



The 'Uh-Oh Moment' And Its Impact On Safety

Neil McManus, CIH, ROH, CSP
NorthWest Occupational Health & Safety
North Vancouver, British Columbia, Canada
nwohs@mdi.ca www.nwohs.com

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Introduction

Humans are complex creatures. At times, our actions reflect reflexive and instinctive deep-seated subconscious programming. More normally, our actions reflect patterns of behavior created through education, training and experience expressed through our conscious minds. Actions expressed through our conscious minds reflect input from sources external to us. These inputs include other people and also nonhuman resources including our environment, and instructional materials such as books and still and video images, created with the intent to capture and to make possible the transfer of knowledge.

At the same time, we receive information and insight from sources internal to ourselves. This occurs during events sometimes of considerable distinction in our lives. These are the moments during which information and insight of fundamental importance to our success in life, and possibly our well-being and survival, become available to us. Once given descriptions that capture the essence of these experiences, these events become recognizable to us and possibly remain with us through retention in long-term memory.

The '**teachable moment**' is a moment in time during which the mind opens to accept new information (Havighust 1961). The person recognizes the importance of learning something not previously encountered and stored as information. During the teachable moment, the participant gives to some agent (a live instructor or inanimate technology, such as a video or book or the internet) permission to provide information for processing and storage. There are many reasons for opening the window to the mind to create the teachable moment, not the least of which are striving for success in life, and possibly our well-being and survival.

We most often experience 'teachable moments' during formal education. These occur relatively frequently when we are children. Inducing the 'teachable moment' in adults taxes the capabilities of the most gifted of instructors. It is the precious gift of receptivity from student to instructor, one not to be squandered.

Teachable moments exist at other times in our lives. They accompany our recognition of need for assistance in problem-solving. We satisfy these needs by asking more knowledgeable people for assistance, and gaining needed information from reference books and the internet, and viewing

instructional videos. The most distinctive teachable moments in this context are those we create for ourselves when we control the agenda or have a desperate need to obtain new information in order to solve a difficult problem. Hence, for adults, teachable moments most often appear during time devoted to activities outside of work.

The **'ah-ha moment'** is the moment during which a person perceives the solution to a problem, the answer to a question of considerable importance or receives the suggestion to follow a previously unrecognized route of enquiry. The inspiration seems to appear from nowhere and provides clear guidance for a course of action. The inspiration may be self-contained or may direct the individual to secondary or tertiary sources. Often the 'ah-ha moment' appears following prolonged deliberation during which no resolution appeared previously.

The 'ah-ha moment' brings relief to the individual through realization about removal of the blockage to further progress. The 'ah-ha moment' is especially monumental and memorable to the individual when the blockage is long-standing and/or consequential for reasons including economic, social, and well-being and safety. An 'ah-ha moment' is perceived as a positive outcome or resolution of a situation.

The **'uh-oh moment'** is the moment during which a person recognizes that an action just taken has caused entry into a pathway that will bring a negative outcome and from which escape is not possible. The 'uh-oh moment' is the point of realization that the course of the action has started, that it involves recognized deleterious outcomes to the individual and possibly to others, and that avoidance of the deleterious outcomes is not possible.

This is the ultimate nightmare scenario. Everyone has had experiences of this kind. The 'oh-oh moment' is perceived and retained in memory as a negative, and frightening or terrifying experience.

In the work environment, 'uh-oh moments' have profound implications to the safety and well-being of individuals and to the entities that employ them. Addressing 'uh-oh moments' in order to minimize their frequency and impact will require an exploration of decisionmaking and decision implementation.

Decisionmaking

Decisionmaking and decision implementation involve two agents: the individual who makes the decision and the individual(s) who implement(s) it.

Who makes decisions? We all do. However, there are circumstances in our lives where we subordinate our right to make decisions to others. These situations occur at work and in the organized operation of modern societies.

How do decisionmakers make decisions? Optimally, they identify a problem and then isolate and characterize the underlying issue; then gather information relevant to the question; seek options and consider the consequences of following each of them; and finally select the option that provides the greatest number of benefits with the fewest consequences and least number and magnitude of risks. At least, this is how decisionmaking should occur.

Often, if not usually, decisionmaking occurs following incomplete isolation of the underlying issue and incomplete search for options, followed by failure to consider consequences and risks. That is, decisionmakers often choose to see only benefits from an option promoted under the self-interest of the proponent.

Decisionmaking occurs either as part of routine activity or as part of an exceptional circumstance. Decisions taken as part of a routine reflect the inputs to the routine. The critical issue is that the inputs remain within the acceptable range of normal for the parameters involved in the decision and that the decisionmaker receives adequate input about deviations.

Decisionmaking that occurs as part of exceptional circumstances is considerably more prone to error or

inappropriateness because of the potential for incompleteness in the information provided by the inputs. For this reason, decisionmaking in this circumstance deserves considerable investigation of options and determination of their strengths and limitations. The decision of the decisionmaker is only as good as the completeness and accuracy of the information provided from what is available.

The preceding discussion highlights decisionmaking in the abstract. The following provides information about decisions made by people performing work tasks.

The investigation of accidents involving contact with hazardous energy across a wide spectrum of industry indicates a number of contributing factors. These include knowledge, control, the limitations of information processing by the human organism, inconvenience or impracticability of required work practices, and communication failure. The data suggest that most of the work performed by victims, when considered from their perspective, was normal. Many of the hazardous conditions existed prior to the start of work.

Knowledge about the environment in which work is to occur is critical for safety. Individuals who work long-term for an employer located in an unchanging location can gain considerable knowledge about the idiosyncrasies of the facility, and its equipment, processes and hazardous conditions. This certainly does not apply to all employees, but the potential for acquisition of the critical knowledge needed to maximize safety is resident in these individuals.

In some situations, the victim knew through training and education or safety talks provided by supervisors or others about the hazardous condition that precipitated the accident, but attempted to perform the task without following procedures, or use or proper use of protective measures.

In other situations, the victim recognized the presence of the energy source, but had no training in control, or perceived the ability to perform the task without undue risk, or perceived the lack of availability of protective measures.

In another variation, the hazard of the energy source was not perceivable through the senses or recognizable by other common means, or the person lacked the knowledge needed to recognize its presence.

The situation for long-term employees contrasts with that of short duration permanent and temporary employees, and employees of contract employers. These individuals are at a distinct disadvantage regarding the knowledge needed to work safely in an unfamiliar premises. This situation is similar to learning a language. Short-duration permanent and temporary employees and employees of contract employers are operating at the level of beginners. Long-term employees have the potential to gain considerable finesse in the nuances of vocabulary and expressions of a language.

The second factor in real-world decisionmaking pertains to control. Control refers to the influence that an individual can exert over the conduct of activity in a workplace environment. Short-duration permanent and temporary employees and employees of contract employers also operate at a considerable disadvantage compared to long-term employees in this regard.

Long-term employees have the greatest potential through knowledge to recognize the hazard and the risk posed by a situation and also the politics that exist within an organization. The latter are critically important, for these underlie the decision about whether and how to exercise the right to refuse, when appropriate. Short-duration permanent and temporary employees and employees of contract employers might recognize the hazard, but are much less likely to be able to judge correctly the magnitude of the risk of harm.

Exercise of the right to refuse work perceived to be unsafe leaves them extremely vulnerable to censure and expulsion in a situation that doesn't meet the perception of high enough risk in the minds of those in control, or that exposes an obvious and embarrassing deficiency. This reality, coupled with the lack of knowledge of conditions at a worksite, leave short-duration permanent and temporary employees and employees of contract employers in a highly vulnerable position leading to reluctance to act or inability

through lack of knowledge to act effectively.

The third factor pertains to the limitation of the human brain to process information. There are three main processes that compete simultaneously for our attention and the ability to process information. These include the natural competition for processing space that centres on the task to be performed, the conditions under which performance of the task occurs and distractions.

Accident investigation has the ability to expose the competition for attention between task and conditions. Task pertains to the actions that we take to reach an outcome. Conditions pertain to the safety hazards that surround us with which we interact as we pursue a task. We cannot simultaneously focus on both, only one or the other.

Our usual and natural focus is task. This observation offers an explanation about why seemingly well-experienced individuals, described by co-workers as being conscientious and highly safety conscious are involved inexplicably in fatal accidents. This comment also applies to practitioners of occupational hygiene and safety. That is, as individuals, we also focus on task and not conditions during our activities at work. This focus on task is a natural human attribute. Focus on conditions requires thinking in the abstract about future events and the mechanisms by which they can occur, rather than at the concrete level of the task, the level at which we normally operate.

We are also subject to the distractive influences to which humans are exposed. These include length of sleep, diet, eating time, health status, relationship between family members, financial matters, substance abuse, gambling addiction, political matters, interaction with strangers, and probably others.

Painting the trim on the edge of the roof of a house by leaning over from above without fall protection overstresses our ability to focus on application of the paint without making a mess or a spill and ensuring that we will not fall over the edge from lack of securement. Work on a ladder near the electrical power lines poses similar challenges. These examples illustrate the competition between the task and the need to protect ourselves accordingly.

Further complicating the situation is distraction created by the black bear that is roaming in the neighborhood, from vehicles with noisy engines driving on the street and from people walking on the street. Distraction from environmental conditions is another element in the competition for information processing. Distraction also results from preoccupation with personal factors as mentioned above.

The fourth factor pertains to the inconvenience or impracticability of measures required, meaning imposed on workers, as a prerequisite for the satisfactory performance of work. This factor is intangible from the perspective of quantitation, but reflects the impatience of workers leading to performing tasks requiring biomechanical movements beyond those considered tolerable or acceptable. This factor describes the situation when people who are knowledgeable about the hazards and risks implicit in a particular situation fail to follow procedures established to ensure safety during the task.

The fifth factor pertains to failure to assess the implication of the safety of an action versus the status of the work. Fatal accidents have occurred when individuals restarted deactivated and de-energized equipment, and in some situations, isolated and locked out equipment, prior to the appropriate moment in a sequence of tasks. These situations have created fatal consequences to the person who performed the activation and to others following activation by a third party.

Decision Implementation

Decision implementation occurs in two main ways. In the one, distance separates the decisionmaker from the individual who implements the decision. In the second, the decisionmaker and the implementer are at the location at which implementation occurs.

A critical factor in the gap between decisionmaking and implementation is the availability of input of information up to the point at which the action of implementation occurs. That is, given an input of

previously unavailable information that is critical to the decision, influence on the direction of the decision can occur right until the last moment.

Implementation of the decision can affect the decisionmaker, the individual who implements the decision, another group of workers not involved in either the decision or the implementation, and lastly bystanders. Bystanders are not workers and likely have little or no idea about the decision and its import to their circumstances.

Information that is missing at the time of decisionmaking could be crucial in importance to the safety of those involved in executing the decision and those affected by its consequences through the change in conditions that it creates. Absence of information can occur by actions of omission and actions of commission.

Acts of omission are tragic because the holder of the information has the ability to influence an outcome but fails to communicate or to communicate in time to influence the making of the decision and its implementation. The agent is left with the obligation of living with the knowledge of failing to act. We read about these situations periodically, especially during inquests and investigations into major accidents.

Acts of commission leading to absence of information due to political issues within an organization are tragic beyond description. Political issues can include labour-management strife, and interpersonal enmity. Regardless of the cause for the inaction, the person withholding the information must live with the consequence created by the refusal to share. Massive destruction of the plant leading to loss of life or serious traumatic injury and long-term future loss of employment that affects this individual, as well as others, constitute a very high price to pay for the satisfaction of gaining the power represented by withholding this piece of insight.

Implementation remote from decisionmaking separates the decisionmaker from the agent who implements the action. As a result, the decisionmaker is potentially not knowledgeable about all of the information that is available at the location at which implementation of the decision occurs. The individual performing the implementation is subject to the outcome created by the decision

Local inputs can reinforce or challenge the wisdom of the decision. In the latter case, this creates the opportunity to inform the decisionmaker about the circumstances created by the input. This situation provides an opportunity to reverse the decision prior to implementation or to create conflict between the individuals involved. Disagreement puts the individual executing the decision into the position of having to perform an action known or suspected to cause personal harm or harm to others.

This situation creates a serious moral dilemma for the individual charged with executing the decision that can lead to refusal to act. The decision to refuse to act is often taken by the individual affected by the consequence, although this can result from action taken by another person or through events of natural cause and initiation. Natural cause and initiation lie beyond the control of the individual.

Local decisionmaking is the situation where the decisionmaker makes the decision freely in the absence of influence from a superior authority and then executes the decision. The decisionmaker is free to act according to the outcome of the internal processes used to make decisions.

The 'uh-oh' moment follows soon after implementation of inappropriate decisions. For survivors of these situations, this is the moment just prior to the onset of the outcome when the realization occurs that the decision and the action were inappropriate in the circumstances. The individual in these situations is literally staring at destiny and its immediate or future impact.

Developing the Skill of Decisionmaking

The challenge in decisionmaking is to minimize the occurrence and impact of 'uh-oh moments'. We have all experienced 'uh-oh moments' as individuals. Some of us have experienced 'uh-oh moments' at work. Fortunately, the outcomes are usually minor or inconsequential. What does occur, is usually considerably

less than what could occur. Sometimes, however, what occurs approaches or equals what could occur. The minor situations serve to remind us about the flaws in our decisionmaking and challenge us to do better in order to minimize risks to our health and safety and that of others for which we are solely responsible.

One of the keys to breaking the pattern intrinsic to faulty decisionmaking is to minimize, if not eliminate the acts of commission, where people decide not to act in a positive manner. Comments that something was the job or responsibility of someone else have become well known, starting with testimony in the trials at the end of WWII. These responses recur periodically during inquests and investigations into fatal accidents. This is a convenient, although shameful way of attempting to disclaim responsibility, especially where the individual making the comment cannot otherwise be held accountable.

The responsibility to act where information becomes available rests with everyone who has learned it. The safety of everyone and the survivability of the place of employment rely on this sense of duty to act and the discipline needed in us to do so. People must know and accept that communication of information that may affect safety is an expectation and requirement as a condition of employment .

The starting-point in creating open communication is the knowledge about what has happened when communication was not open. There are many examples now available for informing people about the necessity for requiring this behavior as a condition of employment. Without knowledge we have no idea about the possibilities of deleterious conditions that can exist or can develop at work. Communication of these concepts during induction training and follow-up during safety meetings is an essential strategy for ensuring that everyone is aware of the importance of open and active dialogue.

Employers must create the means to ensure that information shared in this manner will receive full and due attention. Full and due attention means that the information receives prompt action that is apparent to the individual who provided it.

This situation imposes a burden on employers to ensure that the individual who acts on the information has the technical competence to do so in the appropriate manner. This individual must have the mandate from senior management to be able to institute action in the situation identified, where appropriate in the circumstances.

A second key action is the imposition of safety rules to be followed at work and the expectation and requirement for compliance with them. Safety rules are routines of conduct and action in given circumstances.

As children we learned and practiced routines for crossing streets containing vehicles. Look both ways. Cross at intersections when possible. Where sidewalks do not exist, walk at the edge of the road facing the flow of traffic. Wear clothing that is visible to drivers when walking at night. Through repetition of the words and practice of the motions implicit in them, these behaviors became embedded in our memories. Those routines are every bit as important for ensuring our safety as adults as they were when we were children.

The workplace can impose risks for which the following of rules and routines is critically important for ensuring safety. The workplace analogue of the safety rules we learned as children are stop, look, pause, and think and/or ask before taking a particular action to determine whether serious risk of harm is present. The pause is the critical step because it gives the brain an opportunity to focus on conditions and not the task.

Newcomers must learn and practice these rules and routines during orientation and agree to follow them. Additional dialogue about the importance of the rules and routines, as well as practice and demonstration of the ability to follow them is needed in-service. Safety talks and safety meetings provide a means to refresh memories about these requirements..

The embedding of safety rules and routines at work is somewhat different and not normally as thorough

as what occurs in low-level grades in elementary schools. Workers are adults. Adults learn in different ways than children. Some adults resent the imposition of rules of conduct on the basis of principle, and will actively rebel against them, even though these rules can influence their safety and the safety of others.

Some individuals turn the rules and routines of conduct into games of chance as a show of defiance. Sadly, this situation trivializes the seriousness of the consequences and the intent of the behavior imposed by the rule or routine. The action recommended for such behavior is documentation and implementation of disciplinary processes and procedures. Disciplinary processes usually occur in multiple steps of increasing sanction, the final one being dismissal.

On occasion, people knowingly break rules and routines consciously, by exception, and without defiant intent. In these circumstances, the outcome dictates further action. Where the event occurs without witnesses, the individual must decide whether to impose self-discipline and not to repeat the action while consciously aware of the opportunity to do so again. At the same time, the individual may experience the 'uh-oh' moment as a result of repeated action.

On other occasions, people unthinkingly break the rules of conduct and then realize soon afterward that this has occurred. These situations sometimes lead to the 'uh-oh' moment.

Regulators impose the duty on employers to train workers in the recognition and control of hazardous conditions present or capable of developing in the workplace. Implicit in these requirements is that individuals potentially affected by the events will anticipate their occurrence, recognize the potential for the occurrence prior to an event, and take action to prevent the occurrence or to mitigate against its severity when prevention is not possible.

Education and training and competence gained through practice are key components in the strategy to ensure that untoward events do not happen.

The following examples of training provided to newcomers to a chemical processing facility illustrate the point. During his first week on the job, the employee attended a session on the use of a self-contained breathing apparatus. There was one unit in the classroom for twenty participants. The instructor stood at the front of the room and pointed out the various features of the unit. He also demonstrated how to use it. At the end of the presentation, the participants received a form outlining the details of the training. Each person was required to sign the form to acknowledge receipt of training. This form was placed into the worker's employment record. Not one of the learners actually handled this piece of life-saving equipment.

The newly hired worker then was told to follow an old hand around the plant. The old hand would provide the training. This plant had many dangerous areas, few of which were marked. Hazardous conditions could arise at any time. One of the hazards was hydrogen sulphide (H_2S), a highly toxic gas. Many people have died after unknowingly walking into a puff of H_2S and not recognizing the danger. The newly hired worker would learn soon enough about the dangers of the plant. Perhaps.

These methods are inefficient and ineffective. While an employer can show on paper that workers have attended an education session or received training, there is no indication that they can utilize the information in decisionmaking. The gap between attendance at training sessions and the ability to utilize the information is very wide.

In the US, the Occupational Safety and Health Administration (OSHA) long ago recognized this gap as a major failing in the implementation of the Hazard Communication Standard. The intent of the Standard was to enable workers to make real-world decisions to protect their health and safety, rather than creating hazardous conditions or allowing them to remain unremedied. The absence of success in implementation of the Standard led OSHA to insert the words, 'effective information and training', into the current version. OSHA introduced the word, 'effective', to emphasize to employers their responsibility to close the gap between what OSHA expects and what actually exists.

Employers do not hesitate to send administrative and office personnel on training courses. These cover all

manner of topics ranging from organizing the desktop, files and records, to use of software, to time management, to human relations and conflict resolution, and effective supervision. Yet, training of shop-floor employees and their supervisors remains vastly underdeveloped, despite the fact that trained employees work more safely and productively.

There are a number of reasons for this situation. The most important reason is cessation of production. The economic worth of production and shop-floor workers to an employer is many times the amount that they receive in wages and salaries. The wages and salaries of all employees in an organization from the lowest- to the highest-paid derive from the value of work performed by production and shop-floor workers. Hence, the net worth to the employer of production or shop-floor worker easily is thousands of dollars per hour, not the tens of dollars per hour that these individuals actually receive. Stopping production to perform training incurs a heavy cost in dollars. From this perspective, the disincentive to provision of training to production and shop-floor workers is obvious.

Another factor that complicates the delivery of technical information is the range of education of workers from elementary schooling to advanced degrees. Instructional strategies that interest one individual may disinterest another.

The difficulties facing employers in delivering effective education and training match those of workers receiving it. Firstly, many members of the workforce are doers. They are not accustomed to sitting for long periods in a classroom environment. Many did not like school and prematurely left to enter the workforce for this reason. As well, much of the information in occupational health and safety is grey. That is, there are few yes or no answers. There usually are more unknowns about the properties of chemicals than knowns; that is, there are more questions than answers.

Workplace illiteracy is an increasingly recognized problem. Workers who cannot read and comprehend the written word cannot recognize warnings and act in an appropriate manner. This puts them, and possibly others, at risk.

For many immigrants, English is a second language. Some native English-speakers have never adequately learned reading and writing skills.

In many cases, the cause of illiteracy is lack of training in everyday English usage. Another cause of adult illiteracy is a learning disability. These disorders may arise at birth, from brain damage or from incorrect function. They can affect the ability to read, write, spell, listen, speak, and to perform mathematical operations.

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