Causal Analysis – Quality Control Tool
Manoj M Deshmukh, PMP

Abstract
Causal Analysis is a Quality Control tool that, if used effectively, can provide drastic improvements. As per PMBOK “Quality Control” is defined as

“Monitoring specific project results to determine if they comply with relevant Quality standards and identifying ways to eliminate causes of unsatisfied performance.”

The Causal Analysis approach is an effective tool for “Quality Control” and is used in many Software Development and Services engagements.

Introduction
Quality can be defined in different ways.
- Quality is absence of defects
- Quality is the Degree to which a set of inherent characteristics fulfils requirements (Requirements – Need or expectation that is stated, generally implied or obligatory)

Each one of us is responsible for the Quality of individual work units / work products.

The basic principle of causal analysis is to find causes that you can treat rather than treating symptoms.

The scope of this white paper is to define the importance of Causal Analysis / Root Cause Analysis / Fishbone Analysis approach. This structured approach is explained using one of the case studies for a Software Product Development project which is executed using the Spiral Model (Refer Diagram 001)
**Scope of Causal Analysis**

The scope of Causal Analysis is to provide quality improvements in:
- The next Phase of the current project
- New projects

Following are some of the steps for Causal analysis exercise:

**Define the Purpose**

We need to define the purpose for Causal Analysis. What is the objective of this exercise? This should be well defined when you start any project. For example –
Some projects may have an objective to reduce System Testing defects for the next phase of a project or other projects would like to do this exercise to carry forward learnings for similar projects the organization may be executing in the future.

**Plan for the data**

The Project Manager or Project Leader should define the system to collect this data.
- How are you collecting “System Test Defects”? Is it using Excel or using an Issue Management tool?
- Can your system categorize defects as:
  - Enhancements
  - Bugs
  - Continuous Improvements
- Are you tracking critical details like Severity, Found in Phase, Source Phase?
- Have you defined proper defect categories like
  - Requirements Not clear
  - Environmental (Stacks) Issues
  - Functionality Missed out
  - Functionality incorrect
  - Process Non Conformance
- **Unhandled Exceptions**
  - Is your Issue tracking system tracking required data (Maybe we can make defect category mandatory as we are planning to do Causal Analysis for defects)
  - Providing the necessary training to team members to ensure correct data is entered in the system.

**Define Causal Analysis Schedule**

The Causal Analysis schedule should be well defined during the Planning Phase of the project.

**Track required data**

Make sure that you are tracking the required data in the system in the most efficient way.

**Data Analysis**

As per Causal Analysis plan extract the required data from the system and put in the Causal Analysis format. For example for the above use case format can be:

<table>
<thead>
<tr>
<th>Issue Id</th>
<th>Defect Summary/Description</th>
<th>Defect Type</th>
<th>Severity</th>
<th>Fixed In Phase</th>
<th>Source Phase</th>
<th>Cause Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>72403</td>
<td>Unable to find existing BOM Templates via General Search...</td>
<td>Bug</td>
<td>Major</td>
<td>System Test</td>
<td>Code and Unit Test</td>
<td>Not According-to-Drawings</td>
</tr>
<tr>
<td>72636</td>
<td>Labels Copied are not refreshed in the list</td>
<td>Bug</td>
<td>Minor</td>
<td>System Test</td>
<td>Code and Unit Test</td>
<td>Out of Use Case</td>
</tr>
<tr>
<td>72637</td>
<td>Labels/Packaging/Units - Delete Selected Not Working</td>
<td>Bug</td>
<td>Major</td>
<td>System Test</td>
<td>Code and Unit Test</td>
<td>Out of Use Case</td>
</tr>
<tr>
<td>72679</td>
<td>JSP page doesn’t get displayed</td>
<td>Bug</td>
<td>Major</td>
<td>System Test</td>
<td>Code and Unit Test</td>
<td>Out of Use Case</td>
</tr>
<tr>
<td>74443</td>
<td>JSP doesn’t display</td>
<td>Bug</td>
<td>Major</td>
<td>System Test</td>
<td>Code and Unit Test</td>
<td>Out of Use Case</td>
</tr>
</tbody>
</table>

**Perform Pareto Analysis**

This is done to find out major causes of problems.
**Identify major Cause**

This is a critical step where we will identify problems on which we would like to do Causal Analysis.

**Meeting with Stakeholders**

Call for a meeting with stakeholders who are involved in the project task / activity. For the “System Testing Defects” problem key stakeholders could be:

- Team which had done requirements
- Those involved in Design, Development, System Testing
- Project Lead
- Project Manager
- Quality team

Identify the co-ordinator who will drive this meeting. Define the co-ordinator role and ground rules such as:

- All ideas / issues should be listed
- Team should open up to discuss all issues.
- Co-ordinator should list the issue and should not support / defend any issue

**Take inputs from Stakeholders**

Obtain inputs from different Stakeholders and draw a Fishbone diagram

![Fishbone Diagram](image)

**List Key Action Items**

Based on the discussions and the Fishbone diagram prepare action plans with Action Items, Responsibility, Target Dates, Tangible/ Intangible benefits

**Track Action Items to Closure and measure benefits**

Based on the action plan measure tangible and non tangible benefits. For example for the above problem statement we can track benefits for the next phase of the project.
Plan Causal Analysis for next phase and project

Plan for Causal Analysis for the next phase of the project or for the new project and fine tune the plan.

Summary Benefits

Causal Analysis can provide, and has provided, substantial results in a number of projects. It is a relatively simple process to implement and will bring a focus on quality to any project team.

About the Author

Manoj Deshmukh has engaged in the management of several offshore and onshore projects as a Project / Delivery Manager/ Delivery Head. Manoj is a PMP certified Project Manager with around 13 years of experience in Engineering and Project Management. He has managed many projects / programs across the globe in US, UK, Europe, APAC. He has managed a number of different project types including Product Development / Services, T & M / Fixed Price.

He is BE (Mech), Post Graduate Diploma in Business Management, Post Graduate Diploma in Software Engineering and has extensive experience in the Automotive domain and IT. The authors email address is deshmukhmanoj@gmail.com

Project Perfect is a project management software consulting and training organisation based in Sydney Australia. Their focus is to provide creative yet pragmatic solutions to Project Management issues.

Project Perfect sell “Project Administrator” software, which is a tool to assist organisations better manage project risks, issues, budgets, scope, documentation planning and scheduling. They also created a technique for gathering requirements called “Method H”™, and sell software to support the technique. For more information on Project tools or Project Management visit www.projectperfect.com.au