Human Performance And Behavior-based Safety

Abstract

Safety of employees in the workplace is the number one priority for most organizations while understanding certain behaviours involved when incidents occur. There are two schools of thought in the safety industry, Behavior-Based Safety (BBS) and the Human Performance, sometimes referred to as Human and Organizational Performance (HOP). Both of these approaches are viewed in very different aspects in safety. Some experts view the relationship between BBS and HOP as competing schools of thought or approach, while others feel they complement one another. They different in their views and approaches with employees, but when they are integrated they both can be very beneficial because BBS focuses on employee behaviours and HOP looks into organizational processes of a company. Understanding behaviours of employees and how human errors drive or affect safety is very important in what methods are best for that particular organization and integration that can take place.

Behaviour-Based Safety

Behaviours in the workplace are believed to drive every incident or accident and result because of employees. This has been the belief for many years and during the 1930's, Herbert William Heinrich was the biggest proponent of these theories and beliefs. During his employment at Traveler's Insurance Company, he reviewed the accidents and incidents, by drawing the conclusion that 90% of all incidents or employment illnesses were due to employee errors. Based on Heinrichs' research and his workplace behaviours conclusion, led to many businesses began to place responsibility on employees for causing accidents or being involved in one (Daniels, 2015).

The overall goals we hear for utilizing behavioural-based safety (BBS) is the whole approach is based on transitioning employee behaviour from the "at-risk" behaviours category to "safe" behaviours. Changing behaviour is utilized through the science of behaviour analysis. Behaviour analysis is the practice of the science of behaviour change to identify and find solutions for actual workplace problems, such as safety performance, at the very least, it is believed, that observing employee behaviours can identify the triggers that promote safe behaviours, positive reinforcement that are immediate. There is also the theory of utilizing reward programs and having accountability through punishment that are thought to prevent unsafe behaviours by employees. Thomas Smith, pointed out in his journal article, what's wrong with behaviour-based safety?, he believes that BBS is the wrong approach to preventing incidents and accidents in the workplace (Smith, 1999). He went on to write about the lack of looking at the basic foundations of BBS and that the focus on punishment does not drive safe behaviours, but has an opposite effect on employees.

Six Mistakes Implementing BBS

Many of the early safety programs were misguided by using negative repercussions for attempting to prevent behaviours leading to unsafe situations. A downside to Heinrich's beliefs

and safety approach is that he was more focused on believing employee behaviours were the cause of accidents instead of other factors. His methods eliminated obstacles to safety issues, rather than altering employee behaviours that contributed to workplace accidents (Daniels, 2015).

No one can actually say when the evolution of behaviour-based safety began as we apply it today, but in 1970 the work had started in behaviour-based safety. One of the first pioneers of behaviour-based safety was believed to be Dr. Beth Sulzer-Azaroff, who published her first article in 1980. The article tilted, Behavioral Ecology and Accident Prevention was published in the Journal of Organizational Behavior Management, and this article outlined safety inspections performed in the workplace. Safety personnel would conduct intermittent audits and then in return providing results and suggestions for necessary improvements. Dr. Azaroff found significant reductions in safety hazards that were to be integrated in safety programs going forward (Azaroff, 1980).

When companies launch BBS in their workplaces, there are six identified mistakes that organizations make, that outline common misunderstandings and how this can dismantle BBS.

The Six Risk Implementing BBS (EHS Today Staff, 2001):

1. Thinking that observation and participation are the core of behaviour-based safety
2. Failing to apply positive reinforcement systematically and effectively
3. Changing only the hourly employees
4. Making behaviour-based safety the primary responsibility of the employees
5. Not training managers, supervisors and hourly employees in the core principles of behaviour change technology
6. Trying to fit an activities-based 'program' to your organization

Drawbacks & Rewards of Behavior-Based Safety

There appears to be divide in human performance and behaviour-based safety approaches within the safety industry, as to what approach is best. Like any program, there are good aspects and not so good ones as well, and many factors in an organization influence the successes or failures of a how programs work.

Some safety experts feel BBS is not a positive approach to influencing safety in organizations due to focusing on too many systems that hardly ever fail. Judy Agnew stated, “If you design jobs that require employees to constantly monitor systems that rarely fail, you are designing jobs that will put people to sleep. To then punish people for falling asleep is unjust” (Agnew, 2019). In situations where these circumstances exist, they can compound the risk and consequences because employees take the attitude and approach that they can do safety checks or system checks another day. Nothing has happened and the risk of anything happening are slim, right? We have all heard during our lives “the one time that I did not……” is when something happens or goes wrong. In certain industries BBS is thought to excessively focus attention to behaviours of employees instead of focusing on the elements of leading to injuries or fatalities (Williams & Roberts, 2018).

Behaviour-based safety has really good aspects to the program and many areas that it focuses

on to improve safety. BBS implements concepts that drive leadership support and buy-in for supporting safety. How leadership responds and behaves is critical to the safety culture within an organization, which has to start with the leaders not just talking the talk, but walking the walk. Positive concepts that BBS relies on employee ownership in making safe decisions, co-worker to co-worker safety interactions to prevent injuries, analysis of trends in employees behaviours to recognize hazards or system issues an finding resolutions for the problems (Williams & Roberts, 2018).

According to John Hindley, who has studied BBS and the various initiatives, he identified seven factors that are imperative to the success of BBS in an organization. Hindley believes that if an organization follows the seven factors of the behaviour-based safety processes which he identified as:

I. Seven Critical Factors for Success (Hindley, n.d., pg. 30)

1. Use a process design
2. Focus on communication, leadership & employee buy-in
3. Display guidance
4. Protect Team Abilities
5. Practical action training
6. Use data to measure steady and consistent improvement
7. Provide scientific and applied methods

Hindley goes on to say that if any one of these key factors that impact behaviour-based safety (BBS) is absent or missing, then it will hinder success and can lead to the failure of the program.

Human Performance in Safety

What is human performance in safety? Human performance is the ideology that employees or people make mistakes. Identifying the causes and leading indicators of human errors, while empowering all employees in an organization to participate equally, regardless of position or title, to generate successes operationally and in the safety program (Sowers, 2019). HOP's origins evolved from implementation from the aviation and nuclear power industries and at that time was referred to as Human Performance (HP). Since the inception of behaviour-based safety in the 1970's the focus was always on the employees' behaviours leading to incidents in the workplace. The mentality and thought process of accident causation and behaviours started to recognize that accidents were not necessarily due to behaviours, but employees making errors leading to incidents. This shift was because of the acknowledgement of Human and Organizational Performance (HOP), which was the complete opposite approach of BBS in workplaces. HOP was viewed as the main rival to BBS and would eventually hurt the consultants in the field of BBS in the future (Daniel, 2015).

Human and Organizational Performance that targets impacting educating employees on recognizing risk and focusing on the improvement of the system in a business operation. HOP tends to support the "managing by walking around" process because this allows leadership to interact with their employees and can engage them in their input on safety improvements or concerns they may have. When leadership manages by interacting with employees and talking and listening to them about their concerns and ideas, these behaviours foster buy-in, employee

ownership, and management leading by example within the organization (Geller, 2006). This shows that safety is important and it starts at the top showing true and sincere care with concern for the safety of employees and supporting the entire program.

Five Phases of Human & Organizational Performance (HOP)

The five phases of HOP Integration align very closely to the seven factors we outlined in Behavioral-Based Safety (BBS). HOP is not considered a program because of the shared ideas, principles, and acceptance (Baker, 2019).

5 Phases of HOP Integration:

1. Leadership Appeal: champion to leadership involvement and support.
2. Developing HOP flow: training and education in HOP Principles in creating a shift in thought or mind set.
3. Operational Training: putting learning into action in proactive and reactive scenarios.
4. Arranging & Adjustment: creating HOP principles and operational training systems and merging these into processes, programs, and practices already in place.
5. Safeguarding Management: implementation of operational intelligence, collected through operational understanding, to continuously and collectively design, rehearse, and manage safeguards.

Ph.D., James Leemann, outlined the differences between behavioural-based safety and human and organizational performance in organizations. Dr. Leemann used the example of GE (General Electric), in how the company was focusing on OSHA recordables in order to lower their rates, which they did. GE accomplished an 80% decline in the recordable rate, but high to severe incidents and injuries continued over a period of ten years for GE. These numbers and types of incidents drove GE to finally transition to HOP by using significant experimentation in order to develop HOP principles that fit and worked for GE (Leemann, 2014).

Organizational Behaviors

Human nature influences an employee’s actions which are described through the definitions and terminology of the error modes. Another aspect of HOP is that it provides a look into organizations and how human performance correlates in strategies, goals, and processes. These same strategies, goals, and processes can also influence the percentage and rate that employees are involved in some type of human error. If an organization takes part in challenging precedence’s, or have poorly communicated expectations or work functions, significantly raises the chances for increased errors to occur in the workplace (Clark, 2008). When organizations are in the process of creating relevant barriers, or called the defence in depth, must identify the root causes and taking action when errors occur without adding different chances for errors.

Dr. Scott Geller, Ph.D., stated “the common metric used to rank companies on their safety performance is “total recordable injury rate” (or an analogous count of losses), which puts people in a reactive mindset of “avoiding failure” rather than “achieving success” (Geller, 2006). Employees need to be part of the resolution process to help prevent these mindset from occurring, but most importantly, your employees know the issues and concerns.

Identifying Causes of Human Errors

Errors made by people on the job site will always occur, but what do human errors look like and can be viewed in the workplace? The definition of an error is an unintentional departure from an expected behavioural standard. HOP is primarily focused on protecting employees, products, and property from human error. Human error is part of human nature and is going to happen because we are not perfect and neither is the world we live in.

Kurt Krueger, the health and safety programs manager for GE, stated, “people make mistakes, people don’t think that what they are doing at the moment will lead to an injury, you can’t explain failure with failure, think forward, follow procedures exactly and not much will get done, take two minutes before you are ready to proceed, bad stuff happens faster than we can react to it, seek out high-risk points, and look to eliminate vulnerability at critical set points, etc.”(Leemann, pg. 3, 2014). Dr. Edward de Bono, Ph.D. explained mistakes as, “Mistakes arise directly from the way the mind handles information, not through stupidity or carelessness” (Fitzgerald, 2014).

The human error problem can be viewed in two different approaches: people and system approaches. Both approaches has its own error causation model and each model gives very different philosophies for managing errors.

1. People Approach and Human Errors: The continuing and comprehensive tradition of the people approach focuses on the unsafe acts-errors and policy violations. Unsafe acts as stemming primarily from abnormal mental processes that can include inattention, recklessness, forgetfulness, poor motivation, carelessness, and negligence (Reason, 2000).
2. System Approach and Human Errors: The basic idea in the system approach is that humans make mistakes and we can all expect to make errors, even the best employees in organizations. Errors are viewed most of the time as consequences instead of causes. These include frequent error traps in the workplace and the organizational processes that give boost to them (Reason, 2000).

Error Management

Once errors are identified within an organization, they must be managed and consistently analyzed and revised for the whole system and not focus individual errors. Reason outlined three error management components which are: Reduction, Containment, and the most difficult component to maintain is the management of the components so they remain relevant and current in the organization (Reason & Hobbs, 2003).

Managing errors allows organizational leadership to evaluate the two types of human errors in post-accident investigations or reviews. The two types of human error take the form of Errors of Omission and Errors of Commission and then the determination of intent of the employee who was involved in the incident (Bridges & Tew, 2010).

1. Errors of Omission: are the human errors that employees omit any important or mandated steps in a job function.
2. Errors of Commission: are human errors that employees perform the wrong steps or

functions in a job function.

1. Unintentional Errors
    1. Inadvertent incidents
    2. Unintentional, did not mean to perform the task that way.
2. Intentional Errors
    1. Employee has the mindset that their methods are better in performing a job.
    2. Intentional, but not intending harm, viewed as errors in judgement.

Generic Error Modeling System (GEMS)

A framework for comprehending types of errors in the workplace and creating strategies to eliminate errors in the GEMS Model. The GEMS Model has three performance modes for how errors occur and the mode itself is determined by an employee's experience with a task. The three modes of the GEMS Model are skill-based, rule-based, and knowledge-based (Clark, 2008).

I. Performance Modes

A. Skill-Base Performance Mode: the skill-based mode is defined by regular actions in a well-known setting. It is compared to the tasks or activities we take for granted in our lives.

Errors in skill-based performance happen form lack of attention creating lapses in our execution of a situation. Due to this performance mode and the automatic response actions we take keeps our attention levels very low.

B. Rule-Based Performance Mode: the rule-based mode is defined by performance actions that are preset because of being able to identify in a familiar situation.

Errors in rule-based performance mode are not identified as skill-based, but individuals have already experienced and using the any rules created from the experience to perform the task.

C. Knowledge-Based Performance Mode: the knowledge-based mode are the situations employees find themselves in and have the least familiarity with in the workplace. This mode is identified as "knowledge-based" not because employees already have the knowledge, but because of the knowledge that is gained during these job task (Clark, 2008).

Errors in knowledge-based performance usually occur due to misidentification of a situation because some information is missing or unavailable and people are left to assume during the decision-making process.

System Accidents & the Swiss Cheese Causation Model

The Swiss Cheese Model of Errors is the system that outlines accidents and incidents occur when the defence layers breakdown or do not exist inside an organization at all. In the model, each layer of cheese signifies a level of defence that consist of procedures, equipment, and employee safety training. Dr. James Reason, an English Psychology Professor, created the Swiss Cheese Model in the early 1990's when he was investigating, analyzing, and used this

model as an outline in the prevention of industrial accidents (Larouzée & Guarnieri, 2015).

The holes in each piece of cheese signify the weaknesses in any or all layers of defence and if each hole meets or intersects, this causes those defences in place to fail, causing incidents to take place. When any level of these defences fail, it puts a hole in the entire organization, causing an accident, as we have seen throughout the years and some of the most catastrophic events because of critical breakdowns (Perneger, 2005).

System failures can be analyzed in two ways: active failures and latent conditions, which have been used in healthcare, aviation, engineering, and risk management. Active failures are described as the “unsafe acts” performed by employees on a job, while latent conditions are said to be those unavoidable factors or elements that lay inactive within a system until they eventually merge with the active failures and existing triggers to create an ample opportunity for an accident to occur. Latent conditions happen due to the decisions made by designers, builders, and people creating the policies and procedures, and top level management (Reason, 2000).

The most tragic accidents we have been a part of as a nation were the Challenger explosion in January 1986 that took place just 73 seconds after liftoff of the shuttle (Howell, 2019). The Deepwater Horizon explosion that occurred in April 2010 is another significant tragedy where the Swiss Cheese Model can be applied. These two tragedies were significant example of defence failures and breakdowns with every hole in the model being in perfect alignment for these accidents to have occurred.

Looking into the Deepwater Horizon explosion we see where the breakdowns occurred that were discovered during the investigation that identified what happened from the actions of employees and BP Oil Company to the actual accident. April 20, 2010, the day the explosion took place, there were 11 employees killed and 17 employees injured in the incident. The post-accident discovered several factors that contributed to the horrible accident with Deepwater Horizon. Deepwater Horizon displayed each of the three error performance modes involving the employees on the oil rig (Pallardy, 2016).

I. Factors of the Deepwater Horizon explosion:

1. The quality of the cement used at the base of the borehole was very bad and causing gas to leak and allowing it to come to the surface.
2. The valve failed at the base of the pipe.
3. The misinterpretation of the pressure test to determine if the well was sealed off.
4. Issues with the blowout preventers and gas alarms failed when overflowing gas and mud occurred on the rig.
5. The investigation revealed that inspections, safety documents, and emergency procedures were deficient and inadequate (Williams & Roberts, 2018).

Prior to the horrible explosion, the employees on the oil rig displayed skill-based performance modes in much of the handling of the job functions on the rig prior to the incident. All three types of performance modes were displayed in this incident, but was there was definitely a significant amount of knowledge-based performance that came out of this tragedy with so many costly lessons learned.

Conclusion

Behaviour-based safety or human & organizational behaviours, which is the best approach for an organization to enforce safety? Our behaviours are influenced by cultures, environments, and the mistakes we make whether intentional or not from our decisions. Behaviour-based safety (BBS) approach places the responsibility of safety solely on the shoulders of employees as the cause of incidents and accidents. Human and organizational behaviour approach looks at the organization itself and the responsibility to keep employees safe and what they have in place to do so.

BBS and HOP, both have very good elements, but you need both programs because of how they focus safety in different ways in an organization. When both, behaviour-based safety and human and organizational programs are integrated, it provides accountability for everyone involved within a company for the responsibility of safety. Solid and very successful organizations engage employees by taking ownership, leadership buy-in and support, consistent reviews of processes and programs for improvements, and have accountability measures for everyone including leadership.

Both programs have provisions that analyze the types of performance modes that impact behaviours by delving into why people make mistakes or errors on the job. Identifying active failures or latent conditions, allows organizations to improve systems in regards to safety and promoting practices for employee safety. As safety professionals, we have to remember, safety responsibilities go far beyond OSHA rates, causation reports, and placing blame on an individual when an incident occurs. It is about people and showing care and concern, while performing well-rounded investigations, and ensuring processes identify hazards with valuable solutions for the safety of all employees in an organization.