How to Become a High Reliability Organization (HRO)

BushCo
Sailor Proofing the Flight Deck…
By Karlene Roberts, U.C. Berkeley

A high reliability organizations (HRO) is an organization that has succeeded in avoiding catastrophes in an environment where normal accidents can be expected due to risk factors and complexity.
Who Has Experience Doing This?
Examples of High Reliability Organizations

- Nuclear Navy
- Commercial nuclear power
- Aircraft carrier operations
- Hospital patient care
- Military nuclear deterrent
- Forest service
- Aviation
- Nuclear weapons assembly and disassembly
HRO Principles
(Five Practices for Developing "Mindfulness")

- Preoccupation with failure.
- Reluctance to simplify interpretations.
- Sensitivity to operations.
- Commitment to resilience.
- Deference to expertise.
Does an HPI Approach Make Sense?

- Capacity Factor (% up)
- Cost (¢/kwh)
- Rx Trips/Scrams
- Significant Events/Unit
- Industrial Safety
- HPI Initiated

NEI (Nuclear Energy Institute)
For the first time in history we have four generations working side by side........
United States Total Labor Force Participation by Generation* 17

- Mature/WWII Generation: 4.2%
- Baby Boomers: 38.1%
- Generation X: 32.2%
- Generation Y/Millenials: 25.0%
Pre-baby boomers (born before 1945)
Baby boomers (born between 1946-1964)
Post baby boomers (born after 1965)
Text ‘Yes’ to 1947832
Quiz

Baby Boomers are retiring at 8,000 people per?:

A. Week

B. Day

C. Year
Quiz

Baby Boomers are retiring at 8,000 people per?:

B. Day
And will continue to retire at 8,000/day for the next?:

A. 10 Years
B. 13 Years
C. 16 Years
And will continue to retire at 8,000/day for the next?:

C. 16 Years
Our four generation workforce provides challenges

Seniors
b. 1920-1945

Baby Boomers
b. 1946-1965

Gen Xers
b. 1966-1979

Gen Yers
b. 1980-2000
Our four generation workforce provides challenges

How many of you remember buying your first?:

Seniors
b. 1920-1945

Baby Boomers
b. 1946-1965

Gen Xers
b. 1966-1979

Gen Yers
b. 1980-2000

Computer?
VCR?
Color TV?
Cell Phone?
What drives an evolution in technology?

Two Types:

1. Comfort Technology

2. Self-Perpetuating
Comfort Technology: Phones,
Comfort Technology: Cars
Comfort Technology: TV’s
What drives an evolution in technology?

Two Types:

1. Comfort Technology
2. Self-Perpetuating
At its peak in 2004, Blockbuster had up to 60,000 employees and more than 9,000 stores.

In November 2013, it announced the remaining 300 company-owned stores would close.
14 Years Ago:

- Wikipedia was still an experiment
- Term Web 2.0 not a coined phrase yet
- No Gmail
- Social Media not yet invented
- No Cloud Computing,
- Google IPO still two years away
- Apple reported loss of 25 Million
- iPod had just been launched
- iPad (what’s an iPad?)
- Leader in mobile phones - Nokia
An interview with Futurist Thornton May on January 19, 2015
“The paradox is that while "things are becoming more connected" humans are not."
QUIZ

Would your teenager prefer talking to you:
A. face to face or
B. by text?
QUIZ

Would your teenager prefer talking to you: 
A. face to face or 
B. by text? 
C. Not At ALL!!!!
What does all this have to do with the “Becoming a High Reliability Organization”? 

**Mature Generation:**
Some resistance to change  
Years of doing it a certain way  
Are usually the bosses  
Worked to rules  
Worked hard  
Saturday Worked Harder

**Next Generation:**
Embrace, even love change  
There is no old way  
Working for mature bosses  
Eager for change Right Now!  
Some, Saturday is Day-Off  
Resistant to heavy handed
What we can do.....

**Mature Generation:**
- Willing to change
- Encourage new innovation
- Be a whole brained boss
- Move to sociotechnical
- Work smarter
- Make time for yourself

**Next Generation:**
- Make change enticing
- Respect your elders
- Become whole brained boss
- Patience is a virtue
- Encourage ‘Just’ Culture
HRO Leadership
Discretionary Effort

Discretion of Employee

Percent of Effort

30%  50%  100%
CEREBRAL

LEFT

Analytical
Math
Compliance
Regulated
Mandatory
Text
Logical
Factual

RIGHT

Creative
Synergistic
Imaginative
Holistic
Contextual
Futuristic
Intuitive
Feelings

Leadership
HRO Leadership Left or Right Brained?

High Reliability Organizations
Whole Brain Thinking

High Reliability Organizations

Daniel Pink
“A Whole new Mind”
Some Things We Know about Behavioral Consequences

- Positive Reinforcement (R+) produces higher rates of behaviour than Negative Reinforcement (R-)

Over time…

Aubrey Daniels
The number of Atoms in the known universe: \(10^{99}\)

The number of estimated interconnections and patterns the 10,000,000,000 individual neurons of one brain can make: \(10^{799}\)
HRO Principles
(Five Practices for Developing "Mindfulness")

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Human Performance Improvement

To proactively prevent “Unwanted Outcomes” triggered by human error.
Error:
Something you didn’t intend to do.
Does anybody remember an error on December 20, 2015?
Admit letters for the 2015 fall entry were sent out by this top university in the US to prospective masters' students around the world on Monday. In a matter of a few hours, the university sent out rejections and stated that the gaffe was a result of serious mistakes in their process for generating acceptance letters.

MUMBAI: Carnegie Mellon, a top destination for engineering graduates around the world, accidentally admitted 800 candidates to its blue-chip computer science programme, only to retract the offer about seven hours later.

While this caused disappointment among all those who were rejoicing after a stressful and anxious wait, some others already employed rushed to their bosses with happy resignation letters.
Cool Hand Luke
Reducing Errors should not be the primary focus. It should be reducing the consequences of errors!

HENCE ZERO IS ACHIEVABLE!!!!!!
Reducing Errors should not be the primary focus. It should be reducing the consequences of errors!

HENCE ZERO IS ACHIEVABLE!!!!!!
The Challenge: Identifying what factors affect people performance
Why a Human Performance Improvement Approach?

Unwanted Outcomes

80% Human Error

20% Equipment Failures

Human Error

70% Latent Organization Weaknesses

30% Individual
Industry Event Causes
due to human performance


1,676 = Org behavior (68%)
806 = Individual behavior (32%)
Facts about Human Error

- It thrives in every industry
- It is a major contributor to events and unwanted outcomes
- It is costly, adverse to safety and hinders productivity
- The greatest cause of human error is weaknesses in the organization, not lack of skill or knowledge
- Error rates can never be reduced to zero
- Consequences of errors can be eliminated
The key to understanding Errors

Context !
Principles

1. People are fallible, and even the best make mistakes.

2. Error-likely situations are predictable, manageable, and preventable.

3. Individual behavior is influenced by organizational processes and values.

4. People achieve high levels of performance based largely on the encouragement and reinforcement received from leaders, peers, and subordinates.

5. Events can be avoided by understanding the reasons mistakes occur and applying the lessons learned from past events.
## Error Precursors short list

<table>
<thead>
<tr>
<th>Task Demands</th>
<th>Individual Capabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time pressure (in a hurry)</td>
<td>Unfamiliarity w/ task / First time</td>
</tr>
<tr>
<td>High Workload (memory requirements)</td>
<td>Lack of knowledge (mental model)</td>
</tr>
<tr>
<td>Simultaneous, multiple tasks</td>
<td>New technique not used before</td>
</tr>
<tr>
<td>Repetitive actions, monotonous</td>
<td>Imprecise communication habits</td>
</tr>
<tr>
<td>Irrecoverable acts</td>
<td>Lack of proficiency / Inexperience</td>
</tr>
<tr>
<td>Interpretation requirements</td>
<td>Indistinct problem-solving skills</td>
</tr>
<tr>
<td>Unclear goals, roles, &amp; responsibilities</td>
<td>“Hazardous” attitude for critical task</td>
</tr>
<tr>
<td>Lack of or unclear standards</td>
<td>Illness / Fatigue</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Work Environment</th>
<th>Human Nature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distractions / Interruptions</td>
<td>Stress (limits attention)</td>
</tr>
<tr>
<td>Changes / Departures from routine</td>
<td>Habit patterns</td>
</tr>
<tr>
<td>Confusing displays or controls</td>
<td>Assumptions (inaccurate mental picture)</td>
</tr>
<tr>
<td>Workarounds / OOS instruments</td>
<td>Complacency / Overconfidence</td>
</tr>
<tr>
<td>Hidden system response</td>
<td>Mindset (“tuned” to see)</td>
</tr>
<tr>
<td>Unexpected equipment conditions</td>
<td>Inaccurate risk perception (Pollyanna)</td>
</tr>
<tr>
<td>Lack of alternative indication</td>
<td>Mental shortcuts (biases)</td>
</tr>
<tr>
<td>Personality conflicts</td>
<td>Limited short-term memory</td>
</tr>
</tbody>
</table>
Limitations of Human Nature

- Avoidance of mental strain
- Inaccurate mental models
- Limited working memory
- Limited attention resources
- Pollyanna effect
- Mind set
- Difficulty seeing own errors
- Limited perspective
- Susceptible to emotion
- Focus on goal
Two Kinds of Error

Active Error

Latent Error
Performance Modes -- Attending Problems

High

Knowledge-Based
Patterns

Inaccurate Mental Picture

Rule Based
If - Then

Skill-Based
Auto

Misinterpretation

Inattention

Low

Attention (to task)

Low

High

Familiarity (w/ task)

Resiliency
Bob’s
Veterinarian/Taxidermist

“Either Way You Get Your Dog Back”
Human Performance Tools

- Critical Steps
- Enhanced Pre-Job Briefing
- Peer Check
- Self Check
- Independent Verification
- Error Traps
- Just Culture
- Effective Communication
- Questioning Attitude
- Feeling of Uneasiness
- Enhanced Turnover
- 3 way communication
- Error Precursors
- Performance/Error Modes
- Devils Advocate
- Place keeping
- Poka Yoke
- SAFE Dialogue
- Discovery Clock
- STAR
- Training
What is the Organizations Role?

- Support the Education and Implementation of the HRO/HPI process
- Encourage Accountability and the Development of a Just Culture
- Encourage the use of the HPI tools

What are the Employee’s Responsibilities?

- Have a Questioning Attitude
- Develop a strong sense of Accountability
- Use of the HPI tools, Use the HPI tools