

Cleo's Longwall Accident

Instructor's Copy

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

¹ This exercise was developed and field tested under U. S. Bureau of Mines research Contract No. H0348040. Information about the design and characteristics of the exercise and the field test results are available in the project technical reports filed with the Bureau of Mines Research Center in Pittsburgh, PA. The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing the official policies or recommendations of the Interior Department's Bureau of Mines or the U. S. Government.

Contents

Introduction	3
Exercise summary	3
How to use this exercise	4
Performance objectives	5
Master answer sheet	6
Instructors discussion notes	11
References	14
Scoring key	15
Appendices	
Appendix A: Problem booklet (duplicate this copy for use in class)	
Appendix B: Answer sheet blank (print the invisible ink answers on this)	
Appendix C: Invisible ink answers (print these on the answer sheet)	

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 them.² Answer sheets are consumable. One is needed for each small group of 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: Eleven questions (25 minutes for administration plus 30 for discussion)

Skills: First aid
Treating a crushed hand injury

Location: Underground coal mine

Problem: You are pulling timbers off the chain conveyor of a longwall section and handing them to Cleo. Cleo is putting the timbers on top of the lowered shield to give the shield contact with the roof in a faulted area. Cleo's hand is crushed by a roof fall. You and one other miner are the only ones available to help him. As you help him, he passes out. Now you must decide what to do.

² You can do this yourself if you have the proper equipment, or you may obtain copies of preprinted answer sheets from NIOSH, Pittsburgh Research Laboratory, Pittsburgh, PA phone 412-386-5901, fax 412-386-5902 or email to minetraining@cdc.gov.

How To Use This Exercise

1. Look at the performance objectives. Decide if the exercise is relevant for your annual refresher class.
2. Work through the exercise with the special 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. Put the maps or illustrations on an overhead projector so you can use these to help explain the problem.
6. When you present the exercise to the class:
 - Give each person an exercise booklet, 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 up their score using the instructions at the end of the exercise.
 - When everyone has finished, discuss the exercise. Let class members discuss the merits of each answer. Add your own ideas.

Performance Objectives for Cleo's Longwall Accident

Objective number	Capability verb(s)	Description of required performance and conditions under which it is to occur
1. MH/GC ³	Assess Judge Select	Safe and effective ways of filling a void above a longwall shield
2. GC	Recognize Select	The proper course of action to prevent a fall of roof and injury to co-worker
3. GC/MH	Recognize	Hazards of work being performed, including tripping and stumbling, fall of roof rock, and hazards of handling materials
4. FA	Assess	Probable nature and extent of injury to an extremity due to fall of roof
5. FA	Identify Treat	Multiple fractures of the hand and palm laceration
6. FA	Select	Proper method of immobilizing an injured hand of a shock victim and of transporting him
7. FA	Recognize	Symptoms of shock and factors contributing to the victim's state of shock

³ Skill and knowledge domain abbreviations:

FA = first aid

GC = ground control

MH = materials handling

Master Answer Sheet for Cleo's Longwall Accident

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 make a selection. Otherwise you may not get the information you need.

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

1. [Cleo is tired and unable to handle the crib blocks alone. You hear him
[grunting as he strains to position the blocks above the shield.]]
2. [Correct! Handling heavy materials, such as large blocks, in limited
[space, is more than a two-man job.]]
3. [Correct! Four foot, 6" x 6" blocks can weigh as much as 40 pounds. They
[are difficult to handle without help, especially when tired.]]
4. [The top is known to be bad. A roof fall caused the cavity in the first place.
[This places Cleo in great danger.]]
5. [You are under unsupported roof and are in great danger!]]

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

6. [You are now both exposed to a roof fall hazard. Try again!]]
7. [Cleo says "The crib's only half way up." He keeps working. Try again!]]
8. [Correct! But Cleo does not come out. Do next question.]]
9. [Cleo is in danger. Try again!]]

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

10. [The shield can support a load of hundreds of tons, tens of times more than
[the largest load possible, even if a massive roof failure occurred.]]
11. [Correct! Although everyone nearby is familiar with the hydraulic controls
[and the activity underway, there is a chance that someone will accidentally
[activate the wrong control.]]
12. [Correct! The roof is already known to be weak in this area.]]
[]]
13. [Correct! He should avoid "pinch points."]]

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

- 14. [Correct! Cleo says, "No! Damn it!" Do next question.]
- 15. [This is not the first thing to do. Other injuries may be present. Try again!]
- 16. [Since Cleo is talking, his breathing must be OK Try again!]
- 17. [You should not move an injury victim until you know what is wrong with him.]
[Anyway, you're 100 feet away from the mule train and the first aid kit. Try]
[again!]

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

- 18. [This could cause further injury. You should already suspect multiple fractures.]
- 19. [Correct! Cleo points to his palm and first three fingers.]
- 20. [Correct! The first, second and third fingers are twisted. The wrist appears]
[normal.]
- 21. [Bruising takes several hours to show.]
- 22. [Correct! The wrist appears normal, but the palm and first three fingers are]
[swollen and red.]

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

- 23. [Correct! His hand should be placed in a relaxed position before bandaging.]
- 24. [Correct! His fingertips should be left visible so that circulation may be]
[checked.]
- 25. [This should not be done. His hand should be placed in a relaxed position.]
- 26. [The wrist (radial) pulse won't tell you if the circulation to the hand has been]
[cut off. Circulation should be checked by nail bed compression before and]
[after bandaging.]
- 27. [Correct! Elevating his hand will help minimize swelling.]
- 28. [Correct! Although blood loss may be minimal, he could still go into shock.]
- 29. [Correct! It is important to alert the surface personnel so they can clear the]
[track all the way out and call an ambulance.]

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

30. [When you do, he gets angry and says he was just kidding around. Try again!]
31. [When you do this, Cleo doesn't wake up. You are endangering him. Try again!]
32. [This wastes time and is not called for. You need to be doing something else.]
[Try again!]
33. [Correct! You find, his airway is open. There is no sign of vomit. His pulse is]
[fast and weak. Do next question.]

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

34. [Cleo needs your help now.]
35. [It would be very difficult to carry Cleo 400 feet in this way.]
36. [Correct! A stretcher will make transport much easier.]
37. [Correct! The blanket will help keep him warm and also help you move him.]
38. [Correct! This will help maintain his circulation.]
39. [Correct! All of you may be needed to care for and transport Cleo to the]
[surface.]

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

40. [This could harm him.]
41. [Correct! His breathing is fast but strong and regular. His pulse is fast and weak.]
42. [This could harm him.]
43. [Correct! It is important to maintain his airway since he is unconscious.]
44. [Correct! Your voice and words can comfort him even if he cannot respond.]
[When you pinch, he responds slightly.]

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

45. [Correct! You say you found none. The two EMTs continue their own primary]
[and secondary survey.]
46. [Correct! You say about 30 minutes.]
47. [This is inappropriate and it might be heard by Cleo and add to his problems.]
48. [Correct! You explain a piece of rock fell on his hand when he reached over]
[a shield.]
49. [This is irrelevant and it might be heard by Cleo and add to his problems.]
50. [You say you don't know. The EMTs should know which is the nearest and]
[best facility.]
51. [Correct! You explain how you applied the dressing and bandages. After]
[inspecting the bandage and checking Cleo's finger circulation by nail bed]
[compression, the EMTs leave the bandage in place.]
- 52 [Correct! You say no, but that the shearer helper is upset because his joke]
[made Cleo worse.]

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

53. [Correct! Pain and mutilation can easily induce a state of shock.]
54. [There was very little loss of body fluids.]
55. [It was important to conduct a primary and secondary survey and bandage]
[Cleo's hand before transporting him.]
56. [These are symptoms of shock, not the cause.]
57. [Correct! Such remarks made in jest may be taken seriously by the victim.]
58. [Correct! Although Cleo did not loose much blood, his fainting indicated a]
[pooling of blood in his abdomen and legs. This is why laying him down, and]
[raising his feet helped supply his heart and brain with blood.]
59. [These are symptoms of his shock, not the cause.]

Finding your score

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

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

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

Highest possible score = 59

Lowest possible score = 0

Instructor's Discussion Notes for Cleo's Longwall Accident

Use the information presented in the problem book, 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 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 ground control and/or a materials handling hazard. The discussion following the exercise can contribute to this goal and tailor the exercise content to the needs of the training group.

It is helpful to show overhead transparencies of the exercise questions during the discussion. 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.

Question A - The correct answers are 2 and 3. Many accidents occur because miners disregard safe work practices in an effort to quickly complete a task. This is particularly true for distasteful tasks or those which are classified as "dead work." Large crib blocks are particularly difficult to handle in confined areas and in awkward positions. Although answer (1) minimizes the walking, tripping, and stumbling hazard for Cleo, having Cleo install the blocks alone invites both a materials handling accident (pinch point), back strain, muscle pull, and a roof fall accident (placing himself under unsupported roof). While answers (4) and (5) could make the handling of blocks much easier, the potential for a roof fall injury is increased. It is vital that you stay under supported roof at all times.

Question B - The correct answer is 8. Exposure to a roof fall hazard is minimized by remaining under supported roof at all times. Even though Cleo might not appreciate the tone of voice used to get his attention, there still should be a sense of urgency in getting Cleo back into a safe working position. Miners should be reminded that when helping a coworker complete a task which is underway, the task must still be done safely. By selecting response 6, the task might be done more easily and more quickly, but now two people are exposed instead of one. Incompletely filling the void (7) would not give the shield contact with the roof. The crib prevents enlargement of the roof cavity and ensures a normal working condition for the supports. Waiting while Cleo recovers the wedged block before going to help him (9) lengthens his exposure to unsupported roof. Are there better ways to fill the cavity than with cribs?

Question C - Responses 11, 12, and 13 are correct. Of note here is the increased severity of a potential roof fall accident compared to a materials handling accident, although both types are present. Shields typically have a yield capacity of between 115 and 600 tons. A frame-type powered support can have a yield capacity of up to 1050 tons. Shield failure is

highly unlikely (10). All section workers are usually familiar with operations and controls (12). However, there is still the possibility of someone accidentally activating a control.

Question D - The correct answer is 14. If the accident scene is safe and the victim passes the primary survey checks (airway, breathing, and circulation), the first-aider should then check for injuries other than those which are apparent. This is done both to prevent further harm and to prioritize first aid treatments.

Question E - The correct answers are 19, 20, and 22. Typical signs of a fracture are pain, deformity, swelling, redness, and loss of use of the involved area. This type of crushing accident (19), could be worsened by attempting to move the wrist. Since multiple fractures are suspected, the hand should be immobilized as soon as possible.

Question F - The correct answers are 23, 24, 27, 28, and 29. The procedure for bandaging a crushed hand is: 1) check circulation by nail bed compression; 2) place dressings between each finger and a gauze roll in the palm; 3) bandage the hand with roller gauze leaving the finger tips exposed; 4) recheck circulation; and 5) elevate the hand to reduce swelling. Shock should always be watched for and guarded against after such traumatic injuries, especially since you already know that Cleo is squeamish about the sight of blood.

Question G - The correct answer is 33. Cleo has probably fainted due to the pain and the emotional stress of his injury. This has caused a decrease in his blood pressure and the circulation to his brain has been temporarily impaired. The best treatment for this condition is to lay the victim down, elevate his feet and check breathing and pulse. The pulse check will provide evidence of the severity of shock.

Question H - The correct answers are 36, 37, 38, and 39. A stretcher should be obtained to facilitate Cleo's transport. Since Cleo has signs of shock he should be wrapped in a blanket and his legs elevated upon arrival at the mantrip. Since significant complications could develop during transport, all three miners should go with Cleo to the surface. One is needed to watch Cleo, one to operate the mantrip, and one to throw switches.

Question I - The correct answers are 41, 43, and 44. The unconscious shock victim should remain flat on his back during transport with his legs elevated, if possible. The airway should be maintained by using the head tilt, chin lift method and breathing, pulse, and level of consciousness should be monitored frequently. The victim is covered with a blanket to prevent excessive heat loss to the environment. Since the individual's level of awareness is unknown, he or she should receive the same kind of emotional support as the conscious victim.

Question J - The correct answers are 45, 46, 48, 51, and 52. The information which the EMT's should obtain includes: 1) the number of injured persons, 2) the patients' name, 3) how the injury took place, 4) the injuries found, 5) the treatments given, and, 6) how long Cleo has been unconscious. In addition, the EMT's should ask whether the victim has a known illness and if he or she is taking medication.

Question K - The correct answers are 53, 57, and 58. Bergeron defines shock as "the failure of the circulatory system to provide enough blood flow to all parts of the body." This

failure may be due to inadequacies of one or a combination of the three basic components of the system: the pump (heart), the blood volume, or blood vessel tone (degree of constriction). The last of these appears to be central in the present case. Pain may cause vasodilation by inhibiting centers in the brainstem which are responsible for blood vessel tone. Strong emotions due to the sight of blood, for example, may cause direct vasodilation and slowing of the heart which can result in fainting. When the blood vessels in the abdomen dilate fully the volume of the circulatory system increase so much there is too little blood available for the heart to pump to the brain and rest of the body.

References

- American Academy of Orthopaedic Surgeons. (1981). Emergency care and transportation of the sick and injured (3rd ed.). Chicago, IL: Author.
- Bailey, M. (1982). Emergency! First aid for fractures. Nursing, 12(11), 72-81.
- Bergeron, J. D. (1982). First responder. Bowie, MD: Robert J. Brady Company.
- Dalzel, R. S. and Curth, E. A. (1984). "Remedial and strata replacement techniques on longwall faces: A state-of-the-art report." A. B. Szwiliński (Ed.). Proceedings of the 2nd International Conference on Stability in Underground Mining. Lexington, KY: University of Kentucky.
- Gilbert, G. G. (1981). Teaching first aid and emergency care. Dubuque, IA: Kendall/Hunt.
- Mine Safety and Health Administration. (1980). First aid book. Washington, DC: U.S. Government Printing Office.
- Ooten, N. & Turner, H. (1977). Report of investigation (underground coal mine) nonfatal roof fall accident. Mine ID No. 15-02107. Pikeville, KY: MESA, Coal Mine Health and Safety District 6.
- Peele, R. (1941). Mining Engineers Handbook (pp. 32-43).. New York: Wiley & Sons
- Peng, S. S. (1978). Coal mine ground control (p. 239). New York: Wiley & Sons.
- Peng, S. S. and Chiang, H. S. (1984). Longwall Mining (pp. 6 and 280-281). New York: Wiley & Sons.
- Philips, C. (1986). Basic life support skills manual (2nd ed.). Englewood Cliffs, NJ: Brady Co.

Scoring Key for Cleo's Longwall Accident

The correct answers are marked with an asterisk.⁴

Question	Answer Number								
A	1	2*	3*	4	5				
B	6	7	8*	9					
C	10	11*	12*	13*					
D	14*	15	16	17					
E	18	19*	20*	21	22*				
F	23*	24*	25	26	27*	28*	29*		
G	30	31	32	33*					
H	34	35	36*	37*	38*	39*			
I	40	41*	42	43*	44*				
J	45*	46*	47	48*	49	50	51*	52*	
K	53*	54	55	56	57*	58*	59		

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. To save effort and money, ask the trainees to avoid marking in the booklets and collect all the booklets after the class.

You may obtain a copy of the problem booklet from NIOSH, Pittsburgh Research Laboratory, Pittsburgh, PA phone 412-386-5901, fax 412-386-5902 or email to minetraining@cdc.gov.

Cleo's Longwall Accident

Problem Booklet

Instructions

Read the problem situation described on the next page. Study the diagram until you understand the location of the miners and equipment in the problem. Next, answer each of the 11 questions. Do them one at a time. Don't jump ahead, but you may look back to earlier questions and answers. Some questions ask you to select all of the answers that 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 a choice to a question, look up its number on the answer sheet. Select your answer(s) to each question by rubbing the developing pen between the brackets on the answer sheet. A hidden message will appear and tell you if you are right. When you have finished, you will learn how to score your performance.

Background

You are on a longwall section with a 70 inch seam.

Operations have been complicated by a roof fall above the #1 roadway shield in the head entry.

You are a jacksetter.

You have been trained in basic first aid and you are now taking an EMT class.

Cleo is known to be squeamish about the sight of blood.

Problem

You are helping to fill a cavity with crib blocks above a gob shield. You are carrying the blocks about 100 feet from the scoop near the longwall mule train and are stacking them in front of your partner, Cleo C. Pike. The cribs will prevent enlargement of the roof cavity and will give the shield contact with the roof until the face can be advanced. As you return to the face with a crib block, you see Cleo starting to place the blocks onto the lowered shield. He has his back to you. Cleo is complaining of being tired and is having difficulty positioning the blocks by himself. After studying Figure 1, turn to page 4 and answer the first question.

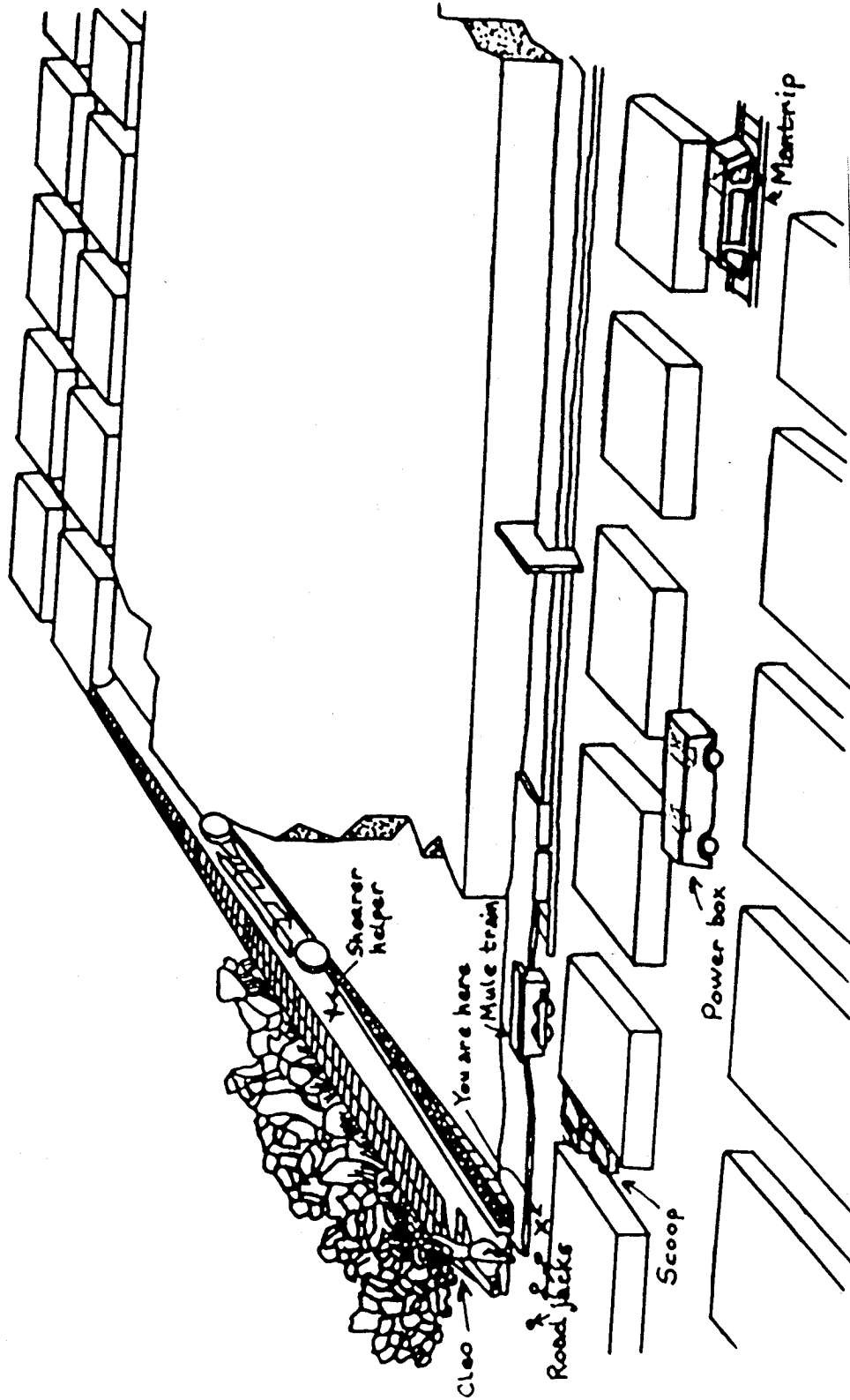


Figure 1: Position of miners in problem

Question A

You are anxious to finish stacking crib blocks on longwall shield #1 so that it can be reset and coal cutting can resume. What should you do to help complete the job safely and efficiently? (Select as MANY as you think are correct.)

1. Keep carrying blocks from the scoop to the work area. Stack them in front of Cleo within easy reach.
2. Call over the shearer helper to assist you and Cleo.
3. Tell Cleo not to try to handle the blocks by himself in such an awkward position.
4. Tell Cleo to get on top of the shield while you and the shearer helper hand blocks up to him.
5. Go behind the chock into the gob area to help recover the blocks used after the last pass was made.

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

Question B

You and the shearer helper go to help Cleo. You see Cleo stretch over the lowered shield to recover a block near the back of the shield that had been used after the last pass, as shown in Figure 2 on page 6. What should you do now? (Choose only ONE unless directed to "Try again!")

6. Stretch yourself over the lowered shield. Help him stack the blocks so that the cavity will be completely filled when the shield is fully extended against the roof.
7. Tell him "That's enough! Let's go ahead and set the shield."
8. Yell "Get out'a there! You wanna get killed?"
9. Wait until he pulls out the block he is reaching for so you'll have room to help him.

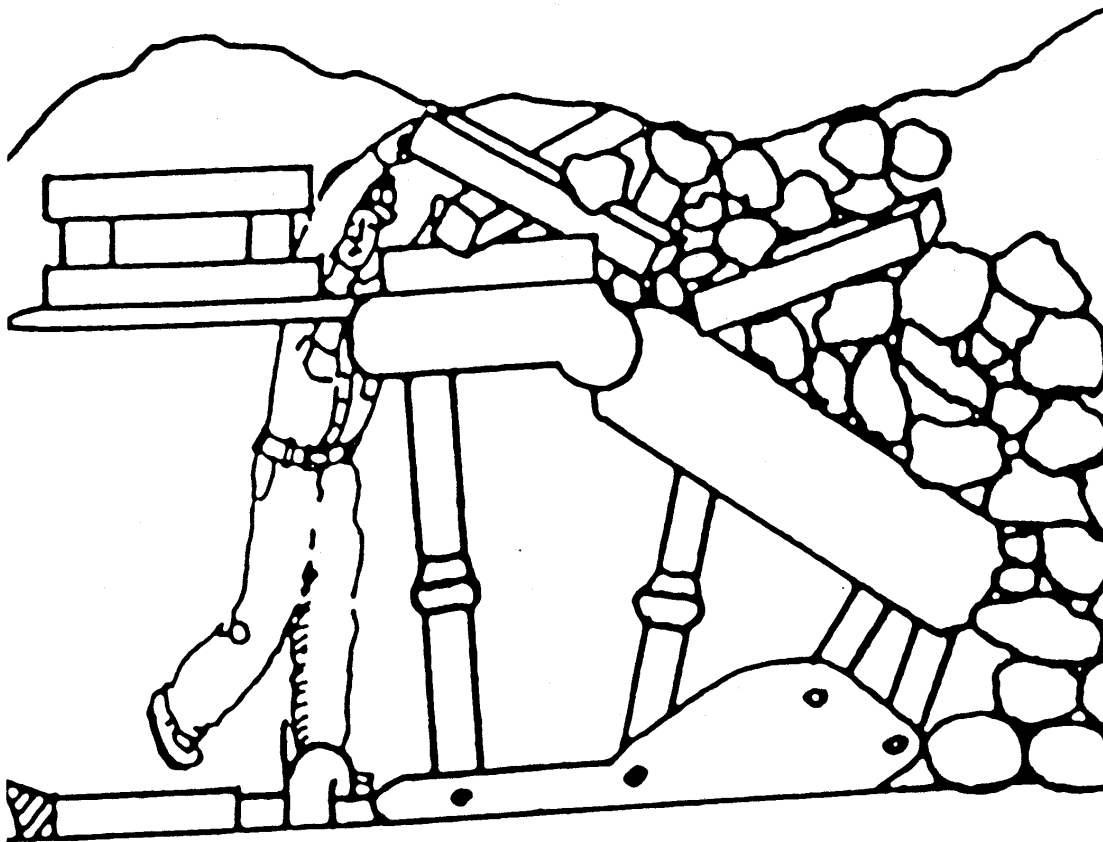


Figure 2: Filling cavity above gob shield with crib blocks

Question C

To what hazards is Cleo exposed? (Select as MANY as you think are correct.)

10. Failure of the shield he is working under.
11. Someone raising the shield by mistake.
12. Fall of roof rock.
13. Having his hands caught between crib blocks or between a block and a shield.

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

Question D

A slab of rock falls out and pins Cleo's right hand. He screams loudly. You manage to lift the rock off of Cleo's hand. Cleo slumps to the floor, cusses, and looks at his hand, which is oozing blood from a gash in the palm as shown in Figure 3. What is the first thing you should do? (Choose only ONE unless you are told to "Try Again!")

14. Ask Cleo if anything else is hurt besides his hand.
15. Bandage Cleo's hand with your handkerchief.
16. Check Cleo's breathing.
17. Walk Cleo to the first aid kit at the mule train.

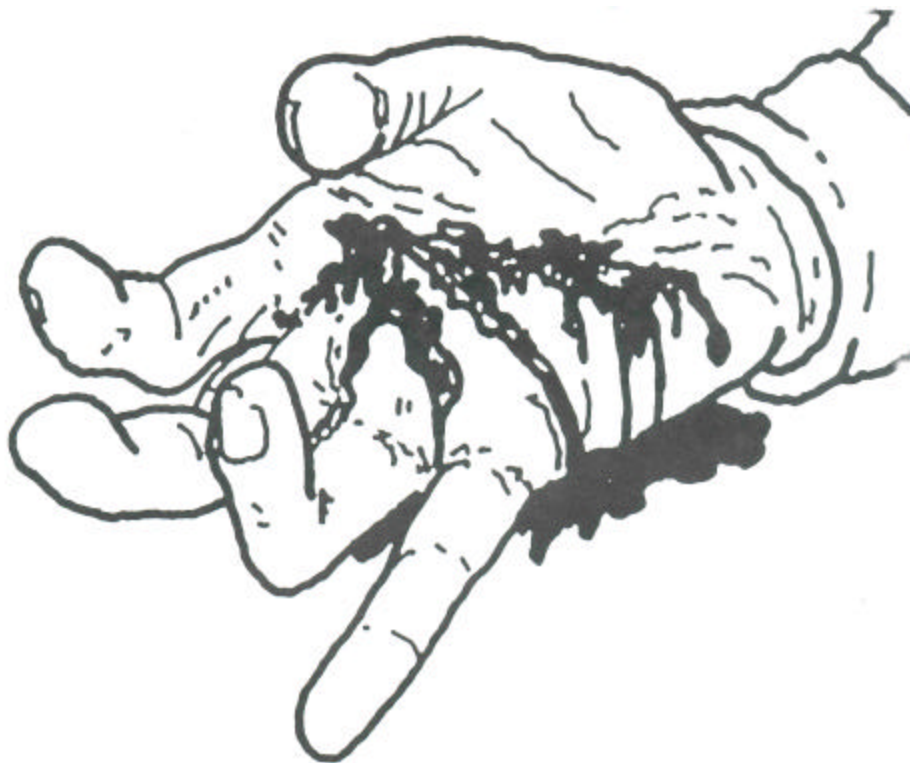


Figure 3: Cleo's injured right hand

Question E

You ask the shearer helper to go for the first aid kit and to tell the foreman about the accident. You give Cleo a clean handkerchief to apply to the laceration in his palm and help him hold his right hand at shoulder level. You are worried that Cleo may have multiple fractures of the hand and wrist. How would you determine what his injuries are? (Select as MANY as you think are correct.)

18. Ask Cleo if he can clench his fist tightly and move his wrist up and down.
19. Ask Cleo, "Where does it hurt?"
20. Check to see if the fingers, palm or wrist look deformed.
21. Look for bruising of the fingers, palm and wrist.
22. Look for swelling and redness of the fingers, palm and wrist.

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

Question F

The shearer helper arrives with the first aid kit and the foreman. How should you care for Cleo? (Select as MANY as you think are correct.)

- 23. Before bandaging Cleo's hand, place a dressing between each finger and a gauze roll in the palm.
- 24. Bandage Cleo's hand with roller gauze and leave the finger tips. visible.
- 25. Place Cleo's hand and forearm flat on a board splint extending from the elbow to the fingertips. Bandage the entire length with roller gauze to keep his hand flat and immobilized.
- 26. After bandaging Cleo's hand, check its circulation by taking a wrist pulse.
- 27. After bandaging Cleo's hand, place his arm in a sling with his hand supported at collar bone level.
- 28. Watch Cleo for symptoms of shock.
- 29. Send the shearer helper to call outside and report the injury.

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

Question G

You examine Cleo and find no other injuries. The shearer helper comes back, just as you finish bandaging Cleo's hand and are leading him out to the mule train. Cleo says he is sick to his stomach. He looks pale. He says "Will my hand be okay?" Before you can answer, the shearer helper responds by saying, "Looks like it's so bad they'll have to amputate." Then he laughs. Cleo's legs get shaky. He faints and you catch him and lay him on the ground on his back. What should you do now? (Choose only ONE unless you are told to "Try Again!")

30. Tell the shearer helper he is a fool.
31. Sit Cleo up, slap his face and try to wake him up.
32. Undo the dressing on his hand to see if the bleeding has stopped.
33. Make sure Cleo is breathing okay and then take his neck pulse.

Question H

Cleo is still unconscious. The plow shearer helper is very upset, feeling his joke made Cleo worse. You are about 400 feet from the mantrip. What would you do now? (Select as MANY as you think are correct.)

34. Leave Cleo where he is, cover him with a blanket, and wait for an EMT to arrive and assist you.
35. Get the foreman and the shearer helper to help you use a three man carry to get Cleo to the mantrip.
36. Send the shearer helper to get a stretcher. Then immobilize Cleo on the stretcher with at least 8 cravats.
37. Wrap Cleo in the blanket from the first aid kit, keeping him on his back and keeping his injured hand across his chest in the sling.
38. Lay Cleo flat in the mantrip with the foot end of the stretcher propped up about a foot on two bags of rock dust.
39. Have the foreman and the shearer helper take Cleo out on the mantrip.

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

Question I

You are now on the mantrip on the way out with Cleo. Cleo is on his back, legs elevated, and covered with a blanket. The foreman is operating the mantrip. The shearer helper is changing switches at crossings. You are taking care of Cleo. He is still unconscious. What things should you do to help him? (Select as MANY as you think are correct.)

- 40. Try to give him small sips of water.
- 41. Watch his breathing and check his pulse frequently.
- 42. If he starts to regain consciousness sit him up.
- 43. Tilt his head and lift his chin to maintain an airway.
- 44. Talk to him. Tell him what you are doing. Pinch his neck muscle at his shoulder every now and then.

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

Question J

Soon you arrive at the portal. Two EMTs and an ambulance are standing by. You tell them Cleo has a crushed right hand. As the EMTs check Cleo, they ask you questions. What questions should they ask? (Select as MANY as you think are correct.)

- 45. Did you see or find any other injuries?
- 46. How long has Cleo been unconscious?
- 47. Who is Cleo's next of kin?
- 48. How was Cleo injured?
- 49. Is Cleo accident prone?
- 50. Which hospital would Cleo like to be taken to?
- 51. How did you bandage his hand?
- 52. Was anyone else injured?

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

Question K

Cleo was taken to the hospital where he was found to have multiple fractures and a deep laceration in his right hand. He had little blood loss. Yet he was in shock. Your prompt and good treatment saved his hand from further harm and prevented his shock from deepening.

What caused Cleo's shock? (Select as MANY as you think are correct.)

- 53. The appearance of, and pain from, his mutilated hand.
- 54. Loss of body fluids.
- 55. Failure to promptly evacuate Cleo before spending the time to bandage his hand.
- 56. Cleo's being sick to his stomach and his fainting.
- 57. The shearer helpers remark that the hand might have to be amputated.
- 58. Pooling of blood in Cleo's abdomen and legs.
- 59. His rapid, weak pulse.

END OF PROBLEM

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 59 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 NIOSH, Pittsburgh Research Laboratory, Pittsburgh, PA phone 412-386-5901, fax 412-386-5902 or email to minetraining@cdc.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. These may be obtained from the A. B. Dick Company, P.O. Box 1970, Rochester, New York 14692, phone 1-800-225-4835.

Answer Sheet for Cleo's Longwall Accident

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 make a selection. Otherwise you may not get the information you need.

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

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

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

- 6. []
- 7. []
- 8. []
- 9. []

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

- 10. []
[]
- 11. []
[]
[]
- 12. []
[]
- 13. []

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

- 14. []
- 15. []
- 16. []
- 17. []
 - []
 - []

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

- 18. []
- 19. []
- 20. []
 - []
- 21. []
- 22. []
 - []

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

- 23. []
- 24. []
 - []
- 25. []
- 26. []
 - []
 - []
- 27. []
- 28. []
- 29. []
 - []

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

30. []

31. []

32. []
[]

33. []
[]

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

34. []

35. []

36. []

37. []

38. []

39. []
[]

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

40. []

41. []

42. []

43. []

44. []
[]

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

- 45. []
[]
- 46. []
- 47. []
- 48. []
[]
- 49. []
- 50. []
[]
- 51. []
[]
[]
- 52 []
[]

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

- 53. []
- 54. []
- 55. []
[]
- 56. []
- 57. []
- 58. []
[]
[]
- 59. []

Finding your score

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

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

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

Highest possible score = 59

Lowest possible score = 0

Appendix C: 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 on the answer sheet blanks, the developing pen reveals the formerly invisible printed message.

You may purchase preprinted answer sheets or you may prepare your own copies. To learn more about this option, and to determine how many answer sheets and developing pens you will need, see the introductory section for Appendix B.

Cleo is tired and unable to handle the crib blocks alone. You hear him grunting as he strains to position the blocks above the shield.

Correct! Handling heavy materials, such as large blocks, in limited space, is more than a two-man job.

Correct! Four foot, 6" x 6" blocks can weigh as much as 40 pounds. They are difficult to handle without help, especially when tired.

The top is known to be bad. A roof fall caused the cavity in the first place. This places Cleo in great danger.

You are under unsupported roof and are in great danger!

You are now both exposed to a roof fall hazard. Try again!

Cleo says "The crib's only half way up." He keeps working. Try again!

Correct! But Cleo does not come out. Do next question.

Cleo is in danger. Try again!

The shield can support a load of hundreds of tons, tens of times more than the largest load possible, even if a massive roof failure occurred.

Correct! Although everyone nearby is familiar with the hydraulic controls and the activity underway, there is a chance that someone will accidentally activate the wrong control.

Correct! The roof is already known to be weak in this area.

Correct! He should avoid "pinch points."

Correct! Cleo says, "No! Damn it!" Do next question.

This is not the first thing to do. Other injuries may be present. Try again!

Since Cleo is talking, his breathing must be OK Try again!

You should not move an injury victim until you know what is wrong with him. Anyway, you're 100 feet away from the mule train and the first aid kit. Try again!

This could cause further injury. You should already suspect multiple fractures.

Correct! Cleo points to his palm and first three fingers.

Correct! The first, second and third fingers are twisted. The wrist appears normal.

Bruising takes several hours to show.

Correct! The wrist appears normal, but the palm and first three fingers are swollen and red.

Correct! His hand should be placed in a relaxed position before bandaging.

Correct! His fingertips should be left visible so that circulation may be checked.

This should not be done. His hand should be placed in a relaxed position.

The wrist (radial) pulse won't tell you if the circulation to the hand has been cut off. Circulation should be checked by nail bed compression before and after bandaging.

Correct! Elevating his hand will help minimize swelling.

Correct! Although blood loss may be minimal, he could still go into shock.

Correct! It is important to alert the surface personnel so they can clear the track all the way out and call an ambulance.

When you do, he gets angry and says he was just kidding around. Try again!

When you do this, Cleo doesn't wake up. You are endangering him. Try again!

This wastes time and is not called for. You need to be doing something else. Try again!

Correct! You find, his airway is open. There is no sign of vomit. His pulse is fast and weak. Do next question.

Cleo needs your help now.

It would be very difficult to carry Cleo 400 feet in this way.

Correct! A stretcher will make transport much easier.

Correct! The blanket will help keep him warm and also help you move him.

Correct! This will help maintain his circulation.

Correct! All of you may be needed to care for and transport Cleo to the surface.

This could harm him.

Correct! His breathing is fast but strong and regular. His pulse is fast and weak.

This could harm him.

Correct! It is important to maintain his airway since he is unconscious.

Correct! Your voice and words can comfort him even if he cannot respond. When you pinch, he responds slightly.

Correct! You say you found none. The two EMTs continue their own primary and secondary survey.

Correct! You say about 30 minutes.

This is inappropriate and it might be heard by Cleo and add to his problems.

Correct! You explain a piece of rock fell on his hand when he reached over a shield.

This is irrelevant and it might be heard by Cleo and add to his problems.

You say you don't know. The EMTs should know which is the nearest and best facility.

Correct! You explain how you applied the dressing and bandages. After inspecting the bandage and checking Cleo's finger circulation by nail bed compression, the EMTs leave the bandage in place.

Correct! You say no, but that the shearer helper is upset because his joke made Cleo worse.

Correct! Pain and mutilation can easily induce a state of shock.

There was very little loss of body fluids.

It was important to conduct a primary and secondary survey and bandage Cleo's hand before transporting him.

These are symptoms of shock, not the cause.

Correct! Such remarks made in jest may be taken seriously by the victim.

Correct! Although Cleo did not lose much blood, his fainting indicated a pooling of blood in his abdomen and legs. This is why laying him down, and raising his feet helped supply his heart and brain with blood.

These are symptoms of his shock, not the cause.