



# ***Root Cause Analysis for Should Cost Management***

## ***ICEAA 2016 Professional Development & Training Workshop***

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# Agenda

- ***Introduction***
- ***Should Cost Management (SCM)***
- ***Root Cause Analysis (RCA)***
- ***Application of RCA to SCM***
- ***Summary***



# *Introduction*



- **Engineers regularly apply root cause analysis (RCA) to determine the cause of critical technical issues and develop solutions. However, RCA can provide project managers with greater understanding of details which drive program cost.**
- **This presentation will demonstrate how RCA techniques can be used by project managers to determine the root cause of cost growth and to better identify non-value added activities in order to improve program performance.**



# What is Should Cost Management (SCM)?



- **A strategy for project managers to identify and pursue should cost savings and provide effective incentives to industry for:**
  - Stronger emphasis on innovation, technical excellence & quality
  - Managing costs through the careful assessment of cost drivers
    - Identification of goals for cost reduction (should cost goals)
    - Implementation of specific efforts to achieve cost reductions
  - Establishing should cost goals and actionable plans to achieve these goals for all activities throughout the program lifecycle

**Continuous process to find and eliminate non-value added tasks.**



# SCM Focus

- **SCM is a continuous effort to improve efficiency and reduce costs**
  - Requires the integration of technical, schedule and cost
- **Identify areas for efficiency improvements**
  - Eliminate nonvalue added tasks
- **Risk balanced – execution and delivery are the focus**
  - Lifecycle view for cost reductions and impacts
- **Continued emphasis on proactively controlling cost**
  - Examine government and contractor processes
- **Execution focus – early identification problem solution aid within budget and on time delivery**

**“Find problems. It is management’s job to work continually on the system”**

**Dr. Deming’s 14 points for improving efficiency**



# Cause and Effect



**“Cause and effect relationships govern everything that happens and as such are the path to effective problem solving. By knowing the causes, we can find some that are within our control and change or modify them to meet our goals and objectives <sup>1</sup>.”**

<sup>1</sup> Apollo Root Cause Analysis, Dean Gano, Chapter 2, Page 41



# Root Cause Analysis (RCA)

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- **Root cause analysis is a structured activity used to identify and understand the source driving the issue**
- **Root cause are rarely the visible problem or symptom**
- **The goal is to identify the factor (event, item) to avoid or reduce future occurrences**
  - Break the problem down to core elements
  - Avoid focus on symptoms
- **Typically there are multiple contributing root causes**
- **Several methods and tools to use**
  - Six Sigma / 5 Whys, Ishikawa / Fish Bone



# Five Why's

- Start with a problem and ask "why" it is occurring
- Continue until you reach the root cause

**Define the Problem: *High Test Completion Cost***

**1: *High test labor costs***

**Why is it occurring?**

**2: *Long test duration schedule***

**Why is it occurring?**

**3: *Equipment Availability***

**Why is it occurring?**

**4: *Expired Equipment Calibration***

**Why is it occurring?**

**5: *No calibration review process***



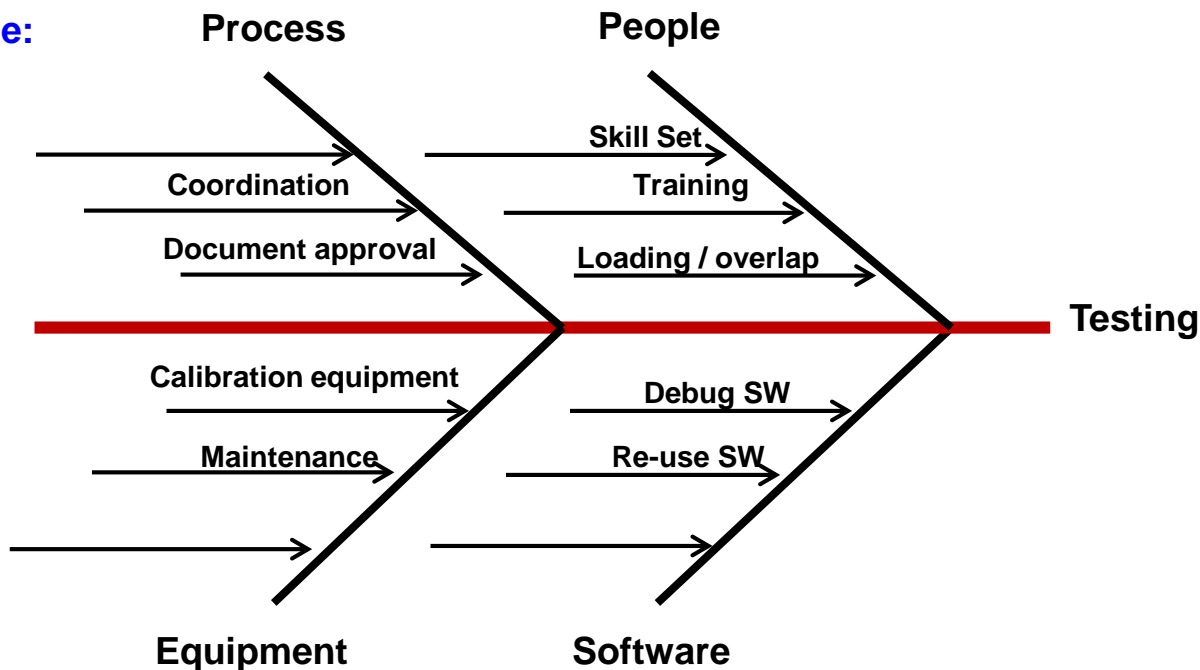


# Ishikawa Diagram



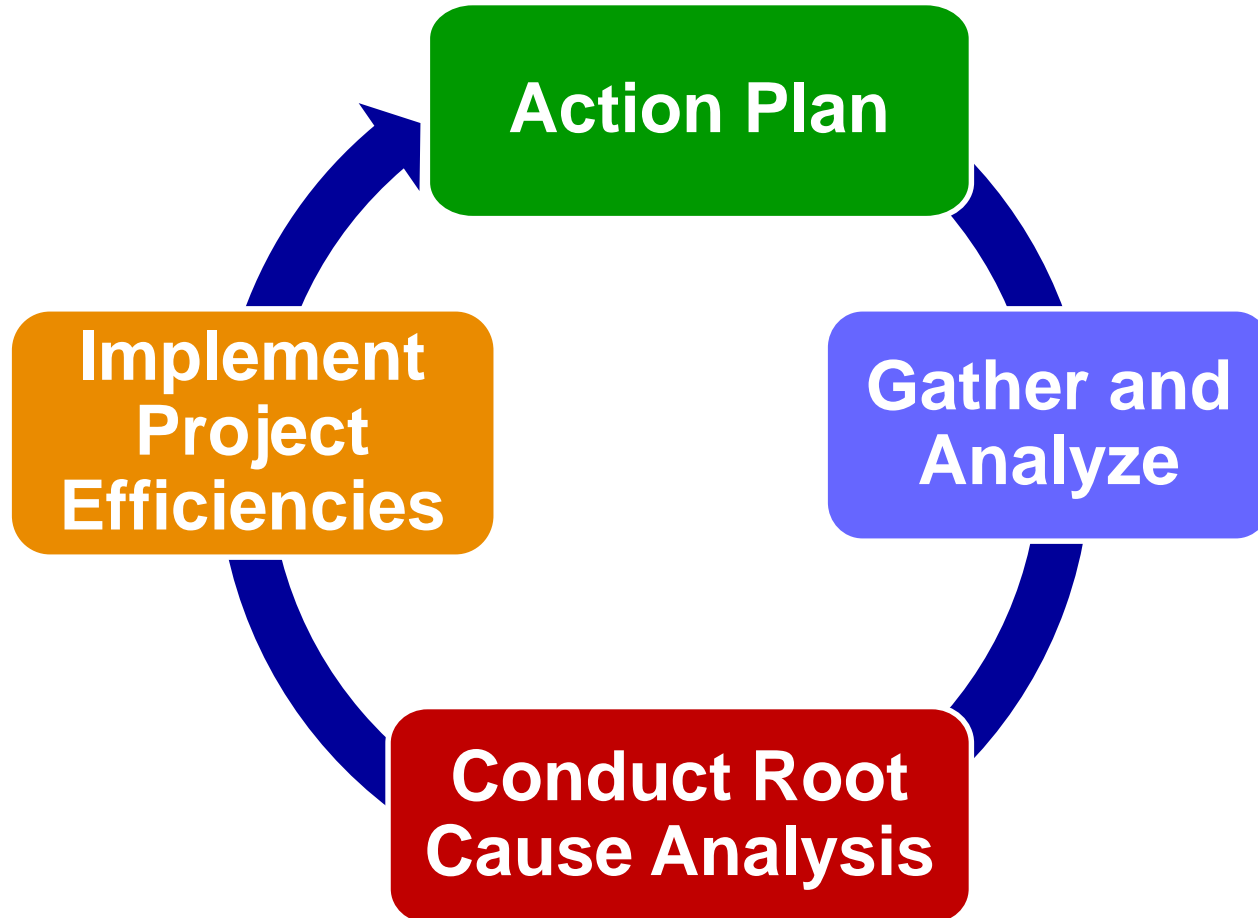
- Technique that helps people specify the origin of the problem
- Basic Type of Causes
  - Equipment: Physical causes
  - People: Human causes
  - Process: Organizational causes

Example:





# Application of RCA for SCM





# Develop Action Plan

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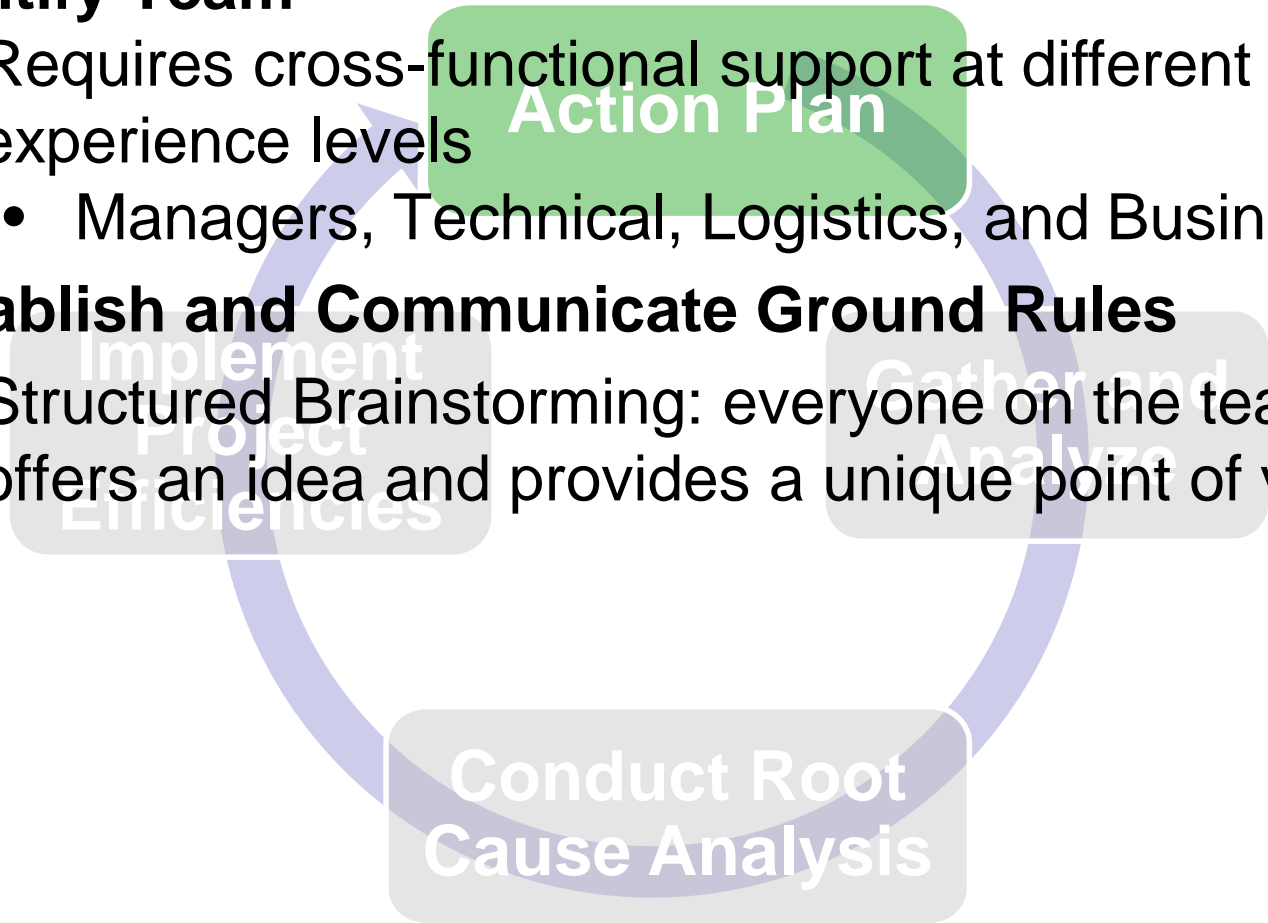
- **Identify Team**

- Requires cross-functional support at different experience levels

- Managers, Technical, Logistics, and Business

- **Establish and Communicate Ground Rules**

- Structured Brainstorming: everyone on the team offers an idea and provides a unique point of view





# Gather and Analyze Program Data

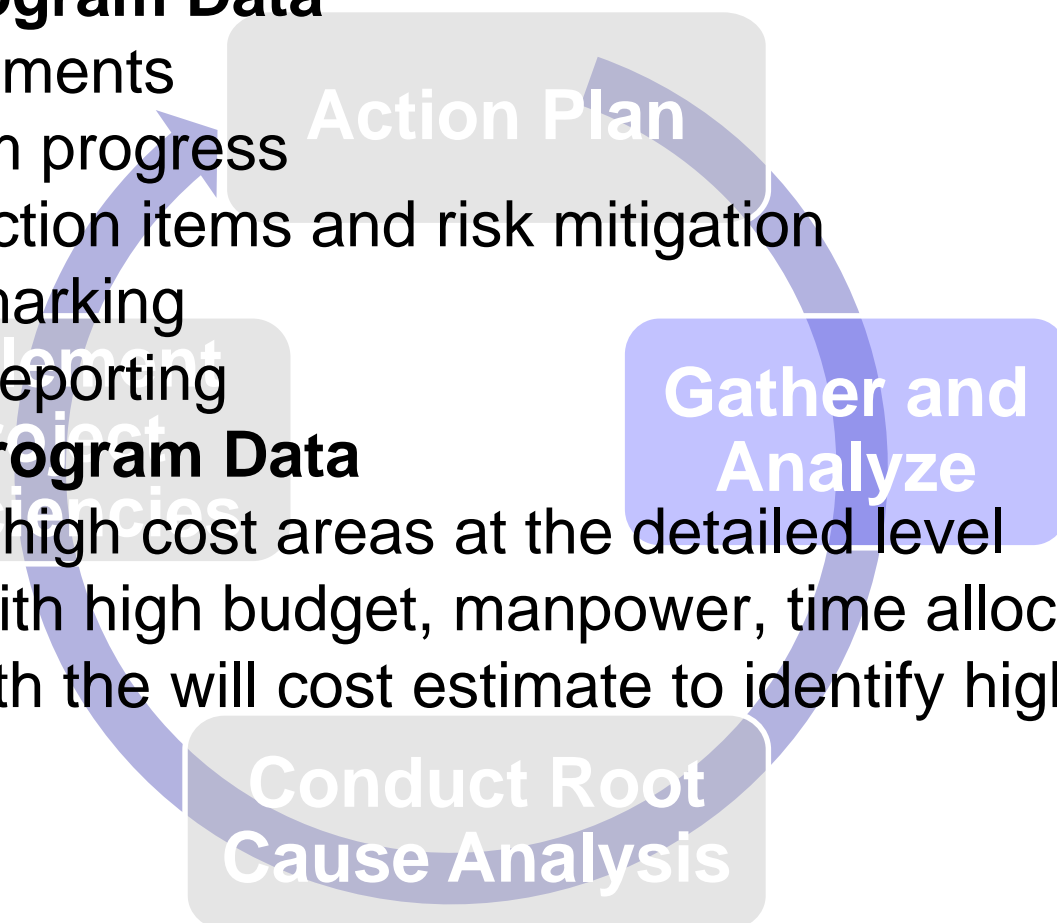


- **Gather Program Data**

- Requirements
- Program progress
- Open action items and risk mitigation
- Benchmarking
- EVMS reporting

- **Analyze Program Data**

- Identify high cost areas at the detailed level
- Items with high budget, manpower, time allocation
- Start with the will cost estimate to identify high cost areas



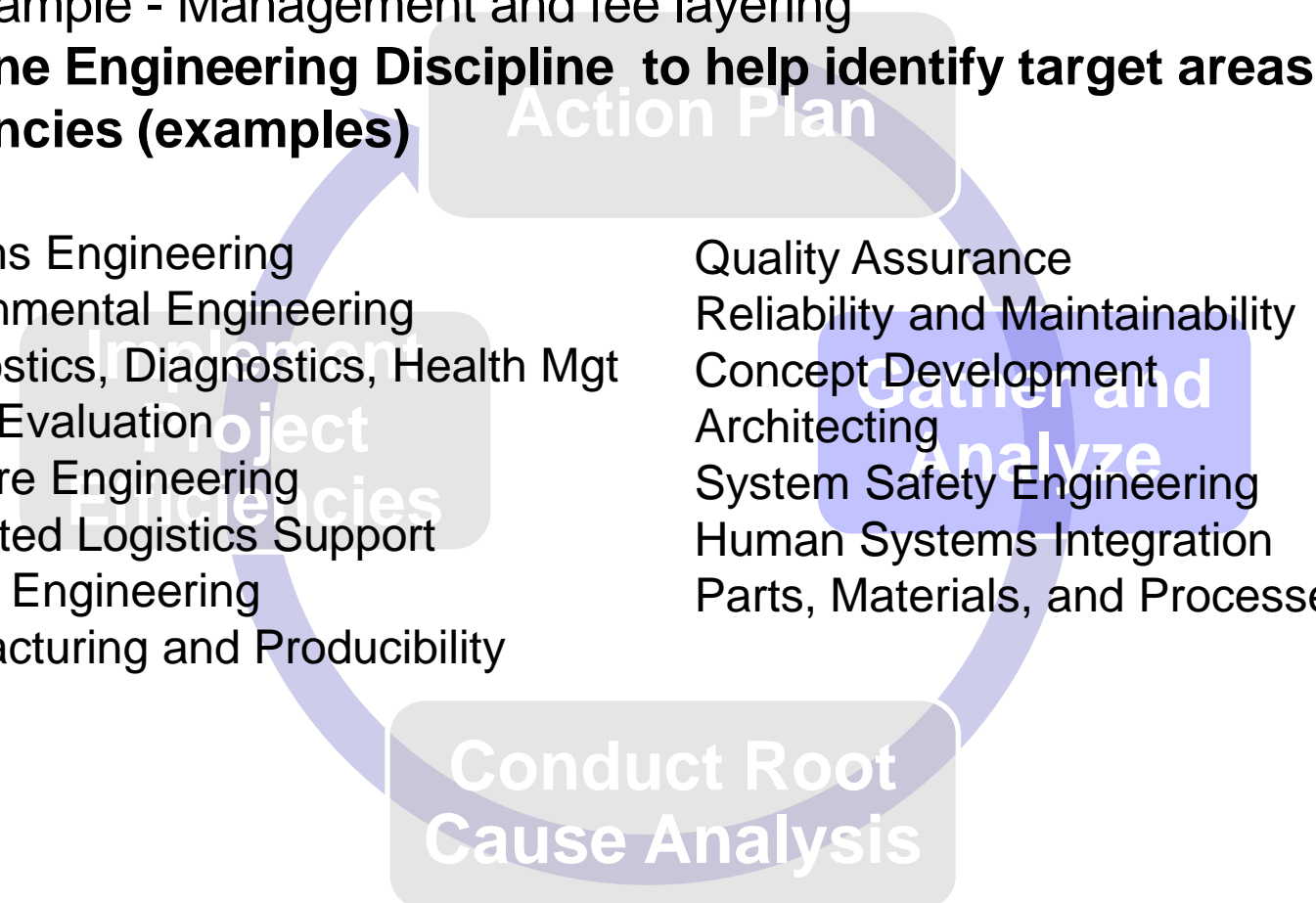


# Identify Areas for Cost Reductions

- **Identify High Cost Areas**
  - Example - Management and fee layering
- **Examine Engineering Discipline to help identify target areas for efficiencies (examples)**

Systems Engineering  
Environmental Engineering  
Prognostics, Diagnostics, Health Mgt  
Test & Evaluation  
Software Engineering  
Integrated Logistics Support  
Design Engineering  
Manufacturing and Producibility

Quality Assurance  
Reliability and Maintainability  
Concept Development  
Architecting  
System Safety Engineering  
Human Systems Integration  
Parts, Materials, and Processes

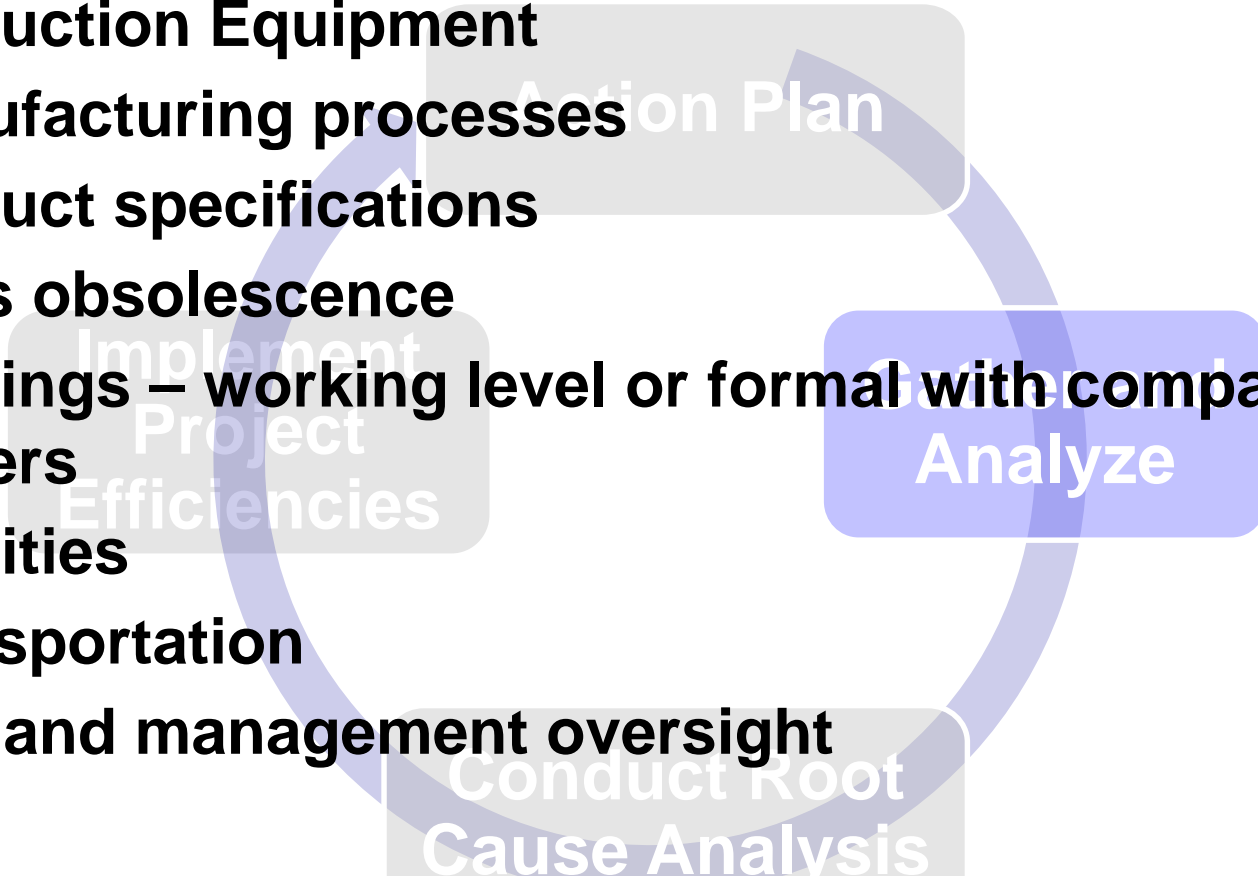




# Example: Production Cost Focus Areas

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- Data requirements
- Production Equipment
- Manufacturing processes
- Product specifications
- Parts obsolescence
- Meetings – working level or formal with company senior leaders
- Facilities
- Transportation
- LOE and management oversight



Use root cause analysis to specify your project's real cost drivers to develop should cost initiatives



# Conduct Root Cause Analysis

- **Select a high cost area/category and brainstorm**
  - A person can pass if they do not have an idea on their turn
  - Building on ideas is okay - - but not discussion of idea
  - Do not discuss or evaluate ideas until the brainstorming is complete
  - All ideas are acceptable - - there are no outrageous ideas
  - Do not quit at first gap in ideas
  - Strive for quantity
  - Combine and rearrange ideas - - additions and revisions okay
  - Record ideas exactly as offered

Conduct Root Cause Analysis



# Identify Cost Drivers

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- **A cost driver is an item or activity which results in the high cost focus area**
  - There can be more than one cost driver
  - Break down each cost area to identify drivers
    - Layering of fees or rates
    - Excessive management
    - Automation of touch labor or other processes
    - Incentives for suppliers / subcontractors to reduce costs
  - Every high cost driver may not be a good SCI candidate
    - High risk technical efforts (hardware or software)
    - One-time, unexpected events which impacted program costs

**Conduct Root Cause Analysis**

**Identify cost drivers using the list of High Cost/Other Cost areas**





# Conduct Root Cause Analysis Cost Drivers Examples



- Identifying cost drivers with cross functional team performing Root Cause Analysis (RCA) of the high cost area / subsystem
  - Multiple cost drivers may impact the high cost area / subsystem

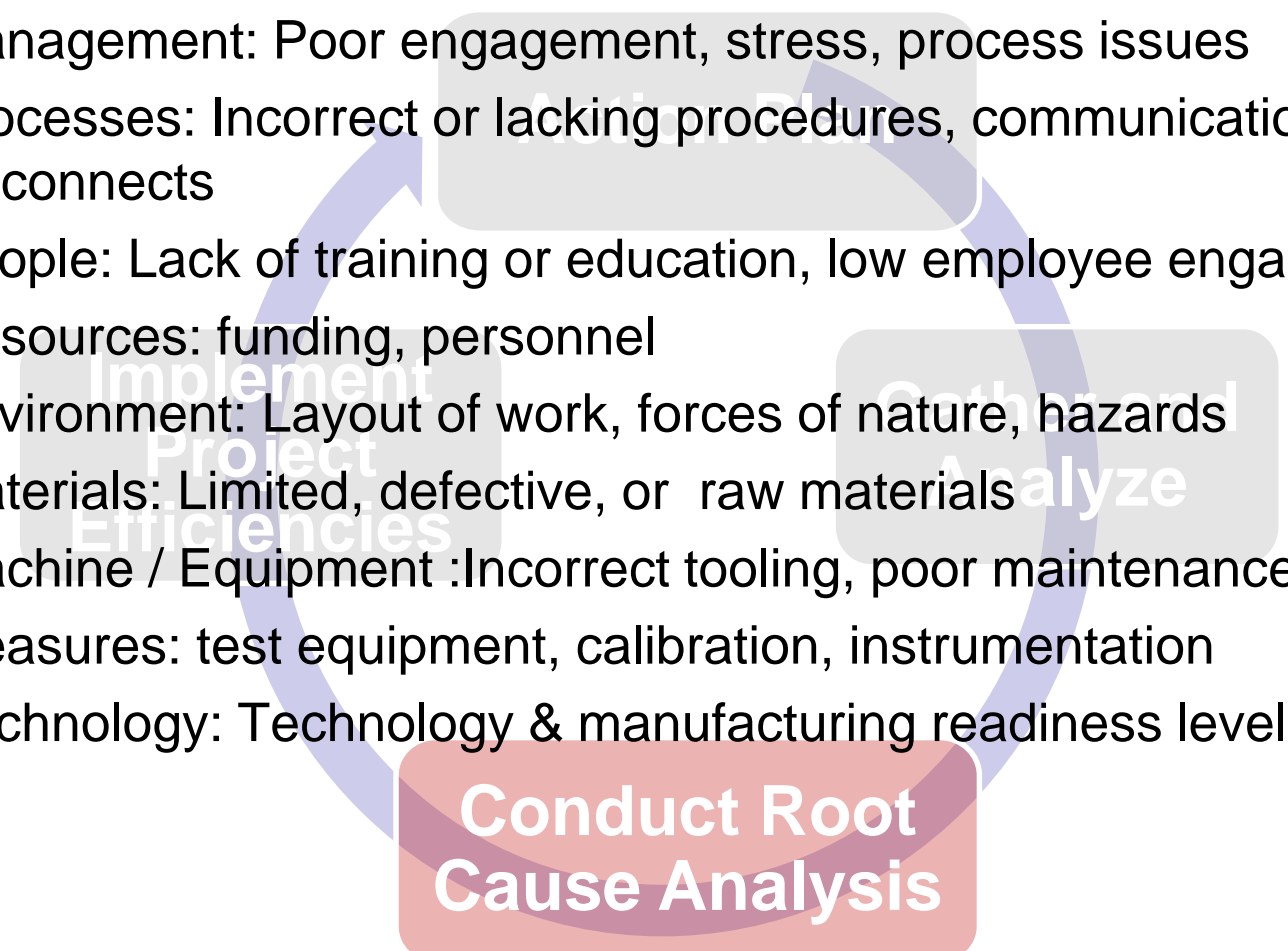
Contractor		Government	
Direct	Indirect	Internal	External (impacts contract cost)
Management Redundancy	Pass through fees on sub-contract effort	Program Office Labor Gov. and Support	Oversight and Monitoring
Learning Curve Efficiencies	Overhead Rates	Program Reviews	Program Reviews
Labor - Engineering, Test, Production	Administrative Expenses	Training	Compliance Requirements
Labor - Meetings and Communications	Facility Rates	Meetings and Communications	Meetings and Communications
Travel Expenses, Per Diem	Negotiated Rates, Burden	Workflow Procedures	Contract Data Requirements List (CDRL)s
Fixtures, Chambers, and Tests			



# Root Cause Analysis

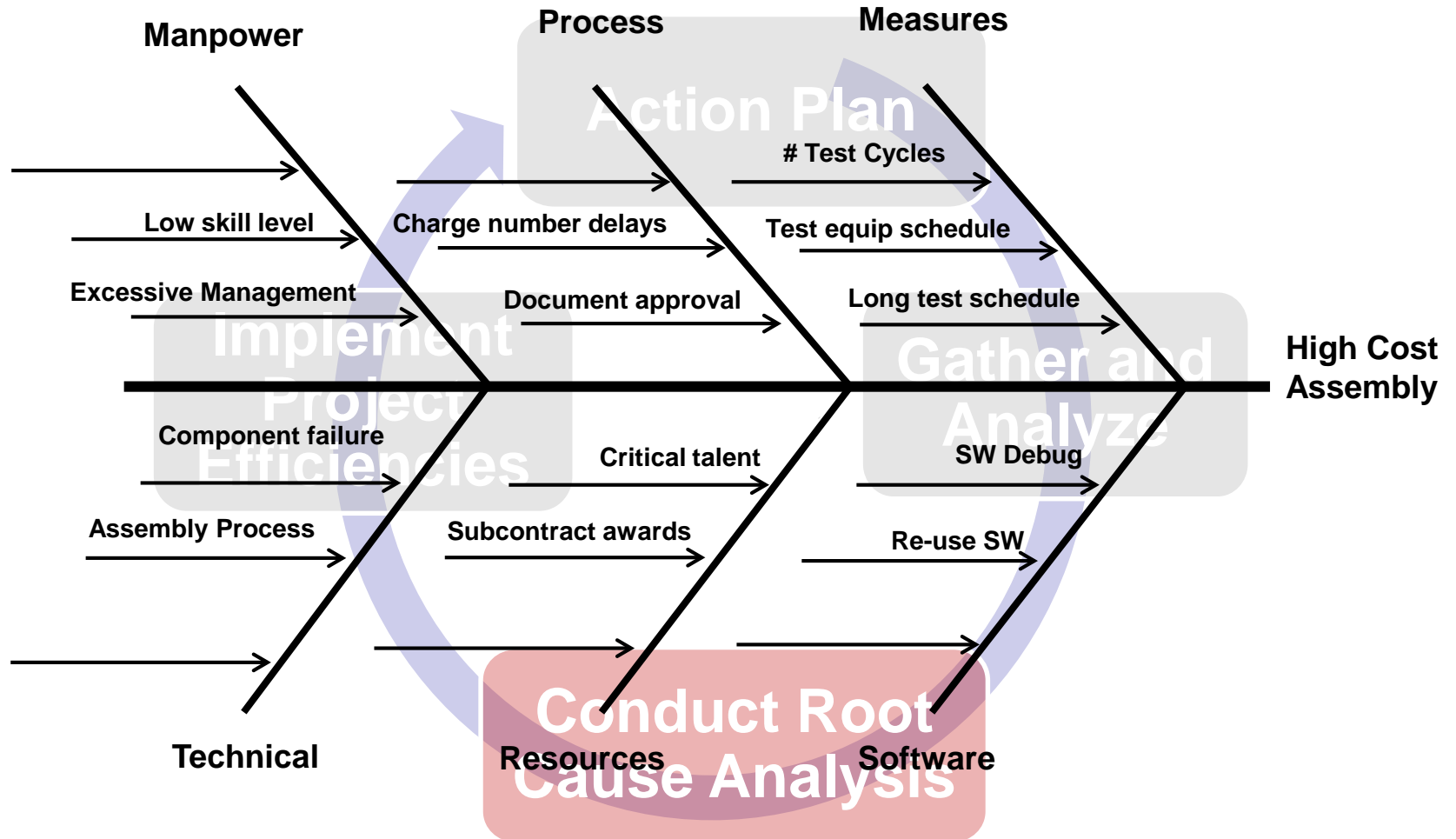
## Ishikawa or Fishbone Diagram

- **Typically there are multiple contributing root causes**
  - Management: Poor engagement, stress, process issues
  - Processes: Incorrect or lacking procedures, communication, disconnects
  - People: Lack of training or education, low employee engagement
  - Resources: funding, personnel
  - Environment: Layout of work, forces of nature, hazards
  - Materials: Limited, defective, or raw materials
  - Machine / Equipment :Incorrect tooling, poor maintenance or design
  - Measures: test equipment, calibration, instrumentation
  - Technology: Technology & manufacturing readiness levels





# Fishbone Diagram





# Implement Project Efficiencies

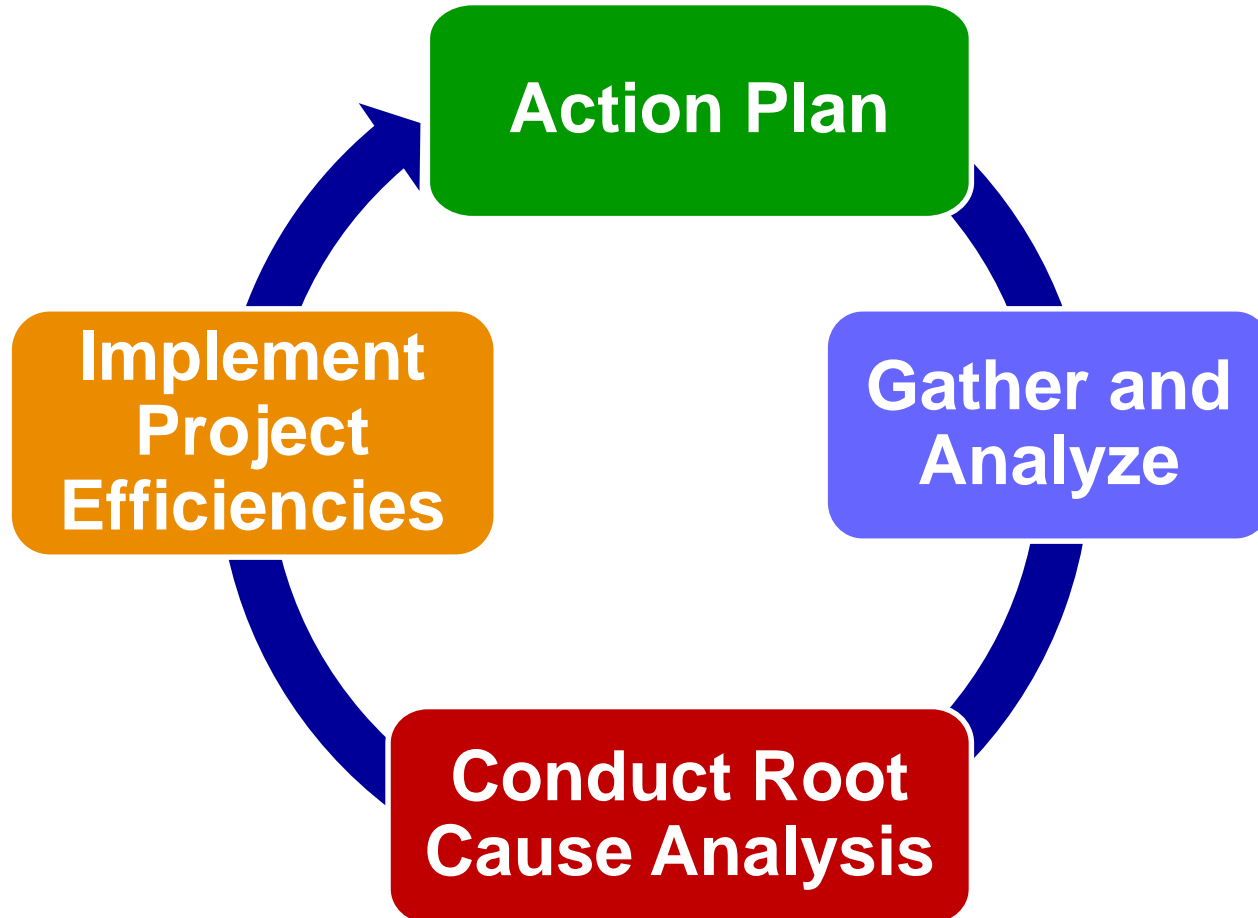
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- **Examine high cost drivers to identify your should cost initiatives/project efficiencies**
  - Target non-value added activities and products
  - Assess Risks and Opportunities
  - Identify reasonably achievable efficiency gains
- **Develop actionable plan to achieve efficiency gain**
  - Actions required to implement changes must be understood
    - Time and resources required
  - Identify risks to program execution
- **Formalize plan and execute**

**Efficiency gains drive savings – not capability reductions**



# Application of RCA for SCM





# Summary

- **Project Managers have responsibility to implement SCM**
  - Requires cross functional team support
- **Use the RCA for SCM process as a tool to help identify and achieve program cost and risk reductions**
- **Striving for efficiency gains is a continuous process which requires team engagement and detailed analysis**