MURUGAPPA MORGAN THERMAL CERAMICS LIMITED
RANIPET PLANT

1. COMPANY AND PLANT PROFILE

COMPANY PROFILE

Murugappa Morgan Thermal Ceramics Limited (MMTCL) was established as a joint venture between **Carborundum Universal Limited (CUMI)** of the **Murugappa Group** and **Morgan Crucible Company** ie (now called as **Morgan Advanced Materials - MAM**) in the year 1982. It was started as 70% CUMI and 30% Morgan Crucible Co, and currently the share holding pattern is 51% Morgan Advanced Materials (MAM) and 49% CUMI.

MAM is an undisputed leader in High Temperature Insulation products and services with a global footprint across diversified applications. Thermal Ceramics is one of the businesses of MAM and the product, Ceramic fibre is related to the Refractories business of CUMI in the field of high temperature insulation application. The Company has approval from the Department of Science and Technology (DST) as a R & D facility.

MMTCL's **vision** is **"MMTCL will be a globally valued company creating protective solutions 'made in India' using advanced materials for a safer and sustainable world** and the **mission** is **"MMTCL will co-create, design and engineer sustainable thermal protection solutions through safe processes to help customers save energy.**

MMTCL manufactures Ceramic Fibre and converted products like Vacuum formed Boards, Shapes, Paper, Mastics and Engineered Fibre. MMTCL is the largest player in India in Ceramic fibre and related products.

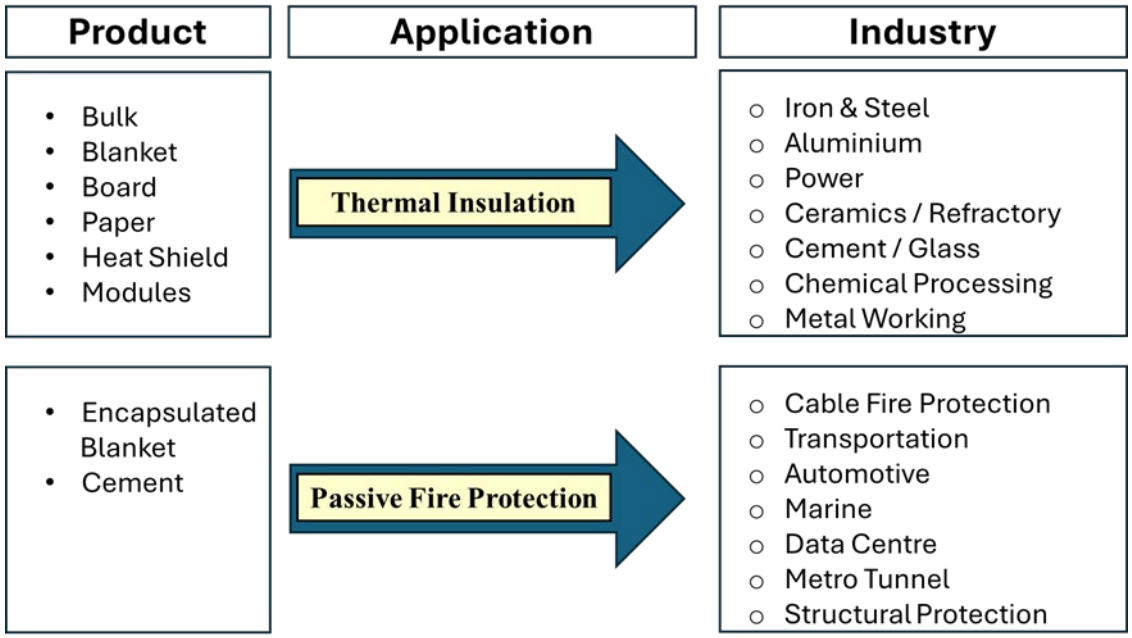
The manufacturing facilities of MMTCL are at Ranipet (near Vellore, Tamil Nadu) and Motibhoyan (near Ahmedabad, Gujarat).

PLANT PROFILE - MMTCL, RANIPET PLANT

The Ranipet plant was started in the year 1984. This is the first Company in India to make Ceramic fiber products. The manufacturing facilities comprise of a Spun line which is a Continuous Process and facilities to make Converted Products like Vacuum formed Boards, Shapes, Mastics and Engineered Fibre which are discrete in nature. The Plant has the capacity to produce 5000 tons annually of Ceramic Fibre.

The manufacturing process comprises of Blending of Raw materials, melting of the materials by Furnacing, spinning into fibre, making of bulk fibre and fibre blankets and converted product lines for making products to meet end applications.

The plant supplies products that go for a variety of applications that find use in industries like Iron & Steel, Ceramics & Glass, Power, Chemical Process Industry (CPI), Automotive and Passive Fire Protection.



2. MILESTONES ON THE JOURNEY OF MANUFACTURING EXCELLENCE

- ✓ MMTCL has been a **market leader** with more than 40% market share and a leader in developing new applications in the thermal insulation space. MMTCL manufactures products that are sold in the Domestic market (Third Party Sales) and sells to other Morgan sites (Inter Company Sales).

- ✓ Over the year new small players have come up in India started manufacturing products in India. This was leading to **commoditization of products, increased competition and created price pressure.** Hence the need to look at reduction in costs so that profit margins could be protected / improved.

- ✓ MMTCL decided to focus on the Third-Party Sales to reduce dependency on the sales from other Morgan sites (Inter Company Sales).

- ✓ Further there was a need to look at new applications and new products to differentiate from competition as the products were getting commoditized. **It also called for a change in the mindset and culture from enjoying leadership status to being challenged by new players who were impacting the market share of MMTCL.**

- ✓ MMTCL had taken up a lot of initiatives in the past, but this was not enough to meet the market conditions prevailing and what was expected to come.

- ✓ To look at reduction in costs to manage the competition from low-cost small players, change in mindset / culture and to look at new applications and products, there was need felt

    1. to do take up actions in a planned manner,
    2. with the involvement of all the employees and
    3. what could be sustainable.

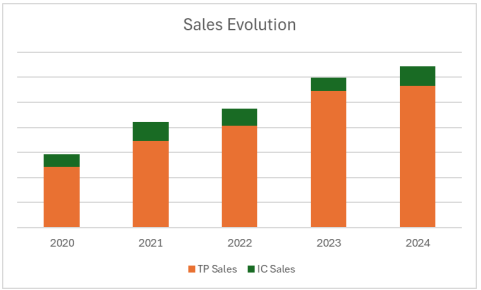
- ✓ MMTCL decided to take up TPM as an approach to Manufacturing Excellence.
- ✓ TPM journey enabled MMTCL, Ranipet Plant to introduce the following initiatives
  - ➢ OEE improvement through Kobestu-Kaizen activities
  - ➢ Loss elimination / reduction of Machine, Man and Cost related loss by adopting Kobetsu-Kaizen methodology by using tools Loss Tree, Cost Tree, Cost Loss Matrix, ECRS analysis through VTR Studies
  - ➢ Elimination of equipment failures through Why-Why analysis and Proactive approach of TBM
  - ➢ Defect elimination through Why-Why analysis and Proactive approach of QM, 10 step methodology
  - ➢ Customer complaint reduction through Quality Maintenance approach
  - ➢ Improved deliveries through Lead Time Reduction
  - ➢ Improved employee morale through OPL, Suggestion Activities
  - ➢ NIL accidents through HIRA, Job Safety Analysis, Safety Patrol, Safety-Walk
  - ➢ Office productivity improvements, Inventory reduction, Purchase cost reduction through Office TPM
  - ➢ New product and new application development through Development Pillar
  - ➢ Approach People development through structured Education and Training activities

MMTCL, Ranipet Plant is now on course, thanks to TPM to become more competitive to meet the growing market requirements in the Indian market and being respected as one of the best performing lines globally by Morgan with

- ✓ Nil Accidents
- ✓ Significant reduction in Breakdowns and Defects.
- ✓ Considerable reduction in cost of manufacturing
- ✓ Increased Employee productivity, confidence and morale
- ✓ New Team actively participated and learned TPM tools and benefits

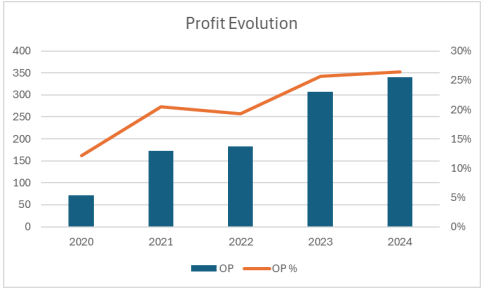
3. BENEFITS ACHIEVED

TPM has significantly contributed to MMTCL, Ranipet by way of sustaining the good performance in a difficult scenario where there was loss of orders from key segments and increasing competition.



As may be seen from the below mentioned table:

- ✓ The impact of the reduction in intercompany Sales has been made up by Third Party Sales.
- ✓ The profitability has been protected though there has been an impact of reduction in high margin intercompany Sales. This has been due to the



efforts taken towards reduction in costs.

TPM benefits in Ranipet Plant

- ✓ Helped in sustaining market share
- ✓ Growth in Domestic market
- ✓ Increased brand image and loyalty

In addition to the financial benefits, TPM initiative at Ranipet has resulted in

- ✓ Immense energy in the team
- ✓ Complete cross functional alignment towards one objective
- ✓ High confidence level in taking up challenges.

4. KEY OF OUR MANUFACURING EXCELLENCE – WAY FORWARD

TPM implementation will enable MMTCL to be a respected site within Morgan, to meet the challenges competitive environment in India and maintain leadership status. We aim to challenge the Level 2 JIPM award in 2027 and the Level 3 JIPM award in 2030.

While TPM has become a way of life at Ranipet Plant, we will utilize TPM to get the following benefits, in the future:

- ✓ Safety will be the foundation on which we will build the business. We will use TPM to build a "No Harm to People, and Planet" culture.
- ✓ Through TPM, we will continuously challenge the cost structure and look at how we can be competitive
- ✓ New applications and products are the lifeline for building a profitable business and in increasing the market share. Through DM Pillar, which provides an excellent framework for product development, we will come up with new applications and products, first time right to the customer. Our goal is to take new product sales to 25% of the Annual Sales in the next 3 years.
- ✓ The key to improving employee productivity is to educate people and multi skill them. We will use the E&T Pillar to educate and train people and improve their capability and productivity.
- ✓ We will use Office TPM to cut down the non-value-added activities and how we can service the customers, Better, Faster and make the processes Easier.

4. PQCDSM BENEFITS ACHIEVED

Category	Key Performance Indicator	Unit Of Measure	Benchmark 2018	Target 2024	Actual 2024
P	Productivity - Spun	Ton / Day	12.0	15.5	15.5
	Productivity - Vacuum Forming	Ton / Day	1.4	2.4	2.5
	OEE - Spun	%	66.2	94.0	92.5
	OEE - Vacuum Forming	%	60.4	85.0	89.4
	No of Tags raised	%	6898	37500	37815
	Number of breakdowns	Nos	147	24	29
	MTBF	Hour	58.7	360	297.9
	MTTR	Hour	5.96	0.30	0.33
Q	Number of customer complaints	Nos / Year	79	12	12
	In-line defect rate (scrap) – Spun	%	3.12	0.20	0.20
	In-line defect rate (scrap) – VF	%	4.80	0.20	0.30
	In-line defect rate (rework)	%	3.80	0.30	0.20
C	Variable Cost Reduction	Cost / Kg	37.6	28.6	28.7
	Maintenance Cost Reduction	Cost	158.8	120.0	137.1
D	Production Lead time	Days	40	24	25
	Delivery performance	%	90.3	98.0	98.9
S	Major Accidents	No / Year	0	0	0
	Minor Accidents	No / Year	7	0	0
	Identify Near Miss	Cumulative No	150	1800	1842
M	Number of Employee Suggestions / Kaizen	Cumultative No	135	3200	3334
	Fiber Exposure Level areas	< 0.25 fb / cc	4	13	12
	Green Energy	%	1.1	40	45

5. CONTACT PERSON DETAILS

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