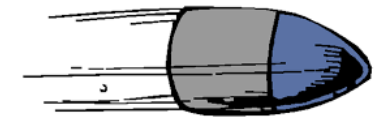- Deviations from norms
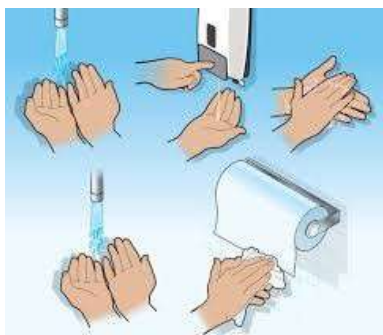- Brittleness
- …

Captain Hindsight

Monolithic solutions:
- Design, construction, maintenance
- Train, automate, redesign, simplify
- Improved safety culture
- Compliance
- Resilience
- …

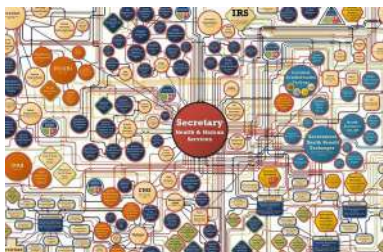**The Silver Bullet**

Problems and solutions must match

Simple problems   *may possibly (?) have*   Simple solutions

Complex problems   *always require*   Complex solutions

Disguising complex problems as simple problems by offering apparently "simple" solutions does not make the problems any simpler.

It only makes it more likely that the solution will not work.

Safety-I – when nothing goes wrong

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

Industry Accident Statistics 2001-2016
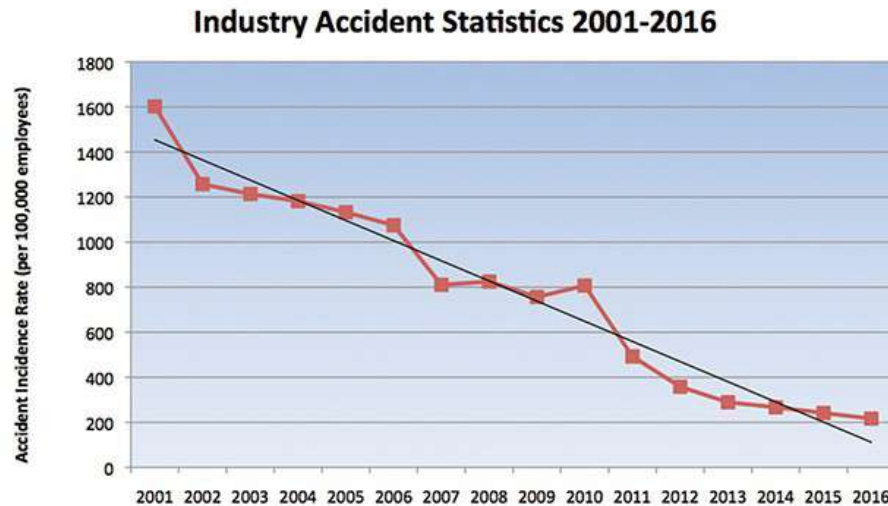
The premise for Safety-I is the need to understand why accidents happen.

Safety-I is defined by its opposite – by the lack of safety (accidents, incidents, risks).

How can we improve safety by studying situations where there is a lack of safety?

Safety-I: Avoid unwanted outcomes

Safety is the condition of being <u>without</u> harm or other non-desirable outcomes.

Negative outcomes are caused by failures and malfunctions.

↓
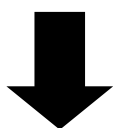
Find and eliminate causes of accidents and incidents
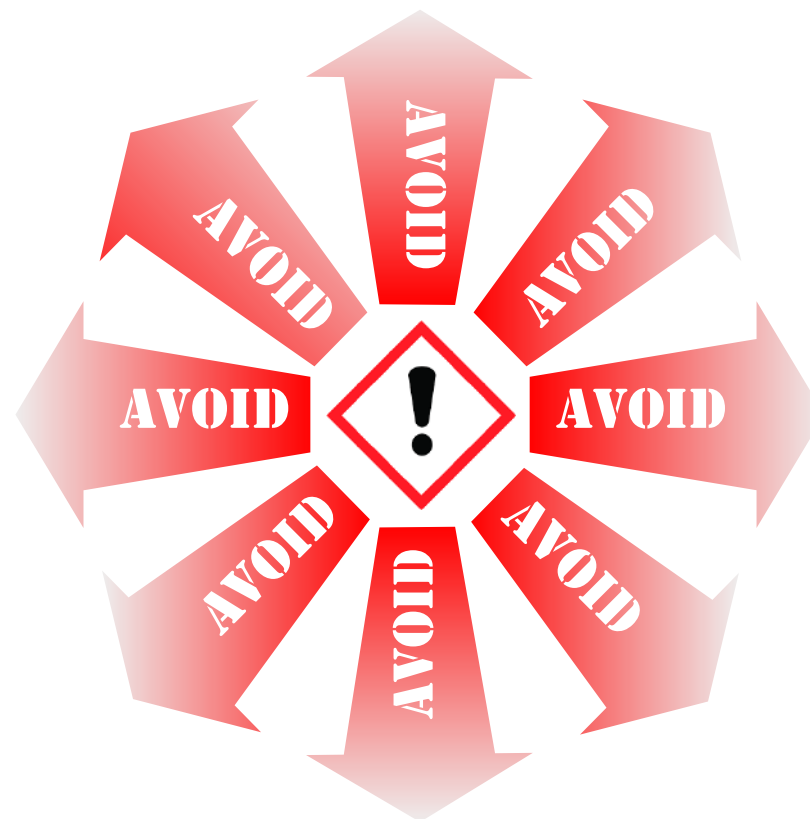
If you want to avoid or get away from something, then any direction you take will work!

Safety is managed by snapshots

Positive

Negative

Time

Presence of safety

Limit of unacceptable performance

Absence of safety

Harmful events attract attention. But they are rare and isolated.

Events are analysed step-by-step. Prevention/responses are developed for each problem found.

How can we learn about safety?

Is it possible to understand what a happy marriage is by analysing and learning from divorces alone?

Analogy suggested by Marit de Vos

Is it possible to understand what safety is by analysing and learning from accidents and incidents alone?

The focus should <u>NOT</u> be accidents!

Safety is defined and measured more by its **absence** than by its presence.
Reason, J. (2000). Safety paradoxes and safety culture. Injury Control & Safety Promotion, 7(1), 3-14.

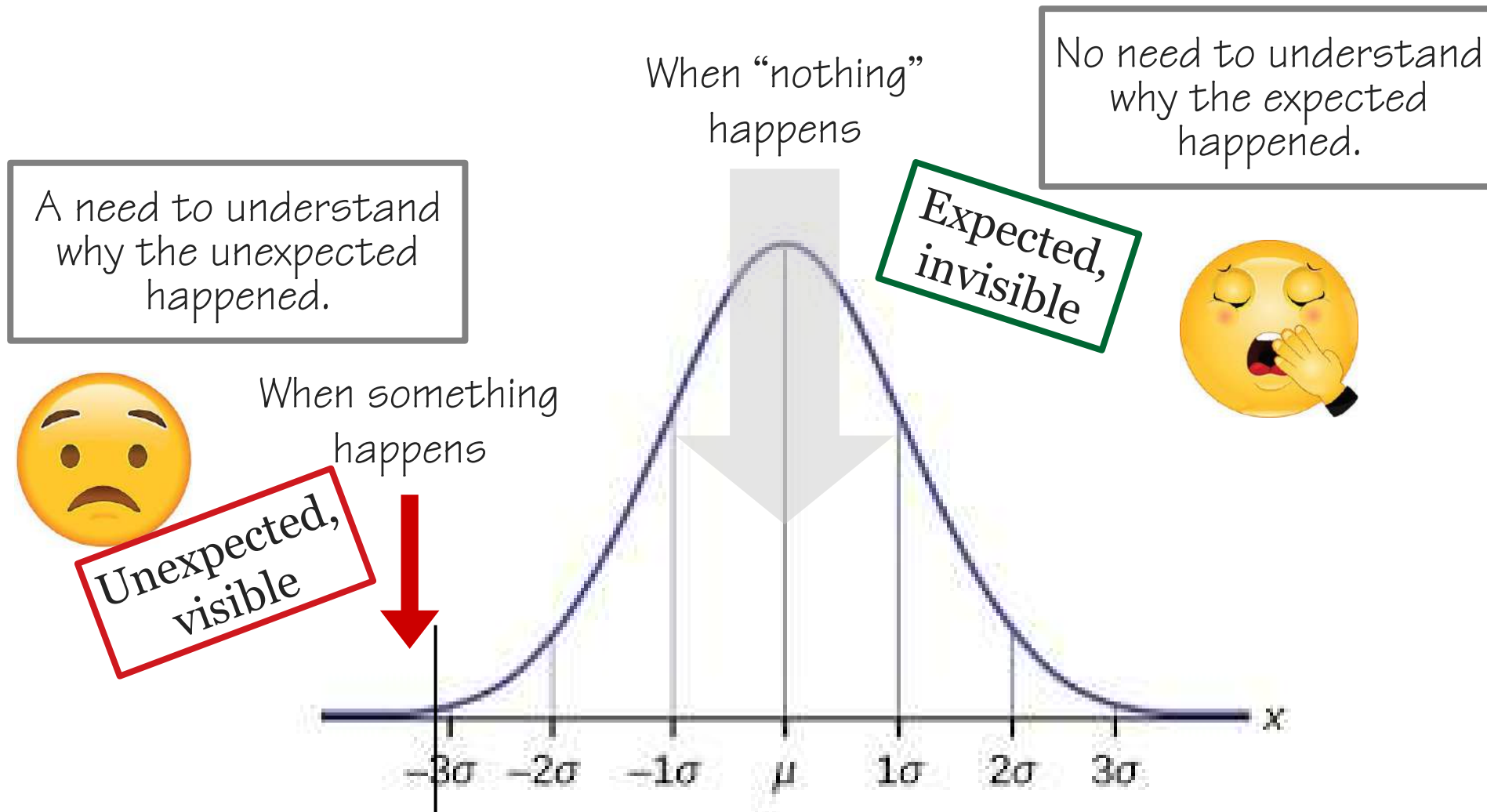Reliability is a dynamic **non-event** … it is an ongoing condition in which problems are momentarily under control due to compensating changes …
Weick, K. E. 1987. Organizational culture as a source of high reliability. California Management Review 29 (2), 112-128.

Non-events are "invisible" because they happen all the time. People get used to something that happens all the time and therefore stop paying attention to it.

Explaining what happens and how

When "nothing" happens

No need to understand why the expected happened.

A need to understand why the unexpected happened.

Expected, invisible

When something happens

Unexpected, visible

−3σ −2σ −1σ μ 1σ 2σ 3σ x

Habituation

When you get so used to something that you no longer notice it.

" … a form of learning in which an organism decreases or ceases its responses to a stimulus after repeated or prolonged presentations."

Crows present in corn field   Introduction of scarecrow   Prolonged exposure to scarecrow

The chair you sit in now.

The clothes that you wear.

Background noises (ventilation, traffic, office sounds, waves, etc.)

Things on the route that you drive every day.

Things that happen regularly.

Work that goes well – as expected.

Life is full of expected events

Every day, from morning to night,

practically everything we do

works just as it should ...

... and we take it for granted

Why does work usually go well?

Availability of resources (time, manpower, materials, information, etc.) may be limited and uncertain.

↓

People adjust what they do to match the situation.

Performance adjustments are inevitable, ubiquitous, and necessary.

↓

Because of resource limitations, performance adjustments will always be approximate.

Performance adjustments are the reason why things usually go well. 🙂

Same process - Different outcomes 🙁

Performance adjustments are the reason why things sometimes go wrong.
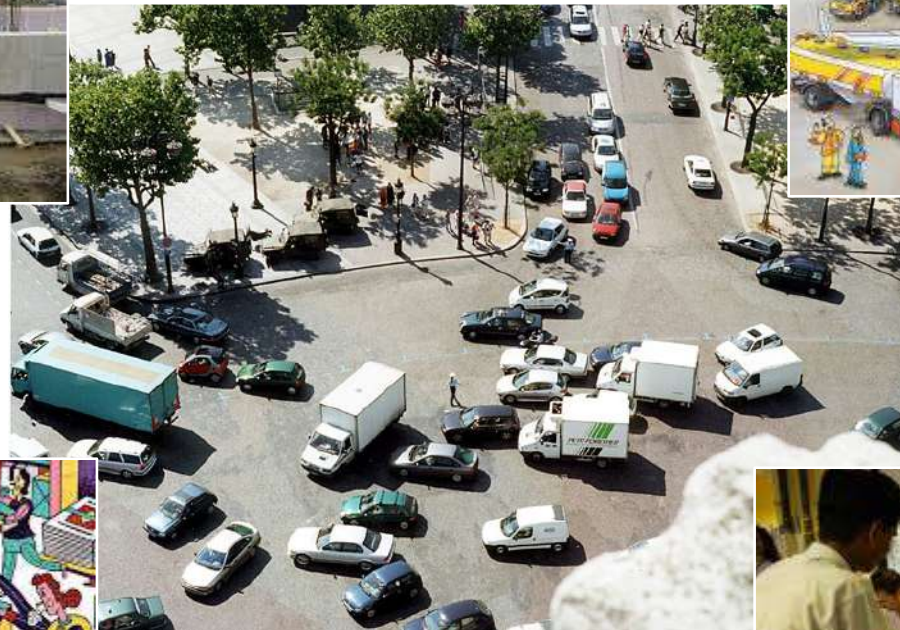
The four systemic potentials

To respond in a flexible way

To monitor what goes on

To learn what works and what doesn't

To anticipate - looking ahead

What You Look For Is What You Find

Looking back

Looking ahead

Look at all the things that went well in the past.

How can make sure they go well in the future?

When we look back we should look at <u>everything</u> that happens, and especially look at what went well.

The future is NOT a "mirror" image of the past.

The future has never happened before. It involves a combination of known performance variability that usually is seen as irrelevant for safety.

Can we explain why things go well?

We have few ways of explaining how and why things go well!

To manage safety we must know what happens when "nothing" happens.

Outcome value

Positive

Negative

Presence of safety

Time

Limit of unacceptable performance

We have many ways of explaining how and why things go wrong.

Safety II – when things go well

Safety is a condition where the number of successful outcomes (meaning everyday work) is as high as possible. It is the ability to succeed under varying conditions.

Safety concerns should be directed at everyday events, at that which happens when "nothing" happens, when work just goes as it should.
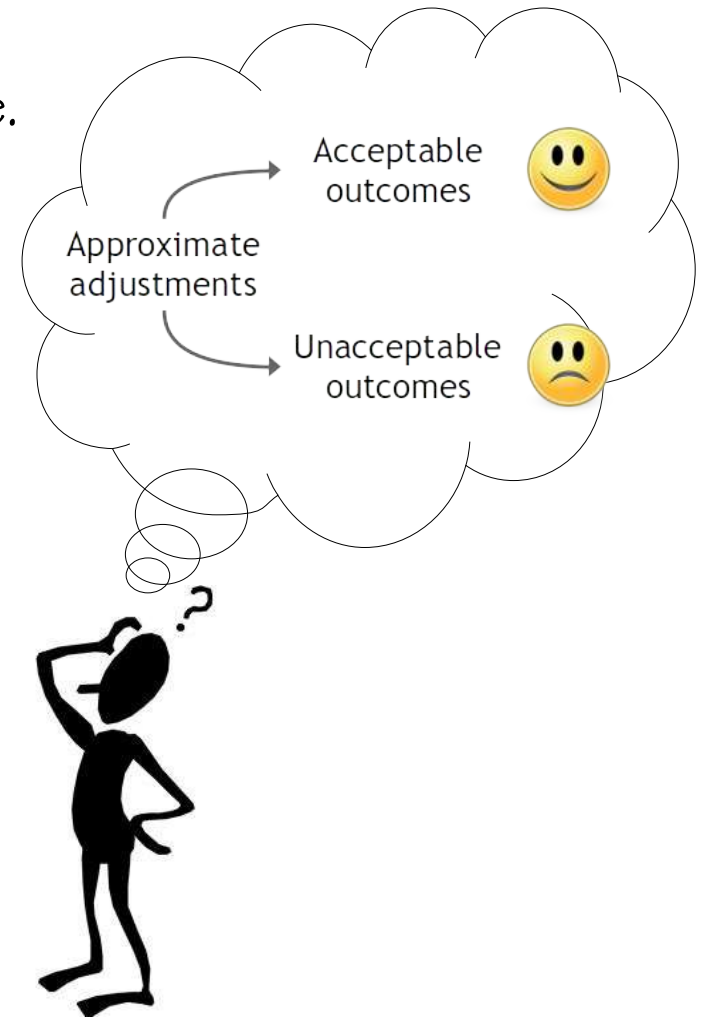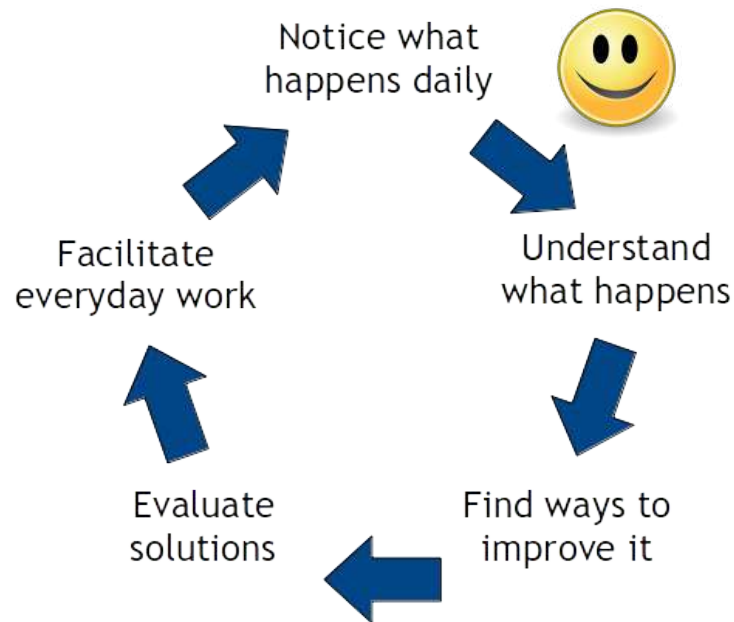
Managing Safety-I

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 <u>found</u> and <u>treated</u> (rational deduction).

(3) All accidents are therefore preventable (zero harm principle).

We are safe if there is as <u>little</u> as possible of this

Prevent, eliminate, constrain. Safety, quality, etc. are different and require different measures and methods.

Managing Safety-II

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

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

Support, augment, facilitate. Safety, quality, etc. are inseparable and need matching measures and methods.

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.

Thank you for your attention

どうもありがとうございました