

Trailing Cable Electrical Problem

Problem Booklet

Instructions

Read the information on this page and the next page. Then you will be asked 7 questions about this problem. Each question is on a separate page. Work through the exercise one page at a time. Don't jump ahead, but you may look back to earlier questions and your answers.

When you have finished reading the first two pages, read Question A on the third page. Think about the situation. Then select as many answers as you think are correct for that question by circling their numbers on the answer sheet. When everyone in your group has selected their answers to Question A, turn the page and look at the feedback page for that question. Then talk about the answers.

The next question has only one right answer. For question B choose the best answer to that question. Continue on and do the remaining questions in the same manner as the first two, following the directions for each question. When you finish you will learn how to score your performance.

Trailing Cable Electrical Problem

Background

This is a 3-section mine with a seam height of 60 inches.

This mine utilizes 550 volt 3 phase equipment and has continuous miners. Femco ground monitors are used.

The mine is mostly dry, but an occasional mud hole is not unusual.

Sam operates one of the shuttle cars and Sparky is the electrician.

The equipment is well maintained, but is getting old and breakdowns are beginning to cut into production.

Problem

Sam, the shuttlecar operator, has dumped two buggies of coal and is going back to the miner for another when the breaker trips, stopping the buggy.

Question A

What should Sam do now? (Select ALL the correct answers.)

1. Tell the boss and ask him to get the electrician.
2. Check the ground monitor.
3. Reset the breaker.

When you have marked your answer(s) on the answer sheet, turn the page and look at the Question A feedback.

Question A Feedback

1. [This is probably not necessary at this time.]
2. [Correct! The ground monitor checks good.]
- 3 [Correct!]

After you have thought about these answers, do question B.

Question B

The breaker stays in and Sam makes two more runs. The buggy operates normally until the breaker trips again as he leaves the feeder. Sam resets the breaker. What should he do now? (Select only ONE answer.)

4. Tell the boss.
5. Check the ground monitor.
6. Notify the electrician that a problem exists.

When you have marked your answer on the answer sheet, turn the page and look at the Question B feedback.

Question B Feedback

- 4. [Correct! The boss tells Sam that he'll send the electrician to
[trouble-shoot the problem.]
- 5. [Not a bad idea but you did this before and it checked out.]
- 6. [You need to do something else.]

After you have thought about these answers, do question C.

Question C

On the next trip, the breaker trips as Sam approaches the miner. He sets the parking brake and goes for the boss. Sam tells the boss that it's not the ground monitor and he doesn't know what the problem is. The boss has the buggy moved out of the roadway and tells Sparky, the electrician, to check it out. Sparky can't find any problem. He finds the ground monitor is good, and the breaker sets properly. Now what should Sparky do? (Select only ONE answer.)

7. Walk the cable.
8. Tell Sam to operate the shuttlecar while he (Sparky) stays at the power center.
9. Call outside for a new cable.
10. Tell Sam to flex the cable at all the splice points while he (Sparky) monitors the energized cable at the breaker.

When you have marked your answer on the answer sheet, turn the page and look at the Question C. feedback.

Question C Feedback

- 7. [This is not the best choice at this time.]
- 8. [Correct! The way the breaker trips could help identify the problem.]
- 9. [This would be premature at this time.]
- 10. [This is extremely dangerous. The cable could blow up. Sam could be
[burned or electrocuted.]

After you have thought about these answers, do question D.

Question D

When Sam operates the shuttle car, the breaker trips while Sparky is at the power center. It sounds similar to the way the breaker trips when the "test" button is pushed on the ground monitor. The trip indicator light does not come on. This indicates that: (Select only ONE answer.)

11. A phase-to-phase fault is not likely.
12. The ground monitor is bad.
13. The ground conductor is: open.
14. A single phase condition exists.
15. A phase-to-phase fault is probable.

When you have marked your answer on the answer sheet, turn the page and look at the Question D feedback.

Question D Feedback

- 11 [Correct! A phase-to-phase fault would cause the breaker to trip violently.
- 12. [This is a possibility,! but the trip light is not on.]
- 13. [This is a possibility, but the trip light is not on.]
- 14. [Not likely, since Sam did not report any loss of power or problem of
[starting the buggy when the breaker was reset.]
- 15. [This is not likely since the breaker did not trip violently.]

After you have thought about these answers, do question E.

Question E

Sparky resets the breaker, but it trips immediately. He notices that the UVR light blinks out and comes back on after the breaker trips. Now what should he check? (Select only ONE answer.)

- 16. The ground monitor.
- 17. The ground conductor.
- 18. The plug.
- 19. The phase conductors.

When you have marked your answer on the answer sheet, turn the page and look at the Question E feedback.

Question E Feedback

- 16. [This is not a possibility.]
- 17. [This is not a possibility.]
- 18. [This is not the best choice.]
- 19. [Correct! A ground fault could give these symptoms.]

After you have thought about these answers, do question F.

Question F

Sparky should know that the first steps in trouble-shooting ground faults are to: (Select ALL the correct answers.)

20. De-energize, tag and lock-out the circuit.
21. Check the trip settings on the breaker.
22. Pull the plug and read from phase to ground with an ohmmeter.
23. Have Sam tram the buggy around to try and determine the problem.

When you have marked your answer on the answer(s) sheet, turn the page and look at the Question F feedback.

Question F Feedback

- 20. [Correct! This is an important safety task that should not be skipped.]
- 21. [This will not help.]
- 22. [Correct! This will show if a phase to ground fault exists.]
- 23. [This will not help identify the problem.]

After you have thought about these answers, do question G.

Question G

Sparky has determined that a phase to ground fault exists. What are the next steps he should take in pinpointing the fault in the cable? (Select ALL the correct answers.)

- 24. Use a "cable hound" on the cable.
- 25. Cut open a splice that looks like it is in bad condition.
- 26. Look for a splice that is being strained by a sheave wheel or the corner of a block.
- 27. Watch the ohmmeter while Sam flexes the cable.
- 28. Check for "hot spots" in the cable.

When you have marked your answer(s) on the answer sheet, turn the page and look at the Question G feedback.

Question G Feedback

- 24. [Correct!]
- 25. [This may work, but is not the best choice.]
- 26. [Correct! This is a good place to start checking.]
- 27. [Correct! This will show an intermittent problem.]
- 28. [The ground fault would not last long enough to heat the cable.]

End of Problem.

Now use these feedback pages to score your answer sheet.