

Prep Plant Belt Problem

Instructor's Copy

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

Division of Mining and Industrial Technology
Mountain Empire Community College
Big Stone Gap, Virginia

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

Contents

| | |
|---|----|
| Introduction | 3 |
| Exercise summary | 3 |
| How to use this exercise | 4 |
| Performance objectives | 5 |
| Master answer sheet | 6 |
| Instructor's discussion notes | 10 |
| References | 13 |
| Scoring key | 14 |
| Appendices | |
| Appendix A: Problem booklet (duplicate this copy for use in class) | |
| Appendix B: Answer sheet blanks (print the invisible ink answers on these blanks) | |
| Appendix C: Invisible ink answers (print these on the answer sheet blanks) | |

Introduction

This document contains most of the materials needed to use the exercise. The main part of the document is the instructor's copy. It tells how to use the exercise, presents the objectives, the master answer sheet, the scoring key, and discussion notes to be used following the exercise. The last part of this document is three appendices. Appendix A is the exercise problem booklet. This booklet can be duplicated locally. The booklets are reusable. One is needed for every person in the classroom. Appendix B is the answer sheet. Copies of this answer sheet must have the invisible ink answers that appear in Appendix C printed on them.² Answer sheets are consumable. One is needed for each small group of 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.

| | |
|------------------|---|
| <u>Type:</u> | Invisible ink |
| <u>Audience:</u> | Coal preparation plant workers (also suitable for other ore plant workers) |
| <u>Length:</u> | Thirteen questions (30 minutes for administration plus 30 for discussion) |
| <u>Skills:</u> | Following correct procedures for aligning conveyor belts Recognizing and avoiding hazards from moving conveyor belts and pulleys Following proper belt drive lock-out and tag procedures when performing maintenance Preventing a co-workers unsafe work practices Rescuing a co-worker trapped between a guard and a moving pulley and belt Administering basic first aid to seriously injured co-worker |
| <u>Location:</u> | Coal preparation plant, second shift |
| <u>Problem:</u> | You and Carl are maintenance workers at a coal preparation plant. You have just cleaned out the cyclone and are running a loadout belt to collect the fines and water in an empty railroad car. The belt is misaligned because fine wet coal is sticking to the tail pulley roller. You decide to shut the belt down so the roller can be cleaned. Carl says he knows a faster way to do the job. He begins a dangerous work practice. You try to stop him, but it is too late. He gets caught between the moving tail pulley and its guard. He is hurt. It is 300 feet to the phone. You are alone. You must act fast to save Carl but avoid injury to yourself. |

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

How to Use This Exercise

1. Look at the performance objectives. Decide if the exercise is relevant for your 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 illustration on an overhead projector so you can use it 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, ask the class members to discuss the merits of each answer. Add your own ideas.

Performance Objectives for Prep Plant Belt Problem

| Objective number | Capability verb(s) | Description of required performance and conditions under which it is to occur |
|-----------------------|-------------------------|--|
| 1. HR/SW ³ | Assess Recognize | Hazards when working nearby moving conveyor belts, and performing maintenance on stopped belts and pulleys |
| 2. HR/SW | Recall Respect | The purpose of equipment guards, emergency stop pull cords, and belt drive lock-out and tag-out procedures |
| 3. HR/SW | Recognize Select | Effective means for preventing a co-worker from engaging in an unsafe work practice |
| 4. HR/FA | Order Establish | Priorities and rescue procedures when preparing to provide first aid to a co-worker entangled in moving equipment that poses a danger to the rescuer |
| 5. FA | Administer Conduct | A primary survey and first aid in terms of ABC priorities for a person with multiple injuries. |
| 6. FA | Recognize Select | Proper methods for restoring and maintaining an airway in an unconscious victim with severe facial and jaw injuries |
| 7. FA | Recognize Identify | Proper methods for controlling bleeding from the face and head in an unconscious victim with multiple injuries |
| 8. FA | Choose Judge | When to leave a victim to get help and when to stay to provide first aid when only the first aider and the victim are present and no help is nearby. |
| 9. FA | Recognize Appreciate | The value of a first aider's continuing to assist emergency medical personnel when an EMT arrives and takes over the care of a victim |

³ Skill and knowledge domain abbreviations:

HR = hazard recognition

SW = safe work practices

FA = first aid

Master Answer Sheet for Prep Plant Belt Problem

Use this answer sheet to mark your selections. Rub the developing pen gently and smoothly between the brackets. Don't scrub the pen or the message may blur. Be sure to color in the entire message once you make a selection. Otherwise you may not get the information you need.

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

1. [This will create coal spillage when the plant starts up. Try again!]
[]
2. [Correct! The belt needs to be straight before it is loaded. Do the next question.]
3. [This wastes time and delays production. Try again!]
4. [This might work, but it is better to find out what caused the misalignment.]
[Try again!]

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

5. [This should never be attempted! It is very dangerous. Try again!]
6. [Correct! Do the next question.]
[]
7. [Even if you are careful this is very dangerous! Try again!]
8. [Dangerous! Someone could restart the belt and you could be hurt or killed.]
[Try again!]

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

9. [Correct! But he says, "Watch me son and I'll show you how its done!" Do the]
[next question.]
10. [Carl may be about to perform an unsafe act. Try again!]
11. [You need to watch out for him. Try again!]
12. [This makes him angry, doesn't help, and may encourage him to do something]
[dangerous. Try again!]

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

- 13. [Correct! Adding coal is a poor way to align the belt and may cause excessive wear. This action makes the problem worse.]
- 14. [Correct! The shovel could become a deadly missile.]
- 15. [This is a poor way to align the belt. If nothing else happens, it will cause excessive belt wear.]
- 16. [Correct! As he pitches the coal he could trip and fall onto the belt, or he could catch the shovel in the belt and be pulled into the pulley.]

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

- 17. [You need to do something else first. Try again!]
- 18. [You are exposing yourself to the same fate as Carl. Try again!"]
- 19. [This would take a long time and expose you to danger. Try again!]
- 20. [Correct! But the belt doesn't stop. Do the next question.]

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

- 21. [You need to do something else first. Try again!]
- 22. [You need to do something else now. Try again!]
- 23. [Correct! Stopping the belt soon is Carl's only chance. Do the next question.]
- 24. [You need to do something else first. Try again!]

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

- 25. [Correct! This will take only a few seconds. It could save your life and Carl's.]
- 26. [This may delay life saving medical treatment for Carl.]
- 27. [Correct! It takes only a few seconds to call. Then you can go help Carl.]
- 28. [This may delay your administering life saving first aid to Carl.]
- 29. [You should do something else.]

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

- 30. [You need to do something else first. Try again!]
- 31. [This could harm him. It is safe where he is now. The belt is off. Try again!]
- 32. [You need to do something else first. Try again!]
- 33. [You need to do something else first. Try again!]
- 34. [Correct! Do the next question.]

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

- 35. [This is unnecessary, wastes time, and could hurt Carl. Try again!]
- 36. [Correct! Your sweep removes broken dentures, blood, and chewing tobacco]
[from his mouth. Carl moans. Do the next question.]
- 37. [This could add to his injuries. Try again!]
- 38. [His life depends on you staying and helping. Try again!]

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

- 39. [Correct! You need to control his bleeding. Do the next question.]
- 40. [You need to do something else first. Try again!]
[]
- 41. [You need to be doing something else. Try again!]
- 42. [It is good to talk to him as you help him, but you need to be doing something]
[else before you cover him. Try again!]

Question K (Choose only ONE unless directed to "Try again!")

- 43. [You need to stay with and help Carl. Try again!]
- 44. [Correct! Carl needs this care or he may die. Do the next question.]
- 45. [You need to be doing something else. Try again!]
- 46. [This is not important now. You need to do something else. Try again!]

Question L (Choose only ONE unless directed to "Try again!")

47. [Correct! The foreman needs this information as he takes care of Carl. Do the]
[next question.]
48. [The other miner doesn't know the details of the accident and Carl's injuries.]
[Try again!]
49. [Not now! You need to do something else. Try again!]
50. [Not now. Try again!]

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

51. [Correct! This might have stopped the belt before Carl got hurt.]
52. [This would be hazardous. The tool could get caught, strike Carl or others, or]
[he could be pulled into the belt.]
53. [Correct! This is a safe and effective work practice if the worker stays well]
[back from the moving belt and guard.]
54. [Correct! The check would have taken only a minute or so and could have]
[prevented or lessened the severity of the accident.]

Finding your score

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

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

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

Highest possible score = 54.

Lowest possible score = 0.

Instructor's Discussion Notes for the Prep Plant Belt Problem

Use the information presented in the problem book, your own ideas and experience, and that of the workers 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 workers. After they have worked the exercise, class members enjoy discussing the problem. They frequently think of better ways to respond to a problem than those listed among the answers. The purpose of the exercise is to help workers remember and think about safe work practices needed to perform maintenance tasks around conveyor belts, and to review rescue and first aid procedures for a person entangled in a moving conveyor pulley. The discussion following the exercise can contribute to this goal and tailor the exercise content to the needs of the training group.

It is helpful to show overhead transparencies of the master answer sheet and illustrations during the discussion. This allows you to lead the group through the exercise and to disclose and discuss all the answers to each question. Most of the information about why particular answers are correct or incorrect is given on the master answer sheet.

The following notes provide additional information for you to discuss with your class. Read through and think about the notes before the class. Don't read the notes to the class members. This would be boring and ineffective. Rather, incorporate the ideas you find here with your own ideas and make these points at the appropriate place in the discussion.

Question A - The correct answer is to walk the belt and look for the problem (2). Allowing the belt to operate when it is misaligned (1) will spill coal and cause unnecessary belt wear. Shutting the belt down and waiting for the foreman (3), or adjusting the top structure to realign the belt (4) are premature. The cause of the misalignment needs to be determined, and, if possible, corrected before calling the foreman or making an adjustment.

Question B - The only correct and safe option is to shut down the belt drive and lock-out and tag the switch (6). All the other responses expose the worker to great danger. Scraping the moving roller with a tool or other object (5) can result in the object and the miner being pulled into the pulley. If the tool gets caught it can pull the miner's hand into the pulley before he or she can let go. The entangled hand can then pull the miner's arm and body between the belt and pulley. Guards should never be removed from moving belts and pulleys (7) because clothing, hair, extremities or tools can become entangled in the equipment. Emergency stop pull cords are designed for emergencies (8), not as substitutes for locking-out and tagging the belt drive before working on or around the belt. (When discussing this question, you may wish to refer to the MSHA's Guide to Equipment Guarding publication listed in the references at the end of these notes. This concise and well organized document provides 35 figures that illustrate hazards, safe work practices, and common accidents involving conveyor belts. Overhead transparencies of some of these graphics can be used during the discussion to further illustrate key points related to this exercise.)

Question C - There is no safe and easy way to work on the roller when the belt is moving, and it is illegal to do so (30 CFR 77, Section 77.404(c)). If there had been, you would not have been on your way to lock-out and tag the belt drive. When Carl states there is a safe way to work on the moving roller and leaves to do so, you should be concerned for his safety and question him (9). Telling him O.K. (10), or waiting for him to do the task (11) are not responsible actions. Telling Carl he is a fool will probably not discourage him from doing something foolish and may encourage him to be foolhardy.

Question D - Answers 13, 14, and 16 are correct. Adding extra coal to the other side of the moving belt and roller is not effective because it will only temporarily align the belt until some of the coal falls away. More spillage and belt damage can result (13). When pitching coal onto the lower belt, Carl could fall and become entangled (16), or he could drop his shovel which could be carried into the roller and become a lethal missile as it is accelerated around the roller (14).

Question E - The correct answer is to yank the emergency stop pull cord (20). If Carl is to avoid further injury, the belt needs to be stopped as soon as possible. All the other responses delay stopping the belt (17 & 19), or expose the rescuer to the risk of becoming entangled in the belt pulley (18 & 19).

Question F - When yanking the emergency stop pull cord fails to stop the belt, the next best method for stopping the belt should be used. This requires running to the belt drive controls at the dryer and cutting the power (23). All the other actions would waste precious time during which the victim may be chewed up by the moving belt or reentangled in the tail pulley. You may wish to ask what should have been done if the belt had stopped when the emergency stop pull cord was yanked. At that point, should the rescuer have crawled behind the guard, and administered first aid to Carl, or should the rescuer have first run for help and locked-out the power at the belt drive? (With other persons working around the prep plant, it is likely that someone could restart the belt while the rescuer was trying to free Carl or providing first aid. In addition, Carl probably has serious multiple injuries. He will need emergency medical treatment soon or he may die. Unless the rescuer first calls for help no one may be alerted to the problem, and the emergency medical system may not be activated for a long time. This delay could use up most of the "golden hour" during which severe trauma victims must receive emergency medical treatment if they are to survive.)

Question G - The correct answers are to immediately lock-out the belt drive power (25), call for help on the pager, and then get the first aid kit and get back to Carl (27). Failure to lock-out the belt drive before going back to Carl exposes both Carl and the rescuer to further injury or death. Failure to alert other persons to the accident will delay emergency medical treatment for Carl and may result in his death. Going to the 5th floor control room and calling for an ambulance (28), or looking for someone to help care for Carl (29) are not necessarily wrong, but may delay life saving care the first aider could provide for Carl. Choosing among these actions presents a predicament that should generate discussion about whether it is best try to get help for Carl before going back to provide first aid, or if it is best to get back to him right away and then try to get help. Emergency medical personnel consulted on this matter tend to agree with the actions as scored here.

Question H - The correct answer is 34, to check his airway and breathing. This is the first step in the first aid ABC treatment priorities. All other actions must wait.

Question I - The correct answer is 36, performing a finger sweep of his mouth to clear his airway, without moving his head if possible. Spinal injuries should be assumed in an unconscious trauma victim. Immediately beginning mouth-to-mouth resuscitation (35) would be ineffective if his airway is blocked, could further lodge material in his airway, and cause unnecessary movement of his head and spine. Sitting him up and telling him to spit (37) might cause severe injury or death if he has spinal or other internal injuries. Leaving to get help (38) would probably result in his death because his airway is blocked and his skin color is bluish. During the discussion you might ask class members what they would do to clear his airway if Carl were unconscious and lying on his back with blood, vomit and other material accumulating in his mouth. (Here a jaw thrust lift movement might be necessary to maintain the airway, and Carl's head and body might have to be moved to the side to allow the airway to remain open and to drain. You may wish to discuss the risks and merits of this procedure, and demonstrate proper methods for carrying out the procedures when only a single first aider is present and a spinal injury is possible.)

Question J - The correct answer is 39, controlling the bleeding from his facial and head wounds with direct pressure. This is the next step in the first aid treatment priority sequence. Although the first aider should talk to and comfort a victim as treatment is administered, all other actions listed are lower priority actions than controlling Carl's bleeding.

Question K - The correct answer is 44, staying with Carl, continuing the direct pressure to control his bleeding, and maintaining his airway. With this type of facial injury it is likely that additional blood, swelling, and vomiting may compromise the airway. The first aider will do well if he or she maintains Carl's airway and controls his bleeding. All the other actions listed are lower first aid priorities.

Question L - It is important for the first aider to stay and help the foreman take care of Carl (47). The first aider who witnessed the accident, and who has been giving care knows what has happened and Carl's condition up to this point. This information needs to be shared with the foreman as he takes charge. In addition, Carl is probably severely injured and his care requires multiple first aiders.

Question M - All of the answers except 52 are correct. Scraping the moving roller with a longer tool is also very dangerous. The tool would be difficult to manipulate, it could easily be caught and become a missile, and the person could still be pulled into the pulley.

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Scoring Key for the Prep Plant Belt Problem

The correct answers are marked with an asterisk.⁴

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

⁴ This page is printed in large type so that it may be copied and used as an overhead transparency.

Appendix A: Problem Booklet

Duplicate this copy of the problem booklet for use in your classes. **Booklets should be printed on only one side of the paper.** Each person in your class should have a problem booklet while they are working the exercise. The problem booklets are reusable. To save effort and money, ask the trainees to avoid marking in the booklets and collect all the booklets after the class.

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

Prep Plant Belt Problem

Problem Booklet

Instructions

Read the problem situation described on the next page. Study Figure 1 on page 4 until you understand the location of the equipment in the problem. Next, answer each of the 13 questions. Do them one at a time. Don't jump ahead, but you may look back to earlier questions and answers. Some questions ask you to select all of the answers that you think are correct. Other questions ask you to choose only one answer unless you are told to "Try again!" Follow the directions for each question.

After you have selected a choice to a question, look up its number on the answer sheet. Select your answers to each question by rubbing the developing pen between the brackets on the answer sheet. A hidden message will appear and tell you if you are right. When you have finished, you will learn how to score your performance.

Background

You are working with Carl T. Donaldson at the Pine Tree Coal Company #5 prep plant.

You and Carl are doing maintenance on the dryer and loadout belts.

It is 8:45 P.M.

The prep plant processes both steam and metallurgical coal. The two belts cross one another at the thermal dryer.

Both belts are reversible and can dump coal at the clean coal stockpiles, or load coal into unit train railroad cars.

Both belts are elevated and on the same level.

Both belts are equipped with emergency stop pull cords.

The belt control panels for both belts are located on a platform at the thermal dryer. (See Figure 1.)

There is a pager and a first aid kit on the platform at the thermal dryer.

There is an outside telephone in the control room on the 5th level.

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

Problem

You and Carl have just finished washing the dust out of a collection cyclone onto the met product belt. You have started up the met product belt to load the water and fines into an empty railroad car. You're in a hurry to get the job done so the prep plant will be ready to run at 10:00 P. M.

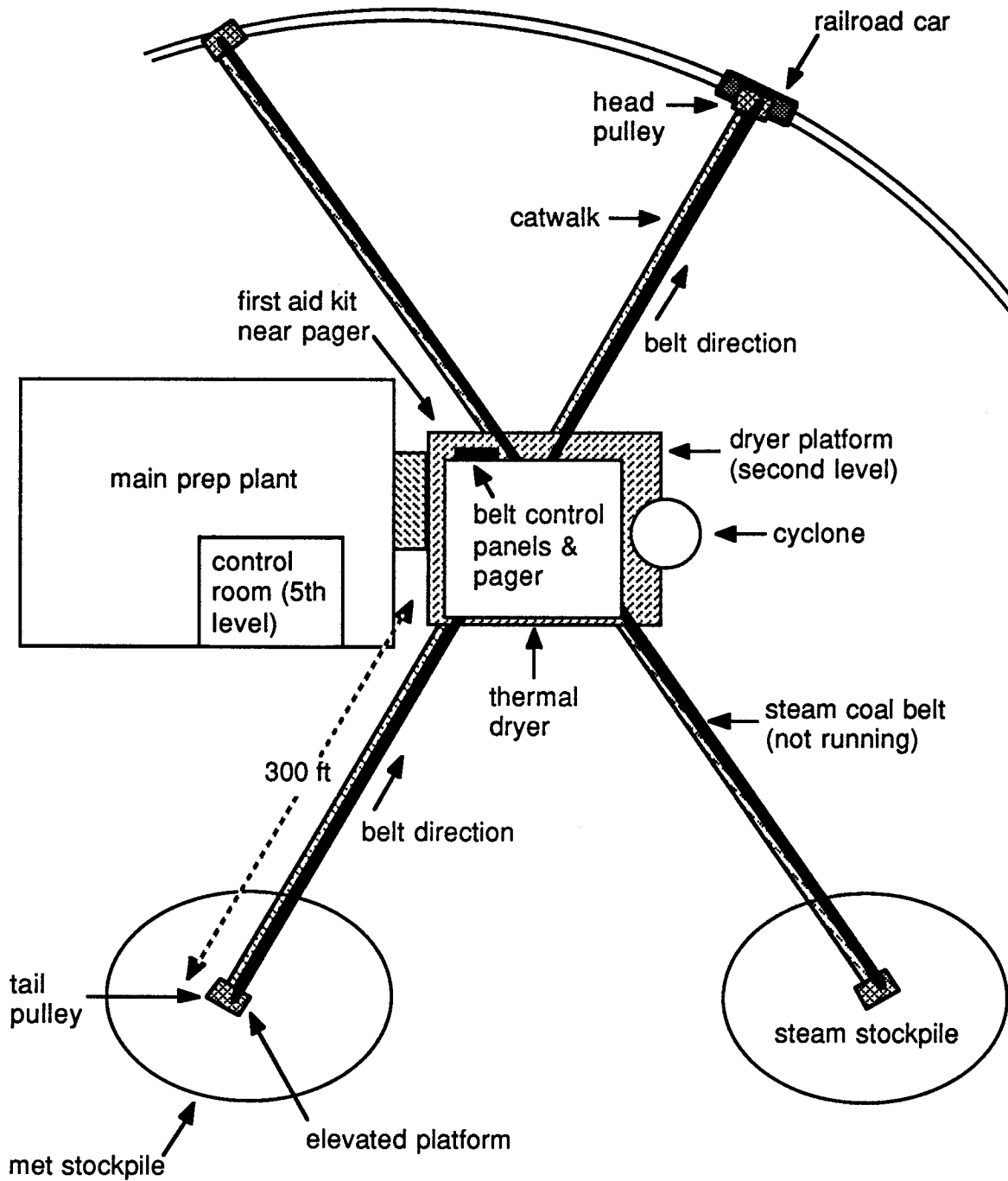


Figure 1: Detail of prep plant thermal dryer and elevated loadout belts

Question A

As you run the met product belt, you notice it is misaligned. What should you do?
(Choose only ONE unless you are told to "Try Again!")

1. Don't worry about it. It will probably straighten out.
2. Walk the belt and look for the problem.
3. Shut the belt down and wait until the foreman comes.
4. Start adjusting the top structure to realign the belt.

Question B

You and Carl decide to split up and look for the cause of the misalignment. Carl walks along the catwalk toward the head pulley at the railroad loadout while you walk the other way toward the stockpile. When you get to the tail pulley, you find wet coal stuck to the right side of the roller. There is a lot of fine coal on the platform under the pulley. The belt is running. What should you do now? (Choose only ONE unless you are told to "Try Again!")

5. Using your 12 inch screwdriver, carefully reach around the guard and scrape the wet coal off the roller.
6. Go back to the belt control panel at the thermal dryer. Shut down the belt drive, and lock-out and tag the switch.
7. Remove the guard near the pulley and take a closer look while being careful to stay away from the belt and pulley.
8. Yank the emergency stop pull cord to stop the belt. Then crawl behind the guard and scrape off the wet coal.

Question C

You decide to go to the belt control panel and lock out and tag the belt drive. Half way there Carl comes to meet you. You tell him you are going to lock out the belt so you can clean the roller. Carl says, "Don't bother! I can fix it easy!" Then he walks off toward the tail pulley. What would you do now? (Choose only ONE unless you are told to "Try Again!")

9. Ask him what he is going to do.
10. Tell him, "O.K. Anything to save time!"
11. Sit down and take a break while he takes care of it.
12. Tell Carl he is a fool.

Question D

You tell Carl to wait until you shut down the belt, but he goes off to the tailpiece, saying he knows how to fix the problem real quick. You follow him back so you can warn him not to take chances. When he gets to the tailpiece, Carl stands on the right side of the belt just before the guard. Then he picks up a shovel and starts reaching in, pitching some fine wet coal on the bottom of the belt on the left side. He says this will put coal on the left side of the roller and line up the belt. What problems could Carl's action create? (Select as MANY as you think are correct.)

- 13. It could damage the belt.
- 14. If the shovel gets caught between the belt and roller either Carl or you could be struck by the shovel or pieces of the shovel.
- 15. No serious problems are likely and this will realign the belt.
- 16. Carl could become entangled in the belt.

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

Question E

You tell Carl to wait while you go back to the control panel to knock the power to the belt. As you leave you look back. Carl has the shovel in his left hand. He is reaching around the guard with the shovel trying to scrape coal off the right side of the roller. Before you can do anything, you hear a thump and the shovel comes flying by your head. You see Carl scrunched up between the right side of the tail pulley roller and the side and bottom of the guard. His face is pushed against the guard looking out. His eyes are open, his mouth is moving, and his face is bloody. (See Figures 2 and 3 on the next page.)

What would you do now? (Choose only ONE unless you are told to "Try Again!")

17. Run and get help.
18. Run back to Carl. Try to reach inside the guard and pull him out.
19. Start removing the guard so you can free Carl.
20. Yank the emergency stop pull cord.

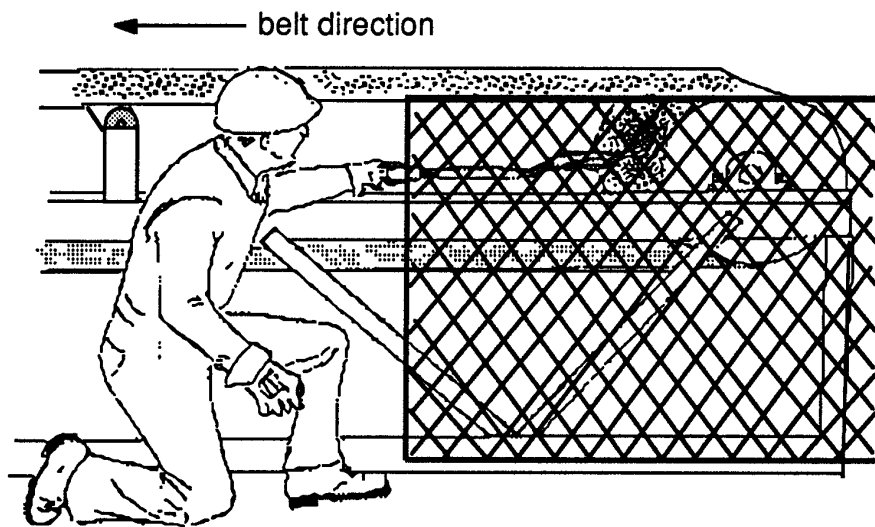


Figure 2: Carl reaches around the guard to scrape the tail pulley with a shovel

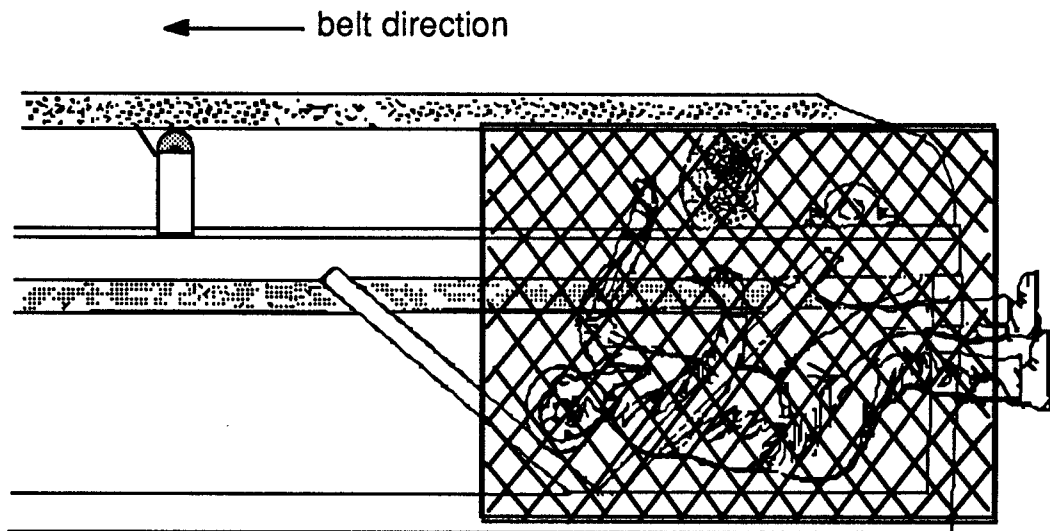


Figure 3: Carl trapped between the guard and moving belt and pulley

Question F

You are scared. Carl is still stuck between the guard and the tail pulley. The belt is running. No one else is around. Now what would you do? (Choose only ONE unless you are told to "Try Again!")

21. Go to Carl and comfort him. Tell him you are going to get help. Then go.
22. Stay with Carl, comfort him, and wait for help.
23. Run back to the dryer and the control panel and cut the power to the belt drive.
24. Immediately run and look for someone to help you rescue Carl.

Question G

It takes you about half a minute to run to the belt control panel. You yell for help all the way there, but no one responds. You quickly cut the power to the met product belt. Now what should you do? (Select as MANY as you think are correct.)

- 25. Lock out the belt starter.
- 26. Grab the first aid kit and get back to Carl immediately.
- 27. Immediately call for help on the pager. Then grab the first aid kit and get back to Carl.
- 28. Immediately go to the prep plant control room on the 5th level and call for an ambulance.
- 29. Go look for the foreman or someone else who can help you take care of Carl.

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

Question H

You take the first aid kit and run back to Carl, hoping someone heard you calling for help on the pager. When you get back you find Carl is free. He is lying on the platform on his left side just to the right side of the belt and the guard. His left arm is deformed and crooked and sticking out to his side. The left side of his face is smashed and bleeding heavily. He is not moving and appears to be unconscious. What should you do for Carl now? (Choose only ONE unless you are told to "Try Again!")

30. Immediately begin checking him for other injuries.
31. Move him away from the belt to a safer position.
32. Cover him with your jacket to keep him warm.
33. Use dressings from the first aid kit to apply firm direct pressure to his head wounds to stop his bleeding.
34. Check his breathing.

Question I

When you check Carl's breathing, you find his mouth is filled with blood and other matter. He is making gurgling sounds and having trouble breathing. The skin on his uninjured right hand is bluish color. What would you do now? (Choose only ONE unless you are told to "Try Again!")

35. Immediately begin mouth to mouth resuscitation.
36. Without moving Carl's head, carefully do a finger sweep of his mouth.
37. Get behind Carl. Sit him up and lean him over and tell him to spit out.
38. Leave and get help. There is nothing more you can do for Carl.

Question J

Now Carl is breathing. He is unconscious and doesn't respond to your questions. He is still lying on his left side. Some blood is draining out of his mouth and nose. The skin on his uninjured right hand is getting whiter. There is a large gash on the right side of his temple and cheek. It is bleeding heavily but not squirting blood. What is the one most important thing to do now? (Choose only ONE unless you are told to "Try Again!")

39. Use compresses from the first aid kit to apply gentle but firm direct pressure to the gash on the side of his face.
40. Check Carl for other injuries.
41. Look carefully at Carl's deformed left arm to see if it needs splinting.
42. Cover Carl with your jacket to keep him warm and talk to him to comfort him.

Question K

Within a few minutes your direct pressure on Carl's wound stops most of the bleeding. Carl is still unconscious. His breathing is fast but regular. Even though you have been yelling for help, no one has come. What should you do now? (Choose only ONE unless you are told to "Try Again!")

- 43. Leave Carl where he is and go get help.
- 44. Stay with Carl. Keep the direct pressure on his wound and maintain his airway.
- 45. Begin a hands-on survey to check him for other injuries.
- 46. Get the splints and bandages out of the first aid kit and get ready to splint Carl's left arm.

Question L

While you are taking care of Carl, the foreman and another miner come. They heard your shouts for help while you were taking care of Carl. The foreman, an EMT, takes charge. He sends the other miner to call an ambulance. What should you do now? (Choose only ONE unless you are told to "Try Again!")

47. Stay with the foreman. Tell him what you saw and what first aid you have given Carl.
48. Ask the other miner to stay and help the foreman while you go call for help.
49. Go get another first aid kit so the foreman will have everything he needs.
50. Go back to the control panel and tag the locked out belt drive switch.

Question M

Soon an ambulance arrives. Carl was taken to a hospital emergency room. He had serious multiple injuries. The circuit for the belt emergency stop pull cord was found to be bridged out. Carl's recovery required two years.

Now think about this whole exercise. What things could have been done to prevent this accident? (Select as MANY as you think are correct.)

51. Instead of going back to the tail pulley with Carl, his coworker (you) could have continued on toward the control panel and cut the power to the belt.
52. Carl could have used a tool with a longer handle to scrape coal off the tail pulley roller. That way he could stay away from the belt and guard.
53. If a hose were available on the platform, the tail pulley roller could have been washed down with water.
54. Carl and his coworker (you) could have checked the belt emergency stop pull cord before working around the belt.

End of Problem

Scoring your performance

1. Count the total number of responses you colored in that were marked "correct." Write this number in the first blank on the answer sheet.
2. Count the total number of "incorrect" responses you colored in. Subtract this number from 36. 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 54 results from selecting all the correct answers and no wrong answers. The worst possible score of zero results from selecting all the wrong answers and no correct answers.

Appendix B: Answer Sheet Blanks

These are the answer sheet blanks. Copies of these blank answer sheets may be duplicated in the normal fashion. However, the answers that are found within the brackets must be printed on these blank answer sheets in invisible ink. These answers are found in Appendix C. If you have the capability to print invisible ink, make copies of the blank answer sheets. Make a master of the answers that appear in Appendix C. Then print the invisible ink on the blank answer sheets, being careful to make sure all pages print and that the appropriate answers line up with the appropriate blanks. The Master Answer Sheet shows all the answers in their proper places.

Most companies and trainers prefer to obtain copies of the preprinted answer sheets from NIOSH, Pittsburgh Research Laboratory, Pittsburgh, PA phone 412-386-5901, fax 412-386-5902 or email to minetraining@cdc.gov.

The exercise is designed to be used in small groups. You will need one answer sheet for each group of 3 to 5 persons in your class. The answer sheets are consumable. You will need a new set for each class.

A developing pen is also needed by each person who marks an answer sheet. These may be obtained from the A. B. Dick Company, P.O. Box 1970, Rochester, New York 14692, phone 1-800-225-4835.

Answer Sheet for Prep Plant Belt Problem

Use this answer sheet to mark your selections. Rub the developing pen gently and smoothly between the brackets. Don't scrub the pen or the message may blur. Be sure to color in the entire message once you make a selection. Otherwise you may not get the information you need.

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

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

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

- 5. []
- 6. []
- 7. []
- 8. []

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

- 9. []
- 10. []
- 11. []
- 12. []

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

13. []
[]

14. []

15. []
[]

16. []
[]

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

17. []

18. []

19. []

20. []

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

21. []

22. []

23. []

24. []

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

25. []

26. []

27. []

28. []

29. []

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

- 30. []
- 31. []
- 32. []
- 33. []
- 34. []

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

- 35. []
- 36. []
[]
- 37. []
- 38. []

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

- 39. []
- 40. []
[]
- 41. []
- 42. []
[]

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

- 43. []
- 44. []
- 45. []
- 46. []

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

47. []
[]

48. []
[]

49. []

50. []

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

51. []

52. []
[]

53. []
[]

54. []
[]

Finding your score

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

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

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

Highest possible score = 54.

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 exactly match up 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.

This will create coal spillage when the plant starts up. Try again!

Correct! The belt needs to be straight before it is loaded. Do the next question.

This wastes time and delays production. Try again!

This might work, but it is better to find out what caused the misalignment.
Try again!

This should never be attempted! It is very dangerous. Try again!

Correct! Do the next question.

Even if you are careful this is very dangerous! Try again!

Dangerous! Someone could restart the belt and you could be hurt or killed.
Try again!

Correct! But he says, "Watch me son and I'll show you how its done!" Do the next question.

Carl may be about to perform an unsafe act. Try again!

You need to watch out for him. Try again!

This makes him angry, doesn't help, and may encourage him to do something dangerous. Try again!

Correct! Adding coal is a poor way to align the belt and may cause excessive wear. This action makes the problem worse.

Correct! The shovel could become a deadly missile.

This is a poor way to align the belt. If nothing else happens, it will cause excessive belt wear.

Correct! As he pitches the coal he could trip and fall onto the belt, or he could catch the shovel in the belt and be pulled into the pulley.

You need to do something else first. Try again!

You are exposing yourself to the same fate as Carl. Try again!"

This would take a long time and expose you to danger. Try again!

Correct! But the belt doesn't stop. Do the next question.

You need to do something else first. Try again!

You need to do something else now. Try again!

Correct! Stopping the belt soon is Carl's only chance. Do the next question.

You need to do something else first. Try again!

Correct! This will take only a few seconds. It could save your life and Carl's.

This may delay life saving medical treatment for Carl.

Correct! It takes only a few seconds to call. Then you can go help Carl.

This may delay your administering life saving first aid to Carl.

You should do something else.

You need to do something else first. Try again!

This could harm him. It is safe where he is now. The belt is off. Try again!

You need to do something else first. Try again!

You need to do something else first. Try again!

Correct! Do the next question.

This is unnecessary, wastes time, and could hurt Carl. Try again!

Correct! Your sweep removes broken dentures, blood, and chewing tobacco from his mouth. Carl moans. Do the next question.

This could add to his injuries. Try again!

His life depends on you staying and helping. Try again!

Correct! You need to control his bleeding. Do the next question.

You need to do something else first. Try again!

You need to be doing something else. Try again!

It is good to talk to him as you help him, but you need to be doing something else before you cover him. Try again!

You need to stay with and help Carl. Try again!

Correct! Carl needs this care or he may die. Do the next question.

You need to be doing something else. Try again!

This is not important now. You need to do something else. Try again!

Correct! The foreman needs this information as he takes care of Carl. Do the next question.

The other miner doesn't know the details of the accident and Carl's injuries. Try again!

Not now! You need to do something else. Try again!

Not now. Try again!

Correct! This might have stopped the belt before Carl got hurt.

This would be hazardous. The tool could get caught, strike Carl or others, or he could be pulled into the belt.

Correct! This is a safe and effective work practice if the worker stays well back from the moving belt and guard.

Correct! The check would have taken only a minute or so and could have prevented or lessened the severity of the accident.