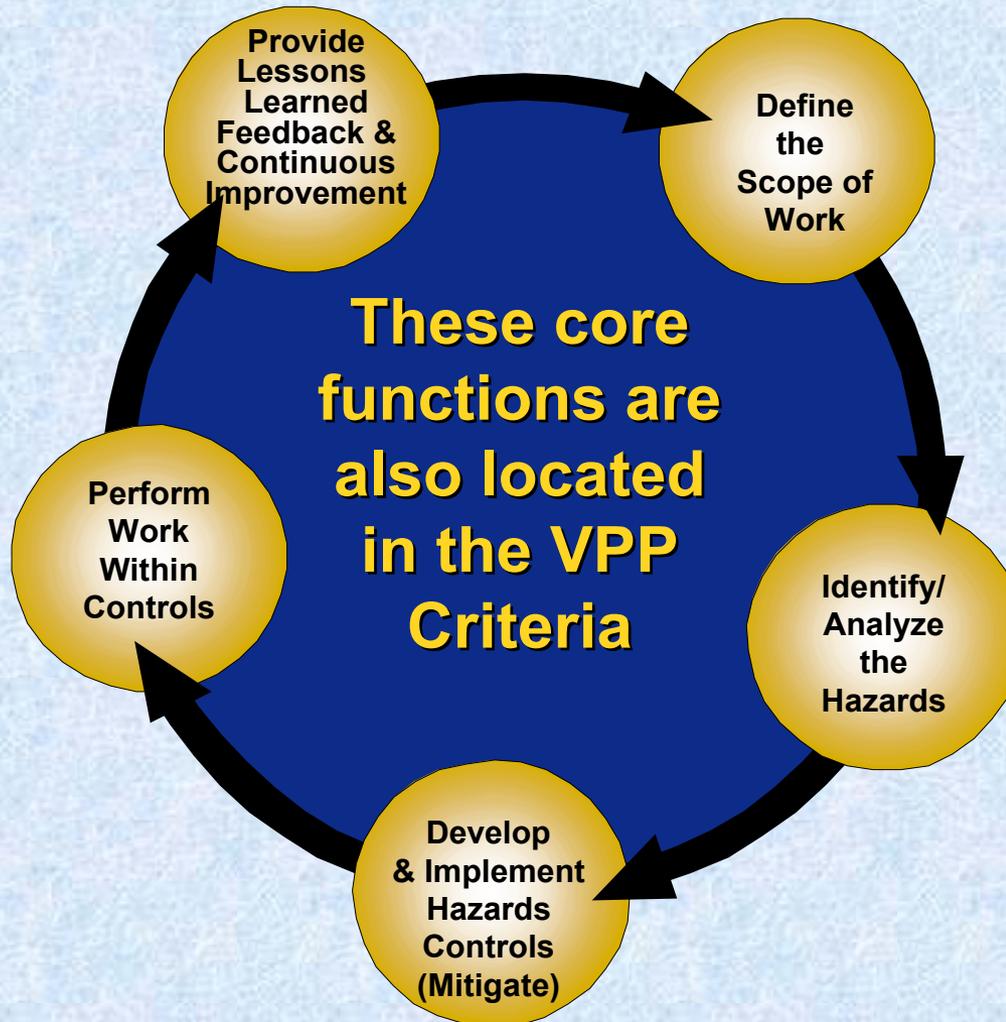


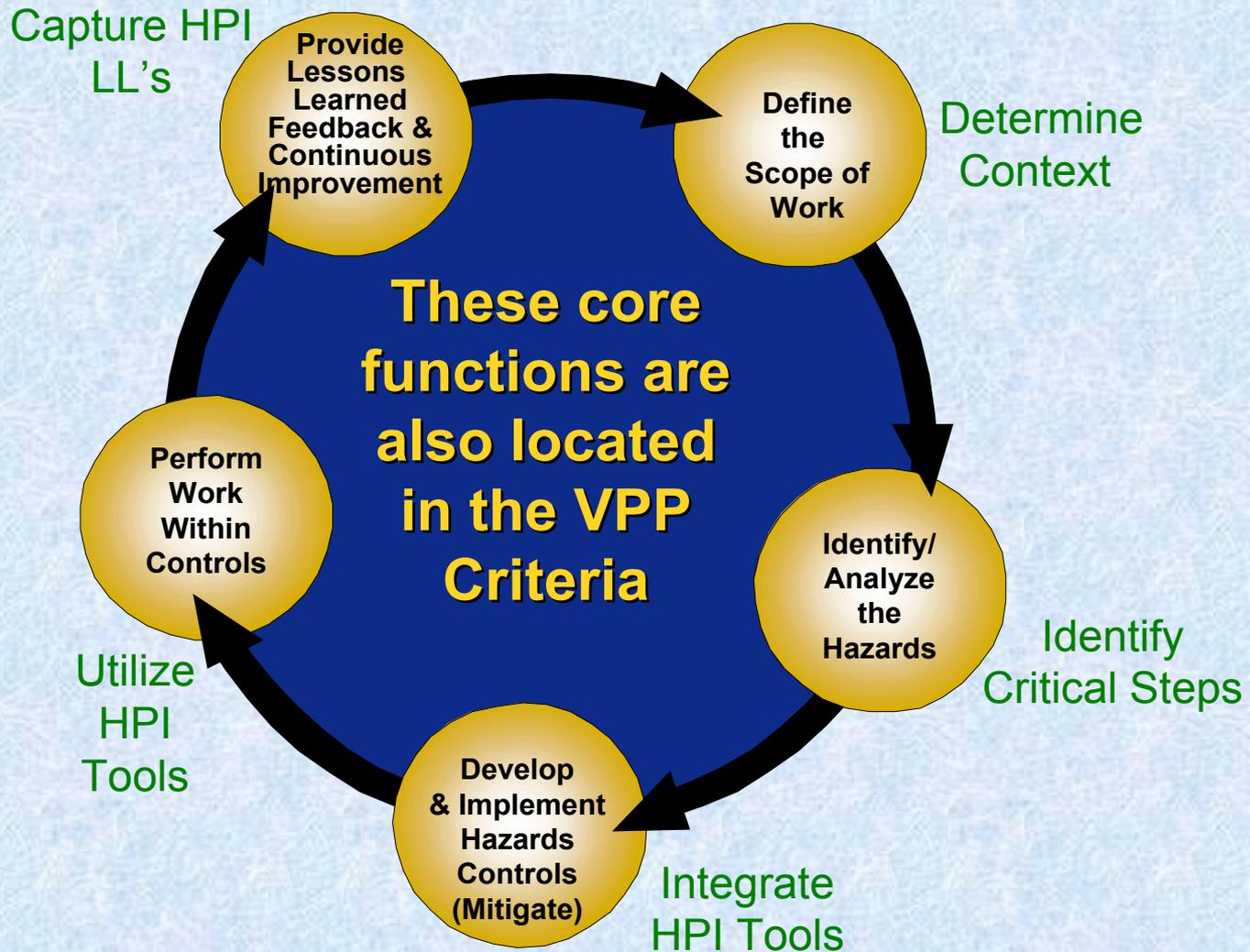


Human Performance/ISMS Workbook and Integration Guide

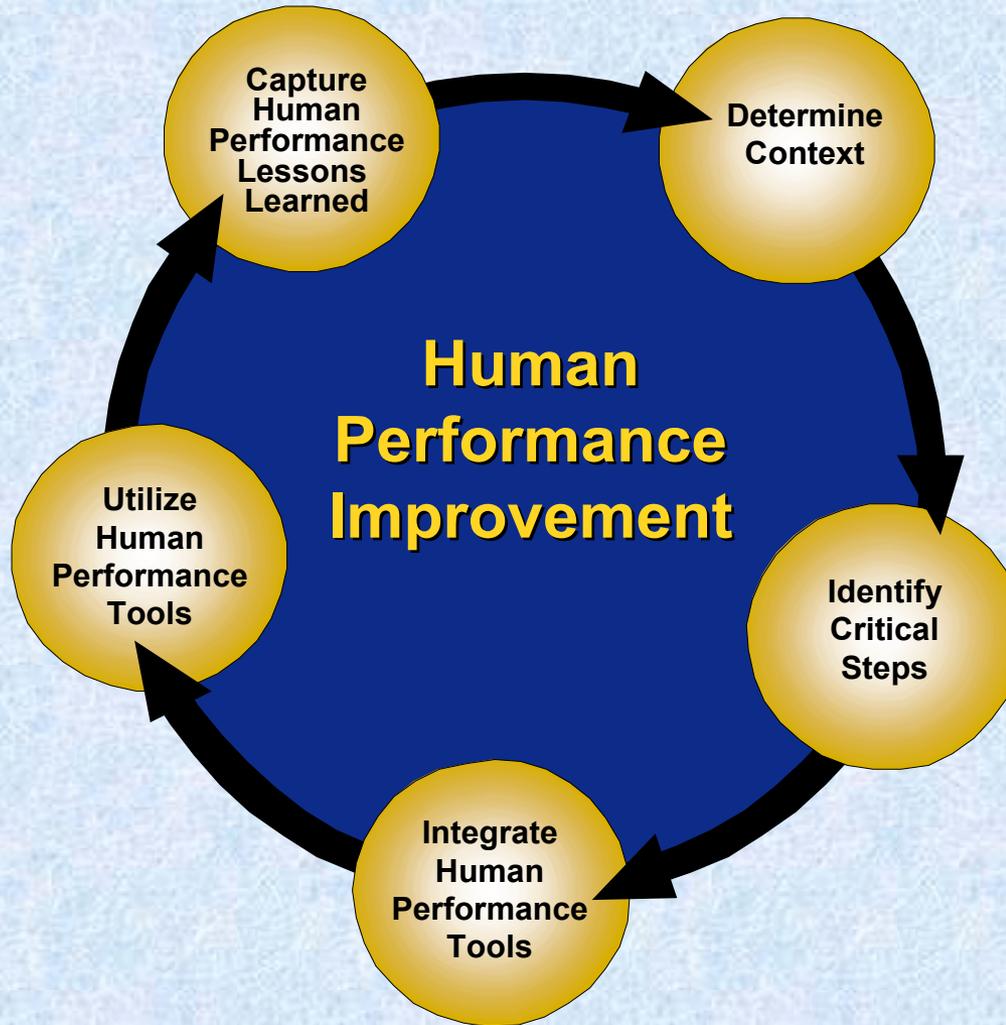
The 5 ISM Core Functions are “Simple” to Remember



Integrating ISMS and Human Performance Systems

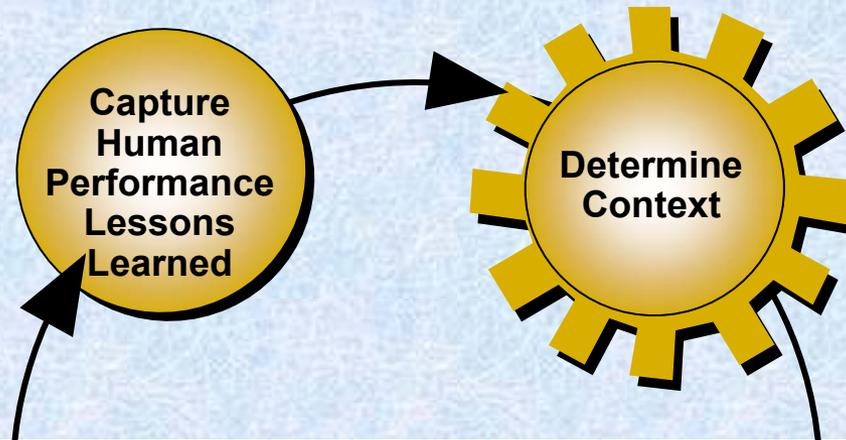


The 5 ISM Human Performance Core Functions



Function 1

Determine Context



Determine the “Context” of the work. Location, day of week, time of day, considered routine or special, Error Precursors, Latent Org Weaknesses, relationship to other work scheduled, etc.

Error Precursors

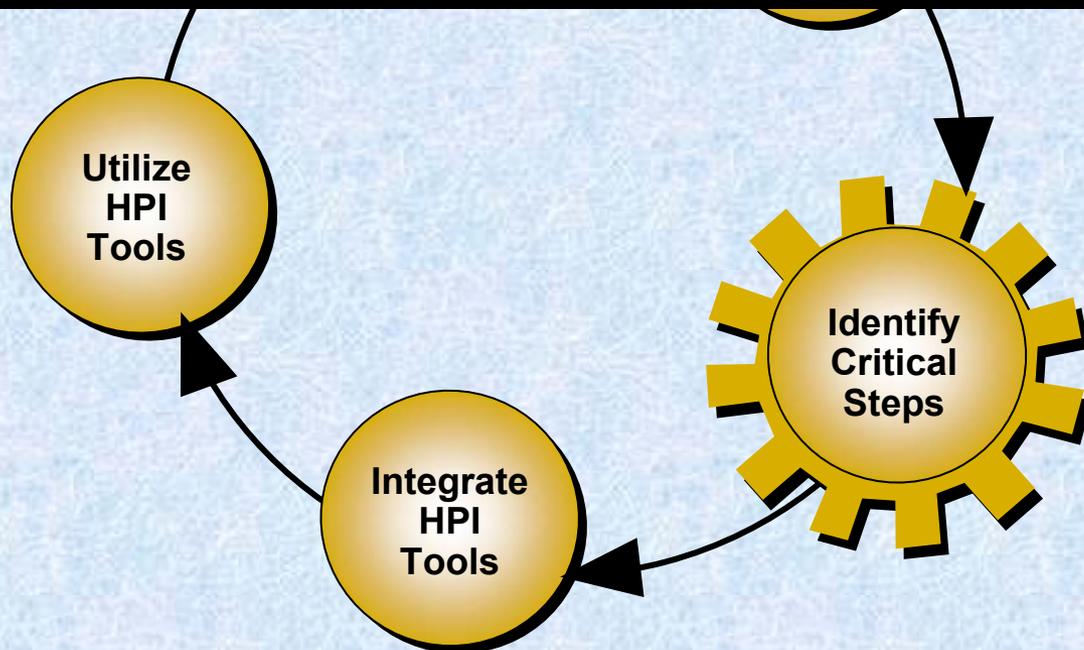
short list

Task Demands	Individual Capabilities
• Time pressure (in a hurry)	• Unfamiliarity w/ task / First time
• High Workload (memory requirements)	• Lack of knowledge (mental model)
• Simultaneous, multiple tasks	• New technique not used before
• Repetitive actions, monotonous	• Imprecise communication habits
• Irrecoverable acts	• Lack of proficiency / Inexperience
• Interpretation requirements	• Indistinct problem-solving skills
• Unclear goals, roles, & responsibilities	• “Hazardous” attitude for critical task
• Lack of or unclear standards	• Illness / Fatigue
Work Environment	Human Nature
• Distractions / Interruptions	• Stress (limits attention)
• Changes / Departures from routine	• Habit patterns
• Confusing displays or controls	• Assumptions (inaccurate mental picture)
• Workarounds / OOS instruments	• Complacency / Overconfidence
• Hidden system response	• Mindset (“tuned” to see)
• Unexpected equipment conditions	• Inaccurate risk perception (Pollyanna)
• Lack of alternative indication	• Mental shortcuts (biases)
• Personality conflicts	• Limited short-term memory

Function 2

Identify Critical Steps

Identify all steps where if Human Error occurred it would result in an unwanted outcome.



Summarize Critical Steps

- Not all steps of a procedure are equally important.
- Critical steps include:
 - Actions aimed at changing the state of facility structures, systems, or components
 - Steps that are irrecoverable or actions that cannot be reversed
 - Steps where the outcome of an error is intolerable for personnel or facility safety.

Anticipate Error Traps

- Review the job-site conditions using the error precursors list.
- Some error precursors are particularly powerful, depending on the performance mode of the individual performing the action. For instance;
 - distractions, simultaneous tasks, and fatigue strongly influence skill-based performance
 - Mindset and confusing procedures influence rule-based performance
 - assumptions, first-time performance of the task, lack of knowledge, and inexperience influence knowledge-based performance

Foresee Potential Consequences

- If a mistake does occur at a critical step, what is the worst that can happen? What is likely to occur?
- Consider the production goals that would not be achieved. However, safety and prevention are more important than schedule.
- Intolerance for error-likely situations should prevail. If the potential outcomes of an error are judged as too severe, the task should not proceed as presently planned.

Evaluate Defenses

- Since error-prevention is situational, this stage requires thinking about necessary defenses in light of potential errors.
- Determine contingencies for potential consequences of error.
- Additional defenses could be put in place for specific steps in the task to guard against an error or an event.
- The pre-job briefing provides an opportunity to identify recovery methods should undesirable errors or consequences occur.

Review Experience

- The first four elements of the task preview address what might happen. This step addresses what errors have occurred with this activity in the past? How have people made mistakes with this task in the past?
- Choose operating experience that focuses on the critical steps of the task at hand.
- Sources of Lesson Learned:
 - OA Data Base
 - OSHA Web page
 - Operating Experience Web page
 - DOE & Contractor Lesson Learned Data Bases

Defend Against Errors and the Consequences of Errors

- In most cases, additional defenses employed to minimize the risk of an error or an event for a particular task will be administrative in nature, such as additional supervision, use of error-prevention techniques, or improvements in procedures or job aids.
- Contingencies should consider defensive functions to enhance the individual's and plant's ability to recover from error, especially at the critical steps, to avert an event.

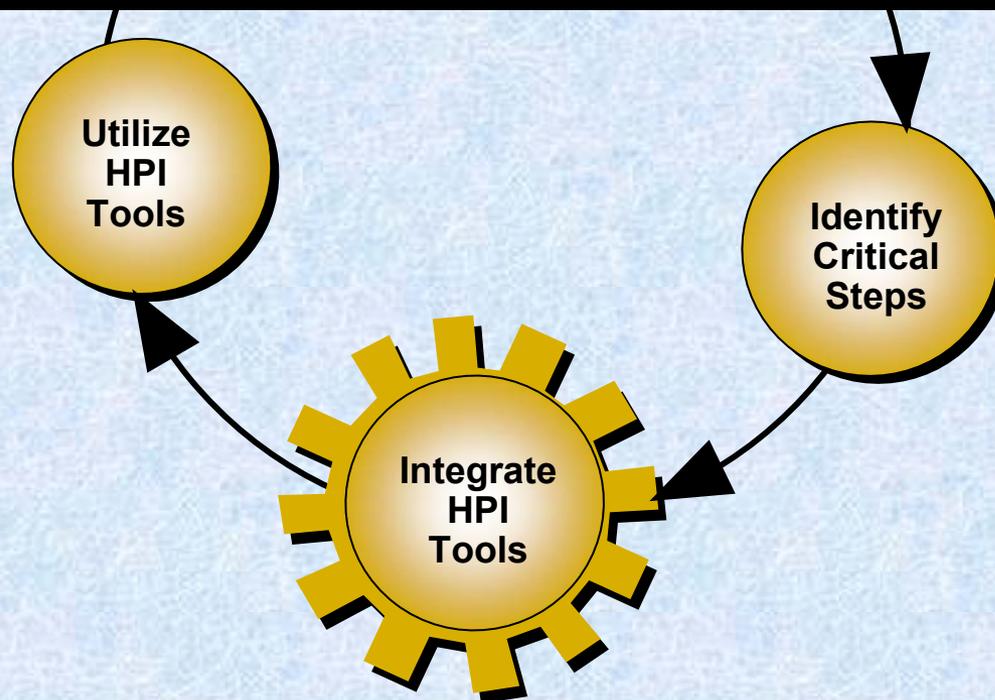
Evaluate Your Defenses within CONTEXT

- K-Basin Diving Activities
- Listed the critical steps
 - Oxygen at 20'
- Three methods of receiving oxygen
 - Main hose
 - Back-up hose
 - Portable oxygen bottle

Function 3

Integrate Human Performance Tools

Review the HPI tool box for tools that are best suited for the given critical steps and integrate into the work control process.



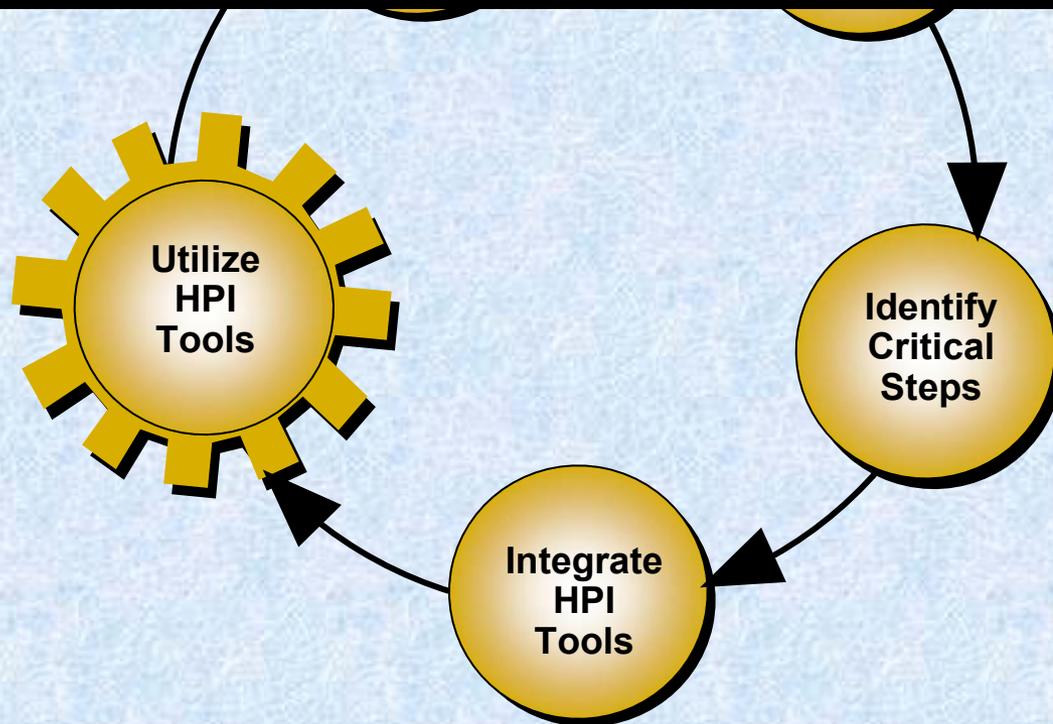
Human Performance Tools

- 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

Function 4

Utilize Human Performance Tools

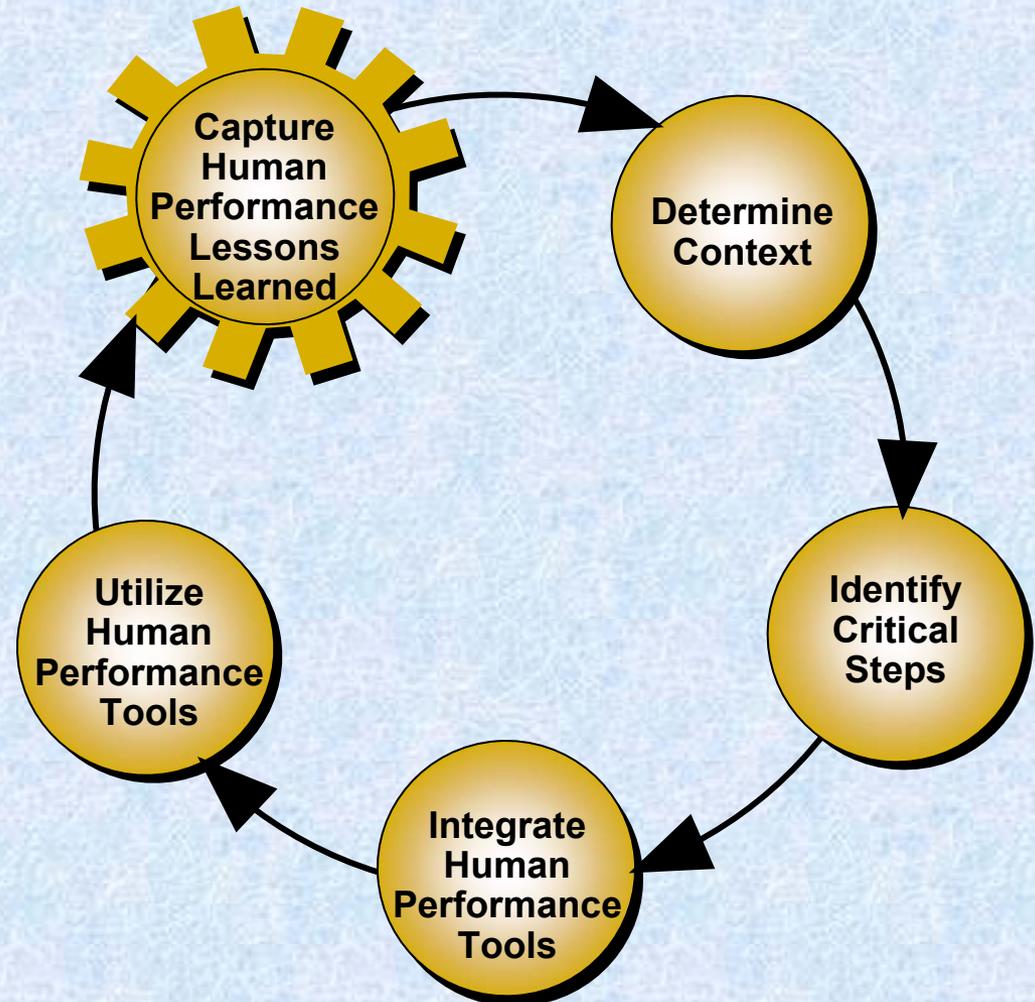
Enhanced pre-job briefings define the proper use of Human Performance Tools.



Function 5

Capture Human Performance Lessons Learned

Feedback information on the adequacy of Human Performance Tools is gathered, opportunities for improving the definition and planning of work are identified and implemented. Defenses are evaluated for integration of lessons learned.



Safety—It's a Serious Responsibility



"You weren't listening. I said, 'Don't fall.'"



American Society of Safety Engineers

www.asse.org

Patterns of Failure

At a particular moment in time, behavior that does not live up to some standard may look like complacency or negligence. But deviance may have become the new norm across an entire operation or organization.

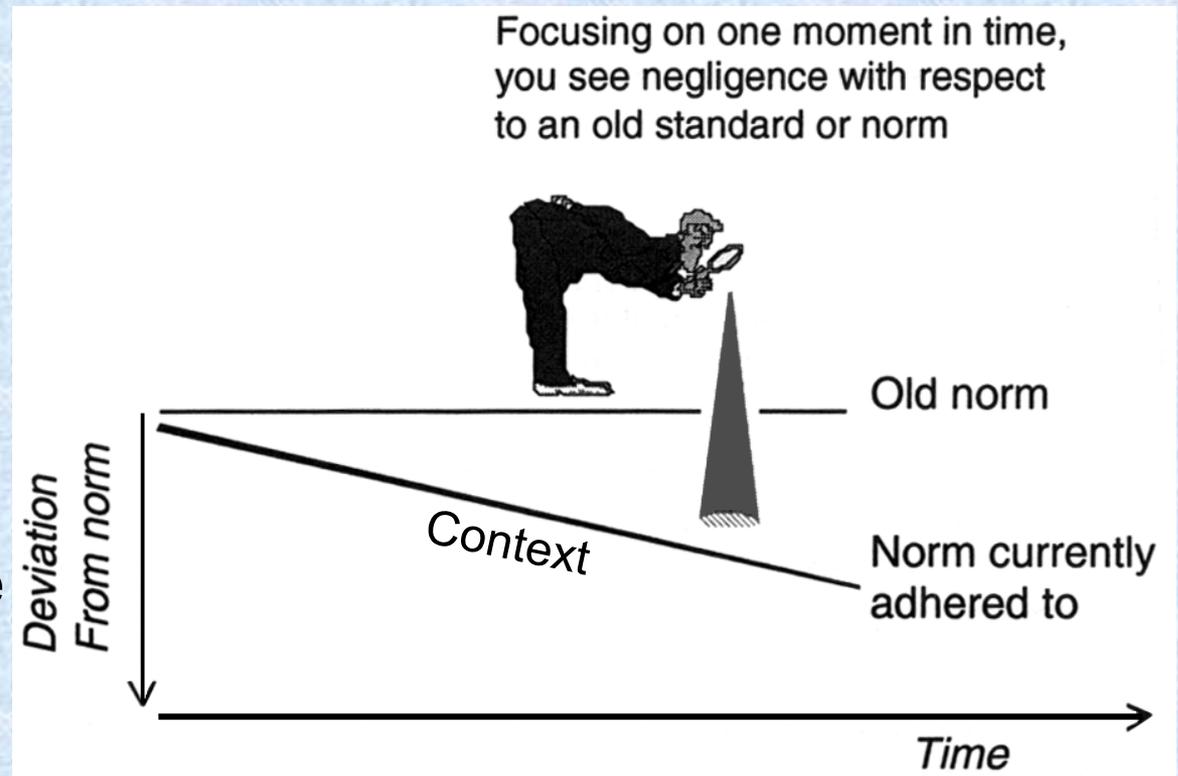


Illustration from: *The Field Guide to Human Error Investigations*

Human Error Investigation Quick Guide.

Post-event analysis helps discover latent weaknesses/conditions in the organization. A common pitfall to root cause analysis is prematurely denoting the 'root cause' of an event with symptoms such as 'inattention to detail' or 'failure to self-check.' There are usually several reasons the event occurred. **Shifting one's thinking from 'who caused...' to 'what could have prevented...' is crucial to identifying the fundamental causes of events.** Using the Anatomy of an Event in an *investigative mode* can help guide an analyst in determining causal factors. In addition to individual performance, the following approach can promote the search for organizational weaknesses/conditions:

- Step 1: Determine level of inquiry: Review, Assessment, or Investigation.
- Step 2: Obtain a general overview of what the event was/is and request that the accident scene is secured if applicable.
- Step 3: Obtain a list of those primarily involved and schedule and complete the interviews as soon as practical.
- Step 4: Review other data such as procedures, policies, statements, etc. If possible walk down the scene of the event.
- Identify and describe the nature of the initiating action, including errors, violations and unsafe acts. This is done by clearly identifying;
- 1) Goal or what he or she was trying to accomplish,
 - 2) Knowledge about the current situation or mental picture,
 - 3) What he or she was paying attention to, and
 - 4) Job-site conditions or error-precursors that provoked any active errors or encouraged violations.
- Step 5: Divide the event into episodes. Begin to reconstruct the situation present during each episode.
- Identify the task(s) or activities associated with each episode.
- Identify the Critical Junctures within each episode.
- Identify the defenses or barriers that failed to prevent, catch, or mitigate the initiating action (the behavior of the individual).
- Identify the defenses or barriers that failed to prevent or mitigate the consequences of the event (the results to the facility).
- Step 6: Capture your findings in accordance with the level of report required by the requesting organization.
- Human Performance is holistic in both causing and preventing events. Your report must address the performance of both the worker and the organization.
- Remember to capture the exacerbating and mitigating influences. Report your findings in the form of Predictions.

Drill
into conduit

Fire
Hydrant

Electrical
Panel

Back Into
Power Pole



Root
Cause

Changes

Root
Cause

Root
Cause

Root
Cause

Assumptions

Habit Patterns

Interpretation

Time Pressure

Unclear Goals

Stress

Error Precursors

Workarounds

New Technique

Simultaneous

Hidden System Response

Complacency

Repetitive Actions

Hazardous Attitude

Human Performance Simulator

Distractions



Error Traps

Time Pressure



Confusing Displays

Error Precursors

Active Errors

Latent Errors

Critical Steps

$$Re + Md = 0$$

Latent Organizational Weaknesses

