



Root Cause Analysis

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Agenda

- Definition
- Methodologies
- Problem identification
- Process understanding
- Cause identification
- Data collection & analysis
- Corrective action



Definition

- Root Cause Analysis:
 - Component of a corrective action process whereby failures or non-conformances are identified, causes are diagnosed and actions are taken to prevent recurrence
 - Focuses on identifying possible causes, collecting and analyzing data and determining actual cause(s)
 - A generic skill that can be applied to nearly any type of problem



Methodologies

- Various methodologies for conducting root cause analysis
 - Events and causal factor analysis
 - Change analysis
 - Barrier analysis
 - Risk tree analysis
 - Six Sigma (DMAIC)

Problem identification

- Effective root cause analysis requires deductive or logical thinking about cause-and-effect relationships
- Example:
 - Effect: Increase in number of cancer diagnoses
 - Possible Causes: ??

Problem identification (*continued*)

- Example:
 - Effect: Increase in number of cancer diagnoses
 - Possible Causes:
 - Increase in number of individuals tested
 - More precise testing techniques
 - Increased incidences of cancer
 - Others...



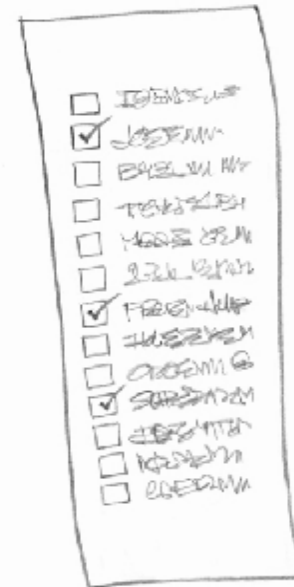
Problem identification (*continued*)

- Root cause analysis can be ineffective when you only focus on what is most visible, or most convenient
- Example:
 - Assuming errors are one time events which will not occur again



Problem identification (*continued*)

- Develop a thorough, succinct description which includes the following:
 - What?
 - Where?
 - Who?
 - When?
 - How much?
- Do not include or imply a cause



Process understanding

- Develop a process flowchart
 - Process flowcharts typically include inputs, processes and outputs
 - The flowchart should be prepared using both the current state as well as the standard (or correct) process
 - A flowchart helps identify where something has gone wrong in a process
 - The flowchart can also help identify data collection points

Process understanding (*continued*)

- Analyze each step within the flowchart for possible weaknesses
 - Lack of defined standards, incomplete process, broken process, non-compliance with process
- Focus on process failures instead of operator failure



Cause identification

- Develop theories about what is causing the problem
 - Examine the flowchart
 - Compare to standards
 - Compare to expected procedures
 - Use a logic tree (5 whys)
 - Use a cause-and-effect diagram (4 Ps)

Cause identification (*continued*)

- Differentiate between symptoms and causes
 - Symptoms are the *signals* that something is wrong
 - Causes are the *underlying reasons* which result in the symptom(s)
- Drill down from symptoms to system cause

Cause identification *(continued)*

Symptoms

- High levels of obsolete inventory

Obvious (physical) cause

- Inventory reserve analysis worksheets are incorrect

Underlying (system) cause

- “Virtual” warehouse locations are not pulled into the inventory aging report

Cause identification (*continued*)

- Analyze to identify possible causes
- Narrow causes down by identifying the ones most likely to have caused the error
 - Conduct a sanity check
 - Is it logical?
 - Is it supported by the data?
 - Is it probable?

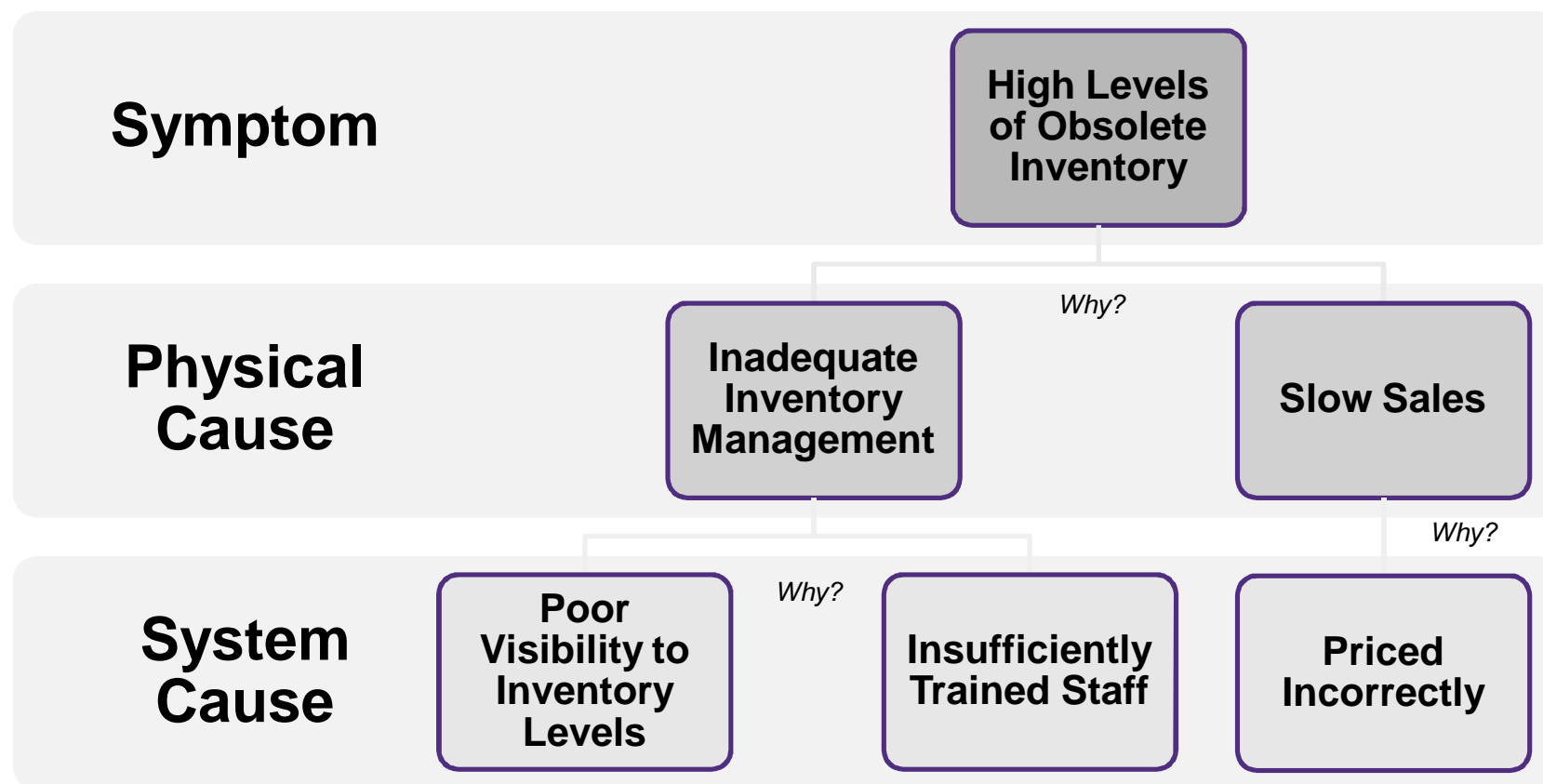


Cause-and-effect analysis

- Drill down from symptoms to system cause
 - The “5 whys” process
 - Keep asking why something happened, until you get to a point where you can take action to correct the underlying system cause

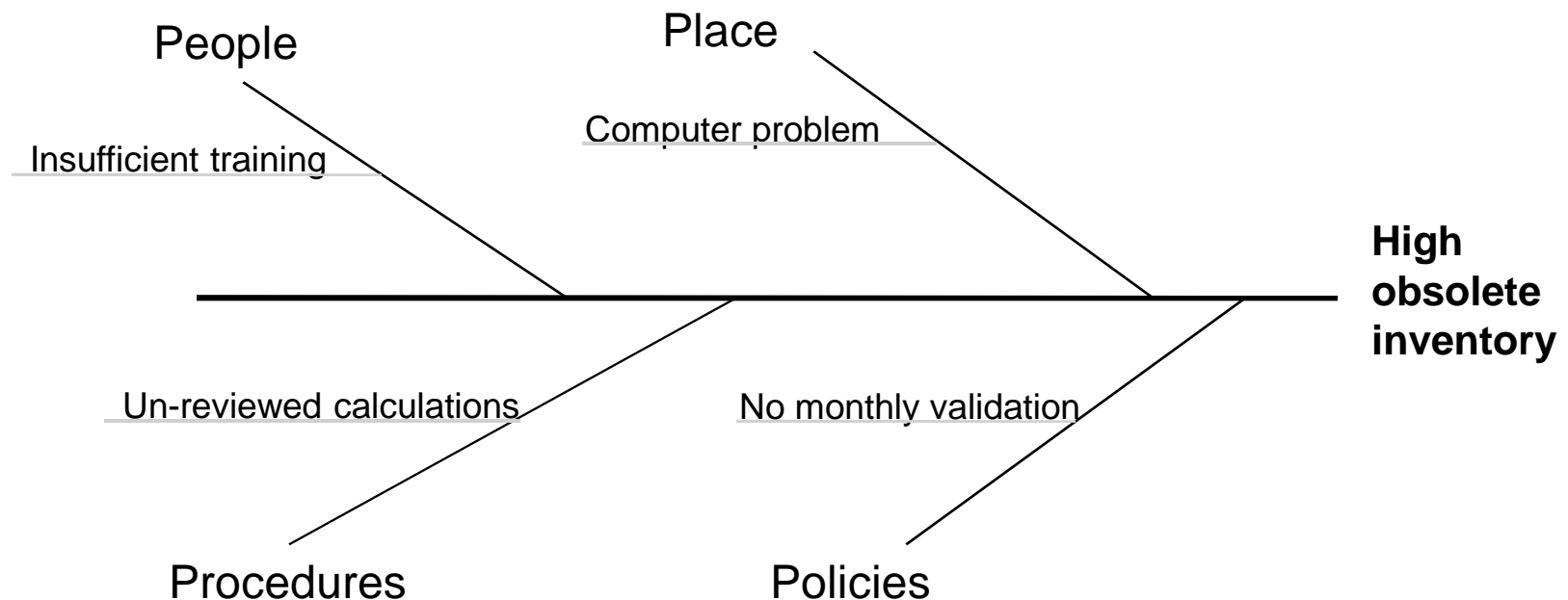


Cause-and-effect analysis *(continued)*



Cause-and-effect analysis (*continued*)

- Drill down from symptoms to system cause (*cont'd*)
 - The “4 Ps” process



Data collection

- Understand cause-and-effect
- Understand the process variables and how they can be measured
- Understand the data and how it can be gathered
- Decide on analysis methods
- Gather the data



Data collection methods

- Interview
- Observation
- Data review
- Scientific techniques



Data analysis

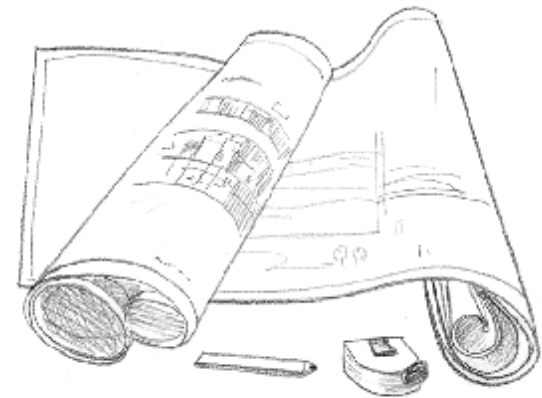
- Ensure the correct data is collected (i.e. data is pertinent to the issue under review)
- Determine the expected outcome
- Analyze the data
- Compare to expected outcome

Data analysis (*continued*)

- Obsolete inventory example:
 - Understand standards or established procedures for inventory management
 - Develop process flowchart showing inventory inputs, processes and outputs
 - Identify data to be collected and analyzed
 - Collect inventory aging by SKU, dollars and quantity
 - Re-perform inventory reserve calculation
 - Compare to existing reserve calculation
 - Identify inconsistencies

Corrective action

- Focus resources on where they would be best spent
 - Identify one problem/reason/cause which may have the largest impact (e.g. dollars, time, re-work, exposure, etc.)
 - Focus efforts on resolving the cause with the largest impact



Questions

