

Audience Analysis

Taking Employees From Awareness to Understanding

By Carolyn Kusbit Dunn

In late September 2015, OSHA released its list of the top 10 most frequently cited violations for FY2014 (www.osha.gov/Top_Ten_Standards.html). Number two on that list is violations of OSHA's HazCom standard. It is superseded only by fall protection in the construction industry, which is not surprising since construction falls are regularly cited as a top cause of worker fatalities.

Yet, it can be surprising that the second most frequent violation stems from an activity that, while identified as an indirect cause of workplace injury, is not inherently dangerous in and of itself: risk communication.

This issue may be compounded by recent changes in OSHA's HazCom standard (HCS), which was revised in 2012. In announcing the changes, OSHA (2012) noted that the 1994 version of the standard "gave workers the right to know. . . . [T]his update will give them the right to understand, as well." This framing of the HCS changes is repeated in a banner headline on OSHA's Hazard Communication website (www.osha.gov/dsg/hazcom) that states, "The standard that gave workers the right to know now gives them the right to understand."

But what is the difference between awareness and understanding, and how does the change bridge the gap? The

reality is that while the changes standardize labels and safety data sheets (SDS) to conform with global standards and add pictograms to enhance understanding, it remains employers' responsibility to ensure that individual workers fully comprehend workplace hazards. While the revised HCS is clear on employer responsibilities, the rule provides little guidance on how employers can meet those responsibilities and help workers move from awareness of workplace hazards to full understanding of them.

To do that, OSH professionals must have an in-depth understanding, not only of the hazards present in the workplace, but also of the workers who face them. By fully considering the audience, OSH professionals can craft information that helps workers transition from awareness to understanding. Using the changes to OSHA's HCS as a backdrop, this article presents audience analysis as a tool to create information that effectively communicates hazards across a spectrum of risk communication formats. OSH professionals can use the information created through this process in face-to-face training, for written documentation, or in videos or web-based training.

HazCom Standard & Workers' Risk Perception

OSHA revised its HCS in 2012 to bring the U.S. into alignment with the Global Harmonized System of Classification and Labeling of Chemicals (GHS), and also to standardize the format of information distributed about hazardous materials so that users downstream are fully aware of the risks and better able to understand them (OSHA, 2012b). The primary differences between the 1994 and 2012 versions are the focus on implementing specific criteria by which chemical manufacturers assess products; new labeling that includes both language and universal pictograms (Figure 1, p. 32); a standardized format for SDS; and additional worker training that teaches employees how to recognize and understand these new labels and SDS (OSHA, 2014a).

IN BRIEF

- **Hazard communication is the second most commonly cited OSHA violation. It will likely remain high on the list in light of recent changes to the HazCom standard, which emphasize workers' understanding of the risk a material poses, as opposed to mere awareness of the risk.**
- **Workers can only make the transition from awareness to understanding with the intervention of OSH professionals. Utilizing audience analysis as a foundation on which to develop information, OSH professionals can consistently deploy training, communication and other media that enable workers to fully understand the hazards.**
- **Audience analysis is the process of discerning an audience's characteristics to tailor effective communication for that audience. This article explores how to use this process to craft risk communication that meets the needs of employees and the requirement of the new rules.**

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In terms of employer responsibilities for training, OSHA (2014b) requires:

that employers train employees on the hazardous chemicals in their work areas before their initial assignment and when new hazards are introduced into the work area, and this training must be conducted in a manner and language that employees can understand.

However, OSHA offers only vague advice on how to accomplish this, and the steps provided are broad, leaving a great deal to the user's interpretation. For example, Step 5 is "inform and train employees" (OSHA, 2014b). While this step indicates that OSHA requires that workers understand the risk of hazardous materials, it does not indicate how employers should ensure that such understanding takes place.

The 2012 HCS also emphasizes pictograms and SDS, which assumes that workers will both access those materials regularly and understand them even though this does not always occur in many work environments. Furthermore, relying solely on the SDS to communicate risk can present problems because it often uses technical terms and jargon.

For example, a 2003 combustible dust explosion at a pharmaceutical plant in North Carolina killed several workers and leveled the building. The investigation identified faulty hazard communication as a contributing cause (CSB, 2004). Although the employees understood that the material that caused the explosion was flammable, they did not understand that it posed a combustible dust hazard. The tragedy is that employees were aware of dust buildup in certain areas of the plant. Had they fully understood the hazard, this incident could have been avoided (CSB, 2004).

Most employees at that facility were blue-collar employees with a high-school education at most (Dunn, 2010). Many manufacturing facilities employ similar workers. Employees with this educational background may not have the technical background or literacy levels to interpret an SDS.

Attitude can be a factor as well. Risk communication is a technical enterprise and employees may view it with "suspicion, confusion, ignorance and disagreement" (Caccia, 2007, p. 166). Any difference between how employers assess risk and how employees assess risk can cause tension, with employers perceiving a lower level of risk than the employees themselves do (Caccia, 2007). Fast-paced or high-stress work environments can also hinder communication in the sense that workers may adopt a collective mind-set, with each person focusing on his/her task to get the overall job done. In such an environment, having to stop and communicate or articulate commands is viewed as dysfunctional (Cyphert, 2007).

Finally, in many facilities, blue-collar employees are not encouraged to question policies or procedures established by their bosses (Caccia, 2007). As a result, they may not ask questions about safety or hazards. In essence, the conflicting responsibilities between workers and employers can impede communicating risk. Thus, it is up to the employ-

ers or OSH professionals to ensure that actual understanding occurs. Understanding the audience receiving the safety training can greatly help to ensure that the risk information itself meets that goal.

ANSI/ASSE Z490.1: An Argument for Audience Analysis

ANSI/ASSE Z490.1, Criteria for Accepted Practices in Safety, Health and Environmental Training, addresses the protocol for developing safety training and is considered the gold standard for OSH training. Section 4 of the standard addresses the importance of conducting a needs assessment when developing training. Embedded within the needs assessment, the standard references several key attributes of audience analysis, including "characterization of the training audience" and "special trainee abilities, languages or culture" (ANSI/ASSE, 2009, p. 15). While the standard stresses the importance of understanding the audience and requires that learning objectives detail the target audience, it does not include a step-by-step explanation of how to perform an audience analysis.

Audience analysis is the process of fully analyzing the audience, then using that analysis to craft information that meets the audience's needs. The language, graphics and even the chosen medium (e.g., print, video, web) are all designed to cater to the designated audience. The goal is to make sure the audience has everything it needs to process, fully understand and use the information.

Audience analysis is a foundational tenet in technical writing. The idea can be traced back to the 1950s (Johnson, 2004), and it is a fundamental part of texts used to teach technical writing (Markel, 2010; Robbins, 1996; Rubens, 2001; Tebeaux & Dragga, 2010). But audience analysis has application beyond technical writing. Any professional whose job involves communicating technical material can benefit from utilizing this approach.

The Markel Model

Across the discipline, the steps for audience analysis are fairly similar. This article presents the steps based on Markel's (2009) suggested framework:

- 1) Identify the primary audience.
- 2) Consider the audience's professional experience and job responsibility.
- 3) Consider the audience's attitude toward the information.
- 4) Define the audience's literacy and education levels.
- 5) Consider how the audience will use the information.

The process begins by identifying the primary audience, those who will actually use the information. Once the audience is defined, the trainer may find it helpful to write a summary of the audience to keep on hand while creating additional information. That helps the creator remain cognizant of the primary audience, and prevents unnecessary information from being added.

Once the primary audience is identified, the analysis focuses on the group's characteristics. What kind of professional experience do audience

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Figure 1
HCS Pictograms

<p>Health Hazard</p>  <ul style="list-style-type: none"> • Carcinogen • Mutagenicity • Reproductive Toxicity • Respiratory Sensitizer • Target Organ Toxicity • Aspiration Toxicity 	<p>Flame</p>  <ul style="list-style-type: none"> • Flammables • Pyrophorics • Self-Heating • Emits Flammable Gas • Self-Reactives • Organic Peroxides 	<p>Exclamation Mark</p>  <ul style="list-style-type: none"> • Irritant (skin and eye) • Skin Sensitizer • Acute Toxicity (harmful) • Narcotic Effects • Respiratory Tract Irritant • Hazardous to Ozone Layer (Non-Mandatory)
<p>Gas Cylinder</p>  <ul style="list-style-type: none"> • Gases Under Pressure 	<p>Corrosion</p>  <ul style="list-style-type: none"> • Skin Corrosion/ Burns • Eye Damage • Corrosive to Metals 	<p>Exploding Bomb</p>  <ul style="list-style-type: none"> • Explosives • Self-Reactives • Organic Peroxides
<p>Flame Over Circle</p>  <ul style="list-style-type: none"> • Oxidizers 	<p>Environment (Non-Mandatory)</p>  <ul style="list-style-type: none"> • Aquatic Toxicity 	<p>Skull and Crossbones</p>  <ul style="list-style-type: none"> • Acute Toxicity (fatal or toxic)

Note. From "Hazard Communication Standard Pictogram QuickCard," by OSHA, 2012, Washington, DC: Author.

members have? Are they subject-matter experts, with advanced degrees and a high knowledge of theory and application? Or is their knowledge more practical, focusing on tasks such as using and maintaining equipment? A subject-matter expert would likely understand complex writing using technical jargon and long, compound sentences. The subject-matter expert also may enjoy reading about theory, but someone with less expertise might not. If audience members' main job is to troubleshoot, maintain or work on equipment and products, they will want clear, concise information. This is why analyzing professional experience influences content and word choice.

Another consideration is the audience's attitude toward the material. Does the audience view risk communication and safety training as helpful and enlightening, or as a waste of time that interferes with their real work? Giving them risk-related information in a clear format designed specifically for them demonstrates that management understands their needs, which can reduce the tension surrounding the communication. It is also important to in-

clude employees in the production of content so that they can provide input on how they use the information and what they feel is important to include. Another way to increase engagement is to explain why this information is important. Make it real for them by explaining why it matters in human terms.

Literacy level is another important consideration. Can audience members read and understand the words used? Do they speak English as a second language? If literacy is an issue, or if the audience speaks English as a second language, the communication product should contain short sentences, clear, simple language and graphics that augment any text. Adding both visual and audio components as opposed to a strictly written format may prove beneficial as well.

The final step is to consider how the audience will use the information. Do these workers need to refer to it before completing each step in a process? If so, it is likely best to produce a document with spiral binding so it will lie flat or that it is permanently affixed as a sticker or placard to the piece of equipment the workers will use. If the information must be seen from a distance, consider printing it in larger text. Environmental factors such as weather or humidity also affect how information is displayed and on what kind of media. Table 1 summarizes the steps of audience analysis and the factors that employers and OSH professionals should consider.

An Example of Audience Analysis

To illustrate this process, let's consider a hypothetical example. The task involves educating a group of manufacturing employees about the health hazards associated with a particular compound. These employees are mostly high-school educated, and work in a fast-paced assembly line environment. Each employee has individual tasks to complete, and relies on other employees along the assembly line to complete their assigned tasks. Several mid-level managers work at the facility, one of whom oversees the facility's safety program.

The compound in question is used in one area of the facility as part of a step in the manufacturing process. Twenty workers come into direct contact with the chemical compound as part of their assigned work; others may come into contact with it as it is being delivered or because they pass through the area where it is used. As noted, the compound is a health hazard, which means it is labeled with the health hazard icon (Figure 1). In this example, the health hazard is mutagenicity.

Step One

For step one, determine who will actually use this information. The 20 employees who come into direct contact with the compound are part of the primary audience, but one must also identify other employees who may come into contact with it. For example, when it is delivered to the facility, who transports it to the area where it is used? Do custodial staff clean the area where it is used?

In the 2003 combustible dust explosion in North Carolina, CSB (2004) found that mainte-

nance workers were aware of the dust accumulating above the false ceiling. Had those employees understood the combustible dust hazard, the accumulation could have been mitigated. Therefore, including employees who come into contact with the compound as part of the primary audience ensures that all employees receive the information they should, and in an appropriate manner. The three mid-level managers would not be considered part of the primary audience because while they should be aware of the risk communication taking place, they will not use that information.

Step Two

The second step of audience analysis considers the primary audience's professional background and responsibilities. In this scenario, these individuals focus on completing specific tasks along an assembly line in a manufacturing environment. If employee A is responsible for task X, then employee A focuses completely on task X while other employees tend to their own individual tasks.

This type of environment encourages collective mindset—each employee does not have the time or the power to worry about or ask questions about safety. S/he may view that as the purview of the safety professional and assume that the safety professional will advise of any risks. People in such an environment may not use limited break time to seek out an SDS nor do they likely have the time for or interest in complex, theoretical discussions. Therefore, whatever information the SDS contains should be communicated directly to these employees in another way.

Step Three

Step three in audience analysis considers the primary audience's attitude toward risk and safety information. In a fast-paced environment, employees may view taking time to attend training as bothersome, especially if that time eats into their breaks or off-work hours. Knowing this, the OSH trainer can tailor the program. For example, rather than conduct a 4-hour face-to-face training session, the trainer could present the material in brief, clearly defined modules that can be accessed online. If attitude is a concern, the OSH professional should

involve employees in the planning process so they have a voice in the content generated.

Explaining why this hazard information is important also allows workers to better understand why it is necessary. In this hypothetical scenario, the compound of concern is a mutagen. Thus, the OSH professional should explain that exposure could lead to birth defects in future children and include historical occupational examples. Such an explanation is particularly critical when a risk is not immediately apparent. For example, if a chemical is caustic and will burn the skin, workers can more easily grasp the risk. With a hazard that is cumulative or not immediately apparent (such as a mutagen), the safety professional must be explicit.

Step Four

Next, the OSH professional must consider literacy and education. In the hypothetical scenario, the employees are high-school educated, which suggests

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Table 1
Audience Analysis Process

Questions to consider	Suggestions for application
Step 1) Identify the primary audience <ul style="list-style-type: none"> Who will actually use the information being presented? 	<ul style="list-style-type: none"> Create a summary of the primary audience to use in completing the audience analysis; this will help narrow the focus and ensure that the audience will understand the training.
Step 2) Consider the audience's professional experience and job responsibilities <ul style="list-style-type: none"> Do audience members have an advanced degree? Could they be considered subject matter experts? Are audience members' job responsibilities more practical? Does their job entail working with equipment, troubleshooting, maintaining it? 	<ul style="list-style-type: none"> Those with an advanced degree (postgraduate) or who are considered subject-matter experts will understand and appreciate a discussion of theory using compound, long sentences and technical jargon. Those with more practical job responsibilities do not care about advanced theory; they care about practical aspects or application of that theory. Use short, clear sentences arranged in lists. Use graphics to augment words where appropriate. Avoid discussions of theory.
Step 3) Consider the audience's attitudes toward the information <ul style="list-style-type: none"> Do audience members view this type of training as a waste of time that interferes with the facility's "real work"? Are they suspicious of this type of information? 	<ul style="list-style-type: none"> Tailor the training to suit the audience; select the proper medium and arrangement of information. Explain to audience members why they should care about this issue—put it in terms they can understand and that make sense to them.
Step 4) Define the audience's literacy and education level <ul style="list-style-type: none"> What education level has the audience attained? What is the literacy level of the audience? Does the audience speak English as a second language? 	<ul style="list-style-type: none"> If audience members do not have an advanced degree in the subject matter, be cautious about using technical jargon and long, compound sentences. If literacy is a concern or if audience members speak English as a second language, use clear, succinct terms and augment the document with graphics. Consider using an audio/video format rather than a written document.
Step 5) Consider how the audience will use the information <ul style="list-style-type: none"> Will the audience use the information as they complete a task? Does the information need to be seen from a distance? Will the environment be a factor? 	<ul style="list-style-type: none"> If audience members must use the information as they complete a task, make it easy to access and use by affixing it to the equipment in question or by giving it a spiral binding so it will lay flat. If the document must be seen from a distance, make sure the type is large and the material it is printed on does not produce a glare that makes it difficult to read. If the environment is a factor, choose a material that is durable, reflective metal or plastic.

that they would not be familiar with highly technical or specialized jargon. Many words included in the new HCS pictograms are problematic in this respect. The meaning of phrases such as *mutagenicity*, *reproductive toxicity*, *pyrophoric* and *self-reactives* is not immediately apparent, and their meaning may be unclear to anyone but a subject-matter expert. Thus, the communication must clearly define these terms using words, graphics and direct language that the audience can understand.

Step Five

The final step in audience analysis is to consider the environment in which the information will be used. In this scenario, the environment is a fast-paced manufacturing facility in which employees work on an assembly line. It is unlikely they can or will access risk information via an SDS in another part of the facility.

Therefore, a better approach is to post this information on a placard or sticker near each point at which the employee encounters the compound. This placard should be durable and displayed so that employees are likely to see it (e.g., at eye level, in multiple locations). For example, "Use exit stairs" signs are prevalent in and near elevators. These signs are usually posted outside the elevator door on each floor and inside the elevator itself. A person using an elevator will encounter that sign several times in the span of one trip. This increases the likelihood that s/he will see (and process) the sign's message in at least one location.

Conclusion

Although this article is presented against the backdrop of the revision to OSHA's HCS, the audience analysis process is applicable to all safety training development and is identified as crucial in ANSI/ASSE Z490.1. The HCS changes provide a new opportunity for OSH professionals to apply this process.

The revised HCS has brought renewed attention to how manufacturers and employers present risk information to workers. The creation of consistent formats for SDS and the addition of pictograms have been touted as the way in which workers will understand the risks that certain materials present in the workplace. But these measures alone will not allow workers to make the transition from awareness to understanding.

OSH professionals must interpret and translate this risk information so that workers can truly access it. By conducting regular, comprehensive audience analysis, OSH professionals can craft more personalized and useful safety and risk information that builds on what the HCS is meant to do: Create full understanding of workplace risk. **PS**

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