



ROOT CAUSE ANALYSIS TOOLBOX

Which Tool, When?



Analysts have choices. Selecting the best tool expedites the process and delivers the results you need.

Table of contents

1. Introduction	3
2. Meet Gloria	5
3. 5-Whys	6
a. Pros and Cons of 5-Whys	7
b. Gloria's 5-Whys Chart	8
c. When to Use	9
4. Ishikawa Fishbone	10
a. Pros and Cons of Ishikawa Fishbone	11
b. Gloria's Ishikawa Fishbone Chart	12
c. When to Use	13
5. Incident Timeline	14
a. Pros and Cons of an Incident Timeline	15
b. Gloria's Incident Timeline	16
c. When to Use	16
6. Sologic RCA Method	17
a. Pros and Cons of the Sologic RCA Method	18
b. Gloria's Sologic Cause & Effect Chart	19
c. When to Use	20
7. Gloria's Team	21
8. Which Plan?	22
9. Ongoing Support	23
10. References	24

In the world of Root Cause Analysis (RCA), like that of home improvement, there are different tools for different jobs.

Sometimes a hammer is all that's needed while other jobs demand something more specialized. The right tool makes the work more efficient and results in a better outcome. Having a well-organized, well-stocked toolbox is a great start, but knowing which tool to use and when to use it requires some basic knowledge.

This eBook will shed light on the differences between a few commonly used tools including the 5-Whys, Ishikawa Fishbone, Incident Timeline, and the Sologic RCA Method. Beyond the pros and cons, it will help to contextualize the use cases for each tool through real world scenarios with an RCA practitioner, Gloria, to help you select the best tool for any problem that you may encounter.



**THE RIGHT TOOL
MAKES THE WORK
MORE EFFICIENT AND
RESULTS IN A BETTER
OUTCOME**



Causelink software

Gloria will be using Causelink software to access each of these tools. Causelink is like a pre-stocked toolbox – it contains all of these RCA tools and keeps you organized throughout the job. When you have the right tools and a well-organized toolbox, the end result is a higher rate of effectiveness and overall success.

Causelink was developed specifically to support RCA investigations. Causelink makes RCA easier by providing a digital template that walks the team through each of the steps. Photos, documents, links and supporting attachments are all stored in a single record.

Meet Gloria

Gloria is on the quality team at Noted, a full-service marketing, design and production firm. They offer a wide range of services to their clients, from assessment of current state, through market definition, design, and customized product creation. Gloria leads the team who analyzes and solves problems, and they often employ various root cause analysis (RCA) methods to do this. We will use Gloria's organization to examine how and when different RCA tools are applied.

**GLORIA LEADS
THE TEAM WHO
ANALYZES
AND SOLVES
PROBLEMS**



5-WHYS PURPOSE IS TO IDENTIFY UNDERLYING CAUSES OF AN EVENT



5-Whys

5-whys* purpose is to identify underlying causes of an event. You start with the problem and then ask “why” or “how” it happened. It may seem simple, but there is actually a lot going on here. First, by starting with the problem, the method requires the team to consider exactly what it is they want to solve. Then it systematically helps identify the events that led up to the problem (the “causal antecedents”). Since each cause has its own causes, the method helps the team identify the “story behind the story.” They can then leverage this deeper understanding to help solve the problem instead of just reacting to it.

Background

5-whys was developed in the 1930s, by Sakichi Toyoda, a Japanese inventor and industrialist, as a technique to better understand events, especially failures (Toyota Industries, 2022). His son, Kiichiro Toyoda would later apply this technique with great success at Toyota. 5-Whys is now widely used in root cause analysis, quality reviews, six sigma assessments and beyond.

Pros

- Simple and easy to use
- Challenges teams to dig a little deeper
- Can be recorded on multiple mediums
- Requires little or no training for facilitators to use

Cons

- Does not encourage analysis beyond 5 causes
- Too simplistic for complex problems with many causes
- Drives to single root cause, thereby encouraging single solutions
- Linear analysis subject to facilitator bias—able to selectively choose only one of many causal paths for the analysis
- Generally, only identifies ‘transitory’ or action-based causes

Considerations

One limitation, however, is the 5-whys is too simplistic for complex problems. It works great for small issues but it breaks down when things get complicated. For instance, a fire is the result of three things (ignition source, combustible material, and oxygen). But what if you wanted to find the causes of each of these? The 5-whys doesn't really let you do this. That's where the Sologic method comes in handy (More on that later).

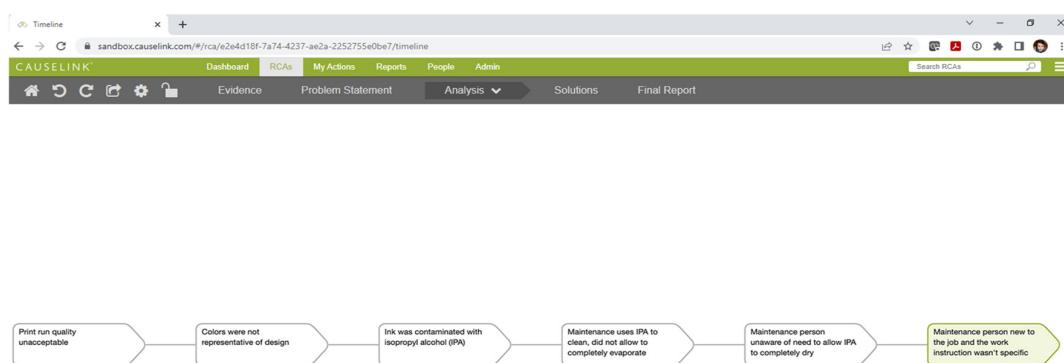
So, the 5-Whys is to RCA as a flat-head screwdriver is to a toolbox: it's simple, useful for many situations, and it doesn't take much training or expertise. But its usefulness in analyzing complex problems is limited.

Gloria's 5-Whys chart

Gloria first heard about the recurring printshop problem when a group of team members were discussing the issue in the hallway. She learned that the team recently found themselves having to re-run print runs because the output quality was low. When she asked for more details, the team explained that the problem had been happening over the last couple of months, typically after maintenance took place. Maintenance would have to come back, drain the ink tank, and then refill it. The business impact of these outages was relatively low, but it was happening regularly and therefore warranted some attention.

Gloria scheduled a meeting with the printshop supervisor, an operator, and a press technician to try to get to the bottom of the issue. She decided to employ the 5-Why technique. After identifying the problem with her team, asking "Why did that happen" five times, reviewing logs and then going to look inside the machine itself, Gloria and her team discovered that there was isopropyl alcohol (IPA) contamination coming from the ink jets.

Gloria's 5-Why chart looked like this



GLORIA HAD THE INSTRUCTIONS REWRITTEN AND MADE SURE THE TECHNICIANS WERE AWARE OF THE ISSUE



IPA is used during maintenance to clean the system. The maintenance manual says to wait at least 3 minutes to allow the alcohol to evaporate completely, but the technician wasn't doing this. He was new on the job and the instruction to wait until the alcohol evaporated was not clearly written into the documentation. Gloria had the instructions rewritten and made sure the technicians were aware of the issue. The printer has not experienced this ink contamination issue since.

TAKEAWAY

When to use 5-Whys

- Simple problems with small scope, low impact
- As a starting point for more in-depth RCA tools



**FISHBONE RELIES ON
A FORM OF LOGIC
THAT PLACES LIKE-
THINGS TOGETHER**

Ishikawa/Fishbone diagram

Fishbone relies on a form of logic that places like-things together. The classic fishbone categories include People, Machinery, Materials, Method/Process, and Environment. These are broad categorical labels, but they help by prompting the investigation team to look for answers in a variety of sources. Because of this, it's a great tool to help organize a brainstorming session.

Background

This visual diagram technique was developed by Kaoru Ishikawa, who was a quality pioneer in the Kawasaki shipyards (Ishikawa Diagram, 2021).

Pros

- Visual tool that creates a broad look at problems by focusing on multiple aspects and categories
- Visual layout is easy to remember and navigate
- Categories can be customized by industry, company or event
- Effective at inspiring and focusing group idea generation
- Presents well, especially to those outside of RCA

Cons

- Diagram structure does not show timing of causes
- Does not illustrate relationships between causes on different branches
- Clarity is compromised when there are too many levels (as happens with complex problems)
- Does not paint a clear picture on how an event unfolded

Considerations

However, Fishbone also has limitations. The structure of the diagram does not show how causes in different groups relate to one another, which in reality they do. Causes work together, but the Fishbone diagram represents them as being in separate, unrelated containers.

Fishbone is like a pair of pliers in your toolbox—valuable for certain jobs, but not for others. It can be used as a primary tool in an RCA to diagram potential causes of an event by category, but its effectiveness decreases as the number of causes and related branches increases. It also falls short by not showing the relationship between causes or their chronological order.



DURING PROCESS IMPROVEMENT EFFORTS, SHE FOUND IT IS VERY USEFUL FOR GENERATING IDEAS

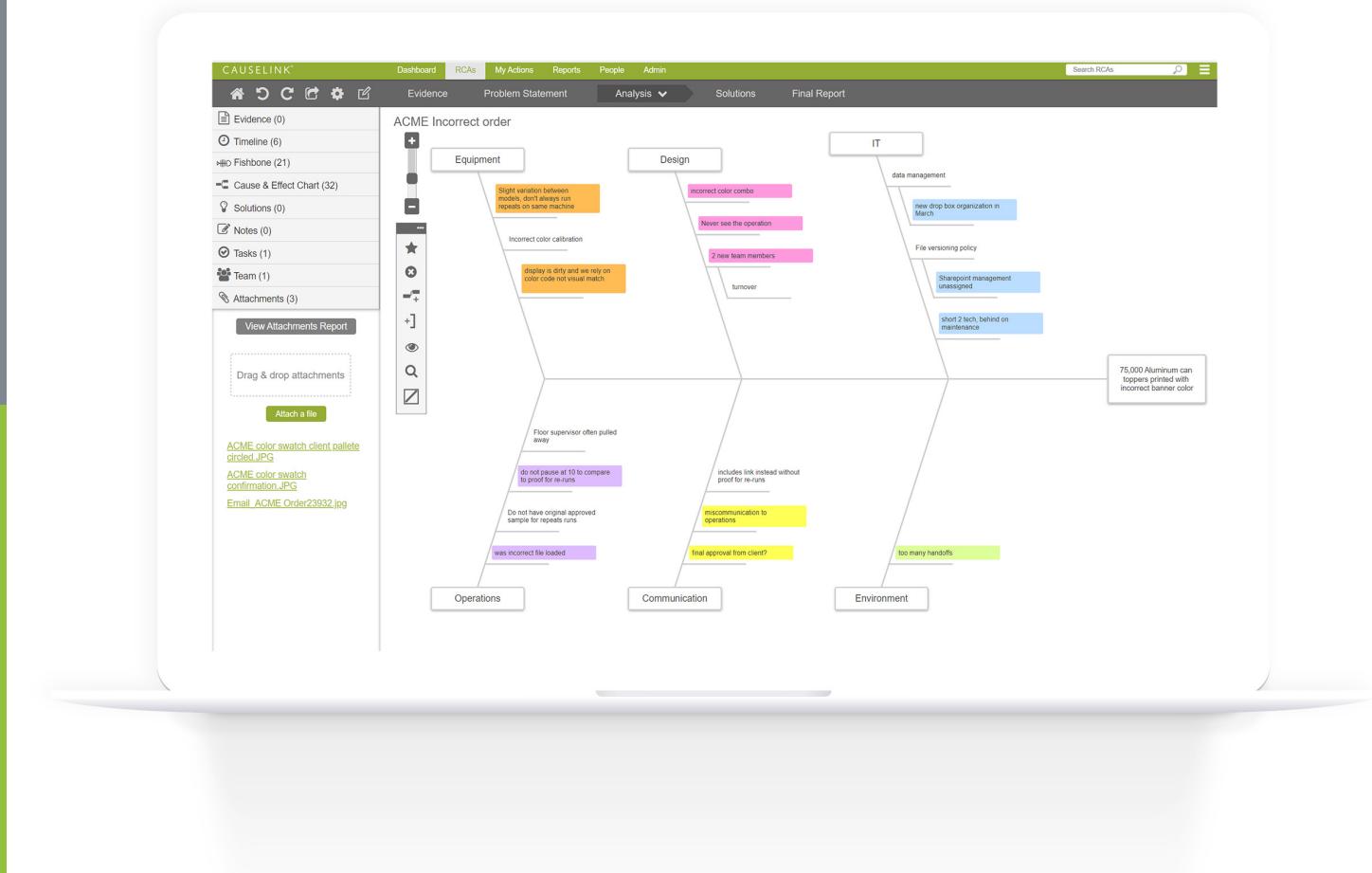
Gloria's Ishikawa Fishbone diagram

Gloria and her team had not used the Fishbone diagram as a primary tool in their RCA investigations because of its limitations. However, she recently repurposed this tool as a brainstorming aid. During process improvement efforts, she found it is very useful for generating ideas and spurring participation from teams that were either new, quiet or needed help focusing. She hoped that it might be particularly helpful with teams that had disagreements or vastly different perspectives, which was the case in her last RCA investigation.

Fishbone helped focus the team's attention on multiple, specific categories rather than 'free forming', which can enable people to hijack the meeting and argue about a single technical issue. She was happy with the results.

Using the Fishbone diagram tool this way and incorporating it into her RCA investigations has been easy. Causelink can transport the results from the Fishbone diagram directly into the Sologic cause and effect chart. After Gloria feels like the ideas have been exhausted in the Fishbone template, or there are just too many, with two clicks she is able to pivot to her Sologic chart and start organizing causes. This offers an entirely new focus and quickly gives the team a lot to work with. Gloria decided to use the Fishbone tool in future investigations to generate ideas for evidence sources too.

Gloria's Fishbone diagram looked like this



TAKEAWAY

When to use Fishbone

- Structured brainstorming of possible causes, evidence, or solutions
- Broader look across multiple sources



TIMELINES CLARIFY THE ORDER OF EVENTS IN A VISUAL REPRESENTATION

Incident Timeline

Another helpful tool for RCA practitioners is an event timeline. Timelines clarify the order of events in a visual representation. The chronology can help establish the logic of causal relationships and helps people with different perspectives see the event through the common lens of time.

An incident timeline/sequence of events is a classic analytical tool. It is useful for organizing how the incident unfolded and can even include the incident response. It's a great way to develop an initial understanding, particularly when the event is complicated. And it can help reconcile perspectives from the different team members.

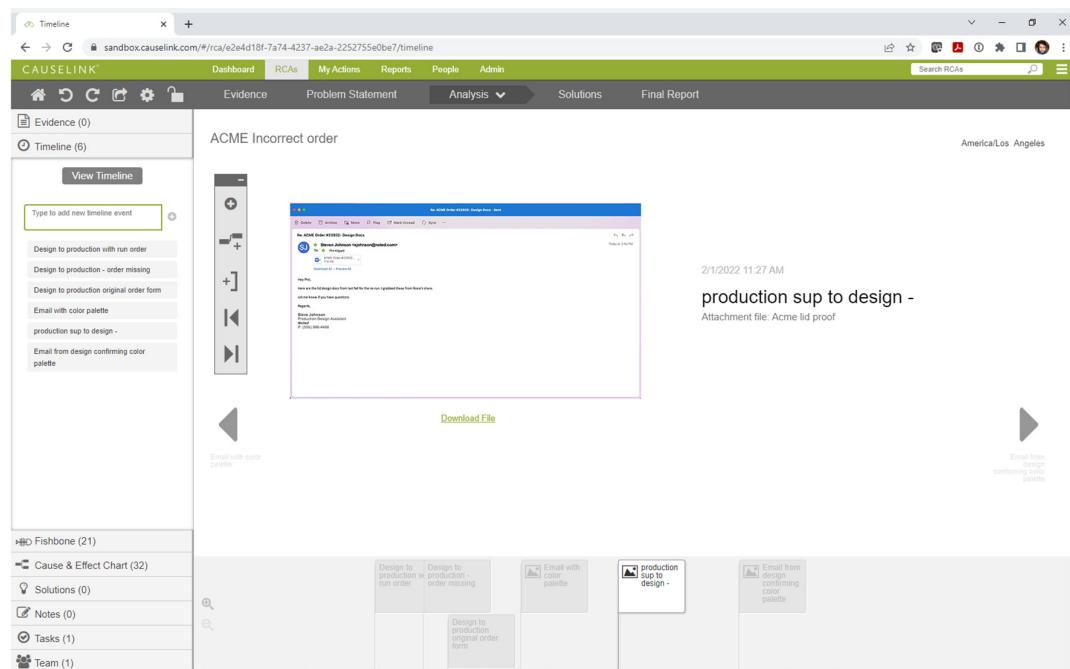
Pros

- Helps to uncover causal relationships when event order is initially unclear
- Visually displays the chronological order of events (especially process-related events)
- Easy to use with no RCA training required
- Intuitive to understand and follow
- Captures events separated by years or seconds

Cons

- Can be duplicative if chronology is undisputed and issue requires a cause-and-effect chart
- Does not illustrate complete causal relationships
- Linear structure is limiting

Gloria's Timeline diagram looked like this



Gloria's Incident Timeline

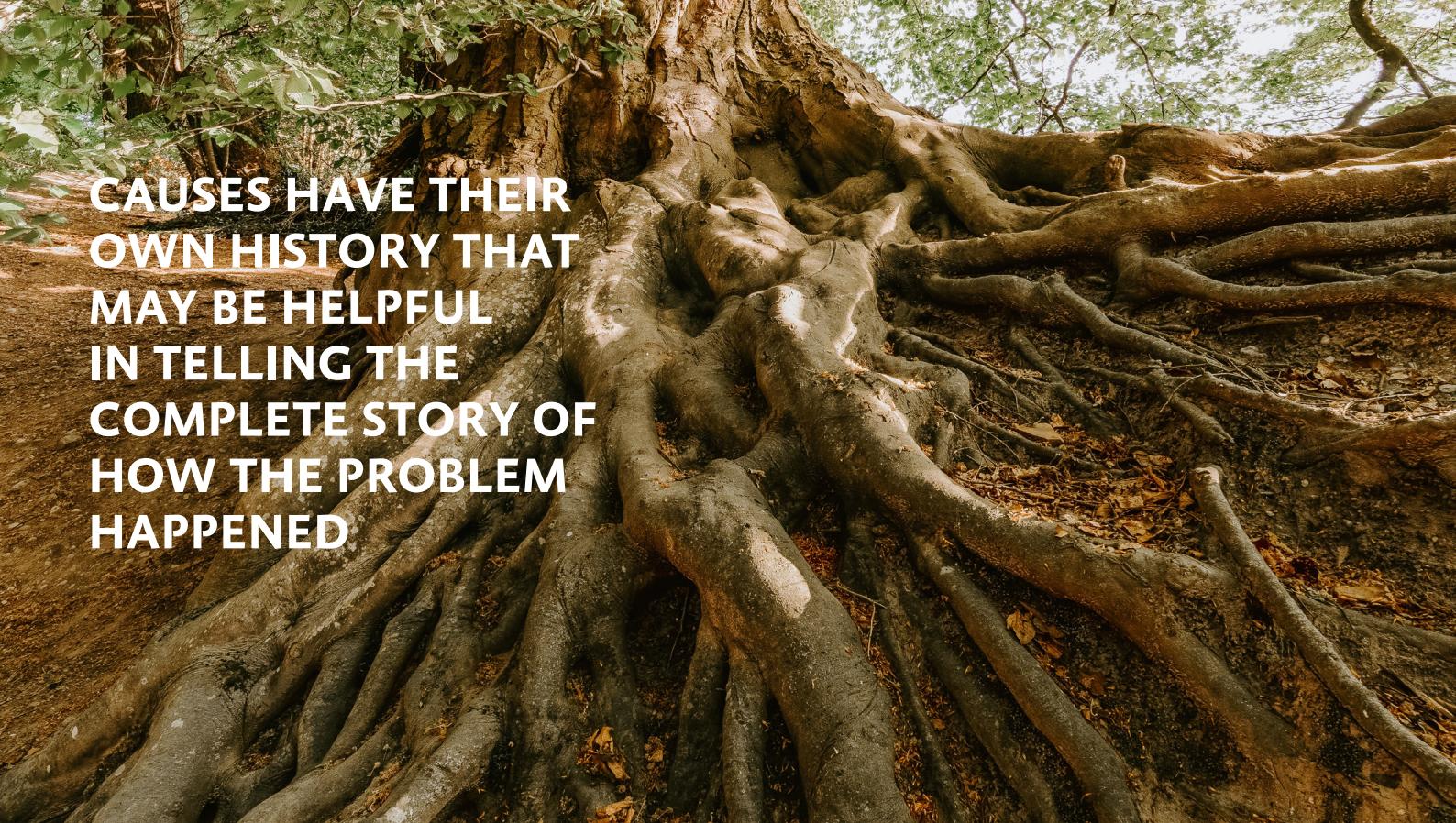
Last Monday, a phone call came through to Gloria from a long-time client, ACME, who had concerns. This client had received two consecutive orders with mistakes. The first order was missing an additional logo that the client had specifically requested. The second order should have been a repeat order from November of last year. The order from last November was correct, but this order had a heading banner that was purple when it should have been indigo. ACME changed this banner color early last year when they re-branded.

Gloria called the design team to see if they could help figure out what happened with ACME's orders. The design team pointed to the production team, claiming they must have loaded the wrong file in their job run. The production team was confused and convinced that they had run the correct file. Each team forwarded emails related to the two jobs to Gloria. As she started reading through the emails, it was difficult to follow as many emails went back and forth and had revisions and attachments, often on the same day.

TAKEAWAY

When to use Incident Timeline

- When chronology is key to understanding
- For events that happen quickly (within seconds)
- For events that span for longer periods (months, years)



CAUSES HAVE THEIR OWN HISTORY THAT MAY BE HELPFUL IN TELLING THE COMPLETE STORY OF HOW THE PROBLEM HAPPENED

Sologic RCA Method

Sologic shares some elements from the techniques previously described. It uses the same logic as 5-whys in that it starts with the problem and asks “why/how”. But, it allows for branching causes at each step. The chart ends up looking like the roots of a tree (albeit from left to right). It shows how each of these causes has its own history that may be helpful in telling the complete story of how the problem happened.

Background

The Sologic method was developed by a group of RCA practitioners with years of experience conducting RCA investigations in a variety of industries. It offers a step-by-step blueprint, bringing structure to each new RCA, even when the issues being investigated are vastly different.

Causes gathered in the fishbone exercise can be represented in a way that shows how they relate to other causes, no matter which category they belong to. Once complete, the Sologic diagram includes all the nuances and details. And it helps the team identify a diverse list of solutions that attack multiple causes. In comparison to home improvement, the Sologic method is like a power drill. It's adaptable to many tasks, makes short work of small jobs, and has the horsepower you need for large jobs.

Pros

- Offers structure and organization to any RCA investigation
- Can accommodate any level of problem complexity
- Visually displays the relationships between all causes
- Causes supported with evidence
- Makes summary reports easy to produce and share
- Makes the business case for why solution expenditures make sense via solution assessment, implementation planning, and review
- Makes “reading” how the event unfolded, and why, logical
- Allows different perspectives to be captured and logically charted
- Increases organizational pattern recognition and learning

Cons

- Requires time to complete all 5 steps, which may be more than some investigations need
- Cause and effect charting skills can become rusty if not applied at least a couple times/year

USED TO INVESTIGATE PROBLEMS THAT MEET NOTED'S THRESHOLD CRITERIA

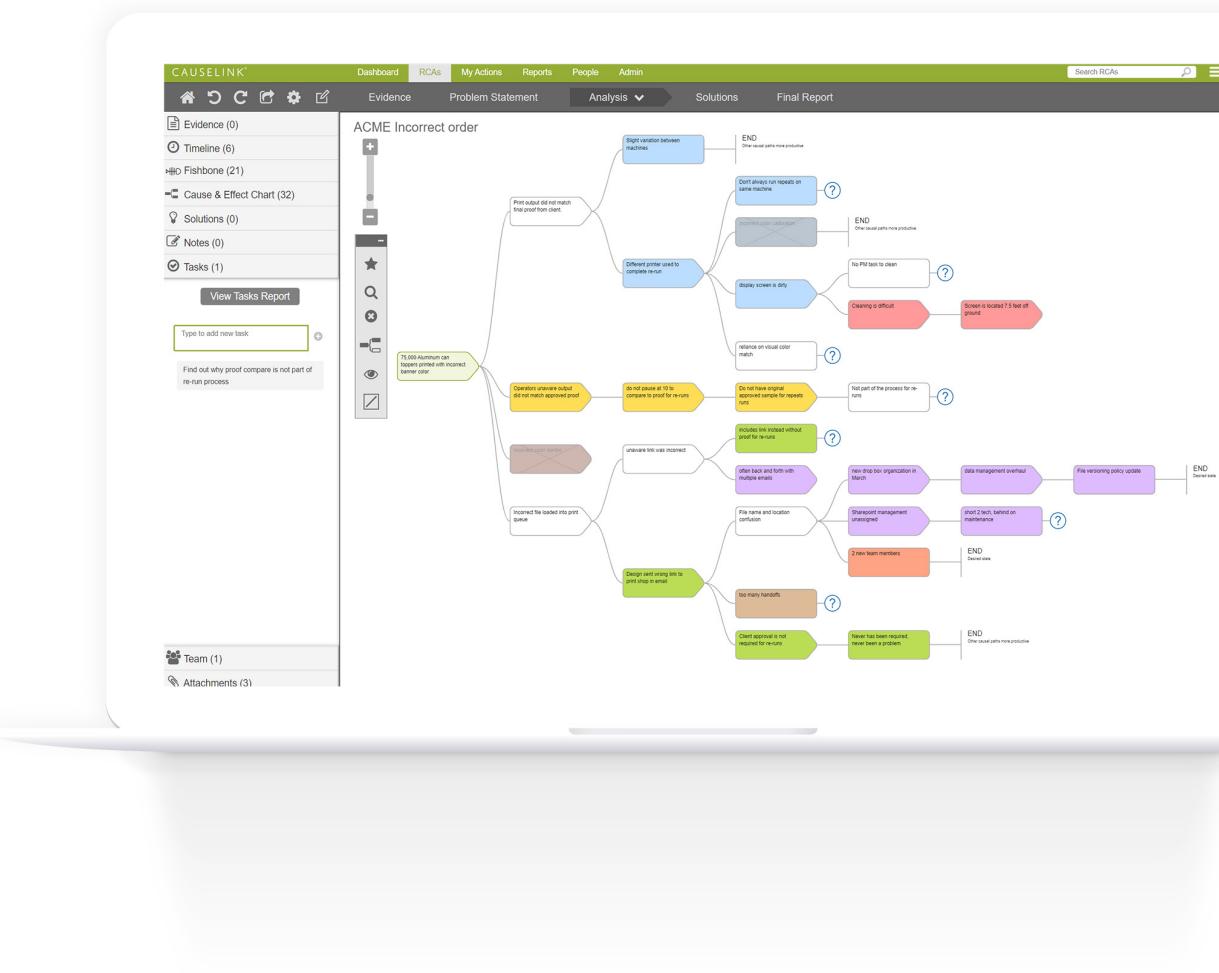


Gloria's Sologic Cause & Effect Chart

Although there was some initial, hesitant agreement that maybe there was a file name mix up, the discussion quickly turned into a string of questions, complaints, and other theories. Gloria realized that she was uncovering systemic issues because new information was being shared that related to SharePoint confusion, approval process disagreements, as well as other causes. Not wanting to waste time or lose the input from this group, Gloria opened a new RCA file in Causelink and jumps straight to the cause-and-effect chart. She entered all the causes she heard from the supervisors onto a chart. She told the supervisors that a broader issue like this is best analyzed by a broader team using Causelink and the Sologic RCA template.

As a rule, Gloria's team defaults to using the Sologic method to investigate problems that: meet Noted's threshold criteria; will clearly be more complex than a simple 5-Why chart can handle; or will take longer than a few hours to investigate. The recent issue with the ACME order certainly fits that criterion.

Gloria's Cause & Effect chart looked like this



TAKEAWAY

When to use Sologic RCA

- Any problem, no matter complexity or impact
- Problems that are too complex for other tools to effectively address
- When problems cross functional boundaries



Gloria assembled a more complete RCA team including members from I.T. and Quality. Together, they completed the five steps of the Sologic RCA process. They generated approximately 40 causes on their chart. This helped sort out what exactly happened, including the causes of the printing problems. The team was able to generate 10 different solution ideas. They evaluated each and settled on 3 solutions to implement that met the organizational goals, provided positive payback and were mutually agreeable between all teams.

With a better understanding of the strengths and limitations of 5-Why charts, Fishbone diagrams, timelines, and the Sologic method, you are better prepared to choose the right tool to tackle whatever incident comes your way, regardless of size or complexity. Problems will always occur, but when you can select the right tools that help you efficiently understand why something happened, you can find effective solutions that prevent the problem from coming back, enabling you to get back in control and onto the things that you most want to spend your time on.

Which Causelink Plan is Right for You?

Causelink includes multiple tools, keeps you organized throughout an investigation, and makes sharing results simple. There's a Causelink package for everyone from an RCA solo practitioner to a large global RCA program team.

Individual

Single user

- ✓ Single user SaaS
- ✓ Access to all RCA tools and templates

Team

2 - 20 users

- ✓ 2-20 users SaaS
- ✓ All **Individual** features
- ✓ Team collaboration
- ✓ Limited admin reporting access

Enterprise

20 + users

- ✓ On premise or SaaS
- ✓ All **Team** features + concurrent licensing
- ✓ Advanced reporting
- ✓ SSO authentication
- ✓ API access
- ✓ Individual support

Cloud-based and mobile-friendly, Causelink Individual is a state-of-the-art RCA investigation tool. Causelink Individual offers the advanced charting performance, intuitive interface, and sharp report output of Causelink Enterprise to the single user.

Cloud-based option for up to twenty named users. If you have a smaller team of problem-solvers who need to collaborate on RCA projects, Causelink Team is the solution. Allows teams to work together to analyze problems and track actions.

Cloud-based or On-Premise, Causelink Enterprise is the world's leading RCA software. Supporting productivity, collaboration and culture, Causelink Enterprise helps solve the toughest problems and gives leaders the power to continuously improve their organization.

Note that everyone that attends Analyst Level 1 receives one year of Causelink Individual free of charge and then at a discount going forward.

Ongoing support

With Sologic, you'll never be on your own. We pride ourselves on the outstanding level of support we provide. As a Sologic client, you will be assigned an account manager who will provide ongoing support, guidance and recommendations to maximize results of your RCA efforts. Your Account Manager will be your main point of contact to answer questions or address any needs or concerns.

But what about software support? Sologic has that covered as well. Software support is provided by the people who've written the code. Our team of in-house developers can quickly resolve most problems.

Sologic has you covered



USA and Canada
info@sologic.com

Europe
europe@sologic.com

South America
southam@sologic.com

Australasia
australasia@sologic.com

Asia and Pacific Rim
aisa@sologic.com

Mexico and Central America
mexico@sologic.com

Africa
africa@sologic.com

References

1. Toyota Industries. (2022). The Story of Sakichi Toyoda. Retrieved from Toyoda Industries : https://www.toyota-industries.com/company/history/toyoda_sakichi/
2. Various. (2021, October 11). Ishikawa Diagram. Retrieved from Wikipedia: https://en.wikipedia.org/w/index.php?title=Ishikawa_diagram&oldid=1049320768
3. Causelink (2022). Causelink RCA/Problem Solving software by Sologic: <https://www.causelink.com> and <https://www.sologic.com>