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Is Your Storeroom Collapsing? The Six Pillars of MRO

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Senior Reliability Consultant- Compli AMR Group

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PRESENTATION TOPICS

- Welcome & Speaker Intro.
- The Objectives of MRO
- Typical Challenges of Managing MRO
- Benefits of Managing MRO Well
- What Good Materials Management Looks Like- The 6 Pillars
- Wrap-up/Q&A



Doug Hart- Certified Maintenance & Reliability Professional (CMRP),
Certified Reliability Leader (CRL)
Certified Reliability Centered Maintenance Facilitator (RCM2)

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- Senior Consultant within Compli's Asset Management & Reliability Services Group
- Held various Maintenance & Reliability (M&R) Consulting and Leadership roles over the past 20+ years
- Assisted numerous industrial and manufacturing organizations improve their M&R programs and is proficient in:
 - M&R best practices Assessment & Implementation Plan Development
 - Asset Criticality Ranking & PM/PdM Optimization
 - Work Management Process Development & Planning & Scheduling Implementation
 - MRO Materials Management & Implementing Maintenance Training Programs
 - M&R Metrics and Scorecards & Developing Best Practices Playbooks
- Served on the KC-SMRP Chapter Board for 3 years as Co-Chair and Newsletter Editor; currently serves as Membership Director



Is Your Storeroom Collapsing?

The Six Pillars of MRO

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THE OBJECTIVES OF MRO

- *“The primary objective of an MRO Materials Management program is to ensure Maintenance has the right parts in the right condition at the right time and in the right location enabling critical assets and processes to be repaired and maintained such that Operations can meet Production demands.”*

➤ *Doug Hart- 2010*



THE CHALLENGES TO MANAGE MRO

- 55% of MRO inventories have no movement in the past 36-48 months
- 30% of parts in stock will NEVER be used
- 25% of Maintenance Technician time is spent searching for parts
- 8% of MRO SKUs have duplicates
- Only 6% of MRO SKUs make up 90% of the annual spend
- MRO inventories are growing at 9% per year while turns are less than 1



BENEFITS of a GOOD MRO PROGRAM

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- By Implementing MRO Best Practices, you will:
 - Identify the actual Maintenance spares on-site as well as those which should remain in Stores
 - Possess the information to make wise financial decisions, improving inventory accuracy to 98%+
 - Reduce the amount of space required for spares while preserving their shelf life
 - Improve technician productivity... typically by 25% less time searching for parts
 - Decrease inventory value by 10-18%
 - Reduced unscheduled Downtime by 8-12%



BENEFITS Continued

- Optimize the MRO Buying process resulting in quicker deliver of the accurate items requested
- Improved storeroom service levels will be realized
- Rush freight shipments reduce by 15-25%
- Optimize on-hand inventory dollars saving 3-5% annually
- Increased speed and accuracy of the entire MRO Materials Management process
- Optimized Storeroom staff time



The Six Pillars of MRO

Pillar #1

MRO
Program
Assess-
ment

PILLAR #1: ASSESSMENT

- The first MRO key element that pacesetting organizations perform:
 1. MRO Best Practices Gap Assessment:
 - They recognize all sites are different and most have done some good work in certain areas so to ensure that effort is expended in the optimal areas, they ASSESS their MRO program and develop an associated Improvement Plan



PILLAR #1: ASSESSMENT

1. MRO program ASSESSMENT:

- Top Performers WANT to be assessed!
 - The Reliability Program of the Year (RPOY) was a global contest established in 1989 to recognize the companies who apply the best Reliability & Maintenance practices
 - I was fortunate to participate in the contest for two years running and witnessed companies that WANTED to be measured knowing they would improve as a result of the process



PILLAR #1: ASSESSMENT

1. MRO program ASSESSMENT:

- Adopt a three-pronged Assessment approach
- Analyze findings and identify gaps from best practices
- Develop recommended solutions to pursue
- Craft an aggressive yet realistic timeline capturing activity champions & resources (Both internal and external)
- Implement a tracking mechanism to measure progress and improvement effectiveness



MRO Inventory Transfer Project Plan

Task ID	Task Name	Start Date	End Date	Status	Owner
1.0	Project Kick-off Meeting	2023-01-01	2023-01-05	Completed	John Doe
1.1	Define Scope, Objectives, and Key Deliverables	2023-01-06	2023-01-15	In Progress	Jane Smith
1.2	Identify and Assess Current Inventory Levels and Locations	2023-01-16	2023-01-25	Not Started	John Doe
1.3	Review and Approve MRO Inventory Transfer Plan	2023-01-26	2023-01-30	Completed	Jane Smith
1.4	Identify and Assign Resources for the Project	2023-01-31	2023-02-10	In Progress	John Doe
1.5	Develop a Detailed Project Schedule and Gantt Chart	2023-02-11	2023-02-20	Not Started	Jane Smith
1.6	Identify and Assign Resources for the Project	2023-02-21	2023-03-05	In Progress	John Doe
1.7	Develop a Detailed Project Schedule and Gantt Chart	2023-03-06	2023-03-15	Not Started	Jane Smith
1.8	Identify and Assign Resources for the Project	2023-03-16	2023-03-30	In Progress	John Doe
1.9	Develop a Detailed Project Schedule and Gantt Chart	2023-03-31	2023-04-10	Not Started	Jane Smith
1.10	Identify and Assign Resources for the Project	2023-04-11	2023-04-25	In Progress	John Doe
1.11	Develop a Detailed Project Schedule and Gantt Chart	2023-04-26	2023-05-05	Not Started	Jane Smith
1.12	Identify and Assign Resources for the Project	2023-05-06	2023-05-20	In Progress	John Doe
1.13	Develop a Detailed Project Schedule and Gantt Chart	2023-05-21	2023-06-05	Not Started	Jane Smith
1.14	Identify and Assign Resources for the Project	2023-06-06	2023-06-20	In Progress	John Doe
1.15	Develop a Detailed Project Schedule and Gantt Chart	2023-06-21	2023-07-05	Not Started	Jane Smith
1.16	Identify and Assign Resources for the Project	2023-07-06	2023-07-20	In Progress	John Doe
1.17	Develop a Detailed Project Schedule and Gantt Chart	2023-07-21	2023-08-05	Not Started	Jane Smith
1.18	Identify and Assign Resources for the Project	2023-08-06	2023-08-20	In Progress	John Doe
1.19	Develop a Detailed Project Schedule and Gantt Chart	2023-08-21	2023-09-05	Not Started	Jane Smith
1.20	Identify and Assign Resources for the Project	2023-09-06	2023-09-20	In Progress	John Doe
1.21	Develop a Detailed Project Schedule and Gantt Chart	2023-09-21	2023-10-05	Not Started	Jane Smith
1.22	Identify and Assign Resources for the Project	2023-10-06	2023-10-20	In Progress	John Doe
1.23	Develop a Detailed Project Schedule and Gantt Chart	2023-10-21	2023-11-05	Not Started	Jane Smith
1.24	Identify and Assign Resources for the Project	2023-11-06	2023-11-20	In Progress	John Doe
1.25	Develop a Detailed Project Schedule and Gantt Chart	2023-11-21	2023-12-05	Not Started	Jane Smith
1.26	Identify and Assign Resources for the Project	2023-12-06	2023-12-20	In Progress	John Doe
1.27	Develop a Detailed Project Schedule and Gantt Chart	2023-12-21	2024-01-05	Not Started	Jane Smith
1.28	Identify and Assign Resources for the Project	2024-01-06	2024-01-20	In Progress	John Doe
1.29	Develop a Detailed Project Schedule and Gantt Chart	2024-01-21	2024-02-05	Not Started	Jane Smith
1.30	Identify and Assign Resources for the Project	2024-02-06	2024-02-20	In Progress	John Doe
1.31	Develop a Detailed Project Schedule and Gantt Chart	2024-02-21	2024-03-05	Not Started	Jane Smith
1.32	Identify and Assign Resources for the Project	2024-03-06	2024-03-20	In Progress	John Doe
1.33	Develop a Detailed Project Schedule and Gantt Chart	2024-03-21	2024-04-05	Not Started	Jane Smith
1.34	Identify and Assign Resources for the Project	2024-04-06	2024-04-20	In Progress	John Doe
1.35	Develop a Detailed Project Schedule and Gantt Chart	2024-04-21	2024-05-05	Not Started	Jane Smith
1.36	Identify and Assign Resources for the Project	2024-05-06	2024-05-20	In Progress	John Doe
1.37	Develop a Detailed Project Schedule and Gantt Chart	2024-05-21	2024-06-05	Not Started	Jane Smith
1.38	Identify and Assign Resources for the Project	2024-06-06	2024-06-20	In Progress	John Doe
1.39	Develop a Detailed Project Schedule and Gantt Chart	2024-06-21	2024-07-05	Not Started	Jane Smith
1.40	Identify and Assign Resources for the Project	2024-07-06	2024-07-20	In Progress	John Doe
1.41	Develop a Detailed Project Schedule and Gantt Chart	2024-07-21	2024-08-05	Not Started	Jane Smith
1.42	Identify and Assign Resources for the Project	2024-08-06	2024-08-20	In Progress	John Doe
1.43	Develop a Detailed Project Schedule and Gantt Chart	2024-08-21	2024-09-05	Not Started	Jane Smith
1.44	Identify and Assign Resources for the Project	2024-09-06	2024-09-20	In Progress	John Doe
1.45	Develop a Detailed Project Schedule and Gantt Chart	2024-09-21	2024-10-05	Not Started	Jane Smith
1.46	Identify and Assign Resources for the Project	2024-10-06	2024-10-20	In Progress	John Doe
1.47	Develop a Detailed Project Schedule and Gantt Chart	2024-10-21	2024-11-05	Not Started	Jane Smith
1.48	Identify and Assign Resources for the Project	2024-11-06	2024-11-20	In Progress	John Doe
1.49	Develop a Detailed Project Schedule and Gantt Chart	2024-11-21	2024-12-05	Not Started	Jane Smith
1.50	Identify and Assign Resources for the Project	2024-12-06	2024-12-20	In Progress	John Doe

PILLAR #1: ASSESSMENT

1. MRO program ASSESSMENT:

- Re-evaluate:
 - Every ~2 years perform an updated assessment to ensure progress is being made
 - An opportunity for re-alignment with new business priorities, etc.
 - Also, an opportunity to celebrate progress/successes



PILLAR #1: ASSESSMENT

■ Pacesetting Organizations develop MRO PLAYBOOKS

1. Sample Playbook TOC may look something like this:

Document Best Practices for Your Site

Table of Contents

Section One- Development & Approval Record

Section Two- Revision History & Approval Record

Section Three- MRO Mission Statement

Section Four- Introduction to MRO Materials Management

Section Five- Purpose of MRO Materials Management & Elements of MRO Success Criteria

Section Six- The Benefits of Implementing MRO Best Practices

Section Seven- Common Materials Management Terms & Acronyms

Section Eight- The 6-Phase Comprehensive MRO Materials Management Model®

- Model Overview

Section Nine- Materials Management Program Assessment

- MRO Best Practices Assessment
- Gap Analysis
- Implementation Plan
- Project Management
- Documentation- MRO Best Practices Playbook

Section Ten- Good MRO Data

- Standardized Naming Taxonomy
- Complete Materials Item Master
- Critical Spares Ranking
- Bill Of Materials
- Min/Max Levels

Section Eleven- Effective MRO Staff

- MRO Roles & Responsibilities
- MRO Job Descriptions
- MRO Staff Training

Section Twelve- Sound MRO Processes

- 25 MRO Process Workflows
- Associated Written SOP Narratives

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Section Thirteen- MRO Best Practices

- Design, Organization & Layout
- Optimal Storage Solutions
- Signage, Labeling and Maps
- Lighting & Housekeeping
- Fire Protection
- Security & Accessibility
- Reservations, Kitting & Staging
- Charging Parts to a Work Order
- Barcoding & Scanning
- Proper Stocking, Withdrawal & Replenishment Practice:
- ABC Classification
- Variance Discrepancy Tolerances
- Cycle Counting
- Supplier Management
- Inventory Management Strategies
- Standardization and Cross Referencing
- Obsolescence and Disposition
- Repairable Spares
- Warranty Tracking

Section Fourteen- Insightful Metrics and Reports

- MRO Metrics and KPIs
- MRO System Reports

Section Fifteen- Conclusion

Section Sixteen- Credits & References

Section Seventeen- Appendix

The Six Pillars of MRO

Pillar #1

MRO
Program
Assessment

Pillar #2

Good
MRO
Data

Pillar #3

Pillar #4

Pillar #5

Pillar #6

PILLAR #2: GOOD DATA

- The second MRO key element that pacesetting organizations perform:
 2. They understand the value of having complete, accurate and standardized data in their inventory module



PILLAR #2: GOOD DATA

2. Good spare parts data includes:

- Standardized parts descriptions
- Not using a smart numbering system
- All parts noted in the system, No duplications
- Company part #, Manufacturer & Manufacturer part #
- Primary & Secondary supplier, Last price paid, Average price, Last receipt date and Lead time
- QOH, Qty. on Order, Location, UOM, Comparable Part, Reservations feature
- Min/Max & Reorder points, Usage history, etc.



PILLAR #2: GOOD DATA

2. Good Spare Parts DATA Includes- Continued:

- Inventory Type and Sub-type
- Ensure critical spares are identified and captured in the system
- Document where the items are used (Supporting Assets)
- Bills of Materials (Planner BOMs) captured
- Note whether the item is a repairable spare and any warranty information as well as serial number, installation date, etc.



The Six Pillars of MRO

Pillar #1

MRO
Program
Assessment

Pillar #2

Good
MRO
Data

Pillar #3

Effective
MRO
Staff

PILLAR #3: EFFECTIVE STAFF

- The third MRO key element that pacesetting organizations perform:
 3. They recognize Storeroom staffing is a key element in having a successful Materials Management program and address the resource element of the Storeroom accordingly



PILLAR #3: EFFECTIVE STAFF

- They address the following Storeroom staffing areas:
 - Identification & distribution of tasks:
 - Create a Master list of MRO R&Rs
 - Compare to see which tasks need to be performed at your site
 - Distribute similar skill set activities among the Storeroom staff and review resource leveling

Task Item #	Functional Area	Activity / Task	Applicable at Your Site	Not Applicable Your Site
1	Receiving	Receives/examines incoming Maintenance Parts		✓
2	Receiving	Notification of incoming spot buy items to requestor's		✓
3	Inventory Mgmt.	Stocks Maintenance Parts	✓	
4	Inventory Mgmt.	Issues Maintenance Parts	✓	
5	Purchasing	Prepares Purchasing Requisitions	✓	
6	Purchasing	Orders MRO spare Parts	✓	
7	Inventory Mgmt.	Critical Spares evaluation	✓	
8	Storeroom Mgmt.	Storeroom Housekeeping	✓	
9	Storeroom Mgmt.	Cycle Counting	✓	
10	Storeroom Mgmt.	"A-B-C" Classification Work	✓	
11	Inventory Mgmt.	Compares inventory count discrepancies against the accepted tolerance table	✓	
12	Inventory Mgmt.	Makes Adjustments to Inventory when necessary	✓	
13	Inventory Mgmt.	Investigates QOH vs. QIS count variances		✓
14	Storeroom Mgmt.	Generates and distributes Inventory Reports	✓	
15	Storeroom Mgmt.	Reviews Inventory Reports	✓	
16	Storeroom Mgmt.	Provides periodic and recurring MRO metric information to Maintenance leadership	✓	
17	Storeroom Mgmt.	Addresses any Storeroom accessibility/security issues		✓
18	Inventory Mgmt.	Manages internal returns to inventory	✓	
19	Inventory Mgmt.	Manages inventory returns to suppliers	✓	
20	Inventory Mgmt.	Kitting & Staging Work		✓
21	Inventory Mgmt.	Implement an effective and streamlined inventory reservation program		✓
22	Inventory Mgmt.	Stock-out log management	✓	
23	Inventory Mgmt.	Bill Of Material activities	✓	
24	Inventory Mgmt.	Standardization/Cross Referencing		✓
25	Inventory Mgmt.	CMMS Data Entry	✓	
26	Storeroom Mgmt.	Obsolescence Work	✓	
27	Storeroom Mgmt.	Provide obsolescence disposition support	✓	
28	Storeroom Mgmt.	Bar Coding, scanning and synching up		✓
29	Inventory Mgmt.	Min/Max Stock Level Adjustments	✓	
30	Inventory Mgmt.	Re-order Points Level Adjustments	✓	
31	Storeroom Mgmt.	Off-site Parts Storage Work	✓	
32	Inventory Mgmt.	Inventory Reduction Effort		✓
33	Inventory Mgmt.	Vendor Reduction Effort		✓
34	Inventory Mgmt.	Blanket PO Work	✓	
35	Inventory Mgmt.	Identify and differentiate between Stock and Non-stock items	✓	
36	Storeroom Mgmt.	Review supplier invoices for errors/approval	✓	
37	Storeroom Mgmt.	Oversee the MRO supplier rating evaluations	✓	
38	Inventory Mgmt.	Adds items to inventory (ATS process)	✓	
39	Inventory Mgmt.	Manages the creation, distribution and updating of the Storeroom Catalog	✓	
40	Storeroom Mgmt.	Tracks delinquent incoming orders & contacts suppliers (Backlog list)	✓	
41	Storeroom Mgmt.	Negotiates pricing concessions	✓	
42	Inventory Mgmt.	Obtains parts data and updates the system (Supplier, lead time, etc.)	✓	
43	Storeroom Mgmt.	Oversees use of high-density cabinets and fit-for-purpose shelving		✓
44	Storeroom Mgmt.	Revise, print out, laminate and post Storeroom map to aid staff in locating parts	✓	
45	Storeroom Mgmt.	POU & vending machine support		✓
46	Inventory Mgmt.	Free issue inventory support	✓	
47	Inventory Mgmt.	Consignment work		✓
48	Inventory Mgmt.	VMI support/work		✓
49	Storeroom Mgmt.	Develops, communicates and updates MRO process flows		✓
50	Storeroom Mgmt.	Develops, communicates and updates associated MRO process flow narratives		✓

PILLAR #3: EFFECTIVE STAFF

- They address the following Storeroom staffing areas (Cont.):
 - Develop up-to-date Job descriptions for each functional role
 - Ensure their activities have been clearly communicated
 - Compare these tasks with those responsibilities they are measured against
 - Periodically review them for accuracy

Job Description

Job Title:	Inventory System Specialist	Creation Date:	10/5/2021
Department:	Maintenance & Engineering	Approved By:	...
Reports To:	Manager of Engineering	Approval Date:	10/6/2021
FLSA Status:	Non-exempt	Revised By:	
Author:	Doug Hart-	Revision Date:	

INTRODUCTION:

This intent of this document is to communicate the typical tasks to be performed by the MRO Materials Inventory System Specialist at in Phoenix, Arizona. This key role within the Maintenance and Engineering group is responsible for providing the overall electronic tasks within the site CMMS and associated company and vendor systems to perform MRO buying, tracking, replenishment and management of the Storeroom function. Although this is a comprehensive list representative of the majority of the tasks that are expected to be performed by this role on a regular basis, other duties and responsibilities may be assigned as required.

SUMMARY:

Orders, receives, inspects, and issues Maintenance-related supplies or tools while compiling and maintaining stock records of quantity, type and value of Storeroom and Free-issue locations by performing the following duties:

1. Re-orders maintenance supplies to established min/max stock levels or from one-time purchase requests by authorized personnel.
2. Fills orders by issuing MRO & OEM supplies from stock to Maintenance personnel.
3. Compiles data from purchase requisitions, Maintenance Storeroom requisition forms, purchase orders, invoices and accounting reports and enters this data to accurately maintain inventory and purchasing records.
4. Prepares requisitions or orders for purchasing new or additional stock items.
5. Counts, sorts or weighs incoming items to verify accurate receipt of items on requisitions, packing slips and/or invoices.
6. Examines incoming items to verify non-damage as well as conformance to specification.
7. Stores parts in bins, drawers, shelving, racking, floor or pallets, according to established storage procedures.

PILLAR #3: EFFECTIVE STAFF

- They address the following Storeroom staffing areas (Continued):
 - The team receives MRO best practices training
 - Site MRO Playbook & Processes training
 - MRO Inventory database training
 - Clear expectations & Accountability
 - Regular performance reviews



The Six Pillars of MRO

Pillar #1

MRO
Program
Assessment

Pillar #2

Good
MRO
Data

Pillar #3

Effective
MRO
Staff

Pillar #4

Sound
MRO
Processes

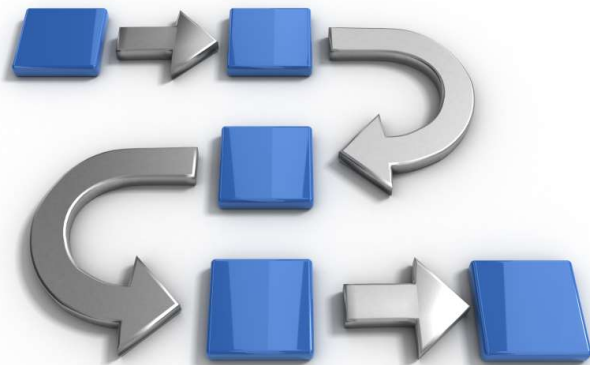
PILLAR #4: SOUND PROCESSES

- The fourth MRO key element that pacesetting organizations perform:
 4. They develop, document, distribute, train and enforce up to 25 sound MRO Workflow Processes and associated SOPs



PILLAR #4: SOUND PROCESSES

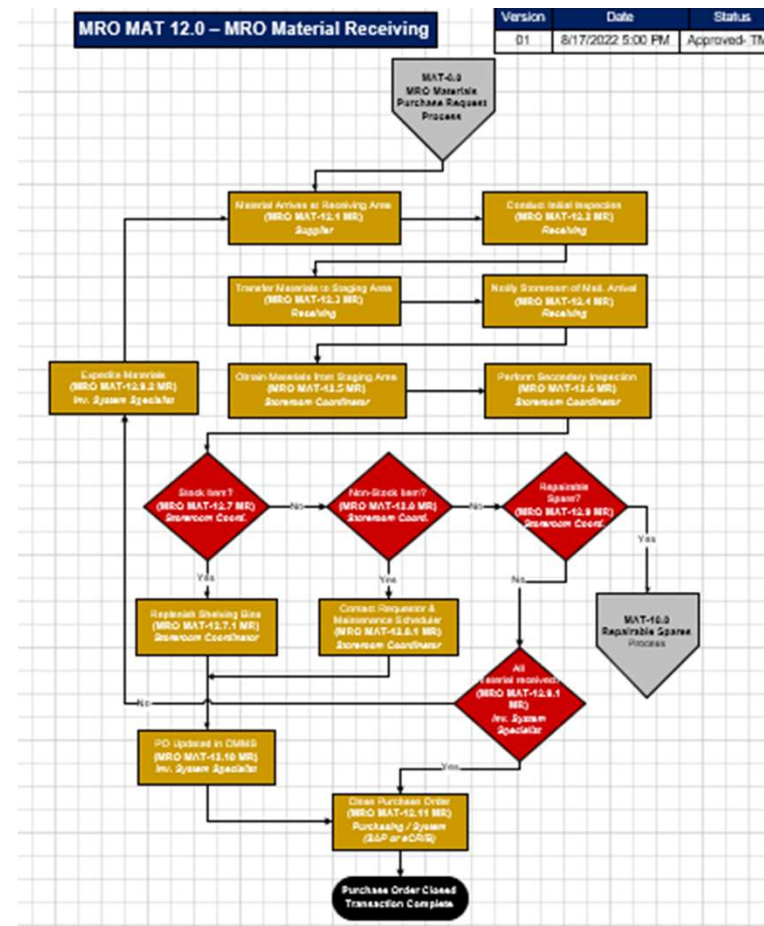
4. Typical MRO Process Flows include:



Item #	Functional Area	Process Workflow #	Process Workflow Name
1	Inventory Mgmt.	MRO MAT- Inv. Mgmt.- 1.0 ATS	MRO Materials Add-To-Stock Process Workflow
2	Inventory Mgmt.	MRO MAT- Inv. Mgmt.- 2.0 IMS	MRO Materials Item Master Set-up Workflow
3	Inventory Mgmt.	MRO MAT- Inv. Mgmt.- 3.0 CS	MRO Materials Critical Spares Review & Assignment Workflow
4	Inventory Mgmt.	MRO MAT- Inv. Mgmt.- 4.0 BOM	MRO BOM Strategy Session Workflow
5	Inventory Mgmt.	MRO MAT- Inv. Mgmt.- 5.0 BOM	MRO BOM Development Workflow
6	Inventory Mgmt.	MRO MAT- Inv. Mgmt.- 6.0 MMR	MRO Materials Min/Max & Re-order Pt. Level Establishment & Optimization Workflow
7	Inventory Mgmt.	MRO MAT- Inv. Mgmt.- 7.0 Free Issue	MRO Materials Free Issue vs. Stocking Item Workflow
8	Inventory Mgmt.	MRO MAT- Inv. Mgmt.- 8.0 VMI	MRO Materials VMI Workflow
9	Purchasing	MRO MAT- Purchasing- 9.0 PR	MRO Materials Purchase Workflow- Stock & Non-Stock Items
10	Asset Mgmt.	MRO MAT- Asset Mgmt.- 10.0 RSpares	MRO Materials Repairable Spares Workflow
11	Asset Mgmt.	MRO MAT- Asset Mgmt.-11.0 RvR	MRO Materials Repair vs. Replacement Workflow
12	Receiving	MRO MAT- Receiving-12.0 Receiving	MRO Materials Receiving Workflow
13	Receiving	MRO MAT- Receiving-13.0 Staging	MRO Materials Staging Workflow
14	Storeroom Mgmt.	MRO MAT- Stores Mgmt.-14.0 Re-Stock	MRO Materials Shelf Re-Stocking Workflow
15	Inventory Mgmt.	MRO MAT- Inv. Mgmt.- 15.0 Storage	MRO Proper Storage of Special Care Items Workflow
16	Inventory Mgmt.	MRO MAT- Inv. Mgmt.-16.0 Issues	MRO Materials Issues/ Inventory Withdrawal Workflow
17	Inventory Mgmt.	MRO MAT- Inv. Mgmt.- 17.0 Stock-out	MRO Materials Stock-out Workflow
18	Storeroom Mgmt.	MRO MAT- Stores Mgmt.-18.0 Kitting	MRO Materials Kitting & Staging Workflow
19	Storeroom Mgmt.	MRO MAT- Stores Mgmt.-19.0 Reserve	MRO Materials Parts Reservations Workflow
20	Storeroom Mgmt.	MRO MAT- Stores Mgmt.-20.0 Returns	MRO Materials Return Workflow- To Inventory
21	Storeroom Mgmt.	MRO MAT- Stores Mgmt.-21.0 Returns	MRO Materials Return Workflow- To Supplier
22	Storeroom Mgmt.	MRO MAT- Stores Mgmt.-22.0 ABC	MRO A-B-C Classification Establishment Workflow
23	Storeroom Mgmt.	MRO MAT- Stores Mgmt.-23.0 Cycle Ct.	MRO Materials Physical Item Count & System Update Workflow
24	Storeroom Mgmt.	MRO MAT- Stores Mgmt.-24.0 Obsolescence	MRO Materials Obsolescence Workflow
25	Storeroom Mgmt.	MRO MAT- Stores Mgmt.-25.0 Standardiz.	MRO Materials Cross Referencing & Standardization Workflow

PILLAR #4: SOUND PROCESSES

4. Typical MRO Process Flows may look something like this:



PILLAR #4: SOUND PROCESSES

- Written narratives (SOPs) should also be developed as new-hire training and guidelines to periodically refer to



Title: Process Workflow- MRO Purchase Request
Procedure No.: MAT 1.0
Revision: Draft
Creation Date: 10/22/2013
Submit Date: 10/24/2013

1 Purpose

- 1.1 This document describes the process to create a purchase request (PR) in the CMMS and transitioning it to a purchase order (PO) in the CMMS. It supports the associated workflow illustrated in the MAT 1.0. Purchase Request Process diagram.

2 Scope

- 2.1 This narrative describes the process elements identified in the MAT 1.0 Purchase Request Diagram.
- 2.2 This process describes the submission of a PR in the CMMS, its review for approval, the transmission of PR data from the CMMS to the create the PO in the CMMS, the transmission of PO data between the CMMS and the submission (including status updates) of the PO to the supplier.

3 Responsibilities

- 3.1 The Requester is responsible for submitting the PR. The requester is responsible for insuring that the items to be requested are not currently obtainable within the organization and that a PR is necessary.
- 3.2 Automated PR's will be generated by the CMMS from the inventory replenishment process as well as the work order direct issue materials process.
- 3.3 The Approver(s) are responsible for approving, rejecting, or cancelling a PR.
- 3.4 Purchasing is responsible for generating and updating PO, including submission of the PO to the supplier.

4 Key Process Assumptions

- 4.1. Only PR's created in the CMMS will be available in the CMMS.
- 4.2. Only PO's generated from PR's created in the CMMS will be available in the CMMS.
- 4.3. All PR's generated from the plant will be created in the CMMS.
- 4.4. All personnel responsible for approving the CMMS PR's will have access to the CMMS.

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Processes

Pillar #5

MRO
Best
Practices

PILLAR #5: BEST PRACTICES

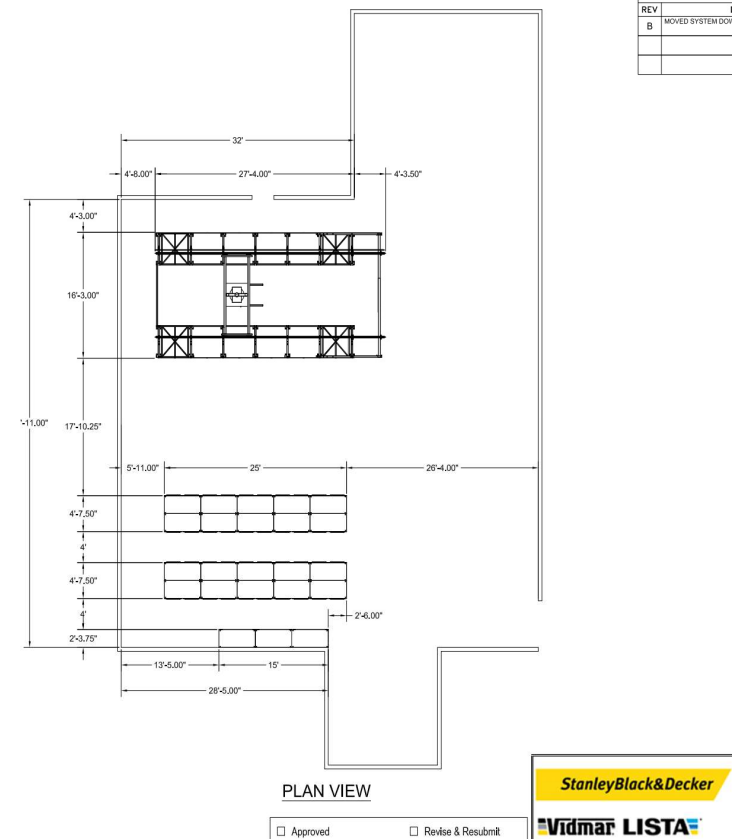
- The fifth MRO key element that pacesetting organizations perform:
 5. They identify, adopt, train and manage MRO Best Practices



PILLAR #5: BEST PRACTICES

5. Common MRO Best Practices include:

- Thoughtful Storeroom Design, Organization and Layout
- Transparency of all “Stashes” and “Cubbyholes”
- Optimal Lighting
- Accessibility and Security
- Use of Flame-Retardant Cabinets
- Climate control considerations



PILLAR #5: BEST PRACTICES

5. Additional MRO Best Practices include:

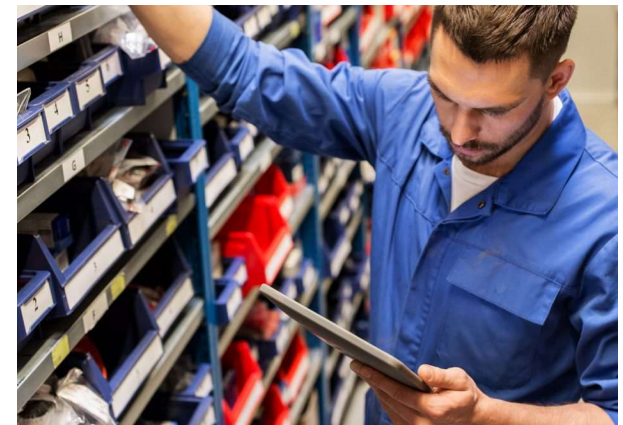
- Optimal Storage Solutions
- Visible Storeroom Map
- Area Signage
- Legible Labeling
- Formalized Add-To-Stock Approvals
- Use of Stock & Non-Stock classifications
- Presence of fire extinguishers & sprinkler system



PILLAR #5: BEST PRACTICES

5. More common MRO Best Practices include:

- Use of Bar coding & Scanning
- Critical Spares Assignment
- Adoption of ABC Classification
- Frequent Cycle Counting
- “Blind” counting approach
- Adoption of Variance Discrepancy Tolerances
- Investigation of events requiring excessive adjustments



PILLAR #5: BEST PRACTICES

5. Some of the MRO Best Practices include:
- Aggressively measure, track and resolve Stock-outs
 - Document Critical Spares in association with Asset criticality ranking
 - Identify and record “Planner” Bill Of Materials
 - Perform Standardization and cross referencing
 - Conduct Shaft Rotation where applicable

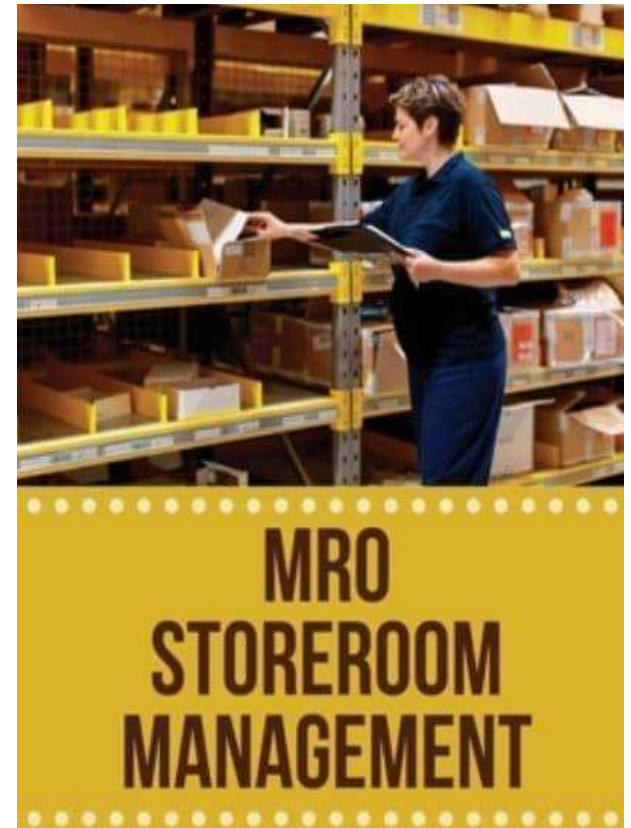
OUT OF STOCK!



PILLAR #5: BEST PRACTICES

5. Common MRO Best Practices include:

- Charging parts to a Work Order
- Spare Parts Reservations
- Kitting and Staging
- Obsolescence Practices:
 - Form a cross-functional obsolescence team
 - Schedule sections of the inventory to be periodically reviewed by the identified SMEs
 - Use the CMMS to capture inactive spares to review



PILLAR #5: BEST PRACTICES

5. Common MRO Best Practices include:

- **Obsolescence Disposition Options:**
 - Return the inventory to your local supplier for a full or partial refund
 - Return the inventory to the local supplier for credit against future purchases
 - Contact the manufacturer to identify resell opportunities throughout their entire distribution channels
 - Resell or give the inventory to a sister plant that can use the items
 - Resell the merchandise to other end users
 - Resell feasible items to employees at a discounted rate
 - Give the items to employees
 - Donate certain items to charity and receive potential tax write-offs
 - Destroy the items and write them off



PILLAR #5: BEST PRACTICES

5. Common MRO Best Practices include:

- Adoption of variable Inventory Management strategies:
 - Point of Use Storage Solutions
 - Vending Machines
 - Free Issue Areas
 - Supplier Stocking
 - Consignment
 - Vendor Managed Inventory



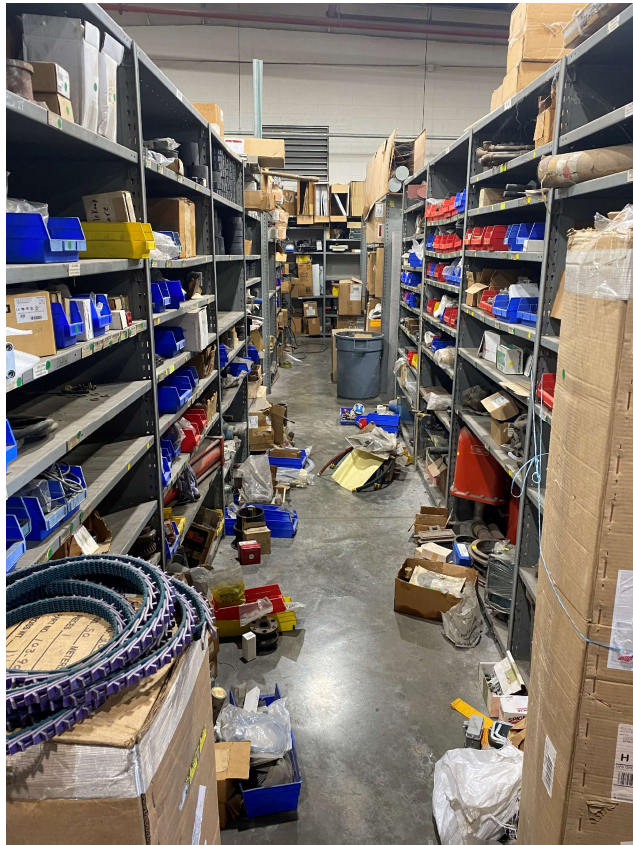
PILLAR #5: BEST PRACTICES

5. Additional MRO Best Practices include:

- Adoption of FIFO Spares replenishment practices
- Staging areas and notifications (Receiving, Returns)
- Repair vs. replacement policy
- Develop a Repairable Spares program including Repair vs. Replacement policy
- Manage Warranty's by capturing serial numbers, date of installation, etc.
- 5S or 6S Program Implementation



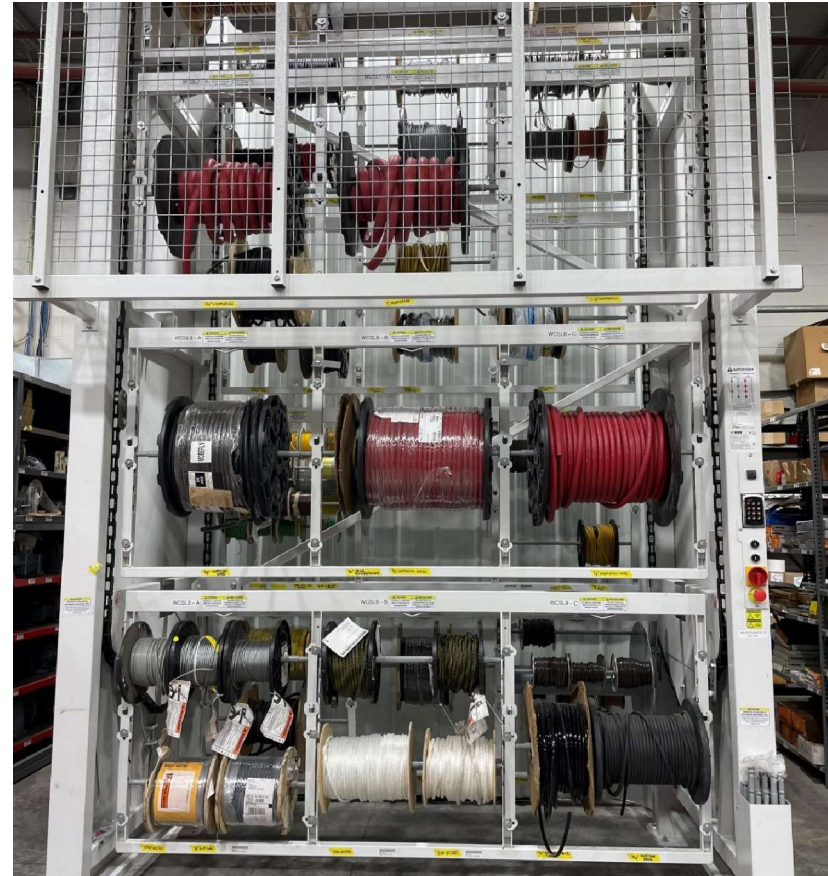
BEFORE & AFTER



BEFORE & AFTER

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The Six Pillars of MRO

Pillar #1

MRO
Program
Assessment

Pillar #2

Good
MRO
Data

Pillar #3

Effective
MRO
Staff

Pillar #4

Sound
MRO
Processes

Pillar #5

MRO
Best
Practices

Pillar #6

Insightful
KPI's
&
Reports

PILLAR #6: KPIs & REPORTS

- The sixth MRO key element that pacesetting organizations perform:
 6. They understand that in order to objectively measure their performance, key and select METRICS are used to ensure continuous improvement occurs



PILLAR #6: KPIs & REPORTS

- Some MRO Metrics & KPI's considerations include:
 - Start by selecting 6-8 of 40 potential MRO KPIs
 - Select those which are most important to your operation
 - Use a mixture of both “Leading” and “Lagging” indicators
 - Determine:
 - The Metric Goal & the Measurement Method
 - The Metric Frequency & Distribution/Visibility
 - The Metric Owner



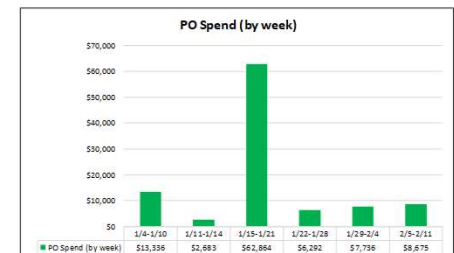
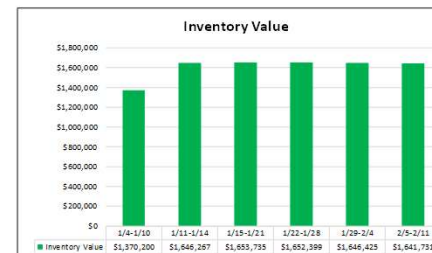
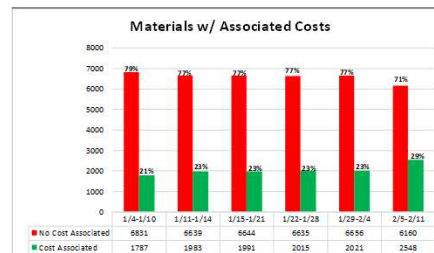
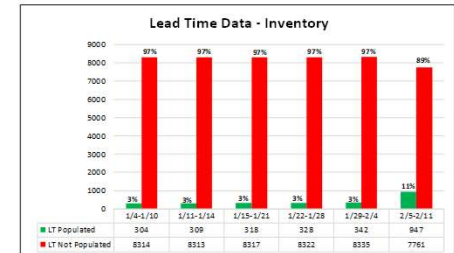
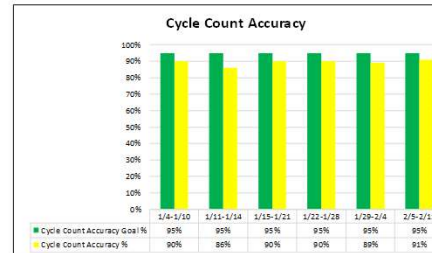
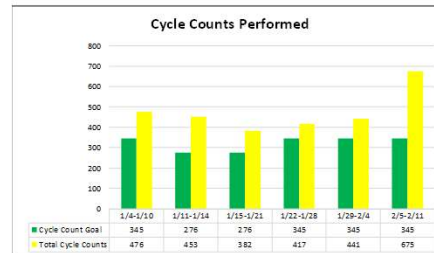
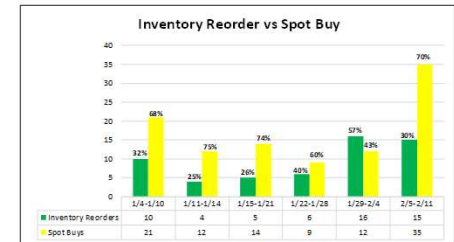
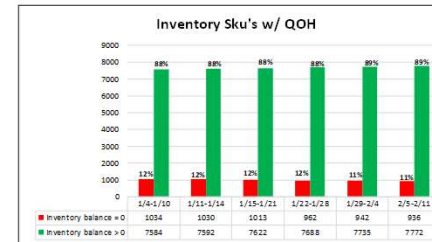
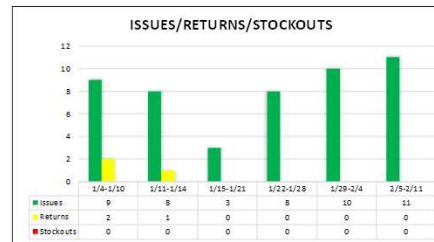
PILLAR #6: KPIs & REPORTS

- Sample MRO Metrics & KPI's include:

#	Metric Description	Metric Formula
1	Service Level % (Stock-outs are the inverse of this %)	$\frac{\text{Total \# of Orders Filled}}{\text{Total \# of Orders Requested}}$
2	% Of Downtime Due To MRO Deficiencies	$\frac{\text{Est. \# Of MRO Related D.T. Hrs./Mo.}}{\text{Est. \# Of Total D.T. Hrs./Mo.}}$
3	% Of Annual Turns	$\frac{\$/\text{Year Of MRO Stores Purchases}}{\text{Total MRO Stores Inventory Value}}$
4	% Of Rush Orders	$\frac{\# \text{ Of Rush MRO Stores Orders}}{\text{Total \# Of MRO Stores Orders}}$
5	% Of Work Orders Which Are MRO Dependent	$\frac{\# \text{ of Maint. W.O. Waiting For Parts}}{\text{Total \# Of Maint. W.O.}}$
6	Cycle Count Activity	$\frac{\text{Actual \# of Items Cycle Counted/}}{\text{Scheduled \# of Items Cycle Counted/}}$
7	Associated Parts	$\frac{\# \text{ of Populated Where Parts Used}}{\text{Total \# of Where Parts Used (SKU Total)}}$
8	Ratio of Obsolete Stock	$\frac{\text{Value of Obsolete Inventory}}{\text{Value of Total Inventory}}$
9	% Of Active MRO Parts	$\frac{\text{Active - Inactive Stock Line Items}}{\text{Total Stock Line Items}}$
10	Inventory Value as a % of RAV	$\frac{\text{Current Inventory Value}}{\text{Plant Equip RAV}}$
11	BOM Progress	$\frac{\# \text{ of BOM's Completed}}{\text{Total \# of Critical Equip. to Perform BOM's on}}$
12	Ratio of Storeroom Inventory per Maintenance Headcount	$\frac{\text{Total Value of Maintenance Stores}}{\text{Total \# of Hourly Maintenance Personnel}}$
13	Storeroom Consumption of Maintenance Budget	$\frac{\text{Total Value of Annual Inventory Issued}}{\text{Total Annual Maintenance Expenditures}}$
14	Jobs Kitted to Jobs Planned	$\frac{\text{The \# of WO's Spares were Pulled}}{\text{Total \# of Spares WO's in Same Period}}$

PILLAR #6: KPIs & REPORTS

- Where possible, utilize graphs to highlight results for a more visual impact



PILLAR #6: KPIs & REPORTS

- Some tips on MRO Metrics & KPI's include:
 - Selecting the valuable few from the numerous many
 - Choosing a mix of leading & lagging KPI's
 - Identifying target values to elevate the significance of the actual measurements relative to the target values
 - Being consistent- frequency, formula, distribution
 - Dynamic- measure different things at different times



PILLAR #6: KPIs & REPORTS

- Additional MRO Metrics considerations:
 - Another advantage of capturing MRO Metrics is that the very act of tracking performance measurements signals that the Materials Management operation is willing to be accountable
 - This tells a lot about the mindset of the MRO program, namely that they recognize there is room for improvement and are transparent in reporting their progress and challenges



PILLAR #6: KPIs & REPORTS

- The Stores Report data will tell you something, but you have to run the reports and look at them or you will miss critical insights!



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Insightful
KPI's
&
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A Foundation of Materials Management Best Practices



We Appreciate Your Interest, Time & Attention!

- **Presenter:**
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