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# REDUCTION OF NON-CONFORMING MATERIALS

**Presented by:** Baxter Team 3

*Pavan Shinde*

*Anish Kumar*

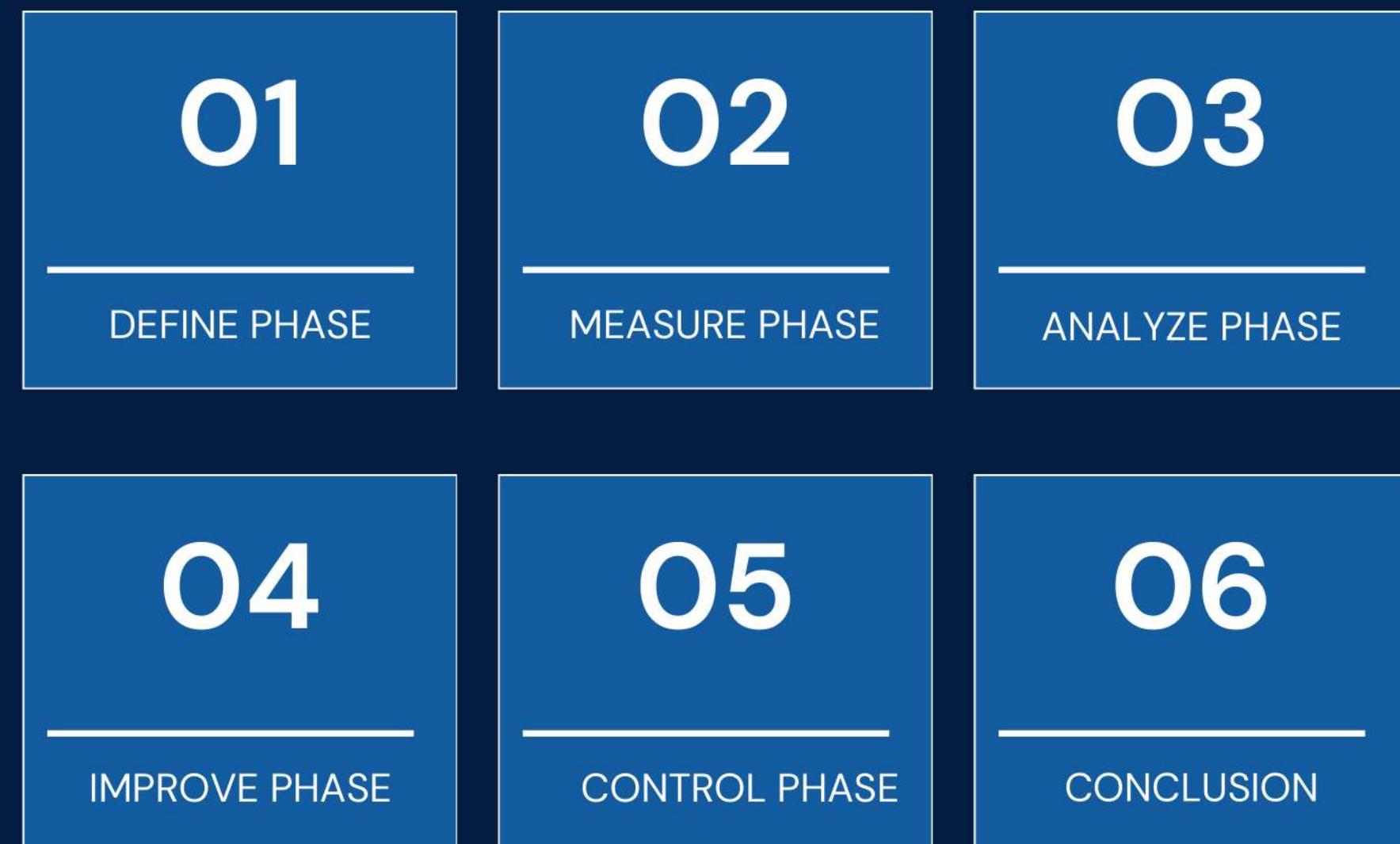
*Vedant Murudkar*

*Shivani Sadare*

*Prasun Singh*



# OVERVIEW



A photograph of a white robotic arm with multiple joints and a gripper at the end, positioned over a workpiece on a blue surface. The background is blurred, showing an industrial setting with other equipment.

# DEFINE PHASE





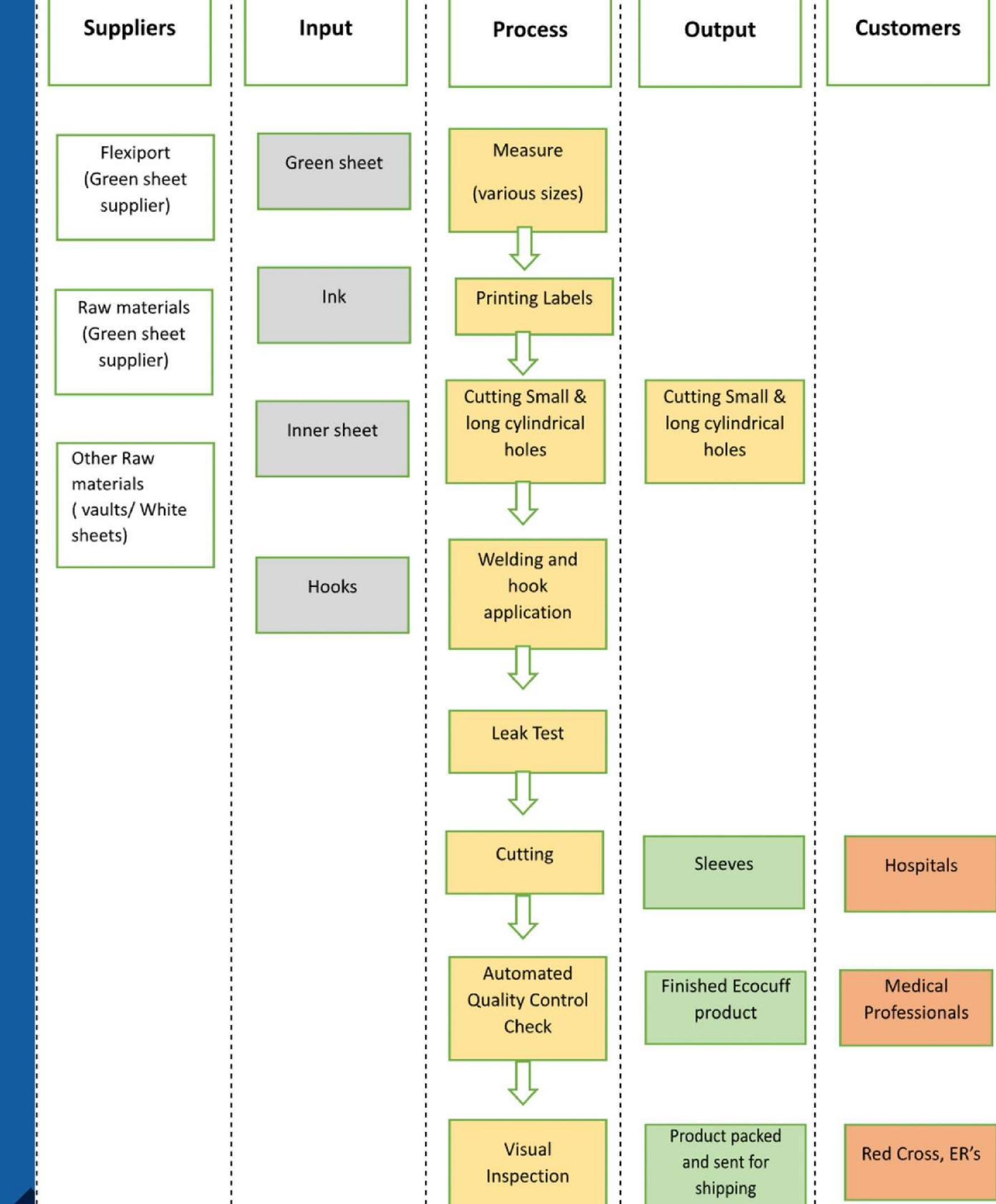
## Problem Statement

Eco Cuff product line produced **15.6%** of the defective products, which are causing a great financial impact to the company.

## Goal

Achieve a reduction in the number of defects from the Eco Cuff product line ranging from 15.6% to **7.00%**.

# SIPOC Diagram

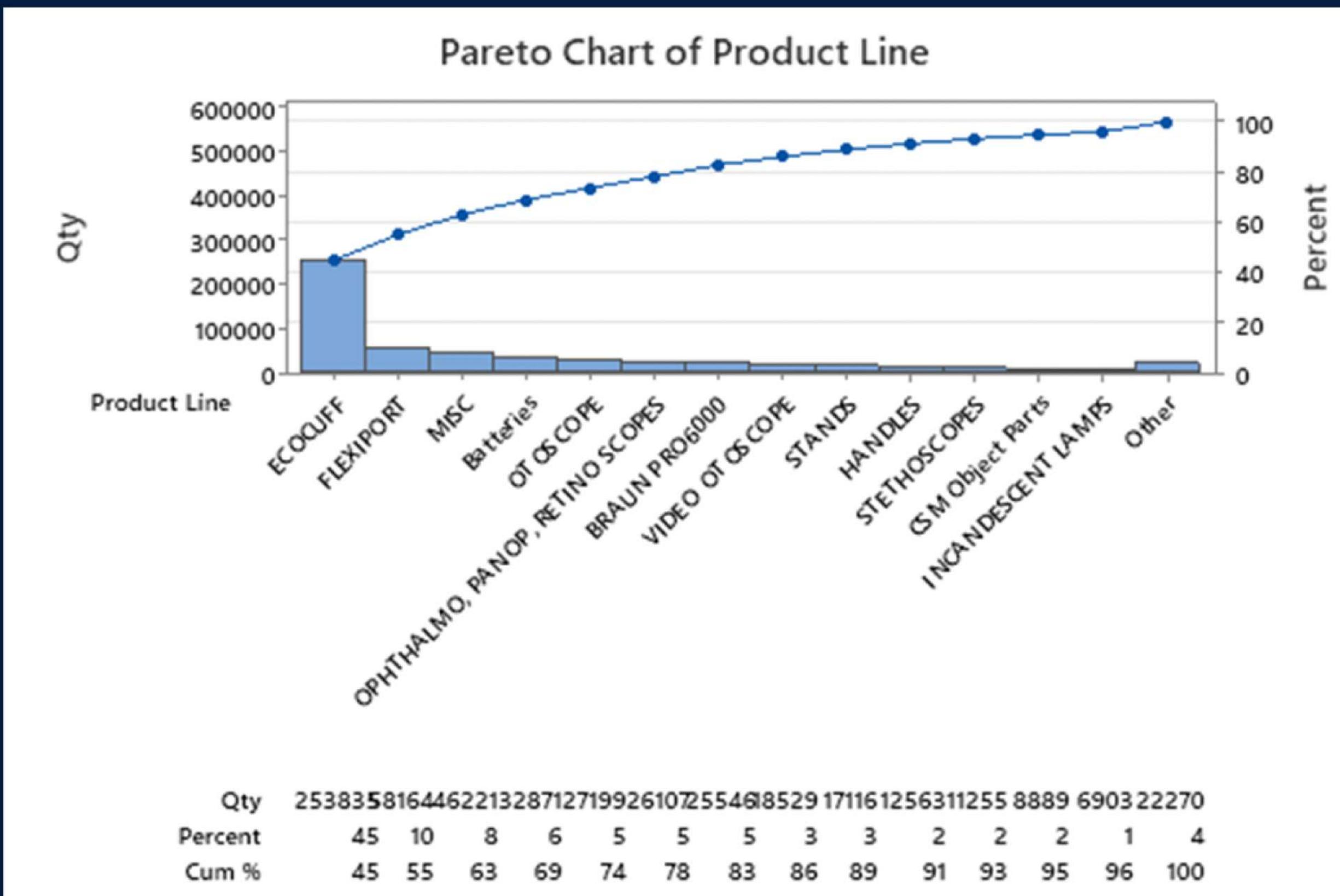


# CTQC

**Critical To Quality Characteristics Chart**

Customers	Need	Driver	CTQC
Baxter	Reliable & Defect free Cuff's	Quality production with less error	Production error
	Consistency in production	Skilled Workforce	Operator error
ER's, Redcross	Quality products	Reliability	Leak proof (Defect)
	Compliance and Safety standards	Quality management Systems, Regulatory Adherence	Adherence to Standards, Compliance measure & Tolerance dimensions
	Sterile Packaging	Health & safety Compliance	Must provide adequate protection during storage, proper packaging & Handling

# PRODUCT LINE SELECTION

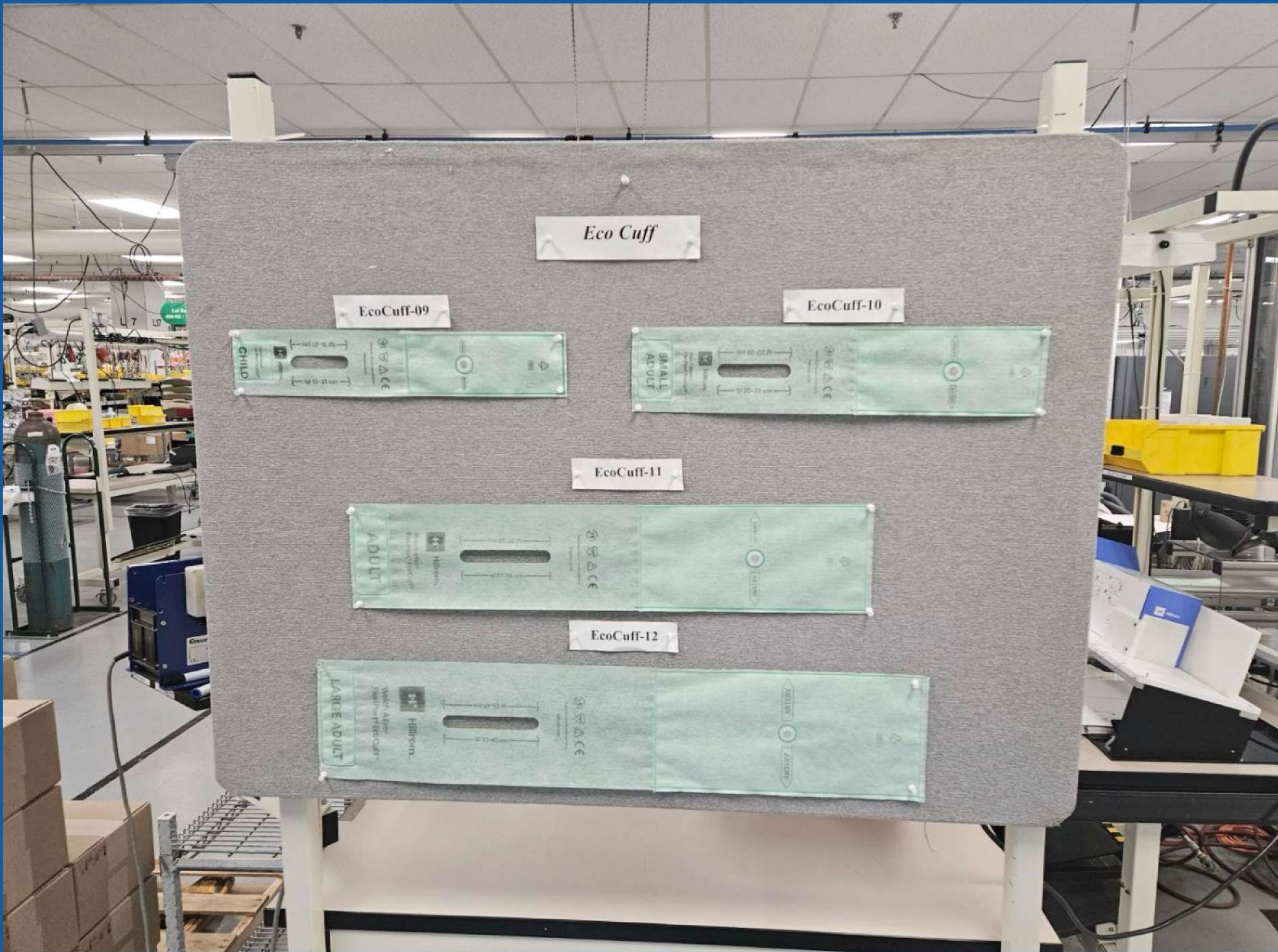


# ECO CUFF

A single-patient cuff helps the hospital to reduce costs, cross-contamination and has notable environmental impact.



# ECO CUFF PRODUCT LINE @BAXTER





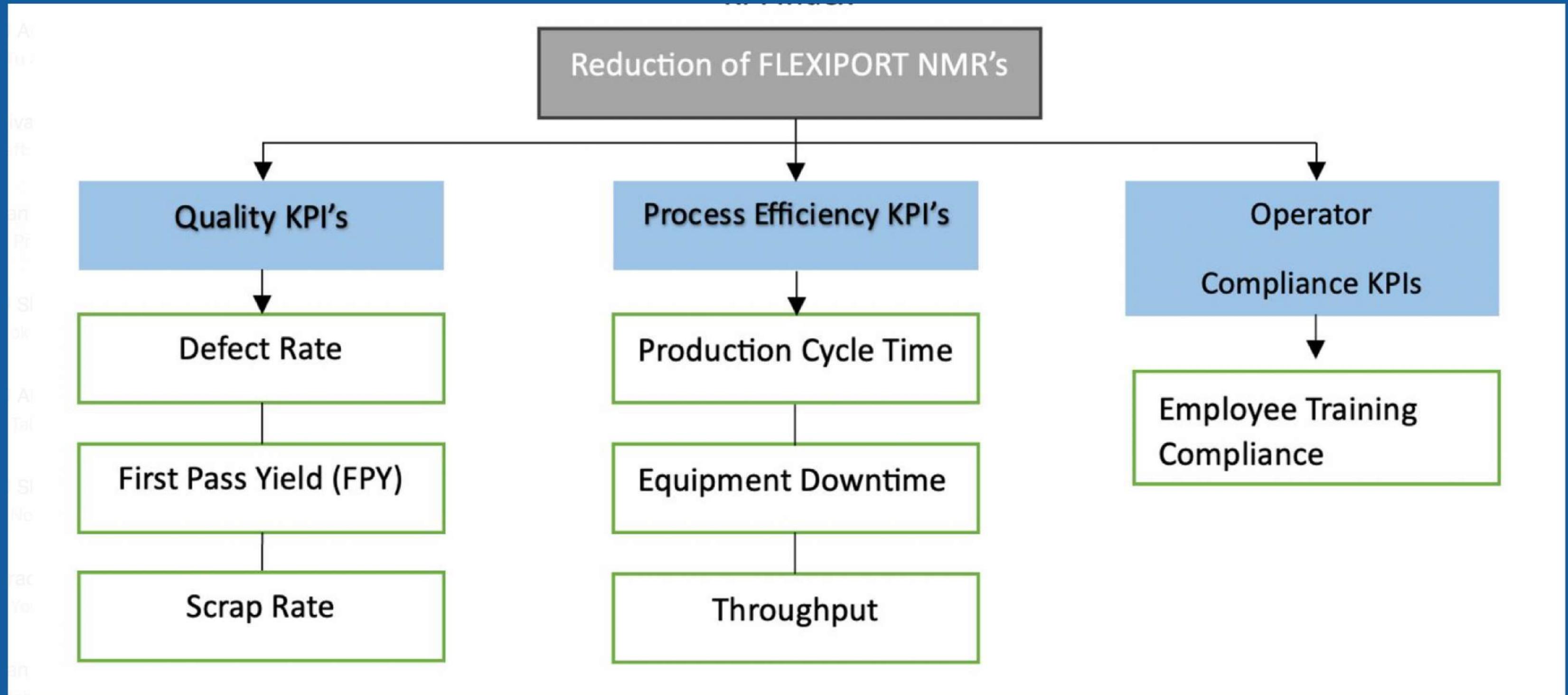
# MEASURE PHASE



# Key Performance Indicators

Department	Key Performance Indicator
Order Fulfilment	Cuff's are available in stock and Quick delivery of Cuff's.
Production rate	No of Cuff's produced per day or shift
Sales	Revenue and Profit margins
Cuff's Defect Percentage	Percentage of Cuff's having defect post assembling
Defective sheets from vendor	Percentage of cuffs having defect pre-assembling
Cuff's Produced	No of Cuff's Produced

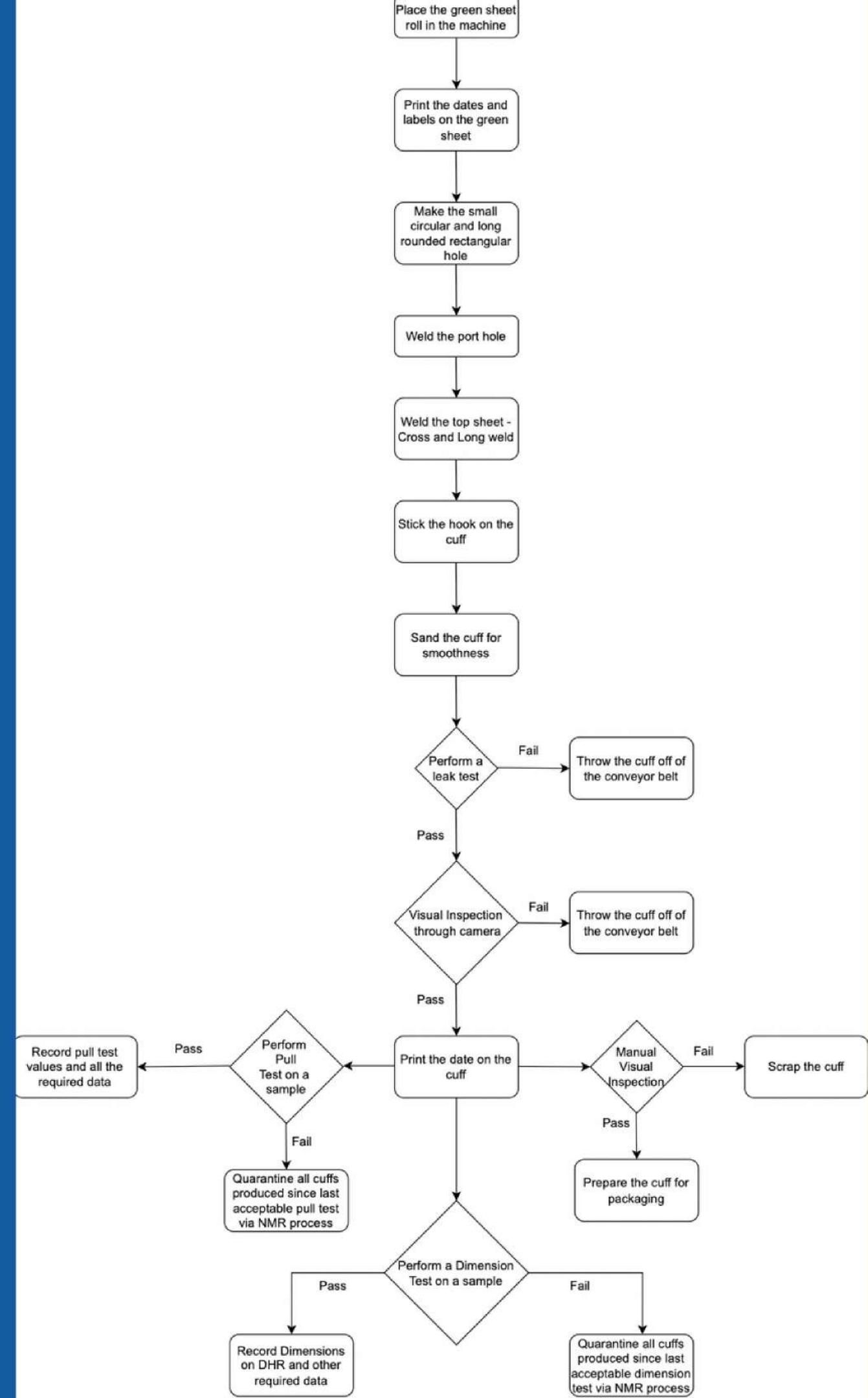
# KPI INDEX



# Data Collection Plan

Description of Measurement	Source of Data	Who is going to Collect?	Method of Collection	When to Collect	Family of Measure <sup>1</sup>
Sheet Size for Production	Baxter Order details	Sales Department	Order Transaction Datasheet	Daily collection of data	Productivity
Welding Temperature & Pressure	Company internal database	Production Department	Company internal Quality report	Start of Shift or Every 4 to 8 hours	Quality
Sticking Temperature & Pressure	Company internal database	Production Department	Company internal Quality report	Start of Shift or Every 4 to 8 hours	Quality
Leak Test - Pressure	Company internal database	Production Department	Company internal Quality report	Each cuff testing	Quality
Pull Test Values	Company internal database	Production Department	Company internal Quality report	Start of Shift or Every 4 to 8 hours	Quality
Dimension Values	Company internal database	Production Department	Company internal Quality report	Start of Shift or Every 4 to 8 hours	Quality
Visual Inspection	Quality control department	Quality Control Department	Company internal Quality report	Upon failing Pull test	Quality

# Flowchart



# ECO CUFF MANUFACTURING UNIT



# ECO CUFF MANUFACTURING UNIT

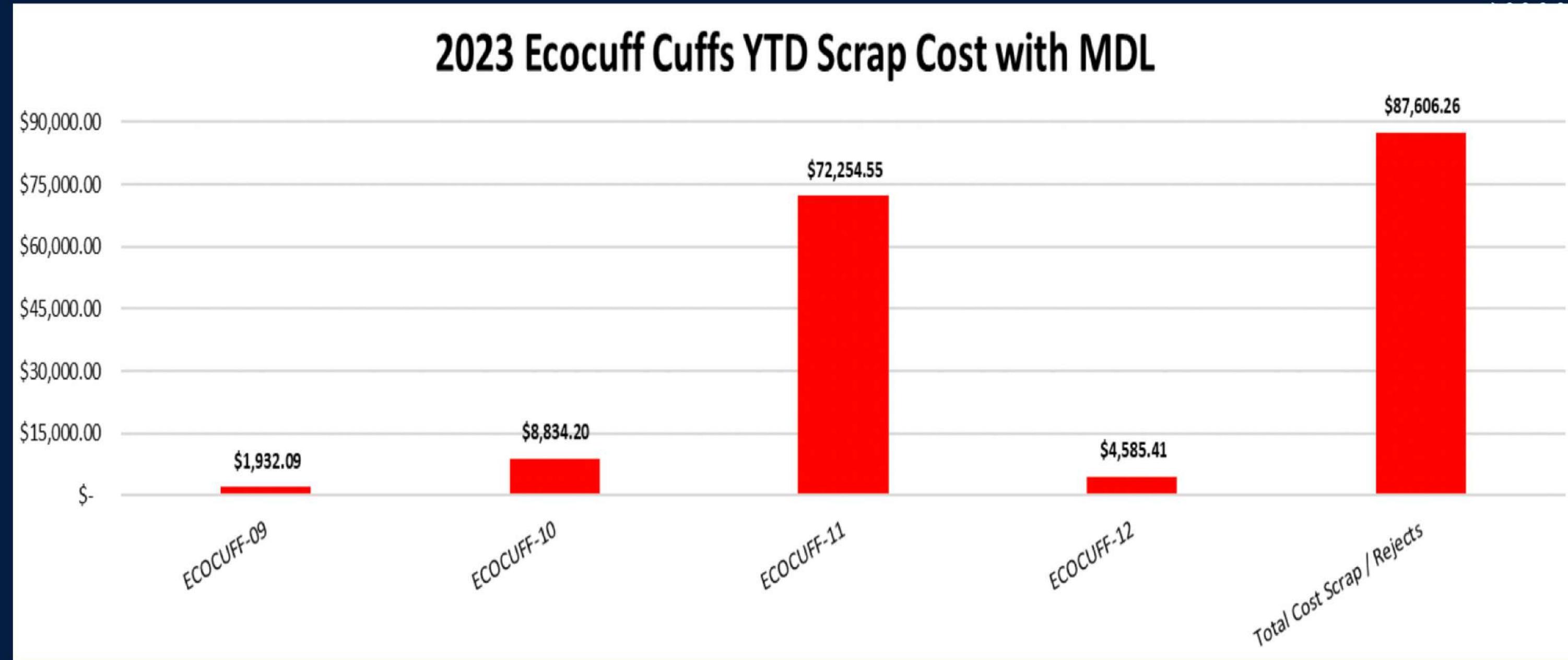




# ANALYZE PHASE



# LOSS TO BAXTER



The company has incurred a loss of more than **\$87,000** USD just from scrapping the various sizes of the cuffs

# DIFFERENT REASONS FOR NMRS



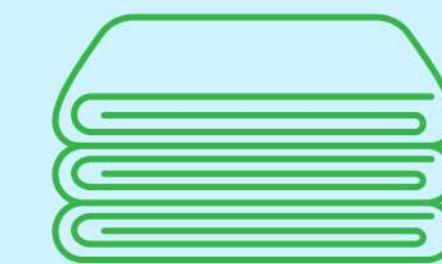
## Machine Dependent

- Poor Welding
- Leak Failure
- Dimensional Error
- Poor Printing
- Bad Hook Placement



## Human Errors

- Incorrect Date Code
- Incorrect Lot Code
- Incorrect Part Number
- Measurement Error

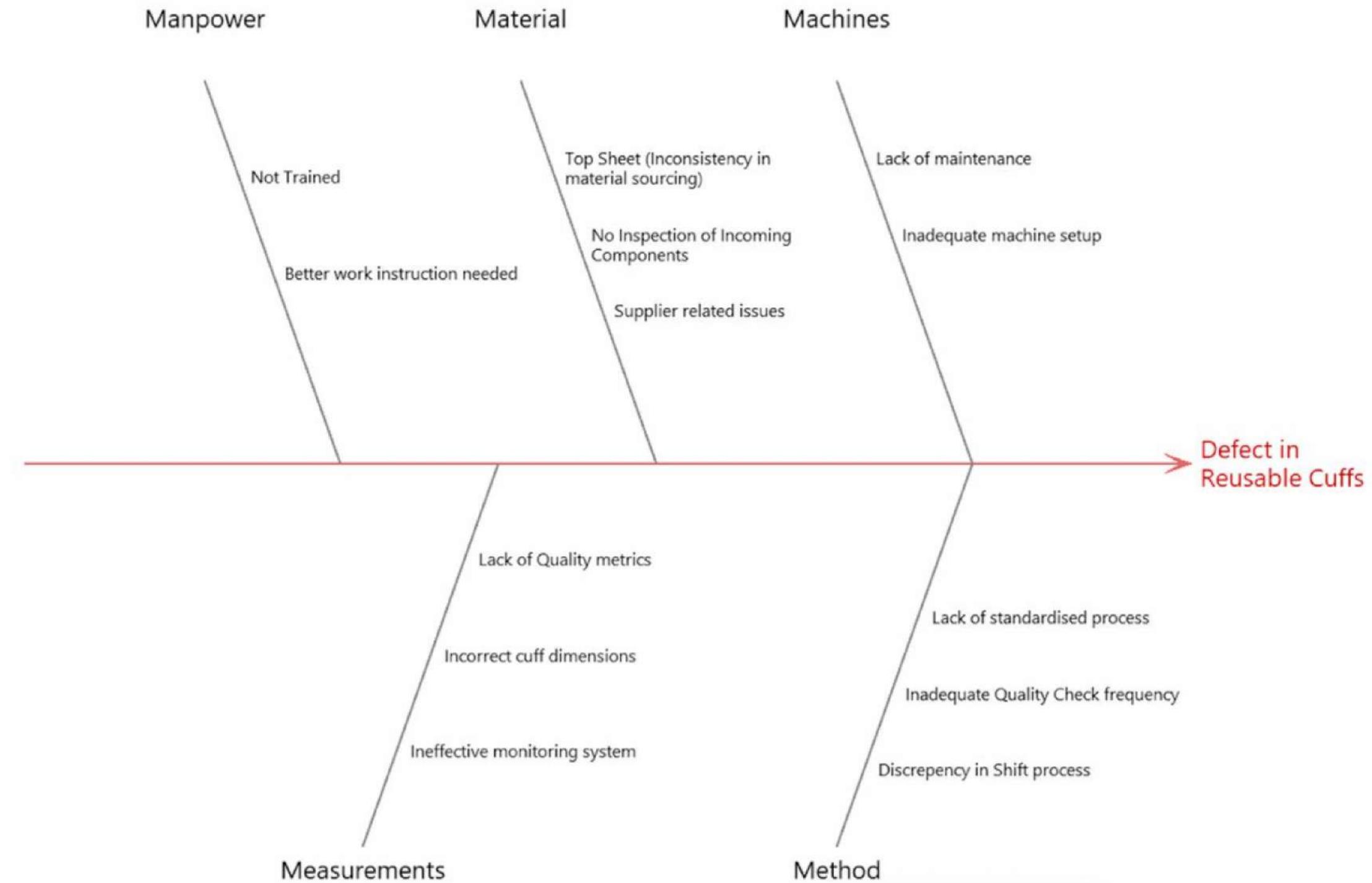


## Material Dependent

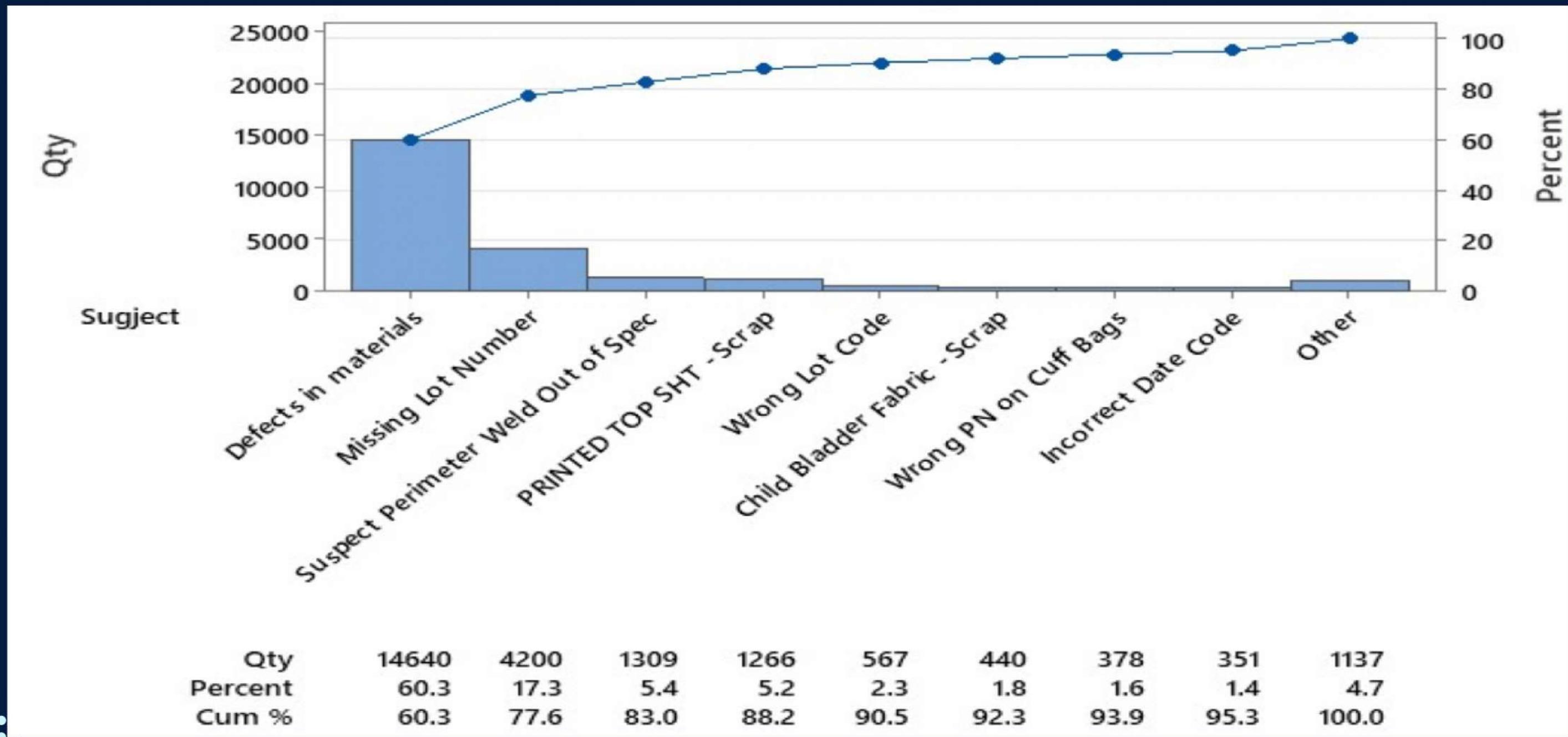
- Poor Raw Material

# FISHBONE DIAGRAM

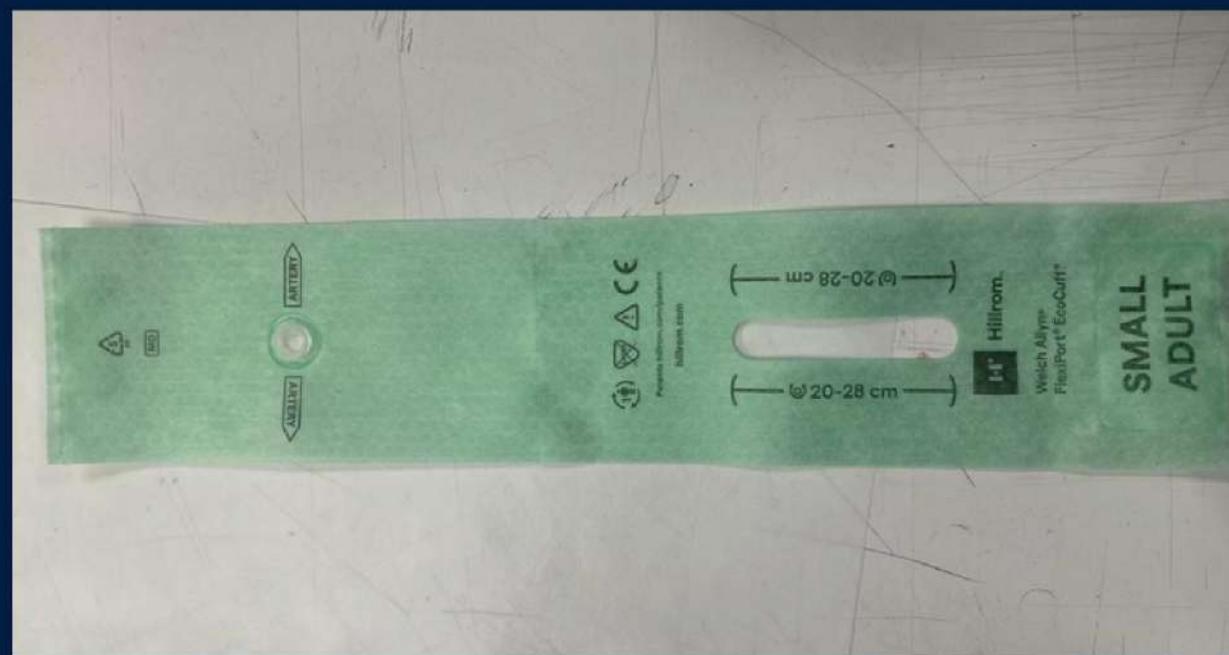
## Reduction of FLEXIPORT NMR's



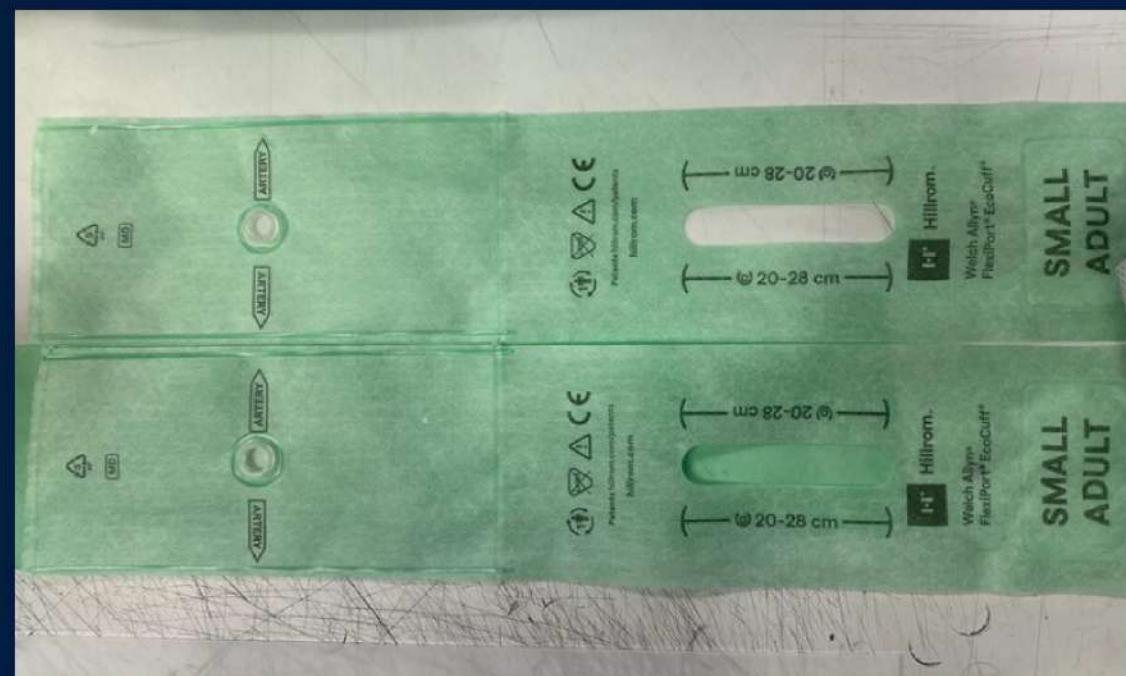
# REASONS FOR NMRS



Printing misalignment



Suspected Perimeter  
weldout of Spec



A photograph of a white robotic arm with multiple joints and a gripper at the end, positioned over a metal workpiece on a conveyor belt. The background shows a blurred industrial setting with other machinery and equipment.

# IMPROVE PHASE



# IMPLEMENTATION PLAN

- The goal of this plan is to reduce the scrap and the defects in the manufacturing process which is the goal of the project.
- Start with careful inspection of the raw materials.
- Place the green roll carefully inside the machine.
- Set the correct date and labels to be printed on the cuff.
- Set the specified temperature and pressure for the welding process.
- Change the sanding paper every hour.
- Increase the frequency of quality checks from every 4 hours to every one hour.
- Carefully label the package with correct part numbers and lot codes.

# PILOT TEST

The mentioned implementation plan was conducted for a week from November 27 to December 1

## Results obtained on Novemeber 27

Date	Time	Leak Test (Pass/Fail)	Pull Test (Pass/Fail)	Dimension Test (Pass/Fail)	Visual Inspection Failure	Printing (Pass/Fail)
27/11/23	8:00	P	P	P	N	P
27/11/23	9:00	P	P	P	N	P
27/11/23	10:00	P	P	P	N	P
27/11/23	11:00	P	P	P	N	P
27/11/23	12:00	P	P	P	N	P
27/11/23	13:00	P	P	P	N	P
27/11/23	14:00	P	P	P	N	P
27/11/23	15:00	P	P	P	N	P
27/11/23	16:00	P	P	P	N	P

# PILOT TEST

Results obtained on November 28

Date	Time	Leak Test (Pass/Fail)	Pull Test (Pass/Fail)	Dimension Test (Pass/Fail)	Visual Inspection Failure	Printing (Pass/Fail)
28/11/23	8:00	P	P	P	N	P
28/11/23	9:00	P	P	P	N	P
28/11/23	10:00	P	P	P	N	P
28/11/23	11:00	P	P	P	N	P
28/11/23	12:00	P	P	P	N	P
28/11/23	13:00	P	P	P	N	P
28/11/23	14:00	P	P	P	N	P
28/11/23	15:00	P	P	P	N	P
28/11/23	16:00	P	P	P	N	P

# PILOT TEST

Results obtained on November 29

Date	Time	Leak Test (Pass/Fail)	Pull Test (Pass/Fail)	Dimension Test (Pass/Fail)	Visual Inspection Failure	Printing (Pass/Fail)
29/11/23	8:00	P	P	P	N	P
29/11/23	9:00	P	P	P	N	P
29/11/23	10:00	P	P	P	N	P
29/11/23	11:00	P	P	P	N	P
29/11/23	12:00	P	P	P	N	P
29/11/23	13:00	P	P	P	N	P
29/11/23	14:00	P	P	P	N	P
29/11/23	15:00	P	P	P	N	P
29/11/23	16:00	P	P	P	N	P

# PILOT TEST

Results obtained on Novemeber 30

Date	Time	Leak Test (Pass/Fail)	Pull Test (Pass/Fail)	Dimension Test (Pass/Fail)	Visual Inspection Failure	Printing (Pass/Fail)
30/11/23	8:00	P	P	P	N	P
30/11/23	9:00	P	P	P	N	P
30/11/23	10:00	P	P	P	N	P
30/11/23	11:00	P	P	P	N	P
30/11/23	12:00	P	P	P	N	P
30/11/23	13:00	P	P	P	N	P
30/11/23	14:00	P	P	P	N	P
30/11/23	15:00	P	P	P	N	P
30/11/23	16:00	P	P	P	N	P

# PILOT TEST

Results obtained on December 1

Date	Time	Leak Test (Pass/Fail)	Pull Test (Pass/Fail)	Dimension Test (Pass/Fail)	Visual Inspection Failure	Printing (Pass/Fail)
01/12/23	8:00 P	P	P	N	P	
01/12/23	9:00 P	P	P	N	P	
01/12/23	10:00 P	P	P	N	P	
01/12/23	11:00 P	P	P	N	P	
01/12/23	12:00 P	P	P	N	P	
01/12/23	13:00 P	P	P	N	P	
01/12/23	14:00 P	P	P	N	P	
01/12/23	15:00 P	P	P	N	P	
01/12/23	16:00 P	P	P	N	P	

Step/Process/Component	Potential Failure Modes	Potential Effects of Failure	Severity (S)	Occurrence (O)	Detection (D)	Risk Priority Number (RPN)
Place the green sheet	Misplacement	Incorrect cuff assembly	10	4	5	200
Weld the port hole	Welding defects	Compromised cuff integrity	10	2	8	160
Print the dates and labels	Printing errors	Incorrect information on cuffs	9	6	5	270
Raw materials	Defective raw materials	Defective cuffs produced	10	5	3	150
Make the small circular and long rounded rectangular hole	Improper hole cutting	Inconsistency in cuff design	7	2	5	70
Stick the hook on the cuff	Adhesive failure	Detached hooks	5	2	3	30
Sand the cuff for smoothness	Inconsistent sanding	Rough or uneven surface	5	1	4	20
Perform a leak test	Test equipment failure	Undetected leaks	9	3	5	135
Print the date on the cuff	Printing errors	Incorrect date information	8	6	5	210
Manual Visual Inspection	Human error	Missed defects	5	3	5	75
Perform Pull Test on a sample	Poor Welding	Poor Cuff Strength	10	3	5	150
Perform Dimension Test on a sample	Human Error	Inaccurate dimensions measurement	9	6	5	270

# FAILURE MODE AND EFFECT ANALYSIS (FMEA)

# IMPROVEMENT SUGGESTIONS

- **Most primary step Baxter should take right away (Short Term)**- Provide detailed step by step instructions to the Line Operators to follow, starting from inspection of Raw materials to Packaging of Cuffs.
- **Mandatory Workforce Training (Long Term)** - The operators should be given mandatory training twice a month. This will improve the operator's efficiency and also inculcate a muscle memory in them.
- **Increased Quality Check Frequency**- The current quality check frequency for pull test is i.e one sample every 4 hours is not so great. Pull test should be performed at the start of every new shift or production. If a defect occurs, take a sample again after half an hour. Else, once more after an hour of the beginning of the shift. If any defect occurred, take another sample after half an hour or else take one sample every 4 hour.
- **Cleanliness in the workspace** -The workspace should be clean. There should not be any scraps lying around near the machine as it can interfere with the manufacturing process. A scrap product may interfere with the welding process.

A photograph of a white industrial robotic arm with multiple joints and a gripper at the end, positioned over a workpiece on a conveyor belt. The background shows a blurred industrial setting with other machinery.

# CONTROL PHASE



# Control Plan

After implementing the new process, we still need to keep monitoring the whole process.

## Quality check frequency

- 1: Update the checklist regularly as suggested.**
- 2: At the start of the shift enter the details in the checklist**
- 3: Second observation should be noted after 30 minutes, check for the defects**
- 4: Observations should be taken after every 2 hours henceforth.**

# Control Plan

# Checklist for Processs Improvement

# Recommendations

- 1. Implement refresher training for the operator workforce, emphasizing adherence to manufacturing SOP.**
- 2. Create and adhere to a daily checklist template for documenting and reporting production data, quality metrics, incidents, or deviations, and reporting non-conformities.**
- 3. The current quality check frequency i.e. 1 sample every 4/8hrs is not efficient. Quality checks should be performed at the start of every new shift/production. If a defect occurs, take a sample again after half an hour. Else, once more after 4hrs from last check. If any defect occurred, take another sample after half an hour or else take one sample every 4hrs.**
- 4. Enhance process supervision, emphasizing accurate entry of dimensions, part numbers, & lot numbers. Improve inspection of FLEXIPORT Top Green sheets, establish protocols for routine machine check-ups & maintenance.**

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# Thank you

