



Best Practice # 70

Human Performance Factors Considered in Causal Analyses

Title: Considering how human error contributes to similar adverse events over time provides managers insight into developing improved defenses.

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Brief Description of Best Practice:

Considering the principles of human performance as part of multiple adverse event analysis offers greater insights for analysts and managers into the ways that human error can be reduced and defenses can be improved. These insights and subsequent corrective actions result in improved operations, enhanced corrective action plans, and greater management engagement.

Analysts use an adverse event sample set that allows for statistical significance and examines causal codes associated with human error. The errors are then related to performance modes and error precursors. Finally, analysts review the entire set of data to understand latent facility conditions and organizational weaknesses that enable the types of errors revealed by the data set.

Why the Best Practice was used:

Building tolerance for human error into work planning and execution improves performance. How to reduce errors or build tolerance for error into the work environment or operations is often overlooked. Typical causal analyses continue to examine adverse events in a way that implies adverse events occur in a very linear fashion. The typical causal methods fail to recognize the complexity involved in adverse events and the dynamic interplay between persons and the systems in which they operate.

By including human performance data, we can better appreciate how behaviors are influenced by factors such as previous learning experiences, cognitive processing and attention, changes in work activities, existing conditions associated with the facility or equipment, constraints associated with resources, time, and technology, and the expectations that are conveyed to workers by their peers and their managers.

Recognition of these factors by analysts and managers creates a focus on corrective actions that strengthen our defenses and continuously improve operations because the actions account for human performance principles. In those operations where it is recognized that human error will occur, managers build in tolerance for error. An often used example of this principle, building in tolerance for human error, is highway lanes built to allow for drivers wandering somewhat within their driving lane and rumble strips built along the side of the outside lane to alert drivers to the need to correct before it is too late.

What are the benefits of the Best Practice:

Evaluation of a collection of event data increases confidence in the results:

- In a typical adverse event investigation, a single case is examined; therefore evaluators are focused on a situation that is the exception to normal operational successes. Collective case study provides increased confidence that human behaviors are understood on a larger scale, more aligned with the "rule" rather than the "exception."

Accounting for human performance principles provides management with an opportunity to truly learn from the event and improve defenses:

- Human performance modes can be understood as an integral piece of a complex system. Considering the entire system leads to corrective actions that address conditions and practices that provoke human error.
- Corrective actions that address human error performance modes are more effective and emphasize correcting the reason for the error. This emphasis, for example, will eliminate the proclivity to

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train personnel as a corrective action instead of addressing the underlying cause which may or may not be related to training.

Accounting for human performance principles improves management engagement:

- Managers who recognize the value of human performance principles, will naturally build in means to be more aware of real-time developments in the work place that effect performance. By increasing operational awareness, managers are afforded the real opportunities challenge assumptions and modify work practices.

What problems/issues were associated with the Best Practice:

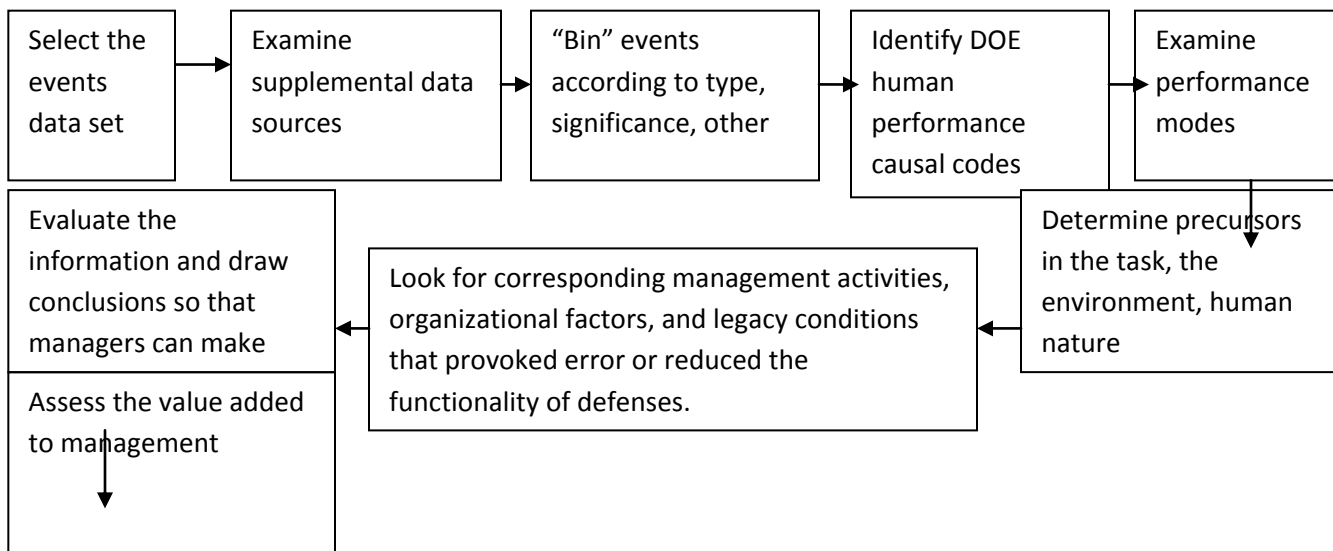
Occurrence investigation reports are the primary source of data that is analyzed collectively. In instances when an ORPS report is assigned a significance level of 4, no analysis is conducted, and the opportunity to learn from the event is lost. So, designing and implementing local practices not required by ORPS reporting to capture this information may be sound practice.

How the success of the Best Practice was measured:

We will measure the success of integrating human performance into collective adverse event evaluation in two ways:

- examine areas of operational experience in which negative performance trends are identified and examine the human performance errors across those events.
- seek management feedback regarding the value of the learning they gain from these evaluations and any changes they make in their work planning and work management.

Description of process experience using the Best Practice:



Including human performance considerations delivers data to managers often resulting in insight to the underlying cause of the recurring problem.