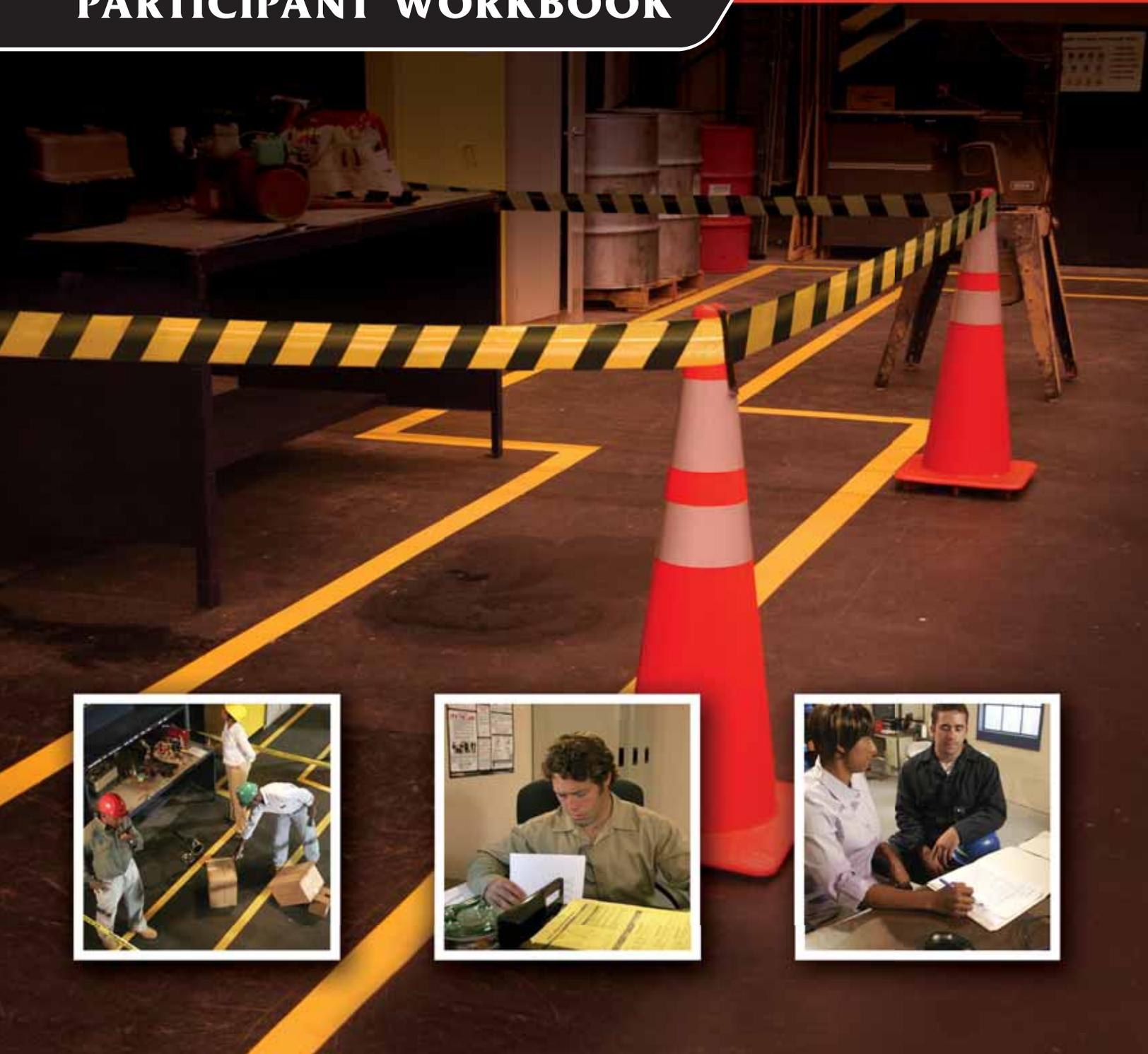


Incident Investigation: Analyzing the Facts and Causes

PARTICIPANT WORKBOOK



Incident Investigation: Analyzing the Facts and Causes

This participant workbook is one of a series of fully-illustrated employee workbooks, informative posters, broadcast-quality video and DVD training programs and interactive Web-based courses produced by Coastal Training Technologies Corporation. Each product is the result of painstaking analysis, design, development and production by the instructional designers and technical specialists on our staff.

Our catalog is constantly being revised and expanded, so we would appreciate any comments on current titles or suggestions for future ones. For further information on any Coastal product, or to receive a free catalog, call 800-767-7703 or fax 757-498-3657. Visit us on the Web at www.coastal.com.

This product is for educational purposes only. Nothing herein is to be regarded as indicating approval or disapproval of any specific practice or product.

Copyright © 2010 Coastal Training Technologies Corp. A DuPont Company. No part of this product may be reproduced by any means or for any reason without the written permission of Coastal Training Technologies Corp. All rights reserved. Printed in U.S.A.

CONTENTS

Review of Previous Module2

Introduction3

Step 4: Determine All Contributing Factors4

 Areas to Explore.....7

 Getting to the Key Factors.....8

Step 5: Determine Systems to Be Strengthened..... 11

Summary14

Preview of Next Module.....15

Quiz.....16

Answer Key19



REVIEW OF PREVIOUS MODULE

In the previous module we covered *Step 2: Form an Investigation Team*, and *Step 3: Determine the Facts* of the 8-Step Incident Investigation process. You also learned how to conduct interviews by asking the right types of questions and you learned how to gather information that formed the foundation of your investigation. Now that you have the facts concerning the incident we will proceed to the next steps of the incident investigation process.

This module will cover *Step 4: Determine All Contributing Factors* and *Step 5: Determine Systems To Be Strengthened*; of the Incident Investigation Process.



INTRODUCTION

When you're on the job, you probably don't think about all the things that can go wrong. We'd get very little work done if we did. But incidents do happen and the best way to prevent them from occurring again is to figure out what caused them in the first place. A thorough incident investigation can uncover clues to help you and your investigative team unravel the mystery. But how do you track down the source of the problem using the data you've gathered from the people, the physical factors, and operating systems that were involved in the incident? Where do you go from there?

This workbook will help you to learn:

- How to identify the key factors that contribute to an incident.
- How to find out how to follow a line of questioning that can lead you to the underlying causes of an incident.

You and your team have already interviewed witnesses and other personnel. You've taken notes and collected evidence from the scene and examined the equipment involved in the incident. That's a lot of data and it probably seems overwhelming. What do you do with the data you've collected?



Additional Notes:

STEP 4: DETERMINE ALL CONTRIBUTING FACTORS

This step in the investigative process is to use all of the information collected to funnel out the facts and determine the key factors.

- Key factors are the circumstances that may have contributed to the incident.
 - These circumstances can seem unrelated to the incident, but they are crucial in building a case for recommendations and solutions.
- Because key factors are the primary causes of the incident, they will form the basis for your recommendations for corrective action and follow-up.
- The best method of defining the key factors of an incident is by conducting a root cause analysis.
 - A root cause analysis looks beyond an incident's immediate cause to uncover weaknesses that can start a chain of events that leads to the incident.
- The first step in determining key factors is to look at the facts you've gathered and look for anything that could've caused the incident.
 - Things like bad weather or faulty equipment.
- Then ask questions about each of the factors until you reach the root of the problem – a key factor.
 - The best way to do this is to keep asking why until you run out of questions.



- When conducting a root cause analysis, there are a few things to keep in mind:
 - First, a root cause analysis is not a way to lay blame or point fingers. It's simply an impersonal tool to get to the root causes of the incident.
 - Second, a root cause analysis is not a simple chronological listing of events or issues. It is a tool to help you explore all the possibilities.
 - Third, your analysis is not a problem-solving tool. It is just a process for *identifying* the causes of a problem.
- The problem cannot be solved until all the related key factors have been discovered and the root causes are identified.
- Only after knowing the root causes can you begin making suggestions for a possible solution.

Discussion Notes:

- Discuss why it's important to look at all factors even if they seem unrelated to the incident.

- Discuss the importance of knowing the root causes in order to make suggestions for solutions.

Additional Notes:

AREAS TO EXPLORE

When determining key factors, you'll want to explore the same three areas you used when gathering information:

- Physical factors
 - Include any physical and environmental conditions surrounding an incident.
- Human factors
 - Are about the people connected to an incident.
- Operating systems
 - Refer to management and company structural issues.
- In your root cause analysis, the best way to process data from interviews and scene and equipment investigations is to break it up into smaller pieces.
 - This can help you examine each bit of information with a clear and rational head.
- Divide the physical factor data into subcategories dealing with weather, terrain, equipment, tools, and personal protective equipment.
- Then identify possible contributing factors and list the initial questions to ask for each subcategory and possible key factor.
- Listing the initial questions for each area before you start questioning will give a good foundation and allow you to build toward more specific questions.

Discussion Notes:

- Discuss the three areas to explore when determining key factors. What are some examples of physical factors, human factors and operating systems?

GETTING TO THE KEY FACTORS

Now that you have identified the possible factors and initial questions, it's time to use root cause analysis to identify and confirm the key factors and you do this by asking why.

- The questioning process is like a branching tree, starting with a single question, then forking out into related topics.
- Ask why until your line of questioning comes to the end of a branch in one of two ways:
 - One, you identify a key factor and this can happen anywhere in the investigative process.
 - Two, you may come to the end of a line of questioning only to find there is no key factor present.
- While asking “why” you may sometimes be surprised at where the line of questioning can lead.





- The investigation may uncover more than one root cause because most incidents are caused by multiple factors.
- Only continued questioning can get to the root of the issue and help you discover the underlying causes of the incident.
- You may discover that the physical and human factors are easiest to list but asking why leads you to the root causes of the incident.
- Problems with operating and management systems often are at the bottom of an incident – the source of the root causes.
- Now that you know how to uncover the factors from the data you've collected, you can see how important it is to dig as deeply as you can to get to the real causes of the incident.
- You'll be well prepared to continue your investigation to offer suggestions for preventing the incident from happening again.

Discussion Notes:

- Discuss what to do when you reach the end of a line of questioning.

- What are some examples of how you can drill down through the facts to get to the key factors of the incident?

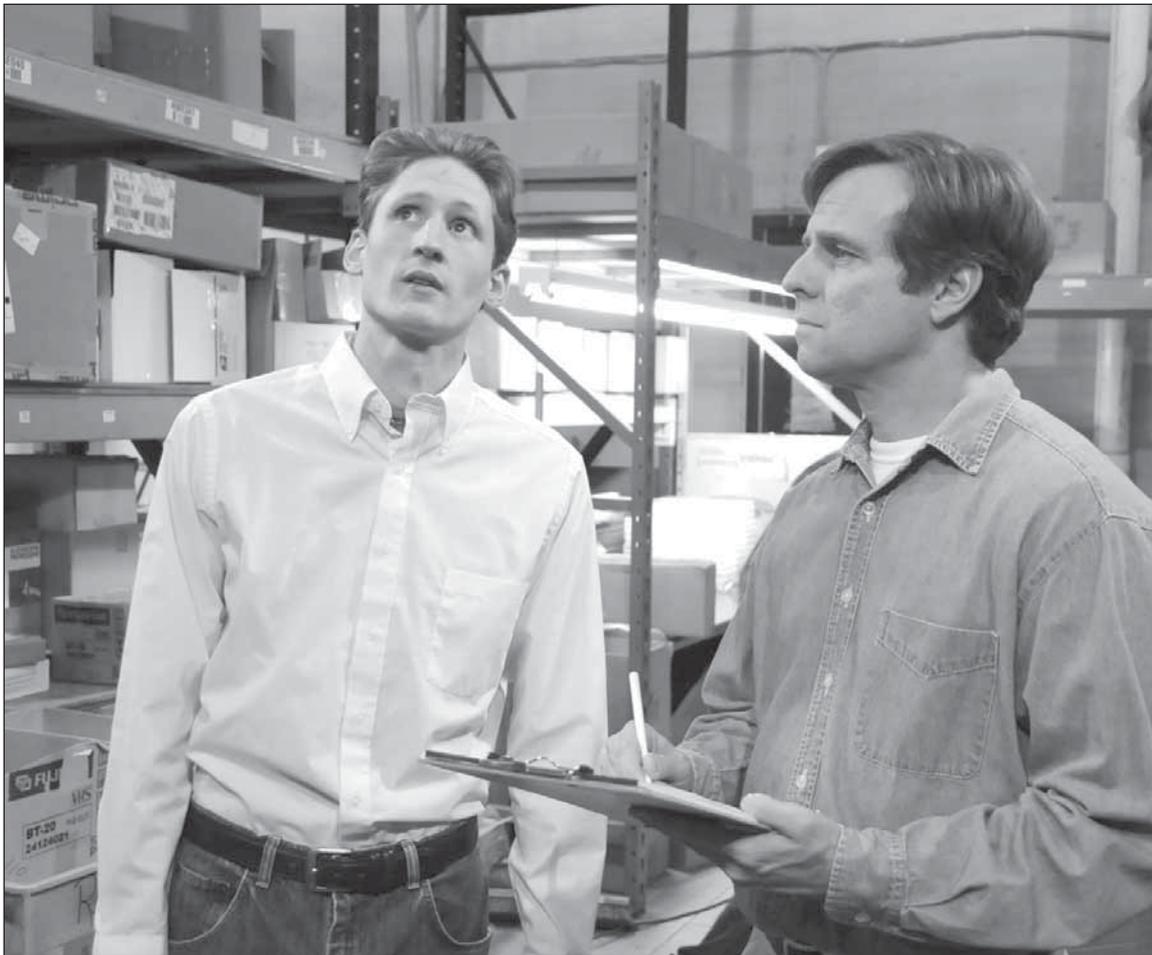
- Discuss some examples of incidents that had more than one root cause.

Additional Notes:

STEP 5: DETERMINE SYSTEMS TO BE STRENGTHENED

In this step, you'll want to look at the management systems related to the key factors, the physical, human, and operating systems.

- If you discovered an underlying problem with one of the systems that determines how work gets done, it must be addressed to prevent a potential recurrence of the incident.
- Systems to consider include operating procedures or safe work practices.
- Take a look at the system of training to make sure training schedules are maintained, and employees feel adequately prepared after training.



- Look at contractor safety to ensure contractors have been included in safety programs and training.
 - Make sure contractors are complying with company safety requirements.
- Other systems to examine include communication.
 - Make sure information is being communicated to the right people and to a wide enough audience.
- Consider how emergency planning and response is handled.
 - Procedures should be written and implemented for emergencies.
 - Ensure response times from emergency personnel and employees are acceptable.
- Ensure that **quality assurance** procedures are updated.
 - Make sure any quality problems are documented and communicated.
- Check the **mechanical integrity** of equipment or systems.
- Look deeper into issues to determine how the underlying systems can be improved.
- Create a checklist that identifies each area of your site.
 - This can be used for making recommendations about various tasks and known hazards.
- Identifying the management systems underlying an incident will increase the likelihood of addressing key factors.
- You can make long-term improvements that will prevent other incidents by examining key factors and the related management systems.

Discussion Notes:

- Discuss what can be done to improve communication and how you can encourage cooperation.

- Discuss what you can do to ensure emergency planning and response is working properly.

- Discuss ways to check the mechanical integrity of equipment or systems.

Additional Notes:

SUMMARY

We've shown you the process of uncovering the root causes of the incident and you've learned how to categorize your data into areas for further exploration - Physical, Human, and Operating Systems. You also know to keep asking "why" until you get to the key factors and root causes of the incident. We've explained how to determine possible management systems that may need to be strengthened. Determining key factors and underlying management systems to be strengthened is critical to preventing similar incidents from happening again. This information will allow you to make significant improvements to your company's safety record. Most importantly, it will demonstrate your commitment to protecting your company's most important resource, its people.



Additional Notes:

PREVIEW OF NEXT MODULE

In the next module we'll take you to the final three steps in the incident investigation process.

Step Six: Recommend Corrective Actions

Step Seven: Document and Communicate Findings

Step Eight: Follow Up.

You'll learn how to apply what you discover from identifying key factors and systems to be strengthened and communicate for the safety of everyone. Also, you'll learn the importance of following up to be sure changes have been implemented satisfactorily.



Additional Notes:

QUIZ

1. The best method of defining the key factors of an incident is by conducting a root cause analysis.
 True False
2. A root cause analysis is a way to lay blame or point fingers.
 True False
3. When determining key factors, you'll want to explore physical factors, human factors, and operating systems.
 True False
4. Your investigation will uncover more than one root cause because most incidents are caused by multiple factors.
 True False
5. When determining systems to be strengthened you only need to consider operating procedures.
 True False
6. Identifying the management systems underlying an incident will increase the likelihood of addressing key factors.
 True False
7. You should not have to worry about including non-employees, like contractors in safety programs and training.
 True False

QUIZ (continued)

8. Training schedules need to be maintained, and employees should feel adequately prepared after training session.
 True False
9. Problems with operating and management systems often are at the bottom of an incident – the source of the root causes.
 True False
10. The first step in determining key factors is to look at the people involved that could've caused the incident.
 True False
11. Because key factors are the primary causes of the incident, they will form the basis for your recommendations for corrective action and follow-up.
 True False
12. A root cause analysis looks beyond an incident's immediate cause to uncover weaknesses that can start a chain of events that leads to the incident.
 True False
13. Root cause analysis is a problem-solving tool.
 True False

QUIZ (continued)

14. The problem cannot be solved until all the related key factors have been discovered and the root causes are identified.
- True False
15. You can make long-term improvements that will prevent other incidents by examining key factors and the related management systems.
- True False
16. In your root cause analysis, the best way to process data from interviews and scene and equipment investigations is to combine everything together.
- True False
17. Physical factor data can be divided into subcategories dealing with weather, terrain, equipment, tools, and personal protective equipment.
- True False
18. When asking questions, if you don't get the answer you're looking for, then you can stop asking questions.
- True False
19. Listing the initial questions you want to ask for each area before you start questioning will give you a good foundation and allow you to build toward more specific questions.
- True False
20. Questioning comes to the end of a branch by identifying a key factor or you may find there is no key factor present.
- True False

ANSWER KEY

1. True.
2. False. A root cause analysis is not a way to lay blame or point fingers. It's simply an impersonal tool to get to the root causes of the incident.
3. True.
4. True.
5. False. You need to consider all operating systems or safe work practices, management of change, training, contractor safety, communication, emergency planning and response, quality assurance and the mechanical integrity of equipment or systems.
6. True.
7. False. You should be sure that contractors have had appropriate safety training and orientation to your workplace.
8. True.
9. True.
10. False. The first step in determining key factors is to look at the facts you've gathered and look for anything that could've caused the incident. Things like bad weather or faulty equipment.
11. True.
12. True.
13. False. A root cause analysis is not a problem-solving tool. It is just a process for *identifying* the causes of a problem.
14. True.
15. True.
16. False. The best way to process data from interviews and scene and equipment investigations is to break it up into smaller pieces. This can help you examine each bit of information with a clear and rational head.
17. True.
18. False. When asking questions, continue to ask why until your line of questioning comes to the end of a branch.
19. True.
20. True.

Incident Investigation Training Series

- Incident Investigation: Getting Started
- Incident Investigation: Forming an Effective Team and Gathering Information
- Incident Investigation: Analyzing the Facts and Causes
- Incident Investigation: Recommendations, Communication and Follow-Up

DVDs, Web Courses and Handbooks from Coastal*

- Back Safety
- Basic Skills Training
- Behavioral-Based Safety
- Biological and Chemical Threats
- Bloodborne Pathogens
- Chemical Handling
- Communication
- Contractor Safety
- Construction Safety
- Customer Service
- Defensive Driving
- Disaster Planning
- Diversity
- Drug & Alcohol Abuse
- Electrical Maintenance
- Electrical Safety
- Ergonomics
- Ethics
- Harassment
- Hazard Communication
- Hazard Recognition
- HAZMAT Transportation
- HAZWOPER Training
- Heat Stress
- Incident Investigation
- Instrumentation & Control Training
- Interviewing/Hiring
- Leadership
- Legal Issues
- Machine Technology
- Maintenance Troubleshooting
- Maritime Safety
- Mechanical Maintenance
- Office Safety
- Operator Inspection
- Performance Reviews
- Personal Protective Equipment
- Predictive Maintenance
- Rigging
- Safety Attitudes
- Safety Orientation
- Sexual Harassment
- Supervisory Skills
- Workplace Violence

* All products not available in all formats, ask about format availability.

COASTAL®



INV003-WKB-ENG-0000

www.coastal.com