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*

I. *Why I'm Here*
II. Failure's Familiar Factors
III. New Problems for New People
IV. Cool Heads and Cold Iron
Travels on the Machine Frontier

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

Were You There?
Were You There ... 

... When it Happened?
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*Disaster Reports Are Short on Villains ...*
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... but long on tragically missed opportunities

Failure-Savviness Goes Back A Long Way
“... 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

The Iron Ring:
A Lesson on Your Hand
Sharp, Alert People in the Field Save Lives Daily
Patterns from the Book: *System Fractures*
All Systems have Weak Points ...

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

Patterns from the Book: Failure to Test and Inspect
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

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
Telltales at Work

Excellence is Possible

“Not on my watch ... Not on anybody’s watch”