

Workflow: Problem Solving

Toolkit 12.2

Structured Problem Solving

target audience

Leadership team, supervisors, and contractors.

what it is

Formal problem solving is part of the corrective action process and is triggered when an abnormal situation is encountered (Refer [Toolkit 12.1 – Managing Problem Situations](#)). It is the process that people must follow to develop sustainable solutions that will prevent similar abnormal situations from happening again, or to put processes in place that will allow companies to be prepared and, in a position, to reduce the impact of an abnormal situation.

There is an old saying that “you cannot solve a problem unless you ask the right question”; and the famous Henry Ford reflected that “most people spend more time and energy going around problems than in trying to solve them”. Both quotes are a reminder that problem-solving and finding lasting solutions is a process, and usually not the outcome of a single bright idea.

The problem-solving process can best be defined by using the DMAIC 6-Sigma process steps:

- Define the problem by asking clarifying questions, e.g., a technique called 5W1H (**W**hat happened, **W**hen did it happen, **W**here did it happen, **W**ho was involved, **W**hich trend was observed, and **H**ow much was the impact?). Defining a problem properly will put you in a position to find the true causes of the problem. Albert Einstein said, “If I had 60 minutes to solve a problem, I’d spend 55 minutes defining it and 5 minutes solving it”.
- Measure – Gather information around the symptoms. Problem solving in operations is like solving a crime. Detectives will spend many hours collecting evidence, particularly from the crime scene.
- Analyse the data and find the root cause, i.e., the real reason an abnormal situation occurred.
- Select and implement the best solution.
- Check the outcomes to make sure that the recommended solutions are effective, i.e., the problem has been eliminated or there is an effective system that provides proactive warning that the problem is imminent.

Questions around formal problem-solving:

1. When do we do problem solving?
 - a) When an abnormal situation or event occurs (Refer to [Toolkit 12.1 – Managing Problem Situations](#)). Problem solving should not be confused with normalising the situation. Normalising is always the priority to get the process or activity going again in a safe way. This might call for some level of “on-the-event” problem solving, i.e., we want to be sure that the reason for a failure has temporarily been removed.

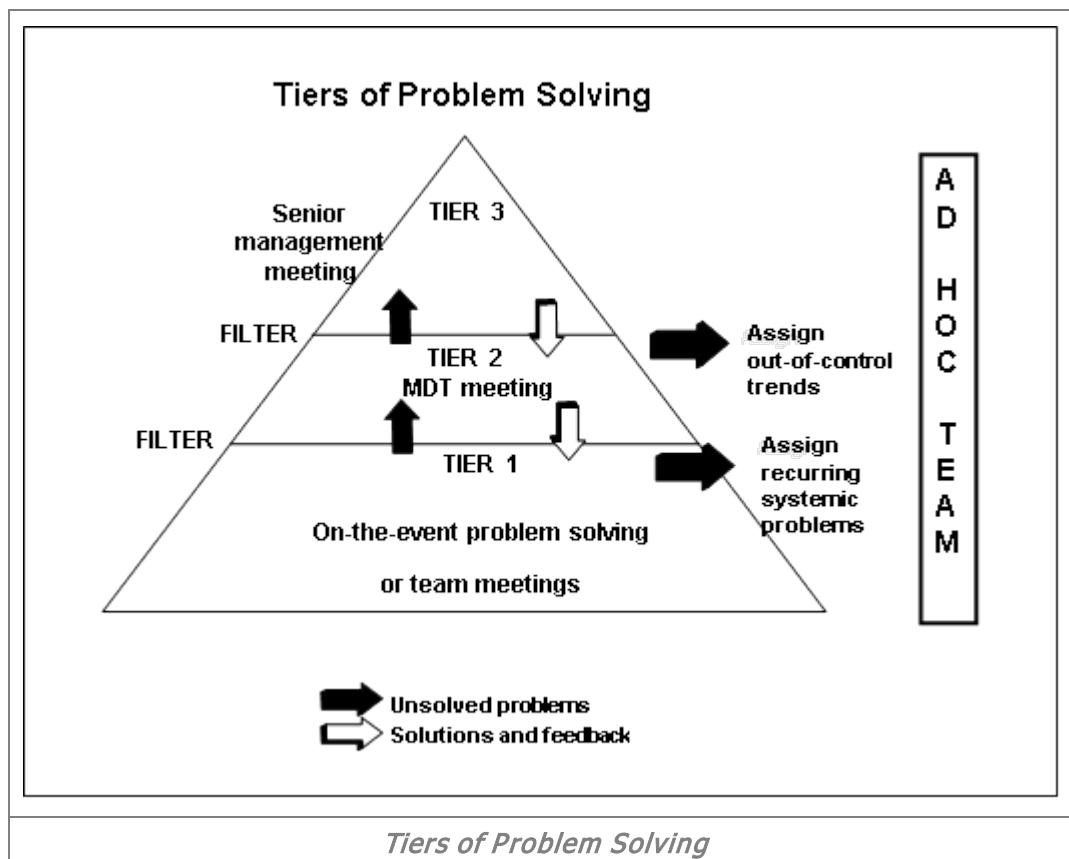
- b) In some instances, the root cause is known, e.g., wear and tear and linked to the maintenance strategy of a piece of equipment, i.e., running to failure. This would be reported and tracked and, if within acceptable parameters (e.g., hours worked), no formal problem-solving will be required.
 - c) Never assume that the root cause is known. It is always better to confirm a root cause than to guess incorrectly and then implementing the wrong remedy.
2. Who is responsible for leading the problem-solving activity?
- a) Depending on the severity of the abnormal situation or problem, different people at different levels of the organisation will lead the problem-solving effort.
3. Which techniques are we using at what level?
- a) DMAIC (refer to resources) – describes the problem-solving process – used at all levels.
 - b) 5-WHY – template for a systemic issue (manager and specialist).
 - c) Brainstorming – primary tool at team leader and operator level.
 - d) Quick Fix Routines (QFR) at operator level. A QFR is a simple check sheet used to get a process going again based on experience from previous problem-solving actions (Refer to the [QFR Example](#) resource).

Tiers of problem-solving

When an abnormal situation happens, there should be certainty within the organisation as to who should be taking the lead. This will be based on the problem category, severity, and triggers which are addressed in [Toolkit 12.1 – Managing Problem Situations](#).

- Example 1, any disabling safety incident, where employees cannot continue to work, needs to be formally investigated by the legally appointed safety officer and most likely with the assistance of the operations manager. There will be legal guidelines to be followed in this case.
- Example 2: An industrial water pump seized up, leaving the packhouse without water supply. The operator and team leader (or supervisor) will immediately report the situation and call for a replacement or connect to an alternative pump. The operator and team leader (or supervisor) will also initiate a 5-WHY problem-solving request and participate in the problem solving. The outcome will be reported to the daily performance review meeting (Refer to [Toolkit 3.4 – Daily Performance Review](#).) where it will be established whether a satisfactory root cause was found and that the corrective action is acceptable. If not, the team leader or supervisor will be requested to do additional analysis, or the issue might be elevated to a specialist for review.

From an operations perspective, the following model can be used to make sure that problems are addressed at the right level:



Problem Solving Techniques

5WHY - The 5-WHY technique identifies potential reasons for an abnormal situation which are then explored for root causes by asking consecutive “WHY” questions. Answers are always evidence-based and logical. Refer to the [5Why Example](#) resource.

Brainstorming – Brainstorming is a method used to generate ideas to solve clearly defined abnormal situations. In controlled conditions and a free-thinking environment, teams approach a problem by asking “what could have caused this” questions. They produce ideas, which are then filtered for feasibility to find potential solutions. All ideas are recorded and considered. Refer to the [Brainstorming Process Description](#) resource.

why it is important

Abnormal situations will occur in any operation, irrespective of how mature the practices and systems are. The answer is not to merely react with a short term or temporary fix, but to accurately analyse them, to avoid the same issue in future, to apply the learnings in similar operations, and to reduce repeated non-conformance. It is an opportunity to understand the underlying reasons or root causes of the deviation from a standard and to implement an appropriate solution or response.

Formal problem-solving should become an embedded process in the organisation, allowing every employee to participate at the right level. Proper empowerment and ownership through participation in formal problem-solving can be a powerful individual motivator. The individual skills picked up can also be applied at a personal level.

success factors

What are the success factors for effective formal problem-solving?

- **Training** – All employees should be trained in appropriate problem-solving techniques. Furthermore, the packhouse leadership should lead by example, and explain that teams are expected to solve certain problems (level/severity appropriate) effectively.
- **Promoting the use of formal problem-solving** – Keeping track of formal problem-solving activities, ensuring compliance to the corrective action process. Making sure formal problem-solving happens and is effective.
- **Clarity on when formal problem-solving is appropriate** – A clear and detailed understanding of an abnormal situation including categories and severity ratings.
- **Using formal problem-solving techniques** – Using the DMAIC problem-solving process steps and other techniques.
- **A formalised response plan** – The abnormal situation management procedure should include guidance on how to respond and who to involve in the effort to effectively deal with the variance or problem. The abnormality category, timing, and severity of the problem will determine what to do and who to involve, which is why it is important for each packhouse to develop their own response plan.
- **A documented corrective action process** - A documented investigation process that follows these steps: (Refer to the [Corrective Action Process Steps](#) and [Toolkit 12.1 – Managing Problem Situations](#).)
 - Contain the effect of the abnormality, e.g., replace poor product or repair equipment.
 - Clearly define the problem. Describe the problem by identifying what is wrong and detail the problem in quantifiable terms.
 - Allocate individual responsibilities. Who should be exploring corrective action? As a minimum, this should be dealt with at the lowest possible organisational level and include workers or operators that witnessed the symptoms.
 - Collect and analyse information/data on the variance or problem.
 - Determine the root cause of the variance.
 - Develop corrective actions to solve the root cause.
 - Implement the corrective actions.
 - Verify that the variance is eliminated.
 - Update the standards (standard work, product, raw material, etc.) if necessary.
 - Provide necessary training for the new standard work.
- **Recordkeeping and embedding the right way** – Keep a record of the solution for future reference and learning, and, where necessary, create or amend standard work processes and SOPs.

execution steps

1. Create awareness of the importance of formal problem-solving at all levels.

2. Establish a working knowledge of the DMAIC problem-solving process at all supervisory levels.
3. Develop and introduce the tiers of problem-solving and develop triggers for operational problem-solving.
4. Introduce a formal 5-WHY template and train all managers and specialists in the use there-of.
5. Introduce brainstorming as a formal process at team level.
6. Implement the abnormal situation procedure and corrective action process steps.
7. Track the outcomes of problem-solving to make sure that we sustain solution and that the expected results are achieved.
8. Record the solution and embed the right way of doing things.

assessment questions

Please Note: There is no minimum / maximum number of questions you can add.

1.	Are there clear responsibilities for problem-solving at all levels in the organisation?
2.	Do you track compliance to triggered events or abnormal situations to make sure formal problem-solving is done?
3.	Have all managers, supervisors and team leaders been trained in 5WHY?
4.	Are actions from 5WHYs recorded in the daily action log and closure confirmed?
5.	Do operators participate in problem-solving activities?
6.	Do you formally record the outcomes and learnings from problem-solving?
7.	Do you share the learnings from problem-solving withing the organisation?

resources

1.	5WHY Template
2.	5WHY Process Description
3.	Brainstorming Process Description
4.	<i>The Six Sigma Strategy's DMAIC Problem-Solving Method</i> by Martin Murray (updated on 30 July 2019)
5.	Corrective Action Process Steps
6.	QFR Example
7.	Problem solving – Effectiveness Exercise
8.	Problem Solving - Triggers and Escalation Matrix Example
9.	5WHY Process Description