NTSB National Transportation Safety Board

Transferability of Successful Aviation Risk Management Processes?

Insurance Institute

of London

Name: Christopher A. Hart

Vice Chairman, NTSB

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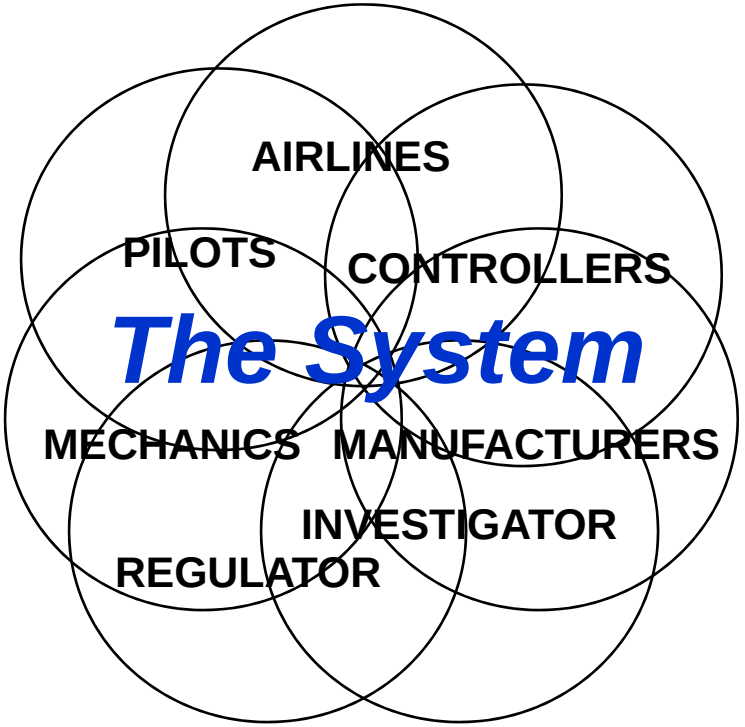
Mid-1990's: The Challenge

- U.S. fatal commercial accident rate, although commendably low, had stopped declining
- Volume of commercial flying was projected to double within 15-20 years
- Public pays attention to the ***number*** of fatal accidents, not the ***rate***
- Simple arithmetic: Doubling volume x flat rate = ***doubling of fatal accidents***
- Doubling of fatal commercial aviation accidents would create major public concern

The Solution:
Commercial Aviation Safety Team (CAST)

Engage *All* Participants In Identifying Problems and Developing and Evaluating Remedies

- **Airlines**
- **Manufacturers**
- **Air Traffic Organizations**
- **Labor**
  - ***Pilots***
  - ***Mechanics***
  - ***Air traffic controllers***
- **Regulator(s)**



Major Paradigm Shift

- **Old: The regulator identifies a problem, develops solutions**
  - **Industry skeptical of regulator's understanding of the problem**
  - **Industry fights regulator's solution and/or implements it begrudgingly**

- **New: Collaborative "System Think"**
  - **Industry involved in indentifying problem**
  - **Industry "buy-in" re solution because everyone had input, everyone's interests considered**
  - **Prompt and willing implementation**
  - **Solution probably more effective and efficient**

Challenges of Collaboration

- Requires participants, in their enlightened self-interest, to reach beyond their "comfort zones"
- Not a democracy
  - Regulator must regulate
- Regulator probably not welcome
- Labor/Management issues between some participants
- Participants are potential co-defendants

Fuel for the Process

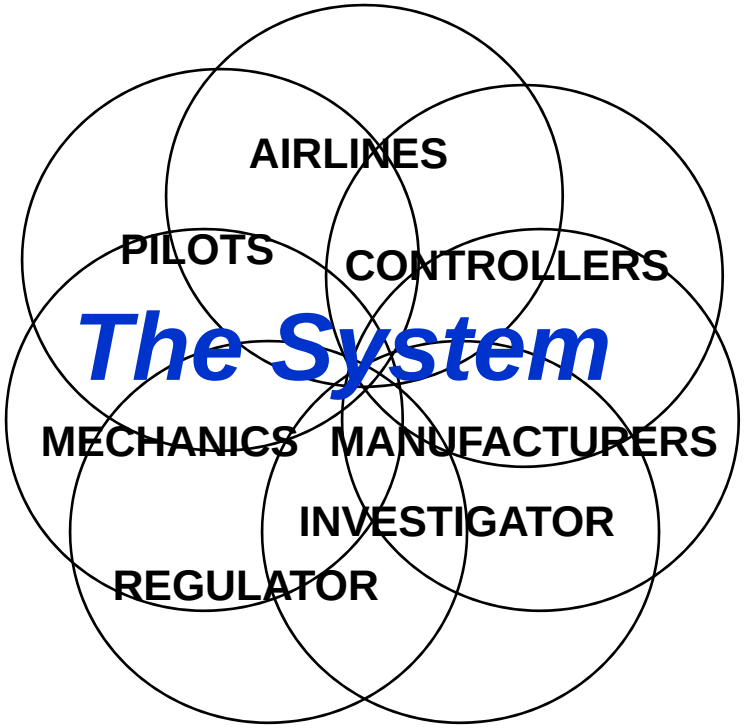
INFORMATION

about what is happening on the front lines

The Context: Increasing Complexity

- **More System *Interdependencies***
  - – Large, complex, interactive system
  - – Often tightly coupled
  - – Hi-tech components
  - – Continuous innovation
  - – Ongoing evolution

- **Risk Management Issues Are More Likely to Involve *Interactions Between Parts of the System***



Effects of Increasing Complexity:

More **"Human Error" Because**

- **System More Likely to be Error Prone**
- **Operators More Likely to Encounter Unanticipated Situations**
- **Operators More Likely to Encounter Situations in Which "By the Book" May Not Be Optimal ("workarounds")**

The Result:

Front-Line Staff Who Are

- Highly Trained

- Competent

- Experienced,

-Trying to Do the Right Thing, and

- Proud of Doing It Well

. . . Yet They Still Commit

Inadvertent

Human Errors

When Things Go Wrong

How It Is Now . . .

You are highly trained

and

If you did as trained, you would not make mistakes

so

You weren't careful enough

so

You should be PUNISHED!

How It Should Be . . .

You are human

and

Humans make mistakes

so

Let's *also* explore why the system allowed, or failed to accommodate, your mistake

and

Let's IMPROVE THE SYSTEM!

Fix the Person or the System?

Is the Person *Clumsy?*

Or Is the Problem . . .

The *Step???*

Enhance Understanding of Person/System Interactions By:

- Collecting,

- Analyzing, and

- Sharing

Information

Objectives:

Make the System

(a) Less Error Prone

and

(b) More Error Tolerant

The Health Care Industry

To Err Is Human:

Building a Safer Health System

"The focus must shift from blaming individuals for past errors to a focus on preventing future errors by designing safety into the system."

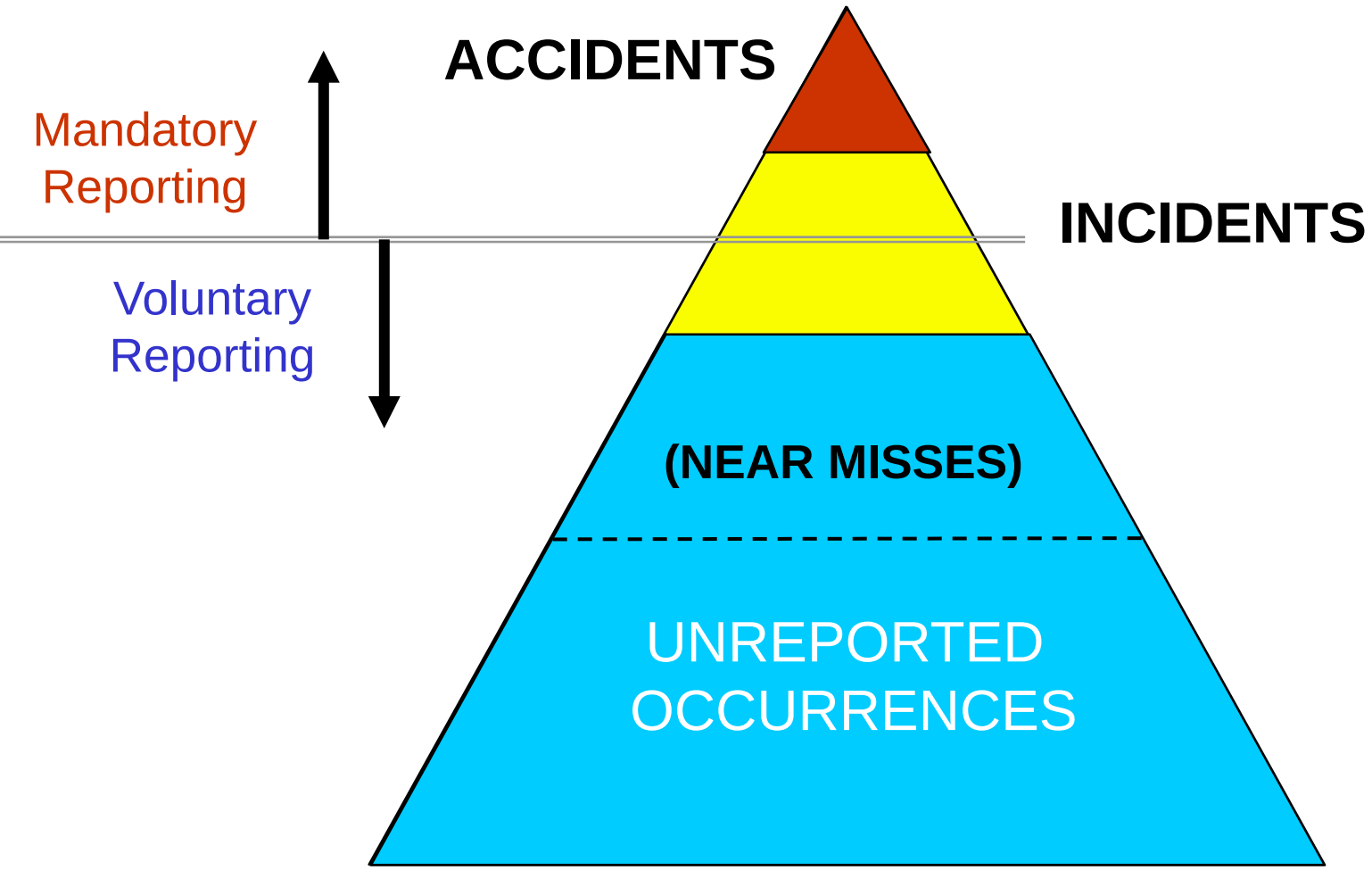
Institute of Medicine, Committee on Quality of Health Care in America, 1999

Current System Data Flow

Most Data Lost Forever

Currently Only a Minute Portion of Data is Collected and Analyzed

Heinrich Pyramid



Major Source of Information: Hands-On "Front-Line" Employees

"We Knew About That Problem"

(and we knew it might hurt someone sooner or later)

Legal Concerns That Discourage Collection, Analysis, and Sharing

- **Public Disclosure**
- **Job Sanctions and/or Enforcement**
- **Criminal Sanctions**
- **Civil Litigation**

Typical "Cultural" Barrier

"Safety First"

Middle Management

"Production First"

Front-Line Employees

"Please the Boss First…
THEN Consider Safety?"

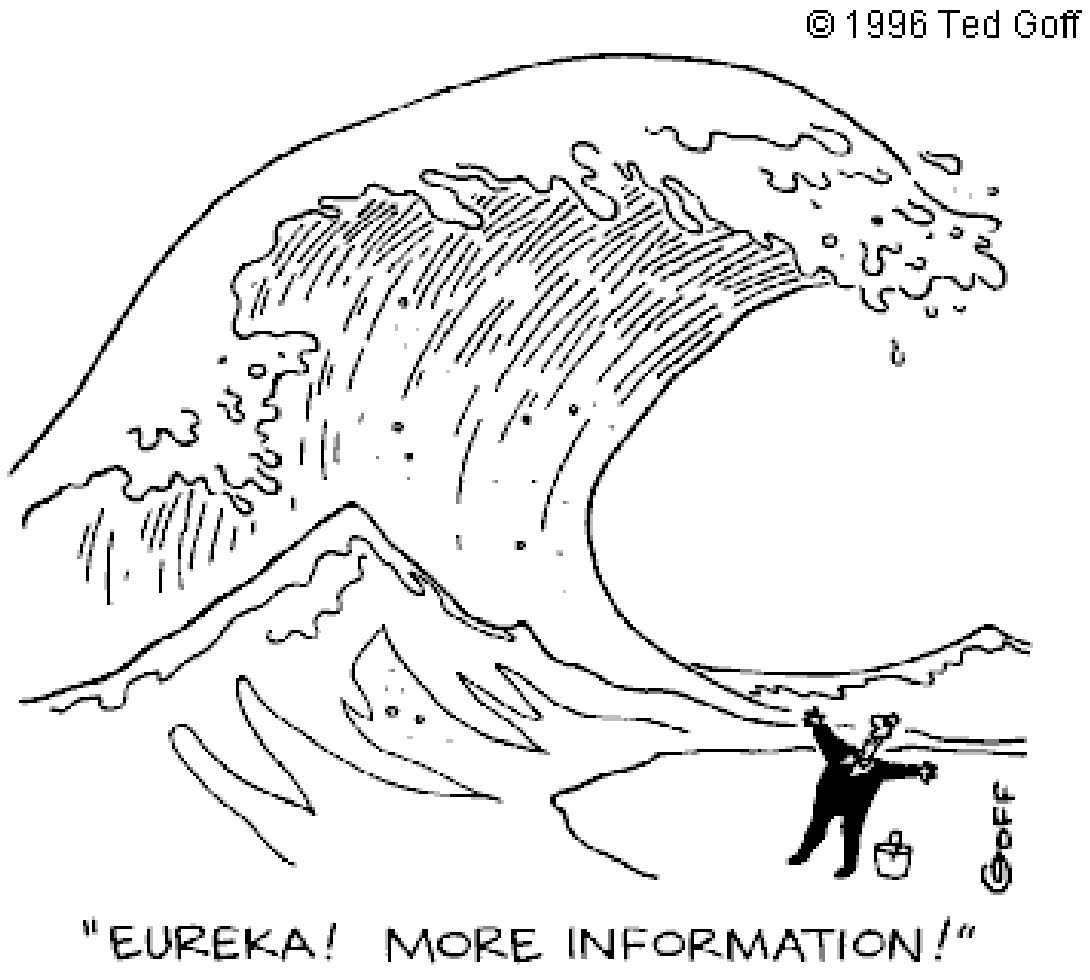
Next Challenge

Legal/Cultural Issues

Improved Analytical Tools

As we begin to get over the first hurdle, we must start working on the next one . . .

Information Overload



From Data to Information

Tools and processes to convert large quantities of data into useful information

Data Sources

Info from front line staff and other sources

DATA

Analysts

USEFUL

INFORMATION

Smart Decisions

- **Identify issues**
- ***PRIORITIZE!!!***
- **Develop solutions**
- **Evaluate interventions**

Tools

Processes

Aviation Success Story

65% Decrease **in Fatal Accident Rate, 1997 - 2007**

largely because of

System Think

fueled by

Proactive Safety Information Programs

P.S. Aviation was already considered *VERY SAFE* in 1997!!

Contravene Conventional Wisdom??

- Conventional Wisdom:

Improvements that reduce risk usually *also reduce productivity*

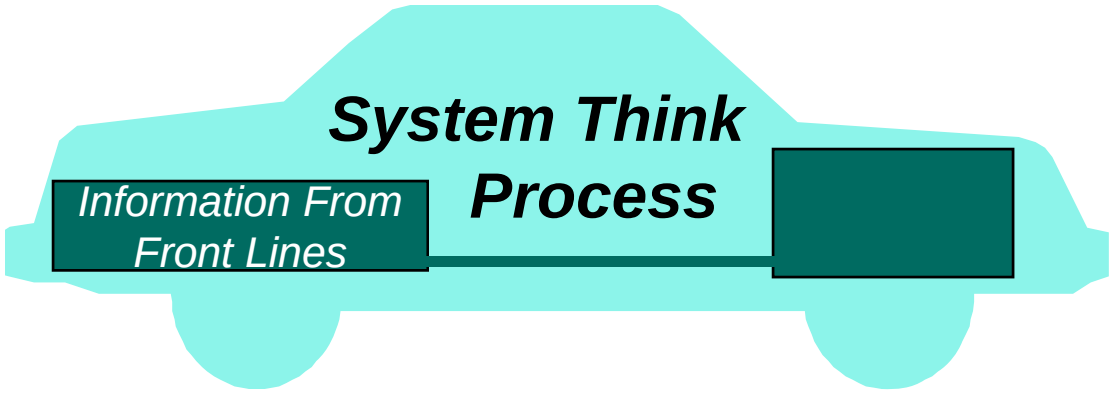
- The Reality:

Risk reduction programs are usually a *NON-STARTER* if they hurt productivity

- Lesson Learned from the CAST process:

Risk can be reduced in a way that also results in *immediate productivity improvements*

Process Plus Fuel Creates A Win-Win



Improved
Risk Management

- AND -

Improved
Productivity

The Role of Leadership

- Demonstrate Safety Commitment . . .

But Acknowledge That Mistakes Will Happen

- Include "Us" (*e.g.*, System) Issues,

Not Just "You" (*e.g.*, Training) Issues

- Make Safety a Middle Management Metric

- Engage Labor Early

- Include the ***System*** --

Manufacturers, Operators, Regulator(s), and Others

- Encourage and Facilitate Reporting

- Provide ***Feedback***

- Provide Adequate ***Resources***

- ***Follow Through*** With Action

How The Regulator Can Help

- **Emphasize importance of System issues *in addition to* (*not instead of*) worker issues**

- **Encourage and participate in industry-wide "System Think"**

- **Facilitate collection and analysis of information**
  - **Clarify and announce *policies for protecting information and those who provide it***
  - **Encourage other industry participants to do the same**

- **Recognize that *compliance* is very important, but the *mission is reducing systemic risk***

If Prevention Efforts Fail . . .

- The NTSB investigates to determine probable cause(s) and make recommendations to prevent recurrences (in all transportation modes)
  - NTSB is an “independent” agency
- Five NTSB Members, nominated by the President, confirmed by the Senate
  - Safeguards re independence
  - Conclusions from facts, not politics

Gathering the Facts

- **NTSB is very small (<400 employees), relies heavily on parties to develop the facts**
- **NTSB selects parties for their ability to provide *technical* expertise**
  - **No attorneys/insurers**
  - **No plaintiffs/representatives**
- **Facts are placed in a public docket**

Analysis

– **Analysis is done *solely* by NTSB; parties do not assist**

– **Analysis is not admissible in court**

Outcome of Investigation

- **Determination of probable cause(s)**
- **Objective is to determine *cause,* *not liability or blame***
- ***SINGLE FOCUS IS SAFETY***
- **Primary product:**

Safety recommendations to whomever can take corrective action on the matter

- **Recommendation acceptance rate:**

More than 80%

Query – Successes Transferable to:

- Other transportation modes
- Nuclear power operations
- Chemical manufacturing
- Petroleum exploring and drilling
- Petroleum refining
- Healthcare
- The financial industries

???

Conclusion

– **One size may not fit all**

but

– **Potentially hazardous industries can learn safety process lessons from each other**

and

– **One industry's safety process success can help other industries improve**

Thank You!!!

Questions?