Highwall Rescue Exercise

Instructor's Copy

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[1] This simulation exercise was developed and field tested under U.S. Bureau of Mines research Contract No. H0348040. 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

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 problem booklet, 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 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

Audience: Surface miners

Length: Ten questions

Skills: Rescuing a victim trapped under a fall of rock at the base of an unstable highwall
Using emergency clothing drag procedures to remove a victim from a dangerous place
Conducting a primary and secondary survey
Providing first aid for shock, bleeding, and fractures
Immobilizing a victim for transport from the mine to an emergency medical facility

Location: Surface mine

Problem: You are a front-end loader operator. Marvin, a co-worker, approaches an unstable highwall. Suddenly a large rock falls and strikes him, completely covering his legs. Marvin is trapped lying face down and screaming. Small pieces of rock continue to dribble down from the highwall. You and the other four miners present must figure out how to help Marvin while protecting yourselves. You must free Marvin, remove him from danger, and provide first aid for his serious injuries.

[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 MSHAdistributioncenter@dol.gov.

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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. Put the 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, 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 up 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 Highwall Rescue Exercise

Objective number	Capability verb(s)	Description of required performance and conditions under which it is to occur
1. FA[3]	Evaluate	The accident scene for risks to the first aid rescuers and the victim because of hazardous conditions (an unstable highwall)
2. EE	Recognize	Cues from the environment that warrant removal of the victim from a dangerous area area prior to administering first aid
3. FA/EE	Select	A sequence of rescue actions to remove a victim from a dangerous place to minimize risk to rescuers and prevent further injury to the victim
4. FA	Order	Rescue, first aid examination and treatment procedures from most to least important
5. FA	Diagnose	Probable nature and extent of injury given an illustration of the accident scene, descriptions of the victim's appearance and behavior, and information from the primary and secondary surveys
6. FA	Recognize	First aid procedures for control of bleeding, immobilization and bandaging of compound fractures, and full body immobilization in the supine position
7. FA	Choose	Communications to surface personnel that clearly and accurately describe the nature and extent of the victim's injuries and the victim's location
8. FA	Recognize	Clinical signs of shock given descriptions of the victim's behavior and vital signs
9. FA	Plan Select	First aid treatment procedures to combat shock
10. FA	Recall	Ways to maintain an open airway in a victim who is unconscious, immobilized in the supine position, vomiting, and unconscious

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

Master Answer Sheet for Highwall Rescue Exercise

Use this answer sheet to mark your selections. Rub the developing pen gently and smoothly between the brackets. Long smooth strokes work best. 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.

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

1. [This would take too long and is dangerous. Try again!]

2. [Dangerous! Marvin's injuries are hidden from view by the rock. Try again!]

3. [Correct! This can provide some protection for Marvin. Do the next question.]

4. [This could crush Marvin. Try again!]

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

5. [Correct! This procedure is the fastest and least harmful way to move him.]
   [Do the next question.]

6. [This would endanger him and you. Try again!]

7. [This method of moving Marvin could cause further injury. Try again!]

8. [Risky and impossible. You can't work on him under the rock. This action]
   [also places you and him in danger. Try again!]

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

9. [You need to do something else first. Try again!]

10. [Correct! The loader protects you and Marvin while you slide him away from]
    [the highwall. You drag him by his shirt collar and shoulders keeping his head]
    [and neck in line with his body as his legs and feet trail. Do the next question.]

11. [His airway has to be O.K. He is screaming. There is a more important first]
    [step. Try again!]

12. [Marvin knows he has serious injuries. Be positive, but do not belittle his]
    [condition or be dishonest. Try again!

13. [This might cause Marvin to become more frightened and make his condition]
    [worse. Try again!]

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

14. [You need to do something else first. Try again!]

15. [Marvin needs help before the EMT arrives. Try again!]

16. [This could hurt Marvin and might kill him. Try again!]

17. [This could hurt Marvin and might kill him. Try again!]

18. [Correct! The highwall is unstable. A large fall could move the loader or fall]
[around and under the loader injuring you and Marvin. Do the next question.]

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

19. [Correct! But Marvin doesn't answer.]

20. [Correct! His airway is open and his breathing is rapid and shallow.]

21. [Correct! His pulse is fast (about 120) and weak.]

22. [You have trouble removing his boots. His legs twist and move. When you]
[get his boots off you can't find the pulses. You should not have done this.]

23. [Correct! Both hands are cool and damp.]

24. [Correct! You see a sharp bone sticking out of his right thigh and much dark]
[red blood. The left lower leg has a large bruise and is crooked.]

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

25. [The message should be more specific and detailed. Try again!]

26. [The message says nothing about the extent of the injury. Try again!]

27. [Correct! The message tells who is calling, describes the injury, and Marvin's]
[location and condition. Color the box under answer 28.]

28. [The message should be more specific and detailed. Try again!]

If the person calling out doesn't give this information, the person who takes the call should request it. Some companies also want the name of the injured person reported, so that his or her medical records can be readied for the EMTs. This type of information can help the emergency medical staff care for the victim. Do the next question.

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

29. [Transporting without bandaging and immobilizing Marvin could cause further injuries and might kill him.]

30. [Correct! This will help control bleeding and protect the wound.]

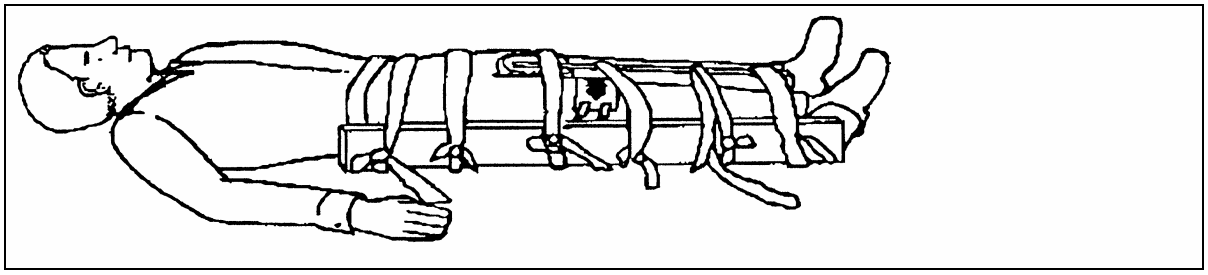
31. [This will cause further injury. Never do this!]

32. [No! Air splints should not be used on an open fracture. Color in the box under answer 35 to see the proper splint and ties.]

33. [Correct! Color in the box under answer 35 to see the proper splint and ties.]

34. [Correct! Inflatable splints may be used on closed fractures.]

35. [His legs need to be supported before he is placed on the stretcher.]



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

36. [You and Marvin are still in a relatively dangerous position.]

37. [Correct! Now that you have controlled Marvin's bleeding and immobilized him it is best to move him further away from the unstable highwall.]

38. [Correct! Verbal assurance and psychological support are important. Persons who appear unconscious often can hear what is being said around them.]

39. [Correct! Without this simple treatment Marvin may die. He is showing signs of shock. Shock is his most serious problem at this time.]

40. [You might miss the ambulance and waste time. The ride in the one ton 4 X 4 is very rough and could hurt Marvin.]

41. [Correct! This is very important and could save his life. Marvin is unconscious and has just eaten a big meal.]

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

42. [This could hurt him. Try again!]

43. [He may choke to death on his vomit. Try again!]

44. [He ate a lot. You can't keep his airway clear. He will choke. Try again!]
[ ]

45. [Correct! This will open and maintain his airway. You need to watch him]
[closely and report his vomiting to the EMTs. Do the next question.]

Question J (Write your list on the blank lines on this answer sheet.)

_____

_____

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_____

END OF PROBLEM

Finding your score

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

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

Add the numbers in blanks 1 and 2 to get your total score (3) _____

Highest possible score = 45

Lowest possible score = 0

Discussion Notes

Use the information presented here and on the master answer sheet, your own ideas and experience, and that 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 the trainees think about and remember basic knowledge and skills they may someday need to deal with an 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 master answer sheet during the discussion, while the trainees look at their problem booklets. This allows you to lead the group through the exercise and to 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. 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 - Answer 3 is correct. Marvin needs protection from additional falling material until he can be removed from this dangerous place. Although people should never go under unsupported raised loader buckets, this situation demands a quick response. The raised front-end loader bucket pressed firmly against the highwall above Marvin provides limited protection from small and medium size rocks. However, being under the bucket is still not safe. A large fall of rock might drop the bucket or move the machine. Still, this arrangement seems to be the only immediate option for rescuing Marvin. Ask your class members to think of alternative and better means for protecting Marvin and the miners who free him. Answers 1 and 3 involve others working under the highwall without any protection. Another rock fall could result in multiple injuries or deaths. Attempting to lift or slide the rock from Marvin with the bucket of the front-end loader (4) is risky because the rock is likely to pivot, slip, or slide, or to be lifted and then dropped. The experts consulted during the development of this exercise generally agree that it is better to use hand tools to lift the rock from Marvin.

Question B - The method described in answer 5 is correct because it pulls Marvin by his clothing without applying force directly to his injured legs. It also pulls his clothing at several points along his body to distribute the force and slide him out smoothly and sideways. Ordinarily a clothing drag should be used to pull a victim head first to keep the head, neck, chest, and lower body in line. Here the position of the rock, the highwall, and Marvin make this impossible.

Answer 7 is a poor choice because it will hurt Marvin to jerk or pull him by his feet. This method would apply stress directly to his legs and broken bones. You may wish to demonstrate the two ways of moving Marvin from under the rock. The advantages of the first method will become apparent. It is not practical to splint Marvin's legs while he is under the rock (6), and it is also impractical to prop up the rock and leave him there until he can be immobilized (8). The danger from the unstable highwall requires that Marvin be moved away from this area as soon as possible.

Question C - The correct answer is 10, using a clothing drag to pull Marvin under the front-end loader. The frame and body of the loader will provide additional protection from falling material. The most important thing to do here is to get yourself and Marvin away from the highwall using the most protected pathway. All other first aid actions must wait. Otherwise another rock fall may kill Marvin and those who seek to rescue him. Answers 12 and 13 are also wrong because they would probably upset Marvin and deepen his shock. The rescuers should talk to Marvin about what they are doing to help him, not present trivial reassurance and question him about his blood type.

Question D - The correct answer is 18. The area under the belly of the front-end loader is safer than the area under the bucket, but still dangerous. A large fall of material could bounce the loader around, and rock and earth could fall around and slide underneath the loader. In either event, Marvin and his rescuers could be injured or killed. The safest and fastest route away from the highwall is to use a multiple person clothing drag to pull Marvin from between the rear wheels of the loader and a safe distance away from the highwall. (You may wish to use an overhead projector to show the figures included at the end of these notes. The figures illustrate proper methods for one and multiple person clothing drags, proper splints and ties for Marvin's fractures, and a proper way to lift an injured person onto a stretcher.) Answer 16 is wrong because transporting Marvin without first examining him for injuries and stabilizing him could cause more injuries and deepen his shock, leading to his death. Answer 17 is wrong for two reasons: 1) first aid procedures must wait until Marvin is moved to a safer place, and 2) his legs should not be propped up. When a person has broken upper or lower legs they should be elevated after the victim's legs have been splinted and the person immobilized on a full length stretcher. Elevating the legs is then accomplished by raising the foot end of the stretcher. This protects the broken legs from further movement. Checking Marvin for injuries (14) must wait until he has been moved to a safer area. Covering Marvin with a blanket (15) would help combat shock, but this action also must wait until he has been moved to a safer place, his breathing checked, a hands-on examination made, his bleeding controlled, his fractures splinted and immobilized.

Question E - All of the answers are correct except for (22). Pulling off Marvin's boots to check his foot pulses would waste time and probably add to his injuries. It would be difficult to remove the boots without moving his broken legs. Even an experienced EMT might have difficulty locating the foot pulses. If weak or no foot pulses are found, there is little that can be done. No advanced life support equipment is available, and no one present is trained to use such equipment if it were available. Most EMTs interviewed for this exercise said they would not try to remove Marvin's boots, even though they knew where the pedal

pulse is located and what to do to restore the pulse if it were missing. Why? Because it would take too long to remove the boots gently without leg movement, and because the pedal pulse would be weak and hard to locate because of Marvin's shock. Questioning Marvin (19) while at the same time checking his breathing (20) will quickly establish his degree of alertness and follows the standard ABC (airway, breathing, & circulation) first aid procedure. Question C revealed that Marvin's right thigh had an open fracture that was bleeding. After finding his breathing to be O.K., his leg should be examined by slitting his pants (24). Then his wound should be examined and the bleeding controlled by applying direct pressure with bandages. If severe, his bleeding should be controlled before doing other things. Feeling his hands (23) and taking his neck pulse (21) would be next. The fast pulse and cool damp hands coupled with Marvin's becoming weaker and passing out are signs of shock. Treatment for shock must begin right away or Marvin may die before he gets advanced life support. Deep shock rapidly becomes irreversible even with advanced life support. Treating Marvin's shock right away is critical if he is to survive.

Question F - Answer 27 is correct. All the other answers have too little information. The person calling the dispatcher needs to identify him or herself, report the nature of the injury, and the condition and location of the victim. It is also good to ask for advice, information, and help from surface personnel, or to ask the dispatcher to get an experienced first aider or EMT to talk with you and give advice. There is disagreement about one aspect of this question. Some companies like employees to report the names of the injured. Medical personnel responding to the call for assistance need background medical information (heart problems, diabetes, medications, allergies, etc.) about the injured person as soon as treatment is begun. Many times this information can be pulled from company medical files and made ready for the ambulance EMTs. Other companies prefer not to name the injured to avoid rumors and misinformation among persons who may overhear the calls. You may wish to discuss this issue in terms of company policy and emergency medical personnel preferences in your area. You might also have class members practice calling out information about a number of typical injuries. One person can role play being the caller and the other the dispatcher. Class members can listen and comment on the performance of the two persons.

Question G - Answers 30, 33, and 34 are correct. The open wound needs to be covered with a pressure bandage to control bleeding (30) and protect the wound from dirt and debris. An inflatable splint may be used on the lower leg (34) as it is a closed fracture, but should NOT be used on the thigh area (32) as there is an open wound. The whole leg should be splinted using board splints (33) and the knots in the ties should NOT be placed where they will cause the victim any more pain. Marvin should not be moved (29, 35) until the bleeding is controlled and the leg has been splinted. **Never** push the ends of a bone back into the wound (31). The jagged edges may cause a more serious injury.

Question H - Answers 37, 38, 39, and 41 are correct. Once Marvin is fully immobilized on the stretcher it is a good idea to carry him further away from the unstable highwall (37). A massive fall could be dangerous to persons located even 70 feet away. It is important to continue talking to Marvin, explaining what is being done to help him and providing quiet verbal support and reassurance (38). Hearing is one of the last senses to fail in persons

who are unconscious and injured. The sounds and voices of the first aiders may be Marvin's only contact with what is going on around him. Now that Marvin is fully immobilized on the stretcher, covering him with a blanket to preserve his body heat, and elevating the foot end of the stretcher (39) are effective treatments for shock that may mean the difference between life and death. Each leg of an average size man contains more than a pint of blood. Elevating Marvin's legs is like giving him a transfusion with his own blood. With his legs elevated the extra blood will flow to his heart and help improve the circulation to his vital organs. It is very important to continue to monitor the breathing in any unconscious victim (41). In Marvin's case it is especially important to do so because he recently ate a large meal.

Question I - Answer 45 is correct. This position will drain his airway. The finger sweeps remove any stringy meat or chunks of food that could be sucked into his windpipe. The head down position of the stretcher will help treat his shock. Having the bleeding thigh wound on the top side will help control bleeding and swelling. If Marvin's airway is not kept clear two things may happen. First, he may asphyxiate from his own vomit solids and fluids and die right away. Second, he may aspirate vomit fluids into his lungs. This will produce a severe pneumonia within a few days that may also kill him, even though he receives good medical treatment. The first aid care Marvin receives here in the field to maintain his airway and treat his shock is more critical and basic than later treatment by medical personnel. Unless his first aiders do their jobs well, he may not profit from later advanced life support treatment.

Question J - Some of the violations noted by experts are: a) working close to a highwall without first making an examination for hazards; b) possible failure to follow safe mining and highwall practices; c) Marvin going too near an unstable highwall, and d) having no EMT nearby to respond quickly. Can you find others?

Figures

Prepare overhead transparencies of each figure. Use the transparencies during the class discussion to illustrate clothing drag procedures, the splinting of Marvin's legs, and the lifting of an injured person onto a stretcher.

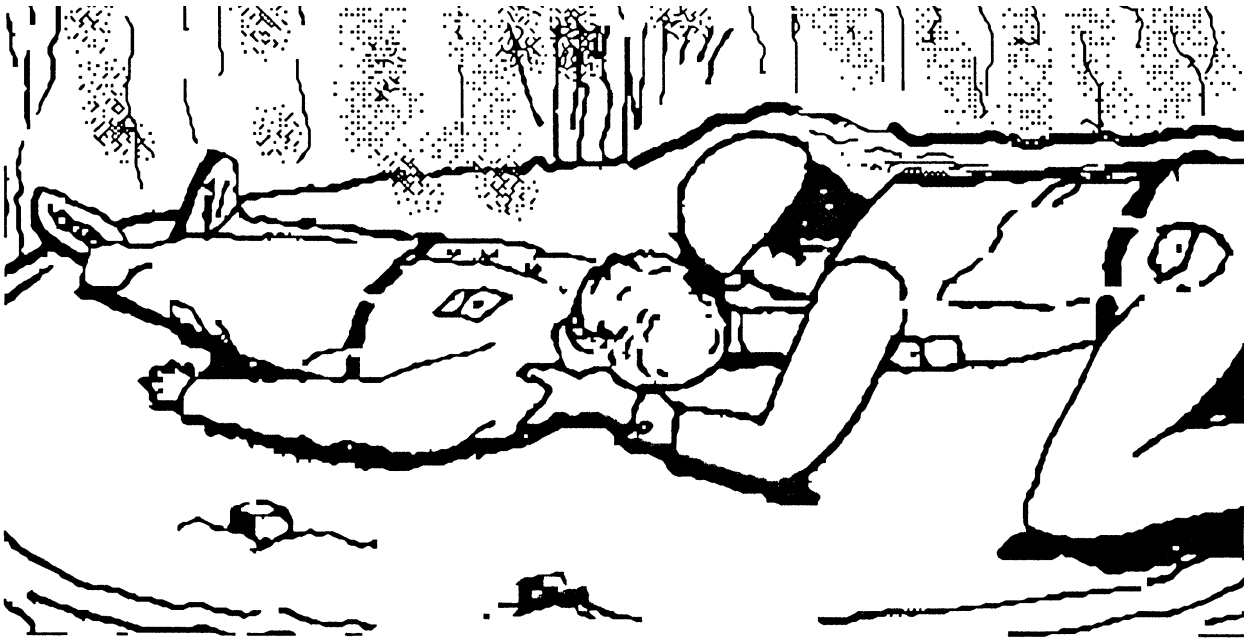

Figure 2: One person clothing drag for moving Marvin

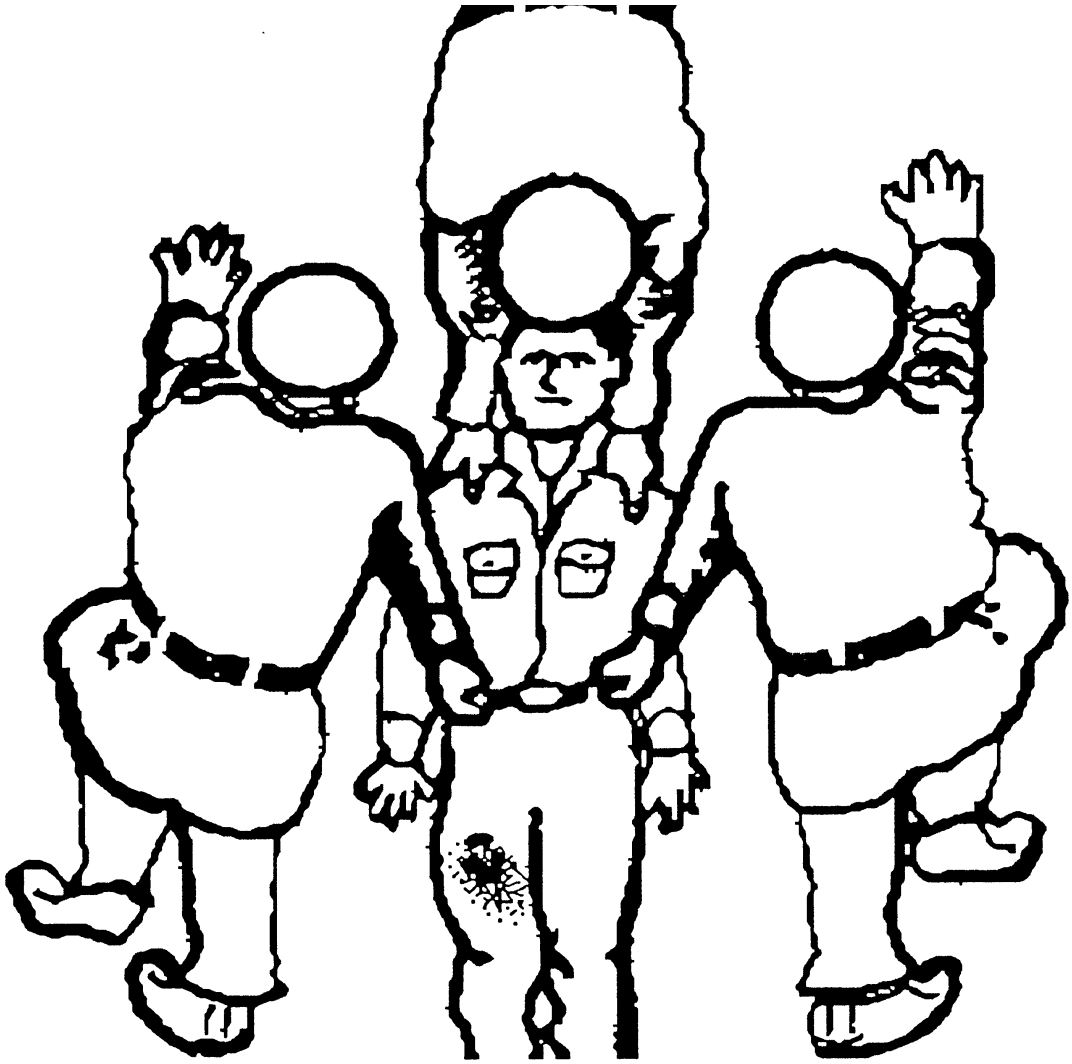

Figure 3: Three person clothing drag for moving Marvin

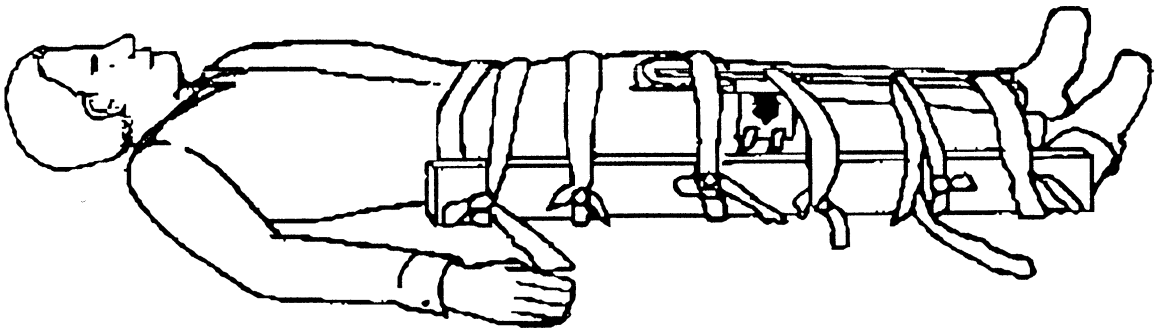

Figure 4: Splints and ties for immobilizing Marvin's fractures

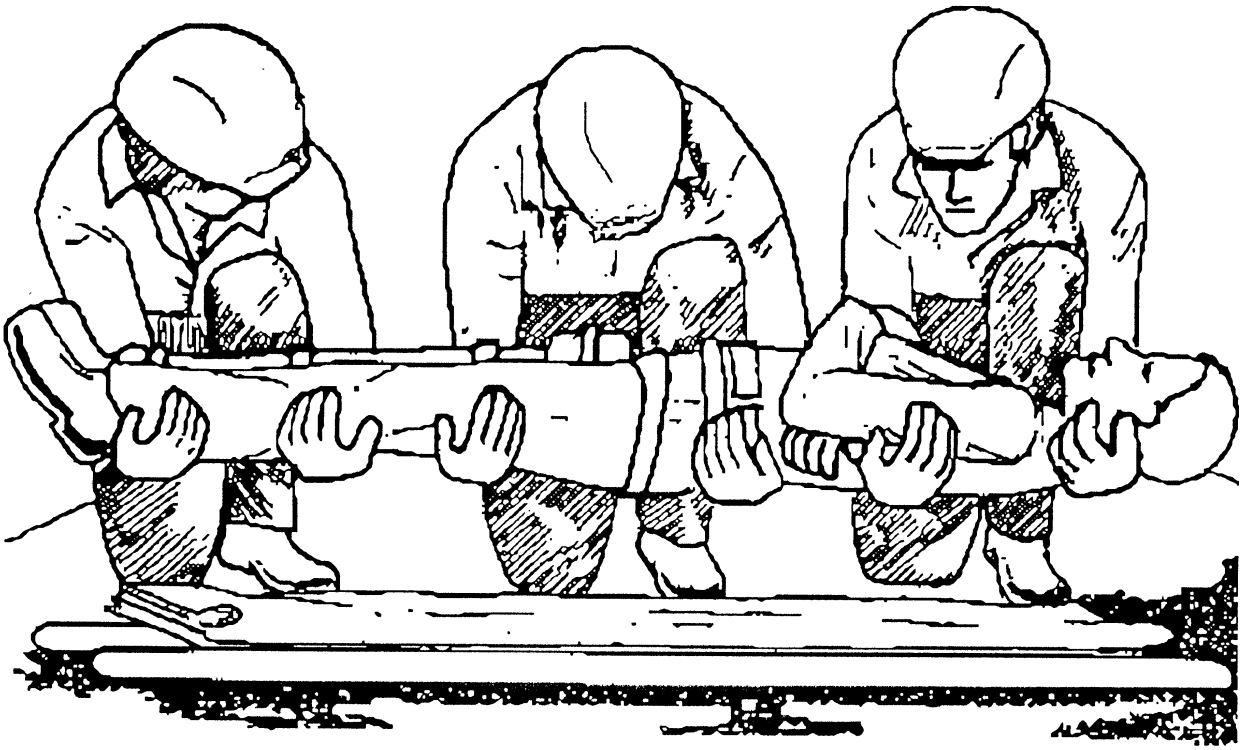

Figure 5: Three person lift for placing Marvin on the stretcher

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Scoring Key for the Highwall Rescue Exercise

The correct answers are marked with an asterisk.[4]

Question	Answer Number						
A	1	2	3*	4			
B	5*	6	7	8			
C	9	10*	11	12	13		
D	14	15	16	17	18*		
E	19*	20*	21*	22	23*	24*	
F	25	26	27*	28			
G	29	30*	31	32	33*	34*	35
H	36	37*	38*	39*	40	41*	
I	42	43	44	45*			

[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 MSHAdistributioncenter@dol.gov.

Highwall Rescue Exercise

Problem Booklet

Instructions

Read the problem situation described on the next page. Next, answer each of the ten questions. Do them one at a time. Don't jump ahead, but you may look back to earlier questions and answers.

Most of the questions ask you to choose only one answer unless you are told to "Try again!" Other questions ask you to select as many answers as you think are correct. Follow the instructions for each question.

After you have selected a choice to a question, look up its number on the answer sheet. Select your answer to each question by using the developing pen to mark the space 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

It is 12:50 p.m., and the temperature is 58^{o}.

You and four other miners are working near the highwall in Pit #3.

The highwall is about 35 feet high at this point.

The mine offices are three miles away.

It is just after lunch. (Marvin ate a big meal.)

The EMT who normally works with you is absent today.

You are trained in basic first aid but not as an EMT.

A one ton 4 x 4 pickup truck equipped with a 2 way radio is in the pit about 800 feet away from you.

Problem

You operate a large front-end loader. As you shut off your machine, you hear a crash and a scream. You look toward the highwall. Three large chunks of rock have fallen. One has hit Marvin Letcher, a co-worker. Marvin is trapped under the rock at the base of the highwall. He is lying face down, screaming. Turn the page, look at Figure 1, and answer the first question.

Question A

You yell for help. Three other workers come quickly. Marvin's legs are trapped under a large piece of rock that has fallen out and slid down from about 10 feet up the highwall. (See Figure 1 below) Small pieces of rock continue to "dribble" from the unstable highwall from an area about 12 feet up. What is the first thing you should do now? (Choose only ONE unless you are told to "Try again!")

1. Send someone for jacks and long planks so you can lift the rock off Marvin's legs.

2. Move close to Marvin to check his injuries and begin first aid immediately.

3. Move your front-end loader facing the highwall. Position the bucket over Marvin and place it firmly against the wall to protect him from other rocks that may fall.

4. Move your front-end loader to the highwall. Use the bucket to push the rock off Marvin's legs.

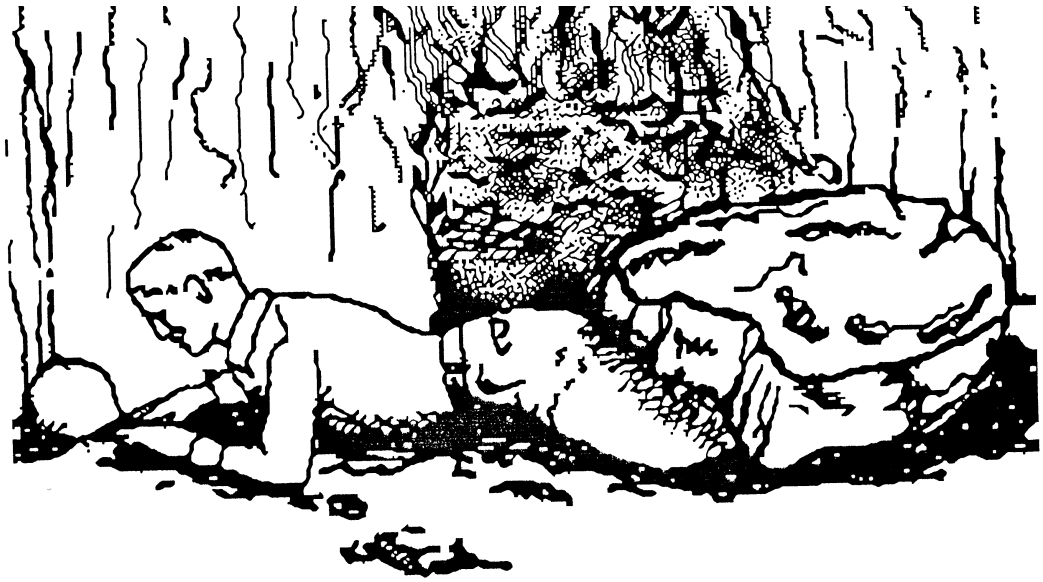

Figure 1: Rock falls and pins Marvin's Legs

Question B

After you raise the bucket above Marvin and push it firmly against the highwall, you stop the loader engine and set the brakes. Working under the protection of the loader bucket, and using crowbars, two of your co-workers gently lift the rock just high enough to free Marvin's legs. You can reach under the rock only far enough to grab Marvin's left leg. Small rocks and pebbles continue to dribble from the face of the highwall about 12 feet up. What should you do now? (Choose only ONE unless you are told to "Try again!")

5. Have your buddies grab Marvin by his belt and shirt while you grab his pant leg above and below his left knee. Pull together and slide him out from under the rock sideways on his stomach.

6. Get a board or some other object to serve as a splint. Put the board between his legs. Then gently tie his legs together before moving him.

7. Try to reach under the end of the rock so you can grab Marvin by his boots and swing his legs sideways out from under the rock.

8. Prop the rock up and leave Marvin as you found him. Give him first aid in this position until he has been fully immobilized and can be moved without further injury.

Question C

Marvin is still screaming after you slide him out from under the rock. While still under the loader bucket, you and the other two miners gently logroll Marvin onto his back. You notice Marvin's right thigh is crooked and bloody. Pebbles continue to dribble from the highwall and strike the loader bucket. What is the first thing you should do now? (Choose only ONE unless you are told to "Try again!")

9. Begin a hands on examination of Marvin for injuries.

10. Have the other two miners help you use a clothing drag to slide Marvin away from the highwall to a protected position underneath the frame of the front-end loader.

11. Check Marvin's airway, breathing, and pulse.

12. Tell Marvin that his injuries are not serious and that he will be fine.

13. Ask Marvin if he knows what his blood type is or if he has any relatives who have the same type of blood.

Question D

You, Marvin, and the other two miners are now under the front-end loader toward the rear wheels. The loader engine is off, the brakes are set, and the bucket is still raised and firmly pushed against the highwall. One of the other miners runs to the pickup truck and radios for help. He returns with the truck and says the EMT is on the way but it will take her about 20 minutes to get to you. Marvin is no longer screaming, but moaning softly and complaining of pain in both legs. Small rocks continue to fall from the highwall and strike the loader bucket. What is the first thing you should do now? (Choose only ONE unless you are told to "Try again!")

14. Check Marvin for injuries.

15. Cover Marvin with a blanket and wait for the EMT.

16. Load Marvin into the pickup truck and take him to the first-aid room at the mine office.

17. Leave Marvin on his back and prop up both legs about 12 inches.

18. Have the other two miners help you use a clothing drag to slide Marvin out from under the loader to a position about 50 feet behind the machine.

Question E

You have used a clothing drag to move Marvin out from behind the loader to a safe place about 70 feet from the highwall. As you dragged Marvin you kept his head and neck lined up with his body as his feet and legs trailed. In this way, you were able to slide him to safety with his whole body moving as a unit. There was very little sideways movement of his head, neck, body, and limbs.

You leave the loader where it is. One of the miners pulls the pickup truck between the highwall and you and Marvin to provide added protection from any stray rocks that might roll down. Now you decide to check Marvin for injuries. What should you do? (Select as MANY as you think are correct.)

19. Ask Marvin if he has pain anywhere else besides his legs.

20. Check Marvin's airway and his breathing.

21. Check Marvin's pulse.

22. Pull off Marvin's boots and take his pulse in both feet.

23. Feel Marvin's hands.

24. Slit both pant legs and look at Marvin's legs.

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

Question F

Jack Mathews, the miner who went to the pickup truck and radioed for help, returns to the pickup to report on Marvin's condition. What should Jack say when he calls the dispatcher? (Choose only ONE unless you are told to "Try again!")

25. "We have a man with broken legs. He needs help."

26. "Marvin Letcher was trapped under a rock fall in Pit #3. He is hurt bad. We need help."

27. "This is Jack Mathews. A miner has been hurt by a rock fall from the highwall in Pit #3. We got the rock off him. He appears to have an open fracture of the right upper leg and a possible fracture of the left leg. He is passed out and bleeding."

28. "We got someone hurt real bad in Pit #3. He needs a doctor as soon as possible."

Question G

Marvin is unconscious. His breathing is rapid and shallow. His pulse is about 120 and weak. His hands feel cold and moist. His skin color is pale. Two miners bring a folding aluminum stretcher, blankets, and a first aid kit. What should you do to care for Marvin? (Select as MANY as you think are correct.)

29. Lift Marvin onto the stretcher, put him into the pickup truck, and take him to the mine's emergency first aid room without delay.

30. Apply a sterile dressing and pressure bandage to Marvin's right thigh wound.

31. Before bandaging, use a sterile dressing to push the ends of the thighbone back into the wound.

32. Splint Marvin's broken right thigh with an inflatable air splint.

33. Apply board splints to Marvin's right leg before you lift him onto the stretcher.

34. Splint Marvin's lower left leg with an inflatable air splint.

35. Lift Marvin onto the stretcher before you splint his broken legs.

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

Question H

You now have Marvin fully immobilized on the stretcher. Both of his legs are properly splinted. Your pressure bandage has stopped the bleeding from his right thigh. You, Marvin, and your two helpers are still beside the pickup truck about 70 feet from the highwall. What should you do now? (Select as MANY as you think are correct.)

36. Leave Marvin on the stretcher, and wait for the ambulance.

37. Move Marvin further away from the highwall to a safer place and wait for the ambulance.

38. While you wait for the ambulance, talk to Marvin. Reassure him and tell him what you are doing to care for him.

39. While you wait for the ambulance, cover Marvin with a blanket and raise the foot end of the stretcher about 12 inches.

40. Put Marvin in the pickup truck and take him to meet the ambulance.

41. Continue to monitor Marvin's breathing.

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

Question I

As you wait for the ambulance to arrive, Marvin starts to vomit. He is still unconscious. What should you do? (Choose only ONE unless you are told to "Try again!")

42. Untie the chest cravats that secure him to the stretcher. Sit him up and tip his head forward.

43. Ignore the vomiting. It won't hurt anything.

44. Use repeated finger sweeps of his mouth to clear the vomit, but don't move his head.

45. Keep the foot end of the stretcher elevated but tip it slightly to the side with his broken thigh on the high side. Turn his head to the down side so the vomit can drain out. Do a finger sweep of his mouth each time he vomits to remove material.

The ambulance arrived in a few minutes. Later, when the front-end loader was backed away from the highwall, several tons of rock fell and covered the spot where Marvin was pinned before you rescued him. He survived because you carried out good rescue and first aid procedures. Incorrect actions might have killed him and his rescuers. Improper first aid might also have resulted in his death.

Question J

List all violations of state and federal laws and your company rules that you can find in this problem. Write your list on the blank lines on the answer sheet.

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 27. 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 45 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.