The Contrast

- Conventional wisdom:
  Improvements that reduce risk usually *also reduce productivity*

- Lesson learned from proactive aviation safety programs:
  Risk can be reduced in a way that also results in *immediate productivity improvements*
Process Plus Fuel Creates a Win-Win

System Think Process

Improved Safety and Improved Productivity
Outline

- The Context
- Importance of “System Think”
- Importance of Better Information
- Improved Safety and Productivity
- Roles of Leadership and Regulator
- Success Story is Transferable
NTSB 101

– Independent federal agency, investigate transportation mishaps, all modes

– Determine probable cause(s) and make recommendations to prevent recurrences

– Primary product: Safety recommendations
  • Favorable response > 80%

– SINGLE FOCUS IS SAFETY

– Independence
  • Political: Findings and recommendations based upon evidence rather than politics
  • Functional: No “dog in the fight”
The Context: Increasing Complexity

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

• Safety 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
The Solution: System Think

*Understanding how a change in one subsystem of a complex system may affect other subsystems within that system*
“System Think” via Collaboration

Bringing all parts of a complex system together to collaboratively

• Identify potential issues

• PRIORITIZE the issues

• Develop solutions for the prioritized issues

• Evaluate whether the solutions are
  – Accomplishing the desired result, and
  – Not creating unintended consequences
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
Major Source of Information: Hands-On “Front-Line” Employees

“We knew about that problem”
(and we knew it might hurt someone sooner or later)
As we begin to get over the first hurdle, we must start working on the next one . . .
Information Overload

"EUREKA! MORE INFORMATION!"

© 1996 Ted Goff
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

Smart Decisions
- Identify issues
- PRIORITIZE!!!
- Develop solutions
- Evaluate interventions

Analysts

Tools and Processes

Data → USEFUL INFORMATION

Data Sources

ERO Enterprise Leadership Conference
March 3, 2017
Aviation Success Story

83% decrease in fatal accident rate, 1998 - 2007

largely because of System Think

fueled by proactive safety information programs

P.S. Aviation was already considered VERY SAFE in 1997!!
Aviation “System Think” Success

Engage *all* participants in identifying problems and developing and evaluating remedies

- Airlines
- Manufacturers
  - *With the systemwide effort*
  - *With their own end users*
- Air Traffic Organizations
- Labor
  - Pilots
  - Mechanics
  - Air traffic controllers
- Regulator(s) [*Query: Investigator(s)?*]
Moral of the Story

Anyone who is involved in the problem should be involved in the solution.
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 identifying problem
  • Industry “buy-in” re interventions because everyone had input, everyone’s interests considered
  • Prompt and willing implementation
  • Interventions evaluated . . . and tweaked as needed
  • Solutions probably more effective and efficient
  • Unintended consequences much less likely
Challenges of Collaboration

– Human nature: “I’m doing great . . . the problem is everyone else”

– Participants may have competing interests, e.g.,
  • Labor/management issues
  • May be potential co-defendants

– Regulator probably not welcome

– Not a democracy
  • Regulator must regulate

– Requires all to be willing, in their enlightened self-interest, to leave their “comfort zone” and think of the System
Characteristics Enabling Collaboration

– Intense media and political interest due to widespread fear of flying

– Anyone’s accident is everyone’s accident
  • Public does not care which airline

– Everyone wants to know why airplanes crash

– Airlines do not compete on safety
  • Willing to share safety lessons learned
Queries

– Is this industry-wide safety success story transferable from aviation to other industries?

– Is this process safety success story transferable to workplace safety?
Applicability of Collaborative Approach:

- Entire industry
- Company (Some or All)
- Type of activity
- Facility
- Team
Manufacturer “System Think” Success

Aircraft manufacturers are increasingly seeking input, throughout the design process, from

- Pilots  (User friendly)
- Mechanics  (Maintenance friendly)
- Air Traffic Services  (System friendly)
Workplace Safety Beta Test

- Select troublesome area
  - Nagging problem for many years
  - Many interventions have been tried, not successful
  - Likelihood that problems are systemic, not just people
  - Collaboration as effort to address the system problems
  - Less defensiveness because not focused on single event

- Select collaborative corrective action group
  - All who have a hand in the process
  - Manufacturers?
  - Operators?
  - Regulators?
  - Others?
Note HRO Characteristics*

– Preoccupation with failure
– Reluctance to simplify interpretations
– Sensitivity to operations
– Commitment to resilience
– Deference to expertise

*Source: Weick and Sutcliffe
But Then . . .

Why are we so jaded in the belief that improving safety will probably hurt the bottom line??
Costly Result$ of Safety Improvements Poorly Done

Safety **Poorly** Done

1. Punish/re-train operator
   - Poor workforce morale
   - Poor labor-management relations
   - Labor reluctant to tell management what’s wrong
   - Retraining/learning curve of new employee if “perpetrator” moved/fired
   - Adverse impacts of equipment design ignored, problem may recur because manufacturers are not involved in improvement process
   - Adverse impacts of procedures ignored, problem may recur because procedure originators (management and/or regulator) are not involved in improvement process

Safety **Well** Done

Look beyond operator, also consider system issues
Costly Result of Safety Poorly Done (con’t)

Safety Poorly Done

2. Management decides remedies unilaterally
   - Problem may not be fixed
   - Remedy may not be most effective, may generate other problems
   - Remedy may not be most cost effective, may reduce productivity
   - Reluctance to develop/implement remedies due to past remedy failures
   - Remedies less likely to address multiple problems

3. Remedies based upon instinct, gut feeling
   - Same costly results as No. 2, above

Safety Well Done

Apply “System Think,” with workers, to identify and solve problems

- Remedies based upon evidence (including info from front-line workers)
Costly Results
Of Safety Poorly Done (cont’d)

Safety Poorly Done  Safety Well Done

4. Implementation is last step
   - No measure of how well remedy worked (until next mishap)
   - No measure of unintended consequences (until something else goes wrong)

Conclusion: Is Safety Good Business?
   - Safety implemented poorly can be very costly (and ineffective)
   - Safety implemented well, in addition to improving safety more effectively, can also create benefits greater than the costs
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 the 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
Conclusions

- Safety issues in complex systems usually involve human/system interface issues
- Collaboration can help address not only the human performance issues but also the system issues
- Collaboration can also help ensure that safety improvement programs also improve productivity, which makes the safety improvements more sustainable
- Aviation industry collaboration success is transferable to other industries and to workplace safety
Thank You!!!

Questions?