Man in the Bin Exercise

Problem Booklet

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

&

Miner Training Project
Southwest Virginia Community College
Richlands, Virginia

Instructions

Read the problem described on the next page. Then answer the 13 questions. Do them one at a time. Don't jump ahead, but you may look back to earlier questions and your answers. Each question is followed by a number of choices. Some choices are good things to do. Some are wrong. The object is to select wise choices and avoid wrong ones. Some questions tell you to select only one correct answer unless you are told to "Try again!" Other questions tell you to select all the answers you think are correct. Follow the directions for each question.

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

Background

You are the weigh master at the scale house at the truck unloading bins at a prep plant that receives coal from several mines in the region.

You have just come on duty. It is 7:05 A. M.

lt has been raining and the temperature has dropped to 20 degrees F.

The scale house is located near bin #1. (See Figure 1.)

You see the evening shift left bin #1 full all night while the plant was shut down.

The plant has just started and the conveyor belt under the feeders is running.

The feeders under the bins are the oscillating type.

The feeders are located about 18 inches below the chute on each bin.

The feeder under bin #1 is running.

Each bin has its own feeder power switch located under the bin on the right hand bin support post. (See Figure 1.)

The main power panel and circuit breakers for all the feeders and the belt under the feeders are located on the lower belt level under bin #5. (See Figure 1.)

The belt under the feeders dumps onto the main belt to the prep plant.

No belts have reverse switches.

A hydraulic boom truck capable of lifting 2,000 lbs., 40 feet in the air is located at the plant. A backhoe is also nearby.

First aid supplies, a folding aluminum stretcher, and a stokes stretcher are located at the main prep plant supply room about 600 feet away.

No EMTs are on the property, but you and the other workers are trained in basic first aid.

A friend of yours, Big Jake (240 lbs.) is dumping the first load of coal for the day shift into bin #1.

Jake's truck is equipped with a CB radio. You know he carries a 40 foot length of half inch hemp rope on the floor in his truck cab.

TURN THE PAGE AND READ THE PROBLEM STATEMENT.

Problem

You are standing by the stairs to the lower level. Big Jake has come over to talk with you for a minute while his load dumps. After 5 minutes he notices his load has not emptied. Jake heads back to the truck cussing. His load is hung up because the bin is still full even though the feeder and belt have been running. Study Figure 1 and then turn to Question A.

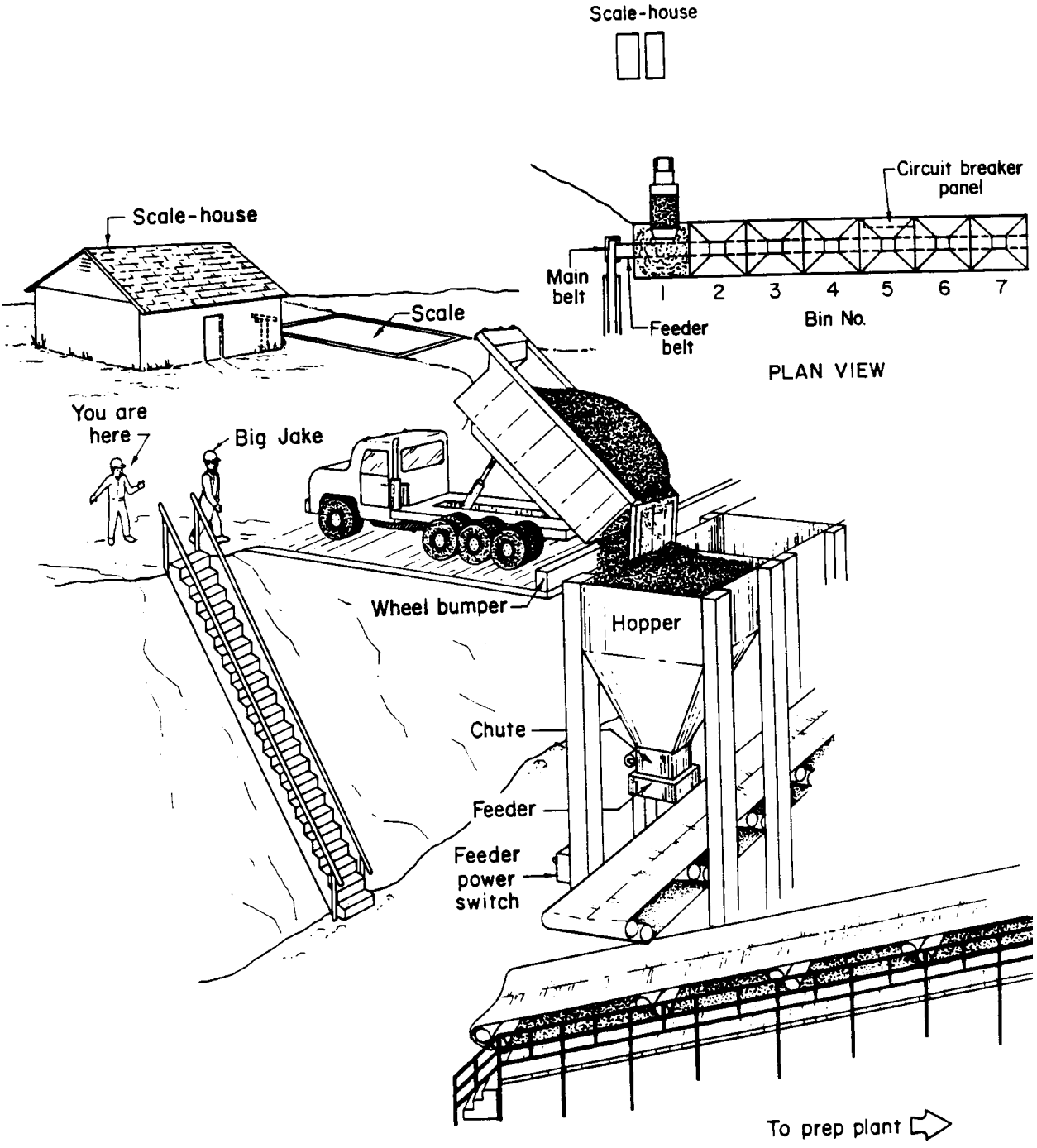

Figure 1: Big Jake's truck won't empty

Question A

Jake is in a hurry to empty his truck so he can go get another load. He says he is going to climb into the back of his truck to help push the load off with a shovel. What should you do? (Choose only ONE unless you are told to "Try again!")

1. Tell Jake this is a tough, two man job. Then offer to climb up and help him free the coal so he can lower the bed and dump the rest of his load at another bin.

2. Ask him to wait until you can get a ladder so he can safely climb into the bed of the truck.

3. Tell him to take it easy and to wait until the coal in his truck comes out by itself.

4. Tell him to not get into the bed of the truck, but to wait until you go to the scale house and call the plant foreman to report the problem.

Question B

As you start for the scale house, you see Big Jake climb up on the wheel bumper and step onto the coal in bin #1. He is holding the top of the truck tailgate with his left hand and stomping on the coal. Before you can say anything, you hear him scream as the coal drops into the bin and he disappears under more coal sliding out of his truck. (See Figures 2 and 3 on the next two pages.) Now what should you do? (Choose only ONE unless you are told to "Try again!"

5. Run as fast as you can to Jake's truck and call for help on his CB radio on channel 9.

6. Run as fast as you can to the scale house and use the phone to call the foreman in the prep plant to tell what happened and ask for help.

7. Run as fast as you can to the bin. Climb up, lean over, and dig around with your hands to try to find Jake to keep him from going through the feeder.

8. Run as fast as you can to Jake's truck, grab the rope that is in his cab, tie it around your waist, secure the other end to the truck tail gate, grab a shovel, and then get into the bin and dig for Jake.

9. Run down the steps as fast as you can to the power switch for the feeder for bin #1. Then knock the power so Jake doesn't go through the feeder.

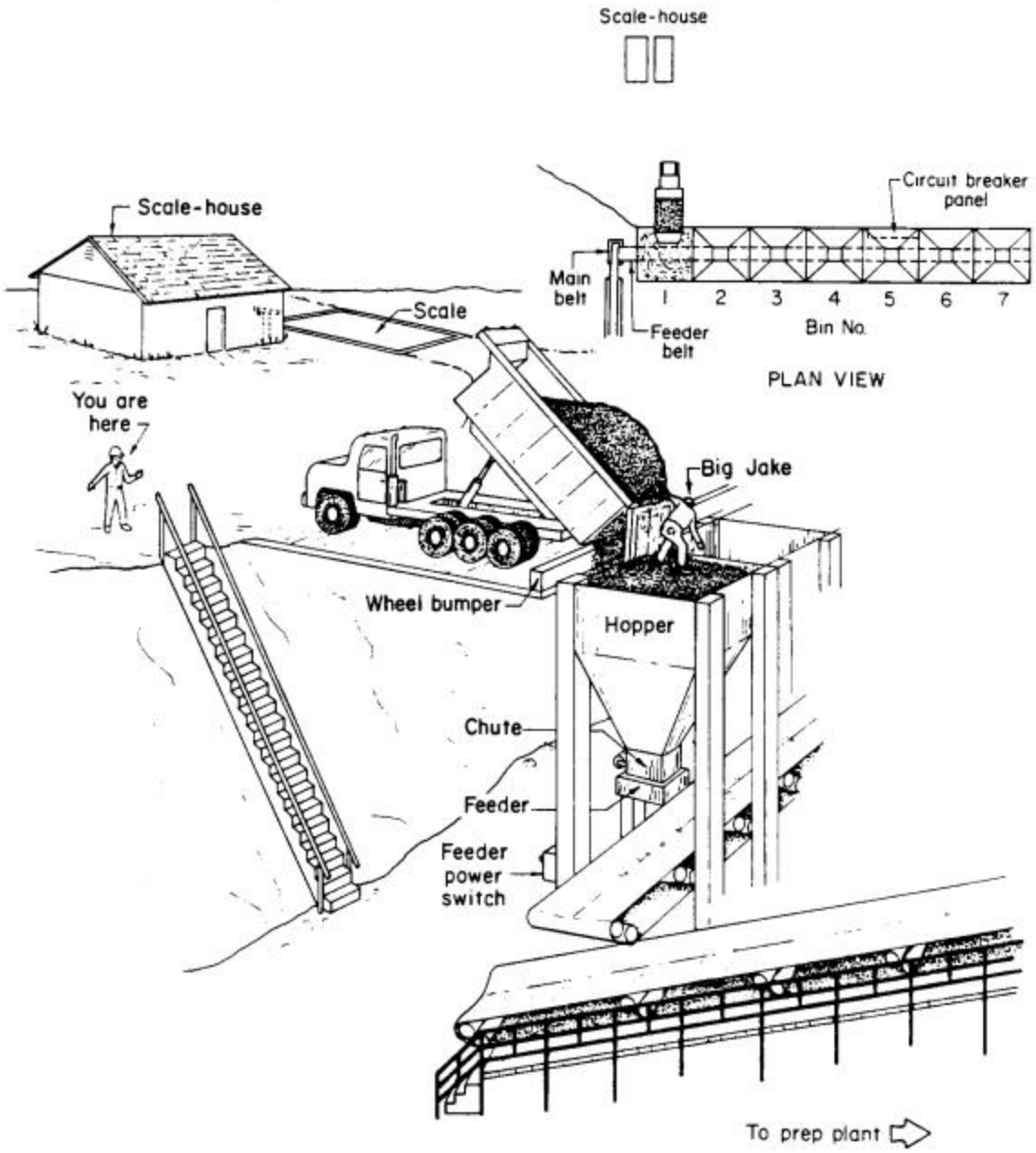

Figure 2: Big Jake climbs into the bin and stomps on the coal.

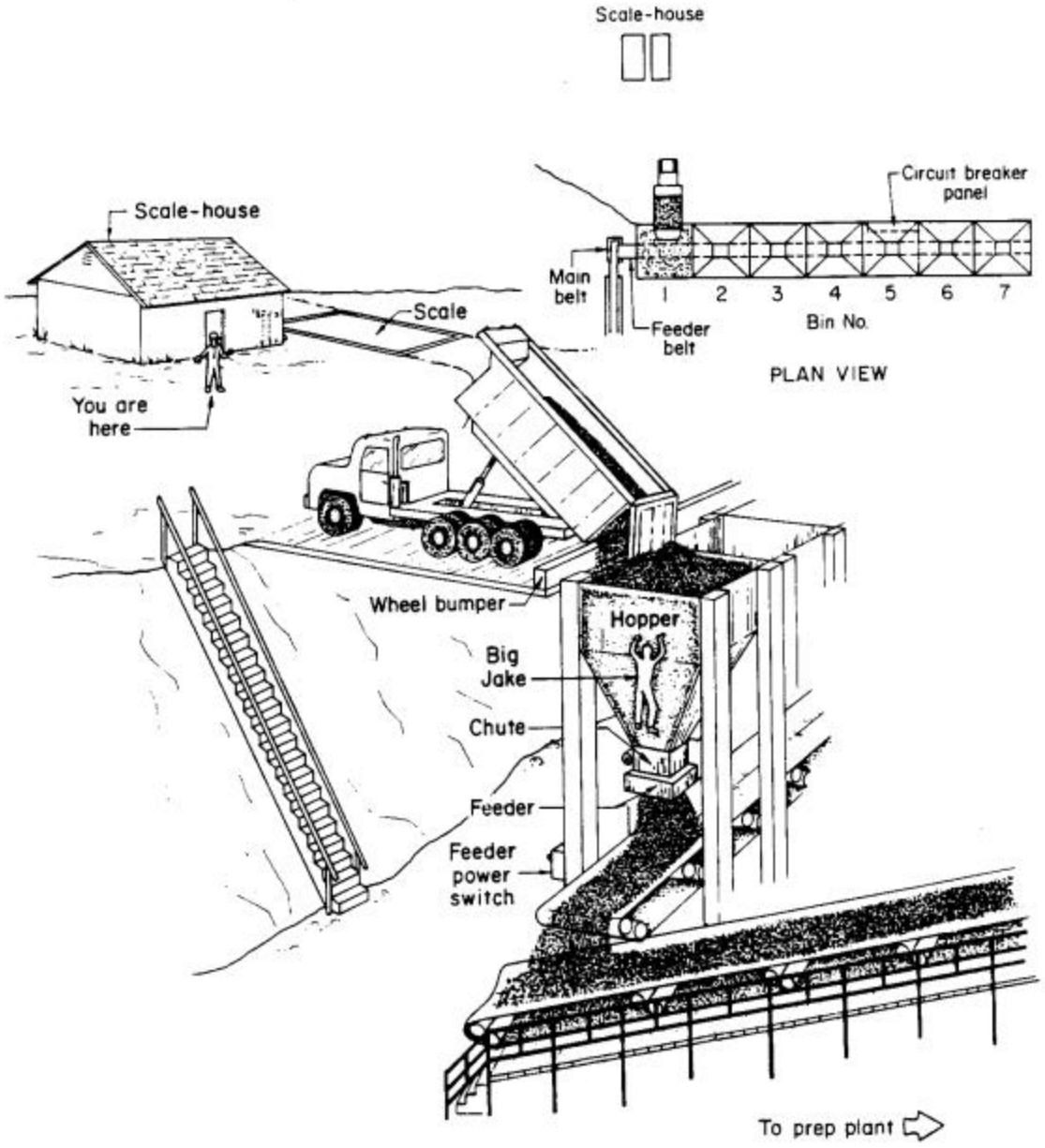

Figure 3: Big Jake falls into the bin and is covered by 20 tons of coal

Question C

You call the main prep plant and report what has happened. The foreman tells you to call the local emergency medical service ambulance. Just as you finish making this call, the foreman and two other workers pull up by Jake's truck in a company utility truck. You notice an acetylene cutting torch in the back of the utility truck. About 3 minutes have passed since Big Jake fell into the bin. Now what should you do to help Big Jake? (Select as MANY as you think are correct.)

10. Shut everything down. Then have three workers get into the bin and start digging for Jake using shovels, and working from the tip of the bin down.

11. Run to the power switch for the feeder for bin #1. Cut the power. Then look for Jake from the top of the bin and by looking up the feeder chute.

12. Leave the feeder and the belt running. Look for Jake by sending one person to the bottom of the feeder to look up the chute and another person to look into the bin from the top.

13. Notify all other prep plant employees to begin looking for Jake along the belt to the prep plant.

14. Shut down the belt under the bins and stop the feeder under bin #1. Then tie the half inch rope to one worker's belt. Have him get into the bin and dig for Jake while two other workers slowly let out the life-line.

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

Question D

You haven't been able to find Big Jake in the bin or the chute. The other workers who are checking along the belt to the prep plant belt haven't found him yet. Jake has been missing for about 4 or 5 minutes. You think he must still be in the bin. What should be done now to save Big Jake? (Select as MANY as you think are correct.)

15. Get the backhoe, move Jake's truck out of the way, and then start digging the coal out of the bin from the top down.

16. Get the cutting torch from the pickup and start cutting a hole in the side of the bin just above the feeder.

17. Call for a mechanic to disconnect the feeder from the bin.

18. Keep the vibrating feeder for bin #1 operating, and the conveyor belt under the bins running.

19. Place one worker at the chute, and another at the circuit breakers for the main control panel for the belt and feeders. Tell the worker at the chute to yell to the worker at the switch to shut down the power if Big Jake is spotted coming out the chute.

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

Question E

The worker by the feeder watches for Big Jake to come through the chute while a second worker waits by the main control panel to cut off the power to the feeder and the belt under the feeders. Then one of the workers watching the belt to the prep plant spots Big Jake about 100 feet from the prep plant. The worker yanks the emergency stop cord. The prep plant belt stops. Jake is 30 feet above the ground on the elevated belt about 80 feet from the prep plant. What should you and your helpers do now? (Select as MANY as you think are correct.)

20. Lock-out the prep plant belt drive power switch before getting out on the belt to examine Jake.

21. Immediately reverse the belt and bring Jake back to the ground.

22. Restart the belt. Let Jake come into the prep plant and onto the first vibrator table so he can be rescued from this position.

23. Be careful. Don't hurry. Big Jake is probably dead. You probably can't help him.

24. Send two people up the catwalk to stay with Big Jake, to watch him, and to wait until the ambulance EMTs arrive to take care of him.

25. Send one worker to the main gate to the prep plant so he can flag down the ambulance and direct it to the correct place on the property.

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

Question F

The belt drive for the prep plant belt is now locked out. You, the foreman, and two other workers have taken the first aid kit, and the folding aluminum stretcher, and a couple of blankets and climbed up the catwalk to Big Jake. The catwalk is covered with ice and freezing rain and is very slippery. Jake is lying on his back on the belt covered with coal. Only part of his face and head and his left boot are visible. The rest of his body is covered with coal. What should you do now? (Choose only ONE unless you are told to "Try again!")

26. Immediately cover him with a blanket to keep him warm.

27. Check his skin color.

28. Check him for broken bones and bleeding.

29. Check his airway.

Question G

Big Jake's nose and mouth are plugged with fine coal and coal dust. He doesn't appear to be breathing. What should you do now? (Choose only ONE unless you are told to "Try again!")

30. Roll him onto his stomach and then strike him sharply between the shoulder blades four times with the heel of your hand.

31. Sit him up, get behind him, and then perform the Heimlich maneuver.

32. Carefully use your pocket knife or a piece of wire to dig the coal out of his mouth and nose.

33. Use your fingers to clean the coal from his mouth and nose.

Question H

As soon as you get the coal cleaned out of Big Jake's mouth and nose he starts breathing. Then he begins to regain consciousness. What should you do now? (Choose only ONE unless you are told to "Try again!")

34. Tell the other three people with you to help move him off the belt to the catwalk so you can better assess and treat his injuries.

35. Immediately have the other three people help you use a three person lift to put Jake on the stretcher while you keep his head and neck lined up with his body.

36. Leave him where he is, comfort him, gently clean the coal off his clothing, and check him for injuries.

37. Leave him where he is on his back. Comfort him but don't try to clean the coal off him, and don't touch him because he may have serious internal injuries.

Question I

While you are kneeling on the belt checking Jake for injuries, he suddenly sits up. He says, "I've gotta get back to my truck!" Then he swings his feet over the side of the belt opposite the catwalk. Then he starts to scoot his buttocks toward the edge of the belt so he can jump off. He is in danger of falling 30 feet to the ground. What should you do now? (Choose only ONE unless you are told to "Try again!")

38. Try to reason with Jake, and tell him to lie down on the belt.

39. Grab Jake by his collar and belt and pull him back and down on the belt.

40. Get a blanket from the first aid kit. Then wrap it around Jake to restrain him.

41. Lean over the far side of the conveyor belt, gently grab Jake's legs, and swing them back up onto the belt.

Question J

You and your three helpers pull Jake back on the belt, but he keeps trying to get up and jump off. He is confused and doesn't understand what has happened or where he is. He keeps repeating he has to get back to his truck. What should you do now? (Select as MANY as you think are correct.)

42. Talk to him and try to calm him down while the other three workers help you restrain him.

43. Get him on the folding aluminum stretcher and tie him in place with the cravats from the first aid kit, so you can carry him down the catwalk to the surface.

44. Yell down for the stokes stretcher to be sent up.

45. While continuing to restrain and talk to Big Jake, snugly wrap his arms, body and legs in one of the blankets.

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

Question K

Big Jake is still on the belt on his back wrapped tightly in a blanket. Another truck driver brings the stokes stretcher to you. How should you get Jake into the stokes stretcher? (Choose only ONE unless you are told to "Try again!")

46. Tell two of your helpers to lift Jake's feet, while you and the other helper lift his shoulders. Then lift Jake and place him in the stokes stretcher on his back.

47. Tell your three helpers to assist you in getting the second blanket under Jake. Then all four of you take hold of the blanket and use it as a sling to lift him smoothly and gently into the stokes stretcher on his back.

48. Place the stokes stretcher on top of Big Jake over his legs, abdomen, chest, and face. Then have your three helpers help you roll him and the basket as a unit so he is face down in the basket.

49. Have your three helpers log roll Jake onto his stomach on the belt. Then put the stokes stretcher over his back. Roll Jake and the basket over so he is in the basket on his back.

Question L

You and your two helpers tie Jake securely on his back wrapped in the two blankets. Now you must decide how to get him down. Jake weighs over 240 pounds. The catwalk along the belt is narrow, steep, and coated with freezing rain and ice. What should you do now? (Choose only ONE unless you are told to "Try again!")

50. Wait until the ambulance EMTs arrive. They will know how to get Jake down.

51. Have your three helpers assist you in lifting the stretcher and carrying Big Jake down the catwalk to the ground.

52. Tie a rope to the head end of the stretcher. Then move the stretcher to the catwalk. Then slowly slide Big Jake down the catwalk.

53. Send for the hydraulic boom truck. Have the operator move the truck near the belt, and attach a couple of pipe slings to the boom. Then have the operator raise the boom to Jake's position so you can attach the stokes stretcher to the slings. Then carefully lower Jake to the ground.

Question M

Think about this whole problem. Then read all the statements below this question. Select the statements that are true. (Select as MANY as you think are correct.)

54. If Jake had tied a rope to himself before he climbed into the bin, he could have been pulled out by you and the other workers.

55. If Jake had tied a rope to himself before he climbed into the bin, the other workers could have gotten into the bin, followed the life-line, and dug him out.

56. If Jake was to live, he had to get out of the bin within a period of about 4 to 6 minutes.

57. If Jake had been covered only to his chin, and his head had remained in the air at the top of the bin, he could have survived for a long time.

58. If Jake had been covered only to his armpits he could have been easily dug or pulled out.

59. When Jake climbed into the bin, he was probably standing over an empty space in the coal below him. Then he broke through the crust and fell deep into the bin.

60. Workers should never enter a bin of granulated material unless they are supported on a platform, or they are secured with a suitable lifeline that remains nearly vertical and taut.

61. Safety harnesses are much safer than safety belts for people working around bins and hoppers.

62. When a person is working in a bin from a platform, or while wearing a good safety harness with a properly secured lifeline, the worker should always keep his or her body above the highest level of material in the bin.

About this Exercise

This exercise is based on an actual case and many other similar cases. The truck driver survived with no serious or permanent injuries. He was very fortunate. In the period from 1980 to 1986, approximately 42 workers were killed in similar accidents in bins, hoppers, and stockpiles. Most of these persons were mining industry workers. Most died from suffocation.

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 40. 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 62 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.