AUDIT REPORT – MANUFACTURING DEPARTMENT

<COMPANY HIDDEN>

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EXECUTIVE SUMMARY:

OEC would like to thank the management at <COMPANY HIDDEN> for the opportunity to audit and report on the infrastructure and processes within the manufacturing department at <COMPANY HIDDEN>.

Based on our observations, audit and analysis, we conclude that the manufacturing and materials departments at <COMPANY HIDDEN> "Needs Improvement". This indicates that a combination of weaknesses in the system of control and minor non-compliances with the controls in place is such as to place service objectives at risk.

We have identified **13 areas of opportunities** for <COMPANY HIDDEN> Management to consider. Our report is structured as follows:

- In the first section titled "Current State of Manufacturing Department at <COMPANY HIDDEN>" we have provided our observations related to the procedures and processes being followed at <COMPANY HIDDEN>.

- In the next section titled "Future State of Manufacturing Department at <COMPANY HIDDEN>" we have provided the proposed changes for the management to consider and implement.

- In the final section "Implementation Plan", we provide a project plan with approximate timeline and sequence of implementation of the identified improvement opportunities.

As per our audit, the top three'Positives' for the Manufacturing Department at <COMPANY HIDDEN> are as follows:

- The supervisors at <COMPANY HIDDEN> are very knowledgeable and highly experienced. They serve as the backbone of the entire manufacturing operation.
- The tool calibration system used at <COMPANY HIDDEN> is very robust.
- There is adequate space and machinery to achieve output targets.

We observed the following top three areas of 'Improvement' for the Manufacturing department at <COMPANY HIDDEN>:

- Absence of a process documentation and record keeping within the manufacturing department.
- Absence of metrics and visual management of manufacturing processes.
- Absence of an improvement of process flows and material management within the facility

1.0 INTRODUCTION:

1.1 Objective

This third party audit includes review of the manufacturing and materials process practices at COMPANY HIDDEN> located in <PLACE HIDDEN>. The audit was conducted by Ozone Excellence Consulting (OEC) between March 5th 2017 to April 15th 2017. The purpose of the audit is to provide an independent and objective view regarding the manufacturing and materials processes at <COMPANY HIDDEN>. This review will propose improvements to the manufacturing processes considering the size, product and geographical location that <COMPANY HIDDEN> operates in.

This report presents the third party review findings with observations and best practice recommendations, where there may be opportunities for improvement.

1.2 Background

XXXX

1.3 Scope of Engagement

The scope of the engagement is to conduct a third party audit assessment of the Manufacturing and Materials Management Department at <COMPANY HIDDEN>.

OEC considers the incoming material at dock as the starting point for this audit and the finished goods leaving the <COMPANY HIDDEN> facility at XXXX as the end point.

Our scope for this engagement is summarized below.

- Review of Manufacturing Operations within <COMPANY HIDDEN>
- Review of Material Handling Procedures at <COMPANY HIDDEN>
- Review of Material movement within the facility
- Review of Metrics and KPI for the Operations department
- Review of Process Routing within the Production department
- Review the Inprocess inspection and documentation procedures
- Review of Operational Procedures/SLA/Manuals
- Review content and understanding of SOP's, Manuals and their adherence thereof
- Provide recommendation for in XXXX
- Provide recommendations for all of the above mentioned areas

1.4 Approach for Engagement

The approach of the engagement is as follows:

- A detailed understanding of the processes was obtained by interviewing the Process owners based on comprehensive checklist covering the processes and sub process of the manufacturing department.

- Copies of system documents were requested and reviewed to familiarize and understand the completeness of the departmental processes. Multiple site visits were also undertaken to review the performance of the department and infrastructure.

- Key risks and controls were identified and documented based on process understanding, site surveys and interviews conducted.

- Detailed examination of key documents related to the process and sub processes was conducted based on the identified risks.

- The observations and recommendations in this report are based upon reviewing the documents and infrastructure, performing site inspections, auditors' previous experience in manufacturing audits, best practices and benchmarks, including documentation provided by <COMPANY HIDDEN> personnel and discussions with the Process Owners and Senior Management.

1.5 Acknowledgement

We would like to take this opportunity to thank the management and staff at <COMPANY HIDDEN>for their cooperation and assistance during the course of the engagement. We are committed to offering you excellent service and look forward to building a long and value-added relationship with you.

1.6 Limitation

This third party audit procedures rely on information and representations made available to the auditors by the process owners and key individuals associated with the processes. Our third party audit procedures comprise inquiries, observations and limited tests of transactions on a sample basis, covering the detailed assessment objectives.

Any misrepresentation intentional or otherwise may affect the results and recommendations of this audit.

2.0 CURRENT STATE OF MANUFACTURING DEPARTMENT AT <COMPANY HIDDEN>

OEC began its audit by performing a walk through and understanding the current processes at <COMPANY HIDDEN>. We reviewed the process flow within the manufacturing operations at <COMPANY HIDDEN>. Our audit summarizes the overall operations process at <COMPANY HIDDEN> in the flowchart below.

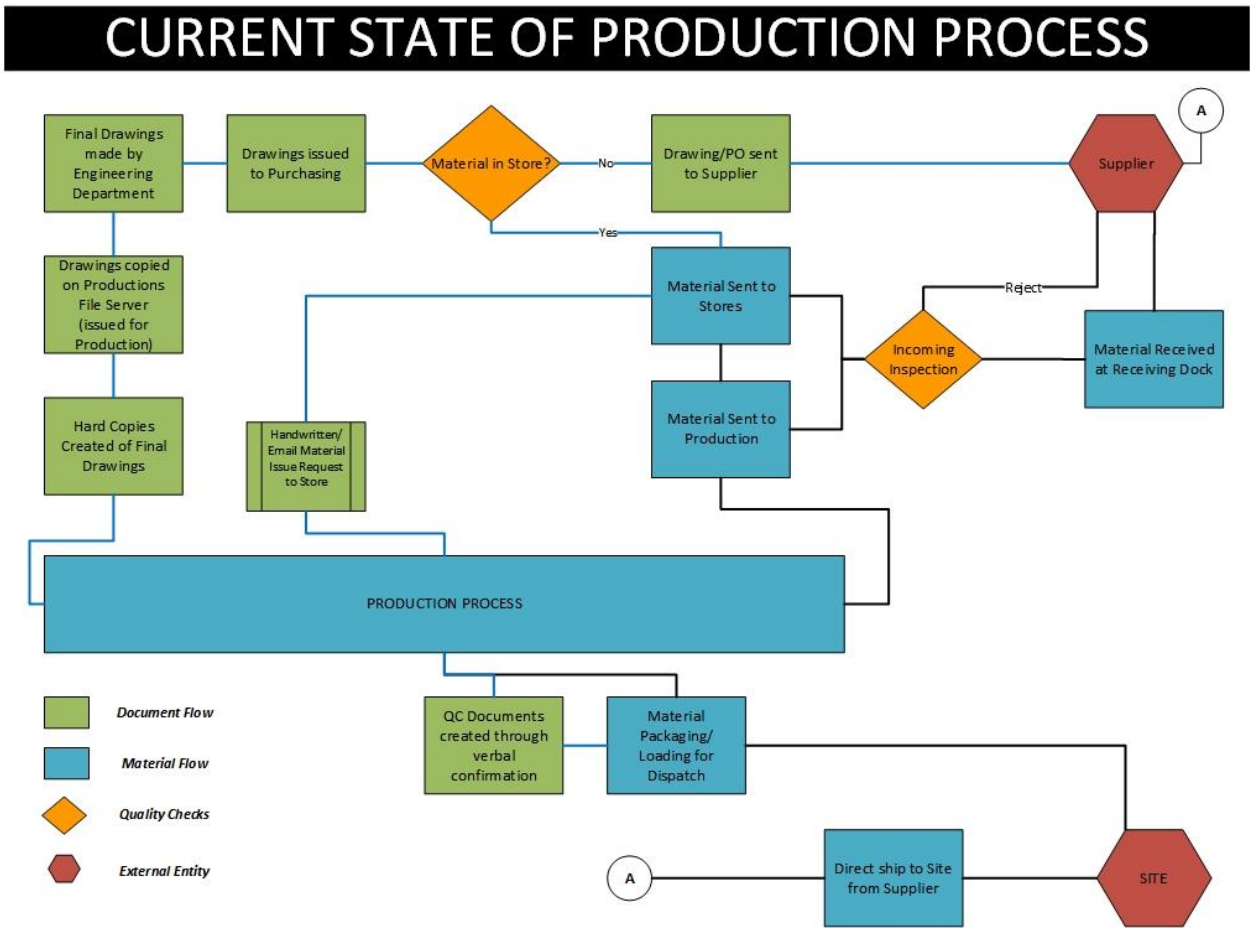


Fig 1: Current State Production Process Diagram

We observed the following areas of opportunity within the process flow:

- XXXX
- XXXX
- XXXX
- XXXX
- XXXX

- XXXX

As a next step we filled out a PQPR for each product family. We have graphically represented **(Spaghetti Diagram)** the process routings for each product family on the current facility layout.A spaghetti diagram is a visual representation using a continuous flow line tracing the path of an item or activity through a process. The continuous flow line enables process teams to identify redundancies in the work flow and opportunities to expedite process flow.

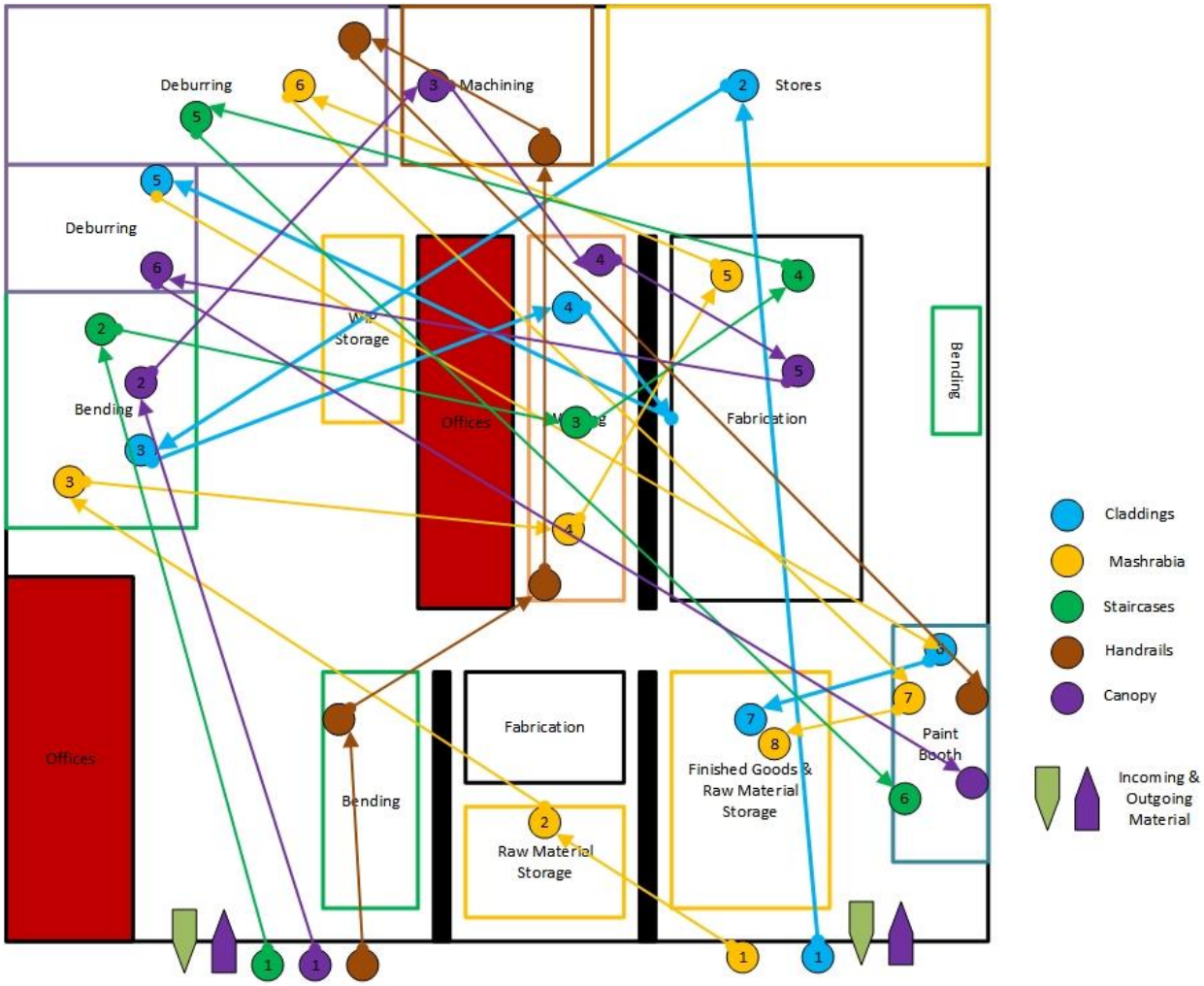


Fig 2: Current State Material Flow Diagram

Observations:

- XXXX
- XXXX

- XXXX
- XXXX

As a next step OEC performed a **14 section** audit on the entire manufacturing operations at <COMPANY HIDDEN>. We reviewed your facility using the same standards that are used to audit manufacturing operations of various global manufacturing facilities. A summarized score for the entire audit is presented below.

SECTION	EXCELLENT (5)	VERY GOOD (4)	GOOD (3)	ACEPTABLE (2)	SUB STANDARD (1)	NON EXISTANT (0)	NOT SURVEYED (N/A)	SCORE	MAX SCORE	%
CUSTOMER SERVICE	0	0	12	0	0	5	0	17	48	35.4%
SUPPLIER AND SUB CONTRACTOR CONTROL	0	0	4	3	0	3	0	10	30	33.3%
SPECIFICATION AND MATERIAL CHANGE CONTROL	0	0	0	0	0	2	0	2	18	11.1%
MATERIAL STORAGE AND FLOW	0	0	0	0	4	3	0	7	30	23.3%
MAINTENANCE SERVICES	0	0	4	3	2	4	0	13	42	31.0%
TOOLING CONTROL	0	0	4	0	0	5	0	9	36	25.0%
PACKAGING AND SHIPPING CONTROLS	0	0	0	6	0	2	0	8	24	33.3%
FACILITIES AND ENVIRONMENTAL CONTROLS	0	0	20	0	0	0	0	20	30	66.7%
EDUCATION TRAINING AND SAFETY AWARENESS	0	0	8	0	0	4	0	12	36	33.3%
PRODUCT/PROCESS INTRODUCTION OR CHANGES	0	0	0	0	0	4	0	4	24	16.7%
INFORMATION COMMUNICATION AND CORRECTIVE ACTIONS	0	0	0	0	0	5	0	5	30	16.7%
PLANT MANAGEMENT AND QUALITY SYSTEMS	0	0	0	0	2	4	0	6	36	16.7%
MATERIAL CONTROLS	0	0	0	3	8	2	0	13	42	31.0%
CALIBRATION SYSTEM	0	30	0	0	0	0	0	30	42	71.4%
TOTAL	**0**	**30**	**52**	**15**	**16**	**43**	**0**	**156**	**468**	**33.3%**

Table 1: Summarization of Process Audit

Rating	
0 - 234	This score is classified as "Must Improve." A score which falls within this range needs immediate attention of Management to initiate remedial actions.
235 – 325	This score is classified as"Good to Improve." A score which falls within this range requires immediate efforts from the Company/Department while taking into considerations financial impact for the organization.
325 -468	This score is classified as"Stable." A score in this range is an observation for the Management to consider opportunities for continuous improvement.

We will elaborate on each section in detail below. We have attached the completed audit checklist as an addendum to this report.

2.1 Customer Order Management

Introduction: This section covers the various activities of customer service requirements (in relations to manufacturing activities).This incorporates areas such as charts for on-time performance, procedures for customer order status and customer requests and complaints. It also audits systems used to reduce paperwork. Furthermore, the presence and responsibilities of a dedicated customer service representative are examined.

<COMPANY HIDDEN> scored a**17 out of 48** available points

Observation:XXXX

2.2 Supplier & Sub-contractor Control

Introduction: In this section the procedures and processes involved when working with suppliers and subcontractors are audited. It also encompasses assessment and evaluation of suppliers, along with their performance rating. Additional aspects such as inspection of supplier quality program and active involvement with suppliers to improve quality are also incorporated in this section.

<COMPANY HIDDEN> scored a **10 out of 30** available points

Observation:XXXX

2.3 Specification and Material Change Control

Introduction: Under "Specifications and Material Change Control", we audit the existence and quality (if applicable) of written procedures to obtain, update and distribute customer specification changes to all appropriate functions of the operation. Procedure for written customer approval is also audited. Additionally the procedure to purge all sensitive materials and obsolete specifications from active operation files is also examined. This includes copies of specifications, dies, labels, printing plates etc.

<COMPANY HIDDEN> scored a **2 out of 18**available points

Observation:XXXX

2.4 Material Storage & Flow

Introduction: This area covers numerous aspects related to materials. This includes raw materials, in-process material as well as finished products. Clear identification and location of material is audited. Another important aspect that is carefully inspected is the layout of the entire facility and material flow. This is to ensure effective material movement for minimal wastage of time and resources. Material related documentation and procedures are also audited.

<COMPANY HIDDEN> scored a**7 out of 30** available points

Observation:XXXX

2.5 Maintenance Services

Introduction: In this section, the various aspects that deal with maintenance for equipment are audited. Documentation for maintenance history, preventative maintenance plan and periodic audits for compliance with the same are examined. Moreover, presence and usage of statistical analysis of maintenance history is observed. Some of the other areas covered include existence and neat storage and accessibility of technical and equipment manuals and spare part inventory.

<COMPANY HIDDEN> scored a**13 out of 42** available points

Observation:XXXX

2.6 Tooling Control

Introduction: As the name suggests, this area audits the documentation and procedures related to handling and maintaining tools. Storage and marking of tools is audited. Additionally documented procedures for evaluation of tools at specific intervals, inspection and maintenance before storage and records for tolling maintenance and repairs are audited.

<COMPANY HIDDEN> scored a**9 out of 36** available points

Observation:XXXX

2.7 Packaging & Shipping Control

Introduction: We audited the written specifications and documentation for truck loading, bracing of shipping units and finished shipping units. This section also includes inspection of documented processes for problem correction (problem caused during shipment to customer or from supplier).

<COMPANY HIDDEN> scored an**8 out of 24** available points

Observation:XXXX

2.8 Facilities and Environmental Control

Introduction: Several aspects related to the overall facility and setting were considered and audited here. Working space for various personnel, overall cleanliness of the facility, lighting and noise survey were performed. Additionally environmental controls for production, warehouse, tool storage and stores areas was examined.

<COMPANY HIDDEN> scored a**20 out of 30** available points

Observation:XXXX

2.9 Education Training & Safety Awareness

Introduction: Various training and education programs are audited in this section. Ongoing education of job responsibilities, training in continuous quality improvement are some of the aspects that are

audited. Further, employee testing and certification, retention and storage of training records is also examined.

<COMPANY HIDDEN> scored a**12 out of 36**available points

Observation:XXXX

2.10 Product/Process Introduction & Changes

Introduction: This section deals with the changes, process and procedures that need to be in place when a new product or process is introduced or changed. Process capability needs to be determined and approved to be satisfactory before standardization of the product. Additionally, we audited the qualification testing of incoming materials and finished products during process/product introduction.

<COMPANY HIDDEN> scored a**5 out of 30** available points

Observation:XXXX

2.11 Information Communication & Corrective Action

Introduction: In this section we examine the existence and efficiency of a corrective action system. We also audit the involvement of the team in the same. Additionally, reports for quality improvement indicators and clear internal quality reports are audited.

<COMPANY HIDDEN> scored a**5 out of 30** available points

Observation:XXXX

2.12 Plant Management & Quality Systems

Introduction: This section examines the involvement of management and budgets allocated for quality improvement processes at the plant and at corporate level. It also involves auditing the systems, procedures and controls documentation in the quality manual. The use of benchmarking to identify the best in class is also observed.

<COMPANY HIDDEN> scored a**6 out of 36** available points

Observation:XXXX
We noted that the ISO certification for the plant was in name alone and principles of the systems were not being followed.

2.13 Material Controls

Introduction: In this section we cover various aspects related to materials: specifications, sampling, material certifications etc. Additionally plant and lab instruments and tests are also evaluated for

capability to measure appropriate characteristics of incoming, in process and outgoing material. Additionally material traceability within the plant is examined.

<COMPANY HIDDEN> scored a**13 out of 42** available points

Observation:XXXX

2.14 Calibration Systems

Introduction: In this section we audited the calibration systems and recording procedures associated with it. Testing equipment, testing methods, calibration standards gauge repeatability and reproducibility studies, testing of operators and inspectors are the numerous aspects that are audited in this area.

<COMPANY HIDDEN> scored a**30 out of 42** available points

Observation:XXXX

Summary of Observations:

i. XXXX
ii. XXXX
iii. XXXX
iv. XXXX
v. XXXX
vi. XXXX
vii. XXXX
viii. XXXX
ix. XXXX

3.0 PROPOSED STATE OF MANUFACTURING DEPARTMENT AT <COMPANY HIDDEN>:

Manufacturing has evolved considerably since the advent of the industrial revolution. In the current global and competitive age, it is very important for an organization to have manufacturing practices which are lean, efficient, cost-effective and flexible. We recommend that a world class manufacturing processes must possess the following characteristics:

- Ideal manufacturing operations must set up 'just in time' production and 'lean management' techniques to reduce wastage in material and manpower resources, thereby reducing costs.
- Such an organization must implement total quality management that leads to reduction of defects and encourages zero tolerance towards defects.
- Implementation of total preventive maintenance procedures to prevent any stoppage of production through mechanical failure.
- Such an organization must have processes that utilize workers, plant, machinery and other resources at minimum cost.

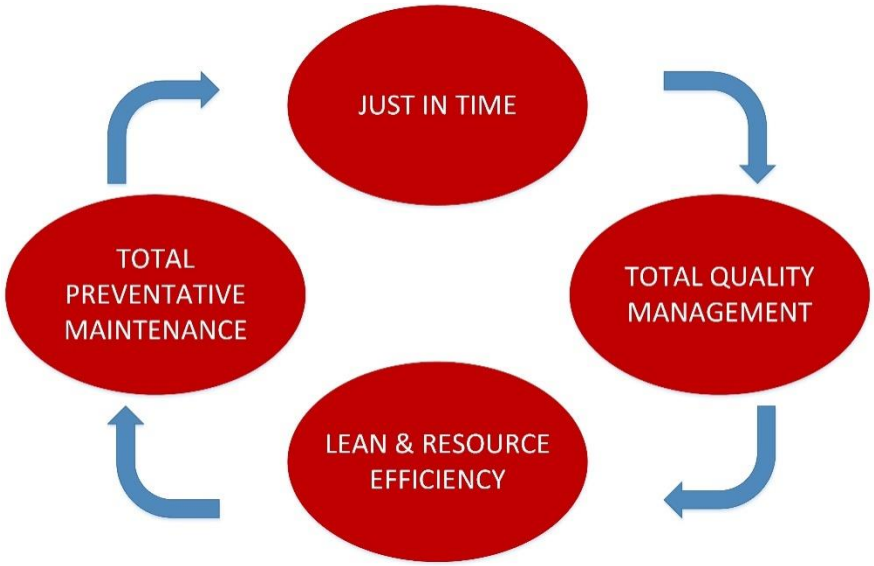


Fig 3.Principles of an Ideal Manufacturing Setup

In the sections below, OEC will recommend **13 areas of improvements**, taking into account the principles mentioned above into our recommendations. Each of the section below describes the activity to be completed and the process to be used to achieve it.

3.1 XXXX

Webelieve that <COMPANY HIDDEN> should develop a long term roadmap for its operations department. This roadmap is a continuously improving, lean, flexible and disciplined common production system that encompasses a set of principles and processes to drive a lean manufacturing environment.Key elements of the system includeXXXX

We propose XXXX.

We believe a holistic approach to process and facility improvement would have a larger impact on the entire operations as opposed to targeted improvements in multiple areas.

Table 2: Recommended roadmap for <COMPANY HIDDEN>PS

3.2 XXXX

One of the key principles of the Toyota Production Systems is to develop 'Straight-line' or 'Horseshoe' flow within facilities. These layouts are considered the most cost effective and lean layouts.

OEC recommends that <COMPANY HIDDEN> create **8 specific work centers** within their facility. These work centers should be grouped according to the processes that they perform.

- XXXX Cell
- XXXX Cell
- XXXX Cell
- XXXX Cell
- XXXX Cell
- XXXX Cell
- XXXX Cell
- XXXX

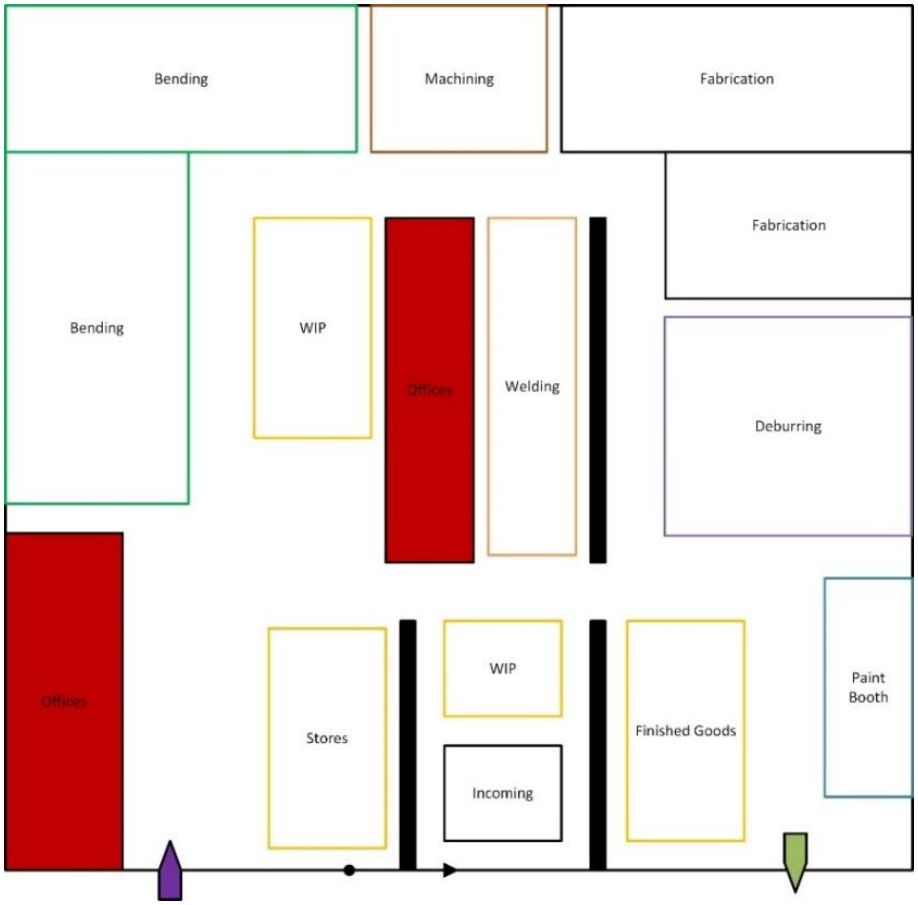


Fig 4: Proposed Facility Layout

This would allow each individual work center to have standard work instructions and allow assignment of hourly costs. Further, <COMPANY HIDDEN> would be able to attain specialization and efficiency from its staff.

We recommend that XXXX

3.3 XXXX

OEC recommends merging all activities XXXX

3.4 XXXX

Streamlining of processes is the first step towards leaning out the manufacturing process. The most common tasks performed in this process include (but not limited to) XXXX

This will allow the organization to develop efficient, structured processes and procedures, that will allow <COMPANY HIDDEN> to produce the right product at the right time in the right quantities. We recommend <COMPANY HIDDEN> XXXX

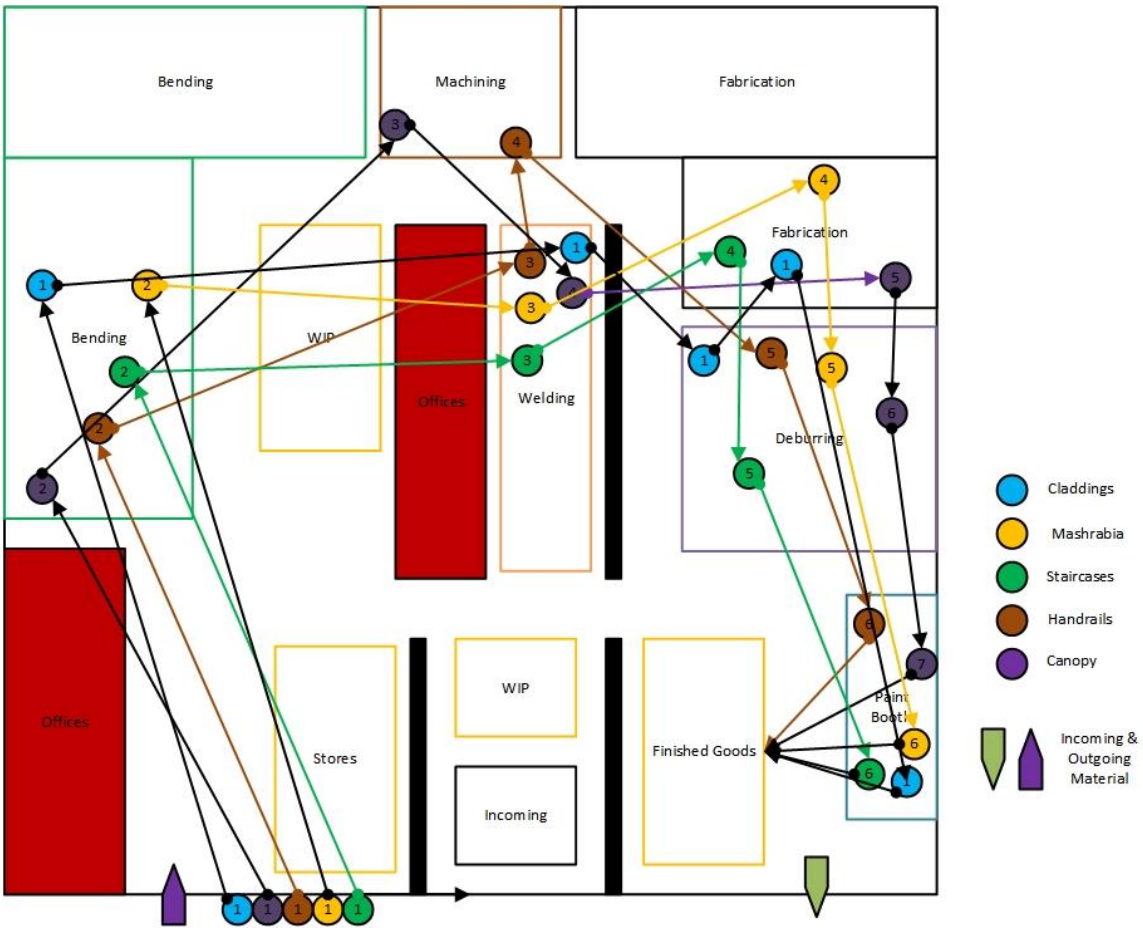
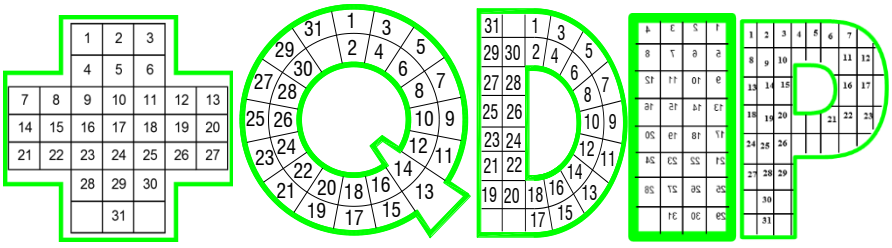


Fig 5: Future State Material Flow Diagram

3.5 XXXX

OEC recommends XXXX. We recommend that the XXXX

<COMPANY HIDDEN> should focus on “Visual Management” and “Meetings at the Gemba”. We recommend Safety (+), Quality (Q), Delivery (D), Inventory (I) and Productivity (P) as the five metrics to track. XXXX



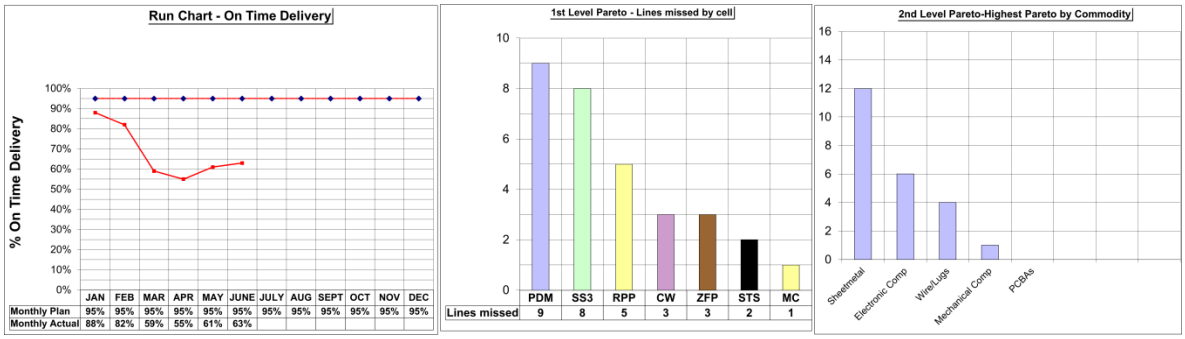


Fig 5 Proposed Metrics Collected Charts (Visual Management)

3.6 XXXX

XXXX

Nonperformance is identified after systematic evaluation and analysis of the root cause of the nonperformance. Non-conformance may be a market complaint or customer complaint or a failure of a machinery or a quality management system, or misinterpretation of written instructions to carryout a work.

Some techniques to consider XXXX

All the XXXX completed over time must be stored in a knowledge repository with access to all if an issue were to arise in the future.

3.7 XXXX

XXXX

We observe that most of the processes at <COMPANY HIDDEN> are informal and are completed solely on the basis of tenure of some critical employees. XXXX

<COMPANY HIDDEN> must consider XXXX

3.8 XXXX

OEC reviewed the documentation provided by the ERP vendor. We conclude that the XXXX

The flow chart below displays how the new work centers will integrate with the ERP module and help develop a robust MIS.

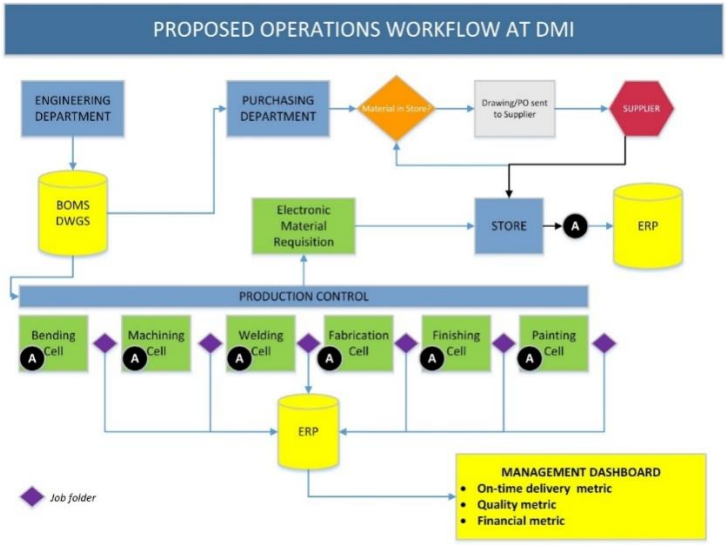


Fig 6: Proposed Information Workflow

3.9 XXXX

OEC recommends that <COMPANY HIDDEN> XXXX

OEC further recommends that XXXX

Thirdly, material today is not identified with its location in the ERP system. XXXX

Finally we recommend XXXX

3.10 XXXX

In process XXXX documentation during the production process. This approach of inspection XXXX

OEC recommends that <COMPANY HIDDEN> create XXXX

3.11 XXXX

The businesses and individuals that provide goods and services to an organization are considered its vendors. XXXX is the process that helps select the right vendors; categorize vendors to ensure the right contract, metrics and relationship; mitigate risk when using vendors; and establish a vendor management organization that best fits the enterprise.

This enables organizations to optimally develop, manage and control vendor contracts, relationships and performance for the efficient delivery of contracted products and services. This can help <COMPANY HIDDEN> meet business objectives, minimize potential business disruption, avoid deal and delivery failure, and ensure more-sustainable multisourcing, while driving the most value from their vendors.

<COMPANY HIDDEN> must develop criteria to XXXX

3.12 XXXX

XXXX

XXXX

3.13 XXXX

XXXX

We recommend developing XXXX that will identify opportunities and improve processes within specified time.

4.0 IMPLEMENTATION PLAN

OEC provides a tentative time requirement to implement the proposed improvements to the manufacturing department. We have recommended the need for an external consultant to complete specific tasks based on our analysis of the expertise available within <COMPANY HIDDEN>

We have highlighted each task as follows

- Red (Must Improve)
- Yellow (Good to Have)
- Green (Recommendation)

#	TASK	EXPERT	DURATION
1	XXXX	External	9 -12 months
2	XXXX	Internal	2-4 months
3	XXXX	Internal	3-6 months
4	XXXX	Internal	2-4 months
5	XXXX	External	2-4 months
6	XXXX	External	2-4 months
7	XXXX	Internal	6-12 months
8	XXXX	External	3-6 months
9	XXXX	Internal	3-6 months
10	XXXX	External	1-3 months
11	XXXX	External	2-4 months
12	XXXX	Internal	1-2 months
13	XXXX	External	Ongoing