CQI-8

Layered Process Audits Guideline

AIAG PUBLICATIONS

An AIAG publication reflects a consensus of those substantially concerned with its scope and provisions. An AIAG publication is intended as a guide to aid the manufacturer, the consumer and the general public. The existence of an AIAG publication does not in any respect preclude anyone from manufacturing, marketing, purchasing, or using products, processes, or procedures not conforming to the publication.

CAUTIONARY NOTICE

AIAG publications are subject to periodic review and users are cautioned to obtain the latest editions.

MAINTENANCE PROCEDURE

Recognizing that this AIAG publication may not cover all circumstances, AIAG has established a maintenance procedure. Please refer to the Maintenance Request Form at the back of this document to submit a request.

APPROVAL STATUS

The Quality Requirements Task Force and designated stakeholders approved this document for publication on November 9, 2005.

Published by:
Automotive Industry Action Group
26200 Lahser Road, Suite 200
Southfield, Michigan 48034
Phone: (248) 358-3570 • Fax: (248) 358-3253

FOREWORD

Industry data show that most manufacturing quality issues are caused by poor process control or by a failure to follow the appropriate process instructions.

Effective management of process capability requires the identification of sources of both special and common cause variation. Once the sources are identified, corrective actions designed to address them must be effectively implemented and sustained.

Employees do not refer to instructions or procedures before every step of a process; they often complete the processes by memory, which comes from repeating and practicing each step many times over. Once necessary process changes are identified, employees must re-learn and adjust. However, it is very easy for employees to return to the old, familiar methods.

Before 2005, DaimlerChrysler and General Motors required different process review approaches, including different approaches for Layered Process Audits. It was recognized that the Layered Process Audit methodology was not unique to any particular company, hence, under the auspices of the AIAG, DaimlerChrysler-and General Motors developed a common approach for Layered Process Audits.

One of the principal purposes of industry standard practices is to address commonly observed issues that are not isolated to any one company, commodity, or process within the industry. Validation of process improvements and corrective actions is one commonly observed industry issue that can be directly improved by the use of Layered Process Audits, which are designed for this specific purpose.

Layered Process Audits require that multiple operational levels within a manufacturing facility review the same key operational controls that ensure product quality. Controlling quality at multiple operational levels is a key strength of Layered Process Audits.

ACKNOWLEDGEMENTS

The following individuals were actively involved in the development of this Guideline.

Name	Company
Jeanine Grimaudo	DaimlerChrysler Corporation
Jerod Long	General Motors Corporation

The Layered Process Audit team gratefully acknowledges the leadership and commitment of Vice Presidents Peter Rosenfeld at DaimlerChrysler Corporation and Bo Andersson of General Motors Corporation as well as the assistance of the AIAG in developing, producing, and distributing this Guideline.

TABLE OF CONTENTS

Tables

Figures

INTRODUCTION

Background

Industry data show that most manufacturing quality issues are caused by poor process control--often a failure to reinforce manufacturing process corrective actions or a failure to follow the required process steps.

Effective management of process compliance requires the identification of sources of both special and common cause variation. Examples of special cause variation might include failure of one shift of personnel to follow the prescribed process. Examples of common cause variation might include an inadequate FMEA for the manufacturing process. Once the sources are identified, the corrective actions designed to address them must be effectively implemented and sustained.

Employees typically do not refer to instructions or procedures before every step of a process; they often complete the processes by memory, which comes from repeating and practicing each step many times over. Once necessary process changes are identified, employees must re-learn and adjust. It is very easy for them to return to the old, familiar methods. There might even be perceived incentives in place to follow the "tried and true" previous processes, even though studies have shown that the "tried and true" processes were not adequate to meet customer requirements.

Purpose of This Guideline

Layered Process Audits reduce variation along the manufacturing line and up through the ranks of plant management. However, if each customer (OEM) developed its own Layered Process Audit method, the effectiveness overall would be reduced. The basic approach for the Audits is an established concept; therefore, there is no competitive advantage for any particular OEM to develop a custom approach. The competitive advantage, though, could lie in the chosen *application* of the common Audit approach.

The concepts behind Layered Process Audits are not new. They find their origin in the well-known Plan-Do-Check-Act continuous improvement cycle.

This Guideline is not designed to introduce any significant improvements in the technology or application methodology of Layered Process Audits. It is designed to provide a common framework of the definitions and standard approaches that can be adopted by any automotive OEM or supplier to an OEM (tier 1), at any depth in the supply chain (any tier).

Each organization may choose to develop specific requirements for Layered Process Audits, for example, the frequency of the audits or the minimum topics to be included in the question sets. Such specific requirements will augment the suggested framework defined by this Guideline.

1.0 WHAT ARE LAYERED PROCESS AUDITS?

It is recommended that a training program for Layered Process Audit auditors be based on material in this Guideline starting with this section.

Layered Process Audits require that multiple operational levels within a manufacturing facility review the same key operational controls (within the reviewer's span of authority) that ensure product quality.

NOTE: While this Guideline describes the common fundamental requirements that DaimlerChrysler and General Motors have agreed upon, each company might have specific requirements such as particular processes audited, reporting format, audit maintenance, etc. Please refer to Customer-Specific Requirements for Layered Process Audits for this information.

1.1 Typical Steps for Developing and Implementing Layered Process Audits

Layered Process Audits can be best understood if they are described by their basic steps for developing and implementing the Audits, as applied to the organization that is using the approach. Table 1A lists the commonly defined steps.

Table 1A. Typical Steps for Developing and Implementing Audits

A cross-functional team identifies existing key process steps to audit. These are selected based on risk to product quality including lessons learned, safety, criticality of process step, or product characteristic.
Layered Process Audit items can also include past non-conformances, past customer returns, and past customer complaints.
Layered Process Audits conducted in manufacturing facilities are owned by Manufacturing Management.
If Layered Process Audits are conducted in Product Development, for example, Product Development Management owns the Audits.
Layered Process Audits reinforce existing processes and requirements and are not intended to develop pilot or draft processes.
Layered Process Audits are short in duration and are conducted according to a regular, planned cadence with specific criteria for frequency.
Multiple levels of plant personnel audit the manufacturing process to the same questions; delegating is not acceptable.
Audit results are recorded consistently, including corrective actions, and summarized for senior management review.
Areas audited are appropriate to the span of authority of the level of person auditing.
The higher the level of management conducting the audit, the greater the span of control and therefore the number of audit items can increase.
The multiple levels of plant personnel that audit must do so with a standard, common set of questions.
Audit items are typically yes/no checks regarding process steps, requirements, etc. Layered Audits are not intended to have multiple layers of management measure part characteristics.
Audit frequency depends on personnel management level, not on availability.

Non-conformances have predetermined reaction plans, which are implemented immediately.
Audit questions are updated as required to incorporate the latest improvements and process updates based on audit findings, employee suggestions, etc.
Layered Process Audits are monitored for completion and issues found. Root causes are then determined and appropriate questions are incorporated into the audits for recurring non-conformances.
The expected result of the Layered Process Audits is that customers benefit from reduced variation in the manufacturing process.

1.2 Scope of Use of Layered Process Audits

Layered Process Audits were developed to validate both the consistent compliance with existing manufacturing process steps and the implementation of changes or corrective actions in those existing steps.

While it might be possible to implement Layered Process Audits in non-manufacturing environments (for example, Product Development), such usage might require a modified approach. This Guideline describes the Layered Process Audit approach that has been effective in the manufacturing environment.

The steps listed in Table 1A have the following characteristics:

- Require that personnel from the operations level through to plant senior management validate the implementation of defined manufacturing processes.
- Reinforce manufacturing process updates (typically implemented as a result of a corrective action).
- Focus on key processes and process steps identified as requiring special attention from multiple levels of plant personnel to ensure compliance due to their criticality to customer satisfaction.
- Do not replace regular Quality Management System audits conducted by internal or external dedicated auditors.

Layered Process Audits can be considered a process audit as required by ISO/TS16949:2002, Section 8.2.2.2, Manufacturing Process Audit.

Therefore, the scope of a Layered Process Audit is limited to the identified processes and process steps requiring special attention due to their criticality to customer satisfaction rather than being a broad check of process compliance.

Not keeping Layered Process Audits to their original intent by, for example, broadening them to include all processes or not updating their question sets, would likely reduce the benefits of the Audits and discourage their use.

A more detailed description of what Layered Process Audits are and are not is provided in section 1.5 of this Guideline.

1.3 The Benefits of Layered Process Audits

Layered Process Audits have several tangible and intangible benefits, most of which are associated with process compliance and directly impact product quality. Other benefits are associated with the softer side of managing an organization, including increased floor time for plant management.

Many organizations have observed that Layered Process Audits achieve the following:

- Measure and encourage work process standardization.
- Reinforce key or updated process steps, including safety requirements.
- Openly publish what is important and what will be checked.
- Increase the interaction between plant management and line operators.
- Allow operators to provide first hand feedback to plant management and see immediate corrective action implementation where appropriate.
- Demonstrate the importance of key processes and key process steps by having plant management review those processes and steps with the operators.
- Institutionalize training and process knowledge for operators and all levels of plant management.
- Reduce errors, reduce scrap, increase First Time Through, and therefore reduce costs.
- Improve product quality and customer satisfaction.

While these are typical benefits of Layered Process Audits, they might not be applicable to every organization. There might be other, more significant benefits that surface from using Layered Process Audit methodology.

1.4 Everyone Is an "Auditor"

There is a significant difference between an internal Quality Management System auditor and a Layered Process auditor. To paraphrase W. Edwards Deming, *no one goes to work with the intention of doing a bad job.* Therefore, everyone wants to know that he or she is doing a good job, for a variety of reasons, including personal pride, recognition, etc. If people need to know that they are doing a good job, they need to have metrics regarding their job.

This starts with the operator personally checking part quality and process compliance, without the fear of a "formal" audit.

The first line supervisor checks key processes and process steps that everyone is aware of since they are on the published Layered Process Audit check-sheet. Process compliance feedback is immediate, as are any agreed-upon corrective actions.

The next level supervisor would then make the same checks, and so forth, up the chain of command in the plant, limited only by the span of authority of the person conducting the Layered Process Audit (who is defined as the "auditor").

In this way, everyone is an auditor for Layered Process Audits. These "auditors" do not need Quality Management System auditor training since they are not Quality Management System auditors.

1.5 Layered Process Audits and the "Is / Is Not" Tool

When implementing Layered Process Audits, it often helps to explain to personnel of all levels what Layered Process Audits are, paradoxically, by explaining what they are not. The "is/is not" tool is recognized in many problem-solving disciplines. This has been applied to Layered Process Audits in Table 1B below.

Table 1B. How to Explain Layered Process Audits to Personnel

Layered Process Audits are:	Layered Process Audits are not:
1. Verification that processes and procedures are being followed.	1. A quality audit of part characteristics.
2. Owned by the operational group where the audit is conducted (e.g., Manufacturing).	2. Owned by any support group (e.g., Quality).
3. Conducted by multiple management levels of personnel in a given facility.	3. Conducted only by an inspector or lab technician.
4. An audit consisting of quick, typically yes/no, questions.	4. An audit that requires measuring parts or other product characteristics.
5. A short list of key and high-risk processes, process steps, and procedures.	5. A long “laundry list” of items that include items not contributing to customer satisfaction.
6. Completed on a regular, pre-determined frequency.	6. Completed whenever the auditor has spare time.
7. Completed by the person identified in the audit plan in each layer of the organization.	7. Allowed to be delegated by the responsible persons.
8. Completed on-site “where the work is done.”	8. Completed in the auditor’s office.
9. A method to verify and sustain corrective actions related to process.	9. A method to determine corrective actions.
10. A method to verify that quality documentation (instructions, control plans, etc.) is being followed.	10. An inspection method to add to the process control plan.

11. An audit with results that are reviewed by site leadership on a regular basis.	11. An audit with results that are filed away and not reviewed.
12. An audit where non-conformances are addressed immediately.	12. An audit where non-conformances are noted and addressed at a later time or after a certain number have been accumulated.
13. An audit typically planned for processes and procedures conducted by people.	13. An audit to validate the operation of a machine.
14. A method to facilitate communication between operators and management.	14. A method to identify the worst employees.
15. A method to stress the importance of complying with processes and procedures.	15. A method to show personnel that "we're watching you."
16. An audit of selected processes and procedures / steps.	16. A replacement for internal Quality Management System (e.g., ISO/TS 16949) audits.

2.0 GUIDANCE FOR PLANNING LAYERED PROCESS AUDITS

Layered Process Audits are effective only when they are carefully planned. Using a multi-disciplinary approach, with management involvement, is the most effective way to plan for Layered Process Audits. There are five factors that should be considered:

- Audit Items – What are we going to audit?
- Audit Layers – What levels of the organization will be involved?
- Audit Frequency – How often will each layer of the organization conduct the audit?
- Audit Non-conformance Reaction – What is the plan when a non-conformance is found?
- Audit Ownership – Who ensures that the audit is conducted and that the results are reviewed and acted upon?

2.1 Audit Items

A cross-functional team should be formed within the organization to develop the list of items for the Layered Process Audit. The Audits should include whatever the organization believes is critical to product quality. The items are typically those that are high-risk to customer satisfaction. Processes, procedures, and other aspects of the business that are critical to ensure product quality are items that should be considered. When selecting items for a Layered Process Audit, the team may consider the status and importance of the related process.

To be most effective, Layered Process Audits should be relatively short in duration. Typically, Audits should include items that can be verified quickly. For example, it is typical for an Audit to verify the existence of the record of the first-piece inspection. It is not typical that the Audit require that someone actually complete the first-piece inspection process.

The Layered Process Audit check-sheet could contain specific items drawn from the following areas:

- Gauges
- Gauge calibration
- Visual aids
- Process/machine parameters
- Set-up and/or changeover procedures
- Job instructions
- Build/processing technique
- Product identification
- Torque monitoring equipment
- Documentation/record keeping
- Error-proofing or error-detection equipment
- Laboratory checks
- Part feature inspection
- Safety procedures
- Corrective actions from past quality issues
- Preventive maintenance

- Housekeeping
- Stacking/packing requirements

Elements that typically should not be part of a Layered Process Audit item list include these:

- Measuring specific part dimensions/characteristics
- Testing specific part performance characteristics
- Actually making a part to test the manufacturing process
- Checking whether or not the operators came to work on time
- Judging operator performance
- Verifying the completion of other "layers" in the Layered Process Audit

Sample items in a Layered Process Audit check-sheet might be these:

- Records (where required) showing that a daily set-up first-part validation check was conducted.
- Calibration not expired for gauge xxx.
- Visual aids of revision level yyy.
- Records showing that an error-proof "rabbit" was run at the beginning of each shift.
- Auditor validates error-proof devices by "running a rabbit."
- Machine zzz parameter 123 is set at level 456.
- Records showing that required preventive maintenance was performed to schedule (could require a proforma record).
- Record of the completion of tool change-over steps.
- Operator is using required personal protective equipment.
- Other relevant items.

Layered Process Audits should be focused where they will be most effective. They can be developed to be operation-specific, process-specific, department-specific, product line-specific, etc. In developing an Audit check-sheet, remember that it should include specific, critical items that can be verified quickly. Therefore, the more focused the Audit check-sheet, the more effective. A Layered Process Audit should not be a laundry list of all requirements within a production cell or department.

Table 2A below gives an example of an operation-focused Layered Process Audit check-sheet.

Table 2A. Example of an Operation-focused Layered Process Audit Check-sheet

OP #30 Assembly	MON	TUE	WED	THR	FRI	SAT
Are the builders checking rotation and marking parts as required by work instruction xxxx-y?						
Are the results of all required dimensional inspections recorded on form zzzz-1?						
	MON	TUE	WED	THR	FRI	SAT
Are the first piece inspection sheets completed daily by all shifts?						
Are all scrapped parts tagged in accordance with procedure tttt-3?						
Was the error proofing verification conducted and documented for each shift?						
Total Nonconforming Items	MON	TUE	WED	THR	FRI	SAT
List any Quality or Manufacturing Concerns on all Operations						

At a minimum, there should be a standard, common list of items for all auditors of a given department, process, etc. As the auditor's level in the organization increases, the number of the audit items and therefore the scope can increase. This is because the higher the level of the auditor, the greater that individual's scope of authority. For example, a supervisor may verify that the first-piece inspection was completed for his or her line, but a plant manager may additionally verify that the first-piece inspection results for the entire plant are summarized and posted at the appropriate location within the plant.

Examples of audit items that can be added as the level of auditor increases include the following:

- Site-wide required quality documentation is updated and posted.
- Evidence that customer delivery requirements have been met.
- Evidence that customer quality concerns are addressed in xx days.

2.2 Audit Layers

A Layered Process Audit gets its name from the requirement that multiple "layers" (i.e., personnel at various levels) of an organization conduct the same audit. Unlike an audit of a product characteristic or feature that is typically conducted only by an operator or a quality department team member, a Layered Process Audit is conducted by personnel ranging from working-level team members to personnel at the highest levels of the facility's organizational structure.

Operators, supervisors, department managers, plant managers, and company presidents conduct the Layered Process Audit. A Layered Process Audit places people of multiple levels of the organization "where the work is being done" to verify critical items. This facilitates communication between management and the working-level team members. The Layered Process Audit also demonstrates to all team members that these designated, critical items are very important. "If the plant manager, or even the company president, is here to verify that it is done, it must be critical."

2.3 Audit Frequency

A Layered Process Audit is conducted at a given frequency, which is determined by the level of the auditor within the organization. The closer the auditor is to the level of the area being audited, the more frequently that auditor will conduct the Audit. For example, a line supervisor may conduct the Audit on a daily basis, while the plant manager may conduct the Audit once per month. Customer specifics may require particular audit frequencies.

Figure 2. Example of a Layer-Frequency Layered Process Audit Strategy

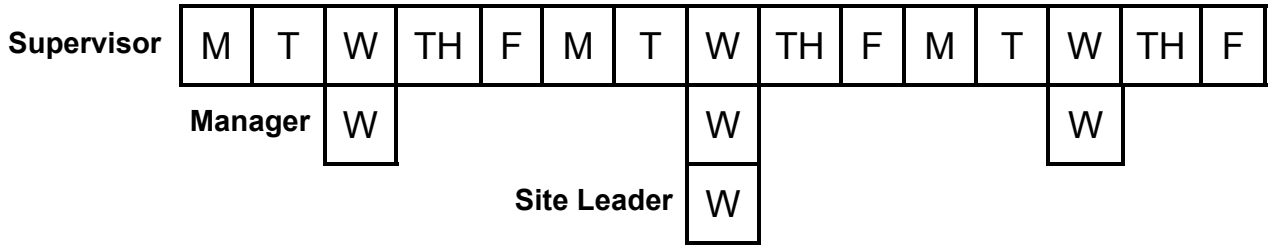


Figure 2 above shows the following plan:

Operators and Supervisors will conduct the Layered Process Audit daily.

The Department Manager will conduct the Layered Process Audit weekly on Wednesday.

The Site Leader will conduct the Layered Process Audit every three weeks on Wednesday.

Audit frequency may also vary depending on the audit item. For example, daily auditing should be done to verify that error-proofing/error-detection equipment verification was completed. Therefore, organizations should plan their Layered Process Audit frequency considering the type of audit items.

Table 2B shows an example of a Layered Audit Process area coverage plan.

Table 2B. Example of a Layered Process Audit Plan Showing Audit Areas (additional areas for higher levels of each layer), Audit Layers, and Audit Frequency

Areas of potential risk		Shift		Daily		Weekly			Monthly		Quarterly	Annually
		Operator	Q.A. Inspector	Team Leader	Supervisor	Plant Manager	Q.A. Manager	Operations Manager	Executive Manager	Director	President	CEO
Part / Product												
	Error-Proofing Verification											
	First-Piece Inspection											
	Last-Piece Inspection											
	Standard Work Instructions											
	Operator Tracking Sheets											
	Safety Issues											
Process												
	Set-up											
	SPC Compliance											
	Tooling Approval											
	Quality Data											
Facility												
	Preventive Maintenance											
	Calibration											
	Lot Traceability											
	Housekeeping											
Voice of the Customer												
	Customer Data Posted											
	Action Plans Updated & On-time											
	Customer Isues Posted											
	Customer Delivery Performance											
	Environmental											

2.4 Audit Non-conformance Reaction

Just as with quality audits or process control plan checks, Layered Process Audits must have defined reaction plans for any non-conformances found.

Reaction plans for Layered Process Audit non-conformances must be documented and must be available for reference and use by the auditor. All non-conformances must be addressed using the appropriate defined reaction plan and documented by the auditor.

A reaction plan is a validated method for 100 percent containment of the particular identified non-conformance. Reaction plans are typically developed before the planning stage of the Audit and are often based on previously addressed non-conformances.

As an example, a Layered Process Audit reaction plan may have two steps: 1) Notify the supervisor for immediate action (e.g., containment), and 2) Notify the responsible manager for long-term action. The reaction plan is typically documented as part of or an attachment to the Layered Process Audit check-sheet.

More information regarding Layered Process Audit reaction plans can be found in section 5.0 of this document.

2.5 Audit Ownership

Layered Process Audits are not an additional audit carried out by the Quality Department. Furthermore, they are not controls that should be included in a process control plan. Layered Process Audits serve to verify that critical procedures and processes are followed by the various functions within an organization. The Audits ensure that defined methods and work instructions are used and that implemented corrective actions are sustained.

Due to the scope and purpose of Layered Process Audits, operations management of the areas where the Audits are conducted must own the process. Operations managers must ensure the following:

- Layered Process Audits are conducted on time.
- Layered Process Audits are conducted by the designated team members.
- The results are recorded and reviewed regularly.
- Resources are available and focused on corrective actions for the non-conformances identified.

3.0 CONDUCTING LAYERED PROCESS AUDITS

Once the audit items, non-conforming reaction plans, audit layers, and audit frequencies have been determined, the trained auditors (trained based on the material in this Guideline along with applicable Customer Specifics) can begin conducting Layered Process Audits. A significant part of the audit process is ensuring that the Audits are performed according to schedule and that the results of the Audits are recorded.

3.1 Discipline in Conducting Audits

It is imperative that management instills discipline early in the process to complete Audits according to schedule. Consistency drives discipline within the organization and shows management's commitment to the Layered Process Audits.

3.2 Recording Results

The results of all Layered Process Audits should be recorded and maintained. The purpose of these Audits is to ensure continuous conformance to the process; however, it is also useful for driving continuous improvement by implementing corrective actions that correspond to Layered Process Audit non-conformances.

3.3 When a Non-conformance Is Found

Non-conformances should be viewed as opportunities for improvement.

When a non-conformance is found, the auditor should refer to the documented reaction plan for direction and take immediate containment reaction. The auditor documents the specific reaction plan implemented to contain the non-conformance.

The organization should follow the established corrective action procedure to resolve, document, and report to management all non-conformances found as a result of Layered Process Audits.

3.4 Corrective Action Plans

The organization should use its established Corrective Action process to resolve the discovered non-conformances. The status of the corrective actions should be tracked to ensure that all issues are resolved in a timely manner. Management should review the status of all corrective actions and provide support and resources when necessary. Implemented corrective actions should be permanent, should address the root cause of the non-conformance, and should validate prevention of recurrence. When possible, corrective actions for Layered Process Audit findings should be consolidated and coordinated to minimize the confusion possible when there are multiple changes within the affected area.

4.0 REVIEWING LAYERED PROCESS AUDIT RESULTS

Management should conduct scheduled reviews of Layered Process Audit results. These reviews show management's commitment to the Audits and may also provide management the opportunity to monitor the impact of the Audits on the organization's business metrics (e.g., First-Time Capability, scrap, rework, etc.). Management review of Layered Process Audits supports ISO/TS16949:2000, Section 5.6.2a, Review Inputs: Results of Audits.

Examples of management review reports of Layered Process Audit results are shown below in Figures 4A and 4B below.

Figure 4A.Example of Layered Process Audit Results – Summarizing Planned vs. Actual Layered Process Audits by Management Level and Month

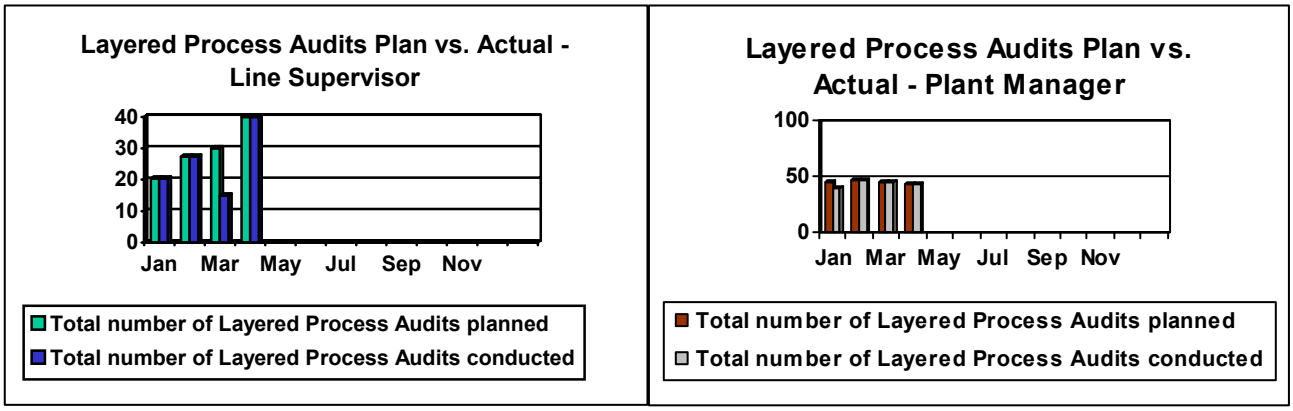
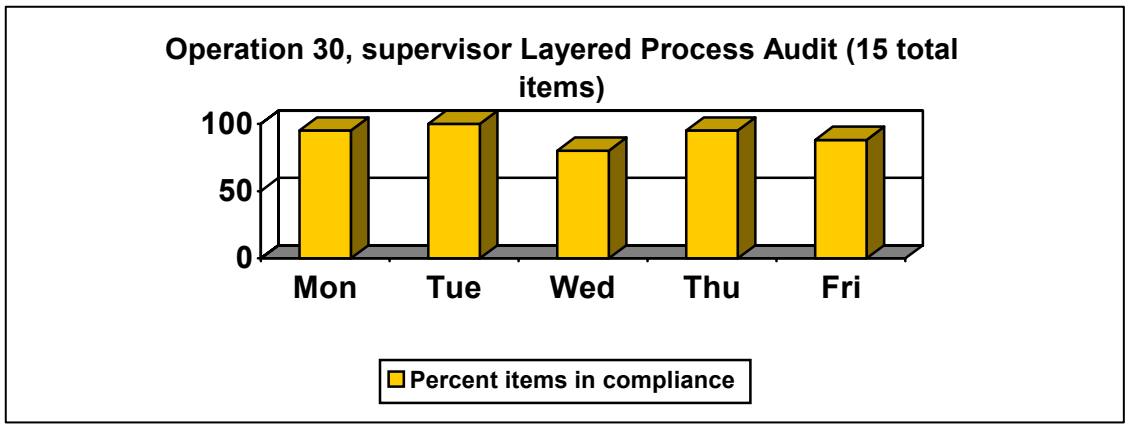


Figure 4B.Example of Layered Process Audit Results – Percent of Audited Items in Compliance



A Layered Process Audit should be designed to detect non-conformances. Therefore, if an Audit continually shows very high compliance, the questions may need to be re-evaluated or the focus changed as part of the maintenance of the Audits.

The ongoing review of Layered Process Audit results should be structured in such a way that systemic issues within the organization can be identified and corrected across the entire organization.

5.0 MAINTAINING LAYERED PROCESS AUDITS

The items in a Layered Process Audit must be reviewed regularly by the organization. This review is necessary to ensure that the Audit check-sheet continues to include those items that are critical to quality.

5.1 Managing the Items on a Layered Process Audit

The items in a Layered Process Audit should drive processes to meet the customers' requirements. Managing the items is a necessary part of an effective Layered Process Audit program.

5.1.1 Adding or Changing Layered Process Audit Items

Items can be added to or changed in a Layered Process Audit in situations such as the following:

- New customer requirements
- New or modified processes or procedures in the organization that are critical to product quality
- Corrective actions to address experienced quality issues (see section 5.2)
- "Critical to Quality" items that must be communicated to all stakeholders
- New process setup requirements
- Verification of corrective actions taken in response to previous Layered Process Audit findings

5.1.2 Deleting Layered Process Audit Items

Items can be deleted from a Layered Process Audit in situations such as the following:

- Automated equipment replaces a previously manual-dependent operation.
- Error-proofing is added to an operation.

Careful analysis must be made before an item is deleted from the Layered Process Audit. Even if a piece of equipment replaces a manual operation, there might be items related to the equipment that could be added to the Audit in place of the old item (e.g., automatic gauging of part features could require a new error-proofing verification). Customer-specific requirements should be referenced and the customer contacted before deleting any Layered Process Audit item.

5.2 Adding Corrective Actions to Layered Process Audits

One of the most important benefits of Layered Process Audits is that they provide an organization with a means to sustain corrective actions, lessons learned, best practices, etc. The primary purpose of a Layered Process Audit is to ensure that key steps of procedures and/or processes are followed.

If a quality issue resulted from a failure to follow some procedure or process, adding that procedure or process step to the Layered Process Audit item list is a means to ensure that it is followed in the future. In addition, layers of management reviewing the specific steps will emphasize to everyone the importance of the requirements.

5.3 Auditing Compliance to Layered Process Audit Requirements

An organization that implements Layered Process Audits should regularly verify that all Audits have been effectively used and implemented. (This could be part of the Quality Management System audit).

Customers who mandate Layered Process Audits in one form or another will audit this compliance themselves, have the audit conducted by an approved third party, or require documentation from the organization showing Layered Process Audit process compliance.

This verification is not focused on the items that an Audit is to verify. Rather, this compliance check is to verify that the organization's Layered Process Audit system meets all requirements (see Table 5 below for an example check-sheet).

Table 5. Example of Auditing Compliance to Layered Process Audit Requirements

Question	Evidence Required	Example of What to Look For	Comments
Is there a system in place to verify the documented manufacturing/ assembly process through Layered Process Audits?	Checklist of high-risk items (customer-used features) audited a minimum of once per shift.	Completed Audits at a frequency of once per shift performed by operator or inspector.	
	Evidence and documentation of immediate corrective action for nonconformance.	Audit check-sheet, Audit work instructions, internal corrective actions.	
	Where appropriate, Standardized Work is verified though Layered Audits.	Layered Audit check-sheet.	
	Layered Audit procedure requires daily verification of quality documentation by a supervisor.	Completed Audits at a frequency of once per day performed by a supervisor or lead person.	
	Procedure requires upper management to audit part, process, system, and voice of the customer.	Completed Audits are performed by managers demonstrating their assessment of manufacturing, quality documentation, process parameters, systems, and customer activities.	
	System exists to document results and communicate to management.	Layered Audit tracking forms, posted Audit results, management review notes, action items, or meeting agenda.	
	Layered Audit issues are used to update company-wide processes.	Completed lessons learned forms that reflect Layered Audit results, nonconformance process updates.	

6.0 SUMMARY

Industry data show that the majority of manufacturing quality issues are caused by poor process control or by a failure to follow the appropriate process instructions.

Effective management of process capability requires identifying sources of both special and common cause variation. Once the sources are identified, the corrective actions designed to address them must be effectively implemented and sustained. Unfortunately, these corrective actions are often not sustained or worse, the basic process steps are not followed.

Layered Process Audits have been demonstrated to be an effective tool to ensure that key ("Critical-to-Quality") process steps are followed and corrective actions are sustained.

Layered Process Audits are especially effective in sustaining process improvements and institutionalizing key process steps because all levels of the organization participate--from operators through to senior managers. Managers often can learn much about the manufacturing processes from operators, and operators can learn much about what is important to customer satisfaction from managers. Layered Process Audits facilitate this two-way communication.

Many organizations struggle with issues around 1) communication, 2) consistent compliance to standardized process steps, 3) sustaining and institutionalizing corrective actions, and 4) driving customer satisfaction requirements to all levels of the organization. Layered Process Audits, when implemented as described in this Guideline, address all these issues.

ABOUT AIAG

Purpose Statement

To provide an open forum where members cooperate in developing and promoting solutions that enhance the prosperity of the automotive industry. Our focus is to continuously improve business processes and practices involving trading partners throughout the supply chain.

Core Values

- **People –** Our strength comes from passionate and personally committed volunteers and staff. We provide an environment of integrity, trust, teamwork, and mutual respect to foster open, frank communication as we achieve consensus on industry needs and solutions.
- **Innovation –** With a sense of urgency, we drive and support the development and implementation of common, leading-edge solutions that provide value to the automotive industry and its customers.
- **Excellence –** We provide quality and excellence in all we do and how we do it.

We do what's right for the industry!

AIAG Organization

AIAG is made up of a board of directors, an executive director, associate directors, a full-time staff, and volunteers serving on projects. Under the direction of the executive director, the department managers, and program managers, plan, direct, and coordinate the association's activities.

AIAG Projects

Volunteer committees focus on business processes or supporting technologies and methodologies. They conduct research and develop, publish, and provide training on standards, conventions, standard business practices, guidelines, and guidelines in the areas of automatic identification, CAD/CAM, EDI/electronic commerce, continuous quality improvement, materials and project management, returnable containers and packaging systems, and transportation/customs.

AIAG - An Association Fostering Total Supply Chain Partnering

Automotive Industry Action Group
26200 Lahser Road, Suite 200
Southfield, MI 48034
Phone: (248) 358-3570 • Orders: (248) 358-3003 • Fax: (248) 358-3253

MAINTENANCE REQUEST

If you find an error or other changes that should be made to this publication, please complete this form and return it to the address below.

PLEASE PRINT OR TYPE

Name of Submitter: _____ **Date:** _____

Company: _____

Company Address: _____

Phone:_____ **Fax:** _____ **E-mail:**_____

MAINTENANCE REQUEST (Use additional sheets if necessary)

Page Number of Change: _____

Document Currently Reads: _____

_____

_____

Recommended Changes/Should Read:_____

_____

_____

Recommended Additions: _____

_____

_____

Reason for Change:_____

_____

Signature of Submitter:_____

DISPOSITION (AIAG use only) – Completed forms are filed in the final document maintenance file.

Program Owner Assigned to:_____ **Log #:**_____

Program Owner's Recommendation: _____

_____

Final Disposition:_____

_____

Comments:_____

_____

Send completed form to the Publication Specialist at:

Automotive Industry Action Group • 26200 Lahser Road • Suite 200 • Southfield, MI 48034
Telephone: (248) 358-3570 • Fax: (248) 358-3253
www.aiag.org