

GUIDANCE DOCUMENT – ROOT CAUSE ANALYSIS METHOD FOR INVESTIGATION

1. INTRODUCTION

Root Cause Analysis (RCA) is a problem solving methodology for establishing that works through information to identify the root causes of problems or occurrences, identified via a range of activities including incident management. It fosters a systems based approach to the analysis process rather than the person centered approach, and has been shown to provide a means for identifying effective solution strategies to a broad range of problems; as well as fully engaging all levels of staff positively in the incident management process.

The primary purpose for investigating an incident is to ascertain so that appropriate actions can be planned and implemented to prevent future occurrence.

WHAT HAPPENED?
HOW DID IT HAPPEN?
WHY DID IT HAPPEN?

Incident investigations should

- Recognize and identify reasons for substandard performance
- Find deficiencies in management systems
- Identify procedural gaps in work
- Learn from incidents and make recommendations
- Implement improvement strategies to help prevent or minimize recurrences, thus reducing future risk of harm

To assist in deciding upon the level of investigation required, the use of a simple risk assessment progression of incidents at the time of occurrence can enable MAPP to implement a much more structured approach. The risk assessment tool requires the incident to be graded according to the actual impact on the project and the potential future impact on a project. Once received, each MAPP Incident Report Form will be rated using the following risk matrix. This grading will establish the level of investigation and root cause analysis that should be carried out for the incident.

Severity of Harm (How serious are the person's injuries/illness or property damage?)	None	Minor (non-permanent harm – up to 1 month or less than \$5,000 in PD)	Serious (semi-permanent harm – up to 1 year or \$5,001-20,000 in PD)	Major (Major permanent harm or \$20,001-50,000 in PD)	Catastrophic (death Or \$50,001+ in PD)
Risk of this happening again	None/Remote	Possible (20% chance)	Likely (60% chance)	Highly likely (90% chance)	Certain

Most likely consequences (if in doubt grade up, not down)

CONSEQUENCES	PROBABILITY					
	Impossible 0	Rare 1	Unlikely 2	Possible 3	Likely 4	Certain 5
Negligible - 0	0	0	0	0	0	0
Minor - 1	0	1	2	3	4	5
Serious - 2	0	2	4	6	8	10
Major - 3	0	3	6	9	12	15
Fatality - 4	0	4	8	12	16	20
Multiple Fatalities - 5	0	5	10	15	20	25

2. LEVEL OF INVESTIGATION REQUIRED

Having established the impact on personnel and the potential future risk through the grading process, the level of investigation and analysis is determined in relation to the scoring, and whether the incident resulted in physical harm (i.e. injury, property damage or near miss).

When an incident results in major permanent harm or property damage, or the death of a person, a formal root cause analysis should be performed. All other incidents with a score of 15 or above, a formal root cause analysis meeting will be performed led by the Corporate Safety Director. The Corporate Safety Director will appoint an investigating team (3-5 members) to perform the root cause analysis.

For all incidents scored below 15, an informal root cause analysis will be performed by the MAPP Corporate Safety Director and the responsible MAPP project team utilizing

the direct and indirect causes identified. An informal root cause analysis is generally not as procedurally structured as a formal analysis but should at minimum include:

- Identifying the scope and content of the incident
- Developing a timeline of events
- Interviewing of personnel involved and review of related documentation
- Identify direct and indirect causes, prioritization of, and then ask why to each cause to determine the root cause through an unstructured method such as brainstorming.
- Completing the Incident Report Form with identified root causes and corresponding mitigation actions.

3. IDENTIFY SCOPE OF THE INCIDENT AND INFORMATION GATHERING

It is essential that all material facts surrounding the incident, its antecedents and its consequences are gathered as soon as possible after the incident. However, the investigative team must be mindful of the impact the event may have had on staff members. As cited by numerous medical review, if appropriate the team may defer immediately questioning parties until a de-briefing or counselling process has been put in place. In determining what information to collect you must consider the precluding activities, as well as the incident itself. For complex incidents it is suggested to start at the point at which the incident occurred and work backwards that the unique start point can be identified. The approach taken must be decided on a per incident basis and by means of consensus amongst the investigation team. The type of information will vary by incident type but may include the person(s) involved in or witnessing the incident, the location of the incident, the environmental conditions in which it occurred, the equipment or object, if any, that was be involved, any documentation (procedures, task or job analysis, permit, etc), and any belief models identified through the interview process.

4. DOCUMENTATION LOG AND TIMELINE OF INCIDENT

You will always collect a reasonable amount of documentation when you undertake a structured investigation into an incident. It is essential that you maintain an orderly method to your document management. Please see Table A1 at the end of the guidance document for MAPP Incident Documentation Log.

The chronology of events is of utmost importance in an investigation. This will affect the ease with which you can visualize the order of events, and identify areas where further fact finding is necessary. The chronology should also enable you to identify key areas of concern, and areas of good practice in the sequence of events. This chronology should be built by interviewing personnel and the documentation gathered.

Below is a sample timeline:

01/01/2001 – Project# 11111**My Bank and Trust Site, 1212 Main Street, Baton Rouge, LA 70801**

6:30 a.m. – MAPP Superintendent arrived on the project site for the day.

7:15 a.m. – Subcontractor B work crew arrived on site.

7:30 a.m. – Subcontractor B work crew began filling out their task JSA for work to be performed that day.

7:40 a.m. - Subcontractor B foreman brought the JSA to the MAPP Superintendent for review and work authorization.

Etc,

5. ROOT CAUSE ANALYSIS**Brainstorming**

This technique can be used to assist the team in identifying the issues that they believe require further exploration. Brainstorming also lends itself to the ‘Five Why’s technique and also to identifying the influencing factors associated with the event. A facilitator will ask each team member to contribute a suggestion or idea of an issue from the chronology review that could have contributed to the incident. There are no right answers with brainstorming and the key to successful brainstorming is not to allow any in-depth questioning, or exploration, of these ideas during the ‘brain storm’. The focus must be on the participants contributing their ideas, the time for clarification comes once all members have contributed, and the process is exhausted. Once the brainstorming process has completed, each idea should be identified as a direct cause or an indirect (contributing) cause of the incident.

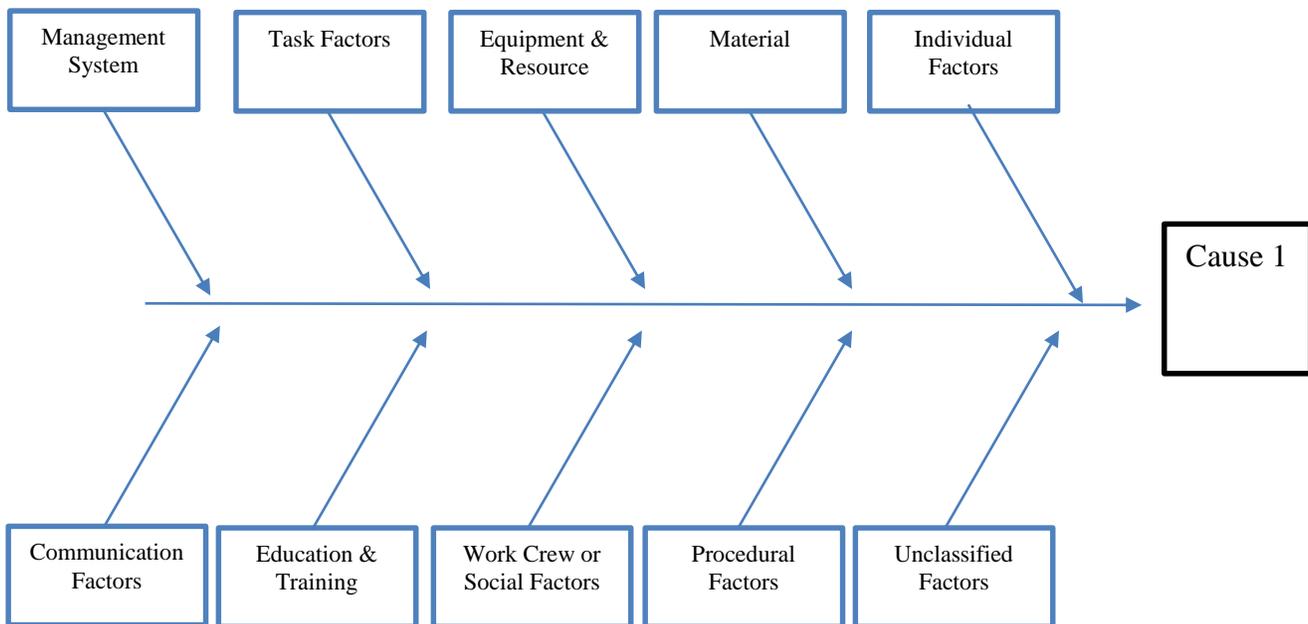
Technique 1 - The Five Why’s

The nature of the 5 why’s technique is to delve into the causes identified during the brainstorming session asking ‘why’ for each direct and indirect cause until there are no more ‘causes’ forthcoming. In a group situation it is a method that requires careful facilitation if it is not to end in a muddle. One way of avoiding confusion is to remember that the team can only undertake one ‘cause and effect’ process at a time. Each identified direct cause should be ‘why’ questioned and ultimately identified whether it is a symptom, an influencing factor or a root cause. As a rule of thumb, the team normally should ask a minimum of 5 whys to each cause to elicit the root of a problem. However, this is not a definitive requirement and the number of whys may vary depending on the cause identified. This Why session should be captured and recorded; which is easiest to do on a flip chart or wall board to that the progression is easily visible to all team members. The information can then later be transferred to a digital format.

Technique 2 - Fishbone Diagram

There are a number of causal factors that could contribute to an incident. When several contributory factors have been identified for a specific cause, it may be helpful to use a classification framework to classify and group them. The fishbone diagram is one method of exploring these factors. The scribe begins by drawing a large horizontal arrow on the flip chart or wall board, and at the head of the arrow is the cause to be explored. Spines are then attached to the arrow body and each spine is given a classification heading which represents the main areas to be explored in different causal factors. It is important to remember that each diagram should only explore the causal factors associated with that one cause.

A framework fishbone diagram is shown below that can be used for MAPP incidents:



6. RECCOMENDATIONS FOR MITIGATING AND CORRECTIVE ACTIONS

Recommendations generated from these incident investigations should be reviewed by MAPP Executive Management team for approval and implementation. Corrective actions are a set of activities implemented to resolve or correct a problem or deficiency. Corrective actions should be focused on addressing not only the direct causes but also the root causes associated with the incident so as to prevent reoccurrence.

