EFCOG Best Practice #151

August 2, 2013

Best Practice Title: Task Preview – A Risk-Based Approach to Error Management in Work Planning

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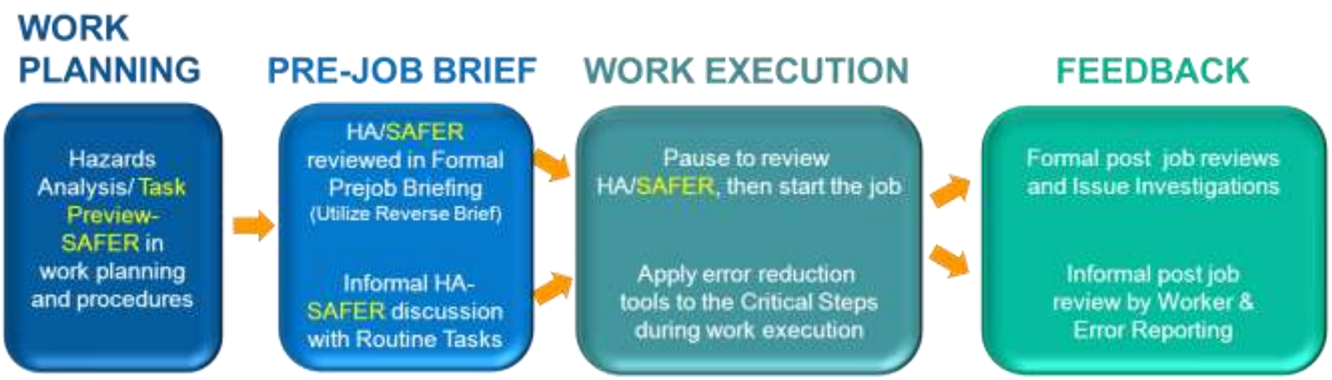
Brief Description of Best Practice: The Task Preview-SAFER error reduction tool provides a structured, risk-based preview of work activities from a human performance perspective and enhances the worker's situation awareness in the field. This best practice is based on INPO's Human Performance Tools for Workers (INPO 06-002) and DOE's Human Performance Improvement Handbook (DOE-HDBK-1028-2009).

Work Process



The Task Preview is performed in the Work Planning phase and is formally incorporated into the Prejob Briefing.

During the Task Preview, workers review procedures, instructions, hazards analyses, and other related technical work documents and may perform a walkdown to familiarize themselves with the scope of work and task sequences. Critical steps are identified along with possible errors and likely consequences. Appropriate error reduction tools (self check, peer check, independent verifications, flagging, placekeeping, etc) are then discussed and incorporated into the technical work documents where appropriate. Other controls and lessons learned from personal experience and industry are also discussed.

A Task Preview takes on one of three levels of effort in the Work Planning phase.

1. For low risk routine work, the supervisor will mentally go through the SAFER review in preparation for the Prejob Briefing.

S ummarize the critical steps.

A nticipate errors for each critical step and relevant error precursors.

F oresee probable and worst-case consequences should an error occur during each critical step.

E valuate controls or contingencies at each critical step to prevent, catch, and recover from errors, and to reduce their consequences.

R eview previous experience and lessons learned relevant to the specific task and critical steps.

2. For non-routine low or high risk work, the supervisor collaborates with the Planner/Procedure Writer to perform a Task Preview review of the work activity. The results are incorporated into the work documents.

3. For one-time, complex high hazard work, the supervisor performs a Task Preview with the whole work group involved in the job.

Once completed, the results of the Task Preview are reviewed in the Prejob Briefing using SAFER.

Reverse Briefs are used to increase the engagement level of the workers.

For routine, low risk work not requiring a formal Prejob Briefing, an informal Prejob Briefing and SAFER discussion is performed. Attachment 1 provides guidance on this discussion.

Task Previews are also performed as part of the procedure development process. Attachment 2 provides guidance on the conduct of Task Previews on procedures.

Pauses are used at the job-site right before starting work to review the jobsite conditions and hazards, hazards controls, and error reduction tools that will be used to perform the job error free.

Why the best practice was used: The Task Preview serves as the foundation for effective application of the error reduction tools, based on error-risk potential.

What are the benefits of the best practice: Effective use of the Task Preview enhances the worker's situational awareness while in the field, leading to the reduction of incidents caused by human error. A group Task Preview captures the knowledge of the whole group in identifying the critical steps and the methods to control them. Site Services Rigging has formalized the group Task Preview for chain-rigging activities, requiring work group SAFER reviews, rigging sketches with documented supervisor approvals, and Peer Checks on critical steps. Task Previews can also streamline the administrative controls placed on work, based on the risks (likelihood and consequence) of error. For example, rather than every step in a "Use Every Time" procedure being initialed and dated, only the risk important steps are. Some steps may have additional rigor (e.g., Second Person Verifications, IVs, etc) applied based on higher levels of risk.

What problems/issues were associated with the best practice: 1) Early implementation was hampered by a lack of understanding the concept of "critical steps". This was a common problem shared with the nuclear industry. To overcome this, numerous examples of critical steps have been provided in Task Preview-SAFER briefings. 2) Personnel have been "conditioned" over the years to be overly cautious on placing controls in procedures. To help create the proper risk-based mindset required to conduct effective Task Preview-SAFER reviews of work activities, facility representatives on the Site HPI Working Group have taken ownership of implementation and are providing ongoing coaching to the supervisors, planners and procedure owners to ensure their understanding of the tool. This often includes facilitating a SAFER review of procedures/work packages with the procedure/work package owners and reviewers.

Attachment 3 contains additional explanation and examples of critical steps.

How the success of the Best Practice was measured: Use of the tool is being monitored and reinforced with Management Field Observations and FEB evaluations. Effectiveness will increase as the organization goes up the learning curve. Sustained reinforcement and coaching of the tool is needed to achieve effectiveness. One facility – Savannah River Tritium Enterprise – identifies critical steps in their technical work documents using a "Bomb" stamp. The stamp provides immediate recognition that the workers are identifying critical steps. Many of them have expressed ownership of the process because they are the ones who decide what steps to stamp. The stamp provides visible evidence that the process of preparing for Pre-Job Briefs and the approach to thinking about work is changing. There are two ways of measuring a HPI-based initiative: 1) you can measure the "doing" (by visible presence of the stamp), and 2) you can measure the improvement by a reduction in events and issues over time. The stamp also provides a kick-off point for enhanced Reverse Pre-Job Briefs that promote worker engagement.

Description of process experience using the Best Practice: One-on-one and small group discussions using relevant examples allows for back and forth Q&A, which is needed to achieve a good understanding of the terms and tool.

The use of reverse briefings is an effective tool for promoting worker ownership of error-free performance in the field.

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ISM core function and guiding principle to which this best practice relates: The Task Preview supports the "Identify and Analyze the Hazards" ISM core function and guiding principle. Following is an explanation of how the Task Preview supplements the traditional hazards analysis.

Hazards analyses are focused on protecting the worker from the hazards with the job and at the work site. This is accomplished by identifying the job and work site hazards, and then complying with the safety requirements (PPE, barricades, confined space rules, HEC, etc) and other site-specified hazards controls (ie, Radcon controls) associated with the identified hazards.

The Task Preview goes beyond the traditional hazards analysis. The focus of the Task Preview, along with all the other error reduction tools, is to protect the plant and environment and population from the human hazard (the worker's errors). This is accomplished by applying error reduction tools to critical steps in order to minimize and/or catch human error that can trigger unwanted consequences. These consequences include process upsets, equipment damage, environmental impacts, and regulatory noncompliances, as well as injuries to the worker and others.

Comparison of Hazards Analysis and Task Preview-SAFER

	Protects	**From Hazards**	**Using Controls**	**To Avoid**
Hazards Analysis	Worker	Job and work-site hazards	Safety Manual RadCon Manual etc	Injuries Contamination
Task Preview-SAFER	Plant Environment Workers General population	Human hazard (error)	Error reduction tools	Process upsets Equipment damage Environmental impacts Regulatory noncompliances Injuries

Attachment 1 - Informal Prejob Briefing

For routine, low hazard work, the questions below can be used to discuss accomplishing the job safely and error-free. Questions 1 and 2 address basic hazards controls. Questions 3 through 6 address the use of error reduction tools.

<u>Hazards Analysis - SAFER Questions</u>

1. Given the scope of work, what are the job and worksite hazards?
2. What controls will be used to protect you from the hazards?
3. Given the work scope and hazards, what is the worst thing that could happen?
4. Where in the job – at what critical step – can the worst thing happen? What else can go wrong?
5. How will you ensure the critical steps will be performed error-free?
6. Are there any lessons learned from past performance of this job?

These questions can also assist in identifying critical steps during a Task Preview in preparation for a formal Prejob Brief.

One supervisor and work group performed this review each morning on a different routine job for three months. More LLs (Question 6) began to surface in the discussions as the group got comfortable with sharing and learning from each other's past experiences.

With that foundation of sharing, a seventh question can be added to the discussion:

7. Did you have any errors or close calls yesterday you want to share with the group?

Attachment 2 - Task Preview-SAFER Review of Procedures

For existing procedures

- apply Task Preview on selected procedures during periodic reviews, or
- issue PCR as needed to capture Task Preview results from the Pre-job Briefing or from a Post Job Review

Informal Prejob Briefing questions can help surface the critical steps in a procedure.

1. Given the scope of work, what are the job and worksite hazards?
2. What Controls will be used to address the job and worksite hazards?
3. Given the scope of work and the hazards, what is the worst thing that could happen?
4. Where in the job – at what critical step – can the worst thing happen ? What else can go wrong?
5. How will you ensure the critical steps will be performed error-free?
6. Are there any lessons learned from past performance of this job?

Attachment 2 (cont'd)

Risk Evaluation of Each Step

Is the step value-added? Is it needed for the worker to perform the job? If you left the step out of the instruction, what is the likelihood it wouldn't get done?

Three types of errors that most often occur when using procedures/work instructions

1. Error of omission – the user forgets to do something or overlooks it
2. Error of commission – the user performs the step incorrectly (operates wrong control, erroneous transcription, lands wire on wrong terminal, incorrect reinstallation)
3. Error of interpretation – the user misinterprets a poorly written action step, often a conditional "If . . ., then" step, or misinterprets plant conditions or communications.

Risk = Potential for error x Consequence of error

Potential
- how often is the task performed ?
- how can the task be performed in error ?

Consequence
- what will happen if the task is performed in error ?

Overall Risk considers Potential and Consequence

Task/Task Frequency	**Potential for error** (forgets to do task or performs task incorrectly)	**Consequence of error**	**Overall Risk**
Replacing electrical component /many times a week	Possible – re-land wires on wrong terminals	Equipment damage	Negligible to High, depending on amount of potential equipment damage
Instrument Calibration/many times a week	Possible – wrong unit of measurement used for calibrating gauge, resulting in as-left pressure setting being too low or too high	Equipment damage; uncontrolled safety envelope for SS system	Negligible to High, depending on function of system the gauge is used in
Component reassembly/many times a week	Possible – forget to do a subtask; reassemble incorrectly	Equipment damage; production impact if long procurement time	Negligible to High, depending on use of equipment and replacement cost

Attachment 2 (cont'd)

Given the step's error risk (potential and consequence), which error reduction tools should be applied, using a graded approach based on the level of risk, to ensure the step is performed error free ?

FUNDAMENTAL HUMAN PERFORMANCE TOOLS............

- Situation Awareness ....
  - Task Preview..........
  - Job-Site Review ....
  - Questioning Attitude..........
  - Stop When Unsure ....
- Self-Checking ....
- Procedure Use and Adherence..........
- Effective Communication..........
  - Three-Way Communication..........
  - Phonetic Alphabet..........

CONDITIONAL HUMAN PERFORMANCE TOOLS..........

- Prejob Briefing..........
- Verification Practices..........
  - Concurrent Verification ....
  - Independent Verification ....
  - Peer-Checking..........
- Flagging ....
- Placekeeping ....
- Turnover..........
- Postjob Review ....

Graded approach to placekeeping and verifications

- Checkmark in left margin
- Step initial sign off
- Verification using peer, FLM, Engr, Safety
- IV

Attachment 2 (cont'd)

Graded approach to applying error reduction tools

1. Errors of omission occur at critical steps, both "point of no return" critical steps and upstream critical steps. Upstream critical steps can be verified after step completion or right before the "point of no return" critical step. An example of an upstream critical step is a valve line up performed in the morning in support of a transfer (the "point of no return" step) scheduled for the afternoon. The valve lineup has error potential and consequence, but the consequence from the error is not immediate. Instead, the consequence occurs later on when the "point of no return" critical step transfer is performed. Because they have no immediate consequence, upstream critical steps can be verified to be error-free <u>after</u> step completion. Placekeeping methods with increasing levels of rigor are selected using a graded approach and include:

- Checkmarks in margin at each step
  - Initialed step
    - Second Person Verification (by Peer, Supv, Engr, etc)
      - Independent Verification (IV) and QC Holdpoints

"Point of no return" critical steps <u>cannot</u> be verified after completion, because consequences at these steps are immediate and irrecoverable. "Point of no return" critical steps must be verified as error-free right before and/or during the step. Error reduction tools that assure these steps are performed error-free include (using the graded approach):

- Self check
  - Peer check
    - Second person verification (documented peer check)

** IV's are <u>not</u> used at a "point of no return" critical step, as they are performed <u>after</u> the completion of a step.

2. Errors of commission can occur at upstream critical steps or at "point of no return" critical steps. Errors of commission at upstream critical steps can be detected after step completion and corrected. Typical error management tools that detect and correct errors of commission at these upstream steps are second person verifications, IVs, QC Holdpoints. Typical error reduction tools that prevent errors of commission at "point of no return" critical steps are self-checks, peer checks, flagging, second person verifications, phonetic alphabet, and three way communication. For some Ops managers, the use of a self-check is a standard expectation whenever manipulating plant equipment, regardless of consequence.

3. Errors of interpretation can occur at upstream steps or "point of no return" steps. Typical error reduction tools that prevent or detect and correct errors of interpretation are prejob briefings, self-checks, peer checks, second person verifications, IVs, three way communication, Questioning Attitude, and Time Outs.

Attachment 3 - Critical Steps

A critical step

- Is a “Point of No Return” action
  - There is a commitment to proceed
  - There is no turning back
- If the step or action, or a preceding action (upstream step), is performed in error, an intolerable consequence will immediately follow the “point of no return” step.
- The error would result in a serious incident, such as a process shutdown, equipment damage, environmental release, a TSR procedure non-compliance, or an injury.

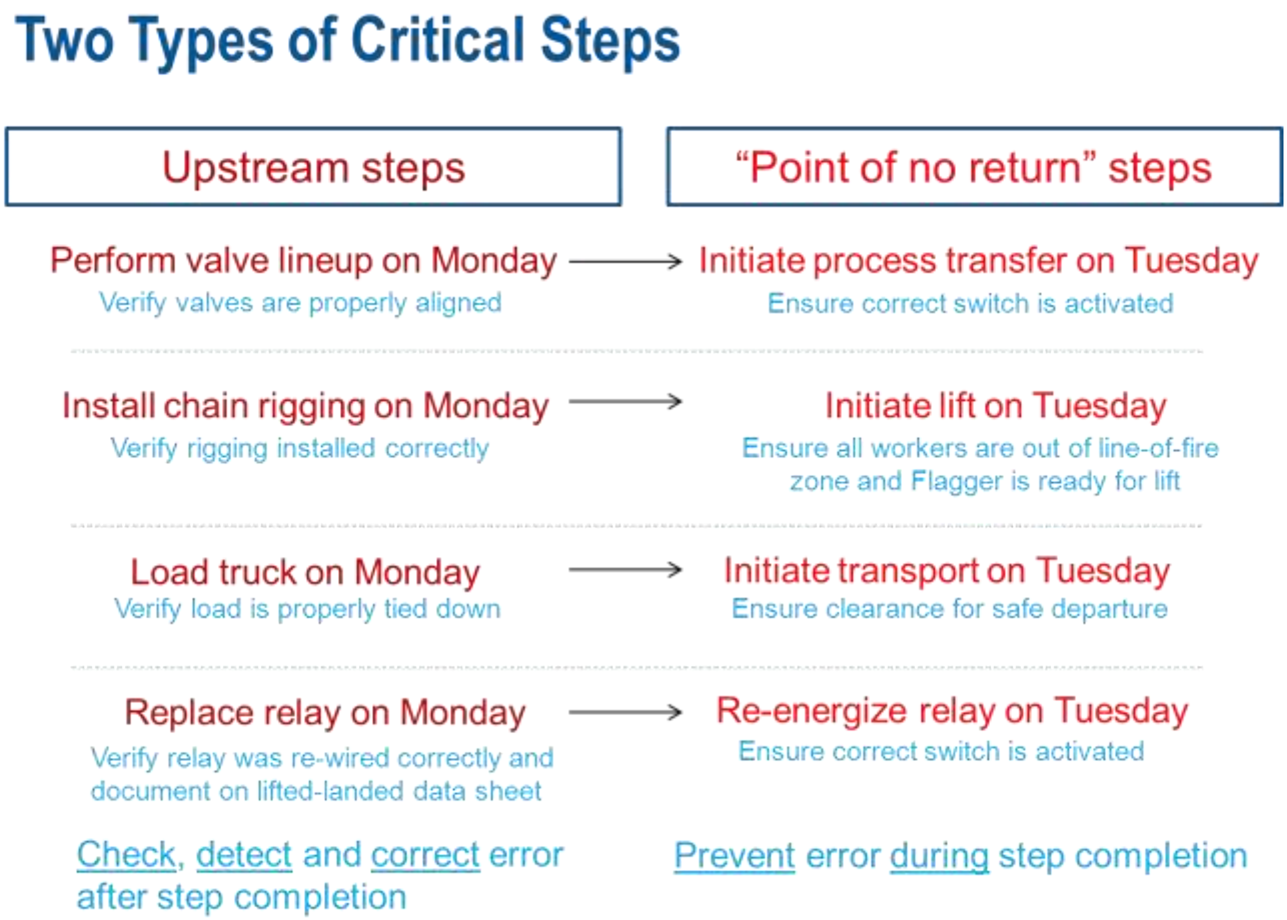
"Point of no return" critical steps - have immediate consequences if performed in error, ie, operating the wrong switch.

"Point of no return" critical steps must be performed without error, since the consequences of error are immediate and irrecoverable. Error reduction tools used at these critical steps include self checks, peer checks, phonetic alphabet, three way communication, procedure compliance, etc. All prevent error from occurring at the "point of no return" critical step.

"Upstream" critical steps - have delayed consequences if performed in error. Examples are improper valve lineups, landing leads on the wrong terminals, improper rigging method or installation, or improper selection or installation of tie down method for loads to be transported. Errors at these steps lie hidden and latent, emerging later at the "point of no return" critical steps.

"Upstream" critical steps can be checked for error after step completion, or right before the final "point of no return" critical step. Error reduction tools used for these "upstream" critical steps include placekeeping, check-offs or checklists, second person verifications, independent verifications, etc. All these tools catch the error and correct it after step completion, but before the start of the "point of no return" critical step.

Attachment 3 (cont'd)



Attachment 4 - Contributors to this good practice

- L Project Operations: Matt Beckum - L Area Ops Manager, Don Joyner - SOM, Linda Hair and Dave Flora - Procedures
- Utility Operations: Les Moore - Ops Water Team, Steve Burke – Procedures
- SRNL Maintenance: Lee Richardson - Maintenance Manager, Jessie Fields – Procedures
- H B Line: Craig Anderson - HB Line Facility Support Manager, Jim Sink – Procedures
- F Area Lab: Barry Sumner - F Area Watch Team SOM, Gene Bell - Procedures, Daryl Smoldt - F Area HPI Rep
- Tritium: Kevin Cross - Shift Ops Manager, Patrick Rapp - Training/Procedures Manager, Jack Alexander - HPI Rep
- F Tru - Bill Tadlock - F Tru Remediation Manager, David Wolfe – Procedures
- Maintenance Work Package Planning : Bruce Johnston – FLM, WP Jimmy Byrd - Planning Manager, Dan Beauchamp and Jimmy Hendrix – Planners; Scott Seigler – Utility Maintenance Manager
- EC&ACP: Jimmy Hall - EP Manager, Mark Spires - EP Technician, Steve Phillips – Procedures
- Diesel Maintenance : Speedy Gambrell – Maintenance Manager, Selvin Smalls and Alan Hayes – FLMs, Steve Burke – Procedures
- Transportation: Mike Owen – FLM
- Rigging – Robbie Strock, Will Kearse, Tom Bolton – Rigging Managers