

Bob's Electrical Shock Exercise

Instructor's Copy

Behavioral Research Aspects of Safety and Health Group (BRASH)
Institute for Mining and Minerals Research (IMMR)
University of Kentucky, Lexington, Kentucky¹

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Introduction

This document contains most of the materials needed to use the exercise. The main part of the document is the instructor's copy. It tells how to use the exercise, presents the objectives, the master answer sheet, the scoring key, and discussion notes to be used following the exercise. The last part of this document is three appendices. Appendix A is the exercise problem booklet. This booklet can be duplicated locally. The booklets are reusable. One is needed for every person in the classroom. Appendix B is the answer sheet. Copies of this answer sheet must have the invisible ink answers that appear in Appendix C printed on them². Answer sheets are consumable. One is needed for each group of 3 to 5 persons who work the exercise.

Exercise Summary

Read this section first. It determines if the exercise is appropriate for your classes. If you choose to use the exercise, examine the table of contents and review the remainder of this document.

Type: Invisible ink

Length: Eight questions (15 to 20 minutes for administration)

Skills: First aid
Removing a victim from a live electrical circuit
Administering CPR

Location: Underground

Problems: Your friend, Bob Hall, leans against a roof bolter. The bolter lights go out. Bob convulses. The mine floor is wet. You want to help Bob, but you need to protect yourself too.

² You can do this yourself if you have the proper equipment, or you may obtain copies of preprinted answer sheets from MSHA, National Mine Health & Safety Academy, Dept. of Instructional Materials, 1301 Airport Road, Beaver, WV 25813-9426 phone 304-256-3257, fax 304-256-3368 or email to lord-mary@msha.gov.

How to Use This Exercise

1. Look at the performance objectives. Decide if the exercise is relevant for your mine training class.
2. Work through the exercise with the developing pen and score your responses.
3. Read the master answer sheet for the exercise. Look at all the answers.
4. Read the "Instructor's Discussion Notes" for the exercise.
5. Become thoroughly familiar with the problem so that you can present it to your class without reading it.
6. When you present the exercise to the class:
 - Give each person an exercise booklet, and each group of 3 to 5 persons an answer sheet, and a developing pen.
 - Demonstrate how to select and mark answers using the developing pen.
 - Go over the instructions for doing the exercise with the whole group.
 - Explain the problem making sure everyone understands the problem situation.
 - Have the class members work the exercise.
 - When the class members finish, have them figure their score using the instructions at the end of the exercise.
 - When everyone has finished, encourage class members to discuss the merits of each answer. Add your own ideas.

Performance Objectives for Bob's Electrical Shock

Objective number	Capability verb(s)	Description of the required performance and conditions under which it is to occur
1 FA/EE ³	Assess	The accident scene and immediate needs/risks for first aider and victim
2 FA/EE	Choose Judge	From among alternative actions effective means of gaining access to the victim without undue risk to the first aider
3 FA	Recall Conduct	A primary survey to check on airway and breathing
4 FA	Recall Apply	Methods of restoring breathing by opening and maintaining the airway and by administering artificial ventilation if needed
5 FA	Recall Apply	Methods for dealing with gastric distention during rescue breathing
6 FA	Recall Apply	Methods for dealing with a conscious victim with an obstructed airway

³ Skill and knowledge domain abbreviations:
FA = first aid
EE = emergency evacuation and escape

Master Answer Sheet for Bob's Electrical Shock Exercise

Use this answer sheet to mark your selections. Rub the developing pen gently and smoothly between the brackets. Don't scrub the pen or the message may blur. Be sure to color in the entire message once you have made a selection. Otherwise you may not get the information you need. The last part of the message will tell you what to do next.

Question A (Choose only ONE unless you are told to "Try again!")

1. [This takes a long time. Bob needs immediate help. Try again!]
2. [Bob needs immediate help. Try again!]
3. [Correct! This is done and Bob stops convulsing. Do next question.]
4. [When you touch Bob you receive a strong electrical shock. Try again!]
5. [When you touch Bob you receive a strong electrical shock. Try again!]

Question B (Choose only ONE unless you are told to "Try again!")

6. [Color pale. This wastes time. Try again!]
7. [Correct! Breathing absent. Do next question.]
8. [No bracelet is present. This wastes time. Try again!]
9. [Both pupils are dilated. This wastes time. Try again!]
10. [Airway appears normal. This wastes time. Try again!]

Question C (Choose only ONE unless you are told to "Try again!")

11. [His heart may be beating. You are not trained in CPR. Try again!]
12. [Bob needs your immediate help. Try again!]
13. [Correct! Do next question.]
14. [This wastes time. Try again!]

Question D (Choose only ONE unless you are told to "Try again!")

- 15. [This should only be done if you suspect foreign material is present. Try again!]
- 16. [Correct! This is all that was needed. Now his chest rises when you blow into
[his mouth. Do next question.]
- 17. [This should only be done if you suspect foreign material is stuck in his
[windpipe. Try again!]
- 18. [This wastes time. Try again!]
- 19. [This wastes time. Try again!]

Question E (Select as MANY as you think are correct.)

- 20. [This may cause injury.]
- 21. [Correct!]
- 22. [This may cause him to vomit.]
- 23. [This wastes time.]
- 24. [Correct! This may improve the airway.]

Question F (Choose only ONE unless you are told to "Try again!")

- 25. [This may cause him more worry. Try again!]
- 26. [Correct! You should be honest, but also reassuring. Do next question.]
- 27. [This may cause him more worry. Try again!]
- 28. [This would upset him, and it is probably not true. Try again!]

Question G (Choose only ONE unless you are told to "Try again!")

- 29. [This could harm him. Try again!]
- 30. [Bob may need help right away! Try again!]
- 31. [Correct! He needs medical attention and he might need CPR should his
[heart stop. Do next question!]
- 32. [This could harm him. Try again!]

Question H (Choose only ONE unless you are told to "Try again!")

- 33. [This may harm her. Try again!]
- 34. [This should not be done at this time. Try again!]
- 35. [Correct! You need to dislodge the object in her windpipe. **End of Problem.**]
- 36. [This is dangerous she may die. Try again!]
- 37. [This is not the most effective thing to do. Try again!]

Finding your score

Number of "Correct" answers you colored in (1) _____

28 minus number of incorrect answers you colored in (2) _____

Add blanks one and two to get your total score (3) _____

Highest possible score = 37

Lowest possible score = 0

Instructor's Discussion Notes for Bob's Electrical Shock Exercise

Use the information presented here and on the master answer sheet, your own ideas and experience, and those of the miners in your class, to discuss the exercise after it is completed. Group discussion can strengthen knowledge and skills, correct errors, and relate the exercise content to the experiences of the miners. After they have worked the exercise, miners enjoy discussing the problem. They also frequently think of better ways to respond to a problem than those listed among the answers. The purpose of the exercise is to help miners think about and remember basic knowledge and skills they may someday need to deal with a mine emergency. The discussion following the exercise can contribute to this goal and tailor the exercise content to the needs of the group you are training.

It is helpful to show overhead transparencies of the exercise questions during the discussion while the miners look at their problem booklets. This allows you to lead the group through the exercise and to disclose and discuss all the answers to each question. Most of the information about why particular answers are correct or incorrect is given on the master answer sheet.

The following notes provide additional information for you to discuss with your class. Read through and think about the notes before the class. Don't read the notes to the class members. This would be boring and ineffective. Rather, incorporate the ideas you find here with your own ideas and make these points at the appropriate place in the discussion of the exercise.

Question A - The correct answer is 3: "Move Bob away from the boom..." Bob's convulsion coupled with the lights going out on the bolter are clues that he is being electrocuted. Knocking power at the power box would not be a good tactic because of its distance from the scene.

Question B - The correct answer is 7. When encountering an unconscious victim you should: 1) check for responsiveness, 2) shout for help, 3) open the airway, and 4) check for breathing. If the victim is in need of resuscitation any other activities will only waste time.

Question C - The correct response is 13. Finding that the victim is not breathing you should then give two breaths mouth-to-mouth (The American Heart Association CPR Standards were changed in 1986 and now call for two initial breaths.)

Question D - The correct response is 16. If difficulty in ventilating the victim is encountered during rescue breathing you should first reposition the head because the most common cause of obstruction is the back of the tongue. As of June 1986 back blows are no longer recommended for adults with airway obstruction.

Question E - The correct answers are 21 and 24. Bob's abdomen is probably becoming distended with air which could cause vomiting and decrease the volume of air he is receiving. In this situation the best responses are to reposition the airway, check that the chest is rising and falling during ventilations, and avoid using excessive ventilation

pressure. Applying pressure to the abdomen with your hand will almost certainly cause vomiting and this material can then enter the lungs.

If ventilations are inadequate after the above maneuvers, the victim may be rolled on his side and abdominal pressure applied as a last resort. If the victim vomits at this time his mouth should be wiped out before ventilations are resumed.

Question F - The correct answer is 26. Bob is probably suffering from the memory loss which is often associated with strong electrical shocks. A good general rule for dealing with such questions from the victims of accidents is to be as honest as possible without frightening them. Victims can sense when you are telling the truth and in order for you to reassure them they need to trust you. Not knowing the truth may allow the victim to fantasize worse possibilities.

Question G - The correct answer is 31. If help cannot be summoned any other way you should leave the victim to obtain it as long as adequate respirations are present. Since Bob may be suffering the aftereffects of insufficient oxygen he should not be encouraged to walk.

Question H - The correct answer is 35. This hypothetical victim is showing the signs of an airway obstruction. She should be treated with abdominal thrusts until the object is displaced, or until she becomes unconscious. If she were coughing strongly you should not interfere with her attempts to expel the object.

Back blows are no longer recommended for the adult victim with an airway obstruction.

References

American Heart Association. (1986). Standards and guidelines for cardiopulmonary resuscitation (CPR) and emergency cardiac care (ECC). Journal of the American Medical Association, 25L (21), 2914-2954.

Investigation report, underground coal mine, fatal electrocution accident. (1984, November). Kentucky Department of Mines and Minerals Bulletin, pp. 6-7.

Scoring Key for Bob's Electrical Shock Exercise

The correct answers are marked with an asterisk.⁴

Question	Answer Number				
A	1	2	3*	4	5
B	6	7*	8	9	10
C	11	12	13*	14	
D	15	16*	17	18	19
E	20	21*	22	23	24*
F	25	26*	27	28	
G	29	30	31*	32	
H	33	34	35*	36	37

⁴ This page is printed in large type so that it may be copied and used as an overhead transparency.

Appendix A: Problem Booklet

Duplicate this copy of the problem booklet for use in your classes. **Booklets should be printed on only one side of the paper.** Each person in your class should have a problem booklet while they are working the exercise. The problem booklets are reusable.

You may obtain a copy of the problem booklet from MSHA, National Mine Health & Safety Academy, Dept. of Instructional Materials, 1301 Airport Road, Beaver, WV 25813-9426 phone 304-256-3257, fax 304-256-3368 or email to lord-mary@msha.gov.

Bob's Electrical Shock

Problem Booklet

Instructions

Read the problem described on the next page. Then answer the 8 questions. Do them one at a time. Don't jump ahead, but you may look back to earlier questions, earlier figures, and your answers. Some questions tell you to select as many answers as you think are correct. Other questions ask you to select only one answer unless you are told to "Try Again!" Follow the directions for each question.

After you have selected your choice to a question, look up the number for that choice on the answer sheet. Rub the developing pen between the brackets for that choice. A hidden message will appear that tells you if the choice is correct and provides you with additional information. When you finish you will learn how to score your performance.

Bob's Electrical Shock Exercise

Background

You and Bob are at the face about 400 feet from the power box.

The other miners are eating lunch at the dinner hole, next to the power box.

You are alone.

You are not trained in CPR.

You are trained to give artificial respiration.

Problem

You are working as a general inside laborer in 53-inch coal. Your buddy, Bob Hall, is sitting on the floor of the mine, leaning against the boom of a roof bolter. As you approach you see him begin jerking convulsively and the lights of the bolter go out.

After studying Figure 1 turn the page and answer the first question.

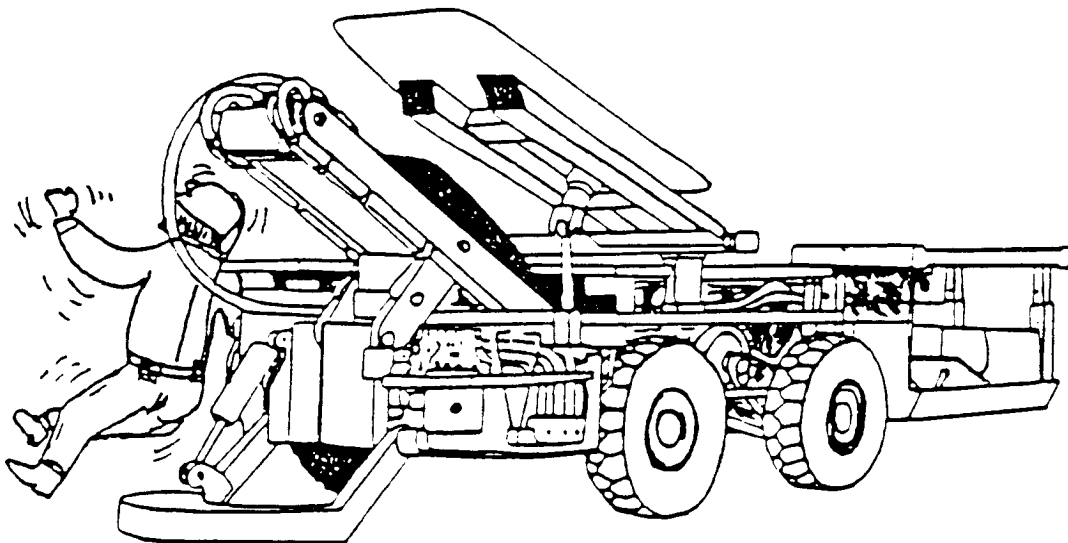


Figure 1: Bob Hall begins jerking convulsively as bolter lights go out

Question A

In this situation the first thing you should do is to: (Choose only ONE unless you are told to "Try again!")

1. Knock the power at the power box.
2. Find the nearest EMT.
3. Move Bob away from the boom using a dry lamp cord (or other non-conductor).
4. Put a folded handkerchief between Bob's teeth.
5. Take Bob's pulse at the wrist.

Question B

Bob is now lying on the mine floor away from the boom. He doesn't respond to voice or shaking. You shout for help, position Bob on his back, clear his mouth, and open his airway. You should now check for the presence of: (Choose only ONE unless you are told to "Try again!")

6. Abnormal skin color.
7. Breathing.
8. A medical alert bracelet.
9. Pupil dilation.
10. "Swallowed" tongue.

Question C

After checking the victim and finding no breathing the first thing to do would be:
(Choose only ONE unless you are told to "Try again!")

11. Begin cardiac compressions.
12. Find the nearest EMT.
13. Give two breaths mouth-to-mouth.
14. Slap Bob's face several times.

Question D

You are attempting to give Bob a breath using the mouth-to-mouth method but even though you generate high pressure his chest does not rise. The first thing you should do now is: (Choose only ONE unless you are told to "Try again!")

15. Clear Bob's mouth using a finger sweep maneuver.
16. Reposition Bob's head by lifting his chin and tilting his forehead back.
17. Perform 6 to 10 abdominal thrusts.
18. Turn Bob on his side and hit him on the back 4 times.
19. Gently compress his upper abdomen.

Question E

After repositioning Bob's head you are able to give him two deep breaths. You check his pulse and find that it is present. You continue rescue breathing but you notice that his abdomen is becoming distended. You should now: (Select as MANY as you think are correct.)

- 20. Apply continuous pressure to his abdomen with one hand while continuing rescue breathing.
- 21. Decrease the force of your breaths slightly.
- 22. Gently compress his upper abdomen, then continue rescue breathing.
- 23. Perform a "tongue-jaw lift" and finger-sweep his mouth.
- 24. Reposition his head and elevate his chin.

When you have made your selection(s) do the next question.

Question F

You and Bob are still alone. After a few minutes of mouth-to-mouth, Bob starts breathing on his own, and he comes to. He says, "What happened to me?" What would you tell him? (Choose only ONE unless you are told to "Try again!")

- 25. Tell him you don't know, so he won't worry.
- 26. Tell him you think he got a shock that stopped his breathing, but that he is OK now.
- 27. Tell him that he passed out but he is OK now.
- 28. Tell him his heart stopped and he is lucky to be alive.

Question G

You and Bob are still alone. No one has responded to your shouts for help. Bob is weak and confused, but talking to you. He says his chest feels funny and he is cold. You take his pulse and find it to be fast, weak, and irregular. You know the other miners, including an EMT, are at the dinner hole, three entries over and four crosscuts outby. What would you do now? (Choose only ONE unless you are told to "Try again!")

- 29. Get Bob up and walk him down to the dinner hole.
- 30. Stay with him and wait until help comes.
- 31. Help make him comfortable, cover him with your jacket, and tell him to rest while you go for help.
- 32. Ask him to get up slowly. Tell him to take deep breaths, and to take a few steps.

Question H

It is a few days later. Bob was taken to the hospital. He recovered in two days and returned to work. Your prompt action may have saved his life.

At the next weekly safety meeting your foreman compliments you on your first aid. Later in the meeting he asks the following question. "Suppose that while you were eating lunch a miner stands up grasping her throat. You hear a high pitched crowing sound when she attempts to take a breath and she is not coughing. What should you do now? (Choose only ONE unless you are told to "Try again!")

- 33. Begin mouth-to-mouth rescue breathing.
- 34. Clear her throat with a finger sweep.
- 35. Do abdominal thrusts until the obstruction is expelled.
- 36. Do nothing until she begins to lose consciousness.
- 37. Strike her between the shoulder blades with the heel of your hand.

Scoring your performance

- 1. Count the total number of responses you colored in that were marked "Correct." Write this number in the first blank on the answer sheet.
- 2. Count the total number of incorrect responses you colored in. Subtract this number from 28. Write the difference in the second blank on the answer sheet.
- 3. Add the numbers on the first and second blanks. This is your score.

The best possible score of 37 results from selecting all the correct answers and no wrong answers. The worst possible score of zero results from selecting all the wrong answers and no correct answers.

Appendix B: Answer Sheet Blanks

These are the answer sheet blanks. Copies of these blank answer sheets may be duplicated in the normal fashion. However, the answers that are found within the brackets must be printed on these blank answer sheets in invisible ink. These answers are found in Appendix C. If you have the capability to print invisible ink, make copies of the blank answer sheets. Make a master of the answers that appear in Appendix C. Then print the invisible ink on the blank answer sheets, being careful to make sure all pages print and that the appropriate answers line up with the appropriate blanks. The Master Answer Sheet shows all the answers in their proper places.

Most companies and trainers prefer to obtain copies of the preprinted answer sheets from MSHA, National Mine Health & Safety Academy, Dept. of Instructional Materials, 1301 Airport Road, Beaver, WV 25813-9426 phone 304-256-3257, fax 304-256-3368 or email to lord-mary@msha.gov.

The exercise is designed to be used in small groups. You will need one answer sheet for each group of 3 to 5 persons in your class. The answer sheets are consumable. You will need a new set for each class.

A developing pen is also needed by each person who marks an answer sheet.

Answer Sheet for Bob's Electrical Shock Exercise

Use this answer sheet to mark your selections. Rub the developing pen gently and smoothly between the brackets. Don't scrub the pen or the message may blur. Be sure to color in the entire message once you have made a selection. Otherwise you may not get the information you need. The last part of the message will tell you what to do next.

Question A (Choose only ONE unless you are told to "Try again!")

1. []
2. []
3. []
4. []
5. []

Question B (Choose only ONE unless you are told to "Try again!")

6. []
7. []
8. []
9. []
10. []

Question C (Choose only ONE unless you are told to "Try again!")

11. []
12. []
13. []
14. []

Question D (Choose only ONE unless you are told to "Try again!")

- 15. []
- 16. []
[]
- 17. []
[]
- 18. []
- 19. []

Question E (Select as MANY as you think are correct.)

- 20. []
- 21. []
- 22. []
- 23. []
- 24. []

Question F (Choose only ONE unless you are told to "Try again!")

- 25. []
- 26. []
- 27. []
- 28. []

Question G (Choose only ONE unless you are told to "Try again!")

- 29. []
- 30. []
- 31. []
[]
- 32. []

Question H (Choose only ONE unless you are told to "Try again!")

- 33. []
- 34. []
- 35. []
- 36. []
- 37. []

Finding your score

Number of "Correct" answers you colored in (1) _____

28 minus number of incorrect answers you colored in (2) _____

Add blanks one and two to get your total score (3) _____

Highest possible score = 37

Lowest possible score = 0

Appendix C: Invisible ink Answers

These pages contain the answers that must be printed in the blanks of the answer sheet in Appendix B. These answers are spaced and sequenced correctly so that they exactly match up with the appropriate blanks on the answer sheet blank.

Once the answers have been printed in the answer sheet blanks, the developing pen reveals the formerly invisible printed message.

You may obtain preprinted answer sheets or you may prepare your own copies. To learn more about these options, and to determine how many answer sheets and developing pens you will need, see the introductory section of the Instructor's Copy.

This takes a long time. Bob needs immediate help. Try again!

Bob needs immediate help. Try again!

Correct! This is done and Bob stops convulsing. Do next question.

When you touch Bob you receive a strong electrical shock. Try again!

When you touch Bob you receive a strong electrical shock. Try again!

Color pale. This wastes time. Try again!

Correct! Breathing absent. Do next question.

No bracelet is present. This wastes time. Try again!

Both pupils are dilated. This wastes time. Try again!

Airway appears normal. This wastes time. Try again!

His heart may be beating. You are not trained in CPR. Try again!

Bob needs your immediate help. Try again!

Correct! Do next question.

This wastes time. Try again!

This should only be done if you suspect foreign material is present. Try again!

Correct! This is all that was needed. Now his chest rises when you blow into his mouth. Do next question.

This should only be done if you suspect foreign material is stuck in his windpipe. Try again!

This wastes time. Try again!

This wastes time. Try again!

This may cause injury.

Correct!

This may cause him to vomit.

This wastes time.

Correct! This may improve the airway.

This may cause him more worry. Try again!

Correct! You should be honest, but also reassuring. Do next question.

This may cause him more worry. Try again!

This would upset him, and it is probably not true. Try again!

This could harm him. Try again!

Bob may need help right away! Try again!

Correct! He needs medical attention and he might need CPR should his heart stop. Do next question!

This could harm him. Try again!

This may harm her. Try again!

This should not be done at this time. Try again!

Correct! You need to dislodge the object in her windpipe. **End of Problem.**

This is dangerous she may die. Try again!

This is not the most effective thing to do. Try again!