

# Quality info

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- ✓ **STAY AT HOME** (UNTIL THE LOCKDOWN IS LIFTED)
- ✓ **STAY ALERT**
- ✓ **STAY SAFE**

## **Layered Process Audits**

Layered process audits (LPAs) are a quality technique that focuses on observing and validating *how* products are made, rather than inspecting finished products. LPAs are not confined to the Quality Department, but involve all employees in the auditing process. Supervisors conduct frequent process audits in their own area, while higher-level managers conduct the same audits less frequently and over a broader range of areas. These audits also typically include integrated corrective and preventative actions taken either during, or, immediately after the audit.

Layered process audits (LPAs) help manufacturers and service providers take control of processes, reduce mistakes, and, improve both work quality and the bottom line.

Organizations with robust LPA programs in place see significantly lower rework and scrap, fewer warranty holdbacks, and reduced customer complaints.

The underlying cause of most of these issues is a lack of process standardization or a failure to follow these approved processes. The key to improvement is to define these standards and create systems that ensure those processes are followed correctly.

A layered process audits program includes three critical things:

- Auditors pulled from across the organization, including all levels of management
- A set of simple audits, which do not require specialized knowledge to conduct, focused on high-risk processes
- A system of reporting and follow-up that exposes problem areas and ensures containment and corrections are put – and held – in place

## Product Inspections are Not Enough

Process audits are an important, but often overlooked, part of a holistic quality system. Most standard quality systems are focused on product sampling and inspections – testing the actual output of a manufacturing or servicing process. This is necessary and important, but doesn't go far enough.

Nonconformances will likely be caught, but because of the delay and small sample sizes, significant rework and scrap costs may have already been incurred. Catching nonconformances earlier can significantly reduce cost of quality.

Moreover, some quality problems, especially those related to durability, cannot be caught with standard product inspections. A part may look fine leaving the plant, but if it was built incorrectly, will exhibit quality issues later. This can lead to significant costs, including customer complaints, warranty costs - even recalls.

## Start with Process Audits

Process audits look at *how* products are made and services are rendered, and they can expose the nonconforming processes much earlier. Most process audits are conducted ad-hoc or less formally, as in a *Gemba* walk. A LPA program introduces a systematized approach to process audits that moves the needle for good quality and better performance.

## LPAs are Process Audits on Steroids

The key difference between a normal process audit and a layered process audit is who participates.

In a LPA program, auditors are drawn from the quality organization, but the team also includes individuals from other areas of the organization and from multiple levels of management, including executive leadership (the "layers" in LPA).

We've found that successful LPA programs often include as much as 40-50% of an organization's headcount as auditors as the "culture of quality" becomes fully realized.

In a LPA system, audits are conducted at a pre-determined frequency depending on the level (or layer) of the auditor. Supervisors often conduct frequent process audits in their own area, while higher-level managers conduct the same audits less frequently and always over a broader range of areas.

By conducting multiple layers of the same audit, a LPA system helps ensure that the audits are conducted accurately because the auditors are essentially double-checking each other. And by including multiple layers of management, the company demonstrates that quality is important to everyone.

## Simple Audits that Anyone Can Conduct

The questions that are part of a layered process audit are written to avoid the need for specialized knowledge because people from throughout the organization are involved in conducting the audits ([learn more about writing good audit questions](#)).

Audits usually focus on processes and devices where deviation from the standard represents the highest risk of deviations or defects. If, for example, an electronic scale continually makes critical measurements for ingredients in a sensitive chemical compound, problems that affect the performance and calibration of the scale could quickly cascade into bad product. The process for calibrating the scale is a good candidate for an audit: it should be examined frequently to ensure that it remains within tolerances.

Another example is a set of bolts that must be tightened in a specific order. The process audit should check that the standard work instructions are clear, and the operator is tightening the bolts in the specified order.

## Containing the Problem and Closing the Loop

Layered process audit systems are only truly effective when they integrate action, analysis and improvements. If an audit area does not pass, the auditor conducting the audit should record their finding, and immediately take steps to prevent potentially defective products from getting out the door – containing the problem. Usually a corrective action can be anticipated, and even taken immediately by the auditor. Many corrective actions, however, are more complex and involve other people.

The LPA system should account for this, track the assignment of the corrective action, and follow it through to completion – closing the loop on quality. Robust LPA systems capture all of this information and make it readily available for later analysis. A good system will highlight problem areas and help management recognize improvement opportunities.

## Why Conduct Layered Process Audits?

Organizations face increasing complexity and change, and are finding it challenging to account for the [full cost of quality](#), including realized risk events, to the tune of tens of billions of dollars in costs across the major industries.

Many organizations are missing a key opportunity to limit and control risk: they are not auditing their operations and processes as comprehensively as their products.

By looking beyond traditional product audits, which are reactive, and adopting process audits, which are inherently proactive, organizations can ensure that key activities are done properly and consistently, thereby improving quality at each and every stage of

production. Layered process audits prevent issues that product audits either can't identify or identify too late, requiring costly repair or scrapping, or even worse.

Further, a LPA system will help identify error-proofing systems that have become ineffective over time, highlight shortcomings before they become serious problems, and guide management on how to direct resources to review symptoms, identify problems and find root causes.

Most importantly, a well-implemented layered audit program will help instill a culture of quality within an organization, as senior level managers and executives actively demonstrate the importance of quality to the overall organization.

### Measuring the Value of an LPA system

The value of a LPA system is fundamentally measured in error reduction, which shows itself in many ways:

- **Direct Material costs** – represent the raw materials used in production which have to be thrown away
- **Maintenance error costs** – although ongoing maintenance is required to keep delivering at the highest levels, errors here can increase production issues leading to scrap or, more directly, lead to costly acceleration of equipment failures
- **Rework costs** – including work that must be re-done because it was completed improperly in the first place. Because it occurs out of sequence, rework generally incurs significantly higher costs than normal straight line operations
- **Warranty costs** – these costs and similar reserves are used to pay for the defects that are identified post-delivery, typically initiated due to dissatisfaction by end customers
- **Inspection costs** – these reflect the total cost to the organization for dedicated and non-dedicated resources assigning, executing, managing, and reviewing audit and inspection activities

Just getting started with layered process audits? We break down implementing an LPA program into 3 simple steps in our [LPA 101 eBook](#).

### Establishing a Robust LPA Program

There are a number of ways to implement layered process audits in your organization, but the most cost-effective way, by far, is to leverage [LPA software](#). It is also the only solution that will help you realize the full potential of a layered audit program. For a more thorough guide to establishing a LPA system at your organization, please review these resources:

## 6 Key Steps for Your Layered Process Audit Implementation

If you could reduce defects by half in just a few months, what would that mean for your company?

It's possible with a layered process audit (LPA) program, but the complexity involved with these audits means many companies don't leverage their full potential. With LPAs, every layer of management participates in daily checks of high-risk processes. It's a tall order for many organizations, requiring a solid plan and a prepared team.

To build an effective LPA system, automotive and aerospace suppliers should focus on the plan-do-check-act approach:

- **Plan:** First steps include learning about LPAs, creating your team, writing questions and determining audit layers.
- **Do:** Rolling out your LPA program requires disciplined scheduling, as well as a closed-loop system to manage findings.
- **Check:** Data analysis is key to assessing performance and leveraging results for further gains.
- **Act:** Continuous improvement means ongoing engagement and updates to questions.

### 1. Learn About LPA Best Practices

Managers and process owners need a firm grasp of the LPA process before building teams and training participants. A good place to start is the Automotive Industry Action Group's CQI-8 [Layered Process Audits Guideline](#), which provides detailed information on:

- How to explain LPAs to your team
- Types of checklist questions to include, and what to avoid
- Best practices for monitoring, measuring and maintaining your LPA program

### 2. Create Your LPA Team

Your audit management team is responsible for creating checklists and implementing the system across the plant. Experts recommend creating your team with employees from all areas of the organization, including administration, sales, quality and order fulfillment.

Whether or not you can realistically include such a broad cross-section of the company, the point is this: you shouldn't only include experts. Fresh eyes often notice what other

people have missed, and rotating auditors also protects data integrity by discouraging buddy-passing.

### 3. Write Your Audit Questions

Each LPA should contain just 3 to 10 questions and take less than 15 minutes to complete. It sounds simple, but getting useful answers means asking the right questions in the first place. That starts with looking at previous quality control problems and high-risk processes, such as those identified in failure modes and effects analysis (PFMEA) reports.

To craft strong audit questions, make sure they are:

- **Objective:** Questions need a clear answer, which is why most LPA questions are yes or no.
- **Specific:** Avoid vague phrases like “proper,” instead providing clear specifications, tolerances or criteria for verification.
- **Concise:** Don’t get bogged down in technical details. People unfamiliar with the process should be able to understand and answer the question.

### 4. Create Your Audit Plan

Layered process audits get their name from the multiple layers of personnel who conduct the audits. To create the audit plan, your team must define the layers as well as the frequency for each layer.

A typical LPA program includes 3 layers:

- **Layer 1** includes supervisors and team leads conducting audits daily across every shift.
- **Layer 2** includes middle management conducting audits once or twice weekly.
- **Layer 3** includes plant managers conducting audits monthly, as well as executives conducting audits quarterly or annually.

### 5. Roll Out Your LPA Program

Once you’ve completed the planning process, it’s time to execute on your plans. Essential elements of a strong rollout include:

- **Efficient scheduling and follow-up:** LPA programs can require thousands of audits annually. Automated LPA software reduces the resulting administrative burden by as much as 85%, allowing you to assign audits and set up auto-notifications in minutes.

- **Communication:** Also critical to implementation is communicating the benefits and expectations around the LPA program. Emphasize that LPAs aren't about blame—the goal is working together to identify problems and create higher-quality, leaner operations.
- **Corrective action:** Unless you have a closed-loop process in place to manage non-conformances, the rest of your LPA efforts are pointless. You should be able to quickly close out smaller non-conformances and assign corrective actions on the spot.

## 6. Measure and Improve Your LPAs

The final step in implementing an LPA program is analyzing your data and taking action based on your findings. Focus on steps such as:

- **Reviewing audit data** while it's still actionable instead of weeks or months later (which is often the case with paper checklists and spreadsheet-based tracking).
- **Updating questions** when processes or requirements change, as well as to verify corrective actions are working.
- **Measuring the LPA program itself** to develop leading metrics such as audit completion rates and time to closure for corrective actions.

Implementing an LPA program can be challenging, but it also comes with significant rewards that include reduced quality costs and a more robust quality culture. Automated tools make the process simpler, eliminating hours of scheduling and data aggregation while providing a closed-loop process that ensures adherence to standards.

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**Edited by : Hari K Taneja, Trustee,  
D. L. Shah Trust  
email: dlshahtrust@gmail.com  
Phone: 022-2309 6529  
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