

# **IMTMA - ACE MICROMATIC**

**Productivity Championship Awards 2024** 

# **Rules & Guidelines governing the competition**

Competition open to companies engaged in the manufacture of Engineering products / Components.

#### Contestants are advised to read the following guidelines carefully before filling in the format

- The objective of National Productivity Summit is to showcase best productivity practices in Indian manufacturing space, by sharing knowledge and experience.
- Participation in this competition is FREE.
- Download and submit the entry form by logging on to www.productivity.imtma.in on or before 30th April 2024. • Please ensure that the file size being uploaded does not exceed 20 MB. Subsequently the hard copy of the entry duly signed and certified by the senior management should be sent to IMTMA's Bangalore office at the below address.
- There will be separate awards for Automotive and Non-Automotive sectors.
- Companies must submit Case study(s) that will showcase and highlight breakthrough achievements that have brought significant competitive advantage to the company. The case study(s) must clearly bring out the value creation and results achieved.
- While companies can send maximum of 2 entries per plant
   / manufacturing location, please note that only ONE best entry shall be considered for evaluation.
- Project must have been implemented and put into regular operation for a minimum period of one year. The project start date must be after January 2020. Entries that were submitted for the previous IMTMA Productivity championship competition <u>must not be resubmitted</u>. Such entries will be summarily disqualified.

#### Note:

- Minor improvements, Kaizens, will not be considered. Participants are expected to submit case study(s) that have brought in significant improvements to their business.
- Projects having application of standard products for productivity improvement / Service plugins that are commercially available will not be considered.
- Companies must submit their entry(s) strictly in the below format along with **Annexure A & B**. Entries without structured information on the case study(s) stands the risk of disqualification.
- Udyam Registration Certificate to be attached as annexure in the last page of this document.

- The selected case study must be presented at the National Productivity Summit 2024 scheduled on 21-22 November 2024, Pune, by a member of the Senior Management of the organization responsible for the project implementation. The presentation must be made in English language only.
- Entries will be judged by an independent jury c o m p r i s i n g of eminent professionals, whose decision will be final. While significant weightage will be given to the conceptualization, link to business need, associated impact, value creation to stakeholders and business sustainability parameters, the other criteria for evaluation will also include analysis, determination of requirements, generation and evaluation of alternative solutions, innovativeness and the thoroughness of planning and implementation. Neither IMTMA nor ACE MICROMATIC will have any role in judging of entries. The jury reserves the right to accept or reject an entry without assigning any reasons thereof. Therefore IMTMA is not obliged to provide reasons for rejection.
- Projects may be validated onsite (physically or virtually) by the evaluation team as part of the process, if required.
- Winners will be awarded cash prizes, a trophy and a certificate. Cash prizes will be awarded to individuals / Team Members
- Presentations can contain concepts and broad contours of the project without disclosing confidential information. Applicants are assured of the confidentiality and their IP rights.
- IMTMA reserves the right to publicise the selected case study in their programs / website and other event promotional collaterals.

#### For any queries please contact:

INDIAN MACHINE TOOL MANUFACTURERS' ASSOCIATION (IMTMA) @ Bangalore International Exhibition Centre (BIEC) 10th Mile, Tumkur Road, Madavara Post, Bangalore – 562 123

> Abhishek (Email: <u>abhishek@imtma.in</u> Mob: 9844294387, Tel: 080 66246829) or Madan (Email: <u>madan@imtma.in</u> Mob: 7899437625, Tel: 080 66246711)



#### Indian Machine Tool Manufacturers' Association (IMTMA)

Head Office : 10th Mile, Tumkur Road, Madavara Post, Bangalore – 562123, Karnataka, India. T: 080-6624 6829 / 6624 6711 W: www.productivity.imtma.in

# Annexure: A

#### IMTMA-ACE MICROMATIC PRODUCTIVITY CHAMPIONSHIP AWARDS 2024

FORMAT FOR SUBMISSION OF CASE STUDY

FOR LARGE & MEDIUM COMPANIES ONLY (Unit level / SBU level turnover > Rs.100 Crores)

Title of the Case Study:

1. Name of company: **Synergy Engineers and Powder Coaters** Address of the Plant / Site location: **C-2/6 & C-2/6 Part 1, Old MIDC Area,** 

Near Maharashtra Scooters Ltd. Satara 415004

#### Tel No.: 02162-246033,246633

Turnover (in Rs. Cr) **2.02 (F.Y.2023-24**) No. of employees: **31 Nos**. Industry sector (mandatory): Manufacturing

2. Name of the project leader: Mr.Aditya Khutale Designation : Partner Mobile No.: 9850552220 Email ID: <u>aditya@khutale.engineering</u>

Alternate contact person: Mr.Prashant M.Mane , Mr. Suraj D. Jadhav Designation : Production Manager , Prod. Supervisor Mobile No. 9226961433 , 8805973711 Email ID: <u>synergycoats@gmail.com</u> <u>3. Project implementation</u> Start date : 22/07/2022 End date :

Is it in continuous operation now? (Yes/No) : Yes

We certify that the project described here is factually correct and is in continuous operation. We confirm that we have read the rules and guidelines governing this competition and agree to abide by the same.

We agree to nominate a member of our senior management to make the presentation, in case this entry is short listed for final evaluation of the award.

We have no objections in IMTMA publicising our case study in their programs / website and other event promotional collaterals.

Name : Mr.Aditya Khutale (Head of Company/Business Unit / Division) Designation: Managing Partner Date: 28.04.2024

Electronic Signature:\_\_\_\_\_



UCTIV

Annexure: B

	Tick( $\checkmark$ ) the appropriate box(es) that best describe your Case study
1.	<ul> <li>Scope of the project: (Please tick as appropriate)</li> <li>Multiple Value streams (Improvements in Multiple Value streams/ product families resulting in breakthrough benefits).</li> <li>✓Single Value stream (Improvements in a Value stream / product family with significant benefits).</li> <li>Localized improvement within a Value stream (Improvements in identified processes / pockets within a value stream, with incremental benefits).</li> </ul>
2.	Project sponsor: ☑ Top management ☑ Senior management (CEO / CXO level) ☐ Middle management (GM/ DGM/ AGM level)
3.	Project trigger:
	<ul> <li>3.1</li></ul>
4.	Project focus :       Image: Manufacturing System Redesign (MSR)       Image: Better Asset Utilization (BAU)         Image: Productivity Through Quality improvement (PTQ)       Image: Optimizing Metal working Process (OMP)         Image: Digital Manufacturing & I 4.0       Image: Optimizing Metal working Process (OMP)         Image: Digital Quality Management (TQM)       Image: Optimizing Green & Clean         Image: Other innovation (Please specify) Pokayoke for Quality Improvement.       Improvement.
5.	Quality / Analytical tools: Please tick If you have used any of the tools listed below for developing productivity improvement solutions.         Statistical Process Control (SPC)       Design of Experiments (DOE)         Eight Disciplines of problem solving (8D)       Root Cause Analysis (RCA)         Standard problem solving tool       Theory of Constraints (TOC)         Six Sigma       7 QC Tools         Pokayoke for quality Improvement
6.	<ul> <li>Project implementation includes</li> <li>☑ All activities within the organization</li> <li>☑ Upstream and Downstream partners/ suppliers</li> </ul>
7.	Productivity improvement includes: ☑ Enhanced output ☑ Reduced inputs ☑ Manpower Rationalization

# Application of Pokayokes system for Zero defect Quality & Safety in Powder Coating Plant ..!

Present Facility – Manual Dipping PT Line & Conveyorized reciprocating / Manual powder spraying & Baking System.

## **BRIEF DESCRIPTION OF OUR PROJECT –**

- We were on the path of CII zero defect cluster, and our goal was to eliminate the defects. There were several defects as a result of the human-centric approach and the absence of equipment/system upgrades.
- We concentrated on powder coating plant kill live defects, which were mostly human-centric. We used zero defect cluster learning to identify as many as 42 pokayokes to manage these faults and were successful in eliminating them by deploying pokayokes.
- These pokayokes are used in numerous stages of the powder coating facility, including pre-treatment, powder spraying, the baking cycle, and the packaging section.
- We are dealing with 14 live defects which we have divided into two categories: live defects and dormant defects.
- We commonly see the following problems,

Many of them have been	which we have categorised as	Some defects are categorised as
reduced by reducing human	active / Live Defects :	dormant cause they are not
interaction, and they are as		observing frequently are –
follows:	1) Powder Spitting	
	2) Low Coverage	1)Fish Eye
1) finger prints	3) Dents	2)Cissing
2) Scratches caused by	4) scratches	3) Blooming
handling	5) Overbaked / Underbaked	4)Jetness
	6)Excess DFT	5) Bittiness
	7)Blisters	
	8)Dust Particles	





Less Powder Job Touch Mark Dent Mark Powder Spitting Shirt Marks Dust Contamination Page 4 of 12

## **TRIGGER OF PROJECT –**

- Business Requirements We were experiencing high rejection.
- **Poor quality / productivity** Due to excessive rejection, we are unable to meet our goal of zero defect aim.
- Unsatisfied customer because of too high rejection and unsatisfactory quality maintenance, the customer demanded greater quality accuracy with 0% material rejection, return and quality improvement.
- **Speed up outcomes** Because of excessive defects materials must be reworked.
- **Optimize manpower** because of low quality getting material that requires rework, workers and assets are required, which decreases optimization of manpower at necessary location.
- **Competitive advantage** because we could not achieve zero defect aim, we are back in the race of competitors.
- Targets that were expected to be fulfilled by these projects 1) ZED Zero Defect Zero Effect Culture
  - 2) Quality Improvement
  - 3) Customer Satisfaction
  - 4) **Optimization of manpower**
  - 5) Reducing the cost of poor quality
  - 7) Productivity Improved
  - 6) Cost Competitiveness

## SOLUTIONS GENERATION, INNOVATION AND COMPLEXITY -

- While on our journey to <u>ZERO DEFECT CLUSTER</u>, we identified many defects in a war room with all field experts.
- While monitoring, we discovered **42 pokayokes**, out of which **26** are related to smoothing powder coating systems, which aid in achieving results such as zero-defect aim, minimizing rejection or rework, and providing quality parameters.
- With the aid of <u>DRVME ( Defect ,Reason of occurrence of defect,Validation, Measurement ,</u> <u>Effectiveness</u>) we were able to spot defects and successfully eliminate them.
- We created a defect directory to assist us in identifying defects. We classified these defects into various categories such as LIVE DEFECTS, DORMANT DEFECTS, and DEFECTS CAUSED BY HUMAN INTERFERENCE.
- We discover these defects and effectively eliminate them with the aid of **pokayokes**.
- We also highlighted **ideal parameters** that are required for the powder coating system to run smoothly and without any defects or rework.
- After detecting human-centric defects or defects caused by human interference, we attack them to eliminate them by adapting new technologies / machines that help to reduce human interference, which automatically aids in achieving zero defect aim, minimizing material rejection while maintaining quality parameters.



### **IMPLEMENTATION –**

- With the use of data obtained while working, certain parameters are discovered that are strictly required to follow for the powder coating system to run well.
- Those functions that require human involvement, such as loading and unloading, are changed with the support of advanced machines, such as **Conveyorized System**
- Those functions require human intervention, such as checking the titration of the pretreatment tank and checking the PH of the water on those parameters. **Checklists** are presented, and they are checked every 2 hours by supervisors.
- After installing a **pressure bar controller**, which leads to errors including reduced DFT, powder spitting, orange peel, and excess coat.



BEFORE (pressure bar controller)



**AFTER** (pressure bar controller)

SR.NO	POKAYOKES	LOCATION	REMARKS	EFFECTS /DEFECTS
1	Lock system to be provided to PT tank drainage valves.	PT Line	Ensuring control over the release of Water / chemical, safeguarding against accidents, and maintaining operational integrity in chemical handling processes & To maintain Bath Levels concentration and PH.	Ensuring Tank bath levels
2	To maintain pretreatment tank levels including water rinse tanks with auto sensor systems.	PT Line	Ensures accurate monitoring of liquid levels, enabling timely replenishment or drainage as needed.	Air Patch / Oil Marks
3	Interlock between (WDO) temperature sensor and on off oven door. If temperature deviates against the set temp. oven door will not open/ Close	PT Line	Ensures that if the temperature deviates from the set parameters, the oven door remains locked, preventing access until the temperature returns to the desired range.	Water Marks / Air Patch
4	Degreasing Tank temp indicator and alarm.	PT Line	Ensures temp. ℜ time monitoring of temperature fluctuations, allowing for timely adjustments and interventions to maintain optimal conditions.	Oil / Grease marks
5	Zinc Phosphating Tank temp indicator and alarm Zinc Phosphating	PT Line	Enables continuous monitoring of temperature levels, facilitating prompt corrective actions to prevent overheating or deviations.	Poor Adhesion / Impact Failure
6	Dipping time interlock with crane operation.	PT Line	Ensures synchronized control, enabling the crane to lift or lower objects from the solution only as per specified dipping durations.	Oil / Grease / water marks

## LIST OF POKAYOKES

7	Bath temperature interlock with crane operation.	PT Line	Ensures that the crane can only lower or lift objects from the bath when the temperature is within specified parameters.	Oil / Grease / water marks
8	Interlock to overhead conveyor and poor earthing on components.	PC BOOTH	Ensures that the conveyor halts operation if inadequate earthing is detected. This prevents electrostatic discharge hazards.	Rough Finish
9	Interlock between powder spraying and suction recovery.	PC BOOTH & Recovery	Ensures that powder spraying only occurs when the recovery system is operational. This prevents powder wastage, optimizes material usage.	Powder spitting
10	Overhead Conveyor interlock with ultrasonic sieve, if sieve/powder filtration system fails conveyor stops.	PC BOOTH	Ensures that if the sieve or filtration system fails, the conveyor automatically stops. This prevents the transportation of faulty or contaminated materials. This system is inbuilt in mitsuba & it is only applicable for Reciprocator.	Dust / Rough Finish
11	Powder coating booth Maintain ratio of fresh and recovery powder.	PC BOOTH	This System is only applicable to reciprocator.	Dust / Rough Finish
12	Interlock between Static charge eliminator and powder coating booth door.	PC BOOTH	Ensures that static charges are neutralized before entry or exit, minimizing the risk of electrostatic discharge accidents within the booth.	Safety Precaution
13	Powder pump indication for replacement of filter kit and pinch valves.	PC Booth & AFU Unit	Ensures triggering when pressure rises due to clogged filters or malfunctioning pinch valves, signaling the need for filter kit replacement or valve maintenance. This System is only applicable to reciprocator.	Dust / Rough Finish / Uneven Spray / Orange peel
14	Powder coating booth Maintain ratio of fresh and recovery powder.	PC Booth & AFU Unit	To maintain the ideal ratio of fresh and recovery powder. Implementing a reliable powder reclamation system, along with proper sieving and blending techniques, ensures consistent coating. This System is only applicable to reciprocator.	Dust / Rough Finish
15	If one of the AUTO Guns/reciprocator not working, signal should go to conveyer and it should get stopped with siren in BOOTH.	Conveyor & Booth	Ensuring swift response to equipment failures and preventing any potential defects in the coating process.	Less Paint
16	Conveyor stoppage signaling system	Conveyor	Included by Manufacture	_
17	Set selection switch to set conveyor speed	Conveyor	Included by Manufacture	-
18	Overhead conveyor location wise stoppage interlock.	Conveyor	Ensures operational safety by halting conveyance at specific points, preventing collisions or hazards, and optimizing workflow efficiency.	Safety Precaution
19	Booth Optic enter Inlet Air Pressure to Conveyor interlock to be provided to avoid if any Low air pressure problem occurs stoppage of spraying.	Conveyor	Ensures that if there's a low air pressure issue, the conveyor halts to prevent gun spraying, maintaining quality standards and avoiding potential defects in the finished product.	Less powder / Dry spray / Powder Spitting / Orange peel

20	PC Oven blower trip interlock with conveyor	Conveyor & Oven	Ensures that the blower halts operation whenever the conveyor stops, preventing overheating and ensuring consistent curing of powder coatings while optimizing safety and efficiency.	Under bake / Overbake / Peel off / High Gloss / Matt finish
21	Interlock between temperature (PCO) sensor and conveyor. If temperature deviates against the set temp. Conveyor will stop.	Conveyor & Oven	Ensures that if the oven temperature deviates from the set parameters, the conveyor automatically stops. This safeguard prevents potential overheating or underheating of products, ensuring consistent curing and quality control	Under bake / Overbake / Peel off / High Gloss / Matt finish
22	Swipe card authentication system fitting to avoid unauthorized handling (Setting the booth parameters	Oven Control Panel	Prevents unauthorized adjustments, ensuring only authorized personnel can access and modify booth parameters. This enhances security, maintains process consistency, and minimizes the risk of errors	Safety Precaution
23	PC Oven temp setting and control	Oven	This system allows operators to input desired temperatures, with sensors monitoring the actual oven temperature. The control system then adjusts the heat output accordingly to maintain the set temperature within a tight tolerance range. This ensures consistent curing of powder coatings.	Under bake / Overbake / Peel off / High Gloss / Matt finish
24	Water drying off oven temp setting and control	Oven	Temperature sensors monitor the control system adjusting burners to maintain set temperatures, ensuring efficient and precise drying without compromising quality.	Water Marks / Air Patch
25	FIFO system in Powder storage	Powder Store Area	Ensures timely use of materials, minimizing waste and maintaining regulatory compliance. It optimizes inventory management and safeguards product quality by prioritizing the use of older materials first.	Rough Finish / Impact, Adhesion / Flexibility
26	FIFO system in PT chemical storage	Chemical Store Area	Ensures timely use of materials, minimizing waste and maintaining regulatory compliance. It optimizes inventory management and safeguards product quality by prioritizing the use of older materials first.	Oil Marks / Chemical Marks / poor Degreasing / Rust marks

## **DESCRIPTION OF IMPLEMENTATION –**

- We accomplished multiple techniques that assist us achieve our objective with the aid of teamwork and innovative thinking.
- We installed alarm sensors that buzz when the water level reaches a certain height, resulting in less water waste and maintaining proper PH of bath more time for other operations.
- Our team installed a copper plate near the powder application booth, which neutralizes static charge absorption by the applicators, resulting in poor transfer efficiency.
- to eliminate as much human interference in order to avoid defects such as shirt marks and hand marks, which helps us achieve our goal We installed a completely Conveyorized System, which cuts human interaction by half.

- In order to reuse as much powder as possible and prevent air contamination, we put together a Cyclone Collector, which enables us to maximize resource efficiency of powder and lower production costs.
- Installing tank temperature indicators with alarms in degreasing tanks provides real-time monitoring of temperature levels, ensuring optimal operating conditions. Alarms notify operators of deviations from specified temperature ranges, preventing overheating or underheating that could compromise the effectiveness of degreasing processes.







Conveyorized System







Cyclone Collector

Copper plate

#### **RESULTS / IMPACT** Productivity Improvements

			Unit of
Mandatory parameters:	Before	After	Measurem
			ent
1. Productivity details: Indicate metrics that showcase	Productivity varies	GAD – 86 -88 %	%
the productivity gains obtained.	customer to customer.	Pricol – 93-95 %	
(Output in relation to the inputs used)- These could	GAD – 83 -85 %	GID – 93-95.5 %	
include reduction of material in various stages such as raw	Pricol – 90-92 %		
materials/ semi-finished goods/ WIP etc. that showcase	GID – 89-93 %		
efficiencies obtained			
2. Reduction of rejects and rework	GAD – 15 -20 %	GAD < 05 %	%
	Pricol – 10-12 %	Pricol < 03 %	
	GID – 5-8 %	GID <3%	
3. Quality	Aesthetically Poor	Aesthetic Finish	
	Finish	Improved drastically	
4. Direct Cost or Cost per piece/unit	Rejection cost per sq.ft	Rejection cost per	Rs/day
(Rejection cost per sq.ft for only those components	is very high	sq.ft is less which is	
having high aesthetic important )	Rs.2210/day	Rs.175/day	
5. Manpower cost (Can include direct/ indirect	3.50	2.95	Rs/Sq.Ft
labour/ contract/ temp resources and man-hours &			
overtime if any)			
6. Delivery & Safety	OTIF 80-85 %	Above 90	%
	For all components	In JIT 99+	
7. Safety ( Accidents )	0	0	Nos/Year

# **RESULTS / IMPACT –**

• Following the implementation of pokayokes and the adaptation of new techniques to achieve our goal, quality improved aesthetically, resulting in customer satisfaction.

- These improvements increase the quality of product development, resulting in a zero defect aim and reducing the likelihood of rework from 2-3% to 1%.
- The decrease in reject rates from 4-5% to 2-3% over two years.

Non-financially, the project has led to a remarkable improvement in product quality, as evidenced by

- This has contributed to enhanced customer satisfaction, with satisfaction levels rising from 8-8.5 to 9-9.2 on a scale of 1-10.
- Additionally, the project had a positive impact on employee morale, with morale scores increasing from 7
   8 to 8.5 9 on a scale of 1-10.
- These strategies and internal improvements result in increased quality and client satisfaction. While bringing opportunities and generating outputs from them, the percentage of rejection decreased significantly, which helps to reduce production costs.

#### **BUSINESS SUSTAINABILITY -**

#### **Business Continuity:**

- By implementing poka-yokes, the company effectively mitigates the risk of production errors and faults, ensuring smoother manufacturing operations with minimal interruptions.
- This proactive approach not only enhances operational efficiency but also strengthens business continuity, enabling the company to reliably meet customer demands and maintain product availability.
- Even in the face of unforeseen challenges such as manufacturing issues or disruptions in the supply chain, the company's resilience safeguards its reputation and customer satisfaction levels, reinforcing its market position.

#### Market Share:

- The integration of poka-yokes results in improved product quality, enhancing the company's reputation in the marketplace.
- Customers perceive the brand more positively due to its consistent delivery of high-quality products, leading to increased recommendations and repeat business.
- Furthermore, the company gains a competitive advantage over rivals grappling with quality issues, solidifying its market position and expanding its share.
- This sustained growth trajectory positions the company as a leader in its industry, driving long-term sustainability and success.

#### **RESOURCE IMPACT –**

The following figures represent the average data from the last two years.

Parameters:	Before	After	Unit of Measurement
1. Powder Coating Area	1346015	1486655	Sq.Ft
2. Water	2507	2220	KLD
3. Air	435	398	Bar
4. Powder	23180	20528	kgs
5. Chemical	3120	3005	Ltr



### **BUSINESS METRICS –**

The following figures represent the average data from the last two years.

- Our customers have placed their trust in our commitment to quality and productivity, leading to a notable increase in our share of business. For instance, one of our customers has boosted their share by 40%, while others have also expanded their reliance on us for certain processes.
- As we continue to enhance quality and productivity, we have exceeded customer expectations by offering superior materials, enhancing delivery timing, and addressing other corresponding factors.

Parameters:	Before	After	Unit of Measurement
	Pricol -60	Pricol – 100	
1. Share of business from	Godrej Medical – 0	Godrej Medical – 100	%
oustomer	Godrej Top Btm - 0	Godrej Top Btm - 100	
2. Customer satisfaction scores	Pricol – 8	Pricol – 8.5	on a scale of 1-10



## SCOPE FOR HORIZONTAL DEPLOYMENT

• Similar powder coating plants can use these pokayokes.



DATE OF UDYAM REGISTRATION

12/12/2020

Disclaimer: This is computer generated statement, no signature required. Printed from https://udyamregistration.gov.in

For any assistance, you may contact:



