

**Low Coal Fire
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 9 questions. Do them one at a time. Don't jump ahead, but you may look back to earlier questions and answers. For some of the questions, 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 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

Low coal, 28 inches high

Shooting from solid

5 entries, 20 ft wide

Pillars: 40 ft x 60 ft (60 ft x 80 ft on center)

Roof control: 30 inch bolts, 4 ft centers

Face 10 breaks from portal (about 850 ft)

Exhausting ventilation, 420 linear ft/min. air velocity in mains

#2 scoop: old, arcing and smoking and soon to be scrapped

2 bags of rock dust on the #2 scoop, but no fire extinguisher

No water line present

Problem

Scoop #2 has been arcing and smoking all shift. The face area gets smoky. The face boss tells the operator to tram the scoop outside for repairs after #3 entry has been loaded out. On the way out the scoop stalls just outby #6 crosscut. The operator leaves and crawls outby 5 breaks (500 ft) to the outside to get the mechanic to work on the scoop. While he is gone, the scoop's hydraulic oil and a tire catch on fire. Heavy black smoke travels rapidly down the #4 and #5 entries toward the face.

After studying the map on page 4, turn the page and answer the first question.

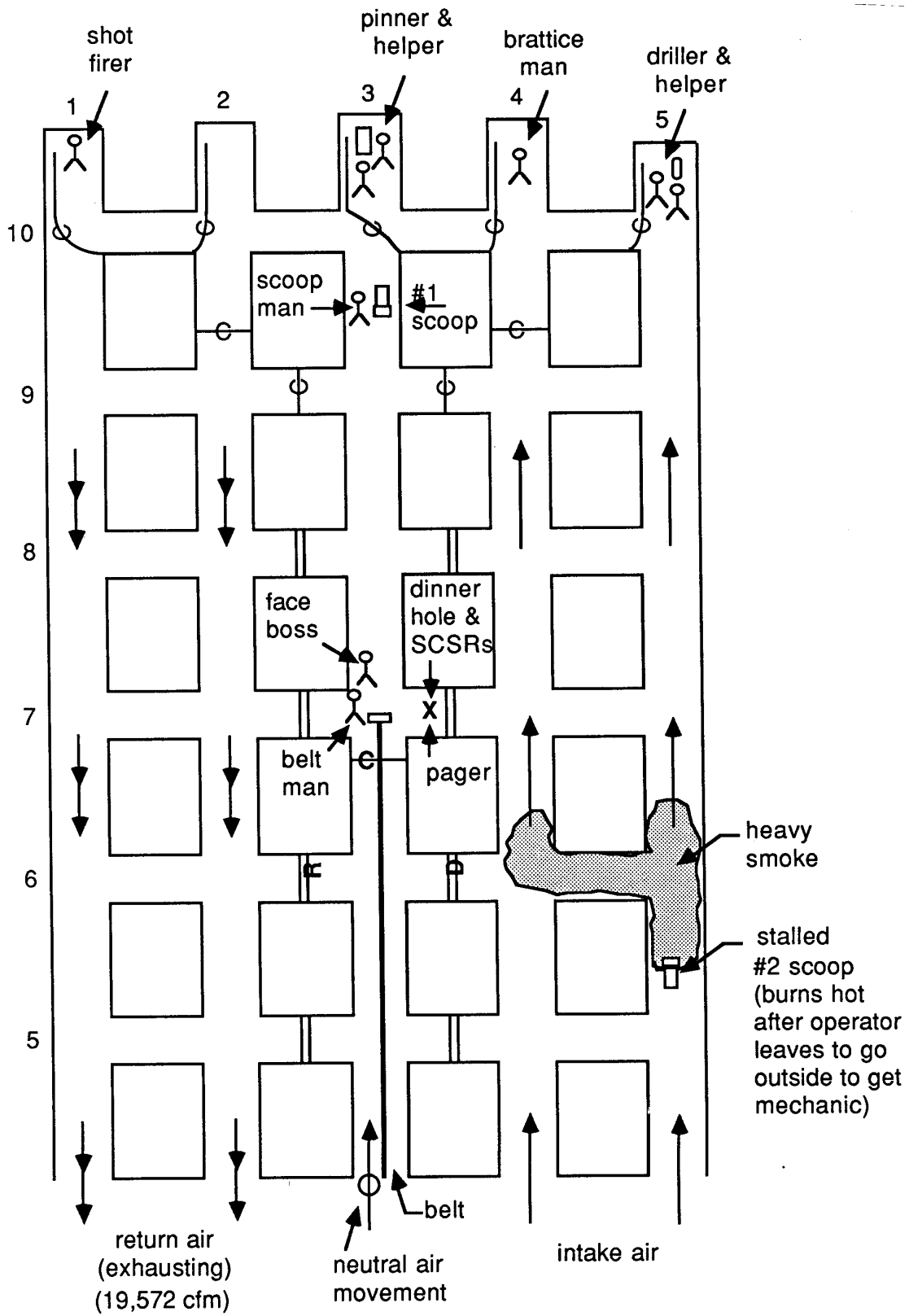


Figure 1: Section map

Question A

After the #2 scoop leaves the face area on its way outside, the driller and helper in the #5 entry don't think much about the smoke. They know the scoop was smoking. However, the smoke soon becomes worse. When they look down the entry they see a cloud of thick black smoke rolling toward them. What should they do? (Choose only ONE unless you are told to "Try again!")

1. Move down the #5 entry to fight the fire.
2. Immediately move down the #4 intake entry toward the portal to get into fresh air. Don't waste time putting on the filter self-rescuer.
3. Put on their filter self-rescuers and move over to #4 and #3 entries to warn the brattice man and the pinner and his helper. Leave the curtains just as they are.
4. Curtain off the air in the #5 entry near the face by pinning the line curtain against the left rib.
5. Crawl down #5 entry. Turn right at crosscut #9. Then go through the check curtain into the #3 entry. Look for the face boss.

Question B

The driller and his helper leave the face. They turn right into the #10 crosscut. They go by the #4 and #3 faces and join up with the brattice man, the pinner, and his helper. The smoke is thick. All have put on their filter self-rescuers. What should they do now? (Choose only ONE unless you are told to "Try again!")

6. Move back into the #4 entry and go on out the intake air.
7. Move outby in the #3 entry to the dinner hole and prepare to go out the beltline.
8. All five miners should spread out and crawl over to the #2 and #1 entries looking for the shot firer.
9. All five miners should exit the mine by the #2 entry, looking for the shot firer on their way out.

Question C

Meanwhile, the #2 scoop operator can't find the mechanic outside. He returns alone to try to start the stalled scoop. He finds it burning so badly he can't see the operator's compartment. The entire entry is filled with heavy black smoke. What should he do? (Choose only ONE unless you are told to "Try again!")

10. Put on his filter self-rescuer and go inby to the first mandoor. Prop the door open, cross the belt and open the regulator all the way to short circuit the smoke.
11. Put on his filter self-rescuer and crawl up the #5 entry to warn the face crew.
12. Fight the fire with the two bags of rock dust he has on the scoop.
13. Put on his filter self-rescuer and go inby in the #4 entry to the first mandoor. Go into the belt entry and move toward the face.
14. Go outside and reverse the fan.
15. Turn around and go out the #5 entry to the surface and get help.

Question D

Except for the shot firer, all the miners who were at the face join up with the #1 scoop man in the #3 entry just inby crosscut #9. They find the air to be cleaner but still a little smoky. The miners move toward the dinner hole. Soon they meet the face boss and the belt man coming inby with six unopened SCSRs. No one has seen the shot firer. What should the face boss do? (Choose only ONE unless you are told to "Try again!")

16. Tell the miners to move down to the tailpiece, stop the belt, take down the check curtain on the belt just outby the dumping point, make sure the mandoor is closed, and close the regulator all the way.
17. Tell all the miners to get into the scoop and tell the operator to tram outby in the #4 entry while the boss stays and looks for the shot firer.
18. Tell the miners to take down the check curtains between the belt entry and the #2 and #4 entries to short circuit the smoke.
19. Tell all the miners to crawl out the belt entry to the surface. The boss and the scoop man put on SCSRs and then tram inby looking for the shot firer.

Question E

The boss says he and the pinner will put on SCSRs, take an extra SCSR, and go into the #10 crosscut and over to entries #1 and #2, to look for the shot firer. The #1 scoop operator is to stay near the pager and wait for them to come back. All the others are to crawl out the belt entry to the surface. The scoop operator says it is too dangerous to search for the shot firer. What should the face boss do now? (Select as MANY as you think are correct.)

20. Immediately send one of the miners to call outside on the pager to see if the shot firer is outside.
21. Immediately have one of the miners call outside to report the fire, its location and intensity, and to notify the superintendent to get help to fight the fire.
22. Examine the seals and pressure gauges on the SCSRs.
23. Gather brattice material, nails, a hammer, and other supplies with which to barricade if needed.
24. Listen to the scoop operator as he reports the fire's location and intensity and reconsider the decision to search for the shot firer.

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

Question F

The smoke in the last open crosscut is now very thick. The air in the belt entry is also getting smoky. The boss and the pinner talk about possible routes they can use. Even though the #1 scoop operator says it is too dangerous, the boss says he and the pinner will search for the shot firer anyway (see Figure 2 on page 11). Which route, if any, should they take? (Choose only ONE unless you are told to "Try again!")

25. None of the routes shown in Figure 2 is safe and none should be attempted.
26. **Route C** is best because the two miners will stay together and make only one pass. They will spend less time in the smoke.
27. **Route D** is best because the two miners can cover the same distance faster.
28. **Route A** is best because it is the most complete search and the most likely to locate the shot firer.
29. **Route B** is best because the two miners can stay together and they may find the shot firer if he is in the return airway.

Question G

See Figure 1 on page 4. What would be the usual designated primary escapeway in a mine like this one? (Choose only ONE unless you are told to "Try again!")

- 30. Number 6 crosscut.
- 31. Number 4 or 5 entries.
- 32. Number 3 entry because it is in neutral air.
- 33. Number 1 or 2 entries.

Question H

Suppose that when the shot firer first saw the smoke getting thicker, he became scared. He decided to go straight out the #1 entry, the shortest route outside. Is his decision risky for anyone beside himself? (Choose only ONE unless you are told to "Try again!")

- 34. No, not as long as he puts on his filter self-rescuer.
- 35. Yes, because the other miners won't know where he is.
- 36. No, as long as he moves out when the smoke first starts to get thicker he will be O.K. He will get out quickly.
- 37. Yes, because he should wait at the face until the boss arrives and tells him what to do.

Question I

On the separate answer sheet, list all the 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".
2. Count the number of "incorrect" responses you colored in. Subtract this number from 26. 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 score is 37.

The worst score is 0.