Causal Factors Analysis to Investigate Information-Rich Events Before Accidents Occur

Beyond Regulatory Compliance, Making Safety Second Nature

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Fundamental High Reliability Organization Practices
Use a Systems Approach to Avoid Catastrophic Accidents

- Ensure system provides safety
- Manage system, evaluate variability
- Foster culture of reliability
- Model organizational learning

- Deploy system
- Evaluate operations – meas. variability
- Adjust processes

HRO Practice #1
Manage the System, Not the Parts

HRO Practice #2
Reduce Variability in HRO System

HRO Practice #3
Foster a Strong Culture of Reliability

- Provide capability to make conservative decisions
- Make judgments based on reality
- Openly question & verify system

HRO Practice #4
Learn & Adapt as an Organization

- Generate decision-making info
- Tiered approach
- Refine HRO system
How Organizational Accidents Happen & Logic of CFA Investigation Process
Organizational Causes of Accidents

If barriers fail, unsafe act could result in Event

Many unsafe acts

As a result of stress, worker cuts corners

As a result, stress in workplace

Organization commits to challenging work load

Event

Failed Defenses/Barriers

Organization Causes

Unsafe acts

Local workplace factors

Organizational Factors

Latent Conditions

Active failures

Adopted from Reason, Managing the Risks of Organizational Accidents
Causal Factors Analysis starts with the low consequence, information-rich event and separates “WHAT” happened from “WHY” it happened. This allows us to drill down to find the:

1) Flawed defenses
2) Active failures (unsafe acts)
3) Human performance error precursors
4) Latent conditions (local workplace factors & organizational factors).

Adopted from Reason, Managing the Risks of Organizational Accidents
Finally, as part of the lessons-learned – the necessary changes in the HRO are made to improve the organizational response or behaviors.

Adopted from Reason, Managing the Risks of Organizational Accidents
Use the organizational causal factors to determine which HRO practice needs improvement.
Primary Outputs of the CFA Process
I/O to Achieve Desired Result of CFA Investigations

Desired Results:
- Prevent Recurrence of Events
- Learn as an Organization

Key Attributes of HRO

3 Process Outputs To Achieve Results:
- Safety Culture Insight
- Corrective Actions
- Lessons-To-Be Learned

Process Inputs:
- Low consequence, information-rich events
- Organizational accident

Criteria to drive CFA Investigations "RIGHT"

CFA Supports DOE Accident Investigation Process

Unique Feature
There is just as much information about organizational weaknesses in the event to the left as there is in the accident on the right.

There is no need to wait for the “big one” conduct a CFA investigation for information rich opportunities!
CFA Process
Causal Factors Analysis Process Flow

1. Event Recognition*
2. Investigation
3. Analysis
4. Judgment of Need
5. Correct
6. Learn

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- Event Recognition*
- Investigation
- Analysis
- Judgment of Need (AND)
- Correct
- Learn
- Repeat Event (OR)
- Check
Causal Factors Analysis Charting

Step 1
Initial Conditions – what we were planning, expecting, assuming, or hoping

Step 2
Final Event & Consequence what actually happened

Step 3
Irrefutable chain of events

Step 4
Why it Happened
Causal Factors
Hundreds of things that weren’t perfect
Key factors that matter

What Happened

What Happened Why it Happened
Folded high reliability concepts with systematic root cause investigation techniques to unveil underlying organizational contributors to prevent significant events.

Contains:

- Investigative Tools
- Step-by-Step Process
- Examples and Templates
- Method to Interpret Results and Provide Feedback to HRO
- Outline for Consistency
- Criteria for Quality

Authors: Hartley, Swaim, Corcoran
Available through GPO
http://bookstore.gpo.gov/collections/hro.jsp
Advantages

- Creates a positive atmosphere where workers feel less afraid to report errors – strengthens culture of safe performance
- Helps to unravel and understand deeper organizational issues and remove operational roadblocks
- Helps develop a stronger understanding of High Reliability Operations
- Facilitates joint union, contractor, and customer investigations into low consequence, yet organizationally rich events
- New investigative process and results are favorably received by regulatory bodies
- Process is designed to support the Department of Energy accident investigation process
- CFA is applicable to any High Risk/Consequence organization, its uses goes well beyond Pantex and the Department of Energy
"Figure out what happened to the last crew here, and tell the next crew not to do that."