



**Incident Investigations:
Taking it to the Next Level**

Clemente A. Zabalza, M.S., OHST
Loss Prevention Services
Texas Association of School Boards




Apollo 13 – Incident with a Long History

- Launched on April 11, 1970
- Two days later on April 13, 1970 – explosion on board
- Incidents related to mission problems happened several years before – Apollo 10




Incident Investigations

- Investigation 101
- Accident vs. incidents
- The next step?
- Root cause analysis
- Case study
- Questions?




Investigation 101

- What are you currently doing?
 - What are you investigating?
 - Injury only
 - First aid cases
 - Property damage
 - Near misses
 - What are your successes?




Investigation 101

- How are you conducting investigations?
 - Documented vs. informal
 - DWC-1
- What information does this provide?
 - Assist only with claim process
 - Corrective action(s) developed




Accident vs. Incident

- We are accustomed to saying accidents in everyday language
- Fred Manuele defines the term “incident” as encompassing all hazard-related events
- Incident investigations are a “Hazard-Related Incident”




Accident vs. Incident

- Incident is “hazard-related”
 - “An unplanned, unexpected process of multiple and interacting events, deriving from the realization of uncontrolled hazards occurring in sequence or in parallel, which most likely could result in harm or damage to people, property, and/or the environment” – Fred Manuele




Incident = Failure

- Most incidents are result of failure to behave or react as expected:
 - People
 - Equipment
 - Supplies
 - Surroundings




Failure of Management System

- Management system
 - Not an actual person but systems, procedures, and practices in place to manage organization
- Incident investigation determines how and why failures occur
 - Focus on preventing recurrences




The Next Step?

- Management commitment to safety requires action to be effective
 - Strong visibility when an incident occurs is important
 - Efforts to determine the cause(s) adds to positive view of management
- Poor response fosters doubts to management commitment




Taking the Next Step

- We are already looking for a cause in the investigation process
 - That is good;
- However:
 - What is the focus?
 - What is the root cause?




Traditional Safety Theory

- Incident investigations would find:
 - One act, and/or
 - One condition;
 - Leading to one corrective action
- But how is a future hazard mitigated through this process?




Root Cause Analysis (RCA)

- What is a "Root Cause"?
 - The initiating cause of a causal chain of events
- Process looks at entire sequence of events (before and during incident)
- Also known as multiple-causation theory




Root Cause Analysis (RCA)

- Look at contributing factors
 - Equipment
 - Processes
 - Procedures
 - Training
 - Supervision
- Evaluate factors before discarding




Root Cause Analysis (RCA)

- Goal of effective safety management is for hazards and contributing events to be:
 - Identified
 - Evaluated
 - Eliminated
 - or
 - Controlled




RCA Pitfalls?

- When do you stop asking questions?
 - Premature stopping point
 - Improper screening of information and evidence
 - Event level
 - Failure to follow procedures
 - Single root cause




RCA Pitfalls?

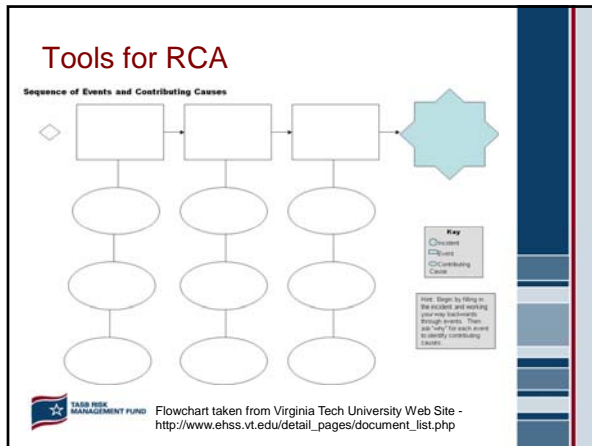
- Setting the investigation target too low
 - Not reaching the root cause
 - Pointing out the obvious
- Finding blame instead of cause
 - Individuals may be part of the failure but understand why instead of who

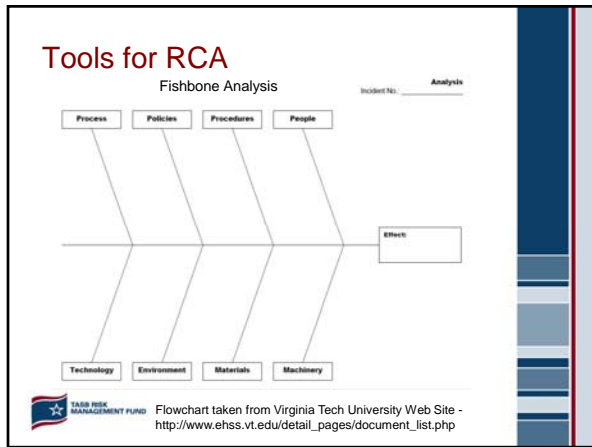


Tools for RCA

- Cause and effect diagram
 - Identifies, sorts, and explains possible causes
 - Illustrates relationships between outcomes and factors
 - Also known as fish bone analysis
 - Additional information at American Society for Quality - www.asq.org







Tools for RCA

- Five Whys
 - Find causes to problem asking “Why?”
 - Peeling the onion, one layer at a time
 - Each answer leads to another question
 - May take more or less than five “whys”
 - Created by Sakichi Toyoda
 - Adopted by iSix Sigma for quality improvement - www.isixsigma.com


Tools for RCA

Root Cause

Root Cause Analysis – 5 Whys Incident No. _____
Once contributing causes have been identified, this method can be used to explore the root cause of a defect or problem.


Problem Statement: _____

Why	_____
Because	_____
Why	_____
Because	_____
Why	_____
Because	_____
Why	_____
Because	_____
Why	_____
Because	_____

 Flowchart taken from Virginia Tech University Web Site - http://www.ehss.vt.edu/detail_pages/document_list.php


Case Study

- Incident:
 - Employee is about to perform maintenance work on a ladder. As the employee reaches the top of the ladder, the securing hardware gives way, causing the ladder to collapse to the floor injuring the employee.




Case Study

- Single cause method
 - Unsafe act: Employee using defective ladder
 - Unsafe condition: Defective ladder
 - Corrective action: Replace ladder
- Does this sound like we will prevent future incidents?




Case Study

- Remember “5 whys?”
- What questions would you ask?
 - Why wasn't ladder found during inspection?
 - Why did employee use defective ladder?
 - Why didn't the supervisor allow use?
 - Why wasn't employee trained?
 - Why didn't supervisor review job first?




Case Study

- Corrective actions
 - Improve ladder inspection procedures
 - Improve employee training
 - Review ladder replacement procedures
 - Improve pre-job employee review
 - Have supervisors review inspection reports




Case Study

- Summary
 - Investigation 101
 - Accident vs. incidents
 - The next step?
 - Root cause analysis
 - Case study



Questions?



References


Boraiko, C., Beardsley, T., & Wright, E. (2008). Accident Investigations. *Professional Safety*. 26-29.

Haight, Joel M. (2008). *The Safety Professionals Handbook: Management Applications*. Des Plaines, Illinois: American Society of Safety Engineers.

Manuele, F. (2004) Is a major accident about to occur in your operations: Lessons learned from the space shuttle Columbia explosion. *Professional Safety*. 22-28.

Phillely, Jack. (2006). Want to Improve Your Investigation Results?. *Occupational Health & Safety*. Retrieved March 29, 2010 from <http://ohsonline.com/Articles/2006/01/Want-to-Improve-Your-Investigation-Results.aspx>

Virginia Tech University: Environmental, Health, and Safety Services. (2010) Accident Investigation Documents. Retrieved from http://www.ehss.vt.edu/detail_pages/document_list.php



Incident Investigations

Root Cause

Root Cause Analysis – 5 Whys

Incident No.: _____

Once contributing causes have been identified, this method can be used to explore the root cause of a defect or problem.

Problem Statement:

? Why
Because
? Why
Because
? Why
Because
? Why
Because
? Why
Because

Quality Tools



Cause and Effect Diagram

Description

This template illustrates a Cause and Effect Diagram, also called a Fishbone or Ishikawa Diagram. A detailed discussion of Cause and Effect Diagrams can be found at www.ASQ.org

[Learn About C and E Diagrams](#)

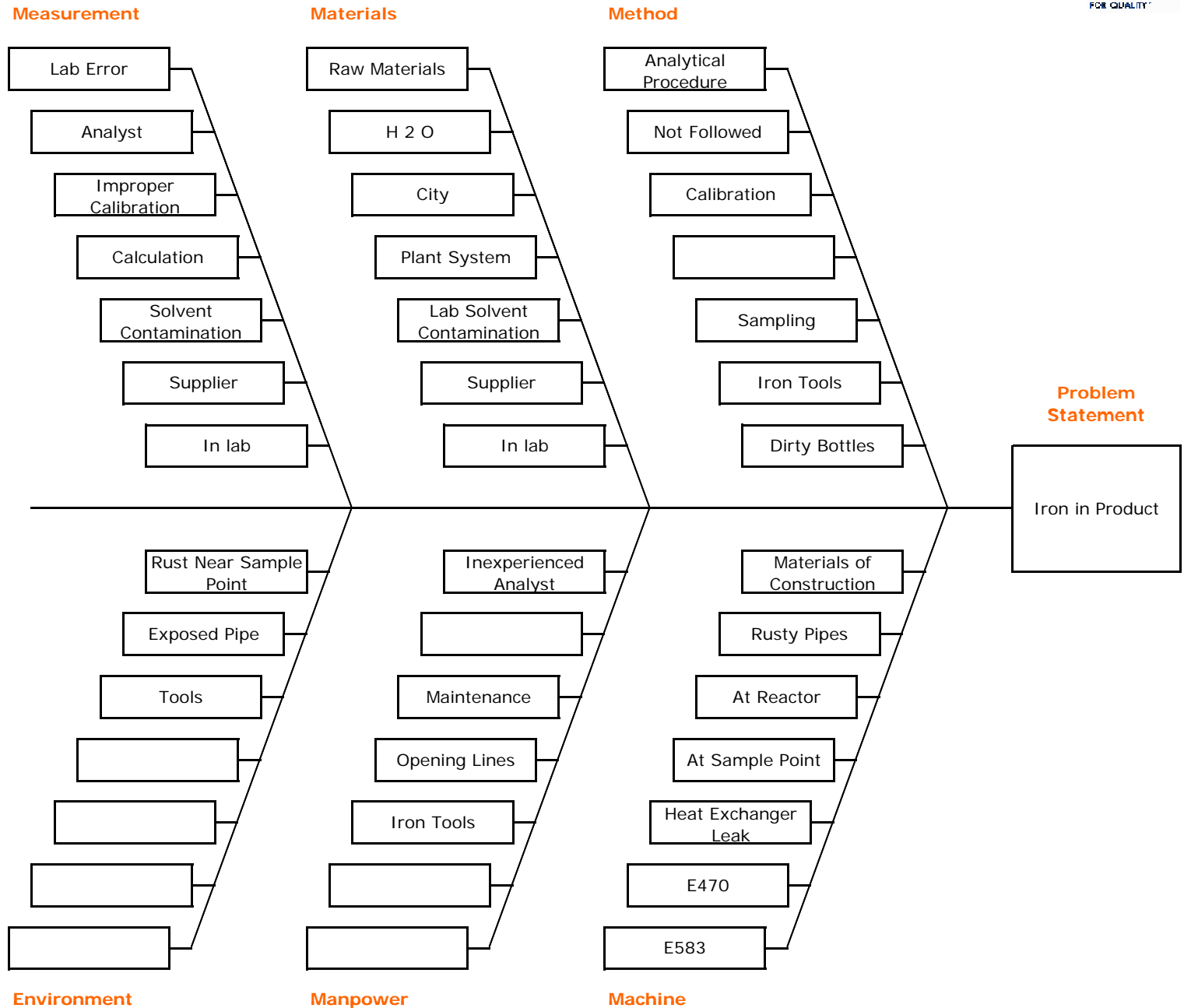
Instructions

- Enter the Problem Statement in box provided.
- Brainstorm the major categories of the problem. Generic headings are provided.
- Write the categories of causes as branches from the main arrow.

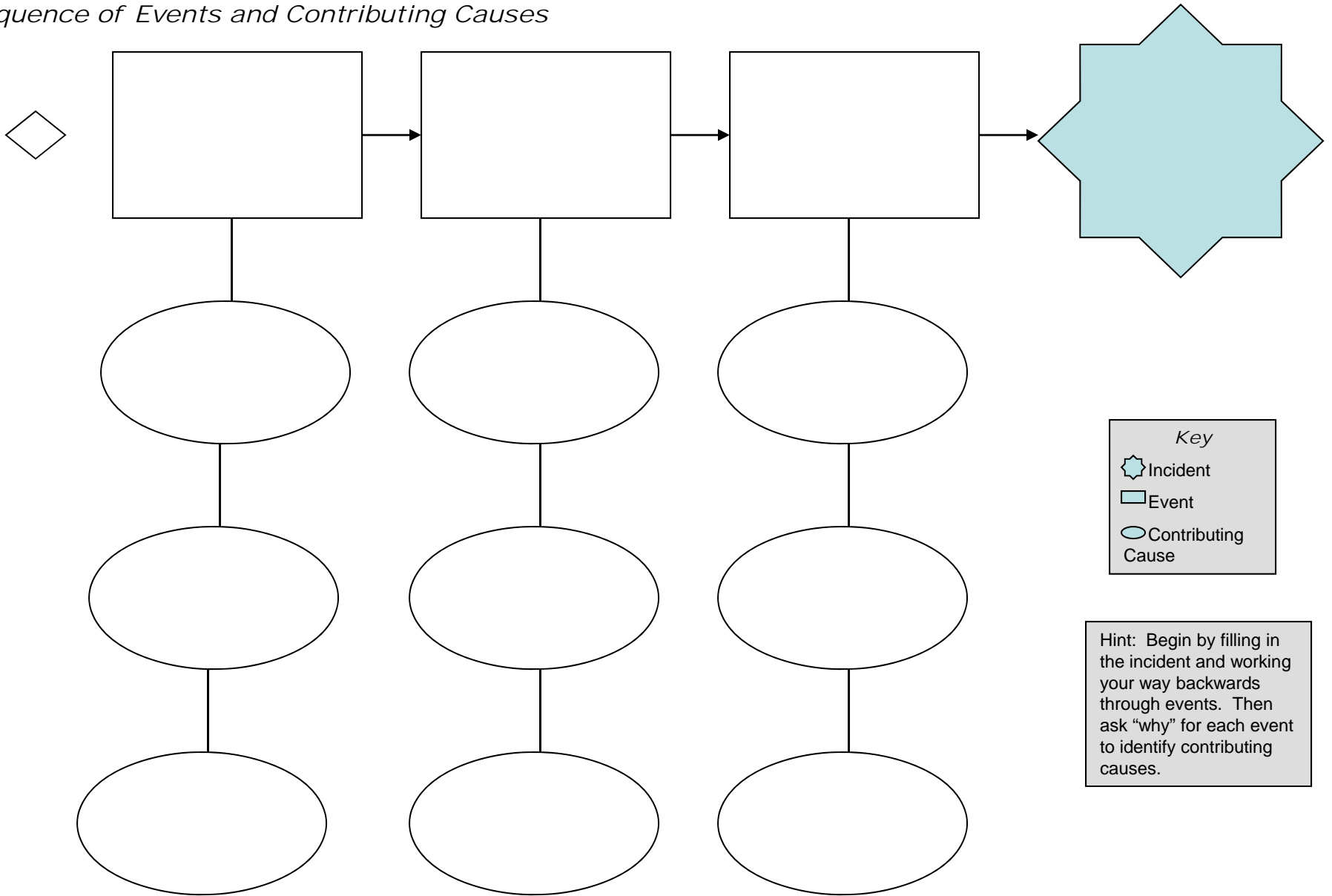
Learn More

To learn more about other quality tools, visit the ASQ Learn About Quality web site.

[Learn About Quality](#)



Sequence of Events and Contributing Causes



Sequence of Events and Contributing Causes

