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HUMAN AND ORGANIZATIONAL PRINCIPLES

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"the discipline or body of knowledge concerned with the understanding of interactions among humans and other elements of a system, and the application of theory, principles, data, and methods of design to optimize system performance"

Human and Organizational Factors (HOF) informs how we think about a workplace and applies tools, data, methods, and training to optimize human and organizational performance. Using a proactive approach, HOF provides concepts and methods to support the identification, evaluation, and management of socio-technical hazards, i.e., specific hazards resulting from the relationship between the different parts of this workplace system.

Once understood, HOF control areas can be used to mitigate related hazards and improve performance outcomes. Examples of where a HOF analysis may be focused to understand and control undetected hazards, include but are not limited to:

- How the design of a procedure may introduce risk (e.g., poor document control resulting in use of outdated procedure document(s), procedure is too text-heavy which impedes clarity of instructions)
- How the interface of a computerized tool may become a hazard if not carefully designed for human use
- How a person's physical and/or cognitive capabilities may impact success of safe work (e.g., fatigue, height, strength, attention to task, memory, etc.)
- How team dynamics (e.g., significant language or age differences and differing beliefs and values) and team situational awareness (e.g., shared understanding and shared mental model of a situation and tasks) may adversely impact the work being undertaken
- How the dangers of insufficient staffing, inadequate competency, and poor workload management can introduce significant risk to safe work execution
- How a culture that does not support open communication and continual learning and improvement can compromise performance of the entire workplace system.

Integrating HOF within a company's management system supports effective safety management and the prevention of harms.

SYSTEMS THINKING

A System is a set of interacting or interdependent parts that form a unified whole.

Systems Thinking is therefore a way of making sense of the complexity of the world by looking at it in terms of wholes and relationships rather than by splitting it down into its separate parts.

It is valuable to apply systems thinking to the workplace to understand how various interactions (positively or negatively) influence human and organizational performance.

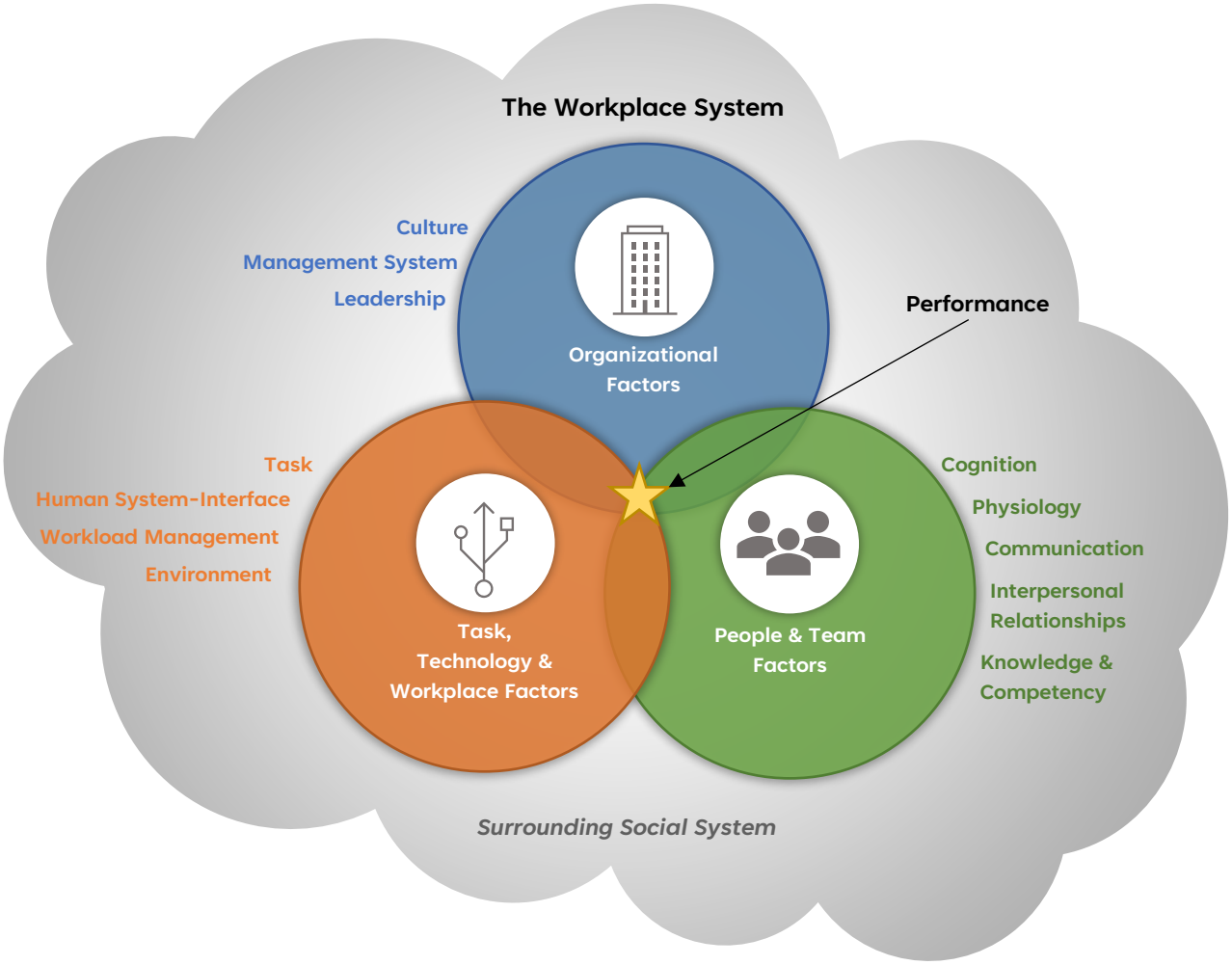
For more information on systems thinking and performance influencing factors see ***Canadian Standard Association Express Document 16:22 entitled Human and organizational factors for optimal pipeline performance (available for free download at the CSA e-store).***

For more learning resources on Human and Organizational Factors and Safety Culture visit the ***CER's Safety Culture Learning Portal.***

The Workplace System

Organizations are comprised of people, technology, and organizational structures that are constantly interacting and changing. Systems thinking helps us identify and consider these dynamic elements and their influence on performance outcomes. This can be particularly helpful when considering safety and environmental protection outcomes but is applicable to all types of workplace performance (i.e., outcomes and results achieved).

The following model provides a visual representation of applying systems thinking to the workplace. It denotes the three key elements of the workplace system and examples of the performing influencing factors that characterize each element:



The interactions and interdependencies between these elements form the context in which work is performed (i.e., how decisions are made and what actions are taken). Performance is at the center of the workplace system. It is important to be aware of the surrounding social system that also has an influence on the workplace system and its performance.

In order to support optimal performance, the application of systems thinking and the identification and evaluation of workplace system complexities can be applied proactively (threat prevention) and reactively (understanding what happened when things go wrong).

Reflective Questions:

(1) What is your current mental model of workplace performance? How does the systems thinking model compare? What are some potential benefits and challenges of applying this model of performance?

(2) How do you consider performance influencing factors in the work that you do? How could better consideration of these factors enhance performance in your workplace?

LOCAL RATIONALITY

A person's understanding and interpretation of the context in which they work is influenced by several factors, including:

- Knowledge
- Perspective
- Perception
- Focus of attention
- Experience level
- Social norms
- Available resources

For more information on systems thinking and performance influencing factors see ***Canadian Standard Association. (2022). Human and organizational factors for optimal pipeline performance (CSA Express Document No. 16:22).***

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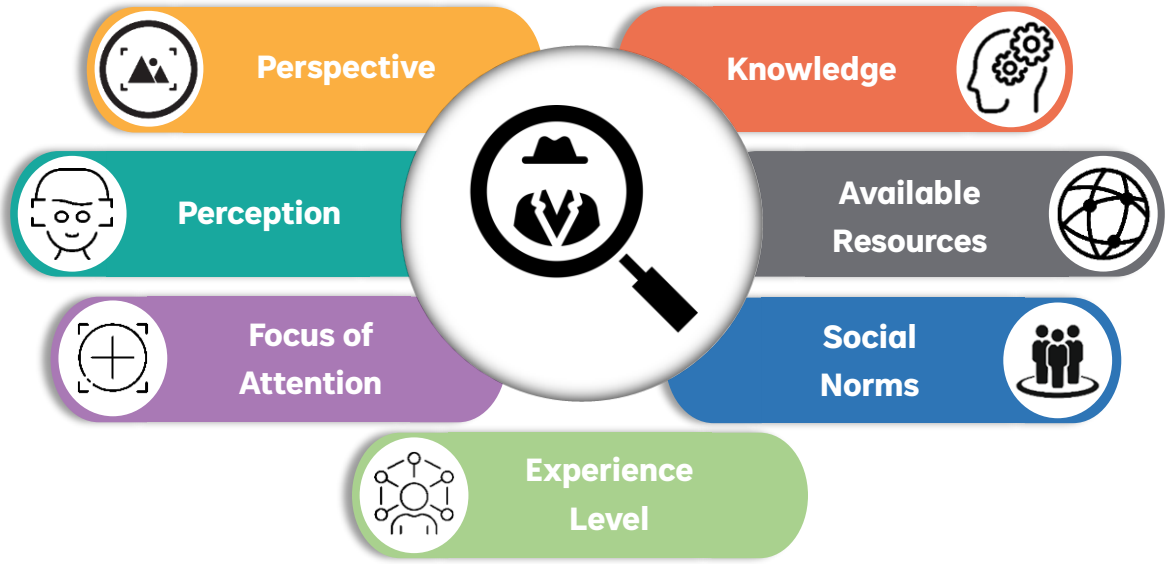
LOCAL RATIONALITY

What is Local Rationality?

Local rationality refers to the fact that people make decisions and take actions that seem rational to them at the time based on their understanding and interpretation of the context. In other words, people do things that make sense to them at the time based on their focus of attention, their goals, and the resources they perceive to be available at that moment.

As part of fully understanding how the workplace system contributes to performance outcomes, work needs to be understood from the local perspectives of those doing the work. This includes consideration of the below factors that influence someone's understanding and interpretation of the context in which they work:



Considering Local Rationality

Workplaces should consider local rationality proactively and reactively:

Example - Considering Local Rationality Proactively:

Local Rationality is a critical factor in decision-making and should therefore be carefully considered in the design of decision-making processes. Workplaces should seek to ensure decision-making is as objective as possible in order to guard against potential biases and related threats. This includes ensuring decisions are informed by data and evidence, including subject matter expert opinions and diverse perspectives, and that a series of checks and balances are in place to ensure decisions are adequately tested prior to finalization. In high-risk workplaces these practices are especially sensitive to ensure decisions do not unintentionally lead to a greater risk of harm.

Example - Considering Local Rationality Reactively:

Local rationality is a critical factor to consider when determining the causal and contributing factors that led to an adverse event. This includes seeking to understand the individual perspectives of all parties involved in the event and how the actions taken likely made sense at that moment in time. This approach can support a better understanding of what contributed to the incident, and in turn, more robust corrective and preventive actions.

Reflective Questions:

(1) What controls exist within your organization to ensure decisions are not negatively impacted by potential biases and related threats?

(2) Does the incident investigation process in your organization seek to consider multiple alternative perspectives and their implications? Are staff and leaders trained to consider the local rationality of the individuals involved in an incident? If not, what improvements can be made to consider this?

PERFORMANCE VARIABILITY

In a workplace system, performance of the same task or activity varies. This is a natural characteristic of the workplace system.

Continual adjustments are often necessary to cope with the unpredictability of the work context. For example, changes related to the work environment, available equipment, manpower, goals, time available, internal/external demands, and pressures may drive adaptation by workers.

Processes and procedures cannot be written for every potential scenario and condition. Without adaptive problem solving and the resulting performance variability, organizational success would often be limited.

For more information on performance variability and performance influencing factors see ***Canadian Standard Association. (2022). Human and organizational factors for optimal pipeline performance (CSA Express Document No. 16:22).***

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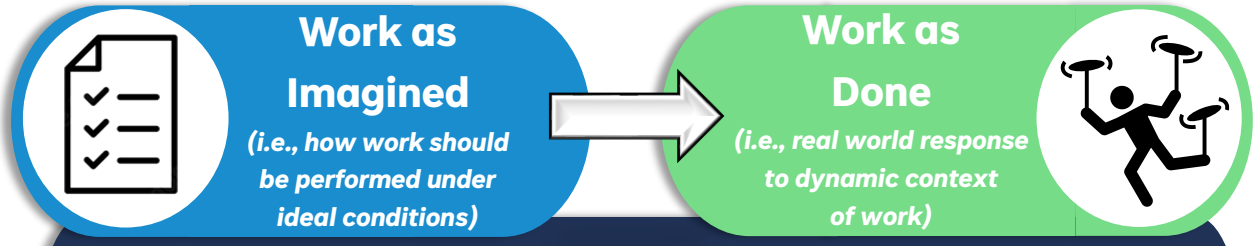
PERFORMANCE VARIABILITY

Employees are very good at adjusting their behaviour to meet expectations and desired outcomes. They often use adaptive problem solving to get things done because the context within which work is performed is so dynamic and unpredictable.

Performance variability is often deliberate, but it is not always well considered and managed to reduce unintended consequences. As a result, new risk(s) may be introduced in the workplace system. Sometimes deliberate variability is new and unexpected. In these cases, the variability may be associated with abnormal or previously neglected workplace issues. Employees may be compelled to try to resolve threats and deficiencies in real time to get the job done.

It is important to identify the nature and sources of all types of variability to better understand the system's functioning and its tolerance for variability. This allows organizations to proactively address underlying system issues and build increased resiliency.



To understand work (and workplace system functioning), organizations need to understand how and why performance varies. Then, resiliency to control variability and potential negative impacts can be built.

Reflective Questions:

(1) When has performance variability facilitated success within your organization? When has variability led to undesirable outcomes? In each instance, what specific workplace context changes drove the performance variability? What do these reflections tell you about your organization's resiliency?

(2) Do you have a mechanism for collecting information about performance variability within your workplace system? If not, why not? What steps could you take today to better understand and learn from existing performance variability?

Is Your Just Culture Under Threat?

If any of the following warning signs exist within your workplace it's time to take action:

Your leaders and coworkers share a "don't snitch" mentality when safety infractions are observed

Errors and mistakes are punished and treated in the same manner as intentional wrongdoings.

Financial bonuses are awarded for production outcomes, regardless of any safety compromises made to achieve them

Incident investigations are limited to identifying the person(s) responsible for the event and corrective actions target "fixing" the person(s) involved (e.g., through training).

For more information on systems thinking and performance influencing factors see Canadian Standard Association. (2022). Human and organizational factors for optimal pipeline performance (CSA Express Document No. 16:22).

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JUST CULTURE

A just culture is a workplace system that seeks to balance the need for accountability with the need for fairness and learning.

An organization with a just culture is one where:

Leaders and workers are encouraged or rewarded to report essential safety information and feel safe doing so

Following mistakes and adverse events, the focus is on learning from mistakes and improving the workplace system, rather than solely blaming individuals

Leaders and workers understand the line between acceptable and unacceptable behaviour

A common view exists that gross negligence or willful engagement in dangerous acts are subject to discipline and dismissal

When wrongdoing occurs, actions are fairly considered to determine culpability of the people involved and any consequences are proportionate with the nature of the wrongdoing

Having a just culture can bring many benefits to an organization, including:

- **Increased accountability:** a just culture promotes individual accountability by encouraging people to take responsibility for their actions, while also recognizing the role that systemic issues can play in causing mistakes.
- **Enhanced collaboration:** in a just culture, individuals are encouraged to work together to identify and address problems, rather than blame each other. This can promote a culture of collaboration and teamwork, which can lead to improved outcomes.
- **Increased trust:** When individuals feel supported and valued, rather than punished for their mistakes, they are more likely to trust their leaders and coworkers. This can lead to a more positive work environment and improved morale.

In turn, this supports:

- **Improved safety performance and continual improvement:** by addressing the underlying causes of mistakes and incidents, rather than just blaming individuals, a just culture can help to improve safety and reduce the number of errors and accidents. Focusing on the workplace system causes of mistakes and incidents, rather than just blaming individuals helps organizations identify opportunities for improvement and make changes to prevent similar problems in the future.

Reflective Question:

As an individual, what actions can you take to support a just culture within your workplace?

Is Your Workplace Facing Uncontrolled Pressures?

If any of the following warning signs exist within your workplace it's time to take action:

- Not enough time/resources assigned to an activity
- Excessive budgetary constraints
- Leaders are less strict about adherence to procedures when work falls behind schedule
- Frequent project overruns
- Slow and gradual degradation in safety margins
- Rewards and incentives are based on production outcomes

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DEMANDS & PRESSURES

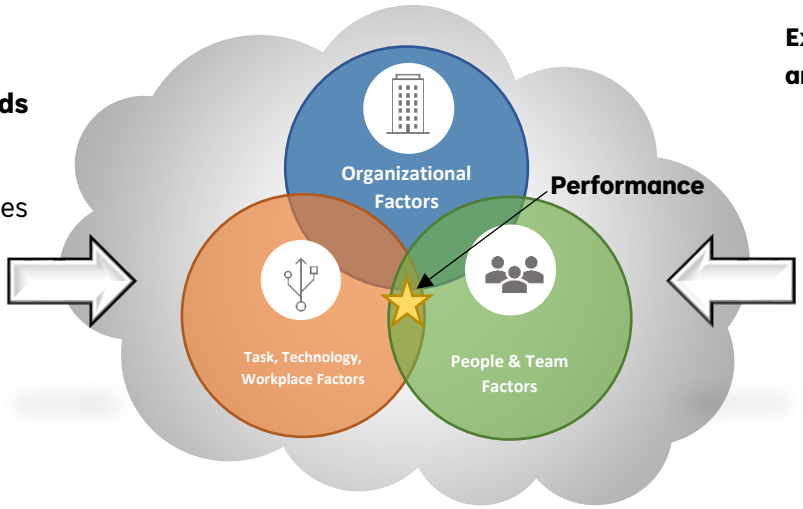
in Workplace Systems

Workplace systems are dynamic settings that are constantly exposed to internal and external demands and resulting pressures. The image below illustrates some examples of demands and pressures that can influence a workplace system:

The Workplace System

Internal Demands and Pressures:

- Shifting priorities
- Unclear expectations
- Budgets



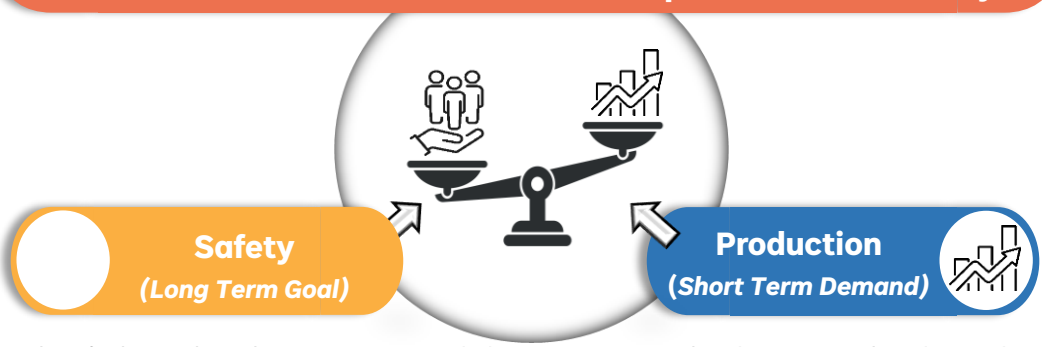
External Demands and Pressures:

- Global markets
- Stakeholder decisions
- Government policies
- Regulatory activities
- Societal expectations

Demands are constantly changing within a workplace system; individuals and teams should aim to continuously adapt and adjust to new emerging demands, particularly when resources and constraints remain static.

A workplace system is at risk when short term demands take away attention and dilute focus on long term goals and objectives. For example, **production pressure** arises when leadership overly values production by emphasizing the meeting of work demands, schedule, or budget, rather than focusing on working safely.

Production Pressure = imbalance between **production** and **safety**.



To identify demands and pressures in a workplace system, consider observing and analyzing the **types, origins**, and **frequency** of demands that are straining the workplace system and how the system adapts and adjusts over time. To aid in detection of production pressure within your organization examples can be found in the leftmost column of this page.

Reflective Questions:

(1) In your workplace:
- (a) What types of internal demands and resulting pressures have you experienced?
- (b) What types of demands and resulting pressures have you experienced from external sources?
- (c) How did these demands and pressures impact your work?
- (d) What were some actions taken to address these demands and pressures?

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Is Your Workplace Facing Resource Constraints?

If any of the following warning signs exist within your workplace it's time to take action:

- *Shortage of qualified personnel to execute the work*
- *Equipment maintenance is continuously postponed or solved with temporary, "band-aid" solutions*
- *Time to complete safety sensitive upgrades and repairs is limited due to competing demands*
- *Specialized software or technology to improve how work is executed is inaccessible*

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RESOURCES & CONSTRAINTS

in Workplace Systems

The availability of resources has a profound impact on the workplace system and resulting performance (e.g., meeting goals and objectives). Not enough resources (i.e., resource constraints) can have a significant negative impact on performance outcomes, particularly for companies in high-risk industries.

Below are examples of resource types and possible constraints within the workplace system:

Resources	Constraints
Physical Resources (equipment, tools, facilities)	Physical Resource Constraints that limit the availability of equipment, tools, or tech
Human Resources (employees, managers, stakeholders)	Staffing Constraints that limit the number of people available to do work
Financial Resources (budgets, funding, capital)	Budgetary Constraints that limit the amount of money available
Informational Resources (data, knowledge, technology)	Informational Resource Constraints that limit availability of data or knowledge
Time Resources (work hours, schedules, deadlines)	Time Constraints that limit the amount of time available to complete work

Defining resource needs, monitoring, evaluating, and taking action to address resource constraints when they arise are critical functions within a company's management system.

To adequately consider availability and quality of resources, companies should ensure the below steps are implemented and effective within their management system:

(1) Identify the resources and constraints available
(2) Prioritize resources based on importance and value
(3) Allocate resources (in a way that ensures they are being used efficiently and effectively
(4) Monitor resource usage to ensure effective and efficient resource use
(5) Manage constraints (identify ways to mitigate or eliminate)
(6) Plan for contingencies (unexpected events or changes in circumstances that may impact availability or use of resources)
(7) Continuously evaluate and adjust

Reflective Question:

Which of the 7 steps to consider availability and quality of resources does your workplace most struggle with? What are some possible steps for improvement?

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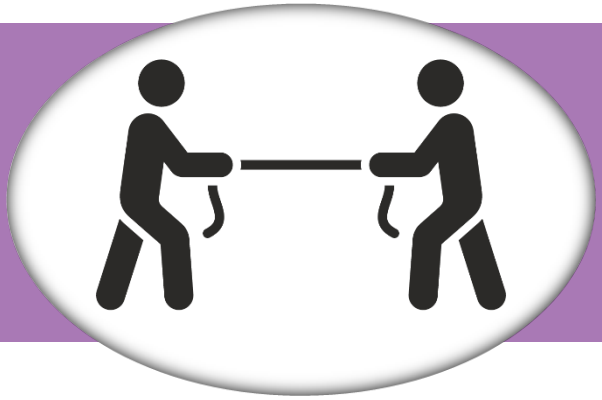
TRADE-OFFS

in Workplace Systems

Within the workplace system trade-offs are constantly made to ensure goals are met and work gets completed. This means that how the work is **actually** completed can sometimes stray from how the work was originally **intended**, whereby we may intentionally or unintentionally break a rule (e.g., organizational policy) or circumvent a procedural step in the interest of meeting our goals and objectives.

While this can often be a harmless act and help us in achieving our goals, in high-risk organizations with safety sensitive operations, doing so may unintentionally introduce significant risk of harm.



While trade-offs made at the frontline level of the workforce may be easier to see, decisions and trade-offs made at higher levels in the organization can create unintended consequences of significantly higher risk. Unfortunately, latent threats introduced by higher level management trade-offs are typically more difficult to detect and often not identified until after a negative event. See the below case study for an example.

Case Study – Trade-Offs & Unintended Consequences

In a recent budget meeting, senior management of a construction company discussed the potential to meet the company's highest earnings year yet. As a result, they decided to employ a new monthly bonus structure to support frontline supervisors and workers meeting monthly production targets.

To achieve this, senior management decided on a 20% monthly salary bonus for frontline supervisors, and 10% for frontline workers when production goals were met. Careful consideration was made to ensure allocating these leader and staff bonuses would provide the best opportunity to achieve the company's highest annual earnings. Unfortunately, while the bonus structure was set with good intentions, the potential risks to safe outcomes were not evaluated.

Despite a robust health and safety policy within the organization, the implementation of this new bonus structure ultimately resulted in frontline leaders and workers circumventing certain safety procedures and practices to ensure production deadlines were met and safety bonuses were achieved. Unaware of this potential consequence, senior management did nothing to guard against this potential outcome, and ultimately, introduced significant risk within the workplace system to achieve their profit goal.

Reflective Question:

1) In the above case study, what could senior management have done differently to guard against the unintended consequence of increased safety risk?

2) Within your workplace what could be changed to support better evaluation of risks and potential unintended consequences when trade-offs are made?

TRADE-OFFS

in Workplace Systems

Trade-offs are often made as a result of conflicting goals, like cost, time, and quality.

It's easy to think about trade-offs at the frontline level of the workforce, however, trade-offs made at the senior management level, without adequate consideration of the resulting risk, have the most significant impact on potential harm.

For example, a construction worker working at height may omit clipping in their fall protection harness because it makes walking around the site slow and cumbersome, impeding speed of production. However, a senior management decision to tie financial bonuses to production goals was a trade-off made that ultimately contributed to this act. See the case study [right] for more details.

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