



WHITE PAPER

Root Cause Analysis: Adding Value to Your EHS Compliance Audit

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A compliance audit is one of the most fundamental tools in an EHS manager's toolkit. Audits bring organization and coherence to the process of identifying both regulatory and management system compliance issues. They provide at-a-glance information about the performance of the EHS management system, and an effective approach to identifying and solving problems. Your comprehensive EHS audit program is providing a great deal of value to your management system.

But are you getting everything out of it that you could? If you haven't added root cause analysis to your EHS compliance audits, the answer is "maybe not." Here's how adding root cause analysis to your EHS compliance audits can take your audit program to the next level.

What is Root Cause Analysis?

Root cause analysis is a visual metaphor: when we see a plant, we only see part of the plant – the part that’s above-ground. Much of the plant is not visible; it is below-ground, in the roots. Even though it isn’t visible, it’s essential to the survival of the plant – and often, if you cut off the part of the plant that’s above-ground but leave the roots, the plant will return. In the same – but slightly more sinister – way, a visible compliance issue in the workplace may not be permanently resolved just because you fixed what you could see. Some problems will persist until you pull them up by the roots. Root cause analysis helps you identify and deal with those roots.

Here’s an example: suppose one of your workers has suffered a minor injury – a trip-and-fall, perhaps, that led to a scrape that required first aid. You might ask: what caused the worker to trip? A quick walk out to the site of the incident reveals that there is an extension cord across the walkway. That’s the proximate, or immediate, cause of the incident – and the on-the-spot fix is to remove the extension cord.

It looks like a simple problem with a simple solution – a worker carelessly strung an extension cord across the walkway and caused another worker to be injured. Tell the workers not to string extension cords across the walkway; problem solved.

But what if it’s not that simple? It could be important to ask the question, why? Why was the cord strung across the walkway? Perhaps the worker who put it there needed to complete a task for which the available lighting was insufficient, so he put up some



temporary task lighting. When they put up the task lighting, they discovered that there was no electrical outlet in their work area, and the nearest one was on the far side of the walkway. So in order to have the lighting he needed to do their job safely, they inadvertently created a hazard that tripped up a co-worker.

Now you're closer to identifying an underlying cause of the tripping problem – one that could crop up again, if you don't address it. But what is the problem precisely? Is it that the ambient lighting in the work area is generally poor – or is it just too poor to perform certain tasks? Is it that the location is not suited to the task the worker was doing? The answers to these questions will guide you toward a solution that actually addresses the problem, in part by helping to identify and disregard incorrect assumptions – for example, if you assumed that the worker strung the cord across the walkway because they forgot that it would create a hazard, and tried to solve the problem through retraining the worker, you might miss the real source of the problem. Addressing root causes organically prevents the hazard from recurring and makes the workplace safer both for the worker who tripped, and for the worker who didn't have enough light to do their job.

That's root cause analysis – a process of looking beyond the immediately obvious symptoms of a problem to get to the highest-level, systemic cause, and the most effective long-term solution. “Root cause analysis” is the difference between a bandage and a stern lecture. It's a solution that makes every worker safer and improves quality and productivity. But root cause analysis isn't just for after a worker is injured. You can incorporate it into your EHS compliance audits, adding value to your workplace proactively rather than reactively.

When Should You Add Root Cause Analysis to Your EHS Compliance Audits?

Obviously, this kind of in-depth inquiry into why there is a compliance issue is going to take more resources – both time and personnel – than simply looking for compliance and fixing it on the surface. Is it really worth the investment?

Root cause analysis provides the greatest return when it identifies a systemic problem that can be fixed in order to improve the performance of the entire organization. Certain types of compliance issues may often indicate a systemic problem. These may include:

- Repeated complaints about a specific issue
- Performance or compliance issues, especially if they occur repeatedly
- A near miss or close call, especially one that has occurred multiple times
- An event that results in a serious injury or fatality, especially if it was preceded by near misses or close calls

Not all of these are applicable to your EHS compliance audit process. For example, there's probably a different process for addressing near misses or accidents that cause serious injury, and you may also have a different setup for addressing complaints. But repeated reports of noncompliance, or compliance issues that crop up over and over during your audits even after you thought you had fixed them, are likely candidates for the kind of “closer look” that root cause analysis provides.

Effective Root Cause Analysis Strategies



There are many different ways to conduct a root cause analysis. The method you choose may depend upon the nature of your workplace, the kind of problem you've identified, or the resources available to you.

Methodologies include:

The Five Whys. Created by Sakichi Toyoda, the founder of Toyota, this basic method requires no special training or expertise. As in the example above of the worker who tripped on a cord, it begins by asking why an incident occurred or why a condition exists, and continues asking why until one or more underlying causes are identified that can be addressed. Based on observation, Toyoda determined that it takes about five whys to identify root causes. Once you can no longer ask a sensible why question, it is likely that you have reached a true root cause of the problem. Once you reach an answer to a 'why' question that is out of your control, you have identified the most basic level at which you can address the problem. The other root cause analysis methods often begin with and build on the five whys in ways that enable a more detailed analysis.

Fishbone Root Cause Analysis. Also originating in Japan and included in every Six-Sigma program, this cause-and-effect diagram is a visual brainstorming tool used by teams to identify root causes. Drawn on the outline of a fish, it begins at the fish's mouth with a "problem statement" – for example, "Egress routes are not kept clear." Working backward from the problem statement, team members identify categories of causes of the problem, such as people, environment, materials, and methods. These are written as branches along the spine of the fish, typically from right to left, since the method originated in Japan and the Japanese write and read from right to left.

Within each category, the team identifies potential contributors to the problem. Perhaps egress routes within the environment are not clearly marked – but why? Is it because floor markings are worn away, or are they covered by dust? Or is the purpose of floor markings unclear to workers (this might fall within the people category)? Often the five whys method is incorporated into the fishbone, with team members asking “why” about each identified causal category until root causes are identified.

Cause mapping. A refinement of the five whys and fishbone analysis methods, cause mapping is a graphical representation of the possible causes of an effect. Cause mapping begins by identifying an undesired effect on the organization’s goals (for example, if the goal was compliance with a specific standard, then the undesired effect is noncompliance) and writing it on a chart. It then graphs “why” questions and their answers to identify cause and effect in a sideways-flowchart style. Cause maps are typically written from left-to-right, which is more natural to native English speakers than the fishbone. A conceptually similar method, the causal tree, is typically organized from the top down.

Which method should you choose? The best method for RCA will depend, in part, upon the nature of the problem you’ve identified. The five whys can be an effective strategy for use by a single individual dealing with limited root causes; because of its simplicity, it might be the handiest tool to use during an EHS audit. The fishbone, cause mapping and causal tree methods offer a visual representation of causes and effects, and a non-linear structure that enables the identification of multiple possible causes. Because these methods involve greater complexity and the identification of multiple possible causes, they often require a multi-specialty team approach, making them better suited to more complex problems with serious or far-reaching consequences for which the investment of time and resources is fully justified.

Documenting Root Cause Analysis



Whenever you perform a root cause analysis, remember to document it for your records. For the graphical analysis methods – fishbone, cause mapping, and causal tree – you should retain a copy of the graph, as well as a list of participating personnel and their areas of expertise and copies of or references to any evidence that was gathered or used in the course of the analysis. For the simpler five whys method, an annotated audit report may be all that's needed. Make sure that it includes the auditor's name, the date, and a list of any relevant resources.

In some cases, the root cause analysis documents may need to be included as part of a tracer tool. A tracer is a document used alongside the audit, root cause analysis and corrective action tools; it enables compliance activities to be tracked around a specific standard, process, or individual. For example, a given tracer tool could document audits, root cause analysis, and corrective actions related to a single process where a problem has been identified, or a single standard around which the organization has experienced ongoing compliance issues.

Root Cause Analysis, Corrective Actions and Continuous Improvement

Most audit tools include a place for recording recommended corrective actions, and well-managed organizations also have procedures in place to ensure that corrective actions are completed. Incorporating root cause analysis into the audit process will enable the organization to better target its corrective actions to long-term, rather than short-term, solutions to problems.

Let's return to our trip-and-fall example, a standard compliance audit that identifies the problem of the cord strung across the walkway might note under "corrective actions" that the cord was removed. With a root cause analysis attached, the same compliance audit might note that an outlet should be installed in the work area to prevent further cord incidents; or that the worker involved has a history of carelessness and may require retraining or disciplinary action; or that the work area lighting needs to be repaired. All of these "root causes" go beyond the immediate hazard of the cord and will contribute to a safer workplace in which such a hazard is less likely to reoccur. If the hazard does reoccur, the root cause analysis can be expanded to look for other, unaddressed causes and more effective corrective actions, such as relocating the job task or redesigning the work area.

With its focus on long-term solutions over quick fixes, root cause analysis enables organizations to avoid the wasted effort of cutting the tops off noncompliance weeds that are sure to return. Instead, with an incremental investment in follow-up root cause analysis, identified compliance issues can be solved more effectively and organizations can move forward on a path of continuous improvement.

ABOUT DAKOTA SOFTWARE



Dakota Software's Compliance-based EHS Management solutions empower companies to more effectively plan and execute EHS procedures and make measurable improvements to their overall operational performance.

Dakota Software is the only provider of EHS compliance solutions that deliver a comprehensive regulatory library through an enterprise-wide EHS compliance process management system. This exclusive feature, combined with Dakota Software's proprietary taxonomy engine, allows users to easily determine which requirements apply to which sites and build the appropriate compliance program for each site. Furthermore, users are automatically notified of upcoming new regulations and pending regulatory changes.

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White Papers

Dakota Software's white papers provide in-depth insight on today's most pressing EHS and Sustainability issues.

Analyst Reports

As an industry leader, Dakota Software has sponsored numerous research reports on EHS and Sustainability best practices and trends.

Application Briefs

View other software applications offered within the ProActivity Suite. Let us help you drive compliance with integrated regulatory content and allow enterprise-wide collaboration from any device, online or offline.

EHS Software Value Calculator

Better information management is critical to improving your organization's EHS performance. End the inefficiencies caused by paper processes, spreadsheets, and ad hoc software by creating your business case.

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