QUALITY SYSTEMS BASICS

Worldwide Systematic Continual Quality Improvement
At General Motors and Their Suppliers
Using
Basic Quality Tools
and
Common Principles
Common Methods
Common Processes

Quality Systems Basic rev February 2011
QUALITY SYSTEMS BASICS

Quality Systems Basics

This is a quality system of basic quality tools that General Motors has developed over the last 9 years for use internally and by their supply base. The system is compatible with supplier’s third party auditing to standards such as ISO and TS. The system is required to do business with General Motors. Some of the tools included in the system are layered audits, statistics, control plans, process failure mode and effects analysis plus many more. Supplier’s systems are audited by General Motors. Quality Systems Basics provides a standardized system of quality management using simple quality tools that is currently used by General Motors and their suppliers and has helped in the success seen at General Motors today.
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Drew Campbell is a graduate of Brock University, in Ontario, with an Honours Degree in Science. He has also graduated from the University of Buffalo with a Masters of Science Degree.

Drew spent the first 31 years of his life working for a Chicago Tribune Newsprint Mill in Thorold Ontario. He worked there as an electrician and as part of the International Brotherhood of Electrical Workers he spent 15 years as a Union Officer and Union President. He then moved into a Management position where he eventually became Acting Director of Quality of this billion dollar site. He was part of the team that was able to make this paper mill one of the lowest cost, highest quality and cleanest mills in the world with cost savings of 234 million dollars a year. He met Dr. W. Edwards Deming in 1985, when the company sought his help, and with his and Dr. Harold Haller’s direction achieved this accomplishment.
Drew has been consulting in New York State for the last 13 years. He has taught a MBA course in Hungary for the University of Buffalo and the State Department, worked in aerospace and the plating industry and for the last 13 years has worked in Quality Systems within General Motors, Tonawanda, where he works as a Supplier Quality Engineer and has been able to provide 20 million dollars plus in cost savings and cost avoidance through the use of simple, basic quality tools.

Drew has been on the Buffalo ASQ Board since the late 1991 and is a Certified Quality Auditor. Drew is an avid bird watcher and taught this subject, for five years in the part time studies program at Brock University. Drew has contributed to a recently published 700 page bird book called ‘Niagara Birds’.
QSB Strategies

1. Fast Response
   - Fast Response Process
   - Problem Solving
   - Lessons Learned

2. Control of Non-Conforming Product

3. Verification Station

4. Standardized Operations
   - Work Place Organization – The 7 Wastes
   - Standardized Work Instructions – SOS
   - Operator Instructions – JES
   - Manufacturing Gage Control

5. Standardized Operator Training – JIT

6. Error Proofing Verification

7. Layered Process Audits

8. RPN Risk Reduction

9. Contamination Control

10. Supply Chain Management

11. Managing Change
1.0 FAST RESPONSE

Solving problems faster & earlier upstream through visual management
Holding task owners accountable for timely corrective action
1.0 - Introduction

PURPOSE:

• Immediately address quality failures
  • External / Internal
• Defines the process to be followed
• Defines method of displaying important information as a visual management tool, supporting status at a glance.
• Applies discipline in responding to issues through a systematic approach.

SCOPE:

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

RESPONSIBILITY:

• Ownership
  ✓ Operations Manager
• Contingency Plan for All Situations
FAST RESPONSE

1.2 - Fast Response Summary

FAST RESPONSE PROCESS KEY STEPS

Quality gathers significant issues from the past 24 hours.

Daily Fast Response Meeting assigns owner to each issue. Outside the meeting the owner utilizes the Problem Solving process to correct and prevent recurrence.

Issues are tracked on the Fast Response Tracking Board. Owners are required to give periodic updates at Fast Response meeting.

Owner responsible for completion of all exit criteria including Lessons Learned. Results of Problem Solving process communicated. Fast Response Tracking Board indicates exit criteria is green.

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1.3 – Problem Solving

Step 3 – Identify the Root Cause:

There are several tools available to problem solve and get to the root cause. Their use is dependent upon the complexity of the process, the type of failure mode, Fit, Function, or Finish, and the system used to measure the specific characteristic that failed which will be attribute or variable data.
1.3 – Problem Solving

Step 3 – Identify the Root Cause:
As an initial root cause step, General Motors uses the 7 diamond process as an immediate reaction to internal Quality issues. The first 4 steps are used to quickly determine if an out of standard condition (special cause) exists. This will prevent excessive use of the statistical problem solving techniques.

(Example)
1.4 – Lessons Learned

A Lessons Learned system:

- Establishes a process for capturing information that will support continual improvement to all operations/processes.

- Prevents repeated mistakes allowing an organization to capitalize on its successes.

- Applies to all functions and responsibilities, therefore, everyone in the organization should participate.

All documentation that will support continuous improvement should be entered into a Lessons Learned system. (e.g. Master PFMEA, Problem Solving, Read Across)
1.4 – Lessons Learned

Lessons Learned may be identified by anyone.

Examples of activities to Identify Lessons Learned:

- APQP Process
- Layered Process Audits
- Error Proofing Verification Failures
- Problem Solving activity for Internal or external Issues
- Verification Station Findings
- Continuous Improvement Teams
- Risk Reduction-Reverse PFMEA Team Activity
- Suggestion Programs
- Company Business/Quality Operating System Management Reviews

A disciplined approach to problem prevention using Lessons Learned shall be established. Activities within an organization to prevent future problems or improve performance that build Lessons Learned may include.

- GM Drill Wide-Read Across communication and follow up
- APQP Program reviews of Lessons Learned
2.0 - CONTROL OF NONCONFORMING PRODUCT

Containment, Identification, Segregation, Disposition
CONTROL OF NONCONFORMING PRODUCT

Outline

2.0) Introduction; Purpose, Scope, Responsibility

2.1) Benefits

2.2) Nonconforming Identification

2.3) Segregation

2.4) Containment
   2.4.1 - Containment Worksheet
   2.4.2 - Communication - Quality Alert, Internal/External

2.5) Disposition
   2.5.1 - Reusable/Rework
   2.5.2 - Reintroduce product
   2.5.2 - Scrap

2.6) Summary; Shalls
CONTROL OF NONCONFORMING PRODUCT

2.0 - Introduction

PURPOSE:

• Ensure that product that does not conform to specified requirements is:
  - Prevented from unintended use
  - Contained and/or segregated
  - Dispositioned by Management

• Ensure proper communication if there is an escape.

• Establish a consistent labeling identification process using Visual Management such as (Stoplight) RED, YELLOW, GREEN method.

SCOPE:

- Production material or components.
- Engineering Samples
- Prototype Samples
- Incomplete Processed material
- Other materials not intended to be shipped to the customer.

RESPONSIBILITY:

• Ownership
  ✅ Quality Manager
• Contingency Plan for All Situations
3.0 VERIFICATION STATION

IN-PROCESS CONTROL & VERIFICATION

Satisfy Your Customer. . .

Do not Build a Defect!

Solve Problems Through Teamwork!
VERIFICATION STATION

Outline

3.0) Introduction: Purpose, Scope, Responsibility
3.1) Benefits
3.2) Description, Roles, and Responsibilities
3.3) Defects Entering the Station
   • Alarm & Escalation
   • Immediate Response
   • Leadership Support
3.4) Defects Leaving the Station
   • Quality Feedback-Feed Forward
   • Performance Metrics
3.5) Problem Solving
3.6) C.A.R.E
3.7) Summary, Shalls
VERIFICATION STATION

3.0 – Introduction

PURPOSE:

• Improve first time quality (FTQ) and process capability.

• Alert team members of changes in the process and know who and when to call for help.

• Obtain the proper support to solve problems as they occur.

• Prevent escape of defects.

• Engage team members in Problem Solving to meet improvement goals.

• Ensure feedback from downstream customers

SCOPE:

- Manufacturing Operations
- Assembly Areas
- Anywhere 100% Inspection or containment is implemented.

RESPONSIBILITY:

• Ownership
  ✓ Manufacturing Leadership

• Support from all Manufacturing, Engineering, Materials, and Quality leadership and staff
VERIFICATION STATION

3.2 – Description, Roles, Responsibility

Definition: The system of building quality in station through prevention, detection, and containment of abnormalities.
3.2 – Description, Roles, Responsibility

WHAT IS THE PURPOSE OF A VERIFICATION STATION?

• Verification Stations check if your process is giving you what it was designed to give you.

• Provides the means through an alarm system to address highest priority customer concerns (PR&R type defects).
  
  - It will also draw attention to the frequent, low severity non-conformances. (e.g. dirt, burns, burrs, orange peel)

• To improve the process by immediately engaging the Team in problem solving as the defects occur.
3.2 – Description, Roles, Responsibility

Where Are Verification Stations Placed?

• Points in the process or operation where there exists:
  – high risk
  – Poor FTQ
  – high RPN
  – low capability (Ppk, Cpk) Any operation with a Cpk or Ppk below 1.33 requires 100% inspection

• Between departments or distinct processes at point of cause.
4.0 - STANDARDIZED OPERATIONS

WORKPLACE ORGANIZATION-5S
A clean, well-organized work environment.

STANDARDIZED WORK (SOS)
What are the Major Steps, how long should it take?

OPERATOR INSTRUCTIONS (JES)

MANUFACTURING GAGE CONTROL
Product is qualified per plan to known standards & specifications

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Global Purchasing and Supply Chain
4.1 - Introduction:

PURPOSE:

• To establish a repeatable, predictable baseline for continuous improvement involving the operator in both the initial and ongoing improvements to achieve the highest levels of safety, quality and productivity.

SCOPE:

• Assembly Area
• Manufacturing Operations
• Repair/Rework Area
• All Operations
• Shipping / Receiving
• Other support functions (e.g. Inspection)

RESPONSIBILITY:

• Single or Dual Ownership
  - Manufacturing Engineering
  - Production Manager
ELIMINATION OF WASTE

Abstract Thinking

- Waste NOT Defined
- React To Large Examples
- Reactive Improvement

Concrete Thinking

- Waste Is "Tangible"
- Identify Many Small Opportunities
  - Leads To Large Overall Change
- Continuous Improvement

Note: The memory aid for the 7 Types of Waste is COMMWIP.

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## 5 S WORKPLACE ORGANIZATION

<table>
<thead>
<tr>
<th>STEP</th>
<th>ORIGINAL 5 S</th>
<th>OTHER 5 S TERMINOLOGY</th>
<th>QSB</th>
<th>DEFINITION</th>
<th>PURPOSE</th>
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</thead>
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<tr>
<td>1</td>
<td>Seiri</td>
<td>Organization</td>
<td>Sift</td>
<td>Tidiness</td>
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<td>Seiton</td>
<td>Neatness</td>
<td>Sort</td>
<td>Orderliness</td>
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<td>Seiso</td>
<td>Cleaning</td>
<td>Sweep</td>
<td>Cleanliness</td>
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<td>Standardization</td>
<td>Sustain</td>
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<tr>
<td>5</td>
<td>Shitsuke</td>
<td>Discipline</td>
<td>Self-Discipline</td>
<td>Discipline</td>
<td>Continuous Improvement</td>
</tr>
</tbody>
</table>

Workplace Organization is applicable to all types of environments (e.g. offices, conference rooms, tool cribs, operator workstations, team/group rooms, etc.).

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4.3 WORKPLACE ORGANIZATION-5S
Visual Management of Out-of-Standard Conditions

4.4 STANDARDIZED WORK
4.4.1 – Standard Operation;
Major Steps, how long should it take? *(SOS)*

4.4.2 - OPERATOR INSTRUCTIONS;
Detailed Steps for What, How, and Why. *(JES)*

4.5 MANUFACTURING GAGE CONTROL
Product is qualified per plan to known standards & specifications
4.4 - STANDARDIZED WORK

Definition:
The document of work functions performed in a repeatable sequence, which are agreed to, developed, followed, and maintained by the functional organization.

Purpose:
To establish a repeatable, predictable baseline for continuous improvement and to involve the operator in both the initial and ongoing improvements to achieve the highest levels of safety, quality and productivity.

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4.4.1 - STANDARDIZED WORK

STANDARDIZED WORK PROVIDES A FOUNDATION FOR:

- Ensuring operators are consistently performing tasks and procedures the same across all shifts and personnel.
- An efficient production sequence.
- Identifying value added tasks.
- Reduced variation within a process.
- *Waste* reduction, line balancing and quality built in station.
- Continuous improvement and problem solving.
- A lean organization.
- Auditing operator conformance to work instructions *(Layered Process Audit)*.
STANDARDIZED OPERATIONS

4.3 WORKPLACE ORGANIZATION-5S
Visual Management of Out-of-Standard Conditions

4.4 STANDARDIZED WORK

4.4.1 – Standard Operation;
Major Steps, how long should it take? (SOS)

4.4.2 - OPERATOR INSTRUCTIONS;
Detailed Steps for What, How, and Why. (JES)

4.5 MANUFACTURING GAGE CONTROL
Product is qualified per plan to known standards & specifications

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JOB ELEMENT SHEET

Definition:
A user friendly document that provides detailed information on a specific element of work to ensure the successful execution of that element.

Purpose:
To provide detailed training information for new team members.
To bridge the gap between engineering information and shop floor knowledge.
To provide a written history of that element.
To provide a baseline for auditing, problem solving, continuous improvement, rebalancing of work and documentation transfer.
OPERATOR INSTRUCTIONS

Where to use operator instructions?

Operator instructions are commonly available for:

- manufacturing and assembly
- inspection and data collection
- pack out
- laboratory

Often overlooked activities include:

- offline rework and containment
- set-up and change-over events
- prototype and engineering activities
- process labeling points
- material handling
- shipping and receiving
- maintenance/repair
- office
4.3 WORKPLACE ORGANIZATION-5S
Visual Management of Out-of-Standard Conditions

4.4 STANDARDIZED WORK

4.4.1 – Standard Operation;
Major Steps, how long should it take? (SOS)

4.4.2 - OPERATOR INSTRUCTIONS;
Detailed Steps for What, How, and Why. (JES)

4.5 MANUFACTURING GAGE CONTROL
Product is qualified per plan to known standards & specifications
MANUFACTURING GAGE CONTROL

4.5 Introduction

PURPOSE:
To establish a common set of definitions and set minimum requirements and guidelines of a system for managing calibration, surveillance of gages, and other measurement devices used within GM Supplier manufacturing sites to evaluate conformance to specifications of parts and products.

SCOPE:
Applies to all devices used to evaluate conformance to part and product specifications

RESPONSIBILITY:
• Ownership
  ✓ Quality Leadership
• Contingency Plan for All Situations

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4.5.1 - Overview

This Procedure applies to all GM Supplier Manufacturing sites.

At a minimum, sites should include the following devices within their gage procedures:

- Gages included in the sites control plan
- Devices used to evaluate conformance to part and product specifications
- Masters used to evaluate/adjust all devices under gage control
- Metrology lab and layout room devices
- Coordinate measuring machines and optical comparators
- Product torque wrenches and transducers
- Leak test orifices
- Balance, flow test weight viscosity and surface texture devices
- Functional test transducers e.g. torque to turn, final test
- Hardness testers and chemistry analyzer
- Personal tools and measuring devices
- Measuring, tools used to qualify or maintain production tools
MANUFACTURING GAGE CONTROL

4.5.1 – Overview (continued)

Organizations shall have written, documented procedures for developing, maintaining and establishing proper use and functions for manufacturing gages within GM supplier locations.

Gage Definitions:

- **Gage**—Any device used to obtain measurement, or assess the conformance of a part or characteristic relative to specifications.

- **Adjustment**—A set of operations to bring a gage into a state of performance suitable for its use.

- **Calibration**—A set of operations that compares and evaluates under specified conditions, the relationship between a gage and a traceable standard.

- **Certification**—A set of operations to document the results of a calibration, indicating conformance or non-conformance to specifications.

- **Master**– a device used to check and/or adjust a gage to a specified value.

- **Mastering**—A set of operations to verify that the gage results agree with the master.
4.5.1 – Overview (continued)

Additionally:

The supplier should indicate in their gage procedure, whether other special measuring devices, such as *Error Proofing* are in or out of scope for gage control activity.

Device Mastering is a part of the gage procedure, but the frequency is at the discretion of the supplier.

Last Part Checked should be held for confirmation of last known good part at a frequency of at minimum of 1 per shift. Best practice would be to retain hourly samples for each inspection, retained for the entire shift or previous 8 hours.
5.0 STANDARDIZED OPERATOR TRAINING

Was Operator training verified and documented?
STANDARDIZED OPERATOR TRAINING
Outline

5.0) Introduction: Purpose, Scope, Responsibility
5.1) Benefits
5.2) The Principles of Learning
5.3) How to Train - 4 Step Training Method
5.4) Training Certification - Records
5.5) Summary, Shalls
STANDARDIZED OPERATOR TRAINING

5.0 - Introduction:

PURPOSE:

• To ensure all Trainers are trained to and apply the same method of training when teaching others.

• To ensure all operators including temporary or supplemental employees work safely, follow standardized work and meet all quality and productivity requirements

• To ensure jobs are properly staffed and identify where additional training or follow up is required to reduce the risk of failures escaping the process.

SCOPE:

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

RESPONSIBILITY:

• Ownership
  ✓ Operations Manager
• Contingency Plan for All Situations
6.0 ERROR PROOFING VERIFICATION

Was error proofing verified?
ERROR PROOFING VERIFICATION

Outline

6.0) Introduction; Purpose, Scope, Responsibility

6.1) Benefits

6.2) Method of Verification

6.3) Management Review

6.4) Summary; shall
6.0 - Introduction

**Purpose:**
Assures error proof/detection devices are working as intended to prevent *nonconforming product* from being made or transferred.

**Scope:**
- Assembly Area
- Manufacturing Operations
- Other support Functions

**Responsibility:**
- Ownership
  - Quality Manager
- Contingency plan for all situations
ERROR PROOFING VERIFICATION

6.1 - Benefits

• Assures error proof/detection devices are working as intended.

• Prevents nonconforming product from being made or transferred.

• Establishes a history for each device; indicates when preventative maintenance or repair is needed.

• Instills discipline within the process.
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
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

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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.
8.0 - RISK REDUCTION PROCESS

PROACTIVE
REDUCING THE RISK OF A POTENTIAL QUALITY FAILURE.
REVERSE PFMEA PROCESS

REACTIVE
ERROR PROOFING PAST QUALITY FAILURES
RISK REDUCTION

Outline

8.0) Introduction page: Purpose, Scope, Responsibility

8.1) Benefits

8.2) PFMEA Overview

8.3) PFMEA Review Process

8.4) RPN Reduction Process
   8.4.1) Proactive RPN Reduction Process
   8.4.2) Reverse PFMEA Process
   8.4.3) Reactive RPN Reduction Process

8.5) Management Requirements
   8.5.1) Tracking Matrix

8.6) Summary, Shalls
RISK REDUCTION PROCESS

8.0 - Introduction

PURPOSE:

• Reduce the risk of a initial quality failures

• *Error proofing* past quality failures

• Ensure that Failure Modes have proper controls (prevention/detection) and work properly.

SCOPE:

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

RESPONSIBILITY:

• Ownership
  ✓ Engineering Manager
  ✓ Operations Manager
• Contingency Plan for All Situations
RISK REDUCTION PROCESS

8.1 - Benefits

• Supports continual improvement as expected by TS16949.

• Allows leadership to allocate limited resources to critical areas.

• Provides a basis for effective error-proofing and problem solving.

• Core tool for APQP and PPAP requirements.

• Provides a Lessons Learned archive.

• Promotes cross-functional teamwork.

• Meets customer expectations for “living documents”.

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9.0 CONTAMINATION CONTROL

Keeping parts and processes clean and free of debris
CONTAMINATION CONTROL
Outline

9.0) Introduction: Purpose, Scope, Responsibility
9.1) Benefits
9.2) Contamination Philosophy
   • Identifying contamination issues within individual operations
     (external / internal) which would potentially contaminate sensitive parts.
     9.2.1) Sediment
           • Monitoring and measuring sediment (Sediment Lab)
           • Sediment reduction strategies
           9.2.1.3) Clean rooms
     9.2.2) Extra Parts reduction strategies
     9.2.3) Dirt in paint
     9.2.4) Retained material in castings
9.3) Communication, Report Out Format
9.4) Problem Solving
   Refer to Section 1.3 - Fast Response – Problem Solving
9.5) Summary, Shalls
CONTAMINATION CONTROL

9.0 Introduction

PURPOSE:

• Improve part cleanliness over time via measurement, control and process / handling improvements.

• Utilize a standardized systematic and a structured approach to monitor and control contamination sources such as sediment, extra parts in assemblies, paint and painted parts contamination.

• Apply a disciplined approach when responding to issues.

SCOPE:

• Manufacturing Operations

• Assembly Area

• Shipping / Receiving

• All In-plant operations

RESPONSIBILITY:

• Ownership
  ✓ Process / Manufacturing Engineering

• Evaluation of Performance
  ✓ Operations Manager
  ✓ Quality Manager
  ✓ Contingency reaction plan for all failures.
CONTAMINATION CONTROL

9.1 BENEFITS:

• Provides a systematic approach for Contamination Control and communication of Contamination issues.
• Provides elements of an effective control system.
• Assigns responsibility for contamination reduction.
• Supports and establishes defined areas of continual improvement.
• Prevents repetitive mistakes and reduces waste of resources.
• Transfers knowledge to all stakeholders in an organization.
• Improves Quality metrics: reduces PPM and warranty costs.
SUPPLY CHAIN MANAGEMENT

10.0 - Introduction

PURPOSE:

• To provide a standard process for managing all of the supplier tiers in the supply chain.

• Ensure all tiers of the supply chain have systems and processes to evaluate, select, communicate expectations and requirements, measure performance, and develop their suppliers.

• To provide final customer with high stability, high quality parts & service from initial Tier 1 thru entire supplier chain.

SCOPE:

• Applies to a supplier’s entire supply chain, including all Tiers, sub-suppliers of raw material, outside processes, and purchased component suppliers.

RESPONSIBILITY:

• Ownership
  ✓ Senior Purchasing Leader

• Champion:
  ✓ Supplier Quality Leader
SUPPLY CHAIN MANAGEMENT

10.1 - BENEFITS

• Supports continuous improvement efforts and achievement of goals through applying common principles, methods, and processes.

• Improves Quality metrics, reduces PPM and warranty costs.

• Creates the ability to identify where problems exist and actions required to prevent additional problems entering the supply chain that negatively impact customer enthusiasm.
11.0 – Managing Change
MANAGING CHANGE

Outline

11.0) Introduction page: Purpose, Scope, Responsibility

11.1) Benefits

11.2) Change Process

11.3) PTR Process

11.4) Banking Process

11.5) By-Pass Process

11.6) Summary, Shalls
11.0 - Introduction

PURPOSE:

• Have a system to manage all plant process changes.
  • Planned Changes
  • Unplanned Changes (Emergency)
• Establish a common Trial Run process with standardized communication, readiness reviews and quality reviews.
• Define minimum requirements for bypassing existing production processes.
• Implement a controlled banking process

SCOPE:

• Changes that may affect the final product.
• Machines and systems that have been approved by the Customer.
• Manual and automated stations within the plant.
• Controlled through a Document Control Process.

RESPONSIBILITY:

• Ownership
  ✓ Operations Manager
  ✓ Manufacturing/Engineering Manager
  ✓ Quality Manager

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11.1 - Benefits

- Improves notification and awareness throughout the organization regarding actions taken which may create out-of-control conditions.

- Assigns responsibility and process for communicating and conducting production trial runs.

- Improves quality of banked parts.

- Proactively defines and approves process methods / controls for bypassing and returning to an existing production process.

- Assures a systematic approach for all changes to customer approved processes.
KEY STRATEGIES

1. Fast Response
   - Fast Response Process
   - Problem Solving
   - Lessons Learned
2. Control of Non-Conforming Product
3. Verification Station
4. Standardized Operations
   - Work Place Organization – The 7 Wastes
   - Standardized Work Instructions – SOS
   - Operator Instructions – JES
   - Gaging Standards
5. Standardized Operator Training
6. Error Proofing Verification
7. Layered Process Audits
8. Risk Reduction
9. Contamination Control
10. Supply Chain Management
11. Managing Change

No Major Disruptions
No PRR’S
+ 0 PPM’S
= World Class Quality