

The background features a large, semi-transparent watermark of the International Civil Aviation Organization (ICAO) logo. The logo consists of a globe with latitude and longitude lines, surrounded by a laurel wreath. The acronym 'ICAO' is visible at the top of the watermark.

Human Factors and Safety Management: The Role of the Regulator

Captain Dan Maurino

**Flight Safety and Human Factors - ICAO
14th Annual FAA/CAA/TC Human Factors
in Aviation Maintenance Symposium
Vancouver, BC
28-30 March 2000**

Raising the flight level

*“To remain successful, we must **challenge the status quo**, refine existing practices, **adopt new best practices**, focus on where we want to be in the next five years and **what strategies** we need to embrace to get there”*

Art LaFlamme

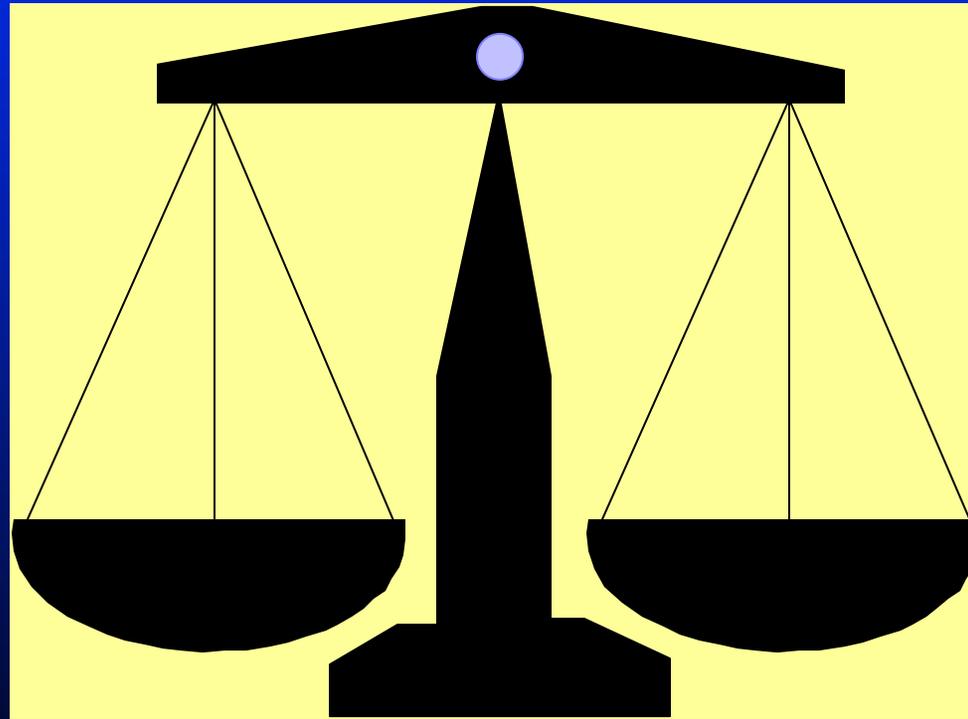
*Director General, Civil Aviation
Transport Canada*

Two Fundamental Strategies

- Countermeasures to *operational* errors
 - ⇒ *human error* **does not** cause accidents
- Risk and *deviation* management
 - ⇒ “*more of the same*” will not be enough

Operational Behaviours

A balance *compromise*

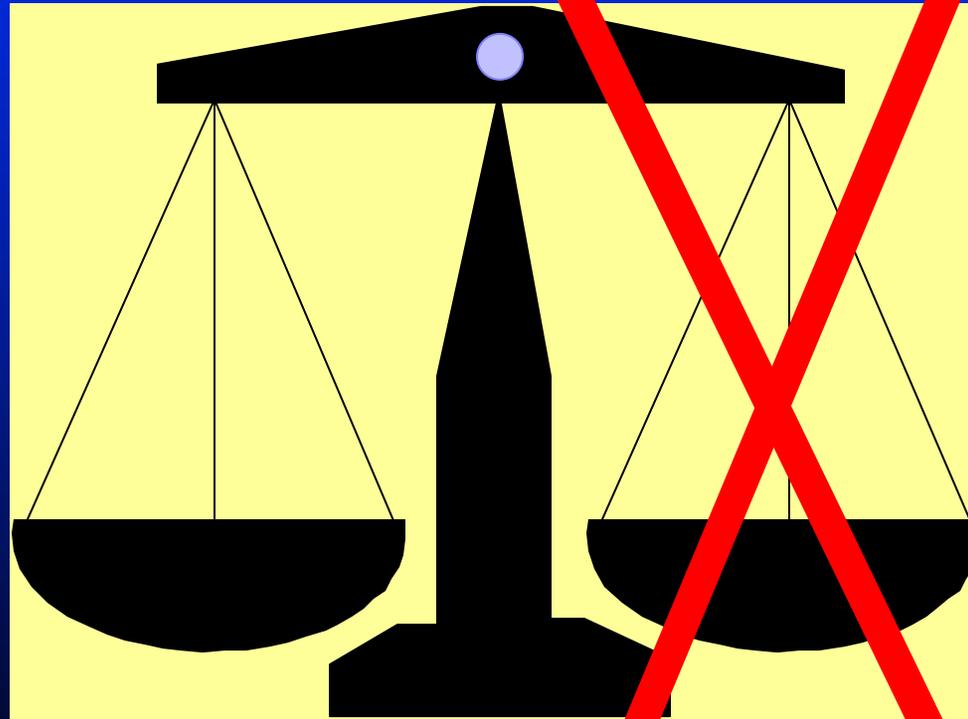


safety

production

Training Behaviours

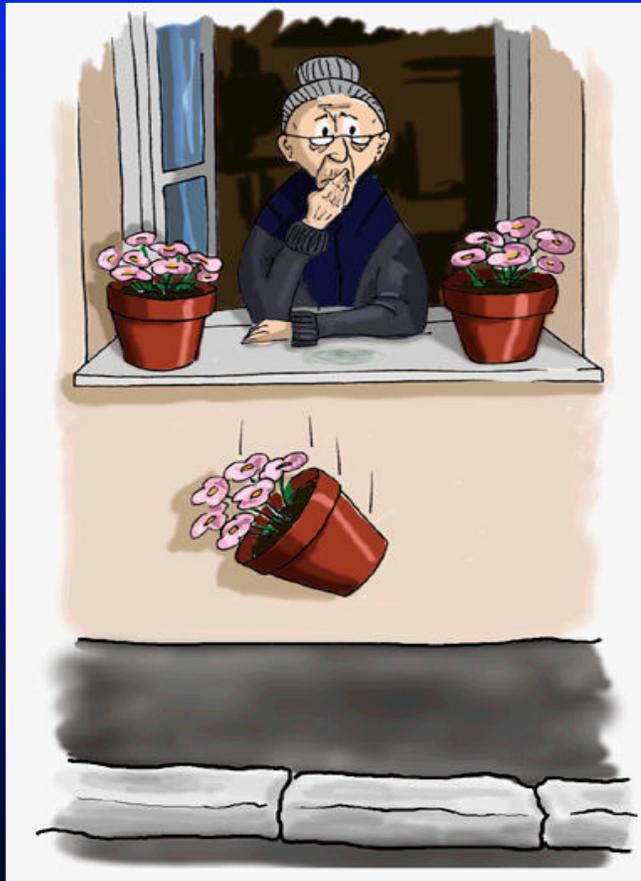
Going “by the book”



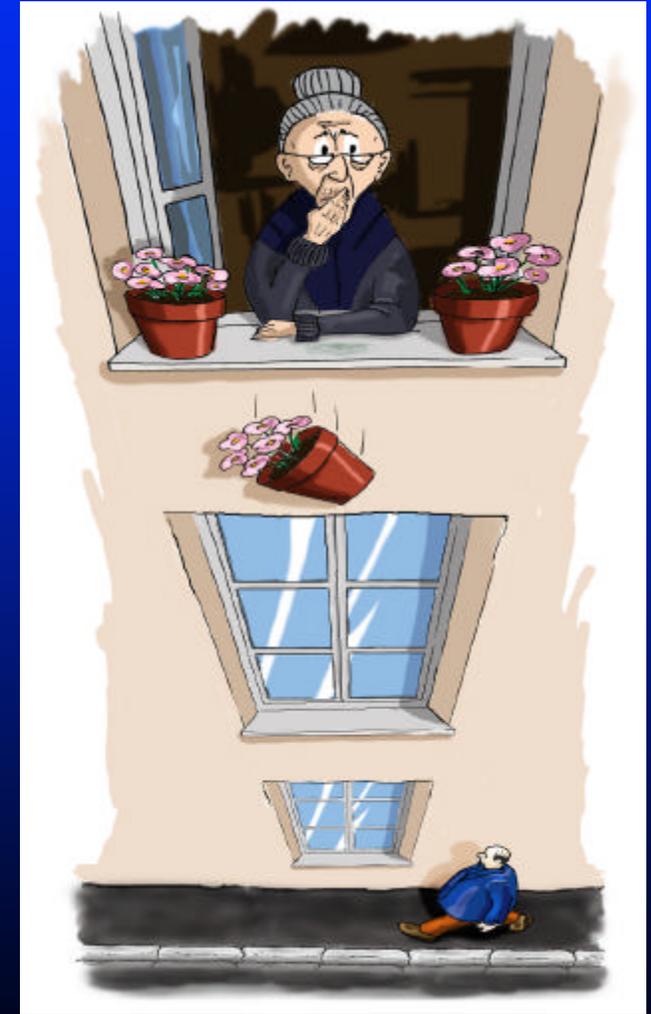
safety

production

Errors & Accidents\Incidents



Causes and consequences
have no
symmetry in
their
magnitude



Understanding Operational Errors

error



deviation



amplification of the deviation



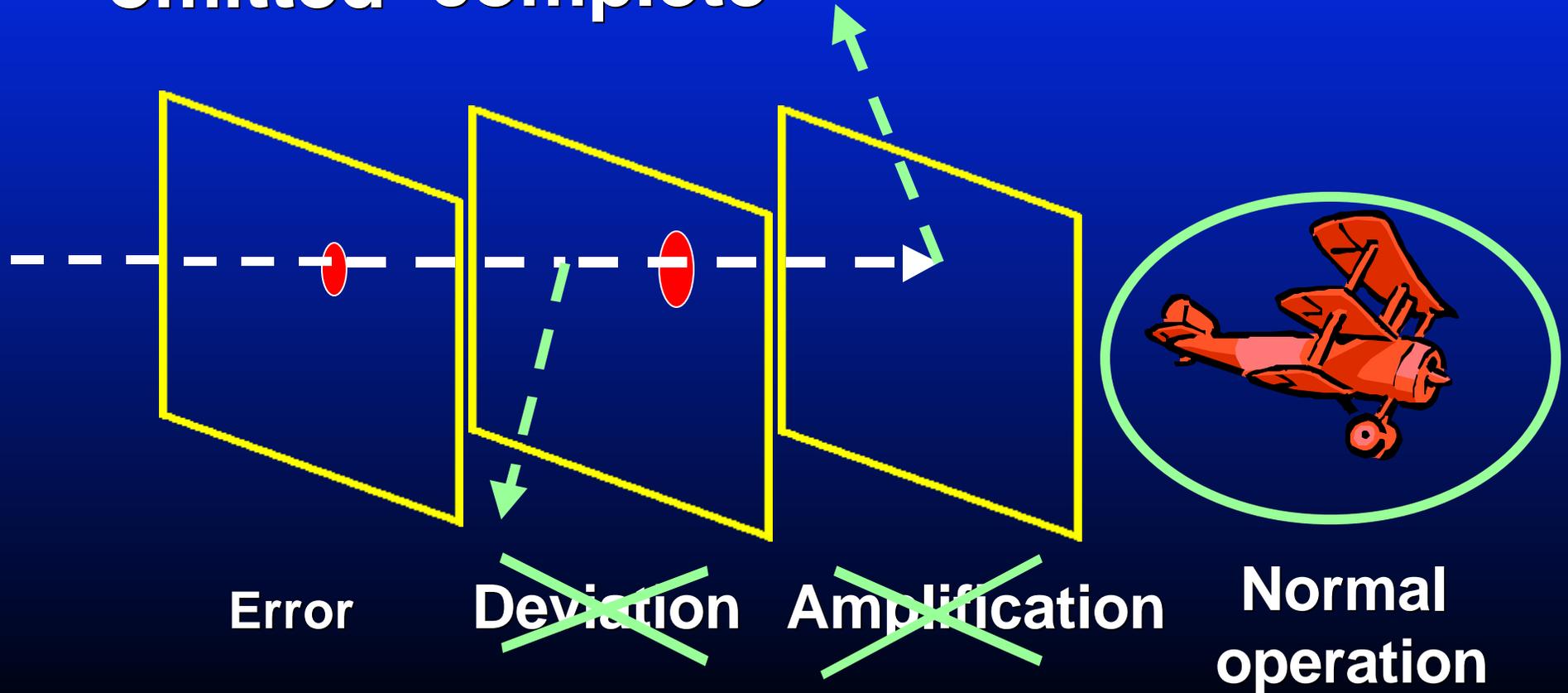
system degradation/breakdown

Errors as They Relate to Safety

Flaps
omitted

Checklist
complete

Warning

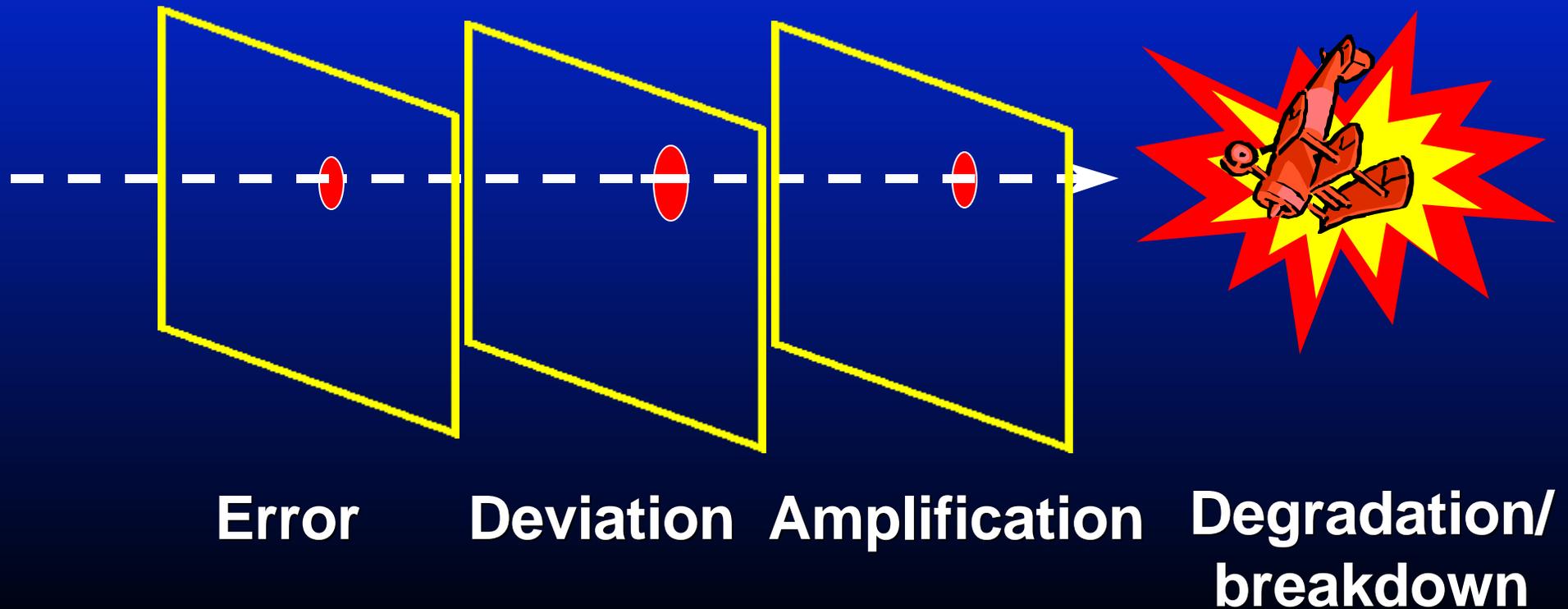


Errors as They Relate to Safety

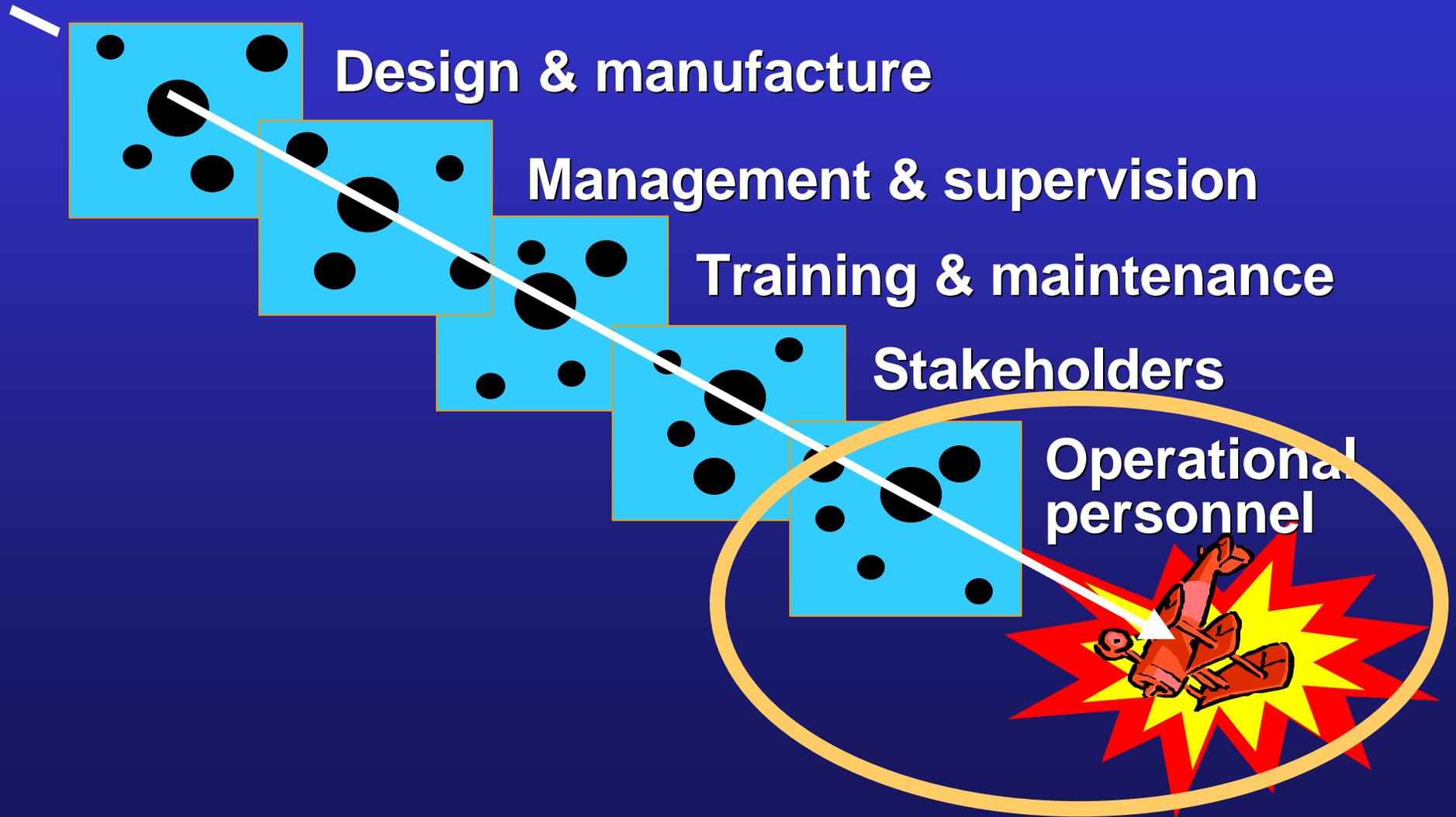
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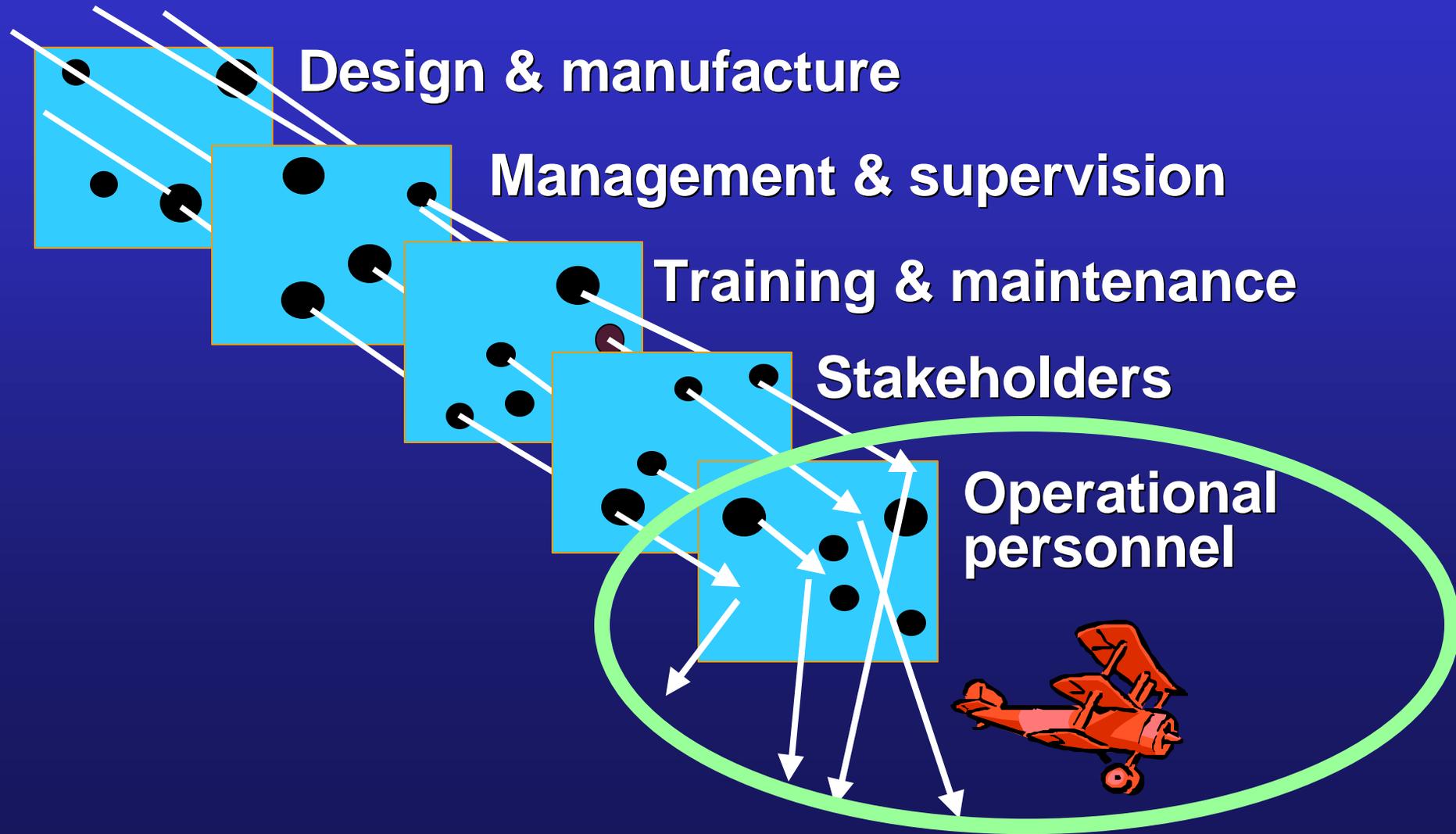
No
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The Data on Error We Collect



The Data on Error We Must Collect



Line Operations Safety Audit (LOSA)

(500 segments, four large carriers)

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(500 segments, four large carriers)

Segments with observed errors -- 74%

Segments with 1 error	24%
Segments with 2 errors	20%
Segments with 3 errors	10%
Segments with 4 errors	8%
Segments with 5 or more errors	12%

Average number of errors per flight -- 2.0

Automation-related errors -- 31%

Operational Errors and Safety

Outcome type	% of all errors
Without consequences	85%
Undesired state	12%
Additional error	3%

Why Monitor Normal Operations

- Operational personnel develop error management skills
- Understand these skills to support
 - ⇒ design
 - ⇒ training
 - ⇒ procedures

Why Monitor Normal Operations

The “big picture” of operational errors is poorly understood

- *We don't need*

- ⇒ more accident/incident reports

- ⇒ more edicts/motivational posters

- *We need*

- ⇒ data on error(s) within the context of specific operational environments

The Problem: Our Culture

- ⇒ ***Confidential*** reporting systems
- ⇒ **Severe** protections to FOQA/QAR
- ⇒ **Presidential** protection to ASAP
- ⇒ **Suspensions/revocations/sacking**
- ⇒ **Remedial training**
- ⇒ **Accident investigation**
- ⇒ **Media (*CVR on NBC*)**
- ⇒ **Criminal liability**
- ⇒ **ICAO Safety Oversight Assessment**

A Safety Culture?

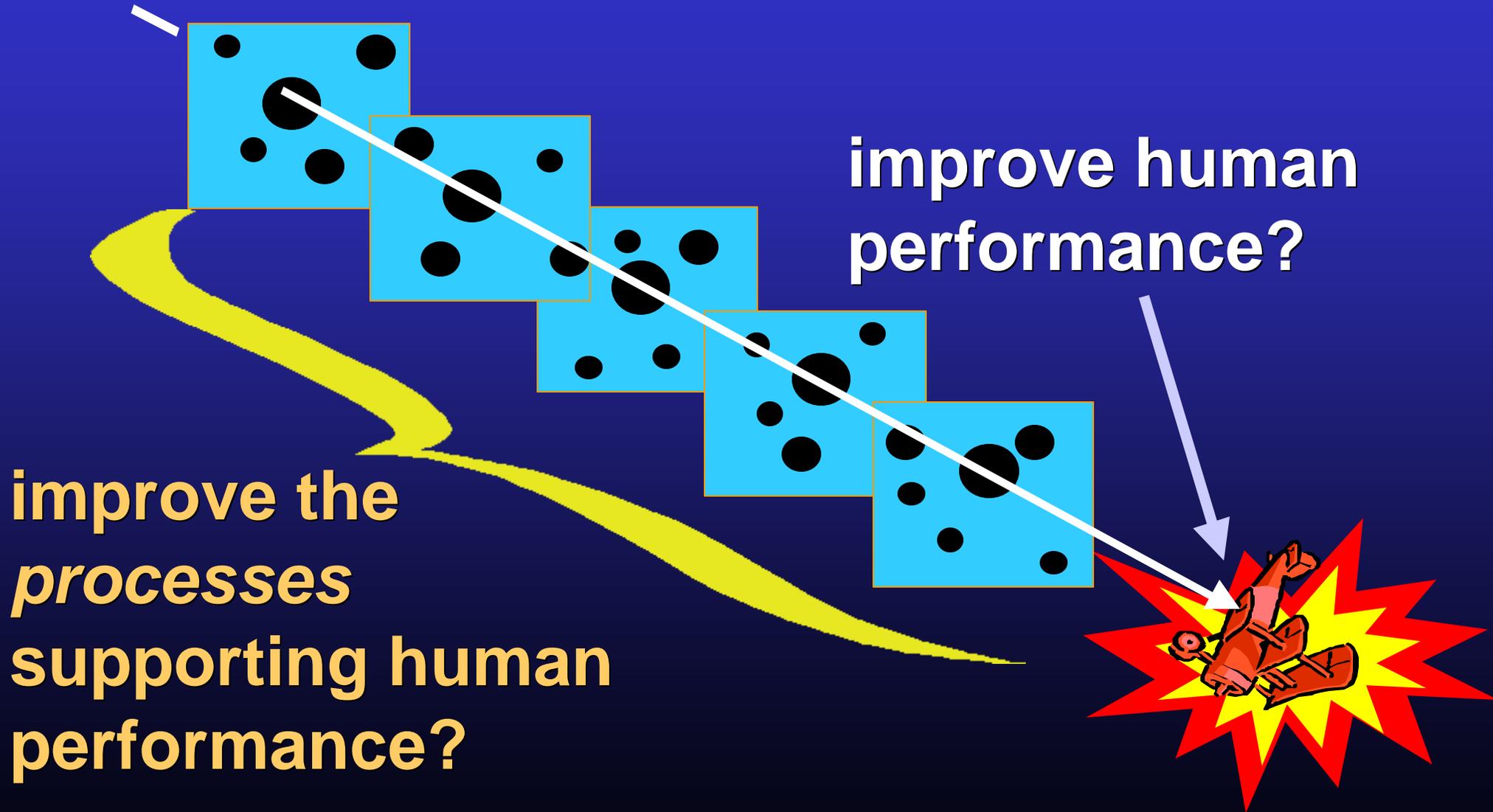
What would happen if we remove regulation?

⇒ Utopian ideals

⇒ Hopes of safe and efficient individual and system behaviours

↳ *A clear role for the Regulator*

More of the Same will not Be Enough



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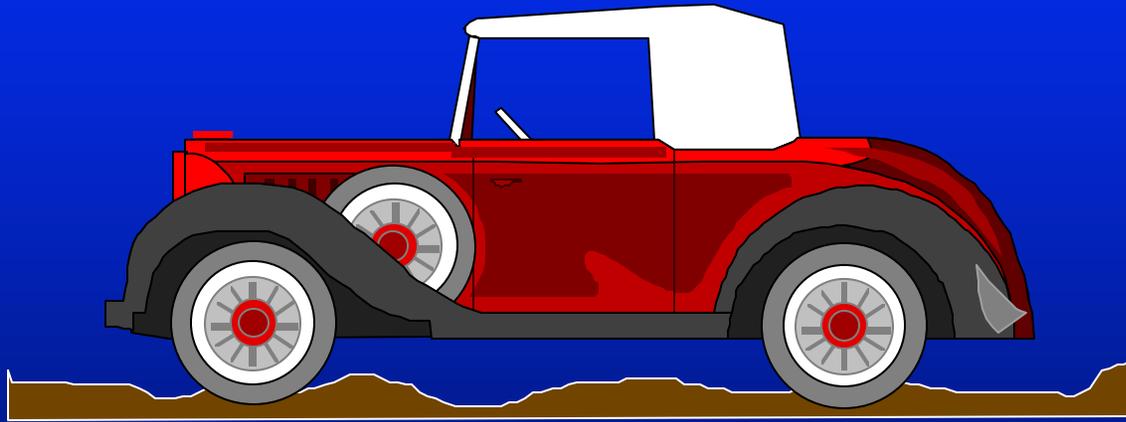
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Risk & Deviation Management

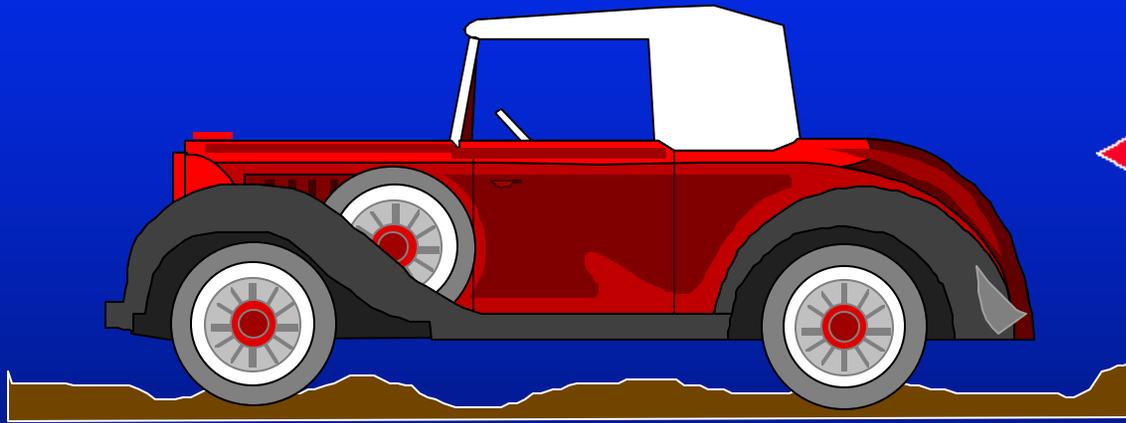
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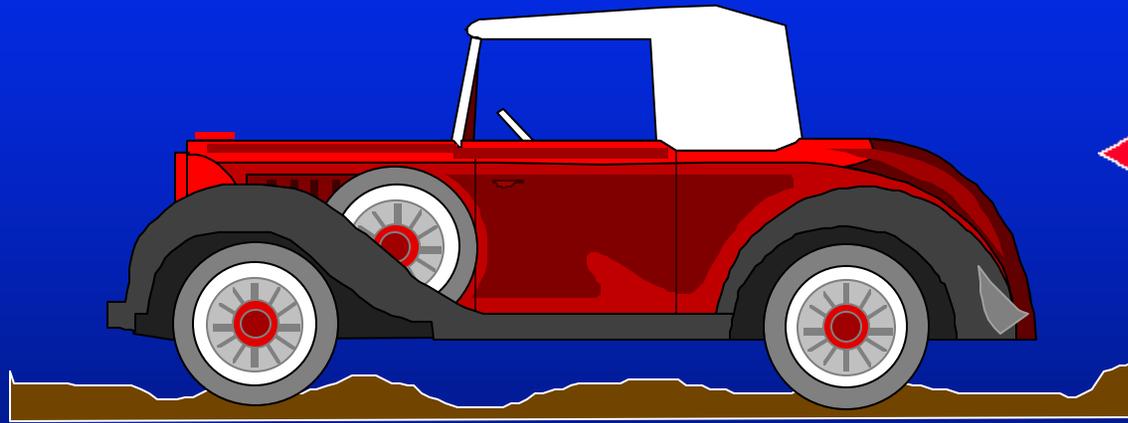
Risk & Deviation Management



Rigid frame

Normative safety

Risk & Deviation Management



Rigid frame

Normative safety

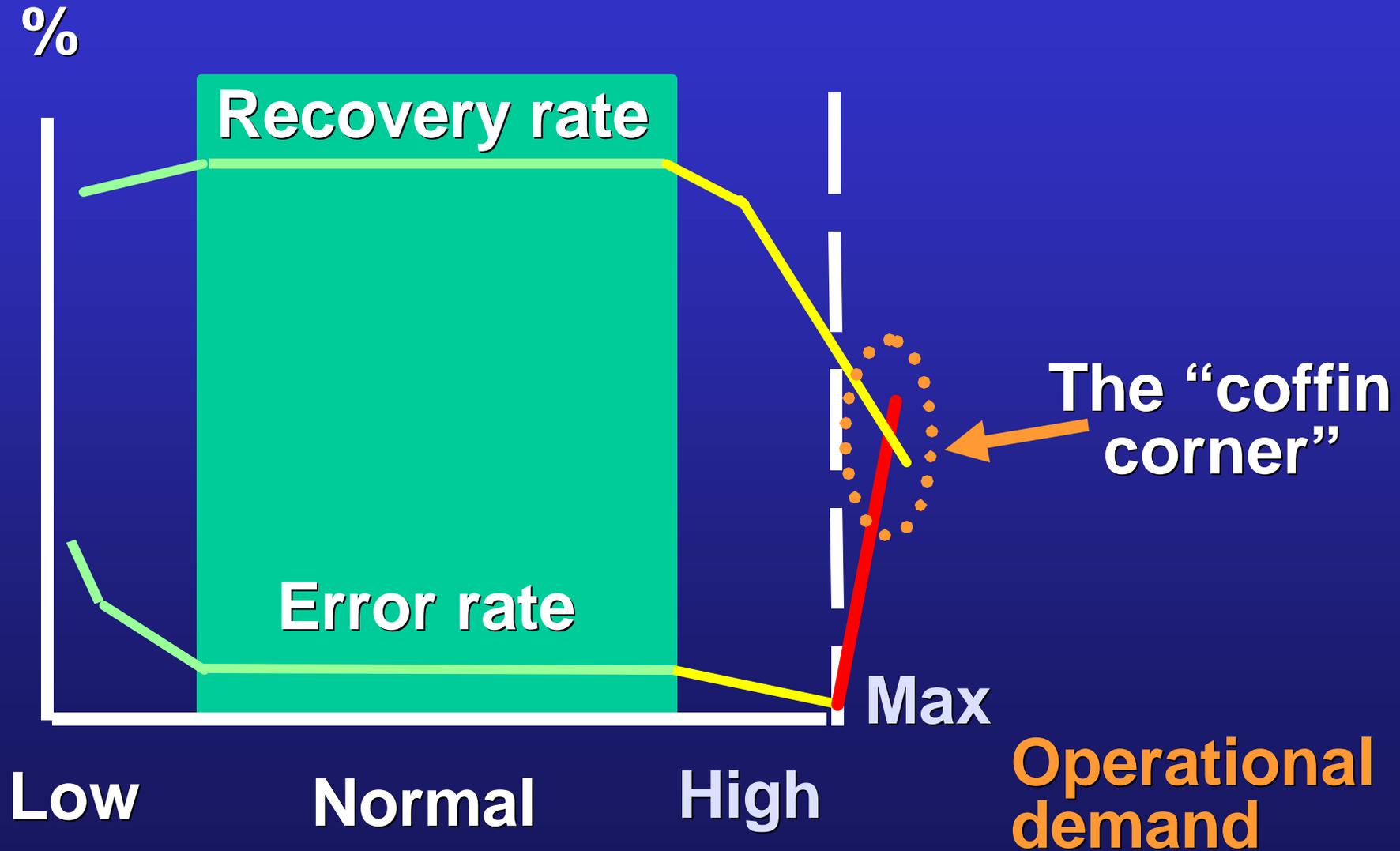


Flexible links
with dampers



Generative safety

Risk & Deviations: Defining the Box



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 - ⇒ *what do people do after they commit errors*
 - ⇒ *what should they do after they commit errors*

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- Think about the *spirit* rather than the *letter* of the law
- Foster a cultural shift
 - ⇒ *what do people do after they commit errors*
 - ⇒ *what should they do after they commit errors*
- Stop the beatings (morale won't improve)