Some side-effects of change

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What is the problem?

Let's implement regulation A

I know I can't foresee all possible consequences

I don't know which possible consequences I can't foresee

Change

Uncertainty

Unawareness
What is the problem?

Let's implement regulation A  \[ \text{Change} \]

I know I can't foresee all possible consequences  \[ \text{Uncertainty} \]

I don't know which possible consequences I can't foresee  \[ \text{Unawareness} \]

"Experience is something you don't get until just after you need it"
Safety compliance
vs.
Safety performance
Safety compliance

You can't fight it. It is mandatory. * 

A
If you are non-compliant and nothing happens, you're fine

Trouble begins with liability

B
In case of accident at work or occupational disease

* Is there an inexcusable mistake?*

* Is there evidence of non-compliance after an audit* 

* Well, sort of
Safety regulations aim at guaranteeing safety

Oh yeah?
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Oh yeah?

Lawyers don't know a thing about work...

...and laws hardly ever get a test period.
Safety regulations aim at guaranteeing safety

Oh yeah?

Lawyers don't know a thing about work...

...and laws hardly ever get a test period.

- For what type work situation?
- Causing what type of constraints?
- Causing what type of possible workarounds?
- ...
Safety regulations aim at guaranteeing safety

Oh yeah?

Lawyers don't know a thing about work...

...and laws hardly ever get a test period.

- For what type work situation?
- Causing what type of constraints?
- Causing what type of possible workarounds?
- ...
Myth: Compliance = Safety

Compliance to regulations does not imply safety performance

- Safety performance implies that the consequences of compliance on work be analysed
- If you do not know where the side impacts of compliance are, you won't be any safer
- Blind compliance can have detrimental effects on safety

Possible effects: risk shifting
Regulation-related examples of risk shifting
Anoxia

Origin

- Air can enable explosions
- Need to ensure safe operations on pipes

Change

- Neutralise pipes with nitrogen

Consequence

- Risk of anoxia for operators in the vivinity of neutralised pipes
External contamination

Origin

- Ensuring a high level of protection in contaminated nuclear environments

Change

- Introduce a pressurised outfit

Consequences

- Operators expose themselves to contamination by contact when the outfit is removed
Working around protection covers

Origin

- Prevent tools or shavings from being ejected from the lathe

Change

- Fit a cover on lathe

Consequences

- Operator works around the cover with even less visibility than before
People being hit on airport tarmacs

Origin

- Diminish the environmental impact of ground operations

Change

- Replace thermic engines of airport tractors with electric engines

Consequences

- Increase in nb of ground operators being hit
More examples of risk shifting
Longer passwords are not safer

**Origin**

- Assumption that longer passwords are safer

**Change**

- Increase the length of passwords

**Consequences**

- Passwords are no longer remembered, and therefore get written down
ABS introduces risks

**Origin**

- Preventing wheels from locking during heavy braking episodes

**Change**

- Fitting half a taxi fleet with ABS

**Consequences**

- Taxis fitted with ABS drive faster in bends, closer to the car in front and... have more accidents

Swapping brake and gear

Origin

• Comply to brake and gear selector positions across Europe

Change

• Move foot brake to the right and gear selector to the left

Consequences

• unknown :-(

See Cacitti & Besnard on negative transfer
safety / compliance  alignment with the market  IT security  technology
safety / compliance
Ergonomics and law do not talk much to each other whereas their interests overlap.

Accident prevention seems to only care about the technical solutions to deploy in order to comply to regulations.
So what?
# Change and complexity

<table>
<thead>
<tr>
<th>Origin of change</th>
<th>Nature of change</th>
<th>Conseq of change</th>
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</thead>
<tbody>
<tr>
<td>Safety</td>
<td>New procedure</td>
<td>Task more difficult</td>
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<tr>
<td>Security</td>
<td>New physical layout</td>
<td>Task takes longer</td>
</tr>
<tr>
<td>Environment</td>
<td>New environment</td>
<td>I can go faster</td>
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<tr>
<td>Market alignment</td>
<td>New operating mode</td>
<td>I can't hear a thing</td>
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<tr>
<td>Productivity</td>
<td>New equipment</td>
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Change and complexity

Origin of change

- Safety
- Security
- Environment
- Market alignment
- Productivity

Nature of change

- New procedure
- New physical layout
- New environment
- New operating mode
- New equipment

Conseq of change

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Change and complexity

Numbers of unexpected consequences

Complexity
Conclusion
A few messages...

- Safety compliance is mandatory
- ...but compliance does not imply higher safety
- Blind compliance causes risks to shift
  - Analyse work **before** you change anything
- Difficulty of change monitoring might be amplified by complexity
  - Safety compliance is only one aspect of it