Safety Defined

A Means to Provide a Safe Work Environment

By Daryl Balderson

How safety is defined affects its application in the workplace and provides an opportunity to influence positive outcomes for workers, managers and an organization. Safety management has progressed substantially since Heinrich first discussed its practice in the 1931 book, *Industrial Accident Prevention*. For example, if the U.S. workforce in 1997 had the same risks of dying from injuries as workers in 1933, an additional 40,000 workers would have died from preventable events. Progress can be attributed to multiple interrelated factors, including efforts by labor and management to improve worker safety, research, education and regulatory activities (CDC, 1999).

A corresponding development in the definition of safety has progressed to a lesser extent as evidenced by the limited number of readily available definitions. Established safety definitions referenced in this article tend to be located in textbooks and with one exception were not identified by online searches available to the general public. Also, these definitions tend to focus on the what instead of the how. Defined in terms of the what, safety tends to describe its nature, whereas, safety defined in terms of the how describes its manner or means to provide a safe work environment.

U.S. fatal work injuries between 1992 and 2013 decreased from 6,217 to 4,585; between 2006 and 2013, the rate of fatal work injuries per 100,000 full-time equivalent workers decreased from 4.2 to 3.3 (BLS, 2015). Despite undeniable progress over the past half century, many safety practitioners still cling to outmoded practices such as utilizing generic safety posters. Of particular concern is the current trend of defining safety performance as a psychological or emotional issue rather than the complex management challenge that it clearly is. Doing stuff, even good stuff, is not the same as having a management system to promote long-term success and continuous safety improvement. Business needs to appreciate that management systems drive safety excellence and the safety culture (Loud, 2012). Most work problems, including employee injuries, are a result of management decisions and directions (Smith, 2011).

Good definitions enable stakeholders to have a common understanding of a word or subject, enabling meaningful conversations and better decision making; conversely, imprecise definitions make it difficult to agree and limit the ability to influence. OSH will never be accepted as a profession until stakeholders agree on a definition of the practice of safety, make it known and meet its requirements (Manuele, 2013).

This article proposes a new safety definition that supports safety management and can be utilized in most occupational settings. Ideally, a safety definition would describe its manner (how), as

IN BRIEF

- **Good definitions enable people to have a common understanding of a word or subject, which enables meaningful conversations and better decision making. Conversely, imprecise definitions make it difficult to agree and limit anyone's ability to influence.**
- **How safety is defined affects its application in the workplace and provides an opportunity to influence positive outcomes for workers, managers and an organization.**
- **Safety is often applied in an organization without a clear definition or understanding of what safety is or how to achieve the desired outcome. Without clearly understanding what safety is, achieving meaningful, sustained safety performance is difficult.**
- **This article proposes a new safety definition that supports safety management and can be utilized in most occupational settings. Workers, managers, safety professionals and an organization can use this definition to achieve business objectives while protecting people.**

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Business needs to transition from seeing safety as an absence of negatives, such as no serious incidents, to seeing it as the presence of a positive capacity to make work proceed properly.

Figure 1
Safety as the Antonym of Risk

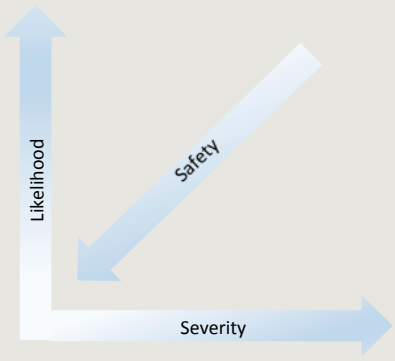


Table 1
Established Definitions of Safety

Definition	Characteristic
Zero harm	Absence
Freedom from harm or danger; the state of not being dangerous or harmful; a place that is free from harm or danger (Merriam Webster, 2015)	Absence
Control of accidental loss (Bird, Germain & Clark, 2003)	Risk
Freedom from unacceptable risk (ANSI/ASSE, 2011)	Risk
That state for which the risks are judged to be acceptable (NSC, 2009)	Risk
The control of recognized hazards to achieve an acceptable level of risk (ASSE, 2015)	Risk
Protection from danger and hazards arising out of, linked with or occurring in the course of employment (CSSE, 2015)	Risk
The ability of individuals or organizations to deal with risks and hazards so as to avoid damage or losses and yet still achieve their goals (Reason, 2000)	Risk
The condition where the number of adverse outcomes is as low as possible by trying to make sure things do not go wrong by eliminating the causes of malfunctions and hazards or by containing their effects (Hollnagel, 2014)	Risk
The presence of capabilities, capacities and competencies that make things go right (Dekker, 2015)	Adaptable
A condition where the number of successful outcomes is as high as possible, ability to succeed under varying conditions by trying to make sure things go right rather than by preventing them from going wrong (Hollnagel, 2014)	Adaptable

Complexity

well as serve as a working definition that can be utilized by workers, managers, safety professionals and organizations to achieve business objectives while protecting people.

In addition, a safety definition should follow established definition logic. A logical or Aristotelian definition is 1) comprised of a genus (category or class) and differentia, which is a distinguishing characteristic from other members of the genus; and 2) is not circular (i.e., does not define a word in terms of itself) (How to write, 2015). Following this guideline, *safety* or *safe* cannot be included in the definition of safety.

Literature Review

Safety is frequently defined as the inverse of risk; the lower the risk, the higher the safety. Safety as the antonym of risk certainly captures the important dimensions of safety, but it does not provide an exhaustive understanding of the concept (Möller, Hansson & Peterson, 2006). Risk is commonly understood as the product of likelihood and severity. By lowering both likelihood and severity, safety is increased, which is the antonym or opposite of risk (Figure 1).

Business needs to transition from seeing safety as an absence of negatives, such as no serious incidents, to seeing it as the presence of a positive capacity to make work proceed properly. A focus on safety and risk should become a focus of resilience (Dekker, 2015). The fact that incidents are relatively rare events should remind all stakeholders that the absence of a negative does not always result in a strong positive (Smith, 2014).

A representative summary of established safety definitions is summarized in Table 1. In addition to describing safety in terms of its nature (what), the definitions can be categorized by its characteristic: absence from harm, risk acceptance and adaptable.

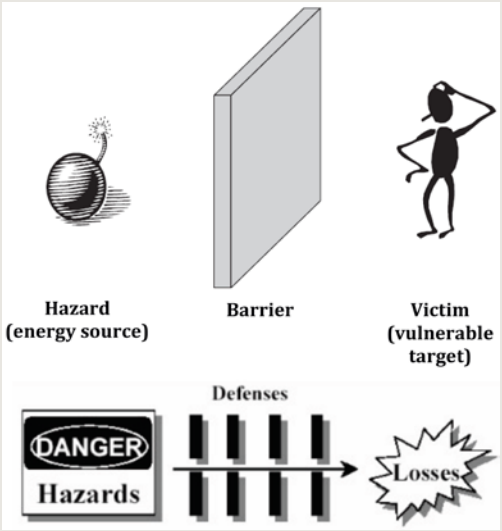
All of the definitions are from referenced sources except zero harm, which is a statement, commitment, aspiration or goal promoting the concept of zero incidents or "no one gets hurt" commonly utilized by organizations. Although zero harm is a statement, it can be used as a default safety definition if no other safety definition exists within an organization. It is included in this article because it is prevalent in many organizations. Generally, the complexity of these definitions progress from absence from harm to risk acceptance, then to adaptable with a focus on what goes right instead of on what goes wrong.

Safety is no more and no less than a condition or judgment of acceptable control over hazards and risks inherent to what an organization is doing at a point in time or chooses to do at some future point. Hazards inherent to the business process, especially those not controlled to an acceptable level, represent the true challenge. The potential outcome from an uncontrolled hazard is harm (Montante, 2008).

Adding to this, hazard control is fundamental to safety management and is an integral component of a proposed safety definition. Equally important is incorporation of how safety management is integrated to achieve the desired safety performance.

When human-induced hazards were created because of industrialism, safety barriers were im-

Figure 2
Energy Model



Note. *Haddon's energy model (top) adapted from "Safety Barriers: Definition, Classification and Performance," by S. Sklet, 2006,* Journal of Loss Prevention in the Process Industries, 19*(5), 494-506. Hazards, defenses and losses (bottom) adapted from* Managing the Risks of Organizational Accidents, *by J. Reason, 1997, Burlington, VT: Ashgate Publishing Co.*

Table 2
Hazard Attributes

Hazard attribute	Strategy focus	Examples
Safe place	Physical environment to remove hazards	•Ergonomics •Access/egress •Noise reduction •Housekeeping •Preventive maintenance
Safe person	Equipping the person to avoid hazards	•Awareness and training •PPE •Hazard assessment/analysis •Site orientations •Work organization
Safe system	Organizational oversight and learning to manage hazards	•Safety management system •Effective procedures and supporting processes •Incident management and root-cause analysis •Audits and inspections •Ongoing evaluation and improvement

Note. *Adapted from "A New Conceptual Framework to Improve the Application of Occupational Health and Safety Management Systems," by A. Makin and C. Winder, 2008,* Safety Science, 46*(6), 935-948.*

plemented to prevent incidents caused by these hazards. The concept of safety barriers is often related to an incident model called the energy model (Figure 2).

Safety barriers are physical and/or nonphysical means planned to prevent, control or mitigate undesired events or incidents (Sklet, 2006). A common safety management approach is to work toward having sufficient barriers in place to prevent an incident or to implement additional barriers after an incident occurs. Defense in depth (barriers) provides an easy to understand linear methodology to evaluate and prevent incidents; however, implicitly it suggests that barriers work independently of one another. In some instances this may be the case but is a limiting view for the complex nature of safety management. In addition, the energy model suggests one additional barrier will prevent an incident from occurring without addressing or improving other barriers (e.g., implementing additional training after an incident without evaluating and reinforcing accountability).

Barriers are most effective when they work as a unified whole but require the components of safety management to be fully evaluated and implemented. Instead of the linear barrier model, the author suggests that the proposed safety definition or model incorporate an integrated view of safety management with the components collectively working together. With this holistic approach, components complement and strengthen each other while the inverse can also occur. The weaker component reduces overall strength of the interrelated elements, increasing the potential for an incident. The greater the strength of the interrelated elements, the greater the flexibility to respond and adapt to changing conditions, which decreases the potential for an incident.

Discussion

The identification of hazards and their corresponding control measures provides the foundation for a safety program and essentially determines a successful occupational safety and health management system. Three approaches for dealing with hazards are referred to as safe place, safe person and safe system, presented in this article as hazard attributes and summarized in Table 2 (Makin & Winder, 2008).

Safe place, safe person and safe system are used to describe the hazard approach, as that is where the hazards manifest and can be managed. This three-approach method considers the entire context of occupational hazards. Items or actions can traverse more than one hazard attribute; for example, housekeeping is emphasized in the safe system with a procedure outlining requirements; safe person when people are trained and familiar with expectations; and safe place when housekeeping is performed to provide a safe work environment.

Hazard control is the identification and management of hazards to mitigate potential injury.

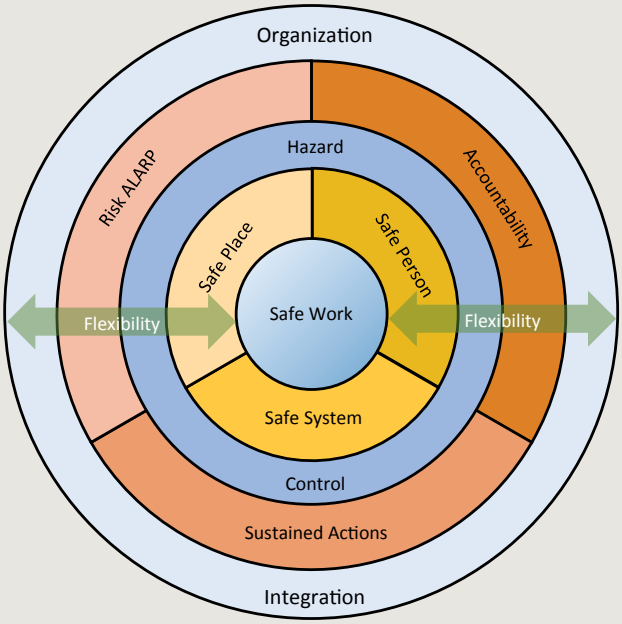
Table 3

Organization Factors

Organization factor	Strategy focus	Examples
Sustained actions	Quality management to improve safety performance	•Prejob planning •Timely communication •Promote organization cross-boundary cooperation •Actively resolve issues or concerns •Quantitative goal setting
Accountability	Equipping the person to seek opportunities for increasing safety performance	•Implement internal responsibility system •Demonstrate visible leadership •Engage workforce participation •Promote forward-looking accountability •Individual annual work plan identifying contributions to increase safety performance
Risk ALARP	Organizational oversight and learning to manage hazards	•Utilize hierarchy of controls •Define acceptable risk •Organization risk management process and risk matrix •Management of change process •What-if analysis and risk assessments

Figure 3

Safe Work Model



Generally, hazard assessment is implemented at the work site with field-level hazard assessments (FLHAs) in addition to task hazard analyses (THAs) or job hazard analyses (JHAs) that are ideally prepared before work begins to assess effectiveness of controls and increase worker hazard awareness.

All risks with which safety professionals are involved derive from hazards; there are no exceptions (Manuele, 2013). Hazard control is fundamental to safety management and has a broader application than simply FLHAs, THAs or JHAs. To help provide a safe work environment, a company should implement hazard control as a comprehensive tool and approach throughout an organization, including procedures, permitting, supporting processes, reporting and incident management, safety oversight, committees and councils, inspections, audits, trending evaluation, training, safety management system, supply chain management, vendor prequalification and performance evaluations. Once hazard control is recognized as the broad effective tool that it can be, the organization will have a greater collective understanding of workplace hazards and controls to mitigate potential injury.

Hazard control is an effective safety management tool; however, without broad understanding, support and application it cannot reach its full potential. Organization integration, incorporating safety management into every operational sector, department or process, is the means to increase the effectiveness of hazard control. Too often, safety management is considered, by default or by design, to belong primarily to safety personnel or frontline operations. Although these groups have a significant direct influence on safety management, their long-term ability to influence desired outcomes is limited if the rest of the organization is not actively participating and working collectively to provide a safe work environment.

By the nature of the work and direct involvement with management, some groups have a greater opportunity to influence safety; however, all groups have the opportunity and should expect to contribute to a safe work environment. Examples range from small to large, such as reporting hazards; participating in committees or councils, or as fire wardens; escorting visitors; verifying contractor qualifications and training; overseeing contractors while work is being performed; and participating in FLHAs and coaching to increase awareness of safety norms. Three approaches for dealing with organization integration are presented in Table 3 as organization factors.

The organization factors are sustained actions, accountability and risk as low as reasonably practicable (ALARP). This is not an exhaustive list of management processes or tools; however, collectively these three factors can have far-reaching application and impact within an organization and are presented as key success factors that promote safety performance. ALARP is that level of risk that can be

further lowered only by an increase in resource expenditure that is disproportionate in relation to the resulting decrease in risk (ANSI/ASSE, 2011).

Quality theory has made major advancements since the 1950s; when W. Edwards Deming's management theory and his system of profound knowledge are applied to safety management, safety performance will improve. Safety management would be better served by spending more time and effort heeding Deming's advice that the most incidents are caused by the system, not by the actions of individuals. OSH professionals must stop focusing on system outcomes because doing so is not as effective as working on the causes of the outcomes. OSH professionals must go far beyond common sense and understand common causes—and fix the system instead of the worker (Smith, 2014).

Deming emphasized that to understand and improve quality one must view work as a system, and he linked systems with management. When people obtain and apply profound knowledge to systems, they view work differently. The quality of safety management can be improved using the methods Deming advocated to improve the quality of any process (Smith, 2011).

Sustained actions are key to quality management and are incorporated into organization integration. With or without safety management systems, organizations can increase safety performance by instilling the desire for sustained actions throughout the organization; it is how an organization instills the desire to increase performance—a quality organization. This is more than demonstrating continuous improvement during a safety management system audit; it is actively performing actions that reinforce desired safety norms. For example, senior management demonstrates visible safety leadership by conducting site inspections and safety stand-downs after an incident.

Commonly, accountability is the obligation to answer for one's performance with respect to expectations, goals and objectives (CCPS, 1994). This backward-looking accountability means blaming people for past events. The idea of holding someone accountable is used for events that have already happened. Experience shows that it only motivates others to be more careful with reporting and disclosure. Instead, if all involved see a person's act as a representation of an organizational, operational, technical, educational or political issue, then accountability can become forward looking (Dekker, 2014).

Forward-looking accountability is consistent with a new type of safety thinking (go from backward to forward). People are not a problem to control but a solution to harness. Forward-looking accountability can help people focus on the work necessary for change and improvement, and it connects organizational and community expectations to such work (Dekker, 2014). Appropriately applied accountability helps individuals understand and achieve expectations, goals and objectives to increase safety performance—not backward-looking blame, but forward-looking actions.

This article proposes a new safety definition that supports safety management and can be utilized in most occupational settings.

Strahlendorf (2001) proposed the Internal Responsibility System, which can be utilized as one of the tools to enhance accountability. It is a system in which every individual is responsible for safety, with a clear set of statements about responsibility and authority for safety listed for each person, and accountability built into the organization structure.

Risk and risk management are inherent in all work tasks, whether it is realized or not by individuals performing the work. Each organization should develop and utilize a process for assessing risk and determining when ALARP is achieved. When workers and managers collectively understand acceptable risk for that organization, it is more likely that desired safety performance will occur. Formalize the risk management process; it will occur regardless and may lead to undesired safety performance. In the vacuum of no formalized risk management process, an informal risk management process will occur that relies on individual understanding of acceptable risk. An organization must manage the risk management process or it will manage the organization and may lead to undesired safety performance.

Safety professionals must be aware that even if everything that they recommend to reduce risk is implemented, and the risk is reduced significantly, residual risk will always exist. Determining whether a thing, activity or an environment is safe

requires making a judgmental decision (determining acceptable risk) (Manuele, 2013).

Conclusion

Bringing all of the discussion together, the author proposes that *safety* be defined as follows. (*Application of hazard control* is the genus and the remainder is the differentia.)

> *Safety:* The application of hazard control through the work place, person and system by integrating into the organization sustained actions, accountability and reducing risk to as low as reasonably practicable to mitigate potential injury.

Figure 3 (p. 66) illustrates the proposed safety definition as the Safe Work Model.

In addition to incorporating definition components, flexibility is emphasized. Flexibility is adaptable safety management to meet organization needs and changing conditions with a focus on what goes right instead of what goes wrong. It can be visualized as an elastic holistic approach, expanding and contracting to continuously provide a safe work environment instead of the linear barrier energy model. The components work together to provide a safe work environment. Conversely, when one component is weakened, other components are weakened and the safe work environment decreases in strength, increasing the potential for an incident to occur.

Utilize the proposed safety definition and Safe Work Model as a tool to enhance safety performance within an organization. The model is a visual communication tool that can be utilized in conjunction with a gap assessment to evaluate how well an organization has identified and implemented the interrelated elements. Based on results of the gap assessment, an organization can identify and implement new or modified actions to align with the Safe Work Model. Throughout the organization, communicate the proposed safety definition, and specific actions that individuals and work groups can take to actively support the Safe Work Model. For example, define acceptable risk (risk ALARP) collectively within the organization so that individuals understand the organization's risk tolerance and can modify work practices when planning and conducting work activities. Safety is more than the antonym of risk. **PS**

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