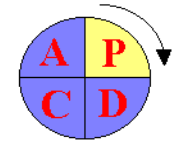


# Injection Department Presenting Our Quality Circle



**SUSTAINABLE  
DEVELOPMENT  
GOALS**

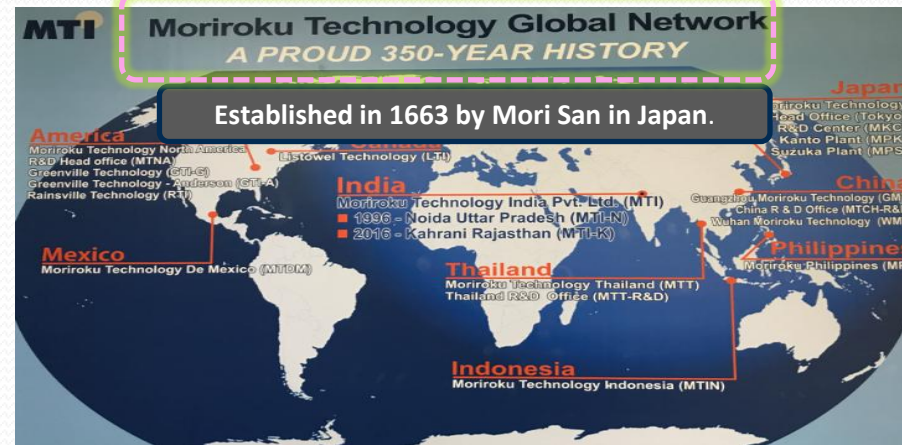
✨ *Create a New Future as One* ✨



**TEAM INJECTION WELCOMES TO ALL  
OUR QUALITY CIRCLE GARV**

## Moriroku Technology India Pvt. Ltd. :

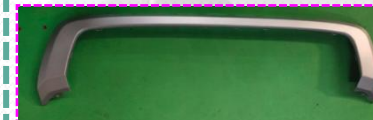
Moriroku Technology India is a manufacturer of automotive parts, Supplier of exterior & interior plastic parts of CITY, AMAZE, JAZZ and ELIVATE model for both local and export parts to HCIL .



**NOIDA**



**KAHARANI**



**GARN RR BPR (3US)**



**BASE FR GRILLE- K3 (3US)**



**SKID GARN FR BPR (3US)**

## MTI EXTERIOR PARTS

## Team composition



MR. BRIJESH SINGH  
CO-ORDINATOR



MR. AVINASH  
(FACILITATOR)



MR. ATUL TRIVEDI  
(LEADER)



MR. RAIS MOHD.  
DESG- TECH. ASSOCIATE



MR. SANJAY SINGH  
DESG- TECH. ASSOCIATE



MR. SACHIN SHARMA  
DESG- TECH. ASSOCIATE



First  
Time

MR. UPENDRA  
DESG- SKILLED ASSOCIATE

PROJECT NO.- 14

PROJECT START- 02 FEB. - 2025



PROJECT COMPLETED – 29 May. - 2025

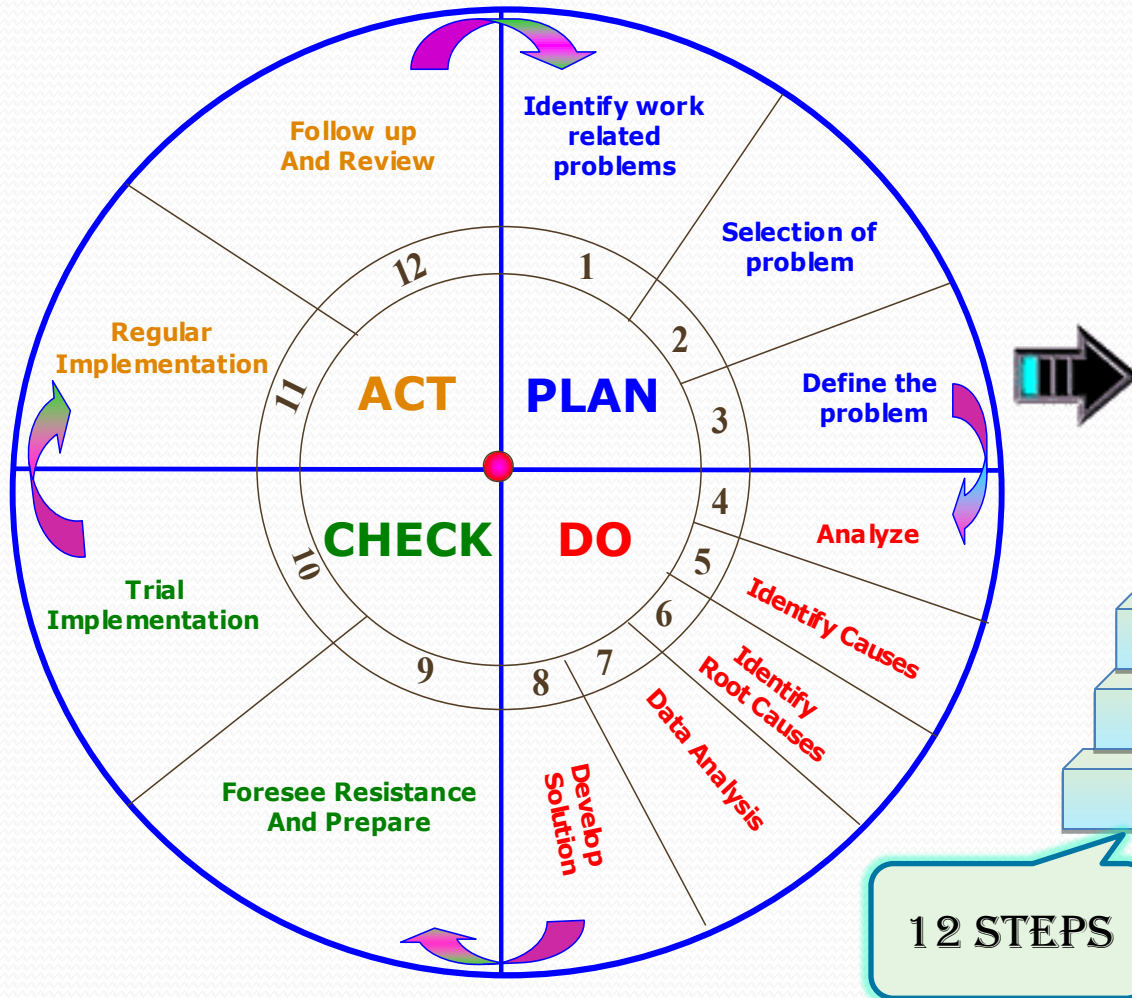
MEETING DAY & TIME- EVERY FRIDAY (3-4 PM)

NO. OF MEETINGS HELD - 15

ATTENDANCE- 92 %

## QUALITY CIRCLE METHODOLOGY:

### DEMING CYCLE



1. Identification of Problem
2. Selection of Problem
3. Define the Problem
4. Analysis of Problem
5. Identification of Cause
6. Finding of Root Cause
7. Data Analysis
8. Developing Solution
9. Foreseeing Resistance
10. Trail Implementation
11. Regular Implementation
12. Follow up & Review

12 STEPS



## PLAN

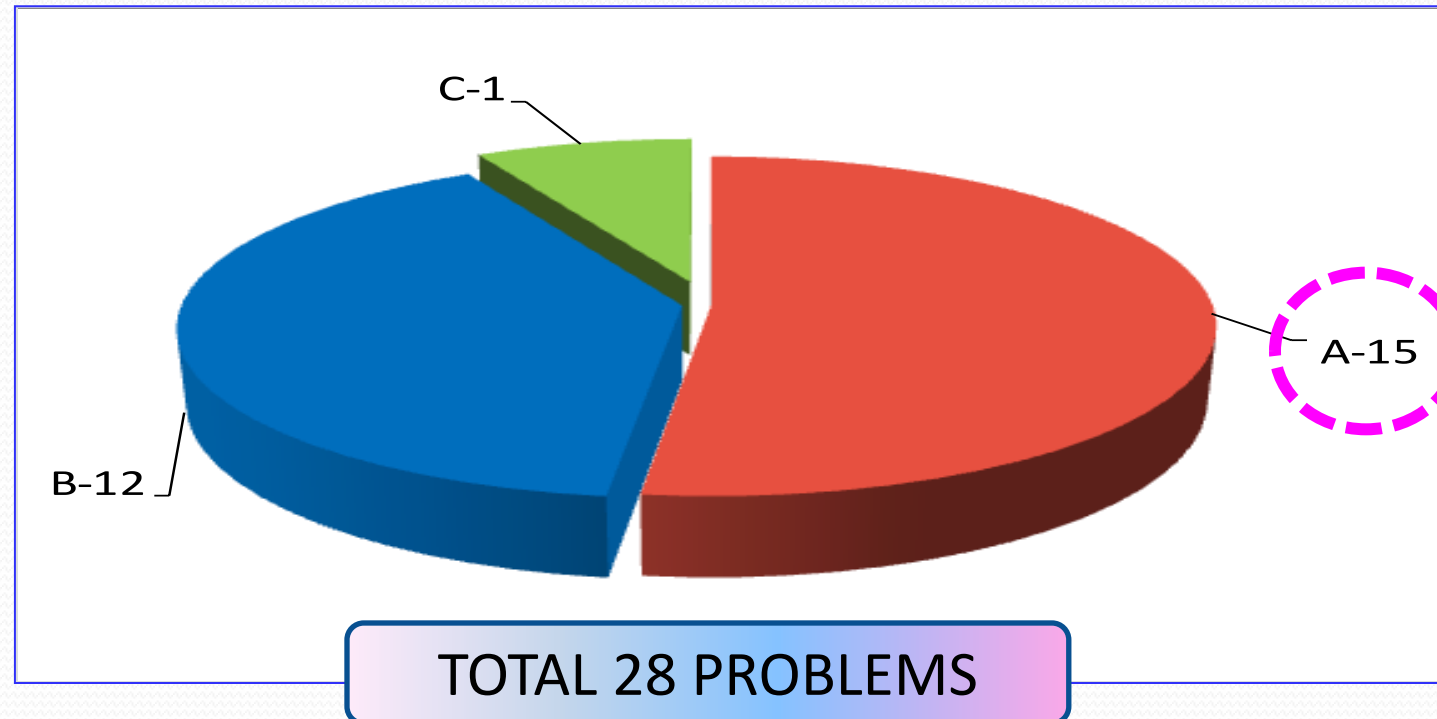


| MONTH                                    |       | FEB. - 2025 |    |    |    | MAR.- 2025 |    |    |    | APR.-2025 |    |       |    | MAY.-2025 |    |    |    |
|------------------------------------------|-------|-------------|----|----|----|------------|----|----|----|-----------|----|-------|----|-----------|----|----|----|
| WEEKS                                    | PHASE | W1          | W2 | W3 | W4 | W1         | W2 | W3 | W4 | W1        | W2 | W3    | W4 | W1        | W2 | W3 | W4 |
| ACTIVITES                                |       |             |    |    |    |            |    |    |    |           |    |       |    |           |    |    |    |
| IDENTIFICATION OF PROBLEM                |       |             |    |    |    |            |    |    |    |           |    |       |    |           |    |    |    |
| SELECTION OF PROBLEM                     |       |             |    |    |    |            |    |    |    |           |    |       |    |           |    |    |    |
| DEFINE THE PROBLEM                       |       |             |    |    |    |            |    |    |    |           |    |       |    |           |    |    |    |
| ANALYSE THE PROBLEM                      |       |             |    |    |    |            |    |    |    |           |    |       |    |           |    |    |    |
| IDENTIFICATION OF CAUSES                 |       | PLAN        |    |    |    |            |    |    |    |           |    |       |    |           |    |    |    |
| FINDING OUT ROOT CAUSE                   |       |             |    |    |    |            |    |    |    |           |    |       |    |           |    |    |    |
| DATA ANALYSES                            |       |             |    |    |    |            |    |    |    |           |    |       |    |           |    |    |    |
| DEVELOPING SOLUTION                      |       |             |    |    |    |            |    | DO |    |           |    |       |    |           |    |    |    |
| FORSEEING PROBABLE RESISTANCE            |       |             |    |    |    |            |    |    |    |           |    |       |    |           |    |    |    |
| TRIAL IMPLEMENTATION & PERFORMANCE CHECK |       |             |    |    |    |            |    |    |    |           |    |       |    |           |    |    |    |
| REGULAR IMPLEMENTATION                   |       |             |    |    |    |            |    |    |    |           |    | CHECK |    |           |    |    |    |
| FOLLOW UP REVIEW                         |       |             |    |    |    |            |    |    |    |           |    |       |    | ACT       |    |    |    |

**BRAIN STORMING – LIST OF PROBLEMS :**

| S. NO. | PROBLEM                                                    | CATEGORY |                                                                                       | S. NO. | PROBLEM                                                     | CATEGORY |
|--------|------------------------------------------------------------|----------|---------------------------------------------------------------------------------------|--------|-------------------------------------------------------------|----------|
| 1      | MACHINE STOP DUE TO AIR PRESSURE LOW                       | B        |    | 15     | RAW MATERIAL SPILLAGE ON SHOP FLOOR.                        | A        |
| 2      | START-UP REJECTION HIGH.                                   | A        |                                                                                       | 16     | OIL LEAKAGE FROM HYDRAULIC MACHINES.                        | B        |
| 3      | QUALITY OUTLOW TO NEXT DEPARTMENT.                         | A        |                                                                                       | 17     | WRONG TAG AT SHOP FLOOR.                                    | A        |
| 4      | FIFO NOT FALLOVED AT SHOP FLOOR.                           | B        |                                                                                       | 18     | MTC RUNNING CONDITION NOT DETECTED.                         | B        |
| 5      | ABNORMAL SOUND COMES FROM MACHINE                          | B        |    | 19     | HIGH VOLTAGE ALARM IN ROBOT PENDANT.                        | B        |
| 6      | INTERNAL REJECTION HIGH                                    | A        |                                                                                       | 20     | HIGH LUMPS GENERATION ON BIG TONNAGE MACHINES.              | A        |
| 7      | FUMES GENERATION DURING BARREL PURGING.                    | B        |                                                                                       | 21     | AIR COMPRESSURE OFF DURING RUNNING OPERATION.               | B        |
| 8      | EMPRO CYCLE TIME AND ACTUAL CYCLE TIME MISMATCH.           | A        |                                                                                       | 22     | MOULD TEMP. INCREASE DURING RUNNING OPERATION.              | A        |
| 9      | HIGH TEMP. AT SHOP FLOOR IN SUMMER, COOLING DUCT REQUIRED. | C        |    | 23     | EJECTOR LIFTER BROKEN DURING RUNNING OPERATION              | A        |
| 10     | RUST IS FORMING ON THE MOULD.                              | B        |                                                                                       | 24     | WATER VALVE NOT OPEN .                                      | A        |
| 11     | EMPRO VS PHYSICAL PART QTY MISMATCH.                       | A        |                                                                                       | 25     | CHILD PART QUANTITY MISMATCH                                | B        |
| 12     | PART RIGHT/LEFT MIXING.                                    | A        |                                                                                       | 26     | 3S CONDITION OF SHOP FLOOR NOT GOOD.                        | A        |
| 13     | RAW MATERIAL MIXING.                                       | A        |  | 27     | BASE FR GRILLE (KJ) PART CATCHING PROBLEM INSIDE THE MOULD. | B        |
| 14     | AIR LEAKAGE ON SHOP FLOOR.                                 | B        |                                                                                       | 28     | PARTS ACCUMULATED AT WORKING TABLE.                         | A        |

## Categorise Problems using 'A' 'B' and C' Category



Category A –(15)  
Involvement & Solved  
by own department

Category B –(12)  
Involvement & solved  
by other department

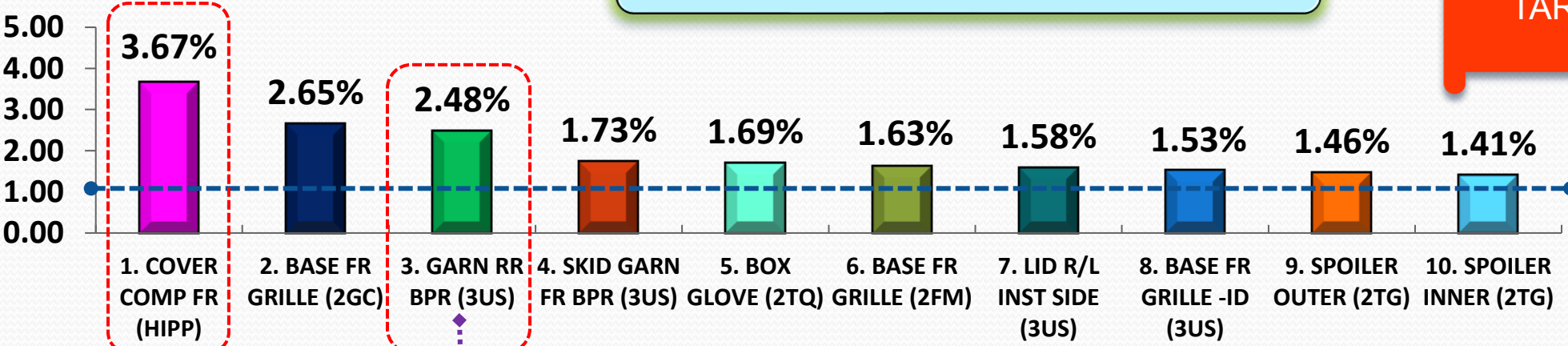
Category C –(1)  
Involvement & approved  
by management

# We started working on A Category - Problems

| Sl. N. | RANKING OF 'A' CATEGORY PROBLEM                  | CAT | ATUL | RAIS | UPENDRA | SACHIN | SANJAY | TOTAL |
|--------|--------------------------------------------------|-----|------|------|---------|--------|--------|-------|
| 1      | START-UP REJECTION HIGH.                         | A   | 3    | 15   | 3       | 10     | 8      | 39    |
| 2      | QUALITY OUTFLOW TO NEXT DEPARTMENT.              | A   | 6    | 2    | 13      | 6      | 6      | 33    |
| 3      | EMPRO CYCLE TIME AND ACTUAL CYCLE TIME MISMATCH. | A   | 7    | 4    | 8       | 7      | 3      | 29    |
| 4      | WATER VALVE NOT OPEN.                            | A   | 9    | 1    | 4       | 9      | 2      | 25    |
| 5      | INTERNAL REJECTION HIGH.                         | A   | 4    | 3    | 2       | 3      | 4      | 16    |
| 6      | EMPRO VS PHYSICAL PART QTY MISMATCH.             | A   | 11   | 12   | 1       | 4      | 15     | 43    |
| 7      | PART RIGHT/LEFT MIXING.                          | A   | 14   | 5    | 9       | 14     | 7      | 49    |
| 8      | RAW MATERIAL MIXING.                             | A   | 2    | 13   | 7       | 12     | 5      | 39    |
| 9      | RAW MATERIAL SPILLAGE ON SHOP FLOOR.             | A   | 1    | 8    | 5       | 2      | 13     | 29    |
| 10     | WRONG TAG AT SHOP FLOOR.                         | A   | 12   | 10   | 14      | 5      | 12     | 53    |
| 11     | HIGH LUMPS GENERATION ON BIG TONNAGE MACHINES.   | A   | 5    | 14   | 6       | 1      | 11     | 37    |
| 12     | MOULD TEMP. INCREASE DURING RUNNING OPERATION.   | A   | 8    | 9    | 12      | 8      | 9      | 46    |
| 13     | EJECTOR LIFTER BROKEN DURING RUNNING OPERATION   | A   | 13   | 7    | 15      | 11     | 1      | 47    |
| 14     | PARTS ACCUMULATED AT WORKING TABLE.              | A   | 10   | 6    | 11      | 15     | 10     | 52    |
| 15     | 3S CONDITION OF SHOP FLOOR NOT GOOD.             | A   | 15   | 11   | 10      | 13     | 14     | 63    |

**MINIMUM MARKS FOR HIGHER WEIGHTAGE**

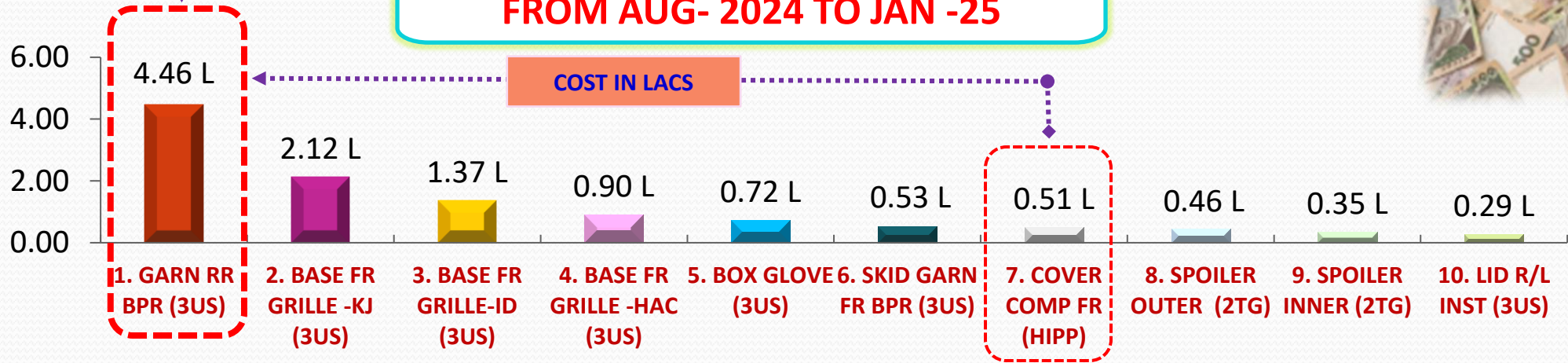
TOP TEN REJECTION PERCENTAGE DATA FROM AUG-24 TO JAN-25



OUR GLOBAL TARGET IS 1%.

MOST HIGHER REJECTION CONTRIBUTION IN 3.67% BUT HIGHER REJECTION FOUND IN GARN RR BPR (3US) COST WISE.

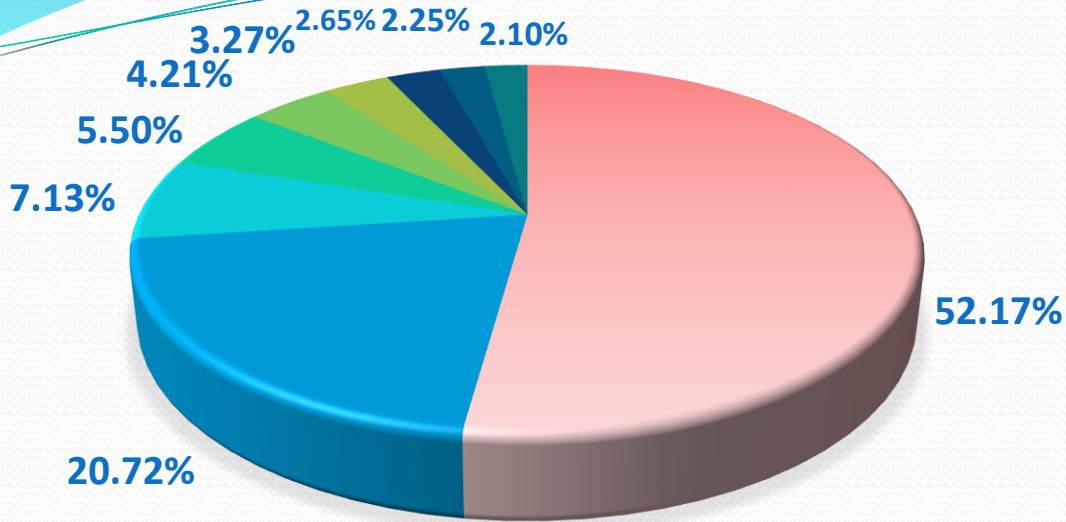
COST WISE TOP TEN REJECTION DATA FROM AUG- 2024 TO JAN -25



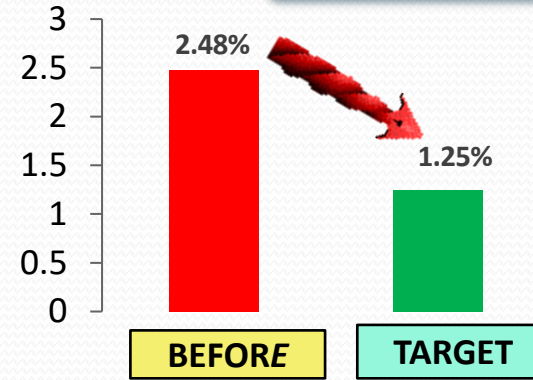
# PROBLEM (THEME) SELECTED

TO REDUCE INTERNAL REJECTION IN GARN RR  
BPR (3US) .





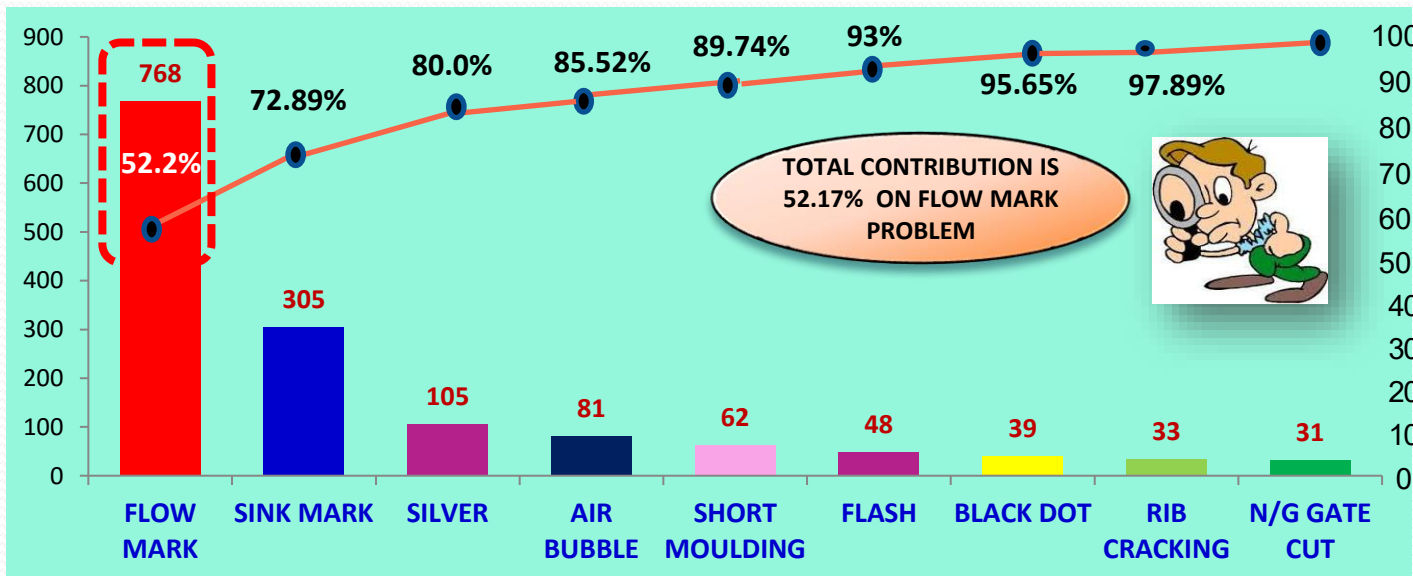
## REJECTION DATA OF AUG-24 TO JAN-25



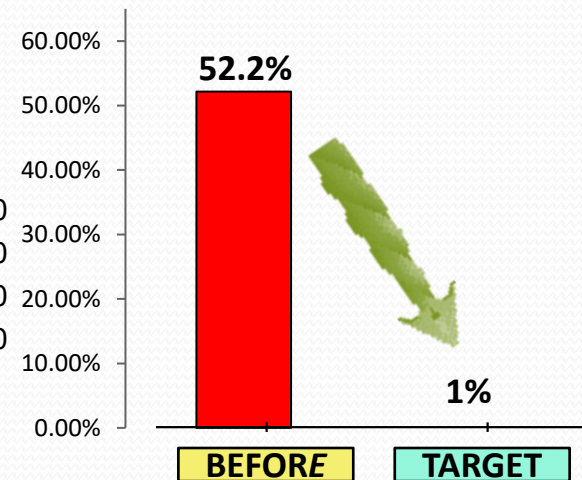
To Achieve Rejection Target  
Up To 1.25%

| TOTAL PART QTY | OK PART QTY | REJ. QTY | PERCENTAGE | REASON OF REJ. |
|----------------|-------------|----------|------------|----------------|
|                |             | 768      | 52.17%     | FLOW MARK      |
|                |             | 305      | 20.72%     | SINK MARK      |
|                |             | 105      | 7.13%      | SILVER         |
|                |             | 81       | 5.50%      | AIR BUBBLE     |
| 59351          | 57879       | 62       | 4.21%      | SHORT MOLDING  |
|                |             | 48       | 3.27%      | FLASH          |
|                |             | 39       | 2.65%      | BLACK DOT      |
|                |             | 33       | 2.25%      | RIB CRACKING   |
| 59351          | 57879       | 31       | 2.10%      | N/G GATE CUT   |
|                |             | 1472     | 100.00%    |                |

## DEFECT WISE REJ% CONTRIBUTION



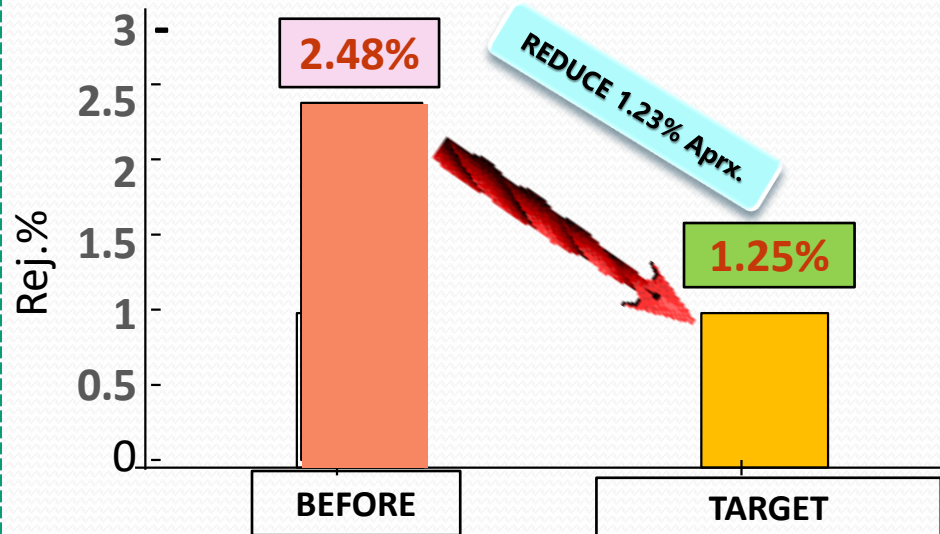
To Reduce Flow Mark Contribution  
52.17% In Rejection & Achieve  
Target Up To 1%



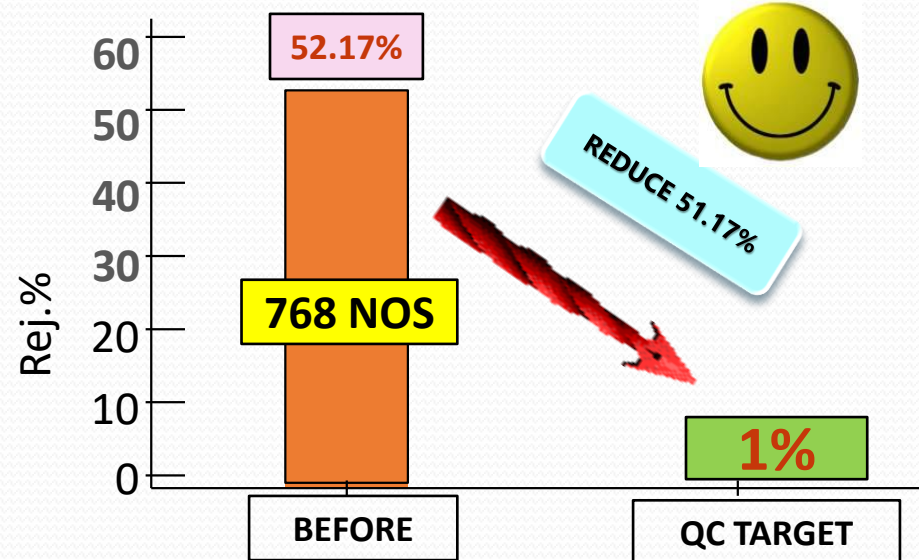
## PROJECT TARGET:

TO REDUCE GARN RR BPR 3US Rejection UP TO 1.25% AND ELIMINATE THE FLOW MARK PROBLEM

GARN RR BPR 3US Rejection  
Target



Our Target



TARGET SET TO  
REDUCE FLOW  
MARK PROBLEM

To Achieve Rejection Target Up To 1.25%



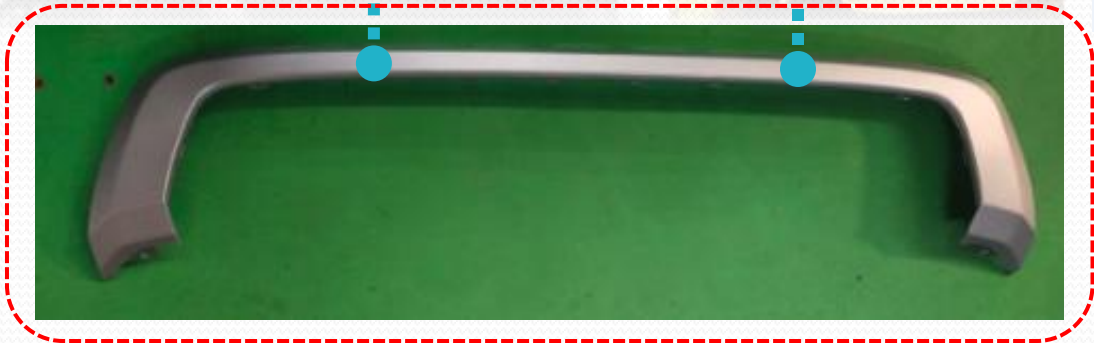
LET `S UNDERSTAND THE PROBLEM

PER PART COST  
(303.06)

FLOW MARK  
REJECTION COST

232750

**What is the Application of a REAR BUMPER in a Car?** - A car REAR BUMPER is a protective metal or plastic latticework or grating located at the back of the vehicle. It is one of the auto parts that completes the rear face of a car. Rear Bumper Garnish Improves the back side Aerodynamic design of the car.



## What Are the Functions & Advantages of Rear Bumper Garnish

GIVE A PREMIUM AND SPORTY LOOK TO THE REAR SIDE OF THE VEHICLE.

PROTECT THE REAR BUMPER FROM MINOR SCRATCHES & SMALL IMPACT DURING PARKING.

HELP IN MAINTAINING AIRFLOW AROUND THE VEHICLE.

REDUCE DIRECT DAMAGE & EXTENDS BUMPER LIFE.

AFTER THE PART INSTALLED IN THE CAR, IT PROVIDE A FEEL SIMILAR TO A PAINTED PART.



Cost of painted part – 798 Rs /-

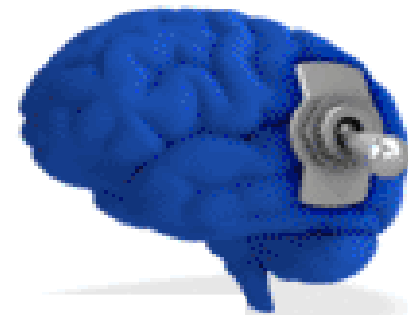


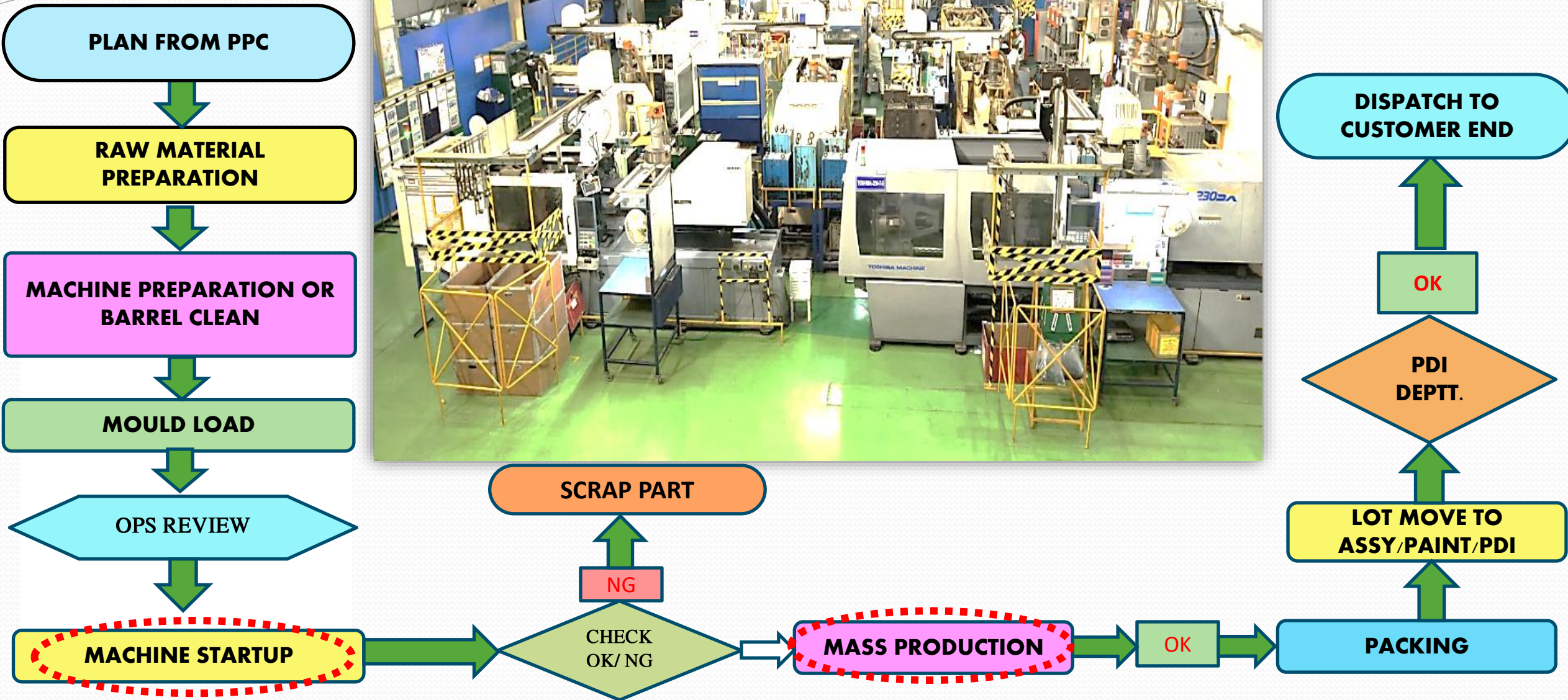
Cost of without painted part : - 303 Rs /-

**TOTAL SAVING AFETR SKIP PAINT OPERATION.**  
**798 – 303 = 495 Rs /- (Apx. Per Part)**

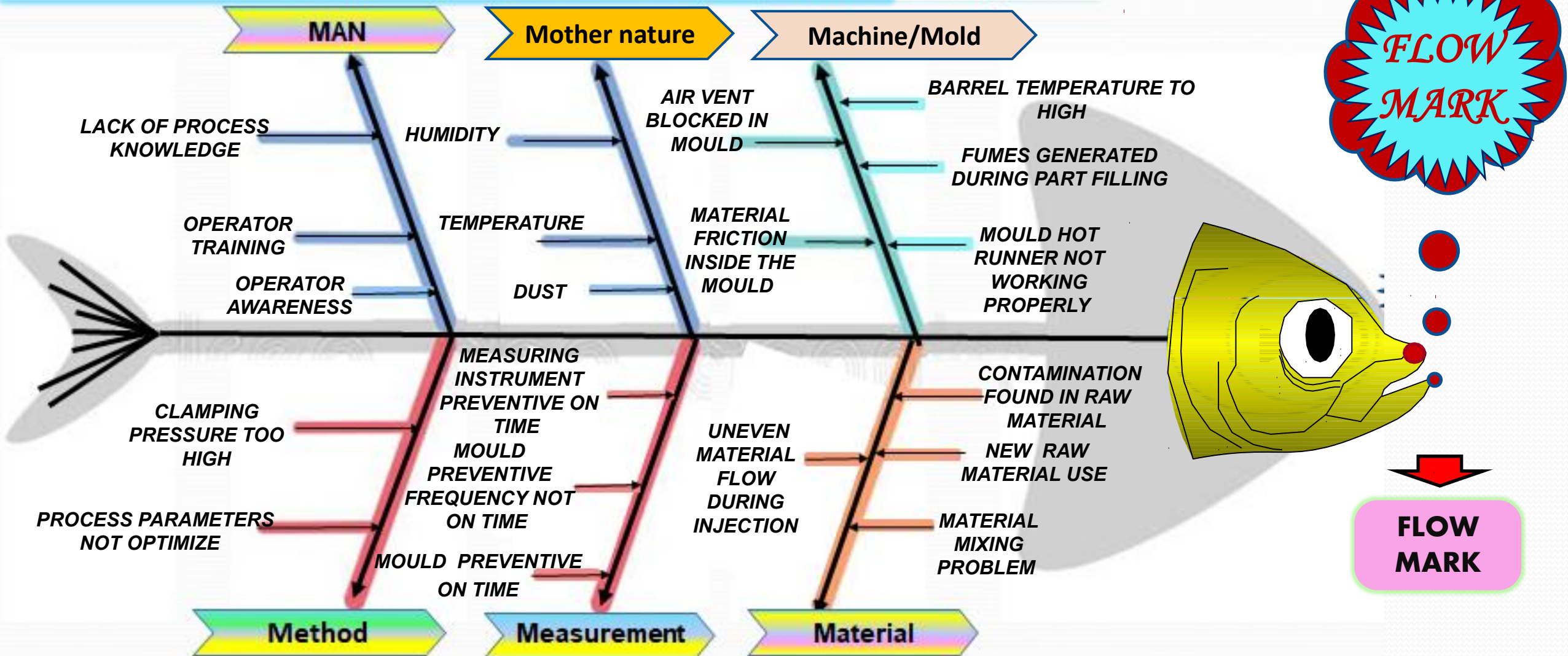


## BRAIN STORMING:



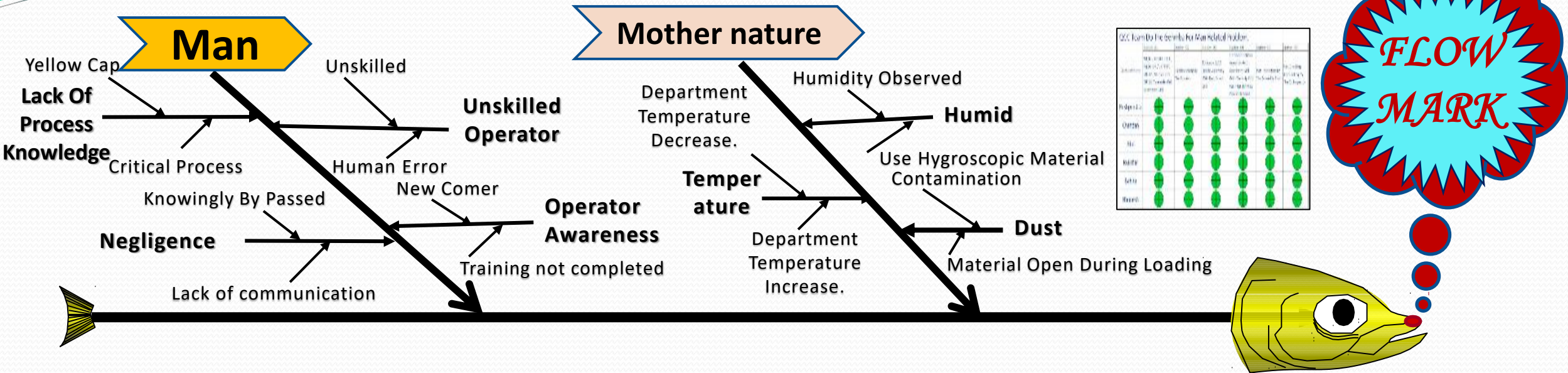


# Factor Analysis with fish bone diagram



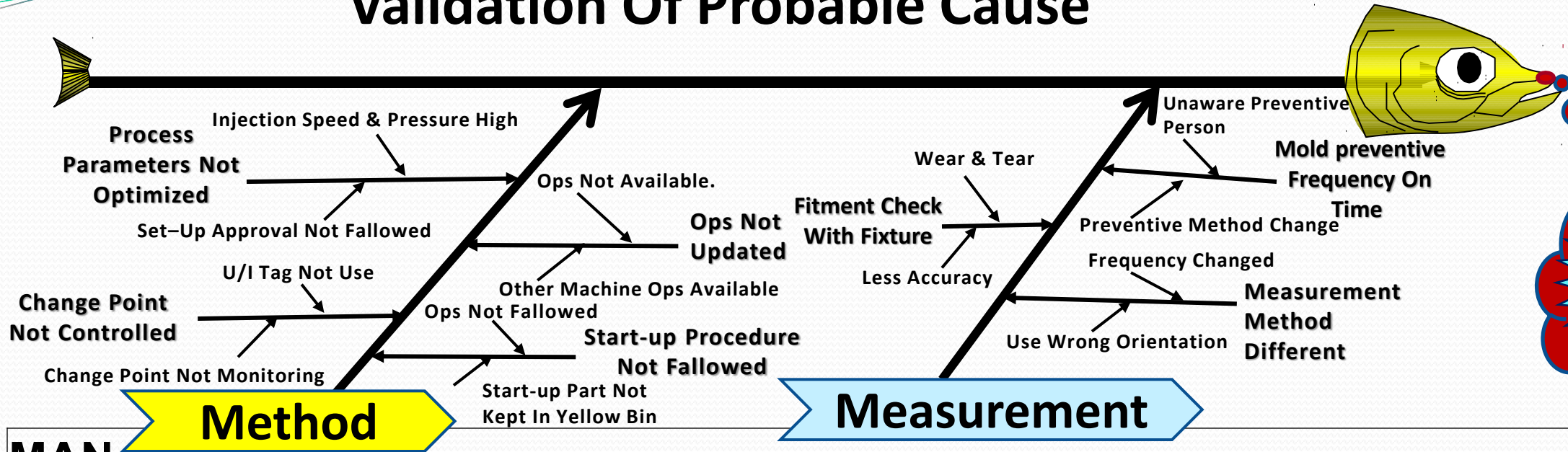
IDENTIFYING THE PROBABLE CAUSE BY BRAIN STORMING WITH THE HELP OF ISHIKAWA DIAGRAM

Validation Of Probable Cause



| MAN |                           |                                    |          |                            |                |
|-----|---------------------------|------------------------------------|----------|----------------------------|----------------|
| SN  | POSSIBLE CAUSES           | OPS/SPEC/ CRITERIA                 | ACTUAL   | SOURCE                     | VALID/ INVALID |
| 1   | Unskilled Operator        | As Per Skill Matrix                | Skill    | By Testing                 | INVALID        |
| 2   | Lack Of Process Knowledge | Operator Process Knowledge Checked | Found Ok | Operator Observation Sheet | INVALID        |
| 3   | Operator Negligence       | Visual                             | Found Ok | Visual                     | INVALID        |
| 4   | Dust                      | No Concern                         | Found Ok | Daily Gemba Visit          | INVALID        |
| 5   | Temperature               | No Concern                         | Found Ok | Daily Gemba Visit          | INVALID        |

# Validation Of Probable Cause



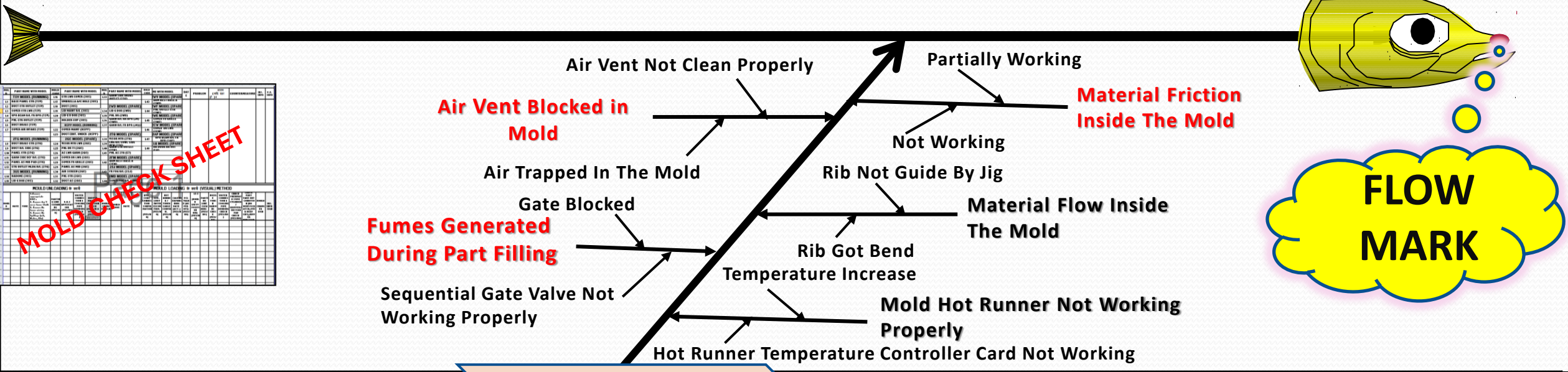
**FLOW  
MARK**



| SN | POSSIBLE CAUSES                 | OPS/SPEC/ CRITERIA           | ACTUAL     | SOURCE                  | VALID/ INVALID |
|----|---------------------------------|------------------------------|------------|-------------------------|----------------|
| 1  | Change Point Not Controlled     | Check Change Point           | Found Ok   | Match With Ops          | INVALID        |
| 2  | Ops Not Updated                 | Ops Updated                  | Found Ok   | Visual                  | INVALID        |
| 3  | Process Parameters Not Optimize | Process Parameters Optimized | Found Ok   | Visual                  | INVALID        |
| 4  | Fitment Check With Fixture      | Instrument Check Sheet       | Found Ok   | Month Wise Verification | INVALID        |
| 5  | Mold PM Frequency On Time       | Mold PM Check Sheet          | No Concern | PM As Per Standard      | INVALID        |

**IDENTIFYING THE PROBABLE CAUSE BY BRAIN STORMING WITH THE HELP OF ISHIKAWA DIAGRAM**

Validation Of Probable Cause

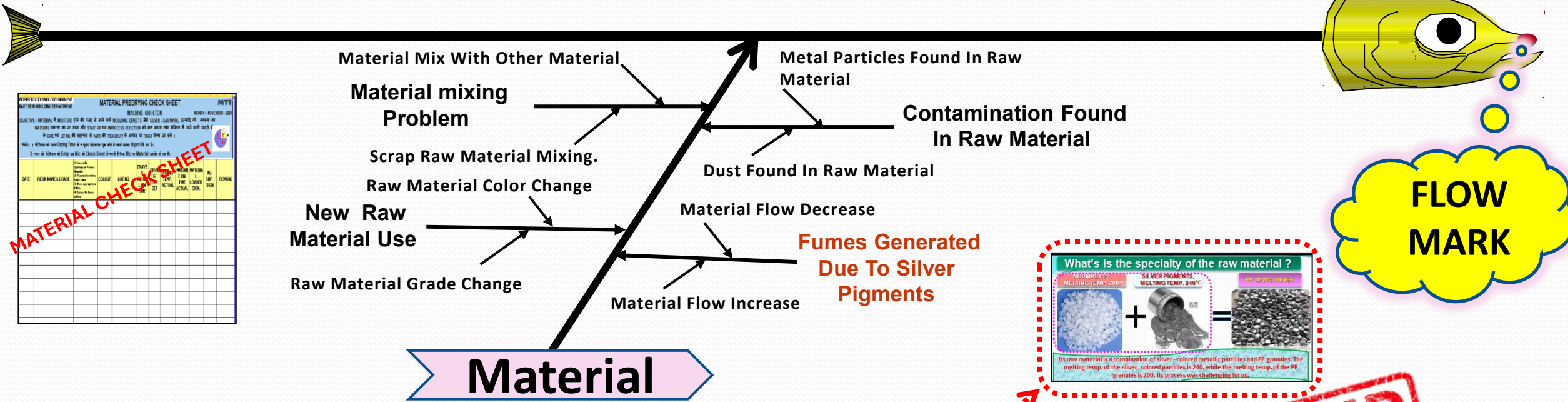


MOLD CHECK SHEET

| NO. | ITEM | STATUS | REMARKS |
|-----|------|--------|---------|
| 1   | ...  | ...    | ...     |
| 2   | ...  | ...    | ...     |
| 3   | ...  | ...    | ...     |
| 4   | ...  | ...    | ...     |
| 5   | ...  | ...    | ...     |
| 6   | ...  | ...    | ...     |
| 7   | ...  | ...    | ...     |
| 8   | ...  | ...    | ...     |
| 9   | ...  | ...    | ...     |
| 10  | ...  | ...    | ...     |
| 11  | ...  | ...    | ...     |
| 12  | ...  | ...    | ...     |
| 13  | ...  | ...    | ...     |
| 14  | ...  | ...    | ...     |
| 15  | ...  | ...    | ...     |
| 16  | ...  | ...    | ...     |
| 17  | ...  | ...    | ...     |
| 18  | ...  | ...    | ...     |
| 19  | ...  | ...    | ...     |
| 20  | ...  | ...    | ...     |
| 21  | ...  | ...    | ...     |
| 22  | ...  | ...    | ...     |
| 23  | ...  | ...    | ...     |
| 24  | ...  | ...    | ...     |
| 25  | ...  | ...    | ...     |
| 26  | ...  | ...    | ...     |
| 27  | ...  | ...    | ...     |
| 28  | ...  | ...    | ...     |
| 29  | ...  | ...    | ...     |
| 30  | ...  | ...    | ...     |
| 31  | ...  | ...    | ...     |
| 32  | ...  | ...    | ...     |
| 33  | ...  | ...    | ...     |
| 34  | ...  | ...    | ...     |
| 35  | ...  | ...    | ...     |
| 36  | ...  | ...    | ...     |
| 37  | ...  | ...    | ...     |
| 38  | ...  | ...    | ...     |
| 39  | ...  | ...    | ...     |
| 40  | ...  | ...    | ...     |
| 41  | ...  | ...    | ...     |
| 42  | ...  | ...    | ...     |
| 43  | ...  | ...    | ...     |
| 44  | ...  | ...    | ...     |
| 45  | ...  | ...    | ...     |
| 46  | ...  | ...    | ...     |
| 47  | ...  | ...    | ...     |
| 48  | ...  | ...    | ...     |
| 49  | ...  | ...    | ...     |
| 50  | ...  | ...    | ...     |

| MACHINE/MOLD |                                      | Machine/Mold                       |              |                                 |                |
|--------------|--------------------------------------|------------------------------------|--------------|---------------------------------|----------------|
| SN           | POSSIBLE CAUSES                      | OPS/SPEC/ CRITERIA                 | ACTUAL       | SOURCE                          | VALID/ INVALID |
| 1            | Air Vent Blocked In Mould            | Process Checked Manually           | Found Not Ok | Check The Status Of Air Venting | VALID          |
| 2            | Material Friction Inside The Mold    | Check Manually                     | Found Not Ok | Process Checked By Mold Trial   | VALID          |
| 3            | Fumes Generated During Part Filling  | Process Verification               | Found Not OK | Check By Open Mold Purging      | VALID          |
| 4            | Barrel Temperature Too High          | Equipment Condition Check With Ops | Found OK     | Visual Check                    | INVALID        |
| 5            | Mold Hot Runner Not Working Properly | Equipment Condition Check With Ops | No Concern   | Visual Check                    | INVALID        |

Validation Of Probable Cause



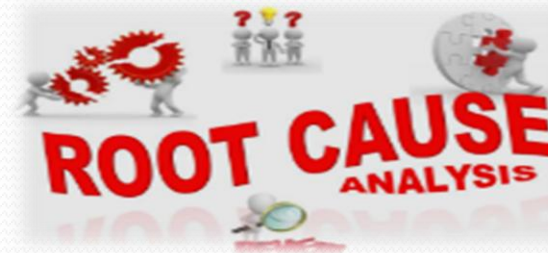
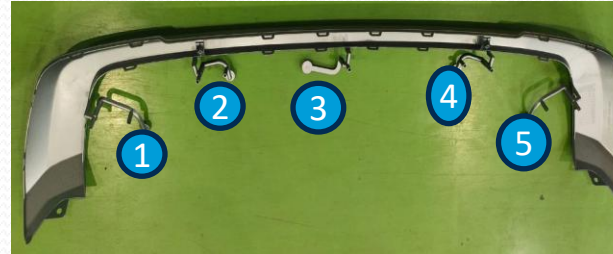
| MATERIAL |                                     |                                  |              |                      |                |
|----------|-------------------------------------|----------------------------------|--------------|----------------------|----------------|
| SN       | POSSIBLE CAUSES                     | OPS/SPEC/ CRITERIA               | ACTUAL       | SOURCE               | VALID/ INVALID |
| 1        | Fumes Generated Due Silver Pigments | Check During Process             | Found Not Ok | Mold Open Purging    | VALID          |
| 2        | Material Mixing Problem             | Check Manually                   | Found Ok     | Check Visually       | INVALID        |
| 3        | Contamination Found In Raw Material | Check Manually                   | Found OK     | Raw Mat. Check Sheet | INVALID        |
| 4        | New Raw Material Use.               | Checked By Raw Mat. Check Sheet. | Found OK     | Visual Check         | INVALID        |

# CAUSE & EFFECT VALIDATION: FLOW MARK PROBLEM

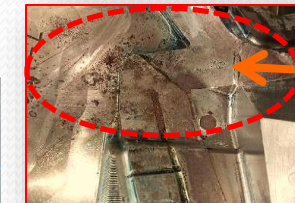
| SR.NO | PROBABLE CAUSE                         | RELATION    | VALIDATION    | RESPONSIBILITY                                                                                                                                                              |
|-------|----------------------------------------|-------------|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.    | OPERATOR AWARENESS.                    | MAN         | INSIGNIFICANT |       |
| 2.    | OPERATOR TRAINING                      | MAN         | INSIGNIFICANT |                                                                                                                                                                             |
| 3.    | LACK OF PROCESS KNOWLADGE              | MAN         | INSIGNIFICANT |                                                                                                                                                                             |
| 4.    | AIR VENT BLOCKED IN MOULD              | MACHINE     | SIGNIFICANT   |       |
| 5.    | MATERIAL MIXING PROBLEM                | MATERIAL    | INSIGNIFICANT |                                                                                                                                                                             |
| 6.    | BARREL TEMP. TOO HIGH                  | MACHINE     | INSIGNIFICANT |                                                                                                                                                                             |
| 7.    | MOULD HOT RUNNER NOT WORKING           | MACHINE     | INSIGNIFICANT |                                                                                                                                                                             |
| 8.    | PROCESS PARAMETERS NOT OPTIMIZE        | METHOD      | INSIGNIFICANT |       |
| 9.    | MATERIAL FRICTION INSIDE THE MOULD     | MACHINE     | SIGNIFICANT   |                                                                                                                                                                             |
| 10.   | CONTAMINANT FOUND IN RAW MATERIAL      | MATERIAL    | INSIGNIFICANT |                                                                                                                                                                             |
| 11.   | CLAMPING PRESSURE TOO HIGH             | METHOD      | INSIGNIFICANT |     |
| 12.   | DUST FOUND IN AIR                      | ENVIRONMENT | INSIGNIFICANT |                                                                                                                                                                             |
| 13.   | FUMES GENERATED DURING PART FILLING    | MACHINE     | SIGNIFICANT   |                                                                                                                                                                             |
| 14.   | NEW RAW MATERIAL USE                   | MATERIAL    | INSIGNIFICANT |   |
| 15.   | HUMIDITY FOUND IN AIR                  | ENVIRONMENT | INSIGNIFICANT |                                                                                                                                                                             |
| 16.   | FUMES GENERATED DUE TO SILVER PIGMENTS | MATERIAL    | SIGNIFICANT   |                                                                                                                                                                             |
| 17.   | ENVIRONMENT TEMP. LOW/HIGH             | ENVIRONMENT | INSIGNIFICANT |   |
| 18.   | MOULD PREVENTIVE MAINTENANCE ON TIME   | MEASUREMENT | INSIGNIFICANT |                                                                                                                                                                             |
| 19.   | MOULD PREVENTIVE FREQUENCY ON TIME     | MEASUREMENT | INSIGNIFICANT |                                                                                                                                                                             |
| 20.   | MEASURING INST. PREVENTIVE ON TIME     | MEASUREMENT | INSIGNIFICANT |                                                                                                                                                                             |

## WHY WHY ANALYSIS

- 1 **Why** Flow Mark problem in Part?  
Due to Air decompress in mould during part filling
- 2 **Why** Air decompress in mould?  
Cavity air is not released from mould
- 3 **Why** cavity air not release from mould?  
Air vent not clean properly.
- 4 **Why** Air vent not clean?  
Air vent blocked rapidly due to more fumes generated in mould
- 5 **Why** more fumes generated?  
High fumes due to special raw materials; existing air vent cleaning is insufficient.



Air vent cleaning by tool room person

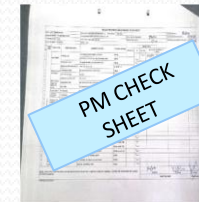


Air vent found blocked



## COUNTER MEASURE 1:

- ☐ Air vent cleaning frequency increase three month to one month.
- ☐ Air vent cleaning Points added in PM Check Sheet .



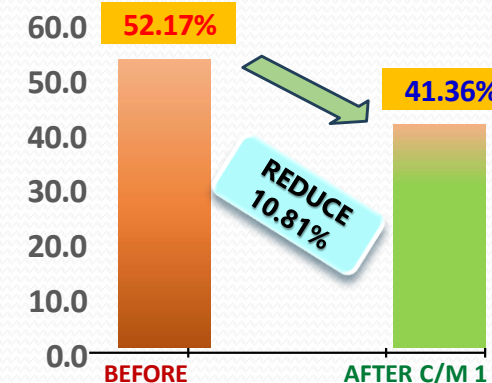
**BEFORE AIR VENT  
CLEANING**

**AFTER AIR VENT  
CLEANING**

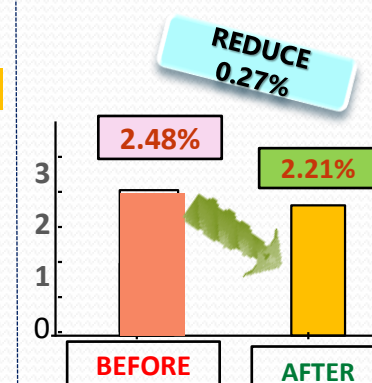
| S.N O. | THICKNESS | LOCATION       | Judgement | S. N . | THICKNESS | LOCATION       | Judgement |
|--------|-----------|----------------|-----------|--------|-----------|----------------|-----------|
| 1      | 0.03mm    | Top side       | OK        | 1      | 0.03mm    | Top side       | OK        |
| 2      |           | Top side       | NG        | 2      |           | Top side       | OK        |
| 3      |           | Operation side | NG        | 3      |           | Operation side | OK        |
| 4      |           | Operation side | NG        | 4      |           | Operation side | OK        |
| 5      |           | Non oper. side | OK        | 5      |           | Non oper. side | OK        |



## FLOW MARK CONTR. %



## REJECTION %



SINCE WE DID NOT  
ACHIEVE OUR  
TARGET.....



CHECK MOULD TEMP. WITH THE  
HELP OF THERMAL CAMERA.



| Part Name | MTC SET TEMP. +/- 10°C | Actual Mold Temp. | Judge ment |
|-----------|------------------------|-------------------|------------|
| TOP       | 40°C                   | 41°C              | ok         |
| MIDLE     | 40°C                   | 42°C              | ok         |
| BOTTOM    | 40°C                   | 40°C              | ok         |



Material preheat  
dryer temp. 80°C



Validate the mold chiller  
temperature & Hot  
runner temperature  
mould temp. is found ok



Chiller  
temperature  
20°C



Hot runner temp. 220°C

220°C



Insignificant

MOULD HAVING PROPER COOLING, THEN  
WHY FLOW MARK GENERATED?

WHY -WHY  
ANALYSIS

WHY 1

Where is flow mark generated?  
Flow mark generated at curve area due  
material property.

WHY 2 :

Why generated in curve area?  
Melted material flow not smooth

WHY 3 :

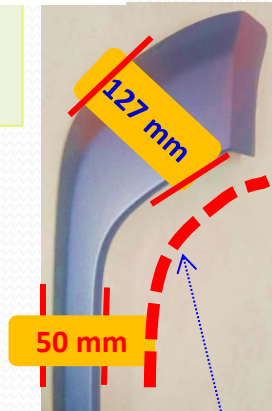
Why material not flow smooth ?  
Mold radius not supported at curve

WHY 4 :

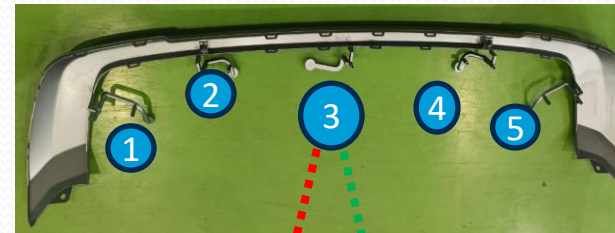
Why radius not supported?  
Radius inadequate at curve area.

Root  
cause

Material friction during injection

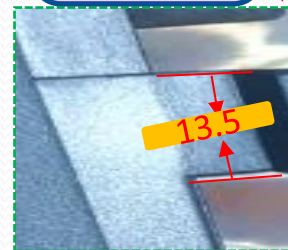


Curve area part  
width excessive.



BEFORE

AFTER



Before Gate size 13.5 mm



Gate size increase 2mm

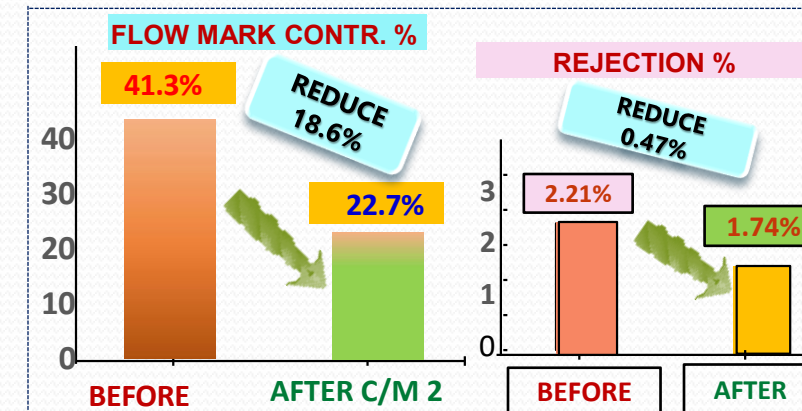
## COUNTER MEASURE 2:

\* The middle gate (no -03) size increased by 2 mm  
from 13.5mm to 15.5mm

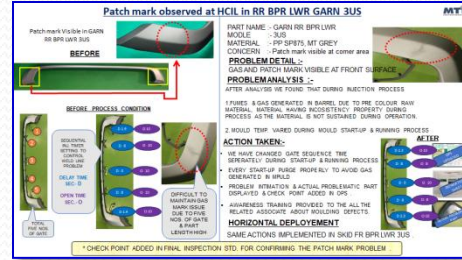


Significant

Effectiveness



# IMPLEMENTATION OF ALL COUNTERMEASURES TO CONTROL FLOW MARK OUTFLOW.

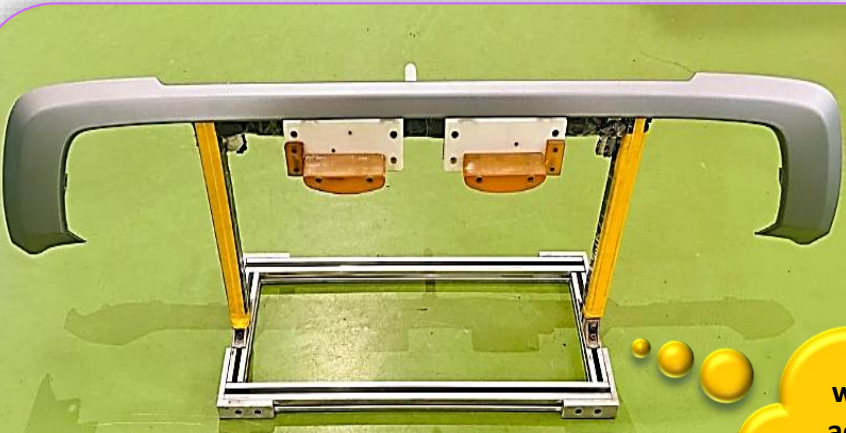


**AWARENESS  
TRAINING  
CONDUCTED**

## Moulding Parts Defect Sheet – Actual Parts and Defects



**FLOW MARK PROBLEM  
MENTION IN MOULDING  
PART DEFECT SHEET**



**Part inspection  
with the help of an  
actual car condition  
inspection jig,  
manufactured in-  
house by us.**

## START-UP PROCEDURE

| MACHINE START-UP & SET-UP APPROVAL RULE ROUTE: 001/DATE - 20/08/2023, REV NO - 01 |                    |             |            |        |
|-----------------------------------------------------------------------------------|--------------------|-------------|------------|--------|
| NO.                                                                               | DESCRIPTION        | BY          | DATE       | REMARK |
| 1                                                                                 | START-UP PROCEDURE | MC OPERATOR | 20/08/2023 |        |
| 2                                                                                 | START-UP PROCEDURE | MC OPERATOR | 20/08/2023 |        |
| 3                                                                                 | START-UP PROCEDURE | MC OPERATOR | 20/08/2023 |        |
| 4                                                                                 | START-UP PROCEDURE | MC OPERATOR | 20/08/2023 |        |
| 5                                                                                 | START-UP PROCEDURE | MC OPERATOR | 20/08/2023 |        |
| 6                                                                                 | START-UP PROCEDURE | MC OPERATOR | 20/08/2023 |        |
| 7                                                                                 | START-UP PROCEDURE | MC OPERATOR | 20/08/2023 |        |
| 8                                                                                 | START-UP PROCEDURE | MC OPERATOR | 20/08/2023 |        |
| 9                                                                                 | START-UP PROCEDURE | MC OPERATOR | 20/08/2023 |        |
| 10                                                                                | START-UP PROCEDURE | MC OPERATOR | 20/08/2023 |        |
| 11                                                                                | START-UP PROCEDURE | MC OPERATOR | 20/08/2023 |        |
| 12                                                                                | START-UP PROCEDURE | MC OPERATOR | 20/08/2023 |        |
| 13                                                                                | START-UP PROCEDURE | MC OPERATOR | 20/08/2023 |        |
| 14                                                                                | START-UP PROCEDURE | MC OPERATOR | 20/08/2023 |        |
| 15                                                                                | START-UP PROCEDURE | MC OPERATOR | 20/08/2023 |        |
| 16                                                                                | START-UP PROCEDURE | MC OPERATOR | 20/08/2023 |        |
| 17                                                                                | START-UP PROCEDURE | MC OPERATOR | 20/08/2023 |        |
| 18                                                                                | START-UP PROCEDURE | MC OPERATOR | 20/08/2023 |        |
| 19                                                                                | START-UP PROCEDURE | MC OPERATOR | 20/08/2023 |        |
| 20                                                                                | START-UP PROCEDURE | MC OPERATOR | 20/08/2023 |        |

## FIRST SAMPLE AND TWO HOURLY SAMPLE PREPARATION.

## INSPECTION CHECK SHEET

| Daily 'ralem' Inspection Checksheet |                            |                   |        |         |
|-------------------------------------|----------------------------|-------------------|--------|---------|
| System                              | Purpose                    | Method            | Status | Remarks |
| 1                                   | Check the machine          | Visual inspection | 0      | OK      |
| 2                                   | Check the material         | Visual inspection | 0      | OK      |
| 3                                   | Check the temperature      | Visual inspection | 0      | OK      |
| 4                                   | Check the pressure         | Visual inspection | 0      | OK      |
| 5                                   | Check the quality          | Visual inspection | 0      | OK      |
| 6                                   | Check the quantity         | Visual inspection | 0      | OK      |
| 7                                   | Check the color            | Visual inspection | 0      | OK      |
| 8                                   | Check the shape            | Visual inspection | 0      | OK      |
| 9                                   | Check the size             | Visual inspection | 0      | OK      |
| 10                                  | Check the weight           | Visual inspection | 0      | OK      |
| 11                                  | Check the length           | Visual inspection | 0      | OK      |
| 12                                  | Check the width            | Visual inspection | 0      | OK      |
| 13                                  | Check the height           | Visual inspection | 0      | OK      |
| 14                                  | Check the depth            | Visual inspection | 0      | OK      |
| 15                                  | Check the area             | Visual inspection | 0      | OK      |
| 16                                  | Check the volume           | Visual inspection | 0      | OK      |
| 17                                  | Check the mass             | Visual inspection | 0      | OK      |
| 18                                  | Check the density          | Visual inspection | 0      | OK      |
| 19                                  | Check the specific gravity | Visual inspection | 0      | OK      |
| 20                                  | Check the refractive index | Visual inspection | 0      | OK      |

**TWO HOURS PART SAMPLE  
FOUND OK**

# BRAIN STORMING

SINCE WE DID NOT ACHIEVE OUR  
TARGET.....MEANS WE HAVE TO WORK ON  
SOME MORE PROBABLE CAUSES



## \*ANALYSIS POINT\*

1. TO VERIFY MELTED MATERIAL FLOW INSIDE THE MOULD
2. TO ENSURE GATE THICKNESS TO PROPER FLOW OF MATERIAL.
3. TO VERIFY AIR VENT STATUS INSIDE THE MOULD.

ANALYSIS DONE  
&  
PARTIALLY EFFECTIVE

SOME MORE PROBABLE CAUSE IS REMAINING FOR  
ANALYSIS

WHY -WHY  
ANALYSIS

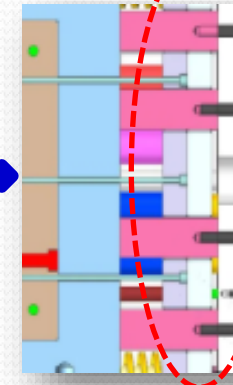
- 1 **Why:-** Flow mark appear at the part surface?  
Due to fumes appear at the part surface
- 2 **Why :-** fumes appear at the part surface?  
Due to fumes generated inside the mould during injection filling.
- 3 **Why :-** Material fumes generated?  
Due to Few sequential valve not working properly among the five sequential valve.
- 4 **Why :-** Few sequential valve not working properly?  
Due to Sequential valve pin not move properly during open purging.
- 5 **Why :-** sequential valve pin not move properly?  
Due to The pneumatic sequential valve pin was not receiving the required pressure for proper movement.



TIMER.

ONLY 4 KG AIR PRESSURE  
RECEIVED.

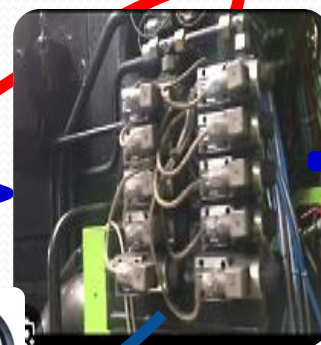
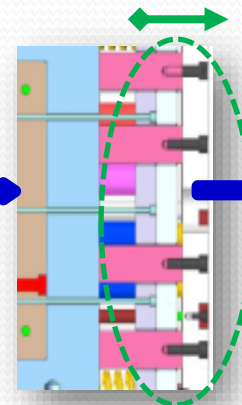
Pin back completely

MOULD WITH SEQUENTIAL  
VALVEMATERIAL FRICTION  
GENERATED DUE TO  
SEQUENTIAL PIN NOT MOVE IN  
BACK DIRECTION INSIDE THE  
MOULD DURING INJECTION.

SEQUENTIAL PIN

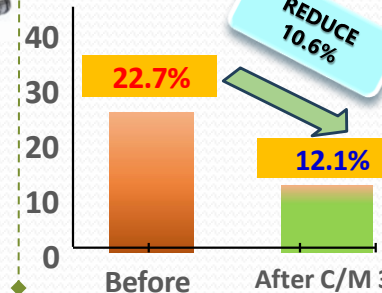
## COUNTER MEASURE 1:

□ We install additional AIR BOOSTER to increase the air pressure for the proper movement of sequential valve ga

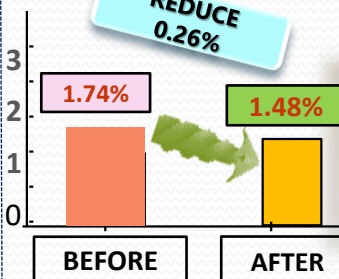
AIR  
COMPRESSORAIR BOOSTER  
ADDEDAFTER USE OF AIR BOOSTER  
AIR PRESSURE INCREASE UP  
TO 5 KG.SEQUENTIAL PIN MOVE IN  
BACK DIRECTION  
COMPLETELY AND REDUCE  
MATERIAL FRICTION  
PROBLEM.

Significant

## FLOW MARK CONTR. %



## REJECTION %

SINCE WE DID NOT  
ACHIEVE OUR  
TARGET.....

We have covered all probable causes we found out, but the Problem is Still Not Solved. What to do?

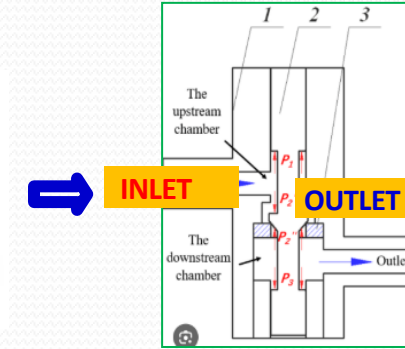
Let us Leave It. We can not improve the flow mark issue

Never lose Hope! Let's go into a deeper analysis of the Flow mark occurrence.

Our Plant Head Guided us



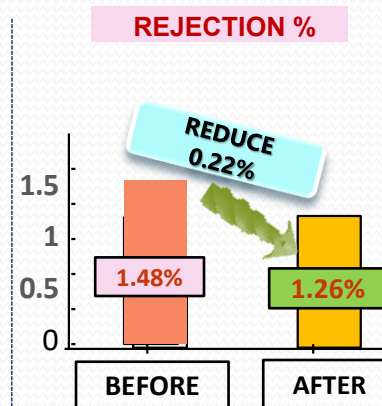
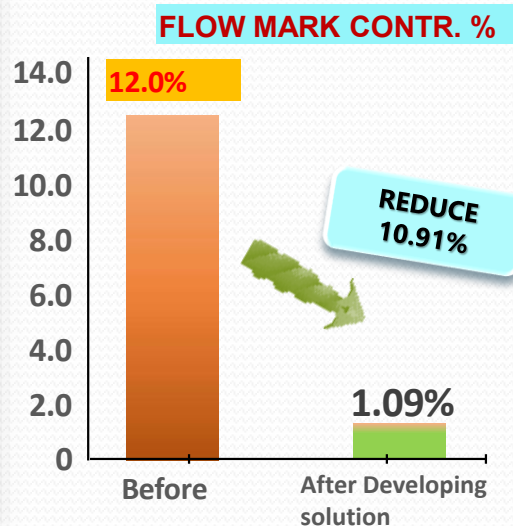
Let's start analysis with mould maintenance team



Installed a vacuum generator in the mold to ensure complete air evacuation.

**Conclusion:-** Comprehensive Reduction In Flow mark Problem , We are Going in Right Direction .

## Results and Effectiveness



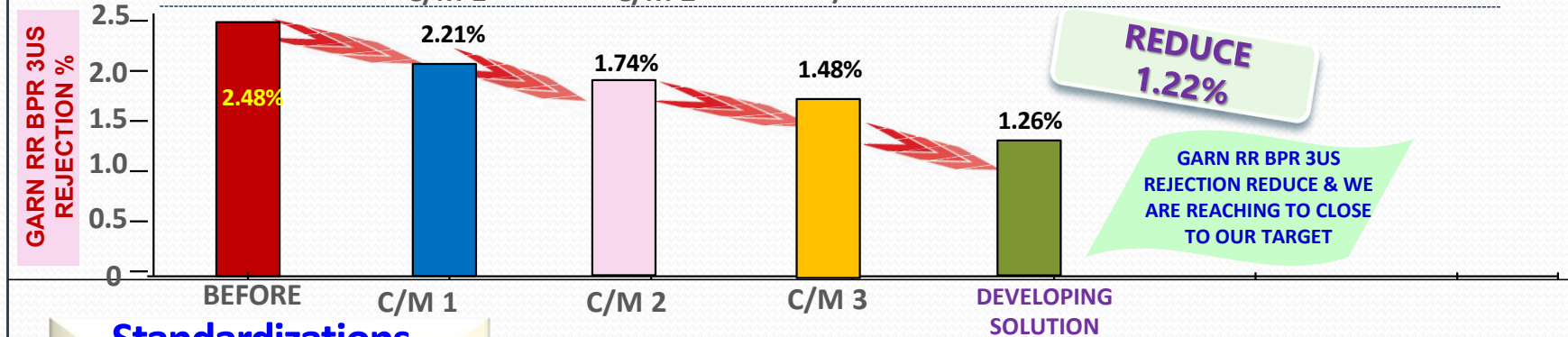
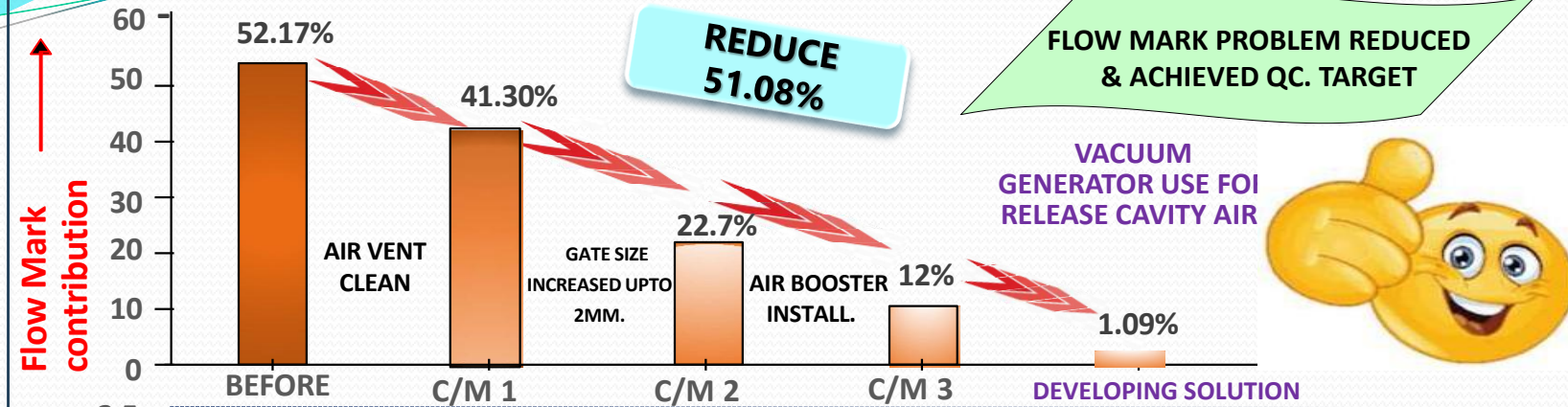
Significant



# HIP-HIP HURRAY !!!



## Overall Summary of Flow mark Elimination

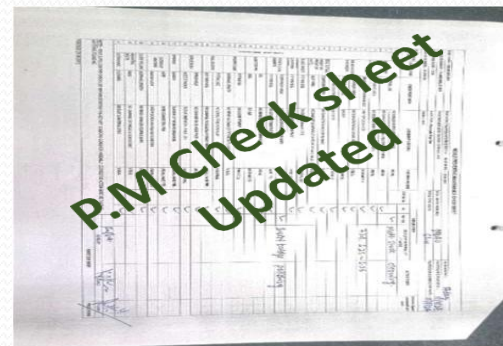
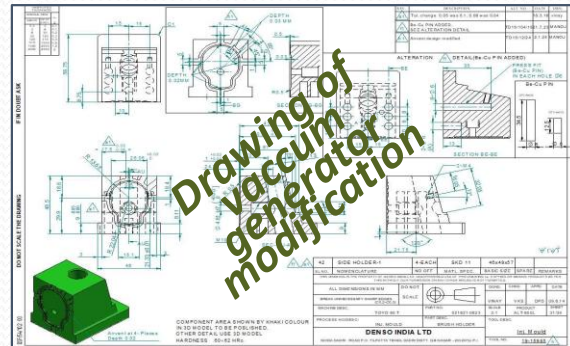
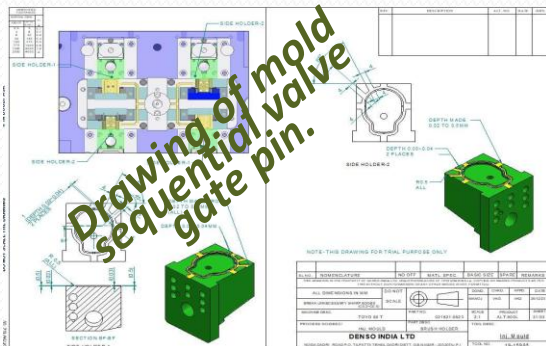


## Horizontal deployment

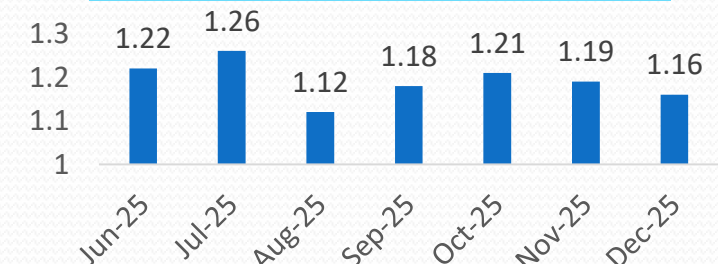


Improvements Shared With Moriorku Japan & Our Other OGC and Same Activity Done in GARN RR BPR (ELIVATE) model.

## Standardizations



## Monthly Trend Rej% Garn RR BPR 3US



**FORSEEING PROBABLE RESISTANCE AFTER COUNTERMEASURES**

| Sr. No. | PROBLEM   | SOLUTION SUGGESTED                                                       | RESISTANCE FACED | REMEDY |
|---------|-----------|--------------------------------------------------------------------------|------------------|--------|
| 1.      | FLOW MARK | ➤ AIR VENT CLEANING FREQUENCY INCREASE                                   | NO RESISTANCE    | NIL    |
| 2.      | FLOW MARK | ➤ GATE SIZE INCREASED 2MM, 13.5MM TO 15.5MM                              | NO RESISTANCE    | NIL    |
| 3.      | FLOW MARK | ➤ ADDITION AIR BOOSTER INSTALL                                           | NO RESISTANCE    | NIL    |
| 4.      | FLOW MARK | ➤ A VACCUM GENERATOR INSTALL IN MOULD TO ENSURE COMPLETE AIR EVACUATION. | NO RESISTANCE    | NIL    |



BY THIS SHEET WE ANALYSE THAT NEITHER ANY DEPT. NOR ANY PERSON WILL MAKE ANY OBJECTION FROM THIS QUALITY CIRCLE.

The diagram illustrates the difference between a planned and an actual scenario. On the left, under the heading "PLAN", there are two red rectangular boxes connected by a blue double-headed arrow. On the right, under the heading "ACTUAL", there are two yellow rectangular boxes connected by a green double-headed arrow. The boxes and arrows are positioned below their respective headings.

| MONTH                                    | PHASE | FEB - 2025 |    |    |    | MAR- 2025 |    |    |    | APR-2025 |    |    |    | MAY-2025 |    |    |    |
|------------------------------------------|-------|------------|----|----|----|-----------|----|----|----|----------|----|----|----|----------|----|----|----|
| WEEKS                                    |       | W1         | W2 | W3 | W4 | W1        | W2 | W3 | W4 | W1       | W2 | W3 | W4 | W1       | W2 | W3 | W4 |
| ACTIVITIES                               |       |            |    |    |    |           |    |    |    |          |    |    |    |          |    |    |    |
| IDENTIFICATION OF PROBLEM                |       |            |    |    |    |           |    |    |    |          |    |    |    |          |    |    |    |
| SELECTION OF PROBLEM                     |       |            |    |    |    |           |    |    |    |          |    |    |    |          |    |    |    |
| DEFINE THE PROBLEM                       |       |            |    |    |    |           |    |    |    |          |    |    |    |          |    |    |    |
| ANALYSE THE PROBLEM                      |       |            |    |    |    |           |    |    |    |          |    |    |    |          |    |    |    |
| IDENTIFICATION OF CAUSES                 |       |            |    |    |    |           |    |    |    |          |    |    |    |          |    |    |    |
| FINDING OUT ROOT CAUSE                   |       |            |    |    |    |           |    |    |    |          |    |    |    |          |    |    |    |
| DATA ANALYSES                            |       |            |    |    |    |           |    |    |    |          |    |    |    |          |    |    |    |
| DEVELOPING SOLUTION                      |       |            |    |    |    |           |    |    |    |          |    |    |    |          |    |    |    |
| FORSEEING PROBABLE RESISTANCE            |       |            |    |    |    |           |    |    |    |          |    |    |    |          |    |    |    |
| TRIAL IMPLEMENTATION & PERFORMANCE CHECK |       |            |    |    |    |           |    |    |    |          |    |    |    |          |    |    |    |
| REGULAR IMPLEMENTATION                   |       |            |    |    |    |           |    |    |    |          |    |    |    |          |    |    |    |
| FOLLOW UP REVIEW                         |       |            |    |    |    |           |    |    |    |          |    |    |    |          |    |    |    |

## TANGIBLE BENEFITS :

(BY RECTIFYING THE PROBLEM OF GARN RR BPR (3US) MODEL  
(AUG-2025 TO OCT-2025)

**COST SAVING:-**

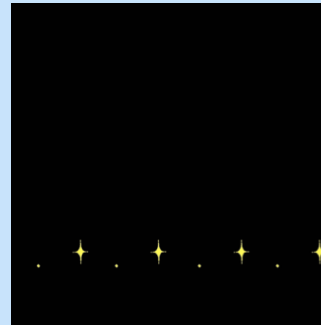
**GARN RR BPR (3US) MODEL ONE PART COST IS = 303.06 Rs/-**

**TOTAL REJECTION REDUCE :- 759 PARTS**

**TOTAL REJECT PART SAVING :- 230022 Rs/-**

**REWORK MANPOWER COST SAVING :- 30000 Rs/-**

**TOTAL COST SAVING :- 260022 Rs/-**



**TOTAL COST –**

**TOTAL COST DURING MOULD POLISHING :- 0 /- (INHOUSE)**

**TOTAL COST DURING GATE THICKNESS INCREASE IN MOULD :- 0 Rs/-**

**TOTAL COST OF AIR BOOSTER + VACUUM GENERATOR + JIG + TRIAL  
REJECTION = 45355/- One-time investment**

**NET COST SAVING = 260022 – 45355 = 214667 Rs/-  
(June-25 to Dec-25) Seven Months**



# OUR NEXT PROJECT

TO INCREASE AUTOMATION RATIO AND MACHINE  
EFFICIENCY.



YOUR INPUTS ARE VALUABLE TO US  
QUESTIONS & SUGGESTION ARE INVITED

GARV

