

7.0 LAYERED PROCESS AUDITS

*Were Leadership Layered
Process Audits
Performed?*



LAYERED PROCESS AUDITS

Outline

- 7.0) Introduction page: Purpose, Scope, Responsibility
- 7.1) Benefits
- 7.2) Process explanation
 - 7.2.1) Schedule and tracking
 - 7.2.2) Develop high risk items for auditing
 - 7.2.3) Layered Process Audit Check sheet Concept
 - 7.2.4) Layered Process Audit Check sheet Evaluation
 - 7.2.5) Countermeasure sheet
 - 7.2.6) Management Review Requirements
- 7.3) Summary, Shalls



LAYERED PROCESS AUDITS

7.0 -

Introduction PURPOSE:

- Ensure consistent application and execution of standards.
- Improve built-in-quality and increase operator/leadership awareness facilitated by coaching/teaching interaction between leadership & operators

SCOPE:

- Assembly Area
- Manufacturing Operations
- Shipping / Receiving
- All Operations
- Other Support Functions

RESPONSIBILITY:

- Ownership
 - ✓ Plant / Operations Mgr
- Contingency Plan for All Situations

LAYERED PROCESS AUDITS

7.1 - Benefits

- Layered Process Audits provide a system to:
 - verify compliance to the documented process.
 - instill discipline.
 - improve communication.
 - improve overall quality.
- Ensures a high level of process control by identifying & controlling high risk / significant process elements.
- Maintains proper application of standards as defined & achieved through operational readiness process.
- Identify opportunities for improvement & provide a process for effective follow up.

LAYERED PROCESS AUDITS

7.2 - Process explanation

- Layered Process Audit (LPA) is a standardized audit performed on a regular, frequent basis by all layers of the organization to verify adherence to operational standards.
- LPA's are an industry standard.
- LPA's supplement ongoing control plan and job instruction checks.
- LPA's shall be owned by manufacturing leadership (Team Leader – Plant / Operations Manager).
- Quality and other functions will participate and support the LPA system.



LAYERED PROCESS AUDITS

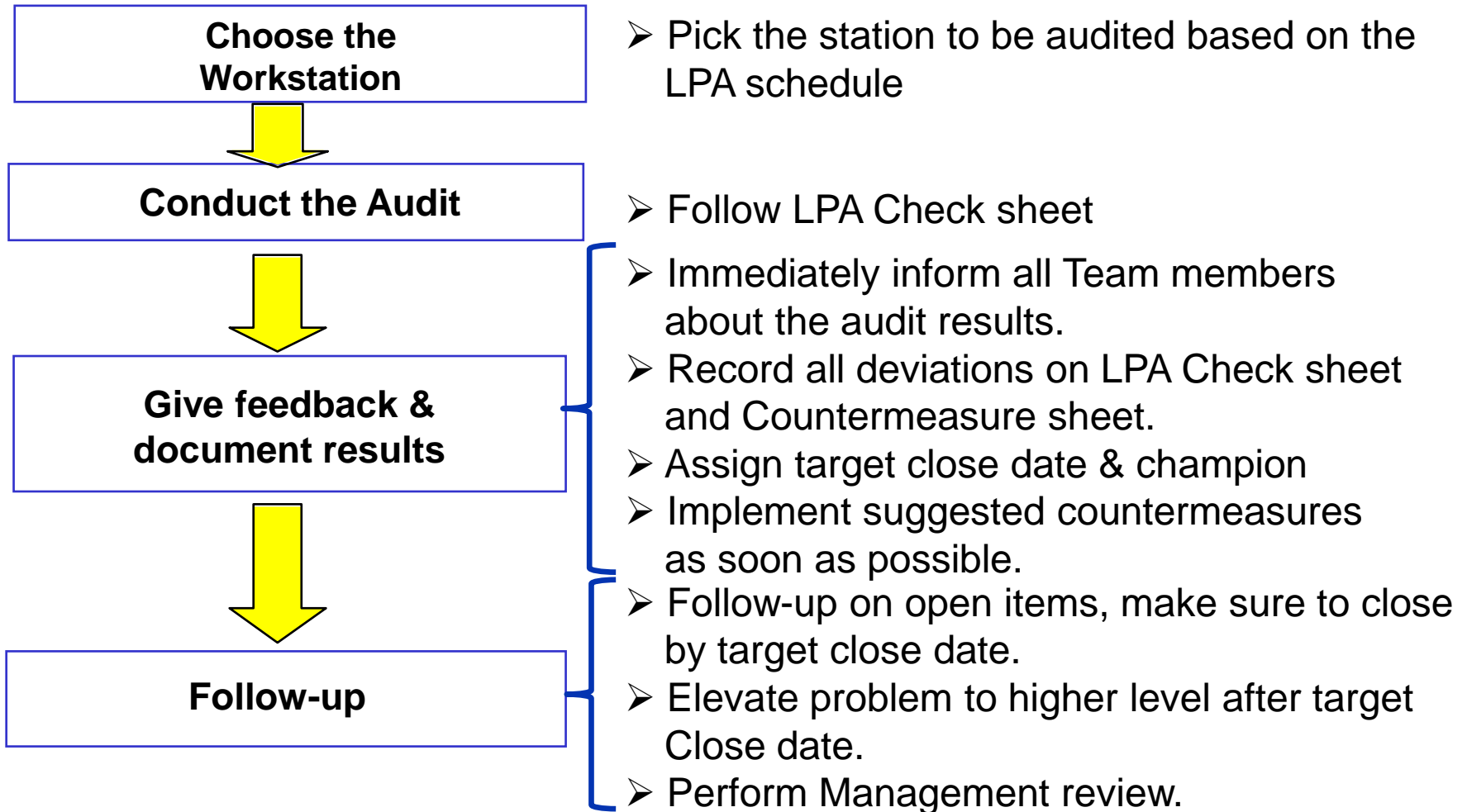
7.2 - Process explanation (continued)

- **The Layered Process Audit system includes:**
 - Schedule and tracking of audits.
 - Identifying high risk items for the LPA.
 - A LPA Checklist that evaluates current processes to established standards.
 - Identification of corrective action requirements and countermeasures.
 - Regular review process by senior management of the audit results and corrective actions.



LAYERED PROCESS AUDITS

7.2 - Process explanation (continued)



LAYERED PROCESS AUDITS

7.2.1 - Scheduling and tracking

- Define the organization levels to perform audits.
- Define audits frequency for each level of the organization.

Layered Process Audits levels & frequency:

- Daily, the manufacturing supervisor shall perform audits.
- Weekly, the manufacturing area manager shall audit & verify that supervisor verification is being completed.
- Monthly, the site leadership shall conduct Layered Process Audits and review audit results and corrective actions.

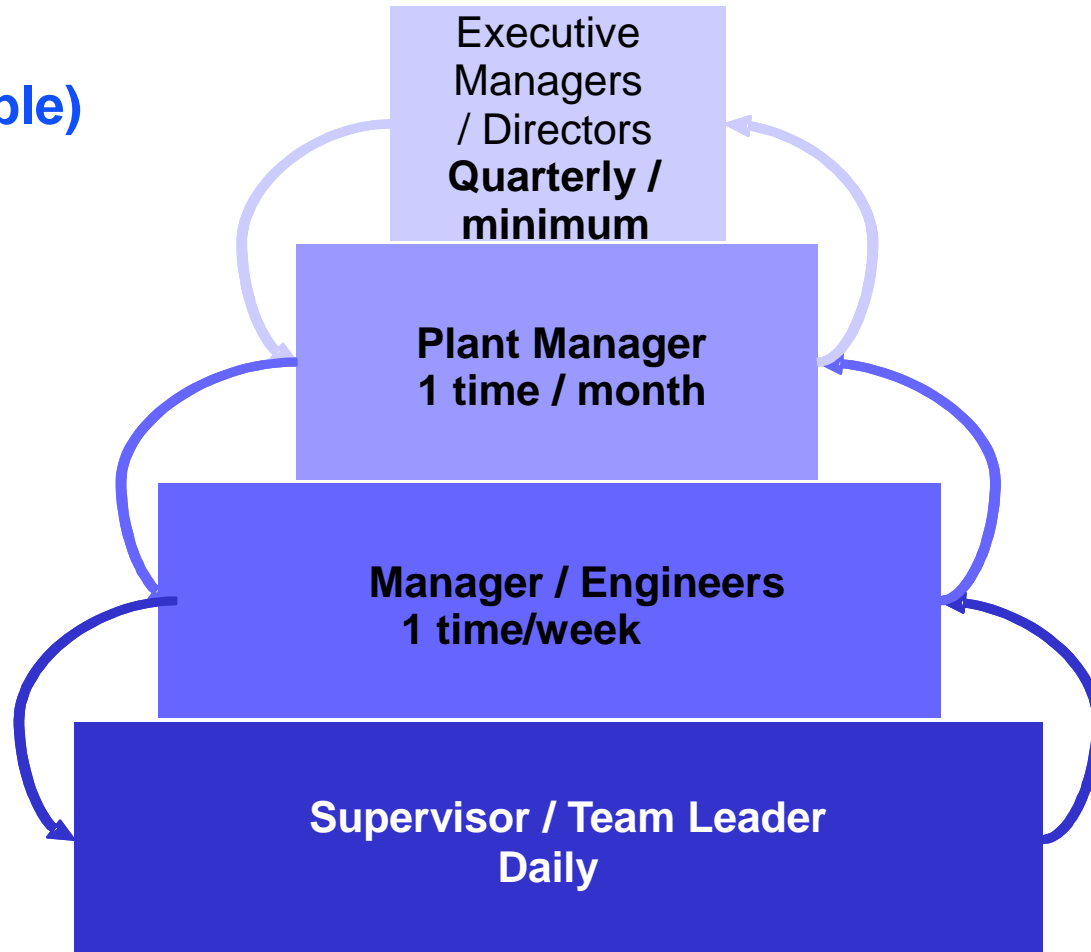


LAYERED PROCESS AUDITS

7.2.1 - Scheduling and tracking

(continued)

(Example)



LAYERED PROCESS AUDITS

7.2.1 - Scheduling and tracking (continued)

The example at the right is another way to ensure each station within a work area is evaluated at a minimum, on a monthly basis. This chart is used by all auditors to determine which stations have not yet been audited and requires the auditor to write down their name, date, and shift for the stations they chose for the audit.

The goal is to audit each work station where a team member is present one time each month.

**Instrument Panel Layered Audit
Workstation Sign-off Layout**

#00 Mod Plate Prep <i>Steve Lawson 1-11 Miaa Machine 1-11</i>	#09 Retainer Fastening	#23 Speakers
Marriage Station	#11 Glove Box Prep.	Q-2
#1 Load Mag Beam	#12 Install Glove Box	S/L Verification <i>Due Corman 1-14-06</i>
#2 Blower install	Radio Prep.	REPAIR
#3 Airbag install	#14 Radio Install	Q-Final
#4 wire harness install	#15 Ashtray / HVAC install	Off-Load
#5 Air Ducts	#16 Cluster -gages	Start Date: 01/04/06
#6 GPS Antenna	#17/18 Steering Column	End Date: 01/31/06
#7 Park Brake	#19 Park Brake	Select a station that has not been audited and <u>sign your name</u> , <u>date</u> , and the <u>shift you are auditing</u>
Q-1	#20 Brackets (Pick Lights)	
Retainer Prep.	#21 Torque Knee bolster	
#8 Install Retainer	#22 Center Stack	

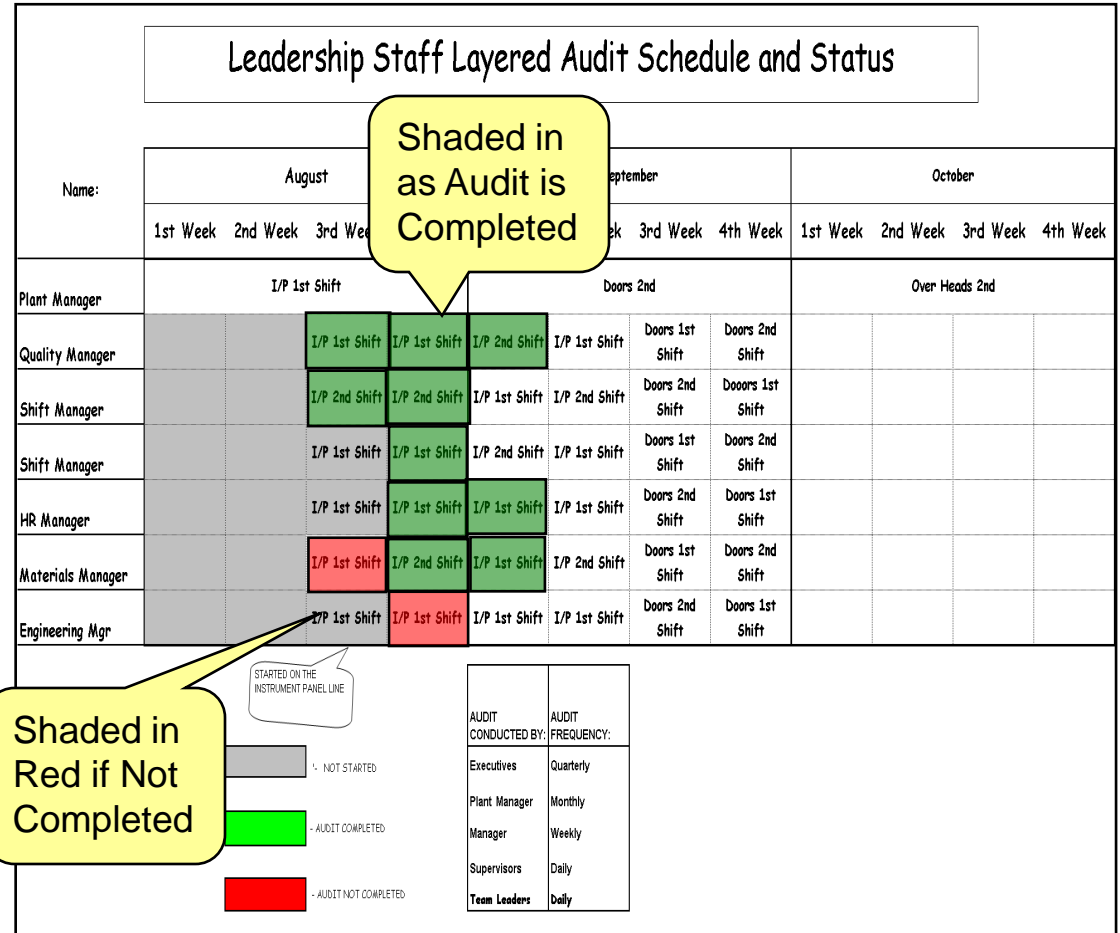
(Example)

LAYERED PROCESS AUDITS

7.2.1 - Scheduling and tracking (continued)

(Example)

Identifying Audits to be completed by the leadership staff is essential to ensure that all areas on the shop floor interact with the management team. An example schedule at the right addresses both the required frequency by manager and the status of this interaction.



LAYERED PROCESS AUDITS

7.2.2 - Development of high risk items for auditing

High risk items shall be identified and included in the audit.

They should be organized by 3 main sections:

- Work Station– list of checks, applicable to all work stations
- Quality Focused – checks are specific to operations and developed by plant, based on quality feedback, process knowledge, and problem solving
- Manufacturing System – list of system checks that focused on compliance to plant operations



LAYERED PROCESS AUDITS

7.2.2 - Development of high risk items for auditing (continued)

Examples of Work Station issues:

- Ensuring proper safety practices and PPE are being followed.
- Ensuring proper tools, gages and materials are available & used.
- Ensuring *standardized work* & quality standards are understood & followed.
- Ensuring Andon system is functioning properly.
- Ensuring Workplace Organization & Visual Management standards are maintained (e.g. according to the plant WPO standards and Visual Management policy).
- Ensuring compliance to Material Processes – FIFO/Min.-Max. levels.

LAYERED PROCESS AUDITS

7.2.2 - Development of high risk items for auditing (continued)

Examples of Quality Focused issues :

- Specific to a Product Line or Area of the plant
- Specific items regarding corrective action implementation to customer concerns. (e.g. *error proofing* verification, use of fixture added to complete *standardized work*)
- Ensure *error proofing* is functioning properly and identified high risk/ significant process elements are controlled to prevent known problems from reoccurring.
- Ensure required quality inspection and/or documentation is being completed.



LAYERED PROCESS AUDITS

7.2.2 - Development of high risk items for auditing (continued)

Examples of Manufacturing System issues :

- Completion of safety talks & tours
- Compliance to Process Control Plans
- Conformance to Workplace Organization standards
- Proper use of the Andon System
- Effective Problem solving & countermeasure implementation
- Effective use of Layered Process Audits process for control and follow up

Verification that special process audits are performed shall be included as applicable. (e.g. CQI 9, 11, 12, Weld Audit, Chrome Audit, Paint Process Audit)



LAYERED PROCESS AUDITS

7.2.3 - LPA Check sheet

- **LPA results are documented on LPA Check sheet .**

The intent is to have a single page LPA Check sheet form that is manually completed on production floor. The back side of the form is available to write down the non-compliance comments.

- **Establish LPA Check sheet questions from the high risk items.**
 - A LPA Check sheet should have two common sections (Work Station and Manufacturing System) and one section (Quality Focused), that is customized to a specific Product Line or Area of the Plant.
 - Work Station and Quality Focused sections of the LPA Check sheet shall be completed by all auditors. The Manufacturing System section shall be completed by the site leadership only.
 - A LPA Check sheet should be created for each unique processing area



LAYERED PROCESS AUDITS

7.2.3 - LPA Check sheet (continued)

(Example)

LAYERED VERIFICATION CHECK SHEET		Date:
SYSTEM: INSTRUMENT PANELS		Start:
Reviewer:	Supervisor/Mgr.:	
Works Station:	Team Leader:	
Section #1: WORK STATION SPECIFIC		
BT	1	Is the team member using all the posted Personal Protective Equipment?
BT	2	Is the Job Station Log present & up to date? (Employee's Station ID# Information)
BT	3	Has the team member been qualified for requirements of the job and is this documented? (operator or Worker/Training)
BT	4	Is the work station safe, neat, clean & orderly? (everything in its place per work place organization standards, 5S/WPQ)
BT	5	Are all items up to date at the work station? (Standardized Work, Quality Alerts, etc.)
BT	6	Is standardized work being followed as defined by the Standardized Work Documents at Work Station (LBS/WPQ) and does the Team Member have a good understanding of the WHY-RT-RO-Why-Point-Reasons WHY - minimum 3 cycles
BT	7	Is the Pink Tag Process being used for ALL repairs?
BT	8	Are the correct tools and gauges present, in use and in Standardized Work?
BQ	9	Are the product quality standards clear, available & followed? (Boundary samples, etc)
BQ	10	Does the team member know the quality standards of the job, key points & reasons for major steps?
BQ	11	Do you know what the customer concerns are? (What are the 0-stations checking for from your station)
BQ	12	Are Team Members working ahead out of footprint? (check for parts accumulating on the floor, racks etc.)
BQ	13	Are all process checks being performed & documented? (Error Proofing, Torque gun & Scanner Utilization)
BLT	14	Are the blue parts located in clearly visible containers (Tray or pan) and all the way around the container, clearly labeled?
BLT	15	Are the material flow racks, piers, FIFO & turn tables labeled with correct part numbers on the operator & side side and is the correct part in the container?
BLT	16	Check for MIN/MAX compliance & is material being used in a FIFO (First In First Out) sequence?
CI	17	Is the call for help (Andon) system working properly (e.g., station light, music, paging system, telephone, radio, etc.)?
CI	18	Are start up & end of shift checks defined and performed?
Section #2: SYSTEM SPECIFIC (CUSTOMER & PROCESS HIGH RISK ISSUES DRIVEN BY THE FAST RESPONSE REVIEWS)		
BQ	1	Marriage Station - Verify that the Tunnel track/line or pooling is working and being verified on both side?
BQ	2	Station #14 - Verify that the wire connections are being installed correctly? (as PUSH-CLICK-TUG being performed)
BQ	3	Station #14 - Verify that the GPS antenna Standardized work is being followed? (customer has sound mixing error)
BQ	4	Station #12 - Verify that the line label on glue box is following Standardized Work? (Sponge Box & force gauge being used)
BQ	5	Station #14 - Verify that the Radio/earpiece connections are fully seated & marked? (as PUSH-CLICK-TUG being performed)
BQ	6	Station #16 - Verify that the installation of Ashtray is following Standardized Work? (does it open easily?)
BQ	7	Station #22 - Verify that the installation of Center Stack is being installed correctly? (cracks, gap, etc)
Section #3: MANUFACTURING SYSTEM SPECIFIC		
BT	1	Are the flexibility charts up to date? (Training Matrix)
BT	2	Are the Layered Audit being performed by all levels of the organization?
BT	3	Are work place organization standards being followed (e.g., all parts/containers in station have a designated space)?
BQ	4	Are the process control plans up to date & followed?
BQ	5	Randomly Audit past closed PRSR for corrective action implementation (document PRSR# _____)
BQ	6	Is material properly identified in the work area with suspicion-confirming material isolated?
BQ	7	Are Post-Action meetings taking place and all records up to date?
BQ	8	Does evidence (sign in sheet, data charts, etc) at the verification station board indicate that meetings are taking place as scheduled and that appropriate assignments follow up is taking place?
BLT	9	Is FIFO (First In First Out) material management being followed?
BLT	10	Are the minimum/maximum direct material quantities in compliance?
CI	11	Is the call for help (Andon) system implemented to achieve communication of manufacturing problems?
CI	12	Do people respond accordingly to the escalation process, and are VS station immediate Response Logs being used?
CI	13	Are call for help (Andon) system data posted & utilized in the problem solving process?
CI	14	Are Business metrics on the Shop Floor properly marked & up to date (specify area that was audited)?
CI	15	Do Business metrics countermeasures correspond to red items and are they tracked & show appropriate follow up?
CI	16	Are problem solving forms posted, has team developed corrective actions & do forms show appropriate follow up?
CI	17	Are layered audit results incorporated into the layered audit countermeasure process?
No. _____		
Comments: _____		
Supervisor/Mgr. Review and sign off: _____ Date: _____		
Rating: <input type="radio"/> Meets Standard <input type="radio"/> Question Found <input type="radio"/> N/A - Not Applicable <input type="radio"/> Total Deviations: _____		

**HEADER: Enter the System Name
Product line or an area of the Plant**

1. Molding
2. Paint/Coating
3. Assembly
4. Warehouse/Shipping

**Section #1:
COMMON Work Station Questions**

**Section #2:
UNIQUE Quality Focused Questions**

**Section #3:
COMMON Manufacturing System Questions**

In this Example the Manufacturer would have (4) four unique one page audit forms/files, to cover all processes.

LAYERED PROCESS AUDITS

7.2.3 - LPA Check sheet (continued)

Header & Work Station Specific

(Example)

LAYERED VERIFICATION CHECK SHEET		Date: _____	
SYSTEM: INSTRUMENT PANELS		Shift: _____	
Reviewer: _____		Supervisor/Mgr.: _____	
Workstation: _____		Team Leader: _____	
Section #1: WORK STATION SPECIFIC			
PI	1	Is the team member using all the posted Personal Protective Equipment?	
	2	Has the team member been qualified to requirements of the job and is this documented?	
	3		
4			
STD	5		
	6	Is standardized work being followed as defined by the the Standardized Work Documents at Workstation, (LBS/PADS) and does the Team Member have a good understanding of the WHAT-HOW-Key-Points-Reasons WHY - minimum 3 cycles	
	7	Is the Pink Tag Process being used for ALL repairs?	
	8	Are the correct tools and gages present, in use and in Standardized Work?	
BIQ	9	Are the product quality standards clear, available & followed? (Boundary samples, etc.)	
	10	Does the team member know the quality standards of the job, key points & reasons for major steps?	
	11	Do you know what the customer concerns are? (What are the Q-stations checking for from your station)	
	12	Are Team Members working ahead out of footprint? (check for parts accumulating on the floor, racks etc.)	
	13	Are all process checks being performed & documented? (Error proofing, torque gun & scanner validation)	
	14	Are Defective parts located in clearly visible containers (Taped or painted red all the way around the container, clearly tagged)	
SLT	15	Are the material flow racks, risers, lift & turn tables labeled with correct part numbers on the operator & aisle side and is the correct part in the container?	
	16	Check for MIN/MAX conformance & Is material being used in a FIFO (First In First Out) sequence?	
CI	17	Is the call for help (Andon) system working properly (e.g. station light, music, paging system, telephone, radio etc.)?	
	18	Are start up & end of shift checks defined and performed?	



LAYERED PROCESS AUDITS

7.2.3 - LPA Check sheet (continued)

Quality Focused & Manufacturing System

(Example)

Section #2: SYSTEM SPECIFIC (CUSTOMER & PROCESS HIGH RISK ISSUES driven by the FAST RESPONSE REVIEWS)		
BIQ	1	Marriage Station - Verify that the Tunnel bracket error proofing is working and being verified on both shifts?
	2	Station #4 - Verify that the wire harnesses are being installed correctly? (is PUSH-CLICK-TUG being performed)
	3	Station #6 - Verify that the GPS antenna Standardized work is being followed? (Customer has found missing antennas)
	4	Station #12 - Verify that the installation of glove box is following Standardized Work? (is Sponge Bob & force gage being used)
	5	Station #14 - Verify that the Radio/harness connections are fully seated & marked? (is PUSH-CLICK-TUG being performed)
	6	Station #15 - Verify that the installation of Ashtray is following Standardized Work? (does it open easily)
	7	Station #22 - Verify that the Installation of Center Stack is being installed correctly? (Cracks, gap, etc.)
Section #3 MANUFACTURING SYSTEM SPECIFIC		
PI	1	Are the flexibility charts up to date? (Training Matrix)
	2	Are the Layered Audits being performed by all levels of the organization?
	3	Are work place organization standards being followed (e.g. all parts/tools/jigs in station have a designated space)?
BIQ	4	Are the process control plans up to date & followed?
	5	Randomly Audit past closed PR&R for corrective action implementation (Document PR&R# _____)
	6	Is material properly identified in the work area with suspect/non-conforming material isolated?
	7	Are Fast Response meetings taking place and all records up to date?
	8	Does evidence (sign in sheet, data charts, etc) at the verification station board indicate that meetings are taking place as scheduled and that appropriate assignments / follow up is taking place?
SLT	9	Is FIFO (First In First Out) material management being followed?
	10	Are the minimum/maximum direct material quantities in compliance?
CI	11	Is the call for help (Andon) system implemented to achieve communication of manufacturing problems?
	12	Do people respond accordingly to the escalation process, and are VS station Immediate Response Logs being used?
	13	Are call for help (Andon) system data posted & utilized in the problem solving process?
	14	Are Business metrics on the Shop Floor properly marked & up to date (specify area that was audited)?
	15	Do Business metrics countermeasures correspond to red items and are they tracked & show appropriate follow up?
	16	Are problem solving forms posted, has team developed corrective actions & do forms show appropriate follow up?
	17	Are layered audit results incorporated into the layered audit countermeasure process?



LAYERED PROCESS AUDITS

7.2.4 - LPA Check sheet

Evaluation

- There are four results that can come out of each audit question:
- Y – No deviation found
 - N – Deviation found / not corrected during audit
 - NC – Deviation corrected during audit – drive this behavior
 - N/A – Not applicable (established at Plant/Shift Leader level)
- All Deviations shall be recorded on the LPA Check sheet .
 - Describe deviations in the detail section on the back of the LPA Check sheet
 - Any Deviations that can be corrected immediately will have a letter 'C' next to N.
 - Any Deviations that cannot be immediately corrected should have additional detail written and transferred to a Countermeasure Sheet.
 - Reasons for non-compliance should be understood.

LAYERED PROCESS AUDITS

7.2.4 - LPA Check sheet

Evaluation

LAYERED AUDIT CHECK SHEET		Date: _____
SYSTEM: INSTRUMENT PANELS		Shift: _____
Reviewer: _____	Supervisor/Mgr.: _____	
Workstation: _____	Team Leader: _____	
Section #1: WORK STATION SPECIFIC		
1	Is the team member using all the posted Personal Protective Equipment?	
2	Is the Job rotation log present & up to date? (Employee Station Shift Information)	
3	Has the team member been qualified to requirements of the job and is this documented? (operator certification/training)	Y
4	Is the work station safe, neat, clean & orderly? (everything in it's place per work place organization standards, 5S-WPO)	
5	Are all forms up to date at the workstation? (Standardized Work, Quality Alerts, etc.)	
6	Is standardized work being followed as defined by the the Standardized Work Documents at Workstation, (LBS/PADS) and does the Team Member have a good understanding of the WHAT-HOW-Key-Points-Reasons WHY - minimum 3 cycles	
7	Is the Pink Tag Process being used for ALL repairs?	NC
8	Are the correct tools and gages present, in use and in Standardized Work?	
9	Are the product quality standards clear, available & followed? (Boundary samples, etc.)	
10	Does the team member know the quality standards of the job, key points & reasons for major steps?	
11	Do you know what the customer concerns are? (What are the Q-stations checking for from your station)	
12	Are Team Members working ahead out of footprint? (check for parts accumulating on the floor, racks, etc.)	
13	Are all process checks being performed & documented? (Error proofing, torque gun & scanner validation)	
14	Are Defective parts located in clearly visible containers (Taped or painted red all the way around the container, clearly tagged)	
15	Are the material flow racks, risers, lift & turn tables labeled with correct part numbers on the operator & aisle side and is the correct part in the container?	
16	Check for MINMAX conformance & Is material being used in a FIFO (First In First Out) sequence?	
17	Is the call for help (Andon) system working properly (e.g. station light, music, paging system, telephone, radio etc..)?	
18	Are start up & end of shift checks defined and performed?	
Section #2: SYSTEM SPECIFIC (CUSTOMER & PROCESS HIGH RISK ISSUES driven by the FAST RESPONSE REVIEWS)		
1	Marriage Station - Verify that the Tunnel bracket error proofing is working and being verified on both shifts?	
2	Station #4 - Verify that the wire harnesses are being installed correctly? (is PUSH-CLICK-TUG being performed)	
3	Station #6 - Verify that the GPS antenna Standardized work is being followed? (Customer has found missing antennas)	
4	Station #12 - Verify that the installation of glove box is following Standardized Work? (is Sponge Bob & force gage being used)	
5	Station #14 - Verify that the Radio/harness connections are fully seated & marked? (is PUSH-CLICK-TUG being performed)	
6	Station #15 - Verify that the installation of Ashtray is following Standardized Work? (does it open easily)	
7	Station #22 - Verify that the Installation of Center Stack is being installed correctly? (Cracks, gap, etc.)	
8		
9		
10		

(Example)

N = Deviation Found
Y = Meets Standard

**If the item is Corrected
Immediately**



LAYERED PROCESS AUDITS

7.2.5 - Countermeasure Sheet

All questions answered “N” on the LPA Checks sheet that cannot be resolved immediately will be entered on the Countermeasure Sheet as an open item.

- The Countermeasure Sheet tracks the specific open issues on an operation/workstation for each group.
- All questions answered “N” on the LPA Check Sheet that cannot be resolved immediately will be entered on the Countermeasure Sheet as an open item.
- The Countermeasure Sheet will be updated and signed off as issues are resolved.



LAYERED PROCESS AUDITS

7.2.5 - Countermeasure Sheet (continued)

(Example)

Item #	Date	Location	Problem Description	Owner	Countermeasure	Target date	Initials	Complete Date
4	7/7/08	005R	New option Side marker lamp, parts don't have a standard marked location.	TL1	Re-layout work station to include one shift's requirement of lamps.	7/28/08	JC	7/26/08
6	7/7/08	005R	tool for installing drainplugs is different from standard, TM used replacement without informing TL	TL1	get standard tool from store, replace at workstation	8/3/08	RS	



LAYERED PROCESS AUDITS

7.2.6 - Management Review Requirements

• LPA Review Process

- Shift Leader is Process Owner
 - Regularly schedule review meeting
 - Review compliance & completion performance
 - Elevate past due countermeasures to next level
 - Review audit questions for Continuous Improvement (add, delete, revise as needed)
- When appropriate, the Layered Process Audit nonconformance shall be added to the *Fast Response* system and/or the *C.A.R.E.* checklist.
 - Layered Process Audit results shall be added to the *Lessons Learned* database when appropriate.
 - Audit results shall be summarized and reviewed by the manufacturing site leadership.

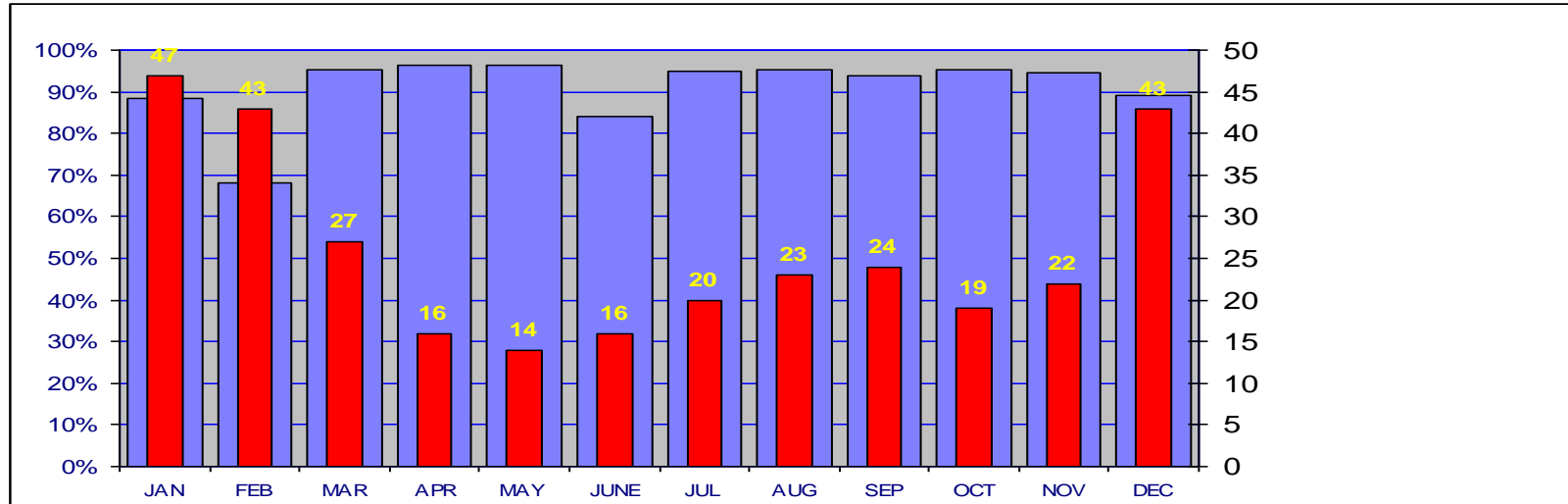


LAYERED PROCESS AUDITS

(Example)

DEPT. _____

LAYERED PROCESS AUDIT RESULTS



	JAN	FEB	MAR	APR	MAY	JUNE	JUL	AUG	SEP	OCT	NOV	DEC
% IN COMPLIANCE:	88%	68%	95%	96%	97%	84%	95%	95%	94%	95%	95%	89%
# OF ITEMS ON ASSESSMENT:	20	15	20	30	20	10	20	25	20	20	20	20
# OF ASSESSMENTS	20	9	28	15	20	10	20	20	20	20	20	20
TOTAL # OF ITEMS ASSESSED:	400	135	560	450	400	100	400	500	400	400	400	400
# OF ITEMS IN COMPLIANCE:	353	92	533	434	386	84	380	477	376	381	378	357
NON CONFORMANCES	47	43	27	16	14	16	20	23	24	19	22	43

NON CONFORMANCES	NUMBER OF ITEMS NOT IN COMPLIANCE											
Safety	10	8	5	2	1	1	1	1	1	1	1	1
Missed Audits	10	8	3	2	3	4	5	2	1	1	1	10
5S Related	2	7	7	3	2	2	2	2	2	2	3	2
Product	10	4	3	2	1	1	1	1	1	1	1	10
Voice of Customer	6	4	2	2	3	4	4	4	3	2	2	10
Systemic	9	7	1	2	2	2	2	2	2	2	2	2
Gage Calibration		5	6	3	2	2	5	6	7	2	2	2
Poke Yoke								5	7	8	10	6

Quality Systems Basics rev March 2009

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LAYERED PROCESS AUDITS

7.3 - Summary, Shalls

Organizations shall...

- ✓ Designate manufacturing to own and conduct Layered Audits.
- ✓ Identify high risk items to be verified during audit process.
- ✓ Verify special process audits are performed as applicable.
- ✓ Establish a schedule & frequency by level.
- ✓ Ensure all levels participate in the audit process.
- ✓ Track and review the results of Layered Process Audits.
- ✓ Link LPA issues to *Fast Response, C.A.R.E., & Lessons*

Learned

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GM

FR

PS

NCP

VS

WPO

SWI (SOS)

OI(JES)

MGC

SOT

EPV

LPA

Risk

Contam

SCM

MC

WS