

# Root Cause Analysis Training

Identifying True Root Causes of an Incident

# Root Cause Analysis

- **Incident Investigations Are Conducted To Prevent Recurrence Of An Unwanted Event**
  - **Recognize root causes**
  - **Identify preventive actions**
  - **Implement changes to correct root causes**
    - **Apply corrective actions to other areas of plant (similar areas/equipment) where corrective actions would be beneficial**

**What is a “root cause” anyway ?**

**A root cause is the  
lowest level *fact* that  
contributed to an incident**

# Why are root causes so important ?

Identification of true root causes will allow us to put appropriate corrective actions in place to prevent recurrence

Initial corrective actions are *reactive* – they immediately remedy a situation and are based on what we “think” happened

After analyzing an incident, and finding the root causes, *proactive* corrective actions may be implemented

Findings can be shared with other Rhodia sites

**How many times have you heard ...**

**“But we *already*  
know what  
happened”**

**... Do you really ???**

# The Root Cause Investigation Process

- Find out exactly **WHAT** happened
- Find out **WHY** it happened (finding root causes)
  - Identify measures to fix root causes to prevent reoccurrences (recommendations)
  - Implement Corrective Actions (actual fixes)

# “But Root Cause Analysis takes forever ...”

You should not be spending the *same* amount of time on investigations for *all* incidents

Look at the **actual** severity as well as the *potential* severity – for near misses as well as incidents

Determine where a more detailed investigation is warranted, i.e., for medium or above actual *and* potential severity

How can we simplify the process ??

Let's use a logic-based approach



# The Process ...

- Establish your investigation team
- Collect all available information
- List **ALL** facts (not judgments or interpretations) surrounding the incident, regardless of whether you believe they contributed to the incident itself
- Start from the result of the incident, and work your way back, asking ...

**WHY, WHY, WHY**

# The Team ...

- † **Individual(s) involved in the incident**
- † **Witnesses**
- † **Supervisor of the area**
- † **Someone who can facilitate the root cause process**
- † **Consider individuals with safety, maintenance, operating backgrounds to assist**

# Information ...

- **List all facts whether they were directly or indirectly related to the incident**
- **Develop a time line listing all of the facts**

# INFORMATION GATHERING

- Should occur as soon as possible after the incident has occurred, after attending to immediate mitigation, injuries and securing the scene.
- Look for physical conditions (housekeeping, equipment conditions, walking/working surfaces, weather... Collect as much data as you can, even if you do not THINK it contributed to the incident – remember, it is harder to go back and try to recreate the “scene” or incident if you do not collect the data immediately
- Interview witnesses before individuals share stories and the actual “viewing” becomes tainted
- If possible, take pictures, or sketch the scene

# Collection of Facts -- Fact vs. “Fiction”

## Ensure “facts” are listed individually

Facts should be written on separate pieces of paper or “Post-it®” Notes for ease of working back from the incident to the true root causes (it’s easier to move a piece of paper than to keep erasing ...)

Statements should be indicated as such, i.e., “John stated he was not in a hurry”, so you can revisit statements and facts if they do not seem to “fit together” in a logical sequence of events

## This is not a “blame” or “fault” session

Do not list “interpretations” – construing of facts or info in a particular way (i.e., the valve was faulty)

Do not list “judgments” – opinions (i.e., it was an unsafe ladder; the person was walking too fast)

**Working with FACTS will keep emotions to a minimum, allowing the team to accomplish their objectives**

# FACT or “Fiction” ???

- He caught his foot on the skid
- The skid should not have been in the aisle
- The valve was leaking
- The ladder was defective
- The ladder should have been taken of service
- The rung was cracked
- He wasn't paying attention to what he was doing
- She didn't follow the procedure
- He slipped on an ice patch

Could you tell the difference ?

# Now What ?

**OK,**

- ✓ **we've assembled our team**
- ✓ **we've collected available information**
- ✓ **we've listed the facts**

**NOW WHAT ???**

# THE SEARCH FOR ROOT CAUSES

**Start with the end result of the incident, working backward, asking “why did it happen?”**

**Is this the only reason?**

**When you are satisfied you have answered all the “why’s” contributing to that fact, you may move on to the next one**

**An Event Can Not Be a Root Cause!**



# Why the “Why” Process ??

## Some examples that may help ...

- Carbon steel pipe leaked ... WHY
- Individual did not follow procedure ... WHY
- Corrosion ... WHY (and, no, “because it’s acid” is not sufficient !!)
- Incompatibility issue ... WHY
- Poor communication about use of specific chemical being used ... WHY
- No system in place for updating pipes in MOC process ... WHY

**You get the idea ...**

# The “Why” Process ... things to think about

- **Causal Factors**
  - **Behaviors**
  - **Conditions**
  - **Management Control**
- **Consider SOP’s, permits, physical conditions, weather, similar incidents, maintenance records, witness statements, housekeeping ...**

# THE SEARCH FOR ROOT CAUSES

Why?

Why?

Why?

Why?

Why?

Why?

but ... **WHY?**

# Are we there yet ?

- **Every time you work back from a “result” or “single event”, ask if that “fact” alone was responsible, or other factors also had to be in place**
- **Do not move on until you are satisfied you have determined all contributing “causes” of that event**

# Some Chronic Challenges

- **Stopping too soon – there may be multiple root causes**
- **Mistaking a symptom or result for a root cause**
- **Only identifying “things” because they are “easier” or “more comfortable” to correct**
- **The *Failure to Follow Procedure, Operator Error, Leaking Pipe* ... root cause trap**

# Chronic Challenges

## Root Causes Do Not Travel Alone ...

- ***Stopping too soon***
  - **Do not make the mistake of stopping the investigation after identifying only one root cause**
    - **Keep an open mind, there may be multiple root causes**

***REMEMBER ... An event cannot be a root cause***

# Chronic Challenges

## *Distinguishing Between Symptoms and Root Causes*

- **Investigations sometimes stop at the *Symptom Level* and do not identify root causes**
  - **Treating symptoms does not fix root causes**
  - **Another repeat incident will occur**

**As an example – “failure to follow procedure” is a symptom of something else – lack of training or understanding, willful issue, equipment change ...**

# In your search for *True* Root Causes

- **Do's**

- Find out the why's
- Show flaws in the overall management system –  
**IDENTIFY MANAGEMENT SYSTEM BREAKDOWN**
- Correct identification of root causes will lead to prevention of recurrence if appropriate corrective actions are implemented
- Get to the underlying reasons behind the human factors

- **Don'ts**

- Do not stop at “operator error” or “failure to follow procedure”
- Do not stop at “we already know how it happened” – this mentality has not prevented recurrence in the past!



# Weighing Human Factors

## Things to consider ...

### Individual Factors

- Lack of Knowledge  
(Insufficient training or understanding of the job)
- Lack of Skill
- Distractions
- Limitations

### Influencing Factors

- Change in staff
- Time
- Performance
- Management of change
- Changes to instrumentation or equipment
- Personal influences

**Not all “human factors” have corrective actions for the *involved* individual**

# Do ALL these facts need corrective actions ???

When the team is satisfied the sequence of events is logical, *and* the true root causes have been uncovered, it is time for the next step

Look at the factors involved and target the ones requiring some type of action

Some facts may be left over as they did not fit into the sequence of events – that's OK – **THEY SHOULD BE LISTED OFF TO THE SIDE AS THEY MAY STILL REQUIRE AN ACTION ITEM**

Facts identified during the process that did not directly impact the incident, but that require some corrective action may be put those on a separate list and/or captured in your action tracking database

## Let's look at an example ...

**Ben was working by himself and using a utility knife to open a box of supplies. The exposed knife blade contacted his left forearm causing a 3" long laceration. Six stitches were required to close the wound. Ben states that he was cutting toward himself when the injury occurred. Forearm guards were available from the storeroom, however, Ben was not aware of them. It was raining and water had tracked inside the room.**

# List the *facts* ...

***Ben was not wearing a forearm guard***

***The floor was wet***

***Ben was using a utility knife***

***3" long cut to left forearm***

***Blade was exposed***

***Ben stated he did not know about forearm guards***

***Ben stated he was cutting toward himself***

***Any others?***

***Ben was working alone***

## **RULES TO REMEMBER**

- 3. LIST ONE FACT AT A TIME**
- 5. DO NOT MAKE VALUE JUDGMENTS**
- 3. DO NOT INTERPRET**

# YOUR TURN ...

Try to put the facts into a logical sequence yourself, then we'll see how we did.

# WORK BACKWARD FROM THE END RESULT ...

A listing of facts that did not contribute to the incident – do they need a corrective action?

*The floor was wet*

*Ben was working alone*

*Ben stated he did not know about forearm guards*

*Ben was not wearing a forearm guard*

*Ben stated he cut toward himself*

*Ben was using a utility knife*

*The knife blade was exposed*

*3" long cut to left forearm*

# TARGET FACTS THAT REQUIRE A CORRECTIVE ACTION

Facts that did not contribute to the incident

**The floor was wet**

**Ben was working alone**

**Ben stated he did not know about forearm guards**

**Ben was not wearing a forearm guard**

**Ben stated he cut toward himself**

**Ben was using a utility knife**

**The knife blade was exposed**

**3" long cut to left forearm**

# LIST YOUR TARGET FACTS AND DEVELOP CORRECTIVE ACTIONS

TARGET	CORRECTIVE ACTIONS	BY	DATE
<b>ORGANIZATION</b> Ben did not know about forearm guards	Add use of forearm guards to departmental rules and training.	VLM	x/x/xx
<b>HUMAN</b> Ben cut toward himself	Retrain employee and apply coaching/disciplinary action as necessary	PKL	x/x/xx
<b>MATERIAL</b> Ben was using utility knife	Utility knives will be replaced with box cutting knives that guard the blade.	CKS	x/x/xx



# Don't forget about other identified issues ...

FACT(s) THAT DID NOT CONTRIBUTE TO THE INCIDENT:

**Floor was wet**

**Do you need to develop a correction action to address the wet floor issue before someone slips and falls??**

# Look at your corrective actions and ask --

If these had been in place, *could* the incident have occurred?

- If so, you have not identified all root causes and/or appropriate corrective actions

Will these corrective actions prevent the same type of incident from occurring again?

Are there other similar areas on site that should be addressed?

Have *human factors* been identified as well as “things” ?

(90-95% of incidents involve human factors)

# BY GEORGE, I THINK WE'VE GOT IT !!!

## Stopping Point --

- Have you captured all the facts?
- Root cause level has been reached
- ALL root causes have been identified
- Symptoms not mistaken for root causes
- All individual branches on logic tree are in agreement
- Facts requiring corrective actions have been identified
- Relevant management system issues have been identified
- Physical conditions have been considered
- Behaviors to be addressed are included – *remember, 90-95% of incidents involve some type of human factor*
- Corrective action recommendations approved and on an action list for implementation?
- Individuals assigned responsibility for corrective actions with time lines for completion

# Don't Forget ...

- Enter your investigation report into the incident database
- Enter corrective actions into your action tracking database
- Go back and see if the corrective actions have really accomplished what they were supposed to
- *Communicate* with your site and other Rhodia sites so learning's can be shared
- Trend your incidents and near misses – they will help identify missed opportunities with your root cause analysis process