

PROCEDURES, RULES, AND TRAINING

There are several techniques for managing, controlling, and changing human behavior. The goal is to help people make their actions safe, and the key approach is training. Proper actions in an organization begin with policy, policy is implemented with procedures, and procedures are implemented through instructions, warnings, and training. Safe behavior can be reinforced through verbal and printed reminders and rewards.

Although procedures and training are very important in safety, they do not remove hazardous conditions, but they may help people recognize hazards so they can be removed or controlled.

32-1 POLICIES AND PROCEDURES

Policy

Policies are statements of goals, objectives, and operational principles that govern an organization. They are created or approved at the highest level by the president, chief executive officer, or board of directors and provide general guidelines that govern activities. Normally, policies are written and publicized in an organization. A policy manual is the collection of all policies formally adopted by an organization. Policies have the effect of convincing top management to subscribe to, endorse, and support major operational provisions of an organization. Policy statements tell all subordinates in an organization what is important, what is to be achieved, and how to act. Typical contents include a statement of policy, implementation instructions, variations or exceptions, explanations for critical or complex situations, and forms for implementation or reporting.

Along with other policies, organizations need safety policies. Typically, the safety policy states that safety for employees, designers, visitors, customers, and the community is of highest importance to the company. It may contain goals to be achieved, and it assigns responsibility for safety to each organizational unit or individual affected by it. It will delegate authority, such as establishing who can sign permits or who makes safety decisions in an emergency. It may identify particular procedures that must be followed, such as general company rules or those in a company safety handbook, and it may reference particular standards to be followed. It should identify how accountability will be measured, may identify staff organizations that provide technical assistance to others in achieving safety, and may establish various safety committees and delegate certain authority to them. Policies need periodic review and before issuing policies, they may need legal review.

Safety Rules

Many companies or organizations have a booklet of general safety rules. Sometimes there is a document containing general rules that employees must follow. Included is a section on general safety rules during company activities. These rules apply to everyone.

Because there are many complexities in safety, many companies have additional rule books covering particular safety problems. This may be a company safety handbook or similar document. The handbook may give details about such topics as fire protection and fire response procedures, and it may list, cite, or define standards that designers, maintenance staff, or supervisors must follow. There may be separate manuals for design and maintenance personnel and particular operations or departments. The handbook may collect all safety manuals and operating procedures into one document system.

Procedures

Procedures are detailed implementation instructions for policies. Procedures give step-by-step information about what to do in particular situations. They identify who should do what and when actions are to be performed. Procedures may cover general situations or particular ones. When procedures apply to routine activities, they may be called standard operating procedures. Nonroutine activities, such as those for emergencies and maintenance, may require special procedures that are different from normal procedures. There are also special procedures that require detailed explanation and emphasis. They may be documented separately and referenced in routine and nonroutine procedures.

Keeping Procedures Current If there is a change in a process, operation, or equipment used, associated procedures must be updated. Obsolete procedures may cause a participant or user to perform the wrong actions. When changes are made, all participants must be informed or retained. It may be important to implement the change at one time for everyone, so that two different procedures are not in place. It is most important to keep procedures that can have serious consequences up to date.

Aviation gives us an example of procedures that are not current. An airplane had four engines. If there was a failure in an engine, the pilot had to verify which engine failed. There were two models for the aircraft. Planes released during the first part of the production were called model A; the later ones were designated model B. Model A required that all engines be shut down and restarted one at a time to isolate the problem, whereas model B required that engines be shut down one at a time and restarted immediately. Pilots flying a model B aircraft during practice normally learned procedures for and flew model A. During a simulated engine failure introduced by the instructor, the aircraft crashed when trainees applied the wrong procedure.

Standardization When there is more than one operation or item of equipment and people can work or operate on any of them, it may be critical to standardize layouts and procedures. If errors or system failures can cause serious losses, injuries, or death, then standardization is crucial. Standardization involves many things. It means that sequences of operations, controls, displays, procedures, and other elements are kept identical across systems and that operations are consistent with learned concepts and principles. Chapter 33 includes a discussion of population stereotypes and compatibility, elements important in standardization.

After the accident at the Three Mile Island nuclear power plant, investigators found several kinds of incompatibilities between control panel displays and patterns of behav-

ior people had learned. A fundamental concept learned across most societies is the meaning of red and green: red means stop or danger; green means go or that things are satisfactory. One arrangement of controls violated this pattern¹ and led to wrong interpretation and action.

Standardization in aircraft is considered very important, and the industry devotes many people to identifying inconsistencies between airplanes of the same model and even between different models. A pilot or mechanic may apply the wrong procedure to an aircraft, resulting in disastrous consequences.

Levels of Procedures It is wise to organize some procedures into different levels. Levels may be based on difficulty or complexity of tasks, frequency of tasks, or level of authority that must be involved. For example, daily startup of equipment may need a pre-energizing inspection and preliminary tests before the activity moves into full operation. Workers can be trained to perform such normal safety checks. However, if there is a failure or the equipment shuts down from an unsafe condition, a second-level procedure may require a supervisor to evaluate and concur in the problem and correction before the equipment is returned to full operation. A major failure or shutdown may require that specialists be brought in to diagnose the problem and to ensure that everything is safe. The second- and third-level procedures may require special tests and testing equipment, rather than observation alone.

Signature An important part of many safety procedures is requiring a signature after they are completed. The signature may attest to individuals having read and understood the standard operating procedure or may attest to a properly trained person having evaluated a situation and made measurements with instruments. The signature also may attest to a person knowing that a procedure was properly and fully completed and that a situation is safe. For complex situations and situations where failure could lead to serious injury, illness, or death, such procedures may require independent evaluations by more than one person, in which case each person would then sign the form. Examples of such procedures are confined space entry, hot work permits, and lookout/tag out procedures.

Job Safety Analysis and Other Analysis

Developing procedures begins with an analysis of the tasks or activities of an operation. Various forms of task analysis may be used for engineering the process and equipment and for estimating cost and production. Included in the task analysis should be identification of hazards or unsafe acts that could occur with each task. For each hazard, the analysis should indicate what controls should be in place or applied, and for each unsafe act that could be performed, the analysis should identify how the task should be performed safely. The analysis also may identify any hazards that remain. Figure 31-1 illustrates one format for job safety analysis or job hazard analysis.

In analyzing an operation, it is not enough to consider the tasks involved in things going right or the operation working smoothly. One needs to forecast what can go wrong. The analysis needs to consider hazards and activities that might occur in abnormal conditions. Too often, injuries occur when people take the wrong action in an unusual event. Chapters 15, 36, and 37 discuss other methods that may be helpful.

Results of analysis are used to make decisions or to develop procedures. Procedures should explain normal or general operations first and then discuss the exceptions, abnormal operations, or special conditions.

Special Procedures and Permit Systems

Special safety procedures include those that explain what to do in emergency, abnormal, or very dangerous situations. They need to identify any changes in authority and responsibility from normal procedures. For example, during a fire, the fire chief or ranking firefighter takes charge of the situation, making the decisions and issuing instructions that others must obey.

Special procedures must explain what changes there are from normal procedures and detail what not to do. They should anticipate errors in judgment and action and explain what behavior is correct as well as explain why incorrect actions should not be followed and the consequences of following them.

A common form of special procedure is a permit system. A permit system recognizes that some conditions may be unsafe for particular activities. The activities and the environment in which they will occur must be evaluated and known to be safe before the activities are allowed to take place.

Two very common permit procedures are a hot work permit and a confined space entry permit. The goal is to make sure that everything is safe before a permit allows the activity to proceed. Both the person normally responsible for the work area and the supervisor of someone entering the area to perform work must sign the permit. Both attest to the conditions being safe for the activity. In some cases, a specialist may have to evaluate the area and sign the permit as well.

Because conditions may change, permits cover limited time periods and expire at the end of the approved period. Then the conditions must be evaluated again, and a new permit issued if everything is safe. Often the permits are for a particular shift or workday only.

It is easy to defeat a permit system. Someone can sign the permit without personally inspecting the area or completing the evaluation, which defeats the purpose of the permit procedure. An effective permit procedure requires that each party signing the permit fully perform the actions necessary to form a judgment that an activity can proceed safely.

Other kinds of special procedures are those that are unique to certain activities. An example is hand signals. There are special signals used by ground crews to guide pilots in moving aircraft, particularly when they are moving to or from parking at a gate or ramp. There are special hand signals used to guide crane operators in moving a load, and there are special hand signals for guiding excavation equipment operators.

Lockout and tag out procedures are special procedures for working on equipment that is normally energized with electricity, steam, mechanical, or other forms of power.

32-2 WARNINGS AND INSTRUCTIONS

Warnings and instructions are important elements of procedures. Warnings identify what dangers exist in equipment or operations and the dangers in normal and abnormal routine and nonroutine operations. Instructions explain how each person involved in an operation is to act and act safely and how people are to protect themselves from the dangers in normal and abnormal, routine and nonroutine operations. Instructions need to have a step-by-step format, need to be imperative, and need to state actions to be followed. Too often, people write instructions in a descriptive form, explaining how a process works.

Chapter 7 discussed warnings and instruction for products. Table 7-1 described 15 characteristics a warning must have. The use of warnings and instructions and principles for preparing them apply to operations as well as to products. Without warnings, users or

participants may not recognize dangers inherent in an operation. Without instructions, users or participants must make up their own procedures.

Alarms and Signals Alarms and signals are one form of warnings and instructions and they are integral parts of procedures. Sensors (sometimes human) must detect a problem and tell people about it. In particular, they must tell people where there is a danger. In one sense, signals and alarms are instructions to act; they are coded instructions, rather than direct, verbal instructions. People must learn what the alarms and signals mean and what actions they call for. Some signals, like hand signals for crane operations, are not automatic.

Symbols Symbols are important elements of warnings. They help convey the message quickly and may help those who cannot read the language of the text. A combination of symbol(s) and text is better than either alone. Text is more precise. Some symbols have high recognition and understanding, and within a sample of people, most in the group will recall and understand the meaning of the symbol. However, for some symbols, the recognition and understanding is quite low. Not all symbols have obvious meaning to all viewers, which is why associated text is important. Seiden² provides a comprehensive list of references on symbols in warnings.

32-3 TRAINING

From childhood on, people gain knowledge, skill, and understanding through training. Training can take on many forms and may involve a variety of media. Training is essential for learning how to formulate safe decisions and take safe actions. Through training, people learn to minimize errors that lead to accidents and injuries.

Principles of Learning

Planning and development of training begin with an understanding of how people learn and what contributes to learning. The following list summarizes some principles of learning.

1. *Stimulate multiple senses.* We receive most information through vision. Hearing processes a lot of information, but cannot handle information at the same rate as visual input. Incorporating visual materials into training helps the learning process.
2. *Identify the need for training.* The trainee will understand what is being learned better if objectives and strategy for training are presented clearly.
3. *Organize the content logically.* It is better to conduct training in small modules rather than large ones. What constitutes logical order depends on the material being taught. One form of order is proper sequence, where early modules establish the background for later modules. Another form of order is level of difficulty, where easy material progresses to that which is more difficult.
4. *Teach principles with procedures.* People will understand procedures better and retain them longer if the principle or objective for the procedures is presented first.
5. *Teach the whole process first, then detailed parts.* Trainees should learn the whole procedure first. They need to see what each step leads to. Then they can go through the details of the process.

6. *Make sure trainees have time to practice, but keep practice periods short.* When trainees are learning skills and the criterion for success is meeting some performance standard, trainees need time to practice. Short practice periods with breaks are more effective than long practice sessions.
7. *Ensure participation when performance is the goal.* When training occurs in group arrangements, some trainees hold back from participating. An instructor must watch for this and find ways to involve everyone.
8. *Give trainees knowledge of results.* Trainees need to know how they are doing. It is better to evaluate trainees in small increments and give them results of evaluations, rather than delay evaluation and results.
9. *Reward correct performance.* There are many forms of feedback. Positive is generally better than negative. Praise and verbal comments can be used when trainees do things correctly. Accurate and immediate feedback is better than delayed and general feedback.
10. *Keep trainees interested and challenged.* Instructors can use various techniques to increase participation and interest in subject materials. Ask questions and stimulate discussion, and when there are skills involving several people, role playing exercises help maintain interest.
11. *Simulation should duplicate actual conditions.* When procedures and settings are simulated, they should accurately represent real situations as much as possible. Unrealistic simulation can lead to incorrect behavior in real contexts.
12. *Unique or unusual material is retained longest.* Use of examples and real situations helps people visualize what is taught. Dramatic and exotic style may be entertaining, but care must be given to make sure such activity is meaningful.
13. *Provide relearning to sustain knowledge and skill.* The idea of a learning curve tells us that the more skilled a person becomes, the slower the rate of improvement. After training, the knowledge or skill achieved by the end of training decays with time. Creating opportunities to relearn, update, or evaluate skills and knowledge will help keep performance at desired levels.
14. *Fit training to individual needs.* The knowledge or skill of each trainee can be assessed through pretests, interviews, and other evaluations. When there is too great a range in knowledge and skill in the same training session, few trainees are well served. With self-paced instruction and criterion-based training, individuals can achieve the desired level of knowledge or skill at their own pace. Slow learners or those with elementary skills are not intimidated by others who are advanced. Computer-based instruction and training systems allow for customized instruction and repeating of sessions to match the needs of individuals.

Training Needs

Training programs begin with assessment of need, of which there are two aspects. Is there a need to train people? What level of knowledge or skill do people already have? Review records of employees to see what knowledge, skill and experience they already have. Observe people on the job to determine if their actions are correct. Use interviews, questionnaires, or performance tests to determine if proper knowledge and skill exist.

Contingency Training in Safety

Too often, people learn how to do a job or operate some equipment by being taught only the procedures for normal operations or conditions. They never receive instructions about what to do when things are not normal or when an activity, like maintenance and cleaning, are not part of normal production operations. When things go wrong, people are left to make their own decisions about what is wrong and what to do. Errors in critical methods can be disastrous.

Training programs must teach about contingencies—anything out of the ordinary. Typically, maintenance, repair, and cleaning are not activities performed during production. A contingency occurs when machines start to produce faulty parts or when feed and ejection elements do not work right. A contingency occurs when something breaks, when a process overheats or pressure becomes too high, or when equipment does not work correctly. Contingencies are events and conditions that are not ordinary or routine.

Contingencies must be included in procedures and training programs. People have difficulty recognizing the symptoms of things going wrong and often fail to recognize what is happening and why it occurs. After they recognize that something is wrong and what it is, they need to know what actions are appropriate and safe, and they need the authority to act with safety for themselves and others. Too often, they place the importance of doing a good job above the importance of safety. Too often, production is paramount to safety.

Who to Train

Everyone needs training for safety. Within a company there are new employees and experienced employees, supervisors and managers, and special committees and teams. Product users and the general public need training in safety.

New Employees Because accident rates decrease with time on the job and are highest at the start, it is very important to train new workers. For new employees, there are many things to learn. An orientation to the company and to a new job is a good way to get started. However, orientation sessions deal with general matters. New workers should understand how important safety is in the company or department and be aware of major procedures in case of an accident.

Details for performing a job correctly should be covered in a separate session from general orientation. Before a new worker begins work, thorough training in doing a job correctly and safely and in contingencies that create dangers should be completed. During the early phases of employment, new workers should have a lot of reinforcement on details of doing the job correctly. There should be review sessions and evaluations to see if the worker applies the training to the job. Extra help should be given until the worker can do the job well.

OSHA requires that employers provide many kinds of safety training. In fact, there are nearly 150 references to specific training requirements in the OSHA regulations, and OSHA requires that employees comply with safety rules and standards. This can be achieved only through training. Many federal and state agencies impose safety training requirements for employees on the employer.

Experienced Employees Experienced employees need training when procedures change. For some aspects of safety, periodic reinforcement is not only necessary, but it is required by law and regulation. For example, many workers must be trained every 6

months or annually about hazardous materials found on their jobs. A worker who changes job assignments should have additional training on hazards and controls for the new tasks.

Supervisors and Managers Supervisors and managers represent company and employer responsibilities. Not only do they need to understand the hazards and controls for their workers, but they need to know what training they must administer. They need to understand the regulatory and legal responsibilities for safety that the employer or company bears and they need to know what responsibilities they have under normal and special procedures. If supervisors and managers have contract relationships with other companies and their employees, the supervisors and managers must learn how to deal with safety matters through contract chains of command.

Special Committees and Teams Many companies have in-house fire brigades, emergency response teams, and other groups that have special responsibilities. Individuals on these committees or teams perform other jobs and leave them when the need arises. Individuals on these teams need special training, which may include special drills and tests. The drills may involve teamwork among groups from within and outside the plant.

Contractors Contractors working on company premises need training in safety as much as company employees, although it is not uncommon for contractor supervisors and workers to be left on their own. A contract should include clauses that cover training requirements for safety.

Product Users Users need training in the safe use of products. Usually, a manufacturer is limited to manuals and instructions that go with the product. The safety information must be clear and understandable for all potential users, which may necessitate instructions in several languages. Warnings may be interspersed throughout the instructional materials.

For large, complex products, a manufacturer may want to provide additional training materials to help users operate and maintain the product correctly and safely. Field staff who perform customer service should be able to provide safety training for the products, although it is not uncommon to find field staff giving wrong advice that leads to accidents and injuries.

When there are changes in products or problems with a product that may cause injury, a manufacturer should try to reach users to provide new information. Many companies have registration cards for new users that can be mailed in or computer-based product registrations. Manufacturers of automobiles must keep records on purchasers that help implement product recalls and inspection notices.

Public Some operations and products can affect people outside the plant. Some companies provide training for the public about hazards of systems and equipment and how to prevent injury. For example, electrical utilities often provide public notices about dangers of excavating into buried lines and the dangers of substations and overhead lines. Several railroads offer safety programs for schools. Local police and fire departments offer public training and informational materials about traffic and fire safety. Any operations that could create dangers for a community should have training programs to inform local authorities and the public about warning systems, hazards, and means of protection.

Engineers Engineers and other professionals need training in safety because safety affects their sphere of responsibility. A National Council of Examiners for Engineering and Surveying survey found that virtually every engineering discipline and every type of

engineering job function had safety responsibilities. In 1987, the Accreditation Board for Engineering and Technology added a requirement that safety be included throughout the engineering curriculum for all engineering disciplines.

Training Techniques

There are many training methods. The method to use depends on the content of and ability to deliver training. For example, there are limited ways to reach the public or product users. Sometimes only a warning sign or user manual are available; sometimes advertisements or radio and television talk shows can be used. By capturing the desired audience of trainees, the methods can be expanded. Standard audiovisual presentations may work well. Stand-up lectures, role playing, case studies, problem solving, special training facilities, computer-assisted instruction, and other techniques are useful. Which one to use depends on whether one is trying to convey general knowledge or to develop skills to a measurable level of performance. Selection also is limited by cost. If a person has a job that plays an important role in personal safety and the safety of others, significant time, money, and facilities may be needed.

A common, low-cost way to reinforce training with workers is to conduct periodic sessions with small work groups. The supervisor conducts the session with employees. Some call these sessions tailgate or toolbox safety meetings. Various techniques may be used. Typically, the group addresses one or two topics, uses a discussion format, and reviews hazards, controls, and safe procedures. A key to making these sessions effective is selecting topics that deal with particular hazards for the group, not just general ones.

Training Aids

For safety, there are many training aids and materials. Several companies produce very good training materials in a wide variety of formats and media. Information about them are found in safety and health periodicals and journals and in safety product directories. NIOSH has many safety training materials available for purchase.

Evaluation

Safety training is worthwhile only when it is transferred into practice. The only way to determine if implementation is accomplished is by making some measurements. One can test trainees during and at the end of training sessions. If performance is essential, there should be set standards that a trainee must achieve. Evaluations should be included to determine if each student has met the standards. There may be formal tests that trainees take or informal review and discussion with trainee groups. One can also apply statistical techniques to observed behavior recorded by trained observers or assessment of accident rates, loss rates, and other data.

Some employers have begun to use certification programs that include tests of knowledge on safety. An example of a nationally accredited certification program in safety for managers and first-line supervisors is the Safety Trained Supervisor certification.³ The program offers tests for construction, general industry, and the petro-chemical industry.

Management of Training

The requirements for teaching safety within a company can be quite complex. The task of keeping track of who had what training is a major job. To do a good job, employers and

their managers and supervisors may need a computer database for tracking safety training required and completed. The system can list who has had what training and when and who must be trained to meet regulatory or management requirements in upcoming months. The tracking system also may need to keep track of performance in particular skills and when a performance evaluation was last made.

32-4 PROMOTING SAFETY

There is a need to reinforce proper attitudes and actions. There are many approaches for promoting safety. This section addresses only a few.

Posters, Flyers and Newsletters

One method for reminding people of safety concepts and safe actions is through posters, flyers, and newsletters. Such publications keep important safety messages in front of people. In view of the competition for people's attention, are these publications effective?

One study⁴ looked at a poster about sling safety for hoisting equipment. The poster gave a detailed instruction: "Hook that sling!" After a poster was on display 6 weeks, there was a 13% increase in hooked slings. Some workers could remember that the poster was up but few could remember the content.

Another study⁵ looked at style of posters. A humorous poster and one with a medium threat were compared. Researchers questioned workers to find out if they recalled either of the two posters and recognized them. The results were as follows:

Poster Type	Recall (%)	Recognition (%)
Humorous	18	15
Medium threat	11	10
Both	18	49
Neither	52	27

Workers preferred the serious poster over the humorous one. The reviewer concludes that recall and preference for style of posters have little relationship with their impact on safe behavior.

Opinions about safety poster content and use vary. One safety poster researcher uses the following criteria: be specific, be accurate, be positive, design for safe behavior, site prominently, and stick to a simple message. Another suggests: have a clear strategy, target the content, attract attention, have a positive and attainable slogan or message, arouse interest, seek to have something that is remembered, and call for specific action.⁶ The National Safety Council has developed recommendations for posters, bulletin boards, and safety displays.⁷

Awards and Rewards

Many people believe that recognition of individual worker's safe behavior is the best way to achieve desired actions. The behavior theories support the need to reward correct behavior. There are many ways to recognize people for what they do correctly. The methods are limited by one's imagination. In general, immediate reward or recognition is best; delayed recognition is less effective. Feedback each time a behavior is correct is also desired, but

often is not possible. Verbal recognition by a supervisor is one of the best and least expensive kinds of feedback.

There are many kinds of award and reward programs. Several companies sell awards and materials for conducting award programs. There are awards for individual behavior and for group achievements. Group programs introduce peer pressure and peer support toward correct actions. Particular programs may be effective for a limited time, but then people lose interest. Changing programs can help maintain interest. Some kinds of awards incorporate company or work group logos and names. These help develop pride and commitment to the identified group and a positive attitude and image for the group.

EXERCISES

1. Work with an employee group to conduct a job safety analysis. From the results, develop a training program for each employee.
2. Review the training program for an employee group. Identify ways to improve it.
3. Develop a computer database management application for tracking training requirements and training completed for each member of an employee group.

REVIEW QUESTIONS

1. Explain the purpose for policies. For procedures, explain how they are related.
2. What are general safety rules?
3. Give one reason why each of the following are important for procedures:
 - (a) keeping current
 - (b) standardization
 - (c) levels of procedures
 - (d) signature
4. How does one start to develop a procedure?
5. What is a special procedure?
6. When someone signs a hot work permit or confined entry permit, what does the signature mean?
7. Explain briefly how each of the following are procedures:
 - (a) warnings
 - (b) instructions
 - (c) alarms
 - (d) hand signals
 - (e) symbols
8. List and briefly explain five principles of learning.
9. What is contingency training and why is it important for safety?
10. Identify why training is important for each of the following:
 - (a) new employees
 - (b) experienced employees

- (c) supervisors and managers
- (d) special committees and teams
- (e) contractors
- (f) product users
- (g) public
- (h) engineers

11. In what way are posters, flyers, newsletters, awards and, rewards an element of safety training?

NOTES

1 Sheridan, T. B., "Human Error in Nuclear Power Plants," *Technology Review*, February: 23–33 (1980).

2 Seiden, R. M., *Product Safety Engineering for Managers*, Prentice-Hall, Englewood Cliffs, NJ, 1984, pp. 222–223.

3 The Safety Trained Supervisor Certification is operated by the Council on Certification of Health, Environmental and Safety Technologists (CCHESST), Savoy, IL (www.cchest.org).

4 Laner, S., and Sell, R. G., "An Experiment on the Effect of Specially Designed Safety Poster," *Occupational Psychology*, 34:153–169 (1960).

5 Reported by Sell, R. G., "What Does Safety Propaganda Do for Safety? A Review," *Applied Ergonomics*, 8:203–214 (1977).

6 "What Makes an Effective Safety Poster?" *National Safety and Health News*, 134:32–34 (1986).

7 *Posters, Bulletin Boards, and Safety Displays*, Data Sheet I-616-Revision 86, National Safety Council, Chicago, IL, 1986.

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 ANSI/NFPA 72F, Installation, Maintenance, and Use of Emergency Voice/Alarm Communication Systems
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 ANSI/NFPA 72H, Testing Procedures for Signaling Systems
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 ANSI/NFPA 171, Visual Alerting Symbols for General Public Fire Safety
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 ANSI/UL 969, Marking and Labeling Systems
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