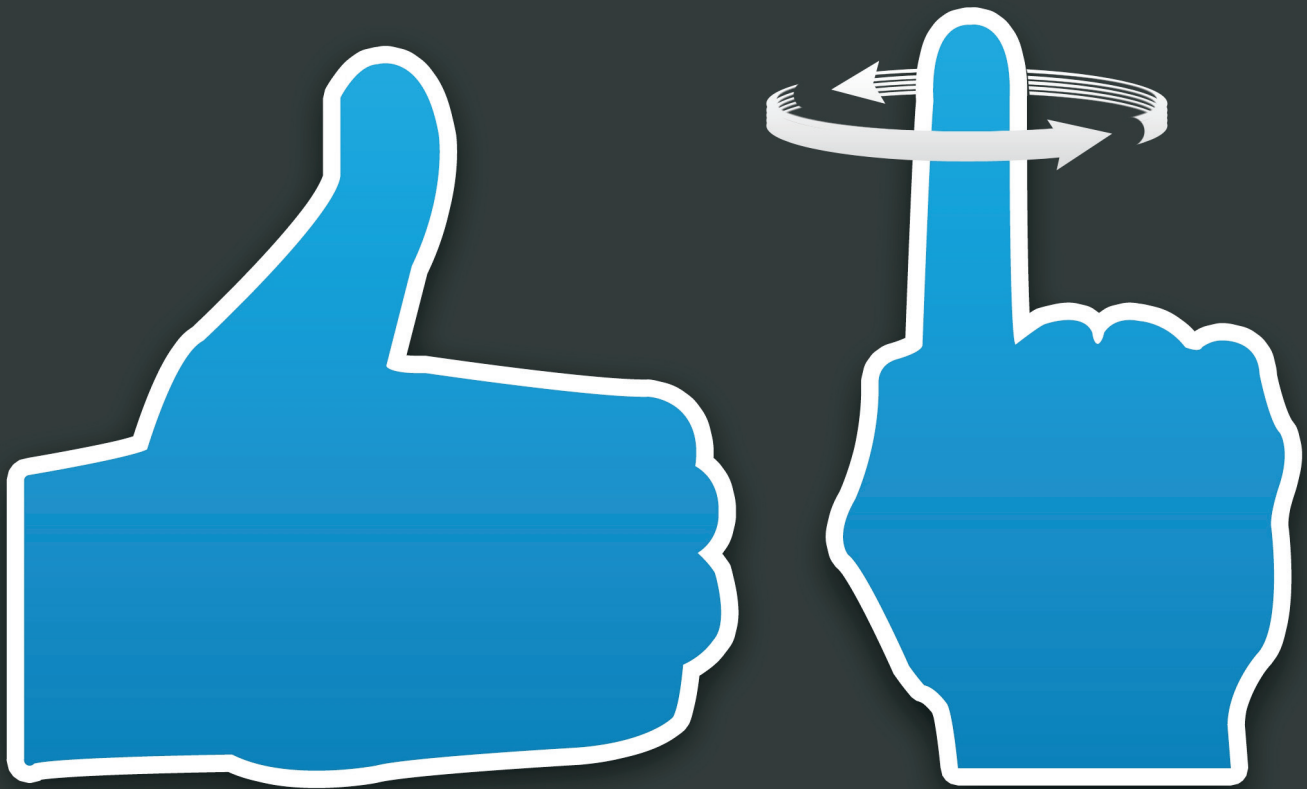


NONVERBAL COMMUNICATION FOR MINE EMERGENCIES



Report of Investigation 9688

**Instructor's Guide:
Nonverbal Communication for Mine Emergencies**

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Overview

Nonverbal Communication for Mine Emergencies is a training program that teaches miners a series of nonverbal hand signals to use in the event of an emergency. These hand signals can be used by miners if they have donned an SCSR and are unable to communicate verbally. The training program includes a Microsoft PowerPoint instructional presentation, several partner/group training activities, and a Microsoft PowerPoint retention test.

Purpose

This training program will provide miners with a set of nonverbal hand signals that they can use in the event of an emergency which requires donning an SCSR. The training prepares miners to use these hand signals by providing practice in the form of three practice activities.

- At the end of this training program, each trainee will be able to effectively identify and perform 16 nonverbal hand signals.

Target Audience

This material has been designed for underground coal miners at all skill levels. It can be integrated into required new miner training courses, annual refresher courses, or any other mine training.

Requirements for Teaching This Module

- If this training is part of a Mine Safety and Health Administration (MSHA) required course, an approved instructor and/or content expert must deliver the training.
- Basic computer skills including ability to use a keyboard and a mouse, ability to connect a computer to an LCD projector, and ability to use Microsoft PowerPoint.

Intended Use

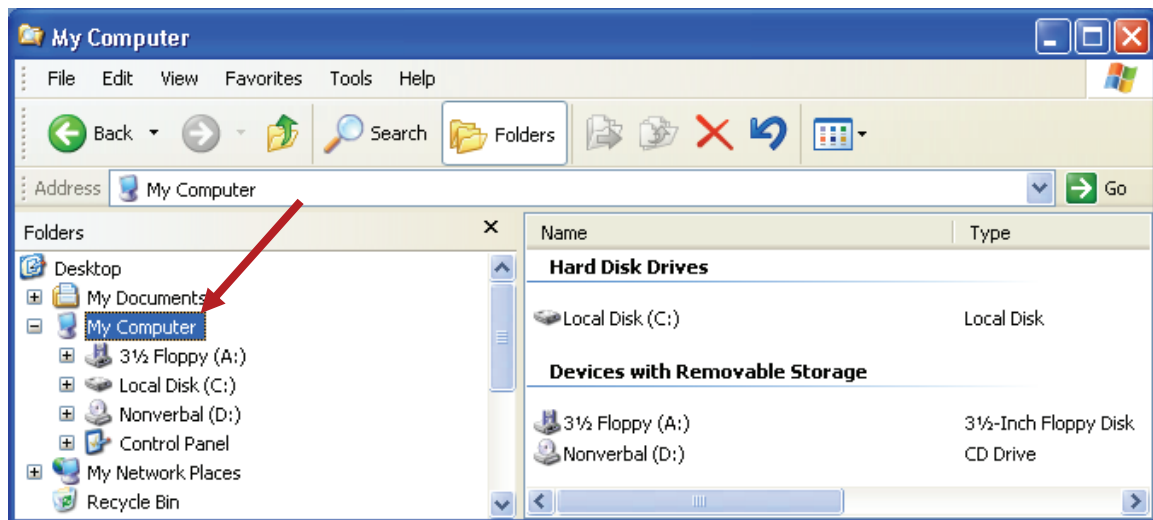
This training program is designed for use by a group of miners rather than individuals. It can be used by a group as small as three. However, a modified version of the training can also be used by individual miners if necessary.

Computer System Requirements

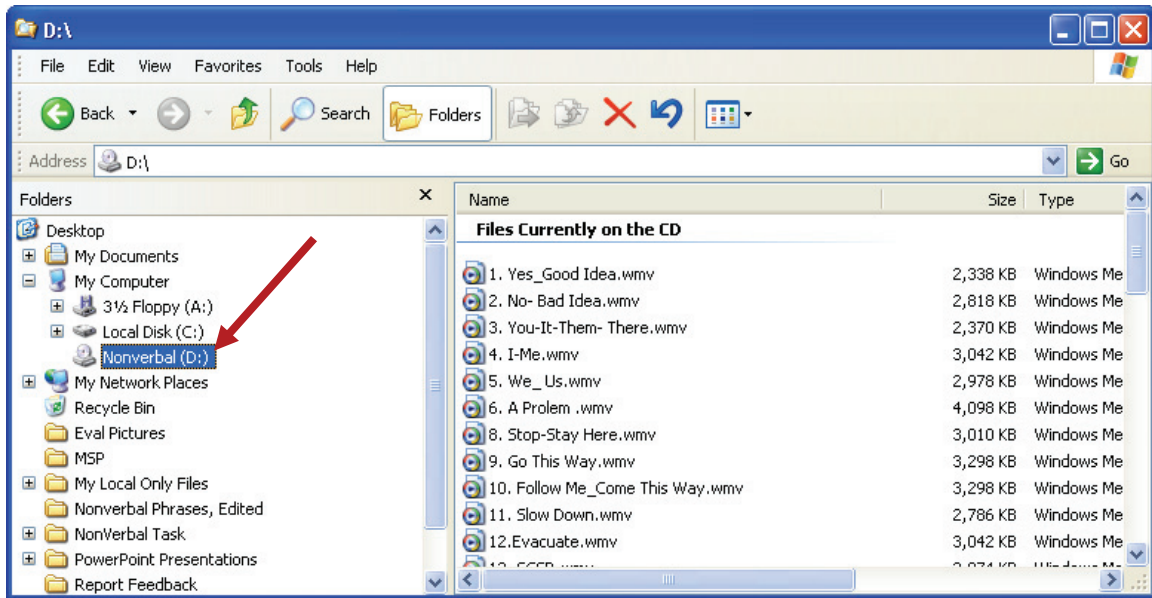
Part of this training uses Microsoft PowerPoint presentations. Most computers should be equipped with this program. Even if your computer does not have Microsoft PowerPoint, the included CD also contains a PowerPoint viewer which will allow you to show the presentation.

Running the Training Program and Retention Test from the CD-ROM

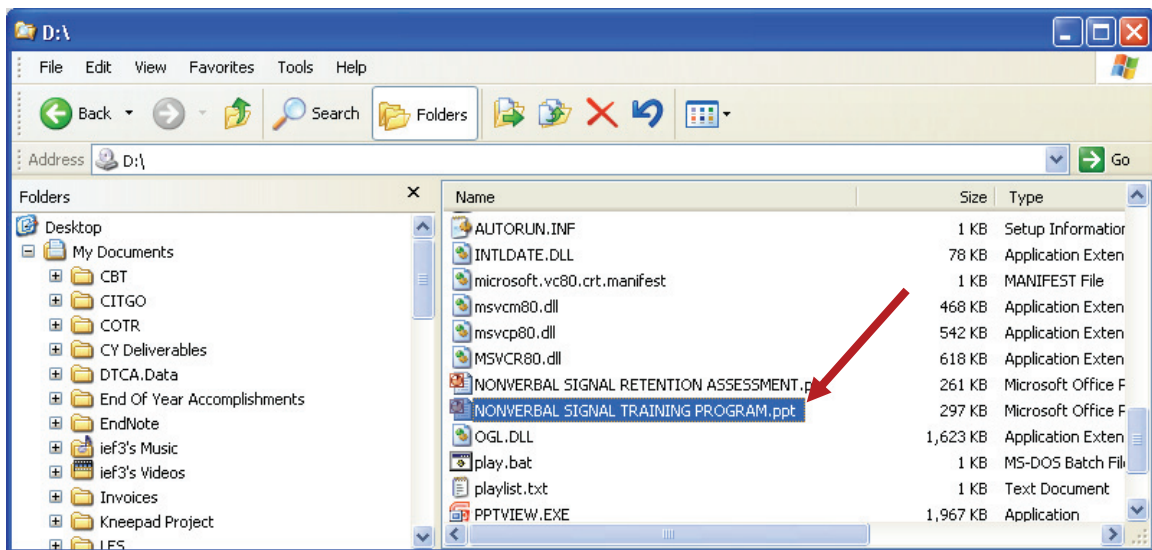
1. Open **My Computer**.



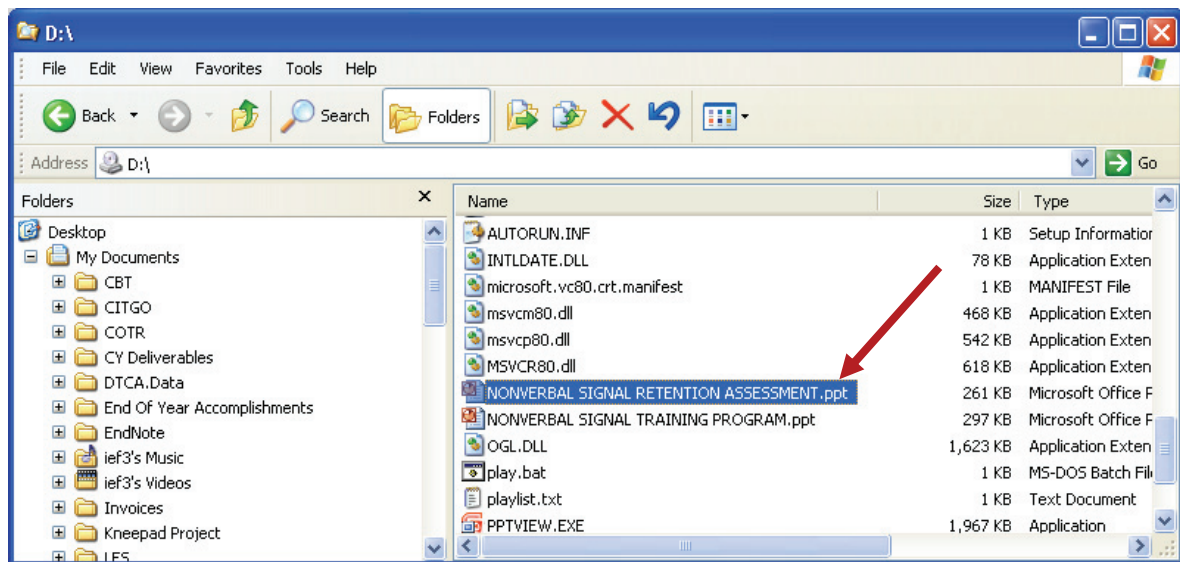
2. Open your CD-ROM drive as shown below.



3. Select and double-click the **NONVERBAL SIGNAL TRAINING PROGRAM** file.



4. Select and double-click the ***NONVERBAL SIGNAL RETENTION ASSESSMENT*** file.



Background Information

In the event of an emergency, miners may need to don self-contained self-rescuers (SCSRs). Miners are unable to communicate verbally when the SCSR mouthpiece is in the mouth, and removing their SCSR mouthpiece may expose miners to toxic gases. However, in past mine emergencies, miners' need to communicate with one another resulted in them removing their SCSR mouthpieces and exposing them to toxic chemicals, often with negative consequences. Therefore, it is necessary for miners to have a set of nonverbal signals that they can use to communicate very basic information in the event of a mine emergency that necessitates the use of SCSR.

Room Setup, Equipment, and Supplies

- Arrange seating so that everyone has a clear view of the screen.
- Make sure that there is enough space in the room for trainees to break out into smaller groups.
- Make sure you have the following equipment and supplies required for large group training:
 - One computer (with a CD-ROM drive)
 - LCD projector
 - Large projector screen or blank wall
 - Nonverbal Communication for Mine Emergencies CD-ROM (included)
 - Extra sets of Activity 1 flashcards (1 set per 2 trainees)
 - Extra sets of Activity 2 flashcards (1 set per 2 trainees)
 - Extra sets of Activity 3 flashcards (1 set per 3–6 trainees)
 - Copies of the Retention Test Answer Sheet (1 per trainee); this answer sheet is included in the Appendix of this Instructor's Guide.

Advance Preparation

- The trainer should be thoroughly familiar with all of the nonverbal hand signals presented in this training. This is necessary so that he/she can circulate throughout the room during training and assist miners as they practice the hand signals.

- Double check all equipment before the training. Make sure that the Nonverbal Signal Training Program PowerPoint presentation and the Nonverbal Signal Retention Assessment PowerPoint presentation are running and that all videos included in the PowerPoint presentations are operational.

Outline of Training Program and Supplies

1. Introduction/Preview of Training Session

- Supplies: none.
- Time Required: approximately 5 minutes.

2. Nonverbal Signal Training Program

- Equipment: computer, LCD projector, and screen or blank wall.
- Software: PowerPoint presentation of Nonverbal Signal Training Program on CD-ROM.
- Time required: approximately 10 minutes.

3. Activity 1: Flashcards Partner Activity (groups of 2 or 3)

- Supplies: one set of Activity 1 flashcards for each pair/group of trainees.
- Time required: approximately 10 minutes.

4. Activity 2: Phrases Partner Activity (groups of 2 or 3)

- Supplies: one set of Activity 2 flashcards for each pair/group of trainees.
- Time required: approximately 15 minutes.

5. Activity 3: Emergency Situation Small Group Activity (groups of 3–6)

- Supplies: one set of Activity 3 flashcards for each group.
- Time required: approximately 10 minutes.

6. Retention Test

- Equipment: computer, LCD projector, and screen or blank wall.
- Supplies: PowerPoint presentation of Nonverbal Signal Retention Assessment on CD-ROM and one answer sheet per trainee.
- Time required: approximately 5 minutes.

List of Nonverbal Hand Signals to be Taught

1. Yes/Good Idea (thumbs up)
2. No/Bad Idea (thumbs down)
3. You/It/Them/There (point at person(s) or thing(s))
4. I/Me (point at yourself)
5. We/Us (point finger up, move in circular motion)
6. Stop/Stay Here (arm straight out, angled toward floor, palm facing forward)
7. Go This Way (arm at side, extend outward from waist indicating direction, palm facing out)
8. Don't Know/Don't Understand (hold both hands out with palms up, shrug)
9. SCSR (put hand in front of face, palm facing you)
10. Refuge Chamber/Barricade (touch fingertips to make triangle in front of chest)
11. Gas Detector/Gas Readings (simulate holding gas detector up to the roof)
12. A Problem (palm facing forward, move hand to and away from top of head)
13. Follow Me/Come This Way (bend lower arm to bring hand up toward self; beckoning motion)
14. Slow Down (slowly lower hand, palm facing down)
15. Evacuate (move bent arms back and forth next to body; running motion)
16. Lifeline/Tether (arm at side with elbow bent 90 degrees to front, move hand as if grasping line)

Lesson Plan for Nonverbal Signal Training Program

Note: Text presented in *italics* can be read verbatim to the trainees.

Introduction/Preview of Training Session

- *When should you don your SCSR in an emergency such as a mine fire or explosion?*
 - Possible Answers:
 - At the first sign of smoke.
 - When the oxygen (O₂) level drops below 19.5% (the state of oxygen deficiency).
 - When carbon monoxide (CO) is detected.
- *How can CO (carbon monoxide) and oxygen deficiency affect you?*
 - Possible Answers:
 - CO can lead to: headache, dizziness, restlessness, paresthesia (tingling), dyspnea (breathing difficulty), sweating, malaise (vague feeling of discomfort), increased heart rate, high blood pressure, coma, asphyxia, and convulsions.
 - Too little oxygen (O₂) can cause you to lose consciousness with little or no warning. If oxygen levels become low enough, you can even die.
- *Once you have donned an SCSR, what are the only times you should remove the SCSR?*
 - Possible Answers:
 - When you exit the mine.
 - When you need to transfer to another SCSR to continue your escape.

- *During escape from a mine emergency, you may need to communicate with other miners. How would you communicate while wearing an SCSR?*
 - Possible Answers:
 - Use cap lamp signals.
 - Write notes to other miners using pen and paper, chalk, or writing in rock dust.
 - Use hand signals.

Nonverbal Signal Training Program

- *Because there are only three universal cap lamp signals, today we are going to complete a training program that can be used in an emergency when you have donned an SCSR. It consists of nonverbal signals. First, we are going to watch a presentation that teaches these signals.*
- Run the Nonverbal Signal Training Program PowerPoint. Demonstrate each signal as it is shown on the screen.
- Have trainees practice performing each signal as it is demonstrated during the PowerPoint presentation.

Activity 1: Flashcards Partner Activity

Information for the Trainers:

- This activity should be done in groups of two. Each group will receive a set of flashcards with the word(s) for a signal on one side and a description and picture of how to perform the signal on the other side of each card.
- Person 1 should show Person 2 the word side of the card and have Person 2 perform the nonverbal signal for the word(s).
- After Person 2 has performed all of the nonverbal communication signals, the partners should switch roles. Person 2 should show the word(s) on the card to Person 1 and have Person 1 perform the nonverbal signals for the word(s).
- Persons 1 and 2 should continue in this fashion until both have performed all of the nonverbal communication signals.
- Circulate around the room to make sure that each person is performing the nonverbal communication signals correctly.

Instructions for Trainees:

- *In groups of two, you will go through a set of flashcards.*
- *Person 1 should show Person 2 the words on the card (on the side of the card that does not have the signal illustration) and have Person 2 perform the nonverbal communication for these words. Person 1 should make sure that Person 2 performs it correctly.*
- *After Person 2 has performed all of the nonverbal communication signals, the partners should switch roles. Now Person 2 should show the words on the card to*

Person 1 and have Person 1 perform the nonverbal communication for these words.

- *When you are done, both persons should have performed all of the hand signals.*
- *If there are 3 trainees in a group, Person 1 should show the word on the card and have both Person 2 and Person 3 perform the nonverbal signal for the word at the same time. After all the signals have been performed, Person 2 and Person 3 can split the stack of flashcards into two stacks and take turns showing Person 1 the words on the cards.*

Activity 2: Phrases Partner Activity

Information for the Trainers:

- This activity should be done in groups of two. If this activity is following Activity 1, just keep the same partners/groups. Each group will receive a set of cards with a few sentences on each card that they need to communicate. The key words that need to be communicated are underlined.
- The trainer should give each group a set of cards and instruct the groups to divide their set of cards into equal stacks. Each person will take one stack of cards. They should be instructed not to let their partner(s) see what is on the card.
- The partners should take turns using the nonverbal signals to communicate the messages on each card. One person will communicate the message, and the other person(s) should guess (out loud) what was communicated.

Instructions for Trainees:

- *Use the nonverbal signals you learned during the training session to tell your partner(s) what is on each card. The key words that you should make sure to communicate are underlined.*
- *Do not let your partner(s) see your card.*
- *Have your partner(s) guess the message that you are using hand signals to communicate. Go over anything that your partner(s) was/were unable to understand.*
- *Switch back and forth with your partner(s) between communicating a message nonverbally and guessing the message your partner(s) communicates.*
- *Remember, the person performing the hand signals is not allowed to talk and can only use hand signals.*

Activity 3: Emergency Situation Small Group Activity

Information for the Trainers:

- This activity should be conducted in groups of three to six trainees.
- In a real mine emergency, scripts will not be provided, and miners will be required to figure out what and how they should communicate using the nonverbal signals. The purpose of this activity is to have trainees practice conveying information about an emergency using only hand signals and without being told exactly what words to communicate. The trainees will have to decide themselves how to handle the emergency and what signals to use to communicate with other miners during that emergency.
- Each group of trainees will be assigned a different mine emergency situation.
- Each trainee in each group will receive a card with information about the situation at the mine.
- The cards for each group are numbered 1 through 6. Give each trainee in the group one of these cards starting with card 1 through card 6. Be sure to pass the cards out to trainees in the group beginning with card 1. This will ensure that one trainee in the group is assigned to each of the following roles:
 - Informed Member: the miner who has the most information about the emergency situation.
 - Dissenting Member: the miner who may have a different opinion about what to do in the emergency situation than other members of the group.
 - Group Member(s): the rest of the miners who have little information about the emergency situation but help the group decide the best course of action.
- The trainees should try to communicate with each other about the emergency situation at the mine using the nonverbal signals that they have learned.

Instructions for Trainees:

- *In the previous two activities you were told what words or phrases we wanted you to communicate using nonverbal signals. However, in a real mine emergency scripts will not be provided and miners will be required to figure out what and how they should communicate using the nonverbal signals.*

- *This next activity involves all of you portraying a group of miners working underground when an emergency occurs. You will be communicating with your fellow miners about the emergency and the best plan of action. We would like you to try to make a plan and carry it out, but it is okay if your group is unable to do so. The important aspect of this activity is that you all have the opportunity to use the nonverbal signals in a situation where you have to determine what and how you can communicate to each other.*
- *You may want to use some of the phrases that were practiced during the partner activity.*
- *Here is the mine emergency situation:*
 - *There is an emergency in the mine.*
 - *Your group has met up at the section belt drive.*
 - *Each miner knows only what is on the card presented to him/her.*
 - *Miners in your group may have different information on their cards.*
 - *The situation you are presented with on your card may be contrary to what you would do in an actual mine emergency, but please follow the situation for this exercise.*
- *Remember, you are not able to talk and can only use hand signals.*

Activity Debriefing:

When the groups are done with the activity, have them debrief with each other. Have each person read the information on their card and then discuss what they thought each person was trying to say. This debriefing should only last about 5 minutes or until all the groups are finished.

Then, it may be a good idea to debrief the entire group of miners all together with a few discussion questions such as the following:

- *What was difficult about communicating without talking?*
- *Were you able to get your messages across?*
- *Did anyone come up with any of their own signals that might be useful for everyone?*

Retention Test

- Have all trainees return to their seats so that they can view the screen.
- Hand out a retention test Answer Sheet to each trainee. (Note: These sheets can be copied from the Appendix in this guide.)
- *We are now going to see how well you remember the signals. The nonverbal signals will be shown on the screen without their descriptions. Please write the meaning of each signal on your answer sheet beside the corresponding number of the hand signal slide video.*
- *If you need help, ask the instructor rather than your classmates.*
- Run the Nonverbal Signal Retention Assessment PowerPoint.
- Show the signals again if anyone did not see them or wants to see them again.
- Collect the Answer Sheets when trainees have completed the assessment.
- Trainees who are NOT able to correctly identify at least 14 of the 16 hand signals should be retrained.

Individual Training Option

This training is designed as a group training session; if at all possible, it should be conducted with a group of at least three trainees. However, if there is only one trainee who needs to complete this training, most of the training can be conducted with the participation of the instructor as a partner. The trainee can view the Nonverbal Signal Training Program PowerPoint presentation by himself/herself. Then, the trainer can test the trainee on both the individual signals and the phrases (Activities 1 and 2). For Activity 3, the trainer could choose to omit it or to give the trainee the “Informed Member” card (card 1) and take the “Dissenting Member” card (card 2) for himself/herself. Then the trainer can give the retention test by showing the Nonverbal Signal Retention Assessment PowerPoint presentation.

Appendix

Nonverbal Communication for Mine Emergencies

Signal Retention/Recall Assessment

ANSWER SHEET

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____
16. _____

Nonverbal Communication for Mine Emergencies

Signal Retention/Recall Assessment

****ANSWER KEY****

1. I/Me
2. Stop/Stay Here
3. Slow Down
4. Yes/Good Idea
5. SCSR
6. We/Us
7. Lifeline/Tether
8. Go this way
9. You/It/Them/There
10. Evacuate
11. No/Bad Idea
12. Follow Me/Come This Way
13. Refuge Chamber/Barricade
14. A Problem
15. Gas Detector/Gas Readings
16. Don't Know/Don't Understand



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