



INVITING DISASTER

Cold Iron and Cool Heads

*Hard-won lessons from the
Machine Frontier, for the next
generation*

James R. Chiles
Author, *Inviting Disaster: Lessons from the
Edge of Technology*



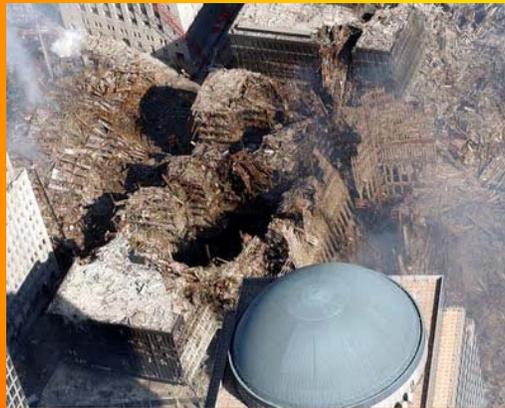
INVITING DISASTER

- I. *Why I'm Here*
- II. Failure's Familiar Factors
- III. New Problems for New People
- IV. Cool Heads and Cold Iron



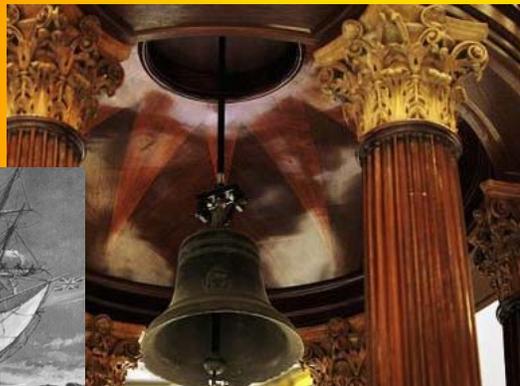
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Travels on the Machine Frontier



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Disaster Discussions: are we just ringing the *Lutine* Bell?





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Domain of *Inviting Disaster*

- Where heedlessness, errors, and poor leadership combine ...
- ... to fracture complex, high-energy systems
- Letting a string of close calls add up to disasters, catastrophes & cataclysms ...
- ... what Karl Weick called "*vu jade*"



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Were You There?



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Were You There ...
... When it Happened?



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Were You There ...
***... When it could have
been prevented?***

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**Disaster Reports Are
Short on Villains ...**



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Disaster Reports Are Short on Villains ...



... but long on tragically missed opportunities

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Failure-Savviness Goes Back A Long Way





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"... you must plan to spare no labor or expense and to be careful and very patient in every detail in order to bring all the means which you are to use to perfection.

Remember that often the whole depends on some small thing; for example, a poorly made binding or ill-fitted joint, the leaking of the mould through a crack ..."

**Vanocchio Biringuccio
Pirotechnia, 1540**



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***The Iron Ring:
A Lesson
on Your Hand***

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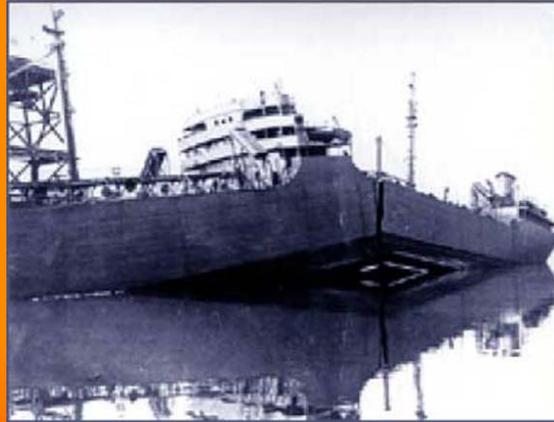
**Sharp, Alert People in the
Field Save Lives Daily**



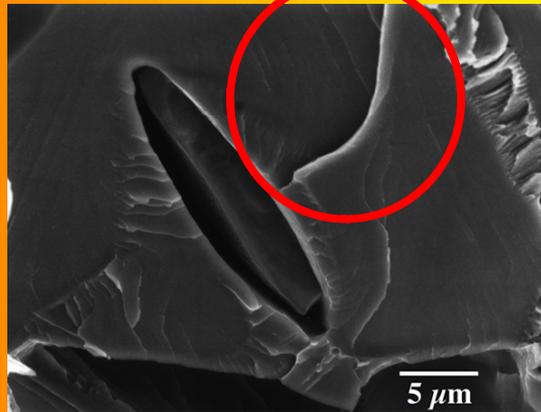


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Patterns from the Book: *System Fractures*



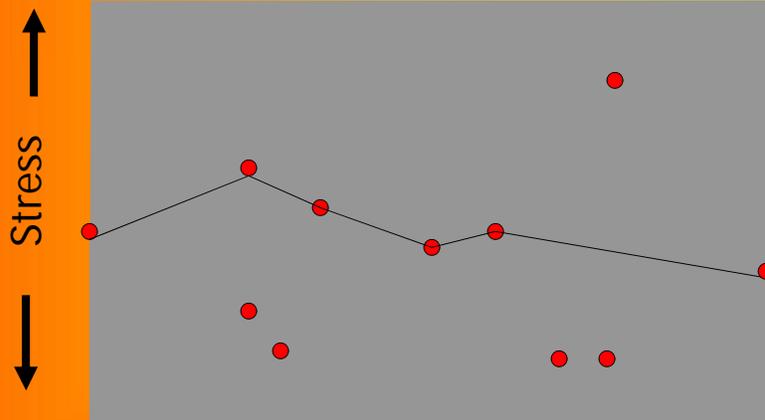
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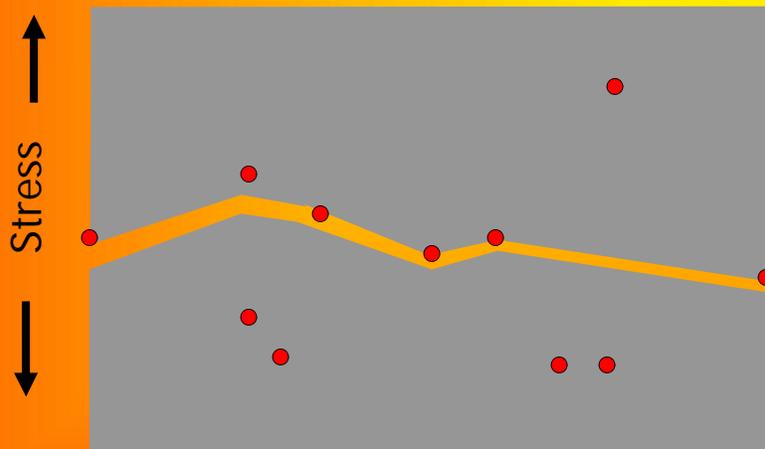
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Metal Fracture 101



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Metal Fracture 101





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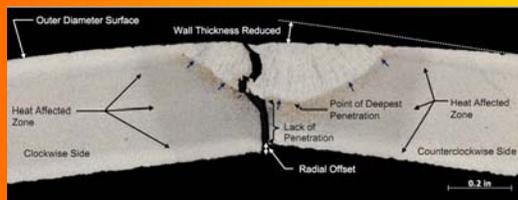
All Systems have Weak Points ...

... But a "Crackstopping" Organization Catches System Fractures Before the Errors and Malfunctions Join Up



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Patterns from the Book: *Failure to Test and Inspect*



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**Patterns from the Book:
*Nature-Triggered
Techno-Disasters***



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Six Challenges for the New Crowd

- *Rapid turnover of employees and contractors*
- *Model-driven safety practices*
- *Re-purposed equipment*
- *Plants are run remotely via SCADA – with no engineers on site*
- *“Full-stop” intervention by regulators is persuasive, but so hard to use*



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The Involuntary Full-Stop: *No Time to Fix, but Plenty of Time to Pick up the Pieces*





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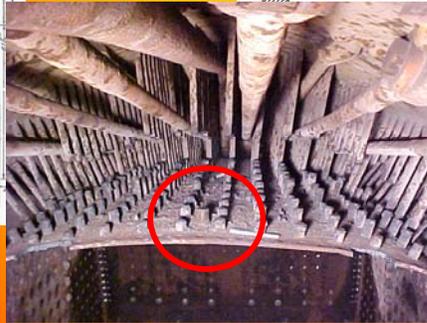
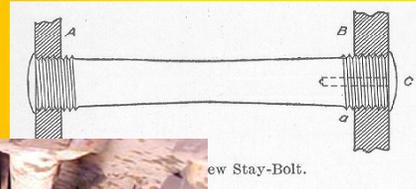
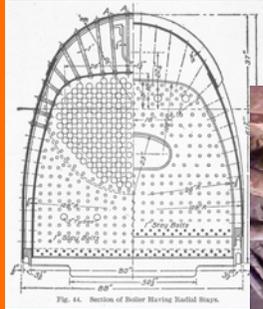
Next Project: *Red Flags and Telltales*





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Telltale at Work



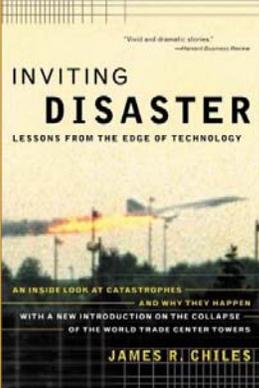
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Excellence is Possible



*"Not on my watch ...
Not on anybody's watch"*

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