



Integrating Strengths of Behavior-Based Safety with Effective Process Safety Management

By Cloyd Hyten, Ph.D.

There are many practice areas in safety where subject matter experts, consultants and performers fail to appreciate what each has to offer the other.

This article addresses two such systems commonly in use today: Behavior-Based Safety (BBS) and Process Safety Management (PSM), both of which require a scientific understanding of behavior, and without which, neither area can excel.

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– Cloyd Hyten

BBS focuses on what people do, analyzes conditions surrounding behavior, and applies a research-supported method to improve safe practices. BBS, when done correctly, is based on practices representing the science of behavior analysis. PSM is an analytical approach to help prevent environmental releases of any substance defined as a “Highly Hazardous Chemicals” by the EPA or OSHA. In settings where PSM is needed, BBS cannot be far behind—and I would argue that the skills embedded in BBS must be present in the practices of PSM.

The words ‘process safety’ refer to a highly defined approach of best practices in the handling, transporting and removal of toxic and explosive materials to reduce the effects of potential disasters, including those we read about in the news: leaks of toxic chemicals, fires, explosions, and massive equipment damage with the potential to inflict mass casualties.

PSM emerged in the chemical industry as a result of the 1984 methyl isocyanate release from a Union Carbide plant in India that killed thousands in a nearby residential district. Its focus is to ensure that good engineering, maintenance and operating practices reduce the chance of a severe process-related event.

Typical activities associated with PSM include Process Hazard Analysis (PHA), developing and maintaining sound operating procedures, training of personnel, mechanical integrity testing, procedures for dealing with changes to equipment or procedures (called Management of Change or MOC), permit procedures, incident investigation procedures, compliance audits, emergency planning, and requirements to involve employees in all of these activities. PSM is designed to ensure technically proficient knowledge and skills in safe practice and containment of chemicals.

BBS systems reduce injury rates and injury severity spanning many industrial sectors. Some companies do not have the process-related hazards typical of the chemical industry and BBS appropriately focuses only on issues of personal safety in those settings. How can process organizations leverage both domains of safety, personal and process, and what can BBS contribute to strengthen their safety culture?

Both of these approaches are designed to address the actions of people to keep the community, the workplace, themselves and others safe. In both cases, actions of people in implementing these process and systemic requirements are shaped and maintained by the consequences of the work. Neither approach is independent. Both require an astute understanding of human behavior to sustain the outcomes they are designed to achieve.

Taking a closer look at PSM, it generates work procedures, training requirements, review procedures, maintenance requirements and emergency response plans, to name a few. All of these are heavily documented



and are assumed to be managed by well-defined standard engineering and management channels. It is tempting to think that extensive documentation guarantees a successful PSM process. But all of these components still depend on behavior to achieve the impact organizations need: the behavior of operators, control room personnel, and maintenance personnel in their daily work; the behavior of engineers and managers in developing and implementing PSM elements.

BBS processes require a thorough understanding of behavior. Safe practices of people performing inside systems ought to include key process-related behaviors as part of their focus in addition to behaviors aimed at reducing personal injury.

Behaviors key to reducing process hazards include, for example:

- Monitoring and logging product level, temperature, and pressure across the shift.
- Communicating vital information properly across shift or area (e.g., operator to maintenance, field to control room)
- Looking for and reporting signs of trouble in a process (e.g., small leaks, unusual vibration or smells)
- Responding properly to alarms
- Discussing what-if scenarios before operations or maintenance tasks are undertaken
- Following well-designed work procedures without taking risky shortcuts

Many PSM formal activities occur sporadically such as requirements to do ‘Process Hazard Analysis every 5 years’ or when a process changes. These involve low-frequency behaviors which tend to be driven by antecedents

like schedules and supported by compliance-related consequences (e.g., just get this MOC documentation done and filed). BBS systems tend to focus on higher-frequency behaviors (i.e., daily or weekly timeframe) that can be more readily strengthened through use of frequent feedback and reinforcement.

Looking at the example process-related behaviors listed above, you can see that many of these are, in fact, higher frequency behaviors that could easily fit into a behavior analytic system that includes system, materials management, and performer interactions (PSM) and daily observation and feedback practices (BBS). Rarely is there a fully integrated approach to process enhancements and to the actions of workers in those settings.

For PSM and BBS, the principles of performance excellence are the same. Tanker container safety and drilling activities of individuals both require the ability to see ‘behavior’ in all its forms.

Some low-frequency behaviors vital to process safety can be addressed by other means derived from an understanding of behavior. For example, emergency response procedures can be practiced through high-fidelity simulations and drills rather than recitation of procedure. Behavior science clearly suggests that practice should occur under conditions as similar to real life as feasible. The message for process safety practices is that BBS systems can help strengthen behaviors to prevent process disasters. The message for BBS practitioners is to examine and build into practice behaviors related to process safety management where process hazards exist.

The message for process safety practices is that BBS systems can help strengthen behaviors to prevent process disasters.



[About the Author]

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For more than 20 years, Cloyd Hyten has been a dedicated thought leader in the field of performance improvement and brings a systems perspective to organizational safety. Cloyd

has presented papers at national conferences, served on the Editorial Board of the Journal of Organizational Behavior Management and co-authored a book on improving performance in work teams. Outside of work, Cloyd enjoys history, food and football.

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