

Unsupported Roof Rescue

Instructor's Copy

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¹ This 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.

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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 and the trainee's questionnaire. 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 person or 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.

<u>Type:</u>	Invisible ink
<u>Length:</u>	Ten questions (30 minutes for administration plus 30 minutes for discussion)
<u>Skills:</u>	Supporting weak mine roof to rescue a victim from a roof fall Freeing a victim from a roof fall Using emergency clothing drag procedures to quickly remove a victim from a dangerous place Conducting a primary and secondary survey Providing first aid for shock, bleeding, and fractures Preparing a victim for transport to the surface
<u>Location:</u>	Underground
<u>Problem:</u>	You are the pinner operator. Your helper, Marvin, goes out under unsupported roof. As you yell to him to get back, there is a roof fall. It catches Marvin's legs. Marvin is lying face down and screaming. The roof is dribbling across the whole entry. You have to figure out how to rescue and help Marvin without getting yourself or other miners injured.

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.

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 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, and each group of 3 to 5 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 Unsupported Roof Rescue

Objective number	Capability verb(s)	Description of required performance and conditions under which it is to occur
1. FA ³	Observe Assess Judge	The accident scene and special needs/risks to the first aid rescuers and the victim because of hazardous conditions (dangerous mine roof)
2. EE	Recognize Identify	Cues from the environment that warrant evacuation of the victim from the immediate area prior to administering first aid
3. FA/EE	Select Plan	A sequence of rescue and first aid actions to remove a victim from a dangerous place to minimize risk to rescuers and further injury to victims
4. FA	Diagnose Recognize	Probable nature and extent of injury given an illustration of the accident scene, descriptions of the victim's appearance and behavior, and information about vital signs gathered in the primary and secondary surveys
5. FA	Recognize Order	First aid examination and treatment procedures from most to least important in the primary and secondary surveys
6. FA	Recall Recognize	First aid procedures for control of bleeding, immobilization and bandaging of compound Identify fractures, lifting procedures and ties for full body immobilization in the supine position, and preparing the victim for transport
7. FA	Choose Recognize Identify	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 Identify	Clinical signs of shock given descriptions of the victim's behavior and vital signs
9. FA	Plan Recognize	First aid treatment procedures to combat shock
10.FA	Recall Recognize Choose	Ways to maintain an open airway in a victim who is unconscious, immobilized in the supine position, vomiting, and in shock

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

Master Answer Sheet for Unsupported Roof Rescue

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.

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

1. [Risky! This may hurt you, the others, and Marvin. Try again!]
2. [Good idea, but the head is too big to fit under the rock. If you try to lift the
[rock this way it may slide, slip, or fall and hurt Marvin more. Try again!]
3. [This action places you and Marvin in danger. Try again!]
4. [Correct. With the roof supported, you can now help Marvin. Do next question.]
5. [When you start to lower the ATRS, more slate falls. This action places you
[and Marvin in danger. Try again!]
6. [When you lower the ATRS and begin to tram the bolter outby, more slate
[falls. Now Marvin is in more trouble and you can't get to him. Try again!]

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

7. [Correct. This procedure would be the fastest and least harmful way to move
[him. Do the next question.]
8. [This would endanger him and you. Try again!]
9. [This method of moving Marvin could cause further injury. Try again!]
10. [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 !")

11. [His airway has to be O. K. He is screaming. There is a more important first
[step. Try again!]
 12. [Marvin probably needs help before being transported. Try again!]
 13. [Correct. This protects everyone. Color the box under answer 14.]
 14. [There is a more critical first step. Try again!]
-
- [First aid treatment usually follows three basics: maintaining the airway,
[controlling bleeding, and treating for shock. In this situation these basics
[must wait until you get Marvin under supported roof. Do the next question.]

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

15. [Correct. This is a clothing drag. It should be used to move a person from a dangerous area. Do next question.]
16. [Would cause further and unnecessary injury to Marvin. It would also be slow and prolong exposure of everyone to a working top. Try again!]
17. [Would take too long. The top continues to work. You are in danger. Try again!]
18. [Would take too long. The top continues to work. You are in danger. Try again!]

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

19. [Correct. Color the box under answer 22.]
20. [Marvin may need help before the EMT arrives. Try again!]
21. [This could hurt him more and might kill him. Try again!]
22. [This could hurt him more and might kill him. Try again!]
-
- [As you begin checking Marvin's injuries, a roof fall at the face of #2 entry covers the bolting machine. You are safe under good top. Do next question.]

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

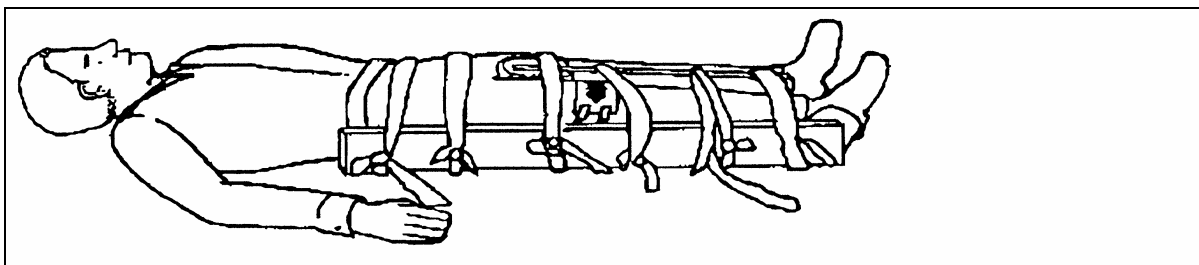
23. [Correct. But Marvin doesn't answer.]
24. [Correct. Airway is open and breathing is rapid and shallow.]
25. [Correct. Pulse is fast (about 120) and weak.]
26. [You have trouble removing the boots. His legs twist and move. Then, when you get the boots off you don't know where to find the pulses. You should not have attempted this. Even qualified EMTs might not in this situation.]
27. [Correct. Both hands are cool and damp.]
28. [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 G (Choose only ONE unless you are told to "Try again!")

29. [The message should be more specific and detailed. Try again!]
30. [Message says nothing about the extent of the injury or if Marvin is out from]
[under the roof fall. Try again!]
31. [Correct. The message tells who is calling, describes the injury, and Marvin's]
[location and condition. Color the box under answer 32.]
32. [The message should be more specific and detailed. Try again!]
-
- [If the person calling out doesn't give this information, the person on the]
[surface who takes the call should request it. The medical emergency team]
[needs this information to care for Marvin. Do the next question.]

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

33. [Transporting without bandaging and immobilizing him could cause further]
[injuries and might kill him.]
34. [Correct. This will help control bleeding and protect the wound.]
35. [This will cause further injury. Never do this!]
36. [No! Not for an open fracture. Color the box under answer 41 to see the]
[proper splint and ties.]
37. [Correct. Color in the box under answer 41 to see the proper splint and ties.]
38. [Correct. Inflatable splints may be used on closed fractures.]
39. [No. His legs need to be splinted before he is placed on the stretcher.]
40. [Correct. Without this simple treatment Marvin may die. He is showing]
[signs of shock. This is his most serious problem at this time.]
41. [Correct. Even though Marvin appears to be unconscious, he may need]
[psychological support.]



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. No reason to]
[suspect a neck injury. Try again]
45. [Correct. This will open his airway. You need to watch him closely all the way]
[out and report his vomiting to the EMTs at the surface. Do the next question.]

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 = 45

Lowest possible score = 0

Instructor's Discussion Notes for Unsupported Roof Rescue

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 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 answers on the master answer sheet during the discussion, while the miners 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 4 is correct. The top must be supported first! Answers 1, 3, 5, and 6 expose the rescuers (and Marvin) to injury and perhaps death from another roof fall. Lifting the rock from Marvin with the head of the roof bolter is a good idea only if there is room to get the head firmly under a corner of the rock and if it is possible to roll the slate back smoothly without any danger of it slipping or shifting more of its weight onto Marvin. This procedure is risky because the bolter head could cause the rock to pivot, slip, slide, or the rock could be lifted and then dropped. The experts consulted in 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 in answer 7 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 rib, the roof bolter, and Marvin make this impossible. Answer 9 is a poor choice because it will hurt Marvin to jerk or pull him by his feet when his legs are crushed. 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.

Question C - The correct answer is 13. The most important thing to do here is to get yourself and Marvin under well supported roof. All other actions must wait. Otherwise

another roof fall may kill Marvin and those who seek to rescue him. His only chance is tied to healthy miners who can rescue him and provide first aid.

Question D - The correct answer is 15. You may wish to use an overhead projector to show the diagram of this procedure that is attached to these notes. Answer 16 is wrong because it would cause unnecessary movement and further injury to Marvin and would take too long. To illustrate this point you may wish to demonstrate the two procedures (log roll versus clothing drag) in your class. Have one person be Marvin and a few others be the rescuers. Try both methods and see which is faster and smoother. Answers 17 and 18 are wrong because these actions prolong exposure of Marvin and his rescuers to bad top.

Question E - Answer 19 is correct. With this type of crushing injury you should suspect serious bleeding, fractures, and a victim who is or soon will be in shock. If you wait 20 minutes for help, Marvin may die. Transporting without first examining for injuries and stabilizing him could also injure him more and deepen his shock, leading to his death. Answer 22 is part of the typical treatment for shock but not when a person has crushed upper and lower legs. With this type of injury the legs should be elevated only after the victim has been splinted and placed on a stretcher. This is accomplished by raising the foot end of the stretcher. This would protect the broken legs from further movement.

Question F - Answers 23, 24, 36, 27, and 28 are correct. You should first question Marvin (23) while at the same time checking his breathing (24). In question C you learned that his right thigh was bleeding. After finding his breathing to be O. K. you would probably want to examine his leg by slitting his pants (28). This would allow you to check his wound and control for bleeding if necessary. Feeling his hands (27) and taking his neck pulse (25) would be next, unless bleeding was severe. If it were severe, the bleeding should be controlled by direct pressure and bandaging before doing other things. The fast pulse and cool, damp hands coupled with his becoming weaker and passing out are signs of shock. You need to begin treating him for this right away or he may die before he gets advanced life support. Deep shock rapidly becomes irreversible even with advanced life support. What you do right away to treat shock is critical if Marvin is to survive. Pulling off his boots to check his foot pulses (26) would waste time and probably hurt him more. You would probably have difficulty getting the boots off without moving his broken legs. Unless you are an experienced EMT you would have difficulty locating his foot pulses. If you find he has weak or no foot pulses, there is little you can do. You have no advanced life support equipment and you are not trained to use it. Most coal mine 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 too weak and hard to locate in Marvin's condition.

Question G - Answer 31 is correct. All the other answers have too little information. The person calling out 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, such as clearing the track all the way out, or asking the person on the surface to get an EMT to talk with you and give advice. There is

disagreement about one part of this question and the "right" answer. Some companies like the miners to report the names of the injured. Medical personnel responding at the surface need background medical information (heart problems, diabetes, medications, allergies, etc.) about the injured person as soon as treatment is begun. Other companies prefer not to name the injured to avoid rumors and misinformation among persons who overhear the calls. You may want to discuss this issue in terms of company policy and emergency medical personnel preferences in your area. You might have class members practice calling out information about injuries. One person can role play being on the section and the other on the surface. Class members can listen and comment on the performance of the two persons.

Question H - Answers 34, 37, 38, 40, and 41 are correct. You can demonstrate each of these procedures in your classroom using the appropriate props and having a miner play the part of Marvin. Other class members can practice the procedures. You may want to use an overhead projector to show the drawings included at the end of these notes. One shows how to lift Marvin onto the stretcher. Another shows how to immobilize him on the stretcher. Answers 33, 35, 36, and 39 are all incorrect for the reasons given in the invisible ink portions of the answer sheet (see the master answer sheet).

Question I - Answer 45 is correct. This 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 on his own vomit and die right away. Second, he may aspirate his vomit fluids into his lungs. This will produce a severe pneumonia that may also kill him within a few days, even though he receives good medical treatment. What you do or do not do in the first aid procedure is more important for Marvin than later treatment by medical personnel. Unless you do your job, he may not profit from later advanced life support treatment.

Question J - Some of the violations noted by experts are: a) working in the section without taking better roof control measures, even knowing the top, though freshly cut, is drummy; b) possible failure to follow the roof control plan; c) possible failure to make a preshift inspection; d) failure to frequently sound and inspect the top; e) Marvin going under unsupported top; and f) having no EMT nearby to respond quickly. Can you find others?

Additional Figures

Use overhead transparencies of these illustrations during the discussion to help demonstrate proper techniques for moving, lifting and immobilizing Marvin.

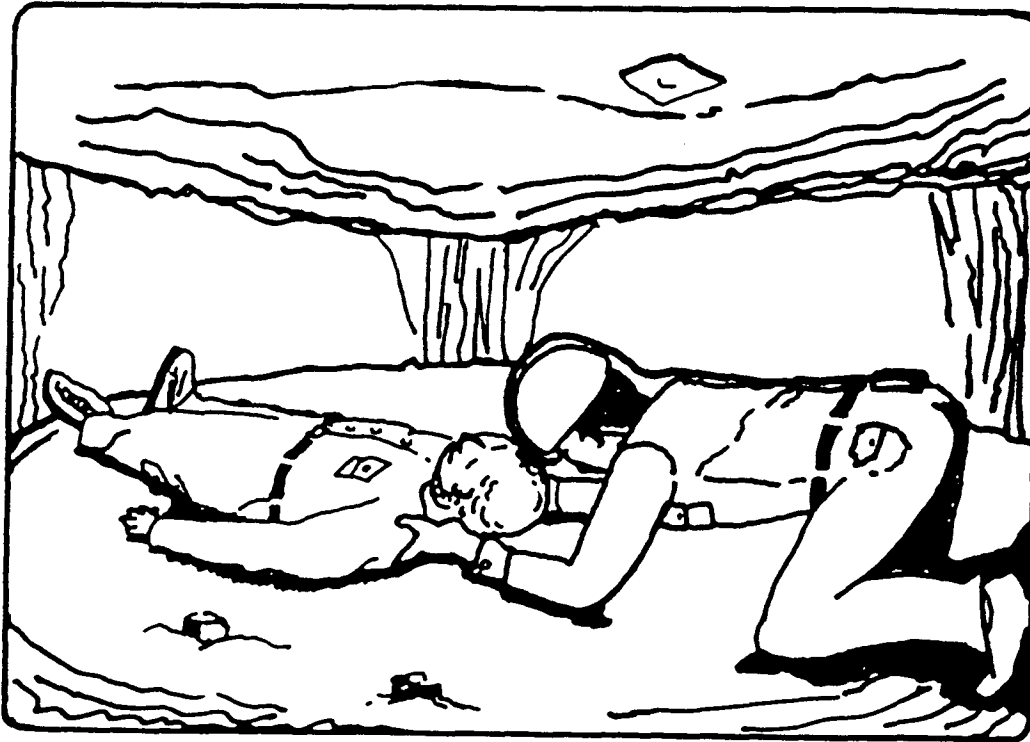


Figure 4: Emergency one-rescuer clothing drag

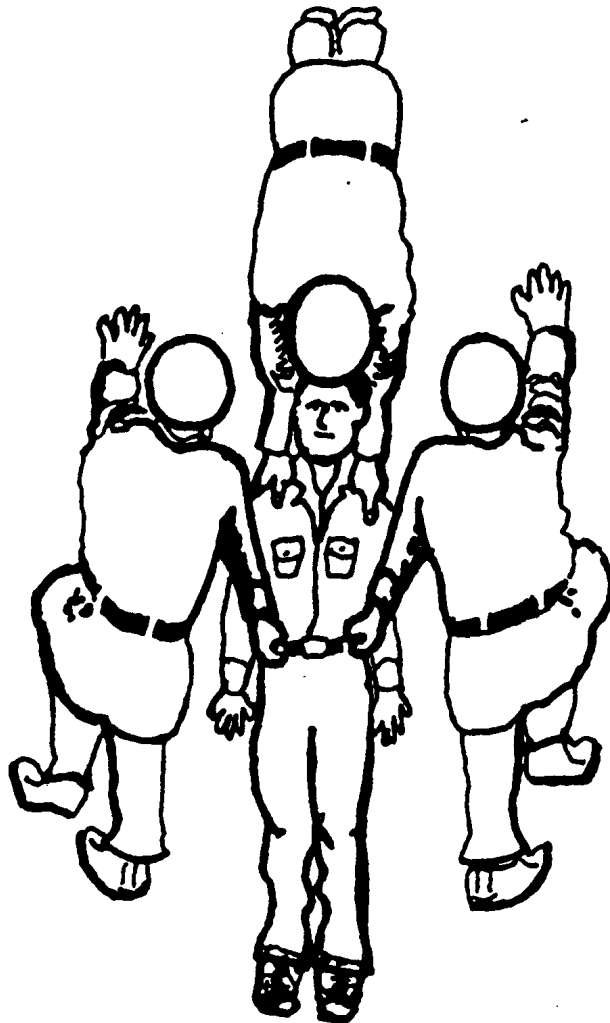


Figure 5: Emergency clothing drag with three rescuers

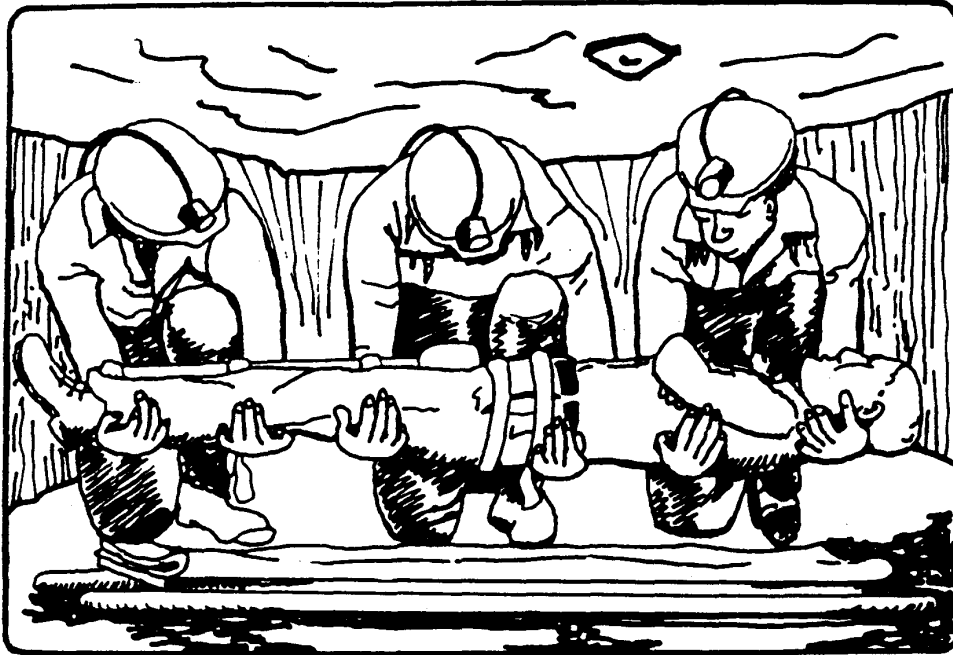


Figure 6: Three person lift for moving an injured person

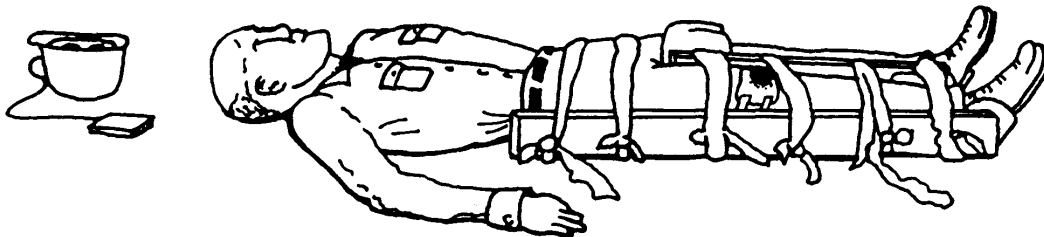


Figure 7: Ties for immobilizing Marvin's leg fractures

References

- American Academy of Orthopaedic Surgeons. (1981). Emergency care and transportation of the sick and injured, (3rd ed.). Chicago, IL: Author.
- American Red Cross. (1981). Standard first aid & personal safety, (2nd ed.). New York: Doubleday.
- Aaron, J. E., Bridges, F. A., & Ritzel, D. O. (1972). First aid and emergency care: Prevention and protection of injuries. New York: Macmillan.
- Bergeron, J. D. (1982). First responder. Bowie, MD: Robert J. Brady Co.
- Darling, K. (1985). First aid and emergency medical care. In F. Cameron (Ed.), The Kentucky underground coal mine guidebook (pp. 150-163), Lexington, KY: The Kentucky Mining Institute.
- Mine Safety Associates. (1985). Federal coal mine safety standards. 30 CFR 75: Pocket edition. Price, UT: Author.
- Mine Safety and Health Administration. (1980). First aid book. Washington, DC: U. S. Government Printing Office.
- Office of the Federal Register. (July 1984). Code of federal regulations. 30. (parts 0 to 199). Washington, DC: U. S. Government Printing Office.
- Peng, S. S. (1978). Coal mine ground control. New York: Wiley.
- Stefanko, R. (1983). Coal mining technology theory and practice (Chapter 5). New York: Society of Mining Engineers.

Scoring Key for Unsupported Roof Rescue

The correct answers are marked with an asterisk.⁴

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

Unsupported Roof Rescue

Problem Booklet

Instructions

Read the problem situation described on the next page. Study the map until you understand the location of the miners and equipment in the problem. Next, answer each of the 10 questions. Do them one at a time. Don't jump ahead, but you may look back to earlier questions and answers. For most of the questions, choose only one answer unless you are told to "Try again!" A few 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 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

8 entries are being driven in 42 inch coal. Eleven miners are working on Section 001.
The portal is 4,000 feet outby the face.

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

The EMT normally on this section is absent today. You are trained in basic first aid but not as an EMT. The top in this section is generally drummy and poor. The roof bolter has an ATRS.

Problem

You are the pinner operator. You are bolting the roof in the #2 entry at the face. Your helper, Marvin R. Letcher, has gone out ahead of the bolter to mark the roof. You yell at him to get back. He almost gets back to supported roof when a piece of draw slate falls trapping both his legs. (See Figures 1 & 2) Marvin is laying face down screaming. The roof is dribbling across the whole entry just past the last row of bolts. Now, turn the page and answer the first question.

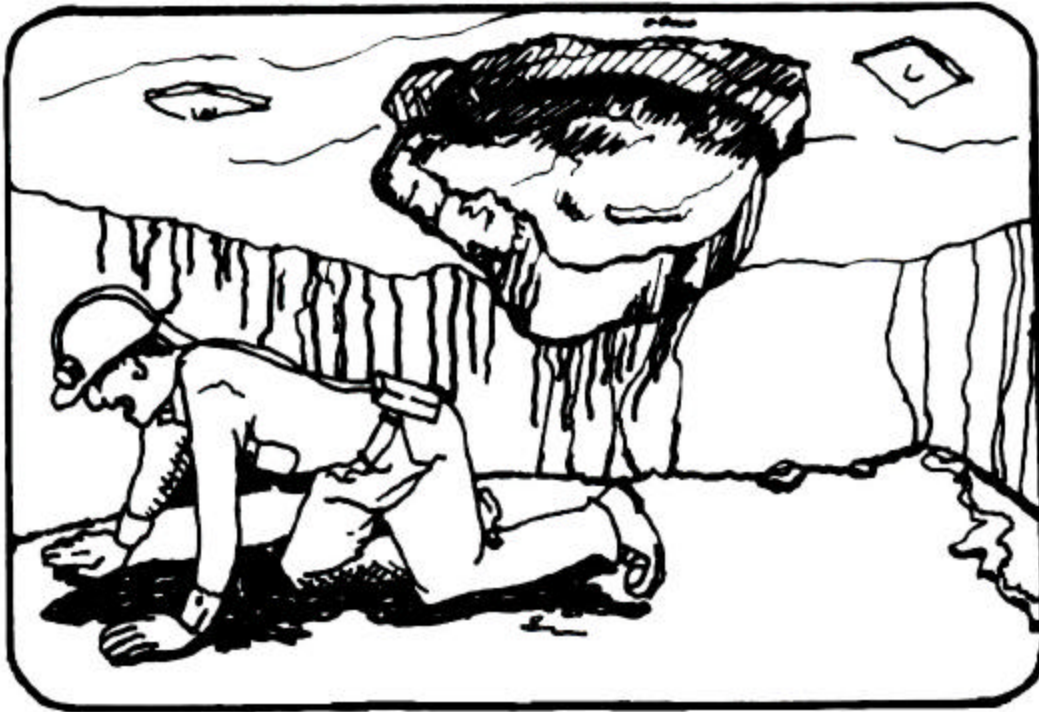


Figure 1: Draw slate falls from roof

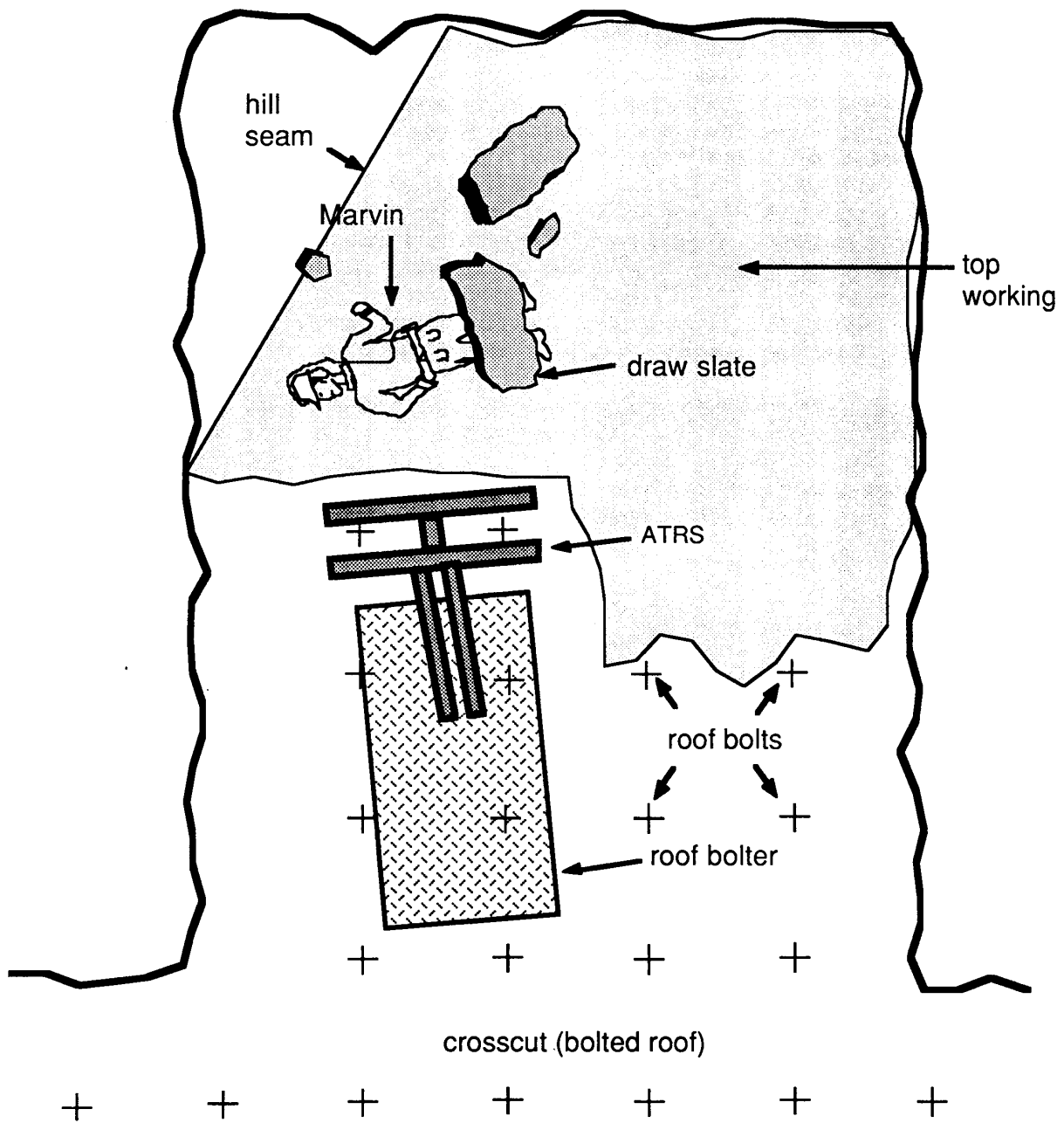


Figure 2: Draw slate hits Marvin's legs

Question A

You yell for help. Three other miners come quickly. Marvin's legs are under the slate. His head is near the left rib. The roof bolter is outby his position about six feet. The ATRS is in place. (See Figure 3) The top continues to work. What would you do now? (Choose only ONE unless you are told to "Try again!")

1. Grab a couple of slate bars. Have the other three miners help you pry the rock off Marvin's legs.
2. Get the head of the roof bolter under the corner of the rock and lift it gently off Marvin's legs.
3. Move close to Marvin to check his injuries and begin first aid immediately.
4. Leave the bolter and the ATRS where they are. Set roof jacks and timbers from the ATRS toward and around Marvin.
5. Lower the ATRS on the bolter. Tram the bolter ahead and then raise the ATRS over Marvin.
6. Tram the roof bolter out of the entry. Then tram a scoop in so you can lift the rock off Marvin with the scoop bucket.



Stretcher and first aid kit at the dinner hole 240 feet away
Mine pager at tailpiece 200 feet away.

Figure 3: Top view of Marvin's position and conditions in the entry

Question B

You have now supported the roof with two jacks and three posts. Using slate bars and a jack, the three of you have lifted the slate just enough to free Marvin's legs. The top continues to dribble across the whole entry. What should you do now? (Choose only ONE unless you are told to "Try again!")

7. Have your buddies grab Marvin by his belt and shirt while you grab his pants leg above and below his left knee. Pull together and slide him out from under the rock sideways on his stomach.
8. 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.
9. Reach under the slate. Grab him by his boots and jerk him out sideways by his feet.
10. Leave Marvin under the rock. 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. You and your buddies log roll him onto his back so you can pull him past the bolting machine. You are about six feet in by the last row of bolts. Even with the extra jacks and timbers you have set, the roof continues to work. You notice Marvin's right thigh is crooked and bloody. What is the first thing you should do in this situation? (Choose only ONE unless you are told to "Try again!")

11. Check Marvin's airway, breathing, and pulse.
12. Put Marvin into a scoop and transport him to the surface.
13. Move Marvin down the entry under supported roof.
14. Slit Marvin's pant leg and look at his right thigh.

Question D

How should you and your buddies move Marvin to get under well supported roof?
(Choose only ONE unless you are told to "Try again!")

15. Cradle Marvin's head and shoulders in your arms. Drag him by his shirt shoulders and his belt at the sides so that he slides on his back with his head, neck, spine, and legs in line. Keep his head and shoulders close to the ground.
16. Continue to log roll Marvin down the entry having all four miners help turn him.
17. Send two miners to get the first aid kit. When they return put Marvin on the stretcher and immobilize him. Then bring a scoop up and put the stretcher in the bucket and take him out by the face.
18. Splint Marvin's legs with a piece of brattice cloth or anything handy. Gently tie his legs together. Then drag him out by head first to a safe spot.

Question E

You, Marvin and the others are now under well supported roof near the last open crosscut of #2 entry. The crosscut is bolted on both sides. An EMT from another section has been called but it will take him 20 minutes to get to you. Marvin is no longer screaming, but moaning softly and complaining of pain in both legs. What is the first thing you should do now? (Choose only ONE unless you are told to "Try again!")

19. Begin checking Marvin for injuries.
20. Cover Marvin with a blanket and wait for the EMT.
21. Use a scoop bucket to take him to the mantrip and take him out immediately.
22. Leave Marvin on his back and prop up both legs with folded brattice cloth.

Question F

How would you check Marvin for injuries? (Select as MANY as you think are correct.)

- 23. Ask Marvin if he has pain anywhere else besides his legs.
- 24. Check Marvin's airway and his breathing.
- 25. Check Marvin's pulse.
- 26. Pull off Marvin's boots and take his pulse in both feet.
- 27. Feel Marvin's hands.
- 28. Slit both pant legs and look at his legs.

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

Question G

Fast Jack, a miner from the section, goes to call outside and report on Marvin's condition. What should he say? (Choose only ONE unless you are told to "Try again!")

- 29. "We have a man with broken legs. He needs help."
- 30. "Marvin Letcher got caught in a roof fall. He is hurt bad. We need help."
- 31. "This is Fast Jack. Marvin Letcher has been hurt by a roof fall on Section 001. His upper right leg is broken and the bone is sticking out. He is passed out and bleeding."
- 32. "We got someone busted up real bad on the section. He needs a doc real fast."

Question H

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.)

- 33. Lift Marvin onto the stretcher and take him out of the mine without delay.
- 34. Apply a sterile dressing and pressure bandage to the right thigh wound.
- 35. Before bandaging, use a sterile dressing to push the sharp ends of the thigh bone back into the wound.
- 36. Splint Marvin's broken right thigh with an inflatable air splint.
- 37. Use a long board on the outside, a short board on the inside, and padding and cravats to splint Marvin's broken right thigh, before you lift him onto the stretcher.
- 38. Splint Marvin's lower left leg with an inflatable air splint.
- 39. Lift Marvin onto the stretcher before you splint his broken legs.
- 40. After Marvin is tied to the stretcher with cravats, cover him with a blanket and elevate the foot end of the stretcher about 12 inches.
- 41. Tell Marvin what you are doing as you care for him.

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

Question I

As you begin to transport Marvin to the surface, he starts to vomit. 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.

Marvin has a good chance to live if you carried out the correct procedures. Too many incorrect actions might deepen his shock and result in his death. Working on him under bad top might kill both you and him. Marvin's only chance is for you to stay safe and well. Otherwise he will die.

Question J

On your answer sheet, list all violations of state and federal laws and your company rules that you can find in this 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 is 45.

The worst possible score is 0.

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 MSHADistributioncenter@dol.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.

Master Answer Sheet for Unsupported Roof Rescue

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.

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

1. []
2. []
[]
3. []
4. []
5. []
[]
6. []
[]

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

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. []

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

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

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

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

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

29. []

30. []
[]

31. []
[]

32. []

[]
[]
[]

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

33. []
[]

34. []

35. []

36. []
[]

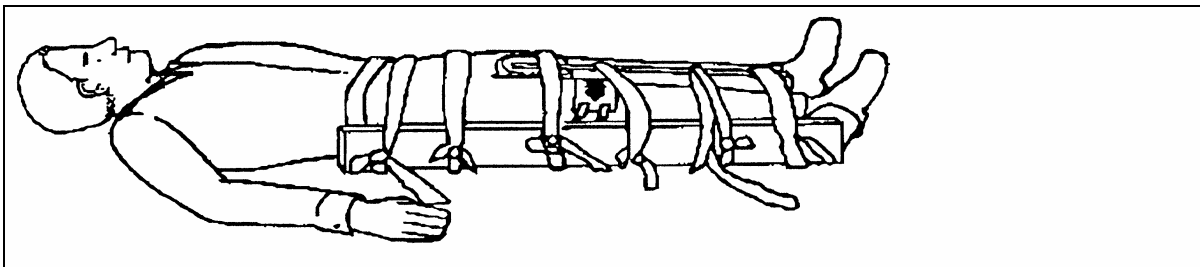
37. []

38. []

39. []

40. []
[]

41. []
[]



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

42. [_____]

43. [_____]

44. [_____]
[_____]

45. [_____]
[_____]

Question J

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 = 45

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 match up exactly 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.

Risky! This may hurt you, the others, and Marvin. Try again!

Good idea, but the head is too big to fit under the rock. If you try to lift the rock this way it may slide, slip, or fall and hurt Marvin more. Try again!

This action places you and Marvin in danger. Try again!

Correct. With the roof supported, you can now help Marvin. Do next question.

When you start to lower the ATRS, more slate falls. This action places you and Marvin in danger. Try again!

When you lower the ATRS and begin to tram the bolter outby, more slate falls. Now Marvin is in more trouble and you can't get to him. Try again!

Correct. This procedure would be the fastest and least harmful way to move him. Do the next question.

This would endanger him and you. Try again!

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

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

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

Marvin probably needs help before being transported. Try again!

Correct. This protects everyone. Color the box under answer 14.

There is a more critical first step. Try again!

First aid treatment usually follows three basics: maintaining the airway, controlling bleeding, and treating for shock. In this situation these basics must wait until you get Marvin under supported roof. Do the next question.

Correct. This is a clothing drag. It should be used to move a person from a dangerous area. Do next question.

Would cause further and unnecessary injury to Marvin. It would also be slow and prolong exposure of everyone to a working top. Try again!

Would take too long. The top continues to work. You are in danger. Try again!

Would take too long. The top continues to work. You are in danger. Try again!

Correct. Color the box under answer 22.

Marvin may need help before the EMT arrives. Try again!

This could hurt him more and might kill him. Try again!

This could hurt him more and might kill him. Try again!

As you begin checking Marvin's injuries, a roof fall at the face of #2 entry covers the bolting machine. You are safe under good top. Do next question.

Correct. But Marvin doesn't answer.

Correct. Airway is open and breathing is rapid and shallow.

Correct. Pulse is fast (about 120) and weak.

You have trouble removing the boots. His legs twist and move. Then, when you get the boots off you don't know where to find the pulses. You should not have attempted this. Even qualified EMTs might not in this situation.

Correct. Both hands are cool and damp.

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.

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

Message says nothing about the extent of the injury or if Marvin is out from under the roof fall. Try again!

Correct. The message tells who is calling, describes the injury, and Marvin's location and condition. Color the box under answer 32.

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

If the person calling out doesn't give this information, the person on the surface who takes the call should request it. The medical emergency team needs this information to care for Marvin. Do the next question.

Transporting without bandaging and immobilizing him could cause further injuries and might kill him.

Correct. This will help control bleeding and protect the wound.

This will cause further injury. Never do this!

No! Not for an open fracture. Color the box under answer 41 to see the proper splint and ties.

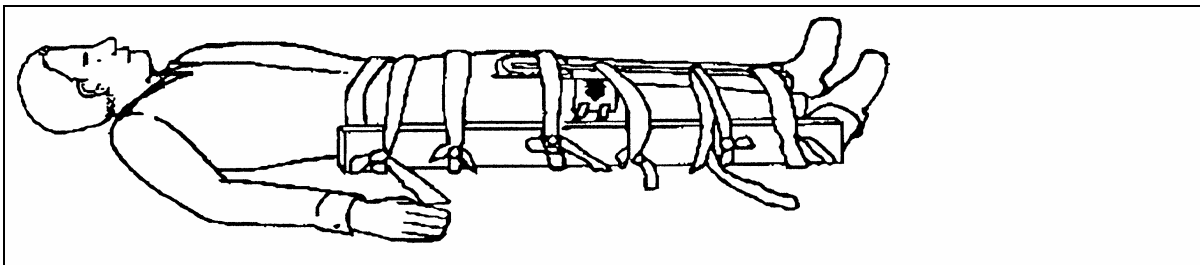
Correct. Color in the box under answer 41 to see the proper splint and ties.

Correct. Inflatable splints may be used on closed fractures.

No. His legs need to be splinted before he is placed on the stretcher.

Correct. Without this simple treatment Marvin may die. He is showing signs of shock. This is his most serious problem at this time.

Correct. Even though Marvin appears to be unconscious, he may need psychological support.



This could hurt him. Try again!

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

He ate a lot. You can't keep his airway clear. He will choke. No reason to suspect a neck injury. Try again

Correct. This will open his airway. You need to watch him closely all the way out and report his vomiting to the EMTs at the surface. Do the next question.