

# Foreword

## Background

Organizations in all industries experience incidents that range from near misses to major accidents. These incidents should be investigated because many regulations require it and industry initiatives encourage it. More importantly, the root cause analysis process helps organizations learn from past performance and develop strategies to improve safety, reliability, quality, and financial performance.

ABS Consulting's SOURCE™ (Seeking Out the Underlying Root Causes of Events) methodology, presented in this handbook, is designed for use in investigating and categorizing the underlying causes of incidents (including accidents and near misses) with safety, health, environmental, quality, reliability, production, security, and financial impacts. The term "incident" is used to generically identify situations that have any one or more of these types of consequences.

The SOURCE™ methodology provides an effective and efficient approach for investigating incidents of any magnitude. ABS Consulting developed the methodology by customizing and combining the best techniques available. Application of the SOURCE™ techniques by ABS Consulting personnel and our clients ensures that these methodologies are field-proven, not just theories. The objectives of the SOURCE™ approach are as follows:

- Provide a technique that will guide incident investigators in analyzing root causes and identifying, documenting, addressing, and trending the causes of accidents and near misses.
- Provide organizations with a structured approach for developing recommendations to address the immediate and underlying causes of incidents.
- Assist clients with the investigation of a variety of types of incidents (including fires, manufacturing errors, equipment malfunctions, and customer complaints) with consequences ranging from minor to major.
- Facilitate analysis of losses whether they are related to safety, the environment, security, reliability, quality, or business losses.
- Provide a technique that is sufficiently flexible to allow customization to a client's own management system; health, safety, and environment programs; or related initiatives.
- Support compliance with root cause analysis and incident investigation-related industry guidelines and regulations.

## The SOURCE™ Methodology

The SOURCE™ methodology (see Figure F.1) encapsulates a process for conducting investigations following losses whether they are related to people, equipment, software, or other factors. This model is described further in Section 1.

The RCA methodology described in this handbook addresses the (1) incident investigation and (2) corrective and preventive action program requirements found in many regulations, industry standards, and guidance documents.

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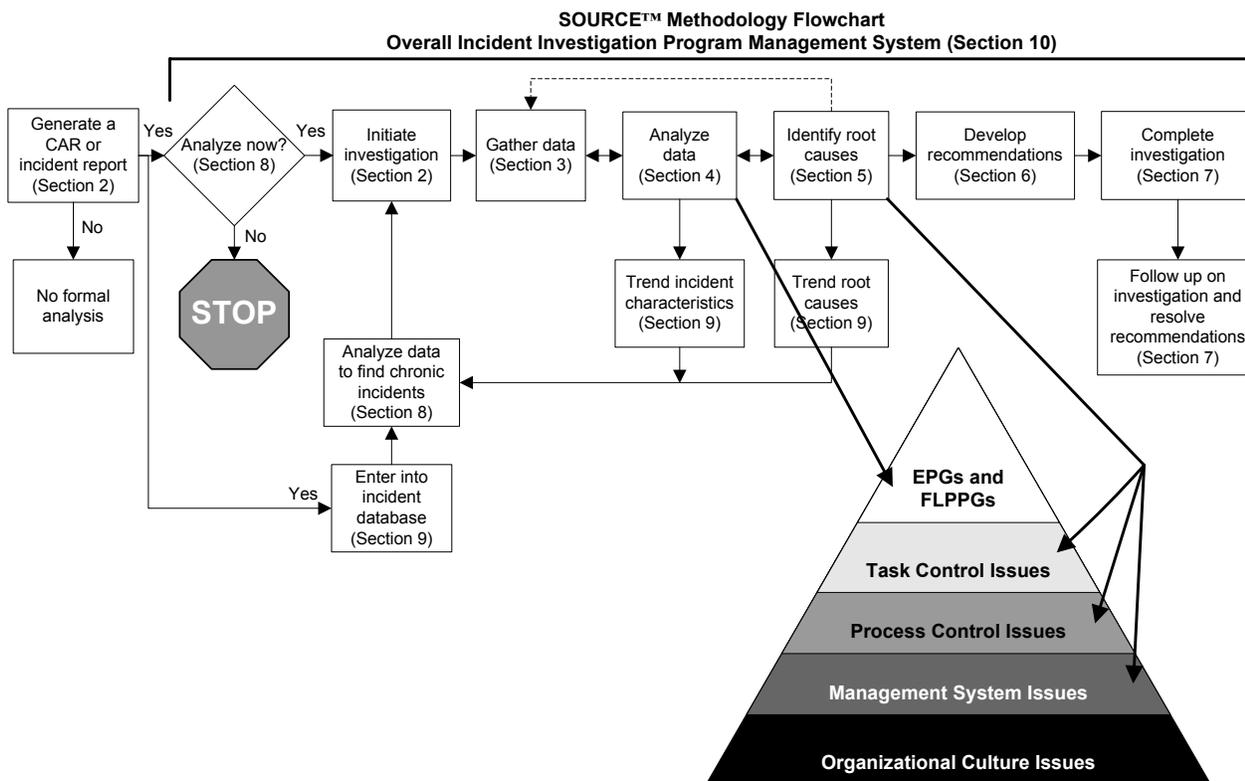


FIGURE F.1: ABS Consulting's SOURCE™ Incident Investigation Model

## Scope of the Handbook

The focus of this handbook is on the application of structured analysis techniques, including the use of ABS Consulting's Root Cause Map™, to the root cause analysis (RCA) process. There are two levels of analyses: apparent cause analyses (ACAs) and root cause analyses (RCAs)<sup>1</sup>. RCAs involve a deeper level of analysis than ACAs. The sections in this handbook generally apply to both levels of analyses. For example, data gathering is performed for both ACAs and RCAs. However, more effort is usually required to gather data for an RCA than for an ACA. This is generally true for most analysis activities.

This handbook provides instructions for performing RCA activities, including:

- *Initiating the investigation*: How to determine whether an incident has occurred, how to classify and categorize the incident, and how to decide whether to conduct an in-depth investigation.
- *Data gathering*: How to collect data related to people, processes, procedures, documents (both hard copy and electronic), position, and physical data associated with an incident.
- *Data analysis*: How to analyze incidents to determine causal factors (see Subsection 1.11 for a definition of causal factors) using tools such as causal factor charts, timelines, and cause and effect trees. Guidance is also provided on identifying root causes using ABS Consulting's Root Cause Map™.

<sup>1</sup> - The term "root cause analysis" as used in this handbook can have two different meanings. First, root cause analysis is used in the generic sense to describe the overall process of investigating incidents to understand their causes and develop appropriate corrective actions. Root cause analysis is also used to describe a specific level of investigation that is deeper than for an apparent cause analysis.

- *Developing recommendations*: How to document causal factors and root causes identified during an analysis, including how to identify what changes (i.e., recommendations) may be needed to enhance management systems and reduce risks.
- *Reporting and trending*: How to archive findings and recommendations to allow review and trending of incident patterns after some period of SOURCE™ use.

## Contents of the Handbook

Each of the first 10 sections of this handbook focuses on one aspect of the incident investigation process. Section 11 includes additional resources that may be helpful when performing investigations. The handbook sections are as follows:

- *Section 1 – Basics of Incident Investigation* presents a basic overview of the SOURCE™ investigation process. It describes the reasons why an organization should perform investigations and includes basic definitions of terms used in the handbook.
- *Section 2 – Initiating Investigations* describes the steps an organization must perform before the actual investigation begins, such as setting up processes for incident classification and team selection.
- *Section 3 – Gathering and Preserving Data* provides guidance for gathering and preserving the different types of data that are needed for an investigation.
- *Section 4 – Analyzing Data* discusses three different methods (cause and effect trees, timelines, and causal factor charts) for analyzing the data that have been collected.
- *Section 5 – Identifying Root Causes* describes the use of ABS Consulting's Root Cause Map™ to assist in identifying the underlying causes of incidents.
- *Section 6 – Developing Recommendations* explains the different types of recommendations that should be developed to ensure that the highest return is obtained from the analysis.
- *Section 7 – Completing the Investigation* describes the activities that should be performed to complete an investigation.
- *Section 8 – Selecting Incidents for Analysis* provides guidance on determining which incidents need to be analyzed.
- *Section 9 – Data and Results Trending* explains the method for setting up and monitoring a trending system. Trending is used to identify chronic incidents that trigger analyses.
- *Section 10 – Program Development* describes the process of setting up the overall incident investigation program.
- *Section 11 – Contents of the Companion CD and Downloadable Resources* provides a brief description of the contents of the companion CD and forms and checklists that can be downloaded from the ABS Consulting Web site at [www.absconsulting.com/RCAHandbookResources](http://www.absconsulting.com/RCAHandbookResources).

Additional information that can help the reader use the SOURCE™ approach is provided in the following appendices:

- *Appendix A – Glossary* provides definitions of and notes on terms used in this handbook.
- *Appendix B – Cause and Effect Tree Details* provides in-depth information about the use, development, and construction of cause and effect trees. Example cause and effect trees are also included. This appendix supplements information provided in Section 4, "Analyzing Data."
- *Appendix C – Timeline Details* provides in-depth information about the use, development, and construction of timelines. Example timelines are also included. This appendix supplements information provided in Section 4, "Analyzing Data."

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- *Appendix D – Causal Factor Charting Details* provides in-depth information about the use, development, and construction of causal factor charts. Example causal factor charts are also included. This appendix supplements information provided in Section 4, “Analyzing Data.”
- *Appendix E – Root Cause Map™ Guidance* describes each segment of the Root Cause Map™ and presents detailed descriptions of the individual nodes (or items) on the map. The Root Cause Map™ itself is included as part of the SOURCE™ Investigator’s Toolkit in Appendix F.
- *Appendix F – SOURCE™ Investigator’s Toolkit* provides summary guidance and resources (such as checklists and forms) that can be used to document incident investigation activities. This same material, as well as other investigation resources, can be obtained from the ABS Consulting Web site at [www.absconsulting.com/RCAHandbookResources](http://www.absconsulting.com/RCAHandbookResources).