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# Effectively Implementing Root Cause Analysis on Projects Involving Advanced Geophysics

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March 27, 2018



# Reference Information

## Site application of munition classification technologies contractor experiences both good and bad II

**Day:** Tuesday, March 27, 2018

**Time:** 3:00 PM - 4:40 PM

**Location:** NASHVILLE BALLROOM SALON F-H

**Program Track/Topic:** Program Track 1

**Session Type:** Oral

### Chair:

Darren Mortimer, Geosoft Inc

Sandra Takata, Weston

## Presentations

[MetalMapper 2x2 –Testing and Effectiveness on a Munitions Response Site](#)

3:00 PM - 3:20 PM

Stephen Stacy, Arcadis

[Applying Advanced Geophysical Classification Technology to Remedial Investigations and Feasibility Studies](#)

3:20 PM - 3:40 PM

Jack Desmond, Parsons

[Effectively Implementing Root Cause Analysis \(RCA\) on Projects Involving Advanced Geophysics](#)

3:40 PM - 4:00 PM

Stephen Massey, Sandra Takata, Chris Gunning

[Quality Considerations for Geophysics to Support Decision-Making on an MR Project](#)

4:00 PM - 4:20 PM

Les Clarke, Battelle Memorial Institute

## Effectively Implementing Root Cause Analysis (RCA) on Projects Involving Advanced Geophysics

### Authors:

Stephen Massey, APTIM

Sandra Takata, Weston Solutions

Chris Gunning, A2LA

### Presentation Title:

Effectively Implementing Root Cause Analysis (RCA) on Projects Involving Advanced Geophysics

### Session:

Innovative applications of geophysics on Military Munitions Response Program (MMRP) projects

On 11 April 2016, the Assistant Secretary of Defense established the DOD Advanced Geophysics Classification Accreditation Program (DAGCAP). Contractors who implement advanced geophysics on munitions response sites are required to implement a management system and technical procedures that comply with ISO/IEC-17025:2005, General Requirements for the Competence of Testing and Calibration Laboratories. The procedure for corrective action “starts with an investigation to determine the root cause(s) of the problem”, and notes, “Cause analysis is the key and sometimes the most difficult part in the corrective action procedure”.

There’s no shortage of opportunities to apply root cause analysis on projects involving advanced geophysics classification. Malfunctioning equipment, complex site conditions, software aspects, suspect data, etc. are a continual challenge to geophysics professionals. Geophysicists are continually troubleshooting problems and glitches that arise. They fast-track field work variances to keep the project moving. They are expected to detect and solve problems upon discovery, and minimize rework. Experienced geophysics professionals expect unforeseen problems and commonly resemble master contingency planners, equipment troubleshooters and talented improvisers in the field.

If you can relate to this description, we believe you will welcome our overview of root cause analysis, featuring root cause analysis examples from an advanced geophysics classification project. We will conclude by highlighting the common elements of an effective Contractor root cause analysis process based on standard industry practice and lessons learned.

# Overview

- ▶ **Root Cause Analysis (RCA) Value Proposition**
- ▶ **Root Cause Analysis Overview**
- ▶ **Root Cause Analysis Framework**
- ▶ **Root Cause Analysis Charts from Geophysics Project**
- ▶ **Sample Technique for Generating Solutions**
- ▶ **Training Resources to Develop Proficiency**

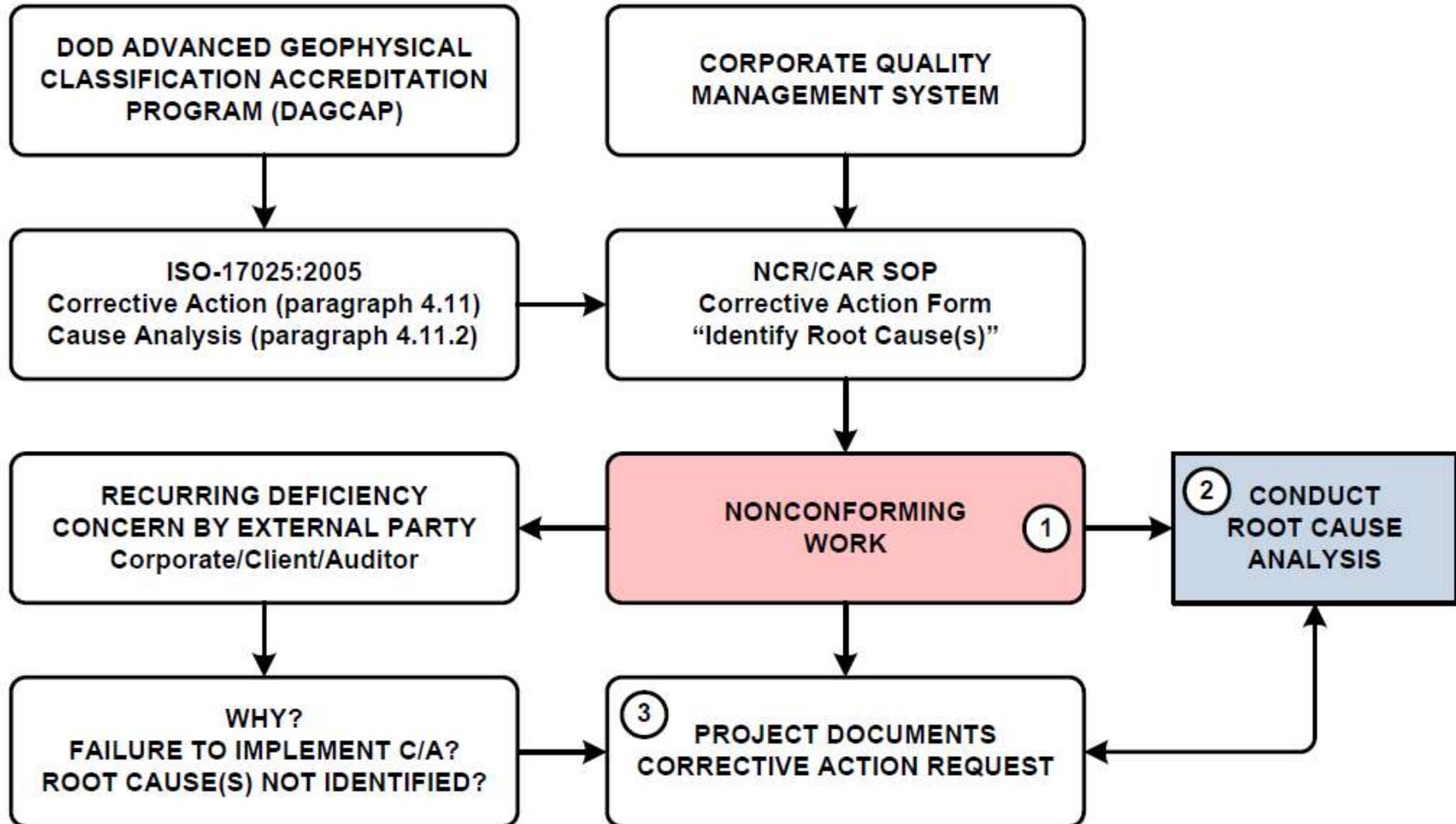
# Root Cause Analysis Value Proposition

- ▶ Root Cause Analysis Improves Team Problem Solving  
*No shortage of geophysics problem-solving opportunities!*

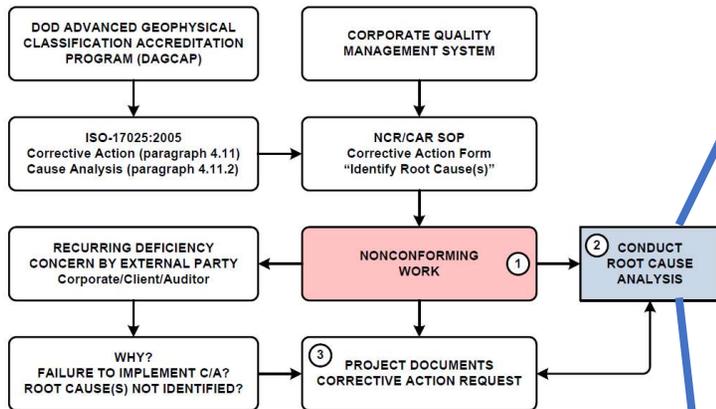
## Key Benefits

- ❑ Avoid quick-fix trap (root cause = human error + retraining)
- ❑ Avoid recurring problems that undermine client confidence
- ❑ Gain deep understanding of process, conditions and impacts on equipment/data
  - *Can't eliminate some causes (e.g., gravity, site noise, etc.)*
  - *May reveal opportunities to control or mitigate effect of causes*
  - *Or design a data collection experiment to improve knowledge*
- ❑ Identify/test/improve solutions to complex problems

# Root Cause Analysis Overview



# Root Cause Analysis Framework – 5 Key Steps



1

## Gather Evidence

An RCA investigation should be based on facts – making sure the RCA is evidence-based helps ensure accuracy.

2

## Create the Problem Statement

An RCA should clearly state the problem, when it occurred, where it occurred, and document the impact.

3

## *Our Focus* → Analyze the Causes

What were the causes? How/why did the problem happen?

4

## Generate Solutions

Solutions control causes to prevent problem recurrence.

5

## Report Findings

The results of the RCA should be documented and shared.

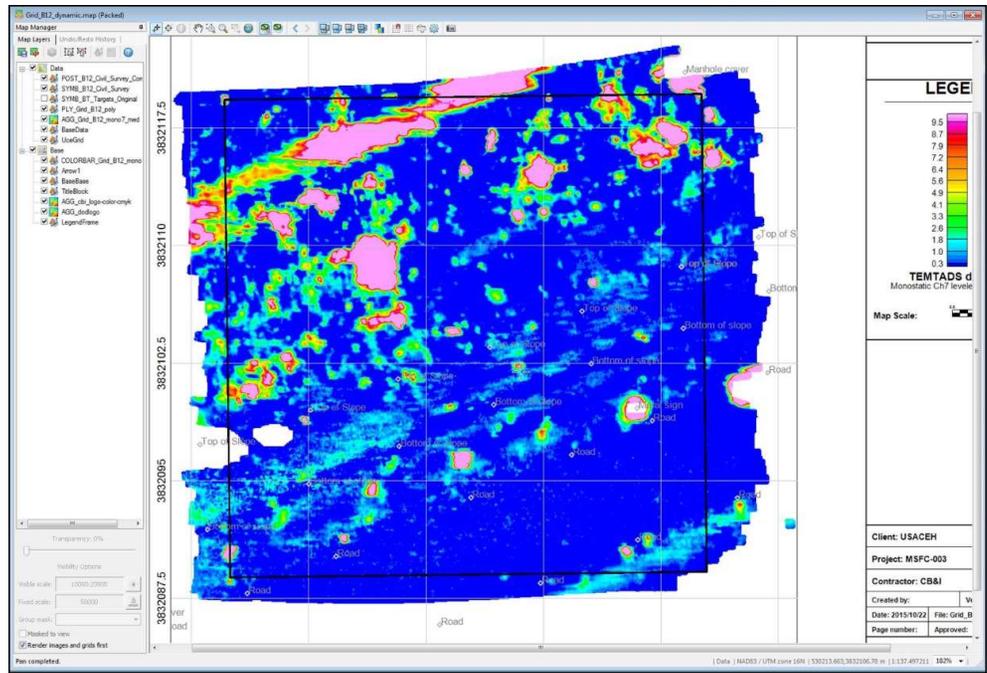
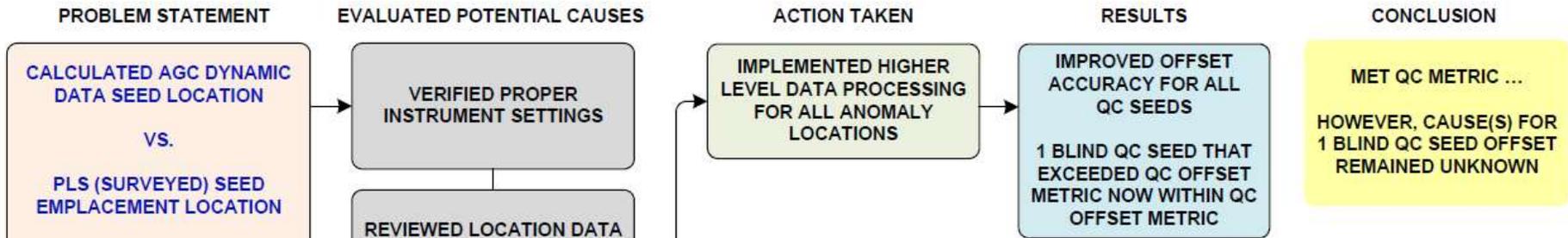
**Single Root Cause Trap**  
*"The root cause is human error"*

CORRECTIVE ACTION REQUEST			
Assignee:	Number:		
Initiation Date:			
Phone:	Standard Spec/Dwg:	Fax:	Reply Due Date:
FROM:			
Part Name:	Part Number:	Criticality:	Major or Minor or Internal Rejection Tag:
Customer Report Number(s):			
Problem Identification:			
Immediate Correction:			
<b>The Root Cause</b>			
Root Cause Correction:			
Corrective Action Verification Plan:			
Follow Up:			

**Corrective Action Request**

Source: "My Boss Told Me To Do A Root Cause Analysis – NOW WHAT?"  
 Free eBook from Sologic

# TEMTADS DYNAMIC DETECTION OF ANOMALIES



# Photographs



# TEMTADS CUED DETECTION OF ANOMALIES

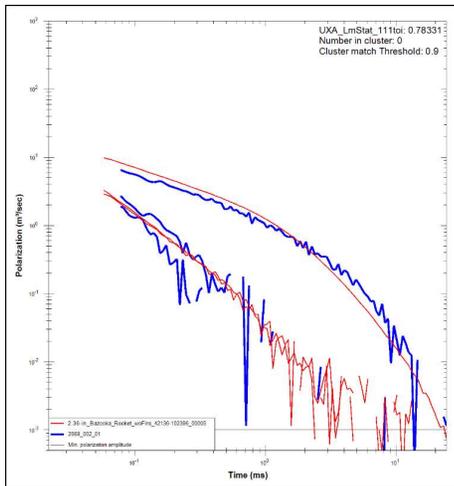
## PROBLEM STATEMENT

**CALCULATED AGC CUED  
DATA SEED LOCATION  
(Same Blind QC Seed)**

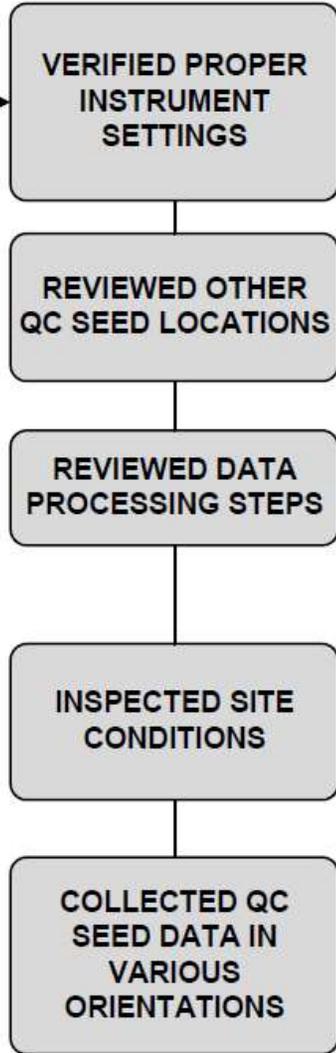
**VS.**

**PLS (SURVEYED) SEED  
EMPLACEMENT LOCATION**

**EXCEEDED 25cm  
QC OFFSET METRIC**



## EVALUATED POTENTIAL CAUSES



**FIELD AND OFFICE  
PROCESSING SHOWED  
OFFSET IN ALL  
ORIENTATIONS**

**OBSERVED  
TERRAIN DISTURBANCE  
Evidence of possible  
expansion/contraction**

**SUSPECT QC  
SEED MOVED**

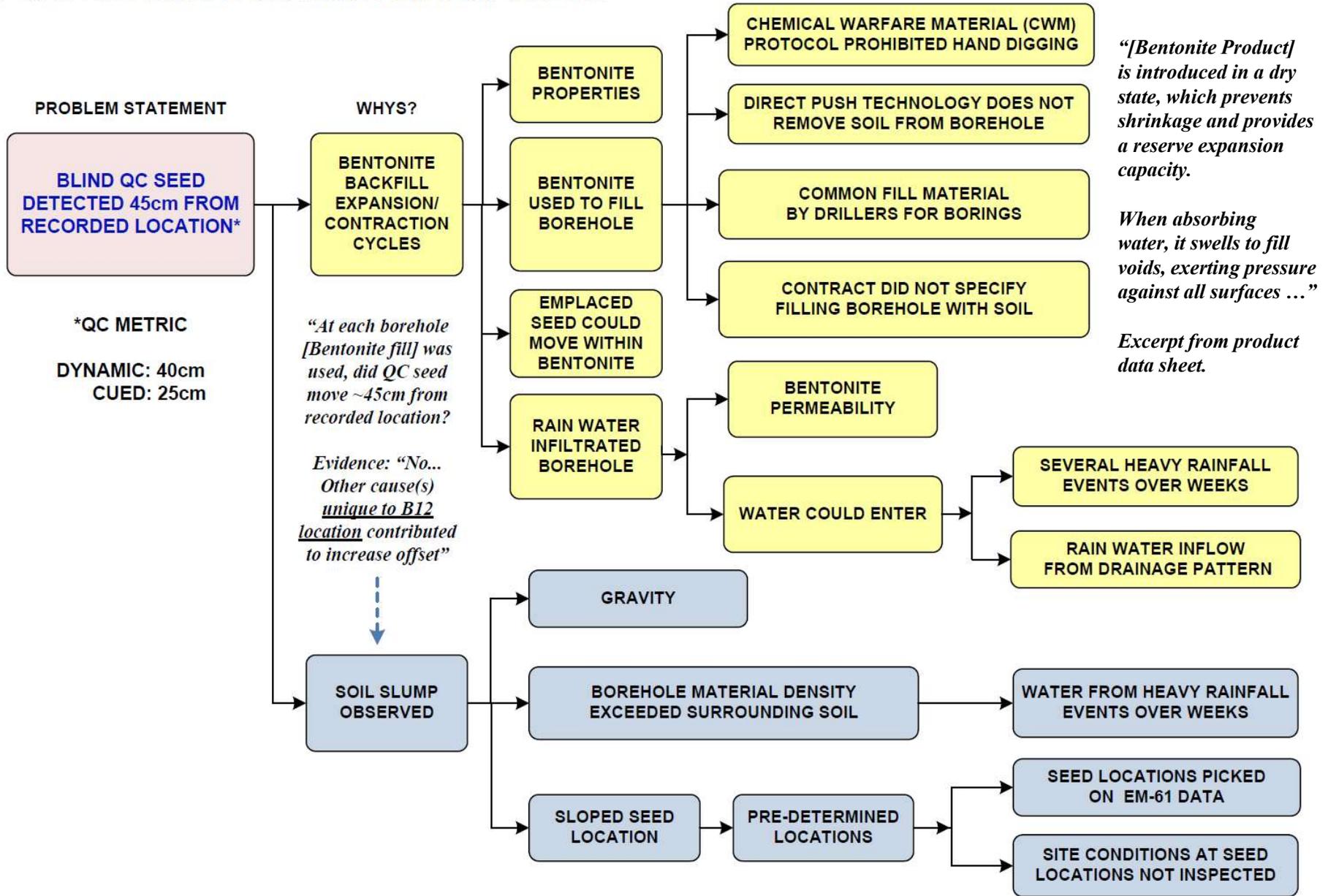
**CONCLUSION**

**WAIT FOR  
DIG RESULTS**



**EVIDENCE OF POSSIBLE  
TERRAIN DISTURBANCE**

# POST-DIG ANALYSIS AND FINAL RESULTS



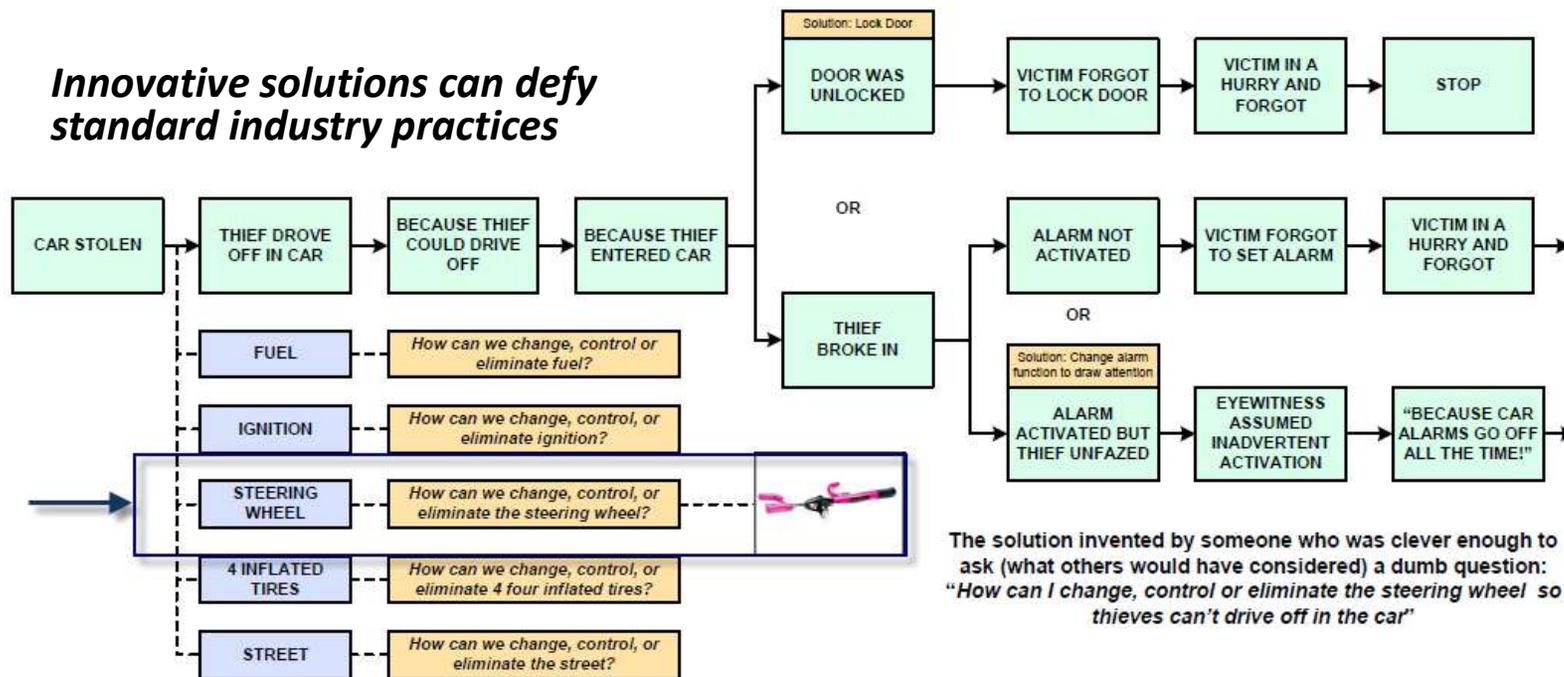
# Sample Technique for Generating Solution Opportunities

For each cause box in the chart, ask question, ***“How can we change, control or eliminate [Cause]?”***

Example: ***How can we change, control or eliminate***

BENTONITE  
USED TO FILL  
BOREHOLE

?

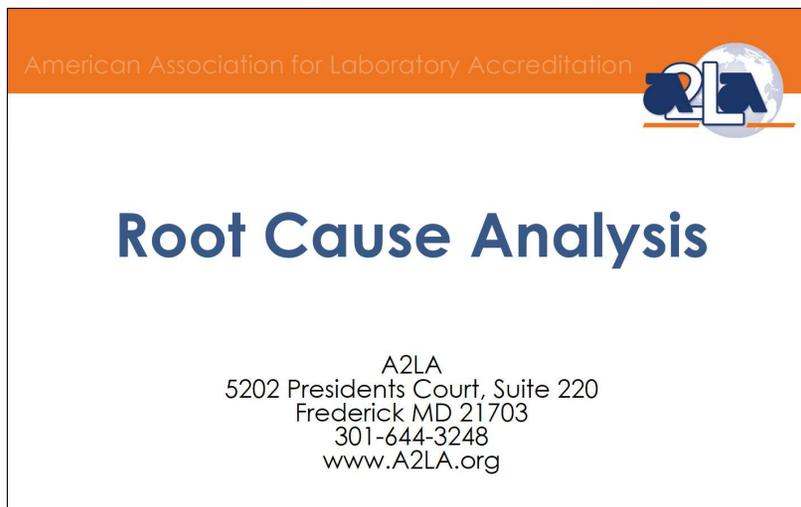


# Training Resources to Develop Proficiency

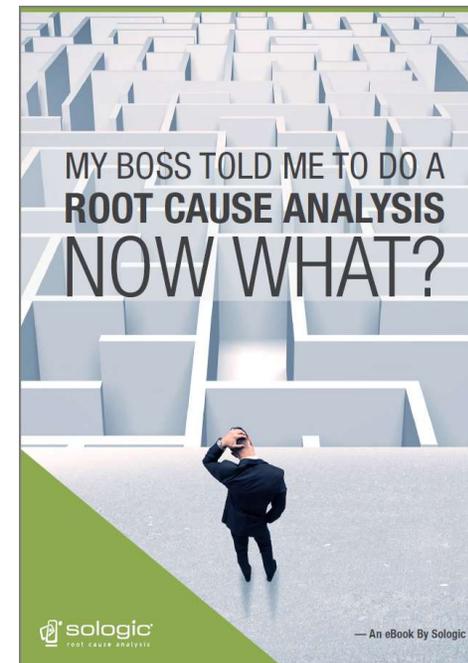
## ▶ [A2LA DAGCAP Web Page](#)



## ▶ [A2LA RCA Training](#)



## ▶ [Free eBook by Sologic](#)



**“My Boss Told Me To Do A ROOT CAUSE ANALYSIS – NOW WHAT?”**

<http://www.sologic.com/>