



# The Relevance & Benefit of ISO 31000 to OSH Practice

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**ACCREDITED BOARD FOR ENGINEERING AND TECHNOLOGY** has certified 20 OSH degree programs (ASSP, n.d.), while many dozens of other institutions throughout the U.S. offer some form of OSH technician training or advanced degrees (Universities.com, n.d.). Conservatively posited is that at no prior time have OSH education and training resources been so widely sought and utilized. This fact stands as a core reason those representing the broad and diverse OSH practices today are rightly regarded as professionals (Valentic, 2017).

Also posited is that risk is the most common theme found in OSH practice, whether the example considered is ergonomics, industrial hygiene, loss control, process safety, construction or mining safety, or others. All are inseparably bound by risk, which most might agree is simply that which can or cannot be accepted. Evidence of this is that each practice inevitably returns to the theme of

risk analysis and assessment as its primary problem identification and resolution methodology (ANSI/ASSP, 2011; 2016; ISO, 2018b). Risk is the tie that binds.

Bernstein (1998) writes:

The revolutionary idea that defines the boundary between modern times and the past is the mastery of risk: the notion that the future is more than a whim of the gods and that men and women are not passive before nature. (p. 1)

Bernstein relates “times past” as the ancient days in which oracles and soothsayers were analogous to today’s weather forecasters, the average person at their mercy for an understanding of current and future events. Many OSH professionals might rightly claim such times past have been witnessed during

the span of their own careers in which luck, hope and hubris (organization and personal) have been exchanged for persistent and repeated devotion to best practices and measurement. Lady Luck relinquished of her power; the OSH practitioner empowered. Finally posited: The many OSH practices so prevalent today are relatively new, but risk is not. There is much to learn from the tie that binds.

Lyon and Popov (2018) have made significant contributions to OSH practice by promoting the importance of incorporating risk into our daily practice. A hazard-based approach alone will no longer suffice, they say. Their paradigm: International Standards Organization (ISO) 31000, Risk Management—Guidelines (ISO, 2018a).

## ISO 31000:2018

Innumerable standards in the world address a vast range of concerns. But only relatively recently has there been international consensus for the realm of risk management. ISO first published ISO 31000 in 2009 and updated it in 2018 (Lachapelle et al., 2018). ISO 31000:2018 is a big-picture document, providing the broad strokes for implementing risk management in a structured way. The details of implementation, however, are intended to be determined by each conforming organization.

Importantly, the standard more precisely defines risk as the “effect of uncertainty on objectives” (ISO, 2018a, p. 1). An effect is a “deviation from the expected. It can be positive, negative or both, and can address, create or result in opportunities and threats” (ISO, 2018a, p. 1). Thus, opportunities and threats are as yin and yang, that is, seemingly opposite or contrary forces that may actually be interconnected and interdependent. If true, OSH professionals should be reflective about their respective roles and efforts. Are they to minimize the frequency and severity of OSH-related threats or hazard risk (Elliott, 2018b)? Or should OSH professionals also persistently seek opportunities that can result in a more competitive and profitable entity? Consider the following case study.

## Case Study

A hazard familiar to workers in metals recycling is the possibility of water becoming entrained in molten material.

## KEY TAKEAWAYS

- OSH professionals and related specialties are wise to incorporate risk management theory into daily practice.
- An internationally recognized consensus standard for risk management provides needed guidance for developing risk-based OSH competence.
- Applied risk principles are needed to ensure alignment with an organization’s paramount objectives for OSH success.

This hazard can result from the use of water to cool various furnace components in much the same manner that cooling systems prevent automobile engines from overheating. In molten metal operations, however, violent explosions result when trapped water instantly expands 1,600 times its original volume (Tabatabaei & Turner, 2009). Many examples of tragic incidents attest to the hazard's serious nature (CSB, 2013; Eckhoff, 2016, Chapter 4).

Related, one Steel Manufacturers Association member implemented a zero-tolerance policy for continuing production operations whenever a water leak is detected (W. Easley, personal communication, Jan. 7, 2020). This might seem an obvious course but those familiar with the complexity of the various systems understand that not all water leaks present an immediate hazard, and that water on top of a molten metal bath rapidly evaporates, that is, given water density is approximately 1,000 kg/m<sup>3</sup> ("Water," 2020) versus steel's 7,700 kg/m<sup>3</sup> ("Density of Steel," n.d.). Those and other variables tempt the delay of maintenance and repair operations for "minor" leaks or encourage quick repairs during the course of ongoing operations to minimize unscheduled and costly downtime.

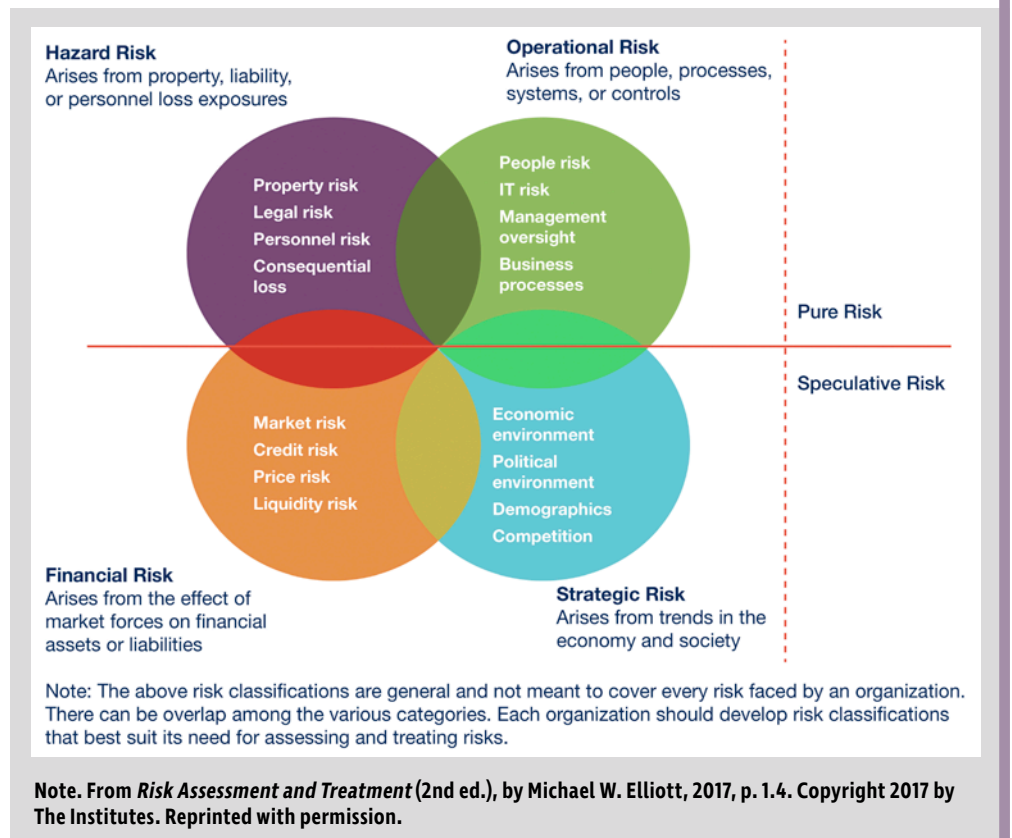
The new company-wide policy was a challenge to implement because informal practices were deeply rooted. As in all workplaces, it is easy for intelligent and capable people to minimize the likelihood of a known hazard if severe consequence is infrequent or has never been personally experienced (Kahneman, 2011). Leadership was persistent, however, and through training, audits and sharing of best practices, personnel can now be relied on to immediately shut down melting operations and evacuate to agreed safe locations until the water supply is isolated and stopped. What had seemed a near ridiculous and unnecessarily costly overreaction to many is now accepted as normal, necessary and basic to safe operation. Any other conduct today would be counter-culture.

This has resulted in significant worker safety and health hazard risk reduction but, as many had worried, the policy also resulted in an approximate 20% increase in production interruption, each minute lost both expensive and irreplaceable. Heroics had previously minimized this loss, but not without excessive hazard risk. This narrative appears to promote the myth that reduction of pure risk (i.e., a chance of loss or no loss) is at odds with the aims of speculative risk (i.e., the chance of loss, no loss or gain; Elliott, 2018b).

It was observed that each water leak incident subsequently encountered was treated as a significant incident. Root-cause analyses and quality techniques to reduce process variation were leveraged to identify maintenance and technology improvement possibilities (ASQ, n.d.). Material and method alternatives along with system design changes were implemented. Downtime due to water leaks has since fallen to the preprocedure change frequency and continues to decline. The new policy not only has resulted in significantly reduced hazard risk, but also improved operational risk. In turn, this has provided improved financial results that improve the organization's strategic risk exposure (i.e., its ability to compete in challenging markets; Figure 1).

If risk is the effect of uncertainty on organization objectives, it is proven in the described instance that uncertainty has been minimized by limiting threats and exploiting opportunity. The problem was always there to be solved but remained hidden. Unmasking the problem allowed committed personnel who were always present to take action to solve it. The only thing better in baseball than a triple is a home run. The case study described is the latter metaphor's industrial equivalent. Safety "singles" are, of course, important. But a "bases loaded organization home run" can be relied on to grow enthusiasm for the possibility of what can be done next, together. Therein lies an important lesson: The risk quadrants described in Figure 1 are often interdependent. The OSH

**FIGURE 1**  
**THE FOUR RISK QUADRANTS**



## CASE STUDY EXAMPLES

Anecdotal case study examples shared by practicing OSH colleagues (Case Study A, S. Williams, personal communication, Jan. 6, 2020; Case Study B, R. Kilpatrick, personal communication, Jan. 7, 2020).

### Case Study A

**A multistage automobile steering production process in which hoses, clamps, valves and connectors were assembled.**

**Significant musculoskeletal disorder (MSD) exposures were experienced due to awkward postures and excessive force required for completing assembly tasks. Quality, productivity and employee morale were additionally negatively affected.**

**OSH professionals joined with employees and plant industrial engineers to redesign the assembly fixture bases and tooling. Tooling balancers and other improvements were provided.**

#### Wins

- Injuries and MSDs were eliminated in that work cell for the subsequent 3 years.
- Quality and morale improved as a result of the improved process controls.
- The redesign effort reduced labor costs 25% while increasing throughput 20%.

### Case Study B

**Engaging employees for improving OSH process ownership. Examples in which employees are provided active ownership roles include:**

- observation, hazard and near-hit reporting,
- employee safety team assignments,
- 5S (sort, set in order, shine, standardize, sustain) workplace management, and
- energy control procedure and job hazard analysis audits and edits.

**Increased peer-to-peer coaching (production and safety) has resulted along with more individual accountability and less waste. Overall equipment utilization is improving.**

professional cannot escape this reality and should not wish it. The “Case Study Examples” sidebar provides additional examples.

The tenets of ISO 31000:2018 do not presume pure and speculative risks to be mutually exclusive propositions. Rather, the understanding and management of both are integral to achieving organization objectives; they are two sides of the same coin (Clark, 2001). It is in this light that Lyon and Popov (2018) describe an old versus new OSH professional paradigm in which reactionary activities are steadily yielding to proactive risk-based methods. Seeking and pursuing organization opportunities does not represent an abandonment of the OSH professional’s mission, but rather better ensures its success. The premise is increasingly supported (Elliott, 2017; 2018a; b; Holizki et al., 2006; Manuele, 2015; Susca, 2019).

### Risk & Objectives

OSH professionals should scrutinize ISO’s insertion of the word “objectives” into its risk definition. Its conspicuous presence is likely owed to the reality that the concept of risk has no utility without context to that which is at risk. Stated otherwise, organization objectives serve as a

reliable North Star for the navigation of all. The well intentioned become lost without such aid, travel in circles, bump into one another, waste resources and create frustration. It is common, therefore, for organizations to focus employee energy on agreed paramount objectives by incorporating supportive language into vision and mission statements (Dalio, 2017). Following are select examples yielded from web searches of organization vision and mission statements, 2019 and 2020.

- LinkedIn: “Connect the world’s professionals to make them more productive and successful.”
- Starbucks: “To inspire and nurture the human spirit—one person, one cup and one neighborhood at a time.”
- Ted: “Spread ideas.”
- American Red Cross: “Prevent and alleviate human suffering in the face of emergencies by mobilizing the power of volunteers and the generosity of donors.”
- Whole Foods: “To nourish people and the planet.”
- Tesla: “To accelerate the world’s transition to sustainable energy.”
- Google: “To organize the world’s information and make it universally accessible and useful.”
- Amazon: “To be Earth’s most customer-centric company; to build a place where people can come to find and discover anything they might want to buy online.”
- Ford Motor Co.: “To become the world’s most trusted company, designing smart vehicles for a smart world.”

Knowing an organization’s paramount objective(s) is highly instructive to all employees, including OSH professionals. Everything, by default, is subordinate to that which is paramount. Unsupportive work must be stopped. Supportive efforts must be started and strengthened. Admitted, the cause-and-effect relationship between the actions of support staff, which includes OSH professionals, and the realization of a corporate-wide objective is often indirect but still can be discerned. OSH professionals soon understand how the alignment of their efforts becomes the basic determinant of their relevance, whether they are sought or avoided, whether they are long or short careered.

Complicating is that organization culture is often argued to be the real engine of every employee’s efforts. Schein long ago illustrated its three levels: 1. basic assumptions (what is believed); 2. espoused values (what is said); and 3. artifacts (what is done; Schein, 1997). Dysfunctional cultures arise when significant differences exist between the three (Isidore & Levitt, 2020; Woodyard, 2020). Witnessed is that corporate vision and mission statements provide but one of the requisite components of culture (what is said) and may not always be in concert with what is believed and done. Corporate statements emphasizing the prime importance of OSH can sometimes be out of sync with real priorities. Wachter (2014) provides more than 50 detailed examples in which OSH professionals encountered significant ethical predicaments, making clear the challenge raised is not abstract or academic. Unaided, we can lose our way.

Krause and Bell (2015) state that “culture sustains performance [for better or for worse]” (p. 49) and Peter Drucker is credited with having said more directly that “culture eats strategy for breakfast” (Cave, 2017). One way or another, employees learn what is most important. It is in this reality that OSH professionals find common

footing with every employee, each imperfectly answering imperfectly sent signals. No group of leaders or those led are without flaws. The leaders are cognizant of the importance of bringing the tribe along for the journey planned; the tribe is anxious to be led. All must survive, grow, adapt and integrate in the culture found, an unsure and challenging process (Schein, 1997). ISO 31000:2018 again provides direction and, thereby, substantial relief.

### ISO 31000:2018 Principles

A significant portion of the ISO 31001:2018 document is dedicated to prescribing distinct principles declared to be foundational to effective and efficient risk management (Table 1). These eight principles are each briefly reviewed to better equip OSH professionals to build bridges between OSH and organization paramount objectives. Such bridges provide crossing opportunities for both directions of travel.

#### Principle 1: Integrated

According to Vanderhoof (as cited in Kilbourne, 2013), OSH is most effective when “balanced with and incorporated into the core business processes.” Vanderhoof believes that OSH integration opportunities are found in such activities as corrective action plans, establishment of risk reduction and hazard control processes, contractor management, and management review processes. When safety and health is integrated across all business functions it is engrained into the organization and becomes a routine way of doing business. It is no longer seen as an “additional initiative that requires special attention” (NSC, 2013).

Dow Chemical Co. (2010) describes its effort to integrate OSH into every facet of the organization. This commitment is expected of all employees and at all levels. All must actively participate. For example, acquisition decisions are weighed through the company’s due diligence review process. Injury and illness rates, environmental emissions and environmental liabilities are proactively assessed to best ensure well-informed business decisions. This is in keeping with the company’s operating discipline management system that further ensures that necessary environmental health and safety elements are implemented consistently across businesses, functions and geographies. These priorities are not add-ons, but rather are basic to the business operating philosophy.

#### Principle 2: Structured & Comprehensive

Attempts to systematically define complete frameworks for OSH practice have been in evidence for many decades. A novel and significantly influential audit system that enjoyed international popularity beginning in the 1980s included 20 related subject areas, 120 subtopics and more than 600 system requirements (International Loss Control Institute, 1994). The International Safety Rating System reasonably can be said to have influenced the development of then and more recent safety management system paradigms including ANSI/ASSP Z10.0-2019, BS OHSAS 18001:2007 and ISO 45001:2018. Commonly encountered elements from these and other examples are:

- leadership commitment
- employee participation

- resources
- objective/goal setting
- document control
- legal compliance
- operational planning
- risk assessment
- hierarchical control strategies
- competence training
- communication
- incident investigation
- corrective and preventive action
- procurement
- management of change
- monitoring and performance evaluation
- audit
- management review

The importance of utilizing such an approach is found in the confidence that it provides. The absence of any one element undermines the total system’s utility. There will

**TABLE 1**  
**ISO 31000:2018 PRINCIPLES OF RISK MANAGEMENT**

No.	Principle	Concept
1	Integrated	Risk management is an integral part of all organizational activities.
2	Structured and comprehensive	A structured and comprehensive approach to risk management contributes to consistent and comparable results.
3	Customized	The risk management framework and process are customized and proportionate to the organization’s objectives.
4	Inclusive	Appropriate and timely involvement of stakeholders enables their knowledge, views and perceptions to be considered.
5	Dynamic	Risks can emerge, change or disappear as an organization’s external and internal context changes.
6	Best available information	The inputs to risk management are based on historical and current information, as well as on future expectations.
7	Human and cultural factors	Human behavior and culture significantly influence all aspects of risk management at each level and stage.
8	Continual improvement	Risk management is continually improved through learning and experience.

**Note.** Adapted from “Risk Management—Guidelines (ISO 31000:2018),” by ISO, 2018, p. 3-4.

Risk is more than the tie that binds all OSH professionals. It is the tie that binds all the world, and so binds us to our benefactors: our maintenance and production superintendents, plant managers, finance and human resource professionals, operational vice presidents and chief executive officers, the companies employing us and their respective objectives.

always be debate about the order, number, terminology and importance of the individual items, but there is enough consensus across all industries and geographies that decreasing benefit is likely to be realized from more academic debate. Structured and comprehensive approaches to OSH abound.

### Principle 3: Customized

Effective OSH processes are industry and organization centric, and are designed to reflect both internal and external influence factors. Internal factors include organizational structure, culture, employees, management, shareholders and reward systems. OSH professionals logically spend most energy on understanding and strategically pushing and pulling upon these levers. But external factors are also strongly impactful to the entire business, including the OSH professional, and so must also be considered. These factors include political, economic, social, technological, environmental and legal considerations.

An example of external factors can be seen in the rail industry and its challenges implementing positive train control to prevent train incidents (“Lack of Positive Train Control System a Factor in Fatal Rail Incident, NTSB Concludes,” 2019; Stahl et al., 2019). There have been years of regulatory delay and legal challenge (political and legal factors) complicated by expensive and nonstandardized systems (economic and technology factors). All conspire to cause passengers and the public prolonged exposure to unnecessary and continued harm (social factors). Positive train control works but it is not getting implemented. The solutions pursued thus far are not adequately customized to the objective’s internal and external context, either societally or organizationally. Uncertainty increased. The paramount objective forfeited.

### Principle 4: Inclusive

Effective OSH practice must include appropriate and timely involvement of all stakeholders to ensure that their knowledge, views and perceptions are considered (Dalto, 2019). A stakeholder can colloquially be expressed as anyone with a “dog in the hunt.” Employers, supervisors, managers and employees represent internal stakeholders. This includes the newest temporary employee no less than the chief operating officer. It includes external stakeholders such as at-risk employee family and friends. External stakeholders also include shareholders, customers, adjacent property dwellers and owners, suppliers, creditors, government and society at large. All stakeholders have a vested interest in the entity’s success. If the organization’s risks are managed poorly, the impact will ultimately be felt by all stakeholders, within and without.

The construction industry has historically contributed disproportionately to workplace fatalities, perhaps in part due to operational complexities not observed in many linear manufacturing processes. Lingard et al. (2015) iden-

tified the industry’s need for a “whole industry” approach to safety. This approach “requires the active engagement and input of all participants in the project delivery process” (p. 3). OSH professionals must have a clear understanding of their stakeholders because they have the ability to “deliberately or even unwittingly influence OSH performance” (p. 11).

The notion of OSH being everyone’s responsibility importantly also promotes

the ideal of inclusiveness. Successful OSH professionals know that the best way to implement their policies and processes is to garner input and support from all constituents. It is impossible to consult every person about every decision but it is vital to know key stakeholders’ concerns, and to keep stakeholders informed and solicit their input when decisions are considered.

### Principle 5: Dynamic

All organizations are subject to constant change as stakeholder needs evolve. Successful but static enterprises prove a contradiction. Anticipation, detection and timely response to change and events are basic to survival and growth. OSH professionals are wise to incorporate these same attributes into daily practice.

A strategy of responding to newly promulgated regulation and workplace incidents requires a reactive approach that will always underserve stakeholders. Dynamic OSH practice is needed to proactively and, therefore, more efficiently and effectively institute needed safeguards. Risk assessment can be argued to be the optimal tool for institutionalizing dynamic OSH practice:

Recent developments take the risk assessment subject to a higher level within the practice of safety. By formalizing the hazard analysis and risk assessment process, a better appreciation of the significance of individual risks is achieved. As risk levels are categorized and prioritized, more intelligent decisions can be made with respect to their elimination or reduction. (Manuele, 2008, p. 112)

Risk assessment will only grow in importance as the modern workplace increases its insatiable appetite for automation, artificial intelligence and operational speed.

### Principle 6: Best Available Information

OSH professionals working within especially high-risk operations understand the importance of having the best available information. A prime example is when an incident command system is required in response to a hazardous materials release. During any incident, the most current and accurate information is critical to the situation’s safe and efficient disposition. These emergencies often progress quickly making it difficult for response personnel to obtain a true picture of the incident. Incoming information is considered to have a half-life, reflecting the reality that data rapidly degrades in utility.

OSH professionals must apply this ethic not only to emergency response, but to all facets of practice, insisting on the best available information prior to advisement. Humility is in order. Everything we know with certainty should be presumed to have a half-life. Ongoing professional development, pursuit of relevant and meaningful professional designations, engaging and participating in professional organizations such as ASSP, BCSP, Canadian Registered Safety Professionals, American Industrial Hygiene Association and others increase the likelihood of being aware of, understanding and correctly applying current technical information.

A sobering reality is that the medical community is not solely capable of malpractice. The OSH professional whose inaccurate advice results in stakeholder harm cannot rationally be guilty of less. Continued education is both a practical necessity and moral imperative.

### Principle 7: Human & Cultural Factors

OSH management is normally trafficked in complex human cultural and behavioral influences (Tranchard, 2018), and so must be part of all organization activities and interactions. Society for Human Resource Management (SHRM, 2019) emphasizes the importance of creating safety consciousness in all employees due to the significant risk that poor attitudes can produce. But how? Traditional modes for providing worker safety such as regulations, engineering controls and PPE have been tried but found wanting. Some researchers believe this is explained by the inadequate consideration and management of human and culture factors (Flin & Agnew, 2018; Reason, 1991; Schein, 1997). ISO 31000:2018 appears to agree.

The ideal situation is one that encourages the worker to choose safe work practices over all other work pressures. This can be pursued through open communication environments in which employees are adequately equipped, trained and led. The caveat is that adequate training is seldom “once and done” but in the high-performing team includes continued feedback. It is less likely that organizations suffer from employee behavior problems than the want of adequate performance monitoring and feedback systems. As Groover (2017) says, “It’s up to leaders to equip workers with the knowledge, skills, tools and environment to consistently make choices that reduce exposure to themselves and others.”

### Principle 8: Continual Improvement

The market environments in which for-profit organizations exist are normally highly competitive. That competition forces businesses to learn, adopt and adapt. The OSH function is increasingly subject to these pressures too. This is observed in various safety management system standards that prominently emphasize the importance of management review (ANSI/ASSP, 2019; ISO, 2018b). Management review is performed in answer to the check and act functions so prominently found in Shewhart’s plan-do-check-act model long embraced in quality and environmental management standards. Its function is analogous to a global positioning satellite application that continuously monitors one’s travel. Real-time calibration between the current and desired situation is provided

to best ensure expedient and sure arrival at the planned destination. Management review provides the realistic hope and expectation of OSH success (i.e., ever-decreasing frequency and severity of stakeholder harm). Just like the organization it serves, the OSH system learns, adopts and adapts to provide optimal competitive advantage by reducing uncertainty.

### Conclusion

Risk is more than the tie that binds all OSH professionals. It is the tie that binds all the world, and so binds us to our benefactors: our maintenance and production superintendents, plant managers, finance and human resource professionals, operational vice presidents and chief executive officers, the companies employing us and their respective objectives. So, too, are we bound to those in harm’s way, their kith and kin, to industry regulators and the body politic. In these orbits risk is not limited to binary simplicity, a chance of loss or no loss that stereotypically is assigned as the OSH professional’s working paradigm, but starkly requires the pursuit of gain. Thus, a natural and persistent tension pervades our daily walks as one primary objective will frequently brush against its apparent contradictory other.

It is hoped to have been demonstrated that ethical OSH practice (Wachter, 2011; 2014) need not neglect or abandon the core mission of preventing pain and suffering by embracing the goal that consumes all others: making the entity served better, stronger and faster. Indeed, the core mission is best served when the OSH perspective is given greater context and import that is only possible when we, as Manuele (2015) says, “operate within the business framework of the organizations to which [we] give counsel” (p. 41), cognizant that “the probability of success will be enhanced if [the OSH professional] is viewed as an integral member of the business team” (p. 41).

Concluded: We underserve or are even counterproductive to our core mission when the opposite of Manuele’s reflection is witnessed. Too fine a line to walk? Debate is welcomed. But there is no debating that the metaphorical line has always been and will always be. The line is risk. A principles-based approach is needed to illuminate our way. Those recited in ISO 31000:2018 shine brightest. **PSJ**

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