SYMBOL COMPREHENSION TESTING PROTOCOL

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PROJECT BACKGROUND

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The ANSI Z535.3, "Criteria for Safety Symbols", provides general criteria for the design, evaluation and use of safety symbols on safety signs and labels. Z535.3 also clearly identifies the image content for 40 messages. However, the art for the symbols vary greatly in graphic style because they are taken from a variety of sources. They do not form a visually consistent and coherent set of symbols.

This project, funded in part by the NEA (National Endowment for the Arts), will refine the art for the symbols in Z535.3 in order to create a family of images. The symbols will conform to the style that has been established for U.S. transportation symbols and to the graphic symbol matrix established by the ISO (International Standards Organization).

To assure the adequacy of the re-designed symbols, it is necessary to subject them to formal testing. Two aspects of the refined symbols should be empirically tested: their comprehension and their legibility. ANSI Z535.3 provides some guidance on comprehension testing, but does not address legibility testing. Comprehension and legibility are not the only criteria upon which a set of symbols should be evaluated, however, they are the two factors for which it is important to obtain empirical information using the potential symbol-viewing audience.

PURPOSE OF COMPREHENSION TESTING

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You will be testing the symbols for comprehension. This document provides the detailed testing protocol. The testing procedures were developed to provide a comprehensive test of the symbols, yet, to be simple and efficient. They do not require any extensive equipment. Procedures for administering the tests are plainly described. The test booklets are provided. The scoring of the responses and analysis of the data will be done by the author/designer.

The primary purpose of the comprehension testing is to be sure that each symbol meets acceptance criteria. Comprehension rates (percent correct interpretations) must be determined for each symbol. The draft ANSI standard recommends the general acceptance criteria of 85% correct responses with a maximum of 5% critical confusions. While this is adequate as a guideline for most messages, it must be recognized that for some messages in the set, it is very unlikely that this level can be achieved, for the general population at least. In particular, "radiation", "biohazard", "radio frequency" and "laser" are unfamiliar hazards in many environments and may lack concrete pictorial counterparts.

In addition to the primary objective of determining comprehension rates, these are several additional objectives. They include the following :

1. Compare the "new" symbol designs with the "old" ANSI examples, to insure that there is no substantial reduction(and, hopefully, document an increase) in the comprehension rate.

2. Reveal the nature of any confusions about the meaning of a symbol, which may suggest graphic improvements.

3. Examine comprehension for sub-groups of particular interest. These include workers who may encounter safety signs in the workplace and older people, for whom a variety of research studies have found greater symbol comprehension problems.

TESTING METHODOLOGY

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The general method is outlined here and detailed in what follows. Comprehension will be measured by showing a test subject the symbol image and asking for a short definition (what it means and what one should do). Each subject will see symbols for the full set of messages, presented in booklet form. People will be tested in small groups with each person's booklet containing the symbols in a different sequence. This method is economical, provides for great flexibility in administration, accommodates any size group, is easily portable (there is no "equipment"), so that the tester can go where the subjects are and allows every person to work at his or her own pace. This last feature helps maintain interest and motivation. It overcomes individual differences that are particularly important when older persons are included in the sample.Also, legibility in the test situation is not a serious factor with booklets for nearly any setting or group size.

Some subjects will see the "new" symbols and others will see the "old" symbols. Comparasions between the symbol sets will be made between groups of subjects. There are a total of 80 symbols to be evaluated; 40 "old " designs shown in the ANSI draft and 40 "{new" designs. We originally considered having each subject view all 80 designs. This is the most efficient method. However, this is a much larger set of symbols than is typically tested. For example, Lerner and Collins (1980) tested only 25 safety symbols in a similar methodology and the sessions took about an hour. With a booklet method, each person can move at his or her own pace, but some people take considerably longer than others. Given the desired composition of the subject sample, it would take too long to present each per-son with 80 symbols. This is particularly true since (a) asignificant number of older persons are to be included and they are known (as a group) to take longer to do this task; and (b) the sample should include industrial workers and the extended time may make it difficult to recruit these people. Further, we could expect some problems of boredom and inattention with so many test signs. Therefore, the general procedure will involve two groups of test subjects: one group will see the new symbols, the other will see the old symbols.

T E S T
A D M I N I S T R A T I O N
I N S T R U C T I O N S

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All of the people to be tested should be assembled in a quiet area, with everyone present before the booklets are handed out. A "script"for the test administrator is presented below. The test administrator is very important in setting the tone of the session. He or she must be friendly, but must still convey that this is serious. Sometimes if the mood becomes too frivolous, it is difficult to keep people from talking, making remarks or giving joke answers. Therefore, the test administrator must set a professional tone.

After distributing the booklet, the test administrator says:

Each of you has a booklet that contains many examples of different symbol signs. These are symbols that you might encounter on product labels, on machines, in workplaces or in public areas. We want to see how well each of the symbols is understood. You will be helping us do this by writing down what you think each symbol means.

It is very important that you write down exactly what the message is. If your answer is too vague or general, we will not be able to determine whether the correct message is getting across.

Turn to the page one of the booklet. This is an example of what you will be seeing. Each page will have an illustration of a symbol that you might encounter on a sign or label. There is a blank for you to write down exactly what the symbol means and another blank for you to write down the action that should take in response to this symbol.

The next page shows you an example of a poor answer. The poor answer says only that the sign means "gears and hand" and the action to take is to "be careful". This is not specific enough.

Don't just say what the image is, but what it means. This one means that there are moving gears which pose a risk to you. What you should do is to be aware of the danger and do not put your hand near the machine. You can see that the "poor" answer is vague and does not let us know if the full message is getting across to you.

The example on the page after the poor answer is a much better answer. It describes the exact meaning of the symbol and tells just what actions should be taken. Make sure that all your answers are clear and precise, like the good example.

There are many different kinds of symbols in your booklets. Some may be familiar to you and others you may have never seen before. Just do the best you can for each, and take an "educated guess" if you are not sure of the meaning. Remember, it is the symbols that are being tested not you. When you think about what the symbol might mean, remember that these are signs or labels that could be encountered on products, on machines, in workplaces or in public facilities.

It is important that you work alone. Do not talk to anyone or make comments out loud. Work through the booklet a page at a time. Once you finish a page, do not go back over it. There is no time limit, but there are a large number of symbols, so try not to spend too much time on each one. If you don't know the meaning, just make your best guess and go on. When you have completed the entire booklet, please bring it to me.

Are there any questions before we begin?

Now please turn the page and begin the symbol booklet. Remember to print your responses clearly.
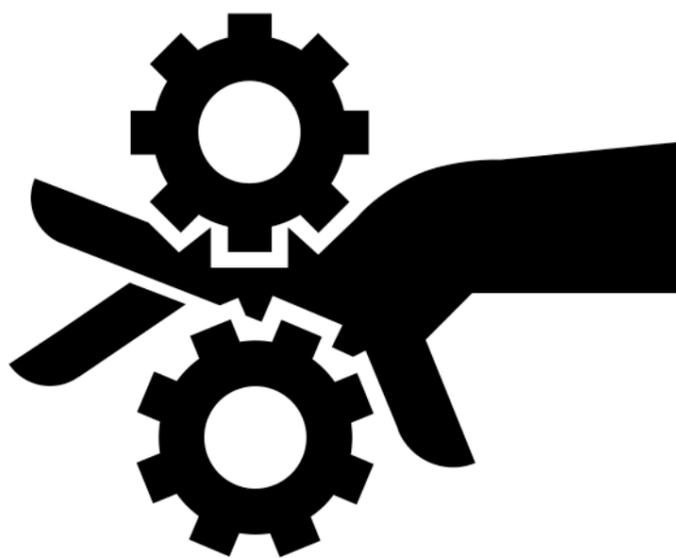
Exactly what do you think this sign means?

What action would you take in response to this sign?

Page 1
(Example of a poor answer)
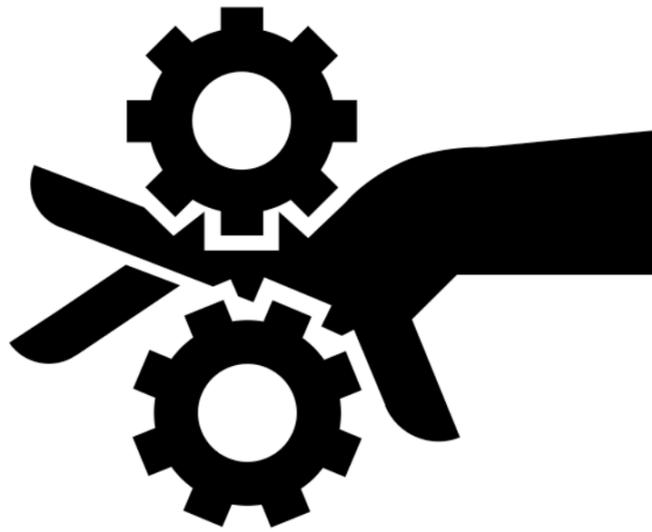
Exactly what do you think this sign means?

Gears and hand

_____

_____

What action would you take in response to this sign?

Be careful

_____

_____

_____
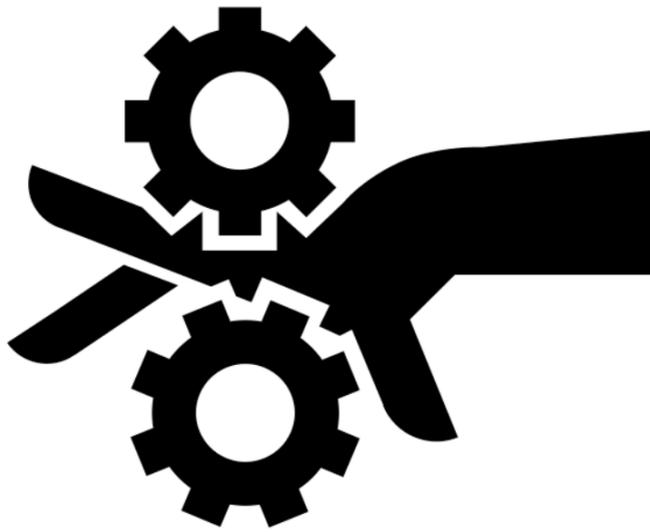
Exactly what do you think this sign means?

Danger. Moving gears.

Do not put hand near machine.

_____

What action would you take in response to this sign?

I would stay away and not put

my hand near the machine.

LAST PAGE

Today's date: _____

Your age: _____

Are you male or female? _____

Your occupation? _____

What was the last grade you finished in school? _____

Is English your first language? _____

If not, what is your first language? _____

Your occupation? _____

Thank you for your cooperation!