

Best Practices in Communicating Risk— Case Studies in ANSI Z535

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Introduction

When it comes to understanding how standards work, there is nothing like a well-illustrated set of case studies to understand how theory gets put into practice...in this case, best practice. Over the years it has been a pleasure for me to be personally involved in writing and revising the primary U.S. and international standards related to safety signs. But just as rewarding is the time I've spent working closely with safety engineers to put into place what we call "visual safety systems." These systems are comprised of accident prevention safety signs, process identification and control signs, and product safety labels. Essentially, these systems are used by companies to improve safety and reduce risk for both their workplaces and products. The purpose of this presentation is to show how several new design options contained in the latest revisions to the American National Standards Institute's (ANSI) Z535 standards can be put into practice. The new design options include internationally harmonized components and formats, giving those in charge of safety for products, facilities and public areas a new and better set of tools to communicate safety. But as with any system, there are choices that have to be made – and made wisely because people's lives are literally on the line. The three case studies shown here illustrate several of the key considerations that need to be factored in when using the latest ANSI Z535 standards to effectively accomplish the goal of reducing risk and protecting people.

Before we delve into the three case studies, it will be helpful to briefly discuss three topics:

- The history of safety sign design in the United States
- Recent efforts to harmonize ISO and ANSI safety sign standards, and
- How people interact with warnings

A Brief History of U.S. Safety Sign Standards

The ANSI Z535 standards are the primary standards in the United States for defining the proper content and layout of safety signs, labels and tags. The beginning of these standards can be traced to a 1914 booklet on accident prevention published by the Workers Compensation Service Bureau

that shows an example of a sign with the word “DANGER” printed below movable arrow signs that would point the direction to the potential hazard (see Exhibit 1). From there, the idea of

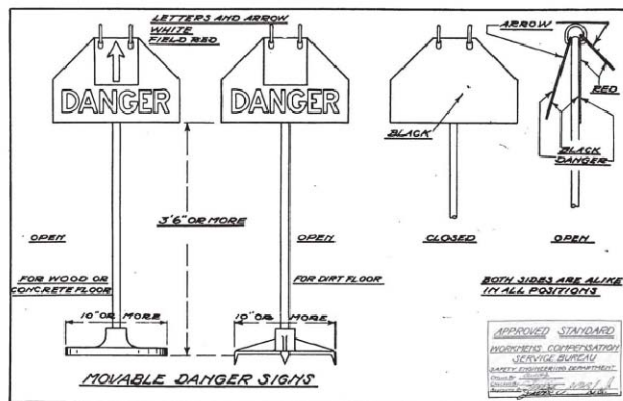


Exhibit 1. Early workplace DANGER safety sign, circa. 1914

placing signs in the workplace to identify potential hazards gained traction and in the late 1930’s work began in the American Standard Association on a national standard for safety signs, a standard that was subsequently published in January 1941 by the ASA as the *American Standard Z35.1 – Specifications for Industrial Accident Prevention Signs*. The top row of signs shown in Exhibit 3 are examples of typical 1941 ASA Z35.1 safety signs. It was this standard’s nearly identical 1968 version that OSHA used as a basis for their 1971 sign regulations.

It is important to understand that the two principle standards committees responsible for safety sign and marking standards in the United States, the Z35.1 committee for accident prevention signs and the Z53.1 safety color code committee were combined in 1979 to form the ANSI Z535 committee on safety signs and colors. The ANSI Z535 standards¹, first published in 1991, replaced the Z35.1 standard with the *Z535.2 Standard for Environmental and Facility Safety Signs* and the Z53.1 standard with the *ANSI Z535.1 Standard for Safety Colors*. It is in this way that compliance with the Z535 standards is considered a de minimis situation with OSHA since the Z535 standards share the same basis documents as the OSHA regulations. It’s also in this way that the Z535 standards are considered to be the most current principal standards pertaining to safety signs in the United States.

¹ The ANSI Z535 series is now comprised of six standards, one for safety colors (Z535.1), signs (Z535.2), symbols (Z535.3), product safety labels (Z535.4), temporary tags and barricade tapes (Z535.5), and safety information in collateral materials (Z535.6)



Exhibit 2. The ANSI 2006-2007 ANSI Z535 standards

The ANSI Z535 Standards and Harmonization With ISO

The ANSI Z535 committee's primary objective is to establish a uniform and consistent means of communicating hazard information, incorporating best practices as defined by research, use, and other standards as applicable. Back in the mid-1990s, Europe was in the middle of forming the EC, international trade was beginning to grow substantially, and the effort to standardize safety signs began in earnest in ISO (the International Organization for Standardization). The ANSI Z535 committee recognized the importance of the ISO work and an ANSI technical advisory group (TAG) was formed out of the ANSI Z535 committee in 1996. Since that point in time the U.S. has played a significant role in shaping the global ISO safety sign standards.

The case studies we are about to look at chose to incorporate the significant changes related to two major changes in the Z535 standards:

1) In an effort to phase in a uniform approach to the formatting used for safety signs found on walls and safety labels found on products, the 1998 version of the ANSI Z535.2 standard made the 1941-era ASA format the "alternate" format for safety signs. The ANSI Z535.4 format was made the "preferred" format in the 1998 revision of the ANSI Z535.2 standard for environmental and facility safety signs. The reason for this change was that the Z535.4 format better accommodates the incorporation of symbols, longer word messages, additional languages, improved contrast colors, and a 4-tier level of signal words that indicate various levels of risk and hazard severity. The 2002

version of the ANSI Z535.2 facility sign standard then made the 1941-era ASA formats completely obsolete. The intention was that all safety signs purchased from that point forward would use the new format.



**Exhibit 3. OSHA-style 1941 ASA Z35.1 safety signs (top),
2007 ANSI Z535.2 safety signs (bottom)**

2) In 2007 the ANSI Z535 committee agreed to a proposal to incorporate international design elements into the Z535 standards as a means to “harmonize” the standards with ISO. Prior to this revision, it was not possible to design signs that met both the ANSI and ISO standards. By incorporating certain formats, sign elements, and graphical symbols from ISO into the 2007 revised ANSI Z535 standards, U.S. facility owners and product manufacturers now have the ability to achieve a level of harmonization that enables their safety messages to be communicated in a global fashion.

It is important to note that, over the years, the ANSI Z535 standards have been built on research, a comprehensive understanding of issues surrounding liability, and on lessons learned in the practical application of the standards. The format that was the basis for the ANSI Z535.2 standard beginning in 1998 was first used by Westinghouse and FMC in the 1980s, and made its first appearance in 1991 in the *ANSI Z535.4 Product Safety Signs and Labels*. At its most basic level, the 1998 change in the Z535.2 standard to use this format was important because the format better accommodated the use of graphical symbols. Symbols have the potential to communicate all or a portion of a safety message across language barriers. In this day and age of cultural complexity and global markets, the use of symbols on safety signs is increasingly viewed as the state-of-the-art best practice.

What separates the latest Z535.2 and Z535.4 standards from the old style signage is that they provide a superior means to communicate safety. Three key aspects prove this point: First, the standards contain a high degree of adaptability in formatting. This is important because those who use safety signs need to be able to fit them to their facilities’ viewing requirements and onto their products’ surfaces. The Z535 standards contain a wide variety of proportions and format options that have proven to be useful for the vast majority of situations.

Second, when compared to the old OSHA-style signage that typically contains only a few words, the ANSI Z535.2 and Z535.4 standards give us the ability to convey more detailed content, content that U.S. court decisions in the 1970s and 1980s had deemed as defining an “adequate warning.” In short, case law has determined that a safety sign should describe:

- The nature of the hazard
- The consequence of interaction with the hazard
- How to avoid the hazard
- And the seriousness of the hazard

Since their initial publication in 1991, the Z535 standards have adopted this case law driven definition as the proper content of a safety sign. The colored signal word panel defines the seriousness level, and the text and/or symbol(s) communicate the hazard nature, consequence and avoidance information. Having said this, the standards mention that one or more of the first three content elements listed above can be eliminated if they can be readily inferred. But omitting some of this content may unnecessarily incur risk because, in practice, the more explicit message can be conveyed using symbols and a concise word message. In short, the legal definition of an adequate warning can usually be accommodated on today’s tailored ANSI Z535.2 and Z535.4 safety sign.

The ability for you to communicate more elaborate content on your safety signs is important because the complexity of our society, manufacturing processes, and a requirement for improved safety have all become more intricate over time. Safety engineers need to take into account today’s business climate, a climate in the United States that is permeated with issues related to liability, risk assessment, litigation, negligence, and an overall demand for a higher level of safety. With regard to safety signs, the ANSI Z535 standards provide the means to create a systematic way of designing safety signs that can communicate what is needed; namely, more substantial safety messages.

Third, the Z535.2 and Z535.4 standards bring a look of attention-getting visual consistency to environmental and facility safety signs and product safety labels. Attention-getting visual uniformity is important so viewers of safety signs will easily recognize that what they’re looking at is indeed a safety message.

Human Interaction with Warnings – The Process

It cannot be overstated how important the attention-getting characteristic of a safety sign is to the process of human behavior that needs to occur for a safety sign to be effective at its job of reducing risk and preventing accidents. According to the latest research², people interact with safety signs in three clearly defined stages:

1) The first step in the human interaction process is that the person must notice the safety sign. This sounds obvious but it cannot be taken for granted. Many non-Z535 safety signs are formatted in such a way that an individual sign can blend into the background of written messages that people see (but don’t pay attention to) on a daily basis. In a different way, safety signs are often jumbled

² Handbook of Warnings, Edited by Michael S. Wogalter, 2006, p. 147, Research on Warning Signs, Gabriel K. Rousseau, Michael S. Wogalter.

together, in what we call “sign clutter,” causing the same effect that none of the messages stand out. In addition, it’s often been pointed out to me by facility safety engineers that the typically one or two word message OSHA-style safety signs have been in place for so long that they are now part of the background, like wallpaper, and go unnoticed.

2) After noticing the sign, the second step in a person’s interaction with the safety sign is that they attempt to understand its message. Here is where the ANSI Z535 standards’ more elaborate content elements come into play. As we have seen, conveying the proper severity level, the nature of the hazard, the consequences of interaction with the hazard, and how to avoid the hazard is part of the design process that characterizes the development of an ANSI Z535 safety sign. The older OSHA format signs don’t typically convey this much information.

What’s important to understand here is that human factors research has shown that people are more likely to comply with a safety sign’s message if they are given enough information to make an intelligent decision. From a facility perspective, consider the common sign, “DANGER - KEEP OUT”....a person may well ask themselves, “why should I keep out...I have to go in here ...what’s the big deal?” A safety sign with a more explicit message that indicates what the hazard is and what the consequence of interaction with the hazard will be, gives the viewer more motivation to “keep out” than the simple “KEEP OUT” sign would generate. For a product safety sign example, take the typical label that says only, “DANGER – PINCH POINT.” The maintenance person may well say, “Sure there’s a pinch point, but I have to clear this jam and the machine is stopped now.” What they might not have remembered or known in the first place is that they had to lock out the power and release the stored energy before attempting to clear the jam. If the sign had said, “DANGER – Pinch point. Moving parts can crush and cut. Lock out power before servicing.” the maintenance person would have a fuller understanding of the hazard and how to avoid it...and would hopefully take the necessary precautions to remain safe. In short, research³ has shown that what determines whether or not a person will obey a safety sign often is a combination of knowing more precisely what the hazard is and how to avoid it.

3) Armed with this knowledge, the viewer makes the decision as to whether or not to proceed with the third and final step in the process of human interaction with a safety sign; namely, whether or not to obey its message.

Concerning this last point, it’s necessary to recognize that the essential purpose of a safety sign is to change human behavior. By providing well-designed safety signs in your facility or on your products, you are reinforcing the need for a measure of responsibility and accountability on the safety sign viewer’s part. In order to reduce risk, the viewer needs to choose to obey the safety messages you have tried to convey with your safety signs. But despite your best efforts, some people ignore warnings and accidents that shouldn’t happen, do happen.

From a product manufacturer’s perspective, this last point holds great significance. A person may ignore a product’s safety sign, get hurt, and then seek damages from the deeper pockets of the product manufacturer. The fact is that we live in an increasingly litigious society. Though a safety sign’s primary function is to help to make sure accidents are prevented in the first place, a well designed standards-compliant safety sign program can greatly assist in reducing the risk a company faces in litigation. It is becoming more and more common for U.S. product liability lawsuits to

³ Handbook of Warnings, Edited by Michael S. Wogalter, 2006, p. 419, Explicit Information in Warnings, Kenneth R. Laughery, Sr. and Danielle Paige Smith.

contain allegations of “failure to warn” and “inadequate warnings.” If a lawsuit containing one of these allegations is brought to trial, the product’s warnings will play an integral role in defending or condemning the manufacturer. Use of the ANSI Z535 standards as the basis for on-product safety signs is, practically speaking, a mandatory step manufacturers should take to reduce product liability exposure.

From a risk reduction perspective, both the product user and the manufacturer benefit from the use of the ANSI Z535 standards. The following case studies demonstrate how these standards are effectively applied; first for a set of products, second, for a specific outdoor environment, and third, for a specific company’s laboratory facilities. All three case studies should help safety engineers entrusted with safety communication to better understand how they can use these standards to begin a program to tailor safety signs and labels to meet their organization’s specific requirements.

Case Study 1: Of Feed and Safety



Exhibit 4. The AFIA safety label program

The first case study we will review involves a program to revise the equipment safety labels that were being used by the American Feed Industry Association (AFIA) members. The initial designs for these labels were created back in the early 1990s. The association’s equipment manufacturer’s council wished to have them redesigned in 2009 to incorporate the advances in warnings technology that were embodied in the latest version of the ANSI Z535.4 standard, with a strong preference for the use of graphical symbols designed using internationally stylized formats.



Exhibit 5. 1990s AFIA label (left), 2009 AFIA label (right)

The illustration of the two safety labels shown in Exhibit 5, above, are good representatives of the “before” and “after” revisions that were made to the 58 label designs that make up the AFIA safety label program. Here are the improvements that were made:

1. Efficient communication and the ability to overcome language barriers – these are the reasons that make symbols one of the keys for effective safety communication. The symbols used on the new AFIA safety signs reinforce the word message (and vice versa) to communicate a more complete safety message. In many of the redesigns, an additional symbol was added to convey the hazard avoidance portion of the word message, such as the “lockout power” message shown in label on the right in Exhibit 5.
2. Many of the symbols that had been developed in the 1990s were completely redesigned in accordance with current best practice principles related to safety symbol design. A decision to adopt international formatting was made because the equipment is used on a worldwide basis. This meant that the symbols were placed inside the colored surround shapes that are an integral part of the ISO vocabulary for safety signs. Using this graphic convention is an important characteristic of the AFIA labels and contributes to their acceptance as internationally formatted safety signs.



Exhibit 6. ISO safety sign vocabulary, left to right: warning sign, prohibition sign, mandatory action sign, safe condition/safety equipment location sign, fire safety sign

3. In another step toward international harmonization, the AFIA chose to use the new 2007 ANSI Z535 signal word panel format that incorporates the international safety alert symbol (the yellow triangle with a black exclamation mark). This symbol in ISO is the “general danger” symbol and its use signifies a potential personal injury hazard. This design element also helps to contribute to the label program’s acceptance as an internationally formatted set of safety signs.

4. The text for each label was re-evaluated for accuracy as it relates to the potential hazard. The text was also left justified and mixed case lettering was used for easier readability. A larger font size was used for the hazard description text so it could be legible from a greater viewing distance. The font style was changed from a narrow font to a normal width font, made bold, and increased in size; all, again, to enhance legibility.

5. The four signal words for the ANSI Z535 standards are defined such that they each designate a different level of hazard seriousness. Choosing the right signal word is more clearly defined by the 2007 ANSI Z535 standards in a new annex. The choice of signal word is based on a combination of the probability of the injury occurring if the safety sign is ignored, and the severity of the injury should a person interact with the hazard. All of the AFIA labels’ hazards were re-evaluated and the signal words were reaffirmed or changed based on this new annex. In the example in Exhibit 5, the signal word was changed to DANGER because the probability of the injury was a “will” situation, not a “can” or “could” situation (the signal word DANGER is used for this higher level of probability).



DANGER: Indicates a hazardous situation which, if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations.

WARNING: Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION: Indicates a hazardous situation, which, if not avoided, could result in minor or moderate injury. It may also be used without the safety alert symbol as an alternative to “NOTICE”.

NOTICE: “NOTICE” is the preferred signal word to address practices not related to personal injury. The safety alert symbol shall not be used with this signal word.

Exhibit 7. The four primary ANSI Z535 signal words.

6. The color of the signal word panel was changed if the signal word was changed.
7. The border color was eliminated so the signal word's background panel color and the symbol colors are allowed to predominate as the attention-getting elements of the label.
8. The materials used in the construction of the label were improved to achieve greater durability.
9. A key component of the overall program is that individual members can have their products' other safety labels revised to bring them in line with the program's labels. Uniformity and compliance with the latest standards are the key factors here. Also, having a product's entire set of safety labels exhibit a degree of consistency should help the labels to reinforce each other to better communicate safety. In addition, customization services are available to produce translated versions of all of the AFIA labels into any one of 38 languages. This will be helpful not just to satisfy equipment export requirements, but also for use in U.S. manufacturing facilities that have a diverse worker population.
10. Finally, as part of the overall plan, AFIA members are encouraged to use the program's services to adopt this same format and symbol structure for the safety signs that appear in their own facilities, replacing the antiquated 1940's era OSHA signage that is currently installed.

Case Study 2: Going to the Beach...And Coming Back Alive



Exhibit 8. Safety on America's beaches

This case study is an on-going project that has the objective of shifting the safety signs used on the beaches in the U.S. to an internationalized set of 2007 ANSI Z535.2 signs – signs that incorporate new ISO water safety symbols. The overall goal of this program is to take a major step forward in the development, promotion and use of a global language for communicating safety on U.S. beaches and waterfronts. The program integrates ISO’s globally standardized symbols into sign formats consistent with the 2007 version of the *ANSI Z535.2 Standard for Environmental and Facility Safety Signs*.

In August 2008, ISO published a new standard, *ISO 20712-1 Water safety signs and beach safety flags – Part 1: Specifications for water safety signs used in workplaces and public areas*. One of the major goals of ISO standards is for national standards to be revised to incorporate the principles set forth in ISO standards so that standardization of industry best practices and corresponding regulations occurs on a global basis. Over the past decade, standards harmonization has occurred throughout hundreds of industries. From a safety perspective, global standardization of visual systems for safety communication has taken on special emphasis (e.g. another prominent example is the UN-sponsored Global Harmonized System (GHS) for communicating hazardous chemical labeling – a system that incorporates standardized symbols and label formats).



Exhibit 9. ISO 20712-2 – 2008, cover page and one page example

The new ISO standard for water safety signs was developed in ISO/TC 145 SC2 WG4 with experts from many countries including the United States. The introduction to ISO 20712 states: “There is a need to standardize a system giving safety information related to aquatic activity that relies as little as possible on the use of words to achieve understanding. Continued growth in international trade,

travel, and mobility of labor requires a common method of communicating safety information. Lack of standardization may lead to confusion and perhaps accidents.”

Global standardization on the symbols contained in ISO 20712 is the objective so water-related safety signs are recognized by people the world over. Since recreation and travel are often closely tied to the enjoyment of water-related activities (e.g. a vacation at the beach), safety signs for these areas have, as their target audience, practically every known nationality. Because it is foreseeable that people speaking a wide variety of different languages could be at locations where water sports are enjoyed, the use of a common global language of safety symbols for water-related risks and precautions is a practical necessity.

The ISO 20712 standard contains 50 graphical symbols, each appearing in one of four ISO-defined safety sign surround shapes. The ISO vocabulary of safety sign design includes the surround shapes and colors as shown in Exhibit 10.



Exhibit 10. Examples of the ISO symbol vocabulary of safety signs: warning sharks, wear personal flotation devices, no swimming, public rescue equipment

One of the goals of the new beach safety signs is to develop a new U.S. best practice that integrates ISO 20712 with the U.S. ANSI Z535.2 standard’s approach. As has been discussed, in the U.S., the *ANSI Z535.2 Standard for Environmental and Facility Safety Signs* sets the basis for defining what constitutes “best practice” in the area of safety signs. By moving toward the inclusion of an internationalized approach, the new beach safety signs will follow the worldwide language of safety so that wherever people go, whatever beaches they visit, whatever nationality they are, they will remain safe.

The use of text to repeat the meaning of the symbol is supported by ISO. ISO 20712-1 encourages the use of text to supplement the graphical symbol so that increased comprehension of the symbol occurs and so, in the longer term, training of the symbol’s meaning occurs.

Exhibit 11 shows an example one of the new beach safety signs using the ISO water safety symbols within an ANSI Z535.2 format.



Exhibit 11. Beach/water safety sign with text and multiple symbols

The new beach safety signs use:

- The new ANSI Z535.2 harmonized formats which have colored signal word panels, the international safety alert symbol, and the proper signal word, typically “WARNING” or “DANGER”
- Text and ISO formatted symbols for both the hazard description and hazard avoidance content of the sign’s message. The intention is that the symbols will communicate the most critical parts of the safety message to people who do not read English.



Exhibit 12. Beach/water safety signs with no text and multiple symbols

Another approach offered by the beach safety sign program is a symbol format that does not use a text message for each sign as shown in Exhibit 12. This format is also in line with the 2007 ANSI Z535.2 standard, where it states:

“8.2 Safety symbol use

Safety symbols may be used to clarify, supplement or substitute for a portion or all of a word message found in the message panel. A symbol may only be used to substitute for a portion or all of a word message if it has been demonstrated to be satisfactorily comprehended (e.g., Annex B of

ANSI Z535.3) or there is a means (e.g., instructions, training materials, manuals, etc.) to inform people of the symbol's meaning.”

It is in this way that the ANSI Z535.2 standard allows the use of symbol-only-based signs in the U.S. – though with the qualification that the symbols must be shown to be satisfactorily comprehended or there must be a way to inform people of the symbol's meaning. The program's implementation methodology that goes with this approach will post symbol-with-signal-word signs on the beach and post “Know Your Symbols” training signs at key locations (such as in the beach's parking lot, at the walk-in entrance to beaches, and on the back of life guard stations). Each of these signs would essentially act as a legend that would explain the safety symbols' meanings in words, in a variety of languages as needed. The legend signs will provide a means for the on-going training that is necessary to ensure that each successive generation has an opportunity to learn the symbols.



Exhibit 13. Current U.S. highway service location signs

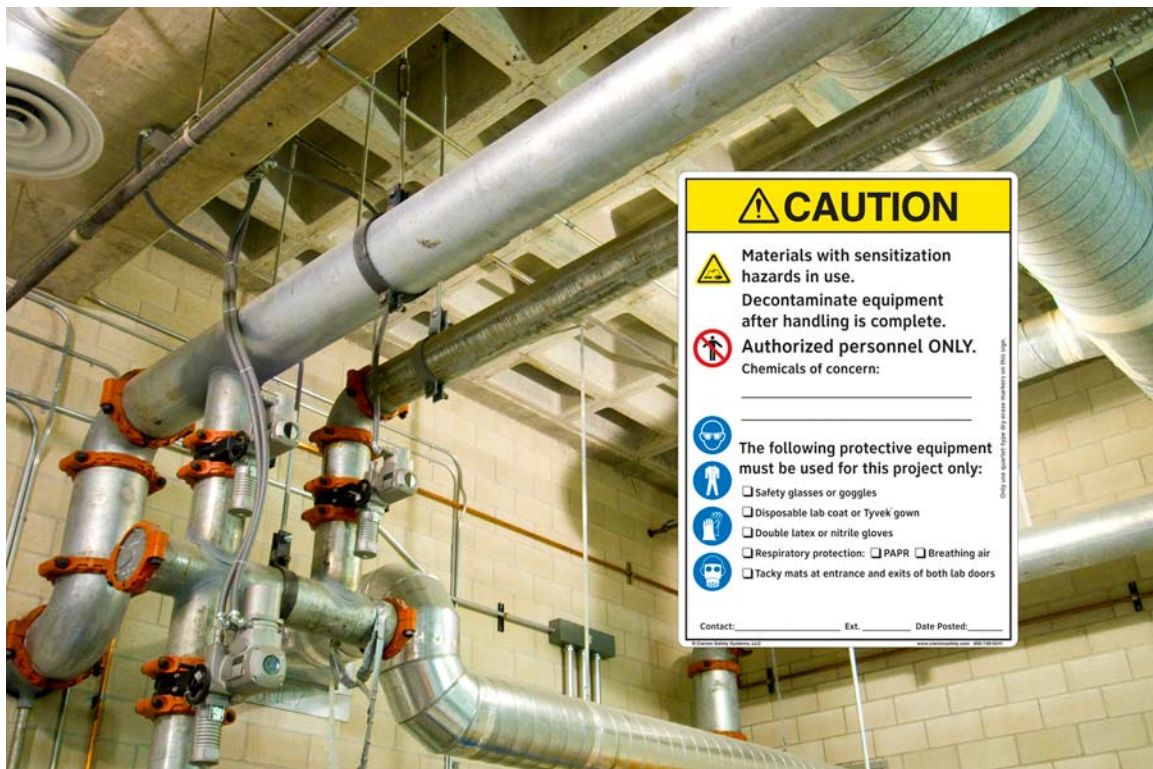
This last approach to creating a visual safety system is interesting for two reasons. First, it copies the method used for our nation's symbol-based vocabulary of road signs. Over the last decade, a symbol-only approach to communicating highway services has been implemented so information such as the location of a hospital, lodging, food and fuel can easily be communicated to drivers. The meaning of our country's highway service signs and the meaning for a particular set of symbol-only street signs is learned through a process of driver education courses, testing, and/or experience. In short, it relies on making it the responsibility of everyone who drives in the United States to know what these symbol signs mean.

As a means to personally test the theory that symbols can be learned, picture in your mind two signs; the “pedestrian crossing sign” and the “school crossing sign.” What are the differences

between them? First you probably imagine the yellow shape of the sign and its context of use, mounted on a post next to a street curb. Next you probably imagine the human figures (usually moving to the left)...one sign has one figure, the other two. Finally, you remember that the “school crossing” sign has slightly smaller figures, one with a skirt, and both figures are carrying lunch boxes. The pedestrian crossing sign does not have figures with skirts or lunchboxes.⁴ The point is that these signs are not intuitively understood, they are learned, we learn them, and their meanings are stored in our memories. Symbol-based signs don’t have to be intuitively comprehended in isolation; they have training and context to back them up.

This point leads to the reason why this approach to our nation’s beach safety signs is important to you as a safety engineer. The same approach may be possible for the signs you use on your products and in facilities. The conditions are slightly different, but the outcome can be the same: people can be trained to understand the meaning of well designed safety symbols. For instance, you might want to consider posting legend signs in lunch rooms and on doors leading into your manufacturing environment to reinforce a symbol-based⁵ approach to communicating safety on your shop floor..

Case Study 3: Eliminating Clutter



⁴ Examples of these two signs are shown at the end of this document, as Exhibit 18

⁵ The term “symbol-based” is used here to mean signs that use symbols as a component of the panel that appears below the signal word panel. The signs may or may not use words to reinforce the meaning of the symbols. In the 2007 ANSI Z535.2 standard, signal word panels are still a mandatory component for environmental and facility accident prevention safety signs.

Exhibit 14. On-Door Multiple-Message Safety Signs

Practically every hospital, school and manufacturing facility has this situation: their on-door safety signs are many in number and visually present a jumble of messages that spill over onto one another. The same is often true at the entrance to construction sites. This case study revolves around the efforts by a major drug manufacturer to ensure that essential safety and process control information is clearly conveyed on the entrance doors to each of their laboratories. Like the examples shown in Exhibit 15, the case study company’s lab doors were an amalgamation of signs posted over the years.



Exhibit 15. Examples of visual safety sign clutter



Exhibit 16. Example of the pharmaceutical company’s new multi-message on-door safety sign

The new sign program, as illustrated in Exhibit 16, was designed to accomplish the following objectives:

1. It separated the process control/identification information from the safety information.
2. It reformatted the safety information that had appeared on many safety signs into a single ANSI Z535.2 standard multi-hazard format sign. The result was that sign clutter was eliminated; usually only a one safety sign and one process identification sign needed to be posted on each door. Also, where typically only hazard identification or hazard avoidance information was contained on each of the older signs, the ANSI Z535.2 multi-hazard format allowed both types of information to be conveyed on the single sign.
3. The laboratory door sign program used multiple ISO-formatted symbols to help communicate the essential hazard description and hazard avoidance information. Use of the ISO symbols will assist in the acceptance of the company's sign program, as the intention is to post these signs in all of its global locations. Various language translations will be used for the text as needed.
4. The old-style OSHA "general generic message" approach to the content of safety signs was eliminated. Each new sign contained detailed hazard description and hazard avoidance information (such as necessary PPE); thereby giving viewers the specific critical safety information they needed to know relative to what is occurring behind the door. Often some of this information was left open on the sign designs so it could be written in on-the-spot with a non-permanent marker. The "fill-in" information included adding specific chemical information, contact information, date, and checks next to the boxes related to the required PPE (see Exhibit 16). It should be noted that all of the signs designed for this program were developed to reinforce a constant program of employee training related to safety.



Exhibit 17. On-door process control/identification flip signs

5. The process control/identification signage was changed from a format of five individual word message signs that needed to be swapped out on the door as the process occurring inside the lab changed, to a single, multi-part flip sign similar in construction to the DOT hazardous material placard signage that appears on trucks. This approach simplified the process of changing process identification signs and ensured that specific signs did not go missing. Various areas within the company's campus of buildings required different customized process control sign designs, something easily accomplished with the new multi-panel flip-sign construction. With appropriate customized tailoring, this approach to process control identification can be carried out in any number of industries.
6. The process control/identification signage was changed from a word-message approach to a color-coded word message plus symbol approach, with custom-designed symbols to indicate the various processes. The inclusion of color coding and symbols helps the message to be conveyed quickly and at greater distances.

7. Even though this presentation is on the implementation of the ANSI Z535 standards, discussing this program's process control/identification signage is helpful here because it points out the need to distinguish "safety" information from "process" or "identification" information. Both types of signage have a role to play in a facility's visual safety system of signs, labels and markings. But in order to ensure that accident prevention and hazard identification information is quickly conveyed, it is most often the case that ANSI Z535 signage is designed so it is not cluttered with process-related information. Typically the systems we put in place separate the two types of information so that process-related information does not appear in signs that use the DANGER, WARNING, or CAUTION signal word panel formats.

Summary

Whether it's a label on feed manufacturing equipment, a safety sign on a beach, or a sign posted on a laboratory door, these three case studies illustrate similar efforts to use the 2007 ANSI Z535 standards to better communicate safety. The three systems share certain characteristics, such as the use of symbols, safety colors, proper signal words, sign formats. But they also differ dramatically in the situation and location they address. It's my hope that you can take these examples and create parallels to your own safety communication needs, whether they're for environmental safety signage found on your construction sites, facility safety signs and markings posted in your buildings, or safety labels placed on the products your company manufactures. In sum, the visual safety system that can result from the proper application of the ANSI Z535 standards is one of your best tools to improve safety in your organization and reduce risk.



Exhibit 18. Pedestrian crossing sign (left), school crossing sign (right), as defined by the Federal Highway Administration

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