High Reliability Organizations (HROs) Can Mitigate Accident Consequences and Can Be Profitable

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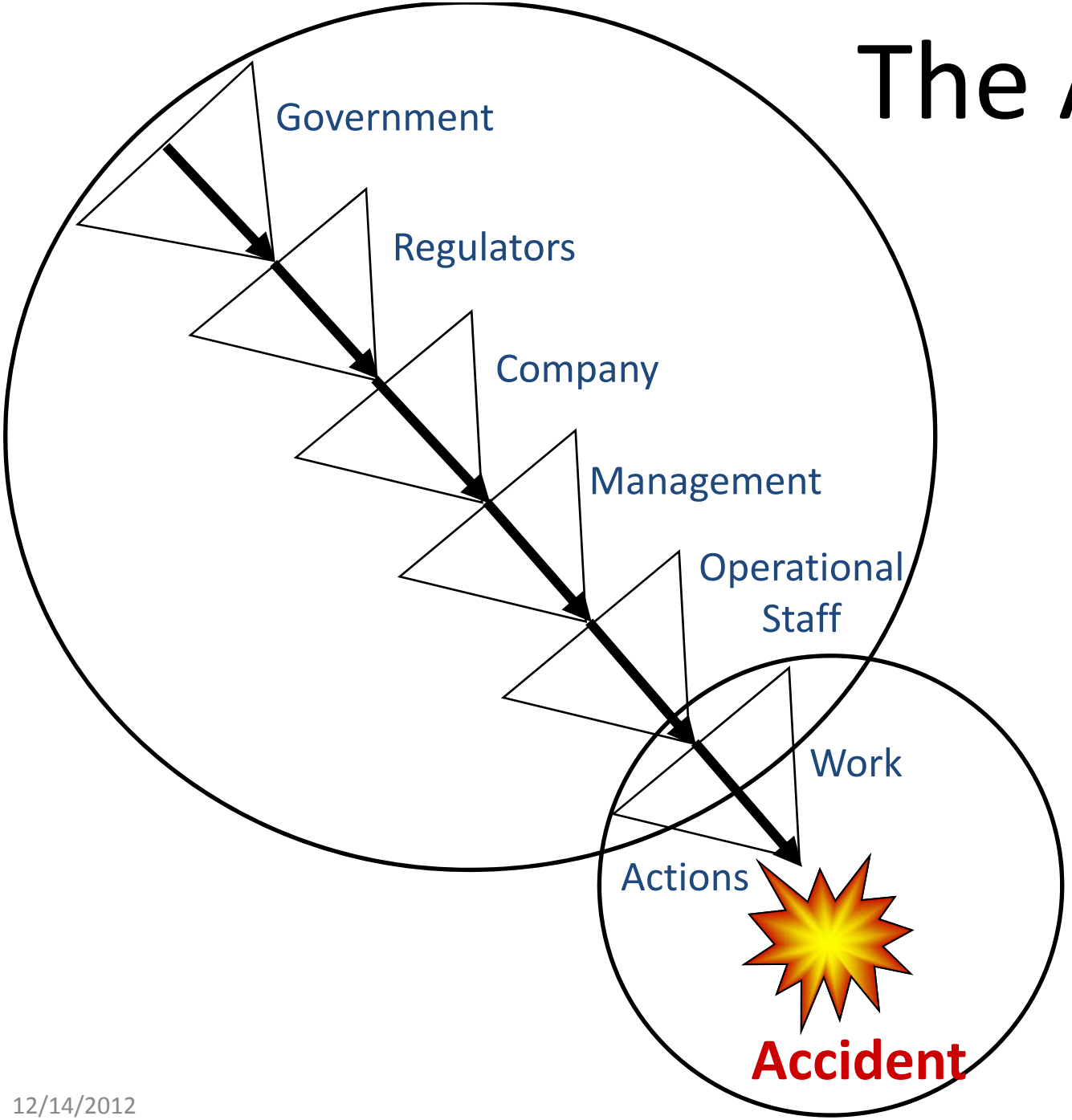
The Arrow


Government
Regulators
Company
Management
Operational Staff
Work
Actions
Accident

What is an HRO ?

- **An organization**
  - conducting relatively error free operations
  - over a long period of time
  - making consistently good decisions resulting in
  - high quality and reliability operations

Poole, R. *Beyond Engineering: How Society Shapes Technology*, 1997, p.276

- In a generation or two, the world will likely need thousands of high-reliability organizations running not just nuclear power plants, space flight, and air traffic control, but also chemical plants, electrical grids, computer and telecommunication networks, financial networks, genetic engineering, nuclear-waste storage, and many other complex, hazardous technologies. Our ability to manage a technology, rather than our ability to conceive and build it, may be the limiting factor in many cases (1997, p. 276).

Five Components of a HRO

- Process Auditing
- Reward Systems
- Quality Degradation
- Risk Perception
- Command and Control

1. Process Auditing:

- An established system for ongoing checks designed to spot expected as well as unexpected safety problems.
- Safety drills are in this category, as is equipment testing.
- Follow-ups on problems revealed in prior audits are critical.

2. Reward Systems:

- The reward system is the payoff an individual or organization receives for behaving one way or another.
- Organizational theory points out that organizational reward systems have powerful influences on the behavior of individuals in them. Don't reward behavior A while hoping for behavior B
- Similarly, inter-organizational reward systems also influence behavior in organizations.

3. Quality Degradation:

- Avoiding degradation of quality and/or developing inferior quality: This refers t the essential quality of the system as compared to a referent generally regarded as the standard for quality in one's industry
- Who is the best in your industry?

4. Risk Perception:

- There are at least two elements of risk perception;

  (1) Whether or not there is knowledge that risk exists, and

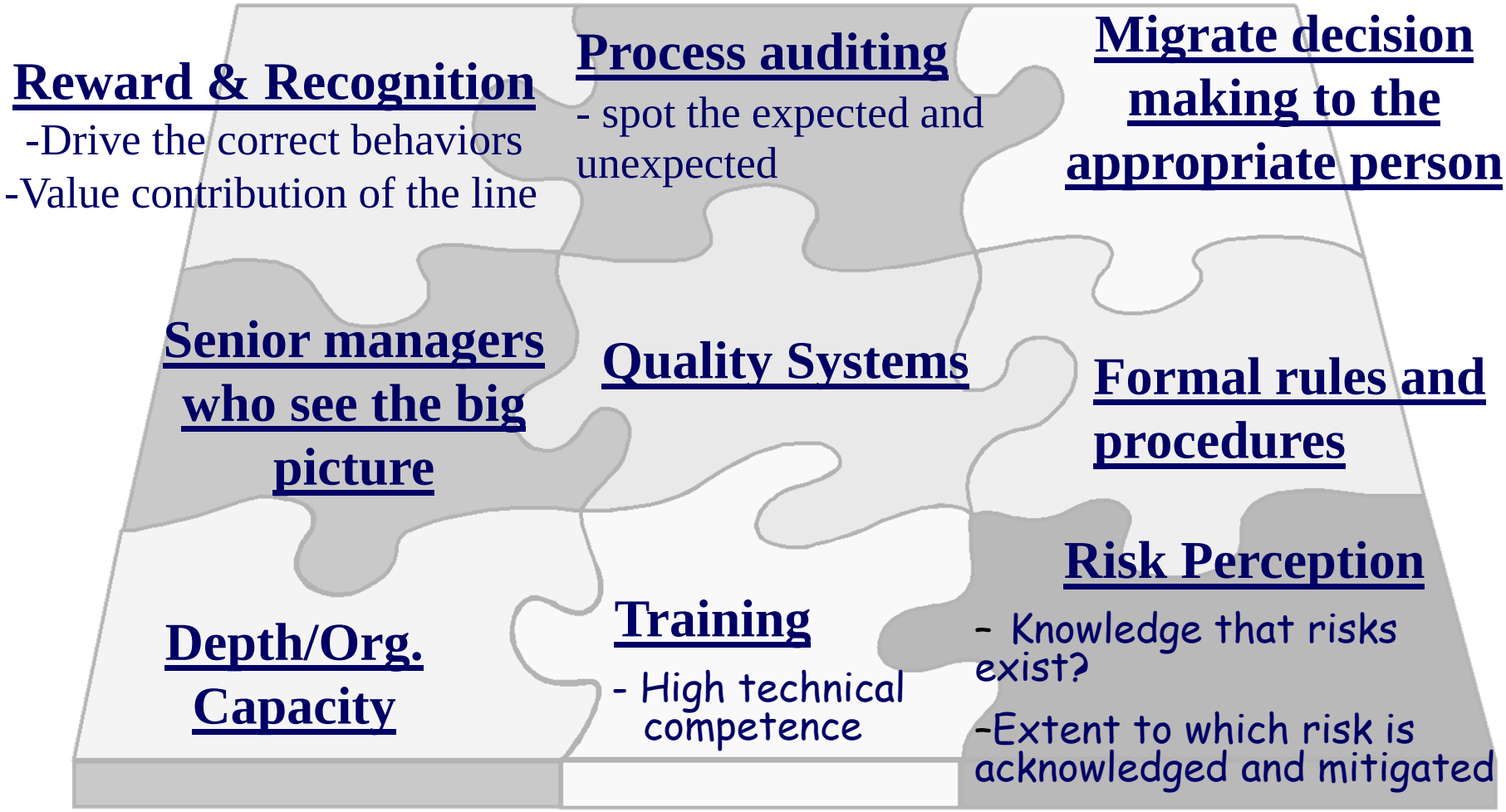
  (2) If there is knowledge that risk exists, the extent to which it is acknowledged and appropriately mitigated and/or minimized

- Part two is a logical outgrowth of part one.

5. Command and Control Elements:

- Migrating decision making: (the person with the most expertise makes the decision).
- Redundancy: (people and/or hardware), i.e., backup systems exist.
- Senior managers who see the "big picture": i.e., they don't micromanage.
- Formal rules and procedures: A definite existence of hierarchy but not necessarily bureaucracy in the negative sense.
- Training. Training. Training.

High Reliability Organizations



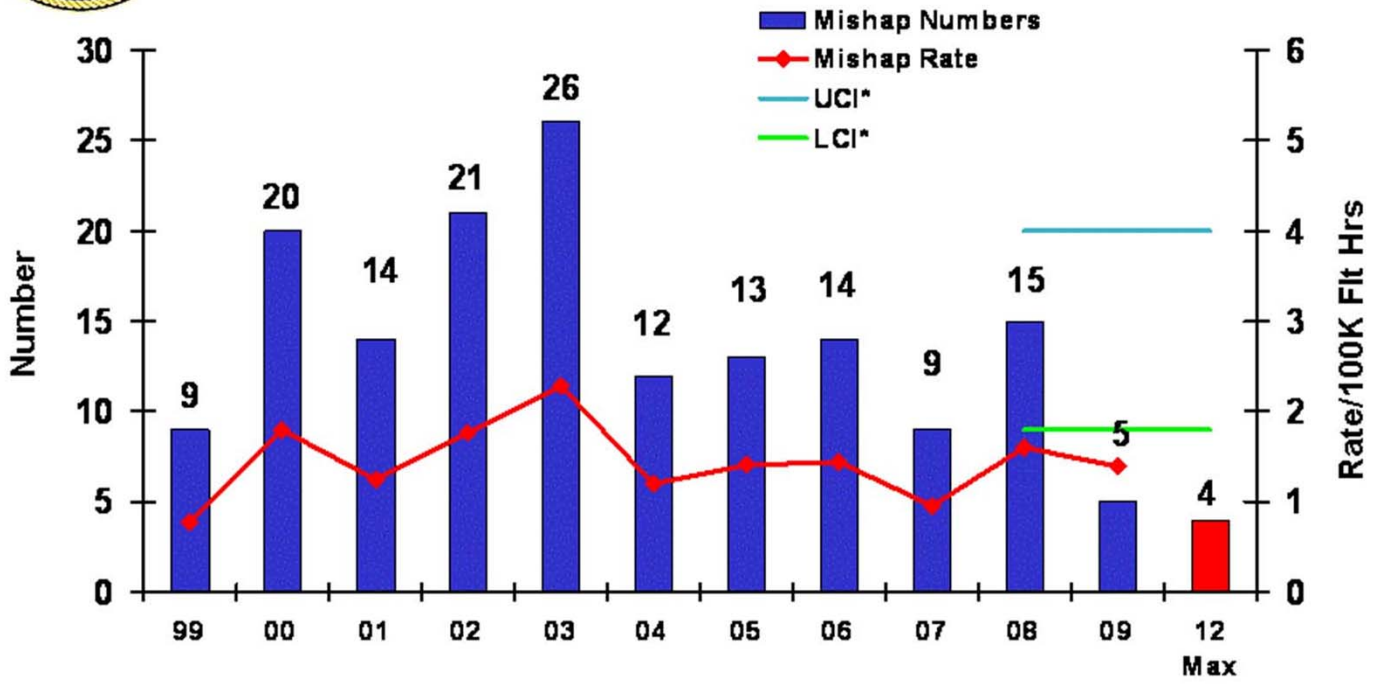
Commercial Organizations that try to be HROs

- Commercial aviation (all commercial airlines use crew resource management strategies)
- Commercial banking (e.g. S.W.I.F.T)
- Health care (e.g. Kaiser Permanente)
- Commercial nuclear power production
- Maritime/Chemical industry (e.g. Shell, Chevron, Gard Services)

Public Organizations that try to be HROs

- Community Emergency Services (e.g. San Bernardino County, CA fire services)
- Manned Space Flight (Columbia Accident Investigation Board)
- U.S. Chemical Hazards and Safety Board
- U.S. Department of Energy
- U.S. Federal Aviation Administration
- U.S. Navy Submarine Command
- U.S. Navy Carrier Flight Operations

CLASS A FLIGHT MISHAPS



	18 Feb 09	18 Feb 08
CLASS A MISHAPS/MISHAP RATE FY COMPARISON:	5 / 1.39	8 / 2.30
FY08 MISHAPS/MISHAP RATE:	15 / 1.60	
10-YEAR AVERAGE (FY99-08) MISHAPS/MISHAP RATE:	15.3 / 1.45	

*see last slide for definition of UCI/LCI

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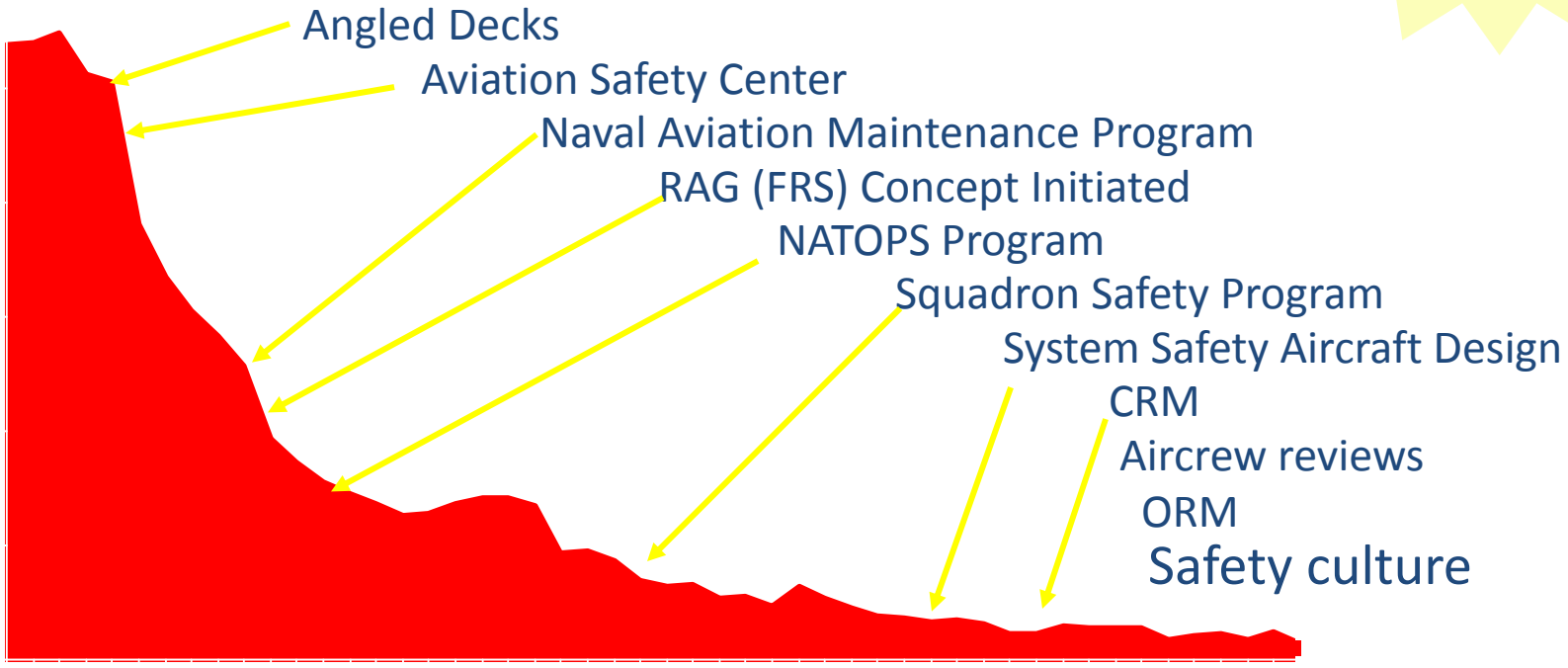
Naval Aviation Class A Flight Mishap Rate

776 aircraft destroyed in 1954

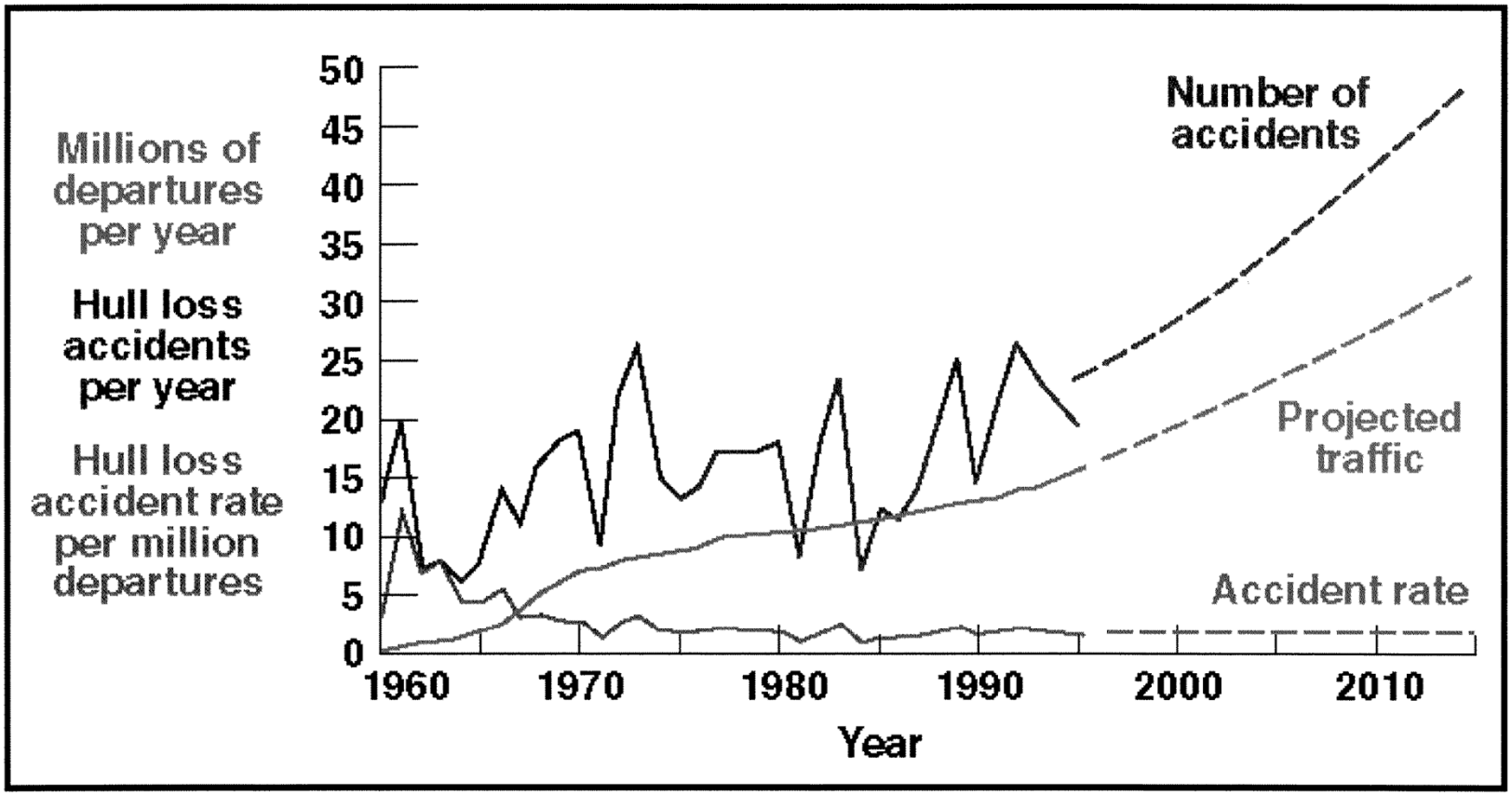
FY50-03

24 aircraft destroyed in FY03- all in flight mishaps



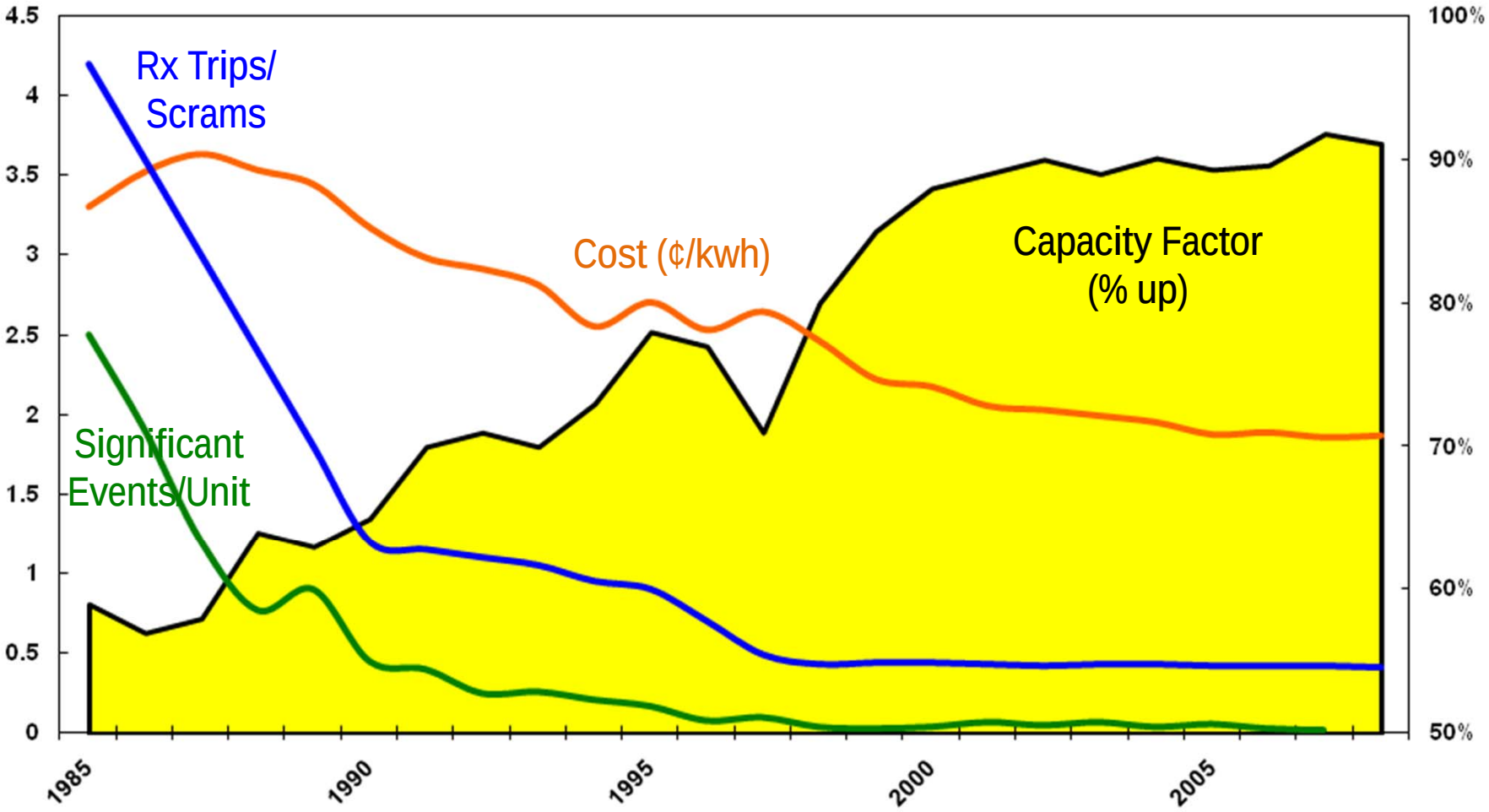
Fiscal Year

Projected Hull Loss —
Assuming Current Accident Rate Does Not Decline But Traffic Increases as Forecast



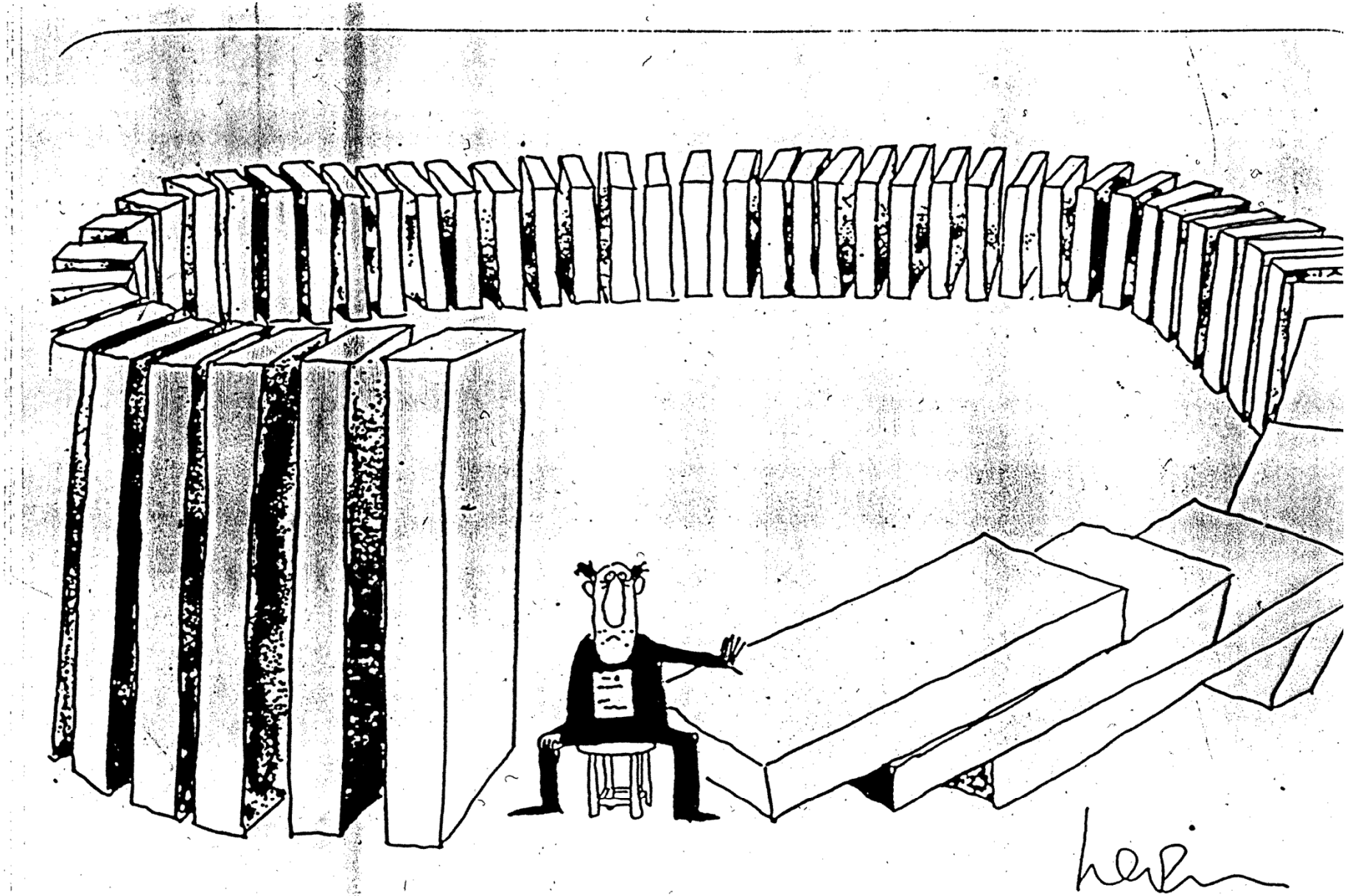
Nuclear Energy Institute Data

1985-2008



Impediments to Implementation

- Inadequate resources
- Failure to buy-in from top to bottom
- One size does not fit all
- Inadequate training
- Perception that HRO is a one shot effort
- Failure to implement HRO processes



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