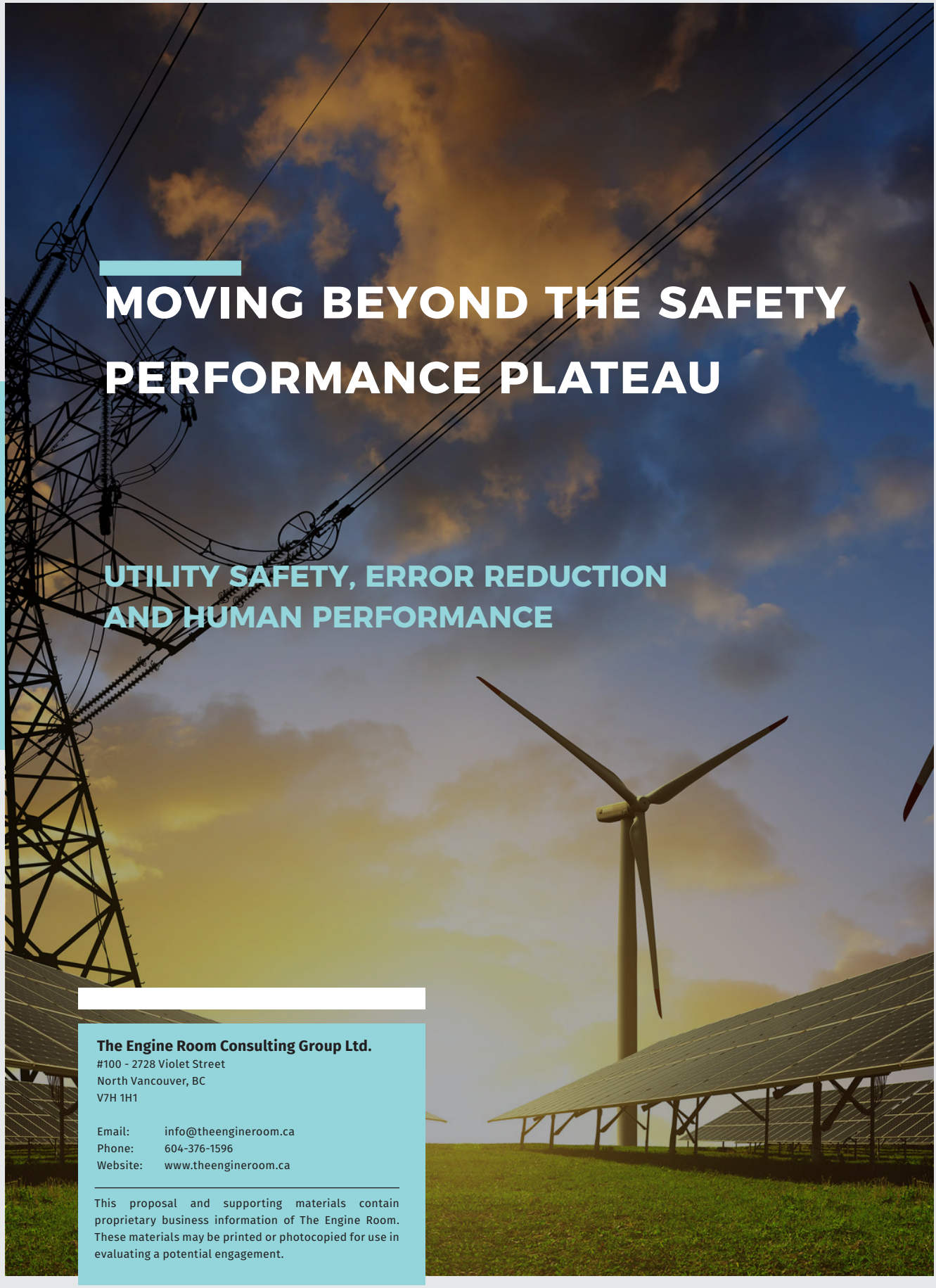


MOVING BEYOND THE SAFETY PERFORMANCE PLATEAU

UTILITY SAFETY, ERROR REDUCTION AND HUMAN PERFORMANCE

The Engine Room Consulting Group Ltd.
#100 - 2728 Violet Street
North Vancouver, BC
V7H 1H1

Email: info@theengineroom.ca
Phone: 604-376-1596
Website: www.theengineroom.ca

Understanding The Safety Journey

Improving safety performance within the power and utility industry has increasingly become the top priority for the majority of organizations across North America. It is a complex challenge of navigating the high-risk nature of the work amidst the challenging operating, compliance driven and transformative environment. Increasingly, companies are implementing an array of safety systems and protocols, including risk, stakeholder and safety management systems, along with robust human capital management programs. However, in many cases, safety performance is still plateauing and safety metrics, including perception surveys, injury frequency and severity rates are indicting a lack of forward progress.

We believe that regardless of current safety performance, there are three distinct phases of a power and utility organization's safety journey, each with different strategies and unique characteristics. In simplistic terms, the three major phases include:

1. Eliminating intrinsically unsafe conditions

Focusing on physical conditions, tools, and equipment, and looking for opportunities to engineer unsafe conditions out of existence.

2. Developing safe work procedures and safety management systems

The specific procedures and systems industries use to reduce the potential for harm when dealing with hazards that can't be completely eliminated, such as working with sources of energy.

3. Error reduction and human performance

Creating an environment in which the likelihood of errors is reduced, and reducing the potential for harm when inevitable human errors occur.

The challenge for most organizations lies in the overlapping nature of these three phases, each requiring very different types of management effort for success to occur. **In companies that truly excel in safety, the principles involved in all three phases are well understood and, as such, the organization is able to apply the most appropriate response for the conditions present.** A degree of success is often achieved with one particular approach to safety, but then safety performance "plateaus" and improvement stops. This does not mean there was anything wrong with the steps taken. The approach was appropriate for that particular phase of the safety journey, but it is not necessarily appropriate for the next one.

To explain why management's approach must change between the three phases, it is useful to look at the commitment needed to achieve success in each phase. In phases 1 and 2, the typical approach to continuous improvement is through analyzing risk, developing action plans and obtaining commitment to completing the required actions. Management can insist on an audit of pinch points and have guards manufactured (phase 1). Similarly, management can insist on safe work procedures being written or a monthly safety audit being done, then hold people accountable to the completion of the activities (phase 2). Phases 1 and 2 respond well to a commitment to informed activity. However, in phase 3, management cannot stand in front of the workforce and seek commitment that employees will not make an error in the coming year. This highlights that management must think differently through the various phases of the safety journey.

Where Safety Performance Stalls

ERROR REDUCTION AND HUMAN PERFORMANCE

To date, power and utilities companies have typically been successful at achieving success in phases 1 and 2 of the safety journey; however, phase 3 is where safety performance typically stalls. The third phase of the safety improvement journey, error reduction and human performance, involves reducing the frequency and impact of normal lapses in mental focus and memory. True success in this phase involves strategies designed to positively influence the workplace and employees to reduce the potential for human error. Common examples include using a pre-flight checklist on an aircraft to reduce the potential for well-trained pilots to make errors arising from the complexity of their tasks, or embedding specific safe work habits, such as applying lock-out/tag-out procedures and keeping personal workspaces free from clutter. **Safety improvements in many companies plateau at this stage of the journey because of the unrecognized differences in what it takes to be successful at reducing errors when compared to engineering intrinsically safe equipment (phase 1) or creating safe work procedures (phase 2).**

THE COGNITIVE DISCONNECT

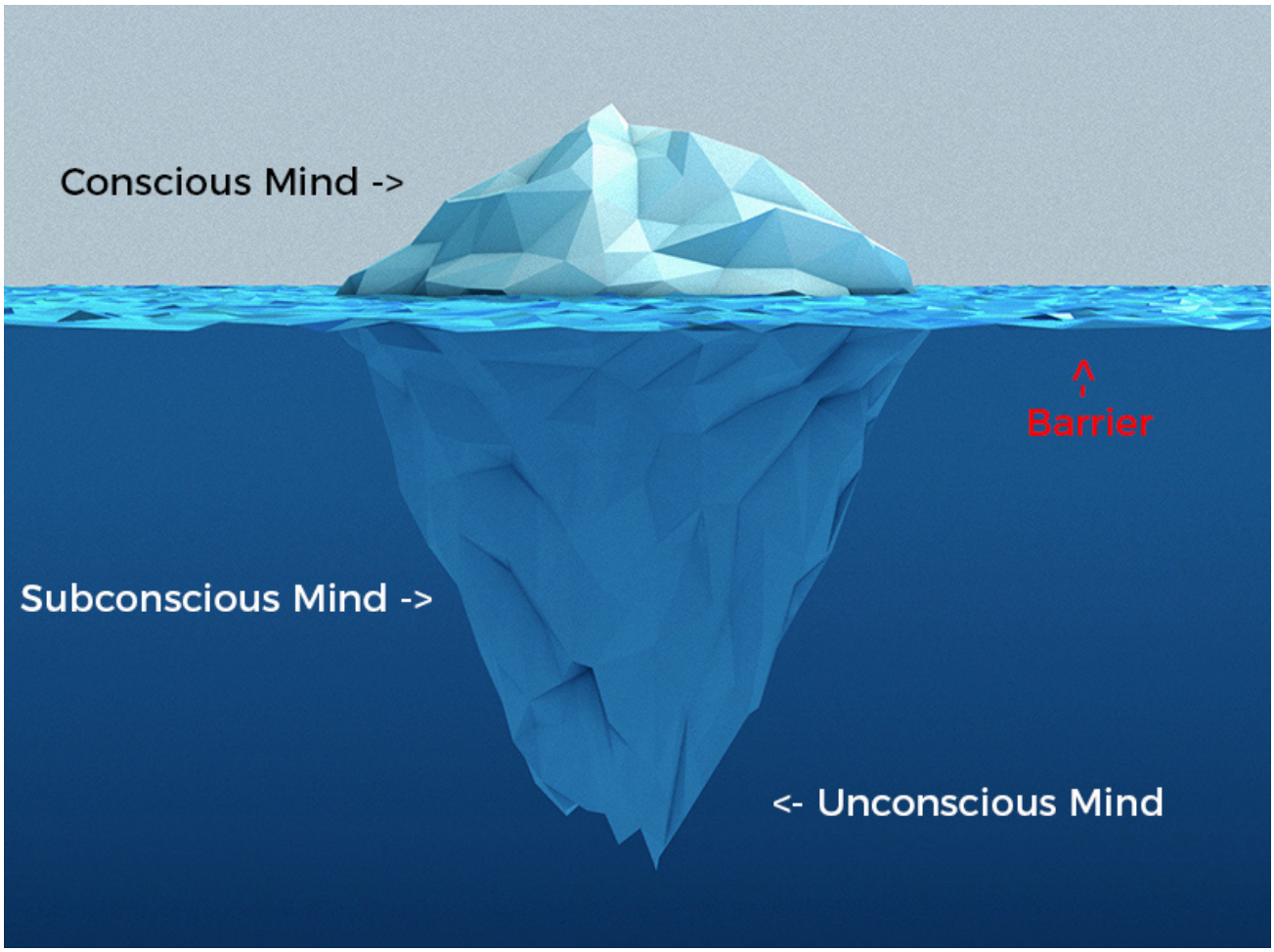
Reducing the number of errors made by otherwise well-intentioned employees and the harm that results requires an understanding of the way our minds work. The principles arise from cognitive psychology and the relationship between our conscious, subconscious, and unconscious minds. The conscious mind processes active thoughts and things we need to remember to do. The subconscious mind allows us to do things, such as walking to a destination without consciously thinking about each step. The unconscious mind takes care of activities like breathing while we walk. With respect to cognitive psychology, the major implications impacting industrial safety performance are:

1. There is an upper limit on the number of thoughts we can maintain in our conscious minds at a single point in time. At work, exceeding that upper limit puts us at risk of an error created by **complexity** in the workplace.

2. All of us experience the inevitable feeling of our minds wandering. In the workplace, none of us will maintain perfect mental focus over extended periods of time. This effects how **complacency** in the workplace is viewed and addressed.

To understand why our minds work the way they do, it may be helpful to know that conscious processing in our brain requires more energy than subconscious or unconscious processing. The more conscious processing we do, the more calories our brains require. As a result, our brains are hard-wired to move functions that don't need conscious processing to the subconscious or unconscious levels. Studies indicate that the average person can maintain four to seven discrete thoughts at a single point in time, but even that requires a concentrated effort. When a person is forced to consider a new thought, one of the previous thoughts is "squeezed out" of the conscious mind. In addition, if there is no reason to be concentrating on something, our brains are conditioned, through millions of years of evolution, to stop thinking about it and move to a less calorie-consuming state of mind.

This reality of the way our brains work has allowed our species to thrive. When our ancestors were not feeling threatened by predators, their minds were able to stop worrying about threats and start thinking about inventing technology, relationships, art and philosophy. However, this same physiological reality has very real implications for companies attempting to improve safety performance. Surprisingly, many companies routinely operate in ways which don't respect this reality.



Errors at Opposite Ends of the Spectrum

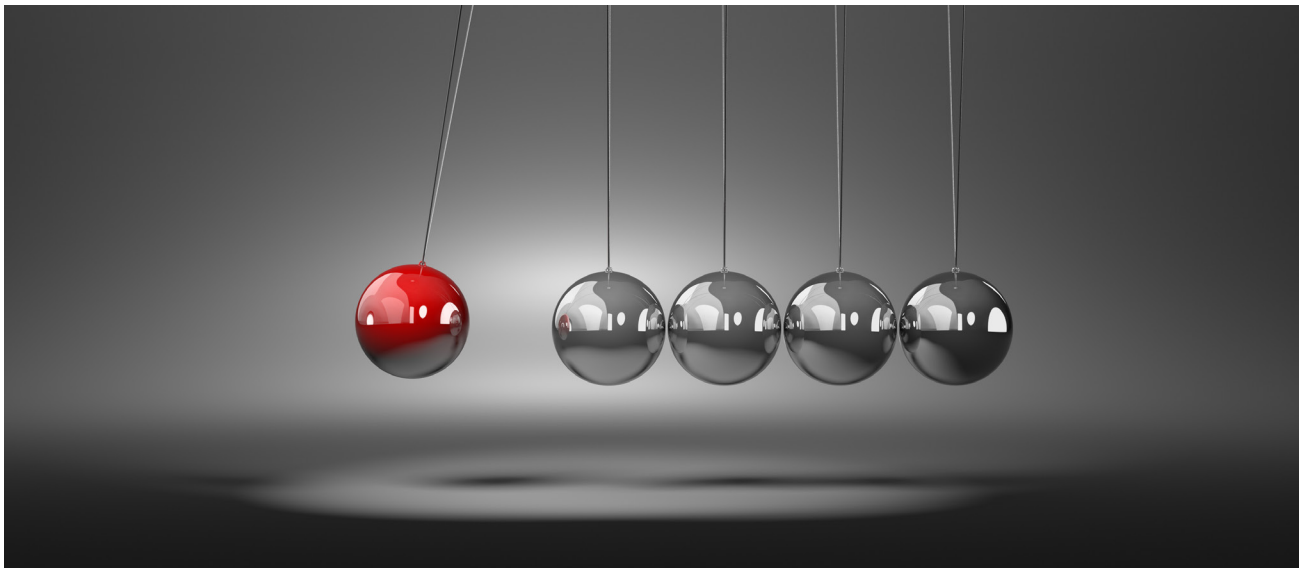
COMPLACENCY

Many people see complacency as a frequent cause of safety incidents, but it's worth exploring just what complacency is. Complacency arises when we become "comfortable with an environment or situation". Our minds determine that we don't need to be overly "focused" on something, and it's safe to think about something else. At this point, we have become complacent, and our mind wanders. It happens to all of us at some point every day. Ironically, the probability of complacency increases when an individual is highly trained to manage the situation. Complacency is also more likely to occur when there are stretches of time with little stimulus. Consider pilots on a Trans-Atlantic flight. It's easy to understand that even the most diligent of pilots will get complacent at some point in the middle of the flight. The good news: it's possible to address this risk. Airlines have invested heavily in techniques and protocols, such as mid-flight staged checklists to pull pilots out of potential complacency traps.

However, in the power and utility sector, it is very rare to see considerations made to address and mitigate complacency traps. Instead, common responses to incidents involving "complacency" include: blaming the individual, warning the rest of the crew about complacency, reminding people to keep their mind on task or assuming it's a training problem and re-training. Unfortunately, many of these strategies are flawed. Blaming an individual who becomes complacent or warning them to never be complacent are unrealistic. Complacency will happen – it's in our DNA! Furthermore, re-training does not address the complacency trap as it was not a skill gap that needed to be addressed in the first place.

That said, there are actions management can and should take so that complacency does not create a safety hazard. Viable and effective strategies that can mitigate the complacency trap include:

- Engineering out the complacency trap; i.e. ensuring a stairwell has consistent stair heights.
- Developing alarms which "alert" people to a higher point of focus.
- Creating methods of checking things which are easy to overlook; i.e. staged checklists.
- Building defensive safe work habits; i.e. having a habit of doing a field level risk assessment before every job, even if it's not documented.



COMPLEXITY

On the opposite end of the spectrum, complexity in the workplace arises from several sources, including performing inherently complex tasks, information overload which creates mental complexity, and cluttered workplaces or environments which can create situational complexity. Regardless of source, complexity leads to errors and hazardous situations in different ways. It can be simple omissions leading to potentially devastating incidents, information overload preventing critical steps of a process from being retained, or working in a cluttered space so people fail to see developing hazards.

Like complacency, there are specific actions management can and should take to mitigate the various sources of complexity. Viable and effective strategies that can mitigate the complexity trap include:

- Breaking complex tasks into components with prompts to remind operators about easy-to-miss steps, i.e. implementing phased checklists, such as in the aviation and medical industries.
- Aligning information transfer with the needs of the audience and not the preferences of the provider, i.e. task training, onboarding, and safety meetings.
- Designing the workplace to reduce situational complexity, i.e. implementing programs, such as 5S workplace organization methodologies.
- Building defensive work habits; i.e. the way carpenters arrange their tools or the way operators test respiratory and rescue equipment before use in confined space entry.

A Common Link

BUILDING SAFE WORK HABITS

One very effective strategy to reduce the loss of focus from complacency or omissions due to mental complexity is to build safe work habits. Ironically, we had many good habits drilled into us when we were young, such as looking both ways before crossing the road or operating the accelerator/brake with the right foot only. Our parents knew that if we developed the habit of looking both ways, it would serve us well forever, whether our minds were wandering or not.

However, in industry, we often see leaders at all levels either reluctant to try to build safe work habits or at a loss on how to coach employees to establish safe work habits. Often, companies focus more on cardinal rules and writing procedures that cover every eventuality. Ironically, some of these additional rules and procedures add to the complexity challenge and increase the chance that employees make mistakes and miss things.

Conversely, many of the best companies and industries identify the specific habits they expect to see exhibited all the time and strive to build and anchor those habits so they become second nature. These are coached and re-enforced by every level of leadership to the degree that the ingrained habit is not only exhibited at the workplace, but in almost all aspects of an employee's life.

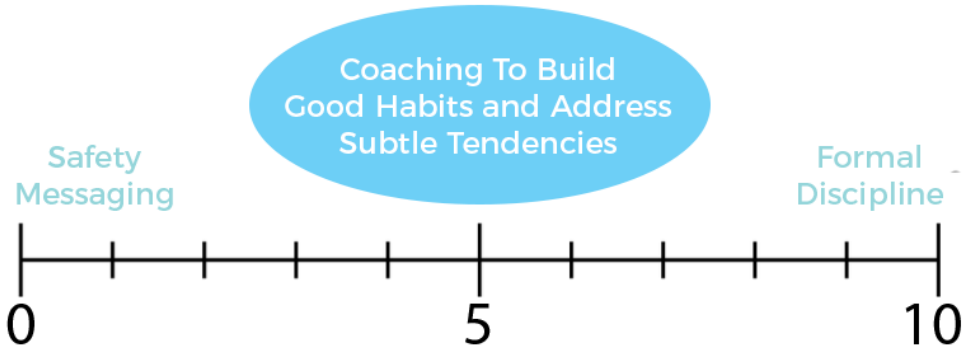
FILLING THE SPACE BETWEEN SAFETY MESSAGING AND DISCIPLINE

In many organizations, it's common to use safety messaging as an organizational safety improvement strategy. We believe that strong safety messaging is a great tool. Similarly, it is always good to look for ways to improve the quality of the safety message. However, the reality is that safety messaging alone will not influence everyone and it does not create the new safety habits required to improve safety performance.

An example many of us remember was the focus governments put on wearing seatbelts. Messaging resulted in some, but not all, people changing their practices. Beyond messaging, we now have legislated requirements and auditory reminders when we start the car. The combination of strategies resulted in the clear majority of us wearing seatbelts all the time. It has become a habit. Most of us would not drive without a seatbelt even if the threat of a ticket were removed.

A real challenge in industry is that there are many well-intentioned leaders who honestly don't know what to do or change to get to zero incidents. These are not bad leaders. They were trained in technical specialties of their industry, but they were not trained in error reduction and cognitive psychology. These leaders often struggle with the question: "What do you do with employees who don't buy-in to the safety message?" Strong messaging can assist in improving safety performance, but it is not a holistic strategy that will create transformational change.

A common response to address people who are not responding to safety messaging is to use the threat of discipline to force change. In the same way that messaging is good, we also believe that formal discipline to address intentional non-compliance is a valid change tactic. However, discipline is not an effective strategy to use in all situations, and an excessive reliance on discipline has consequences. Consider employees who simply have a skill deficiency or well-intentioned employees who make honest mistakes. Do they deserve to be written up? Will that really change their behavior? Likely not.



A Safety Tactics "Intensity" Scale

WHAT HAPPENS IN BETWEEN? HUMAN PERFORMANCE AND SAFE WORK HABITS

If we were to think of how "aggressive" or intense different tactics are, messaging is a relatively friendly and less intense strategy; whereas, formal disciple is several notches up on the intensity scale. There is a very effective strategy which works to create safe work habits that occupies the middle ground between messaging and discipline - **coaching to build safe work habits**. Our parents did this when we were young, and it is done in the aviation and medical. Even organizations like police forces coach to encourage the desired driving habits a police officer needs to develop. The police forces have realized that recruits arrive with either strong or less than ideal driving habits and tendencies that need to be coached away from.

This concept of intentionally building positive safe work habits requires more front-end effort than the typical approach taken by most companies. Too many companies assume that "telling" a person to do something or providing information in a computer-based training module creates the knowledge leading to desired habits, but it rarely does. Most of us have had to develop safe habits over time through re-enforcement, coaching, and feedback. It's not as straightforward as putting on a training seminar. However, once a new habit is established, it becomes the new normal practice that requires little effort to sustain. If you consider the time and dedication needed to anchor good behaviours, coaching to establish safe work habits is less effort than training, re-training, threatening, and discipline.

Companies that excel in safety performance understand it is incumbent on the company to go beyond telling an employee to do something in training. Behaviours must be repeated at a high enough frequency over a period of time to become a habit.

This reality means that the coaching process always extends beyond most company's initial training programs. As a result, the employee's supervisors must play a role in the safe work habit-forming process. On a positive note, there are only four prerequisite coaching requirements essential for supervisors to anchor safety behaviours and create the right habits. Front-line supervision must:

1. Be able to spend time in the field.
2. Position themselves to observe and have knowledge of what to look for.
3. Have courage to speak up and act on their observation.
4. Skill in communicating in a way that helps the person being coached.

It is crucial to coach foremen and supervisors to get to a level where they understand their safety role and have the skill sets and confidence in their ability to move the needle forward on safety every day. Managers and senior leaders, on the other hand, would benefit from having a clear understanding of the pros, cons, and limitations of default tactics – specifically, safety messaging and formal discipline.

Operating Contrary To Error Reduction

HOW ORGANIZATIONS CAN GET IT WRONG

Over the years, we have experienced many situations where well-intentioned companies, managers and supervisors try to do the right things to improve safety in their organizations. These companies look to industry leaders to borrow practices and processes to implement within their own organizations. We see great derivative safety process in almost every organization. Unfortunately, we also see too many situations where well-intentioned organizations get it slightly wrong and end up operating in a way that misses the mark and runs contrary to good error reduction practice.

SAFETY TRAINING PROGRAMS

Some safety training is intended to educate with information, other training is intended to build habits

How organizations can get it wrong:

- Many businesses don't distinguish between information training and building habits training.
- Companies try to operate in the "hope" that people will figure it out on their own.
- Companies attempt to set expectations during training then fail to have supervisors and managers do the the kind of follow-up to convert the theory into habits.
- Many companies have mandatory re-fresher training, where original information is merely repeated.
- If habits were not built the first time, people tune it out the second time, because, while they know it, they just don't do it – it's an accountability issue, not a knowledge challenge.

SUPERVISOR / MANAGER WORK SITE VISITS

An excellent opportunity to observe actual employee practices and habits, positively influence performance, reinforce positive behaviours, and improve less than ideal behaviours.

How Supervisors / Managers can get it wrong:

- Not knowing how to conduct quality observations and what to look for.
  - Only focusing on conditions and compliance, but overlooking safety behaviours and habits.
- Not spending time observing work habits.
  - Is risk assessed when watching crews set up after arrival?
  - How are tools, parts, and waste being managed?
- Not knowing how to engage employees.
  - Not positively re-enforcing desired safety habits.
  - Not asking the right questions or telling employees what to do.
  - Not understanding the negative impact of issuing more instruction.

SAFETY MEETINGS

An excellent opportunity to communicate messages and address employee concerns.

How organizations can get it wrong:

- Attempting to cover a list of disconnected topics with poor flow.
  - Creates a complexity problem, where employees can't retain the content.
- Meetings are too long and poorly executed.
  - Creates a complacency problem, where employees tune out.
- Reliance on empty messages, like "keep your mind on the task".
  - Things can be done to help keep your mind on the task; it's not a slogan.
- Managers not fully understanding employee concerns before passing judgment.
- Management having the naive view that "the information has been passed on".
- Employees retain very little, and the event has little impact with little engagement.

FIELD LEVEL RISK ASSESSMENTS

Are powerful tools used to identify hazards and design mitigation strategies.

How Risk Assessments can go wrong:

- Insisting on “cards” being submitted, even if they are obviously “pencil-whipped”.
- Mandating the number of FLRAs to be done.
- Supervisors / Managers not participating in FLRAs have no idea how well they are done.
- Employees completing FLRA’s the same way, day after day, with little real thought.
- Writing mundane statements (like “wear PPE”) just to find something to put down.
- Crew leads completing FLRAs by themselves, and failing to engage the rest of the crew.
- Crews starting the job before the hazard mitigation barriers are in place.
- Employees believing that corporations are attempting to shift liability to employees.

SAFETY CHECKLISTS

An effective tool to reduce operator error and break complex situations into manageable tasks.

How organizations can get it wrong:

- Companies produce checklists confusing “how-to” instructions with the concept of reminders for highly trained professionals.
  - They can create complacency problems.
- Checklists are too long.
  - They can create complexity problems.
- Checklists that don’t have a clear purpose or time they are to be used.
- Checklists that have non-specific language (“use all PPE as required”).
- Completed checklists as evidence of performance.
- Companies which create checklists yet fail to develop the habit of using checklists.

THE MANAGEMENT CHALLENGE

Error reduction begins with leadership acknowledging their role in reducing the impact of errors. We continually see that many leaders and managers don't know what to do. We routinely hear well-intentioned but frustrated leaders say; "We trained them, what else can we do?" In this situation, companies often double-down and "force" more of the same safety activities they know are not resonating onto the workforce. Alternatively, leadership must make it their responsibility to find and implement techniques to reduce the potential and impact of human errors. Many industries, such as the aviation industry, have done it with resounding success. In those industries where there has been success in error reduction, **the common element is that there is always a clear focus on the quality of safety activities and processes, with leadership actively fighting against safety processes becoming "tick the box" activities**. In addition, successful companies respect and work with the constraints created by how our minds work. When these two conditions are met, moving past safety performance plateaus is achievable.

THE FRONT-LINE SUPERVISOR CHALLENGE

As much as senior management may take the lead on safety strategy, it is front-line supervision that has the largest impact on safety culture, standards, and performance. **Front-line employees are exposed to the greatest risk, and, as such, their immediate supervisors have the greatest potential to influence employees, habits, conditions, and practices.** By setting clear expectations, holding people accountable, observing what is really going on, and acting on observations, changing employee behavior is a realistic and tangible goal. Furthermore, front-line supervisors have a specific role in error reduction through leveraging their observations and knowledge of good versus bad habits, and having the courage required to establish and change work habits, including challenging leadership on safety strategies that are not resonating at the front-line.

ERROR REDUCTION IMPLEMENTATION

Improving safety performance involves preventing incidents before they happen, and preventing incidents before they happen requires anticipating errors and seeing the subtle early warning signs of potential incidents. In most companies where safety has plateaued, the organization has probably already done a good job in phases 1 and 2. Consequently, it is rare to see glaring hazards or wildly unsafe practices during field visits. Therefore, most error reduction work these days occurs when there are no overt "problems" to address, when the risk of complacency and complexity is high, and when the indications of potential problems are subtle. Pursuing an error reduction strategy to improve safety is not something that every company elects to do. However, for those that do, the results can be significant. The typical steps involved in implementing an error reduction strategy are:

1. **Introduce the concepts of error reduction and the impact of cognitive psychology to the safety department and operational leaders to explore implications and create alignment.** Simply introducing the core concepts can have a positive impact on safety results, when management understands the limitations to some of the traditional approaches to safety.

2. **Conduct an operational safety diagnostic to distinguish the symptoms from the true root causes of issues surrounding safety performance, compliance, and unique cultural conditions.** Determine the degree to which safety systems conflict or align with error reduction principles, while prioritizing high value target areas. It is an unbiased identification of how your people think, free from the pre-conceived notions difficult for in-house personnel to avoid.

3. **Align or restructure the safety philosophy with an implementation strategy supporting error reduction, including designing or re-designing tools, processes, and support structures that will aid the initiative.** Often, only subtle adjustments are needed to exponentially increase the value of existing safety processes and systems.

4. **Most importantly, coach front-line management in their roles as leaders so they can contribute positively to error reduction and avoid the pitfalls which can inadvertently increase error rates.** Not to be confused with training, this is a hands-on, boots on the ground effort in safety habit creation and anchoring behaviours.

MOVING FORWARD

While the specifics of an error reduction strategy will be different from industry to industry, **one of the biggest hurdles to overcome is acknowledging that reducing errors is a responsibility of management, and not just something to "blame on the employee who made the mistake"**. The second big challenge is looking at the activities in the workplace through a different lens. Naturally, this is difficult, because people with experience will tend to see it as "how it has always been" and "normal". As a result, it often takes a crisis in the company (a fatality or other serious incident) or a third-party perspective to create the trigger which opens thinking to a different approach.

At the Engine Room, we believe it is essential to think about moving past safety performance plateaus from a holistic perspective. Our methodology of an operational safety diagnostic is predicated on the belief that performance in any business occurs when the combination of leadership, strategy, process, technology, engagement, and execution all converge. No single item is the "silver bullet" that will overcome weakness in the other areas. We also believe that any strategy designed to improve performance should target the highest value opportunity. In effect, address the real issues before throwing more activity, more process, or more resources at things that are not a problem.

The Engine Room Consulting Group Ltd.
#100 - 2728 Violet Street
North Vancouver, BC
V7H 1H1

Email: info@theengineroom.ca
Phone: 604-376-1596
Website: www.theengineroom.ca