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Going solid & flirting with the margin

Presentation for
 "Managing safely the Boundaries of Operations"
 ANSP CEO'S Safety Conference
 EUROCONTROL
 Split, Croatia, 11 June 2015

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Conclusions

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1. Safety is dynamic. Production pressure constantly pushes operations towards the edge of failure.
2. Low accident frequency encourages *flirting with the margin*.
3. *Going solid* (dynamic tight coupling) makes the operating point movements large.
4. The second story: operators work to prevent the system from going solid.
5. Future safety work will explore second stories.

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Disclaimer, COI

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1. Views expressed are those of the speaker alone. They are not endorsed by Eurocontrol or any ANSP.
2. Conflicts of interest.
 - Travel costs and honorarium for this conference provided by Eurocontrol.
 - Travel costs and honorarium as visiting professor at Deutsche Flugsicherung on several occasions.
3. The speaker is **not** an ATC expert.
 (The mileage you get may vary.)

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Always at the Edge of Failure

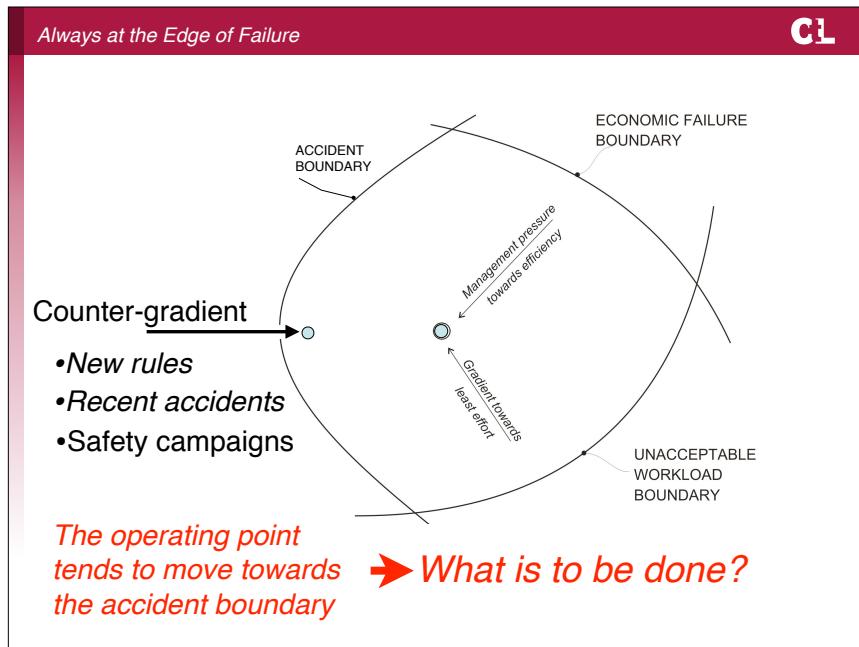
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...we are talking about a law of systems development which is: *every system always operates at its capacity*. As soon as there is some improvement, some new technology, we stretch it...

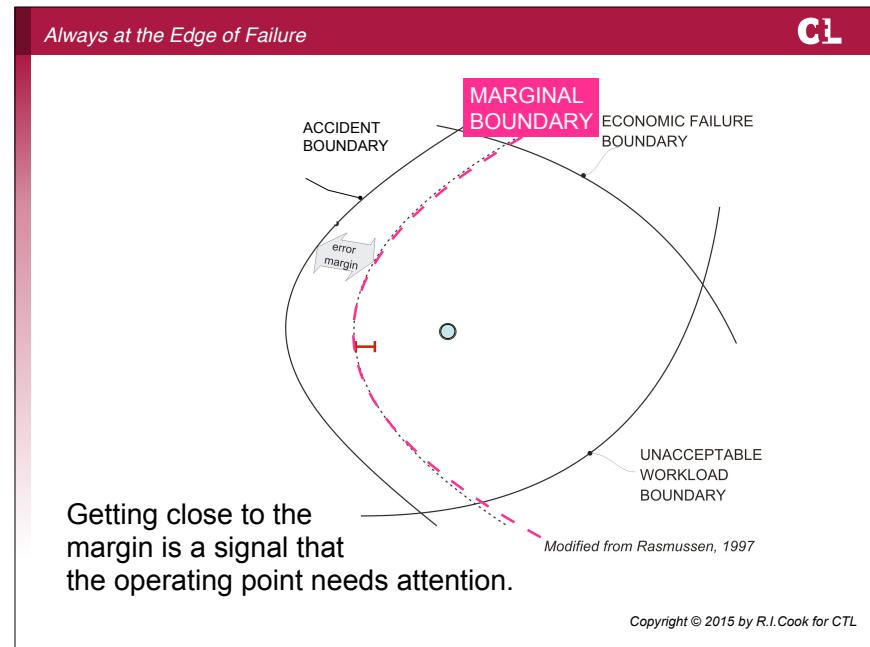
Larry Hirschhorn
 quoted in Cook & Woods,
 A Tale of Two Stories, 1997.

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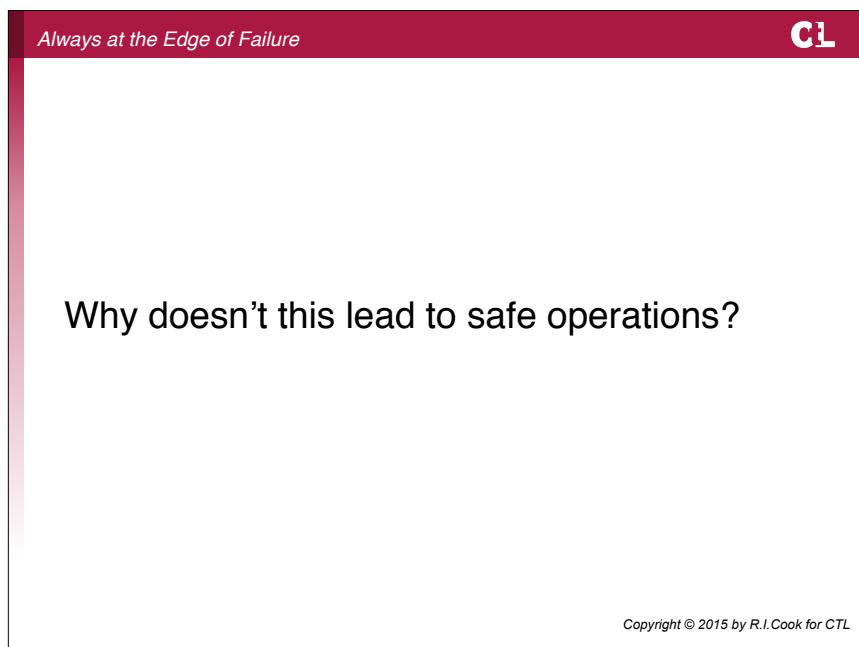
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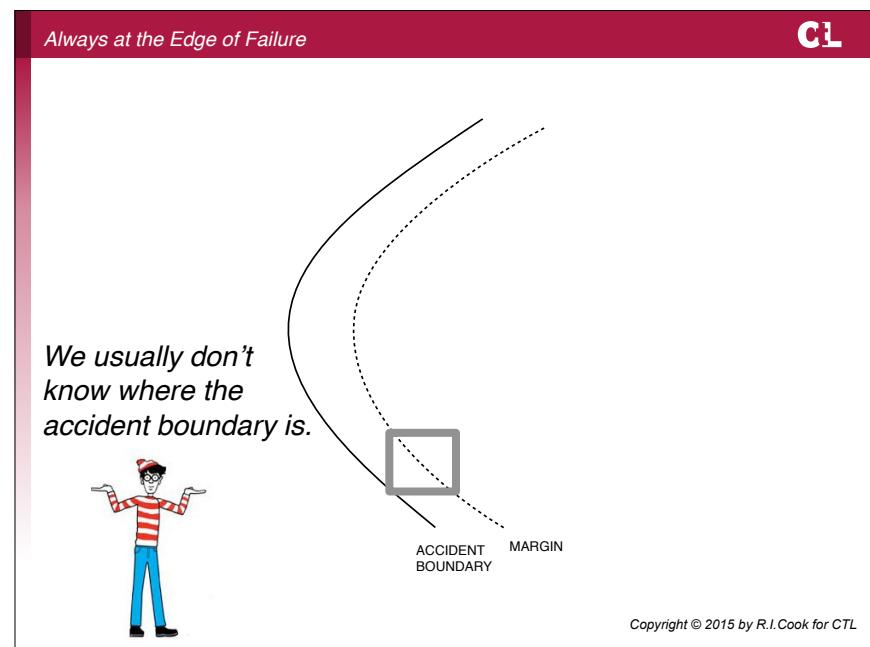
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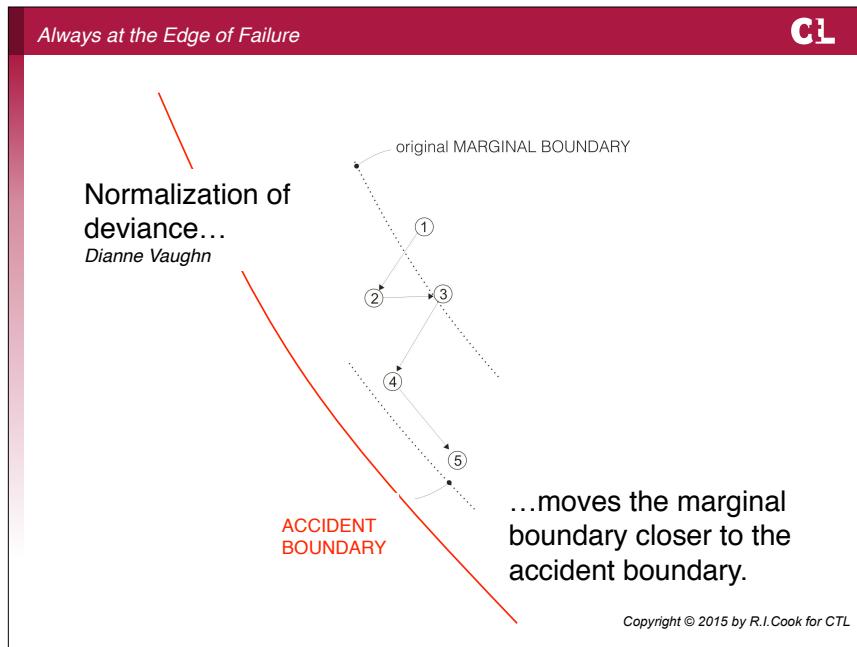
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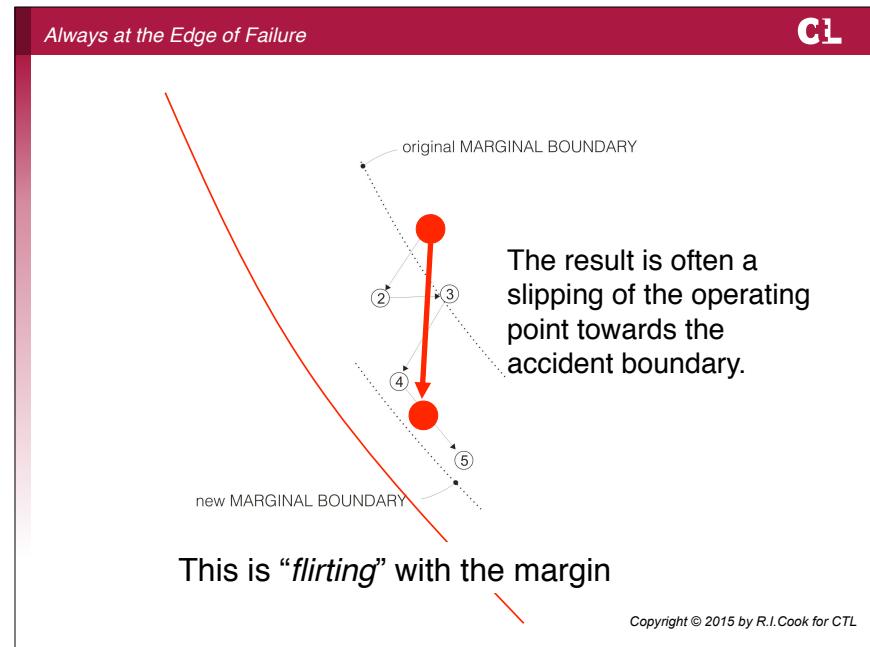
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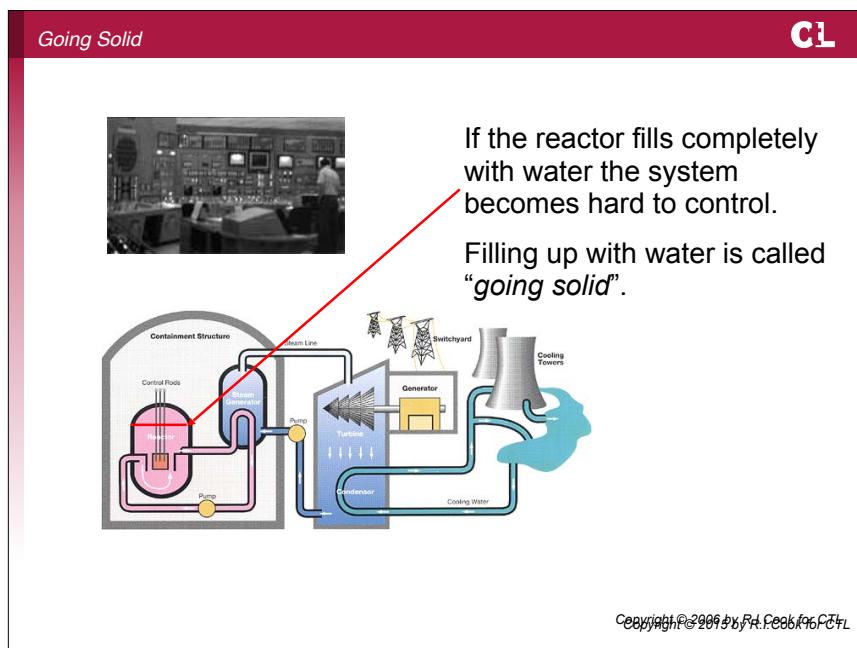
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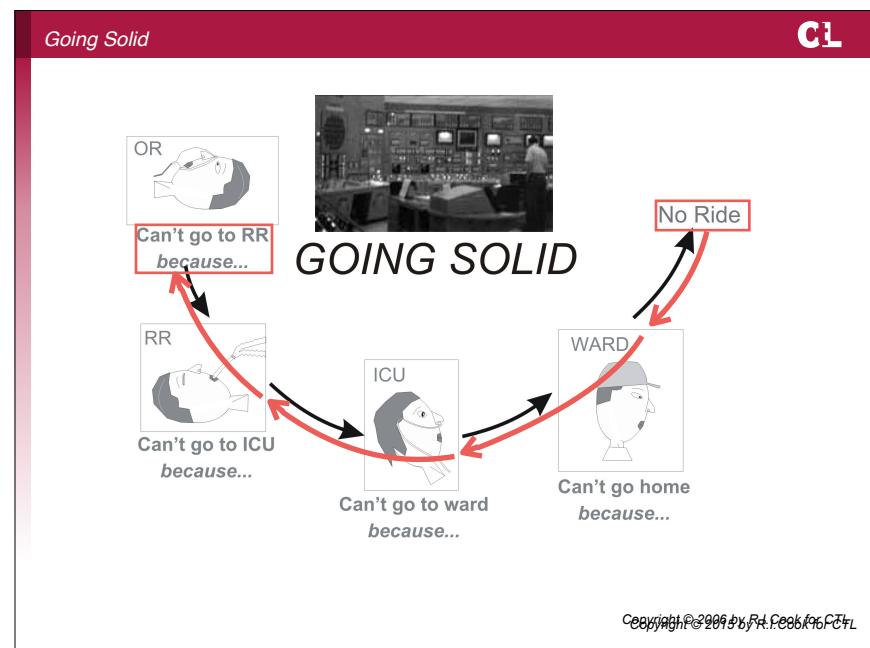
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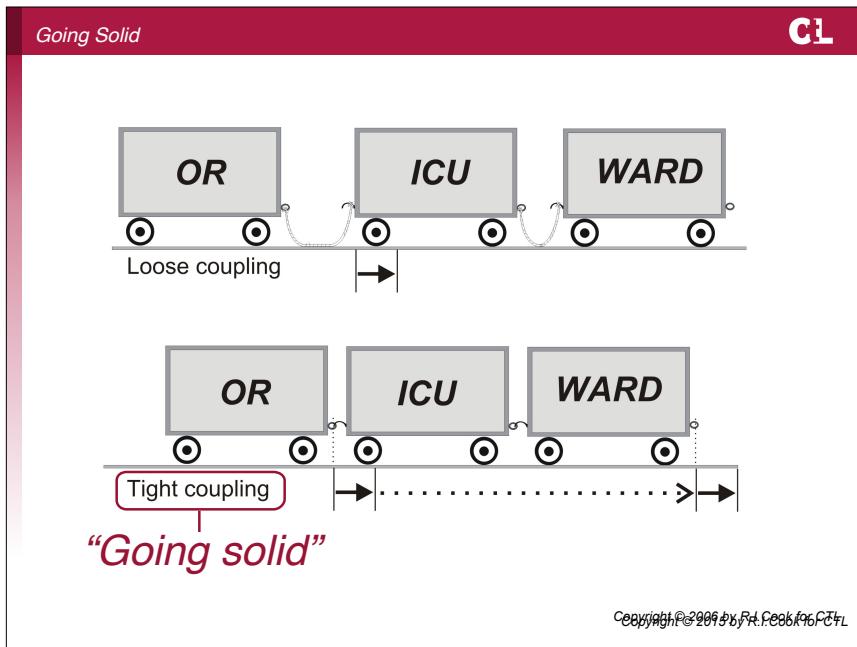
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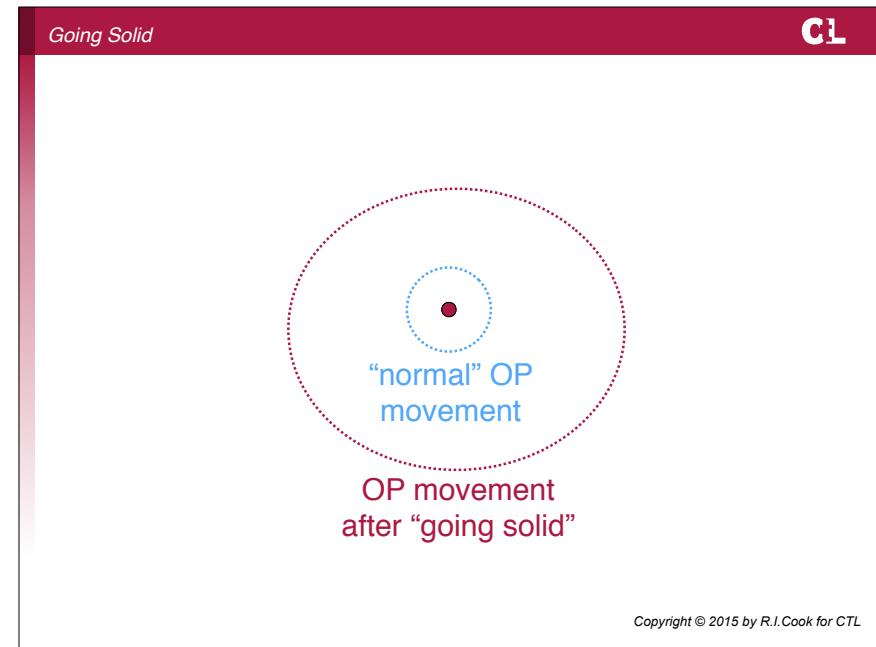
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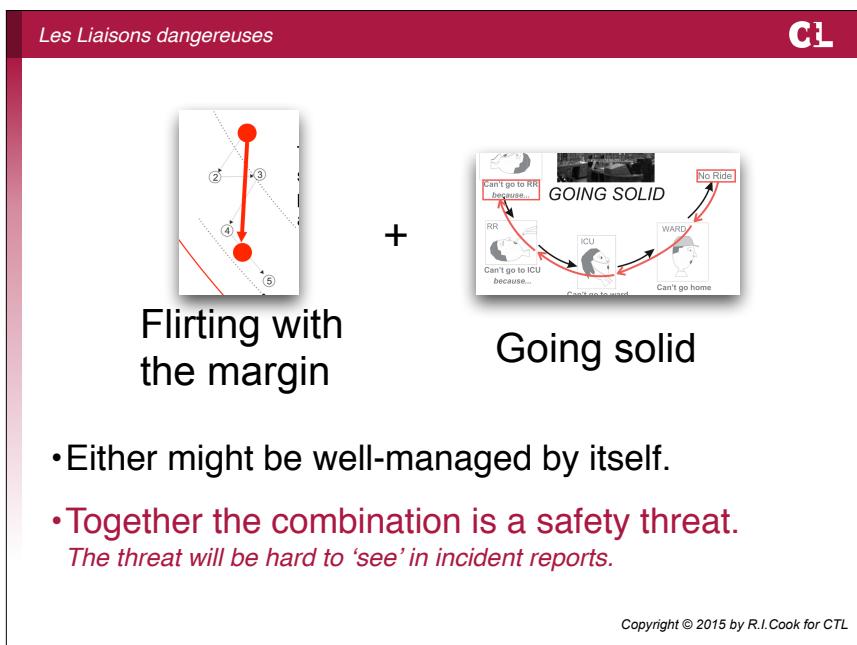
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Les Liaisons dangereuses

What is surprising is not that there are so many accidents...

..it is that there are **so few!**

Operators are producing safety by decoupling the system as the OP nears the margin.

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Les Liaisons dangereuses

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*But how? (this is the **big** research question in safety)*

What operational tactics do we observe?

- Flexibility in resource assignment
- Dynamic restructuring of task work
- Deliberate tradeoffs (e.g. explicit goal sacrifices)
- Reactive measures

What should be the strategic approach?

- Second story inquiry (e.g. study sector splitting & other decoupling methods)
- Looking at recovery
- Better anticipation help (e.g. visualization tools)

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Thank you for your kind attention!

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