1. Company and Plant Profile

1.1 About Owens Corning

Owens Corning is a global leader in building and construction materials, operating through three segments: Composites, Insulation, and Roofing. Founded in 1938, it is a Fortune-500 company for the last 68 consecutive years, with market capital of 9.8 billion USD having about 19,000 employees in 31 countries united to build a sustainable future through material innovation. Computerworld has named Owens Corning one of the best places to work in information technology. Ranked No.1 on 3BL Media's list of 100 Best Corporate Citizens for five years in a row since 2019, Owens Corning has a strong sustainability foundation.

Mission: To build a sustainable future through material innovation

Purpose: Our People and Products make the world a better place

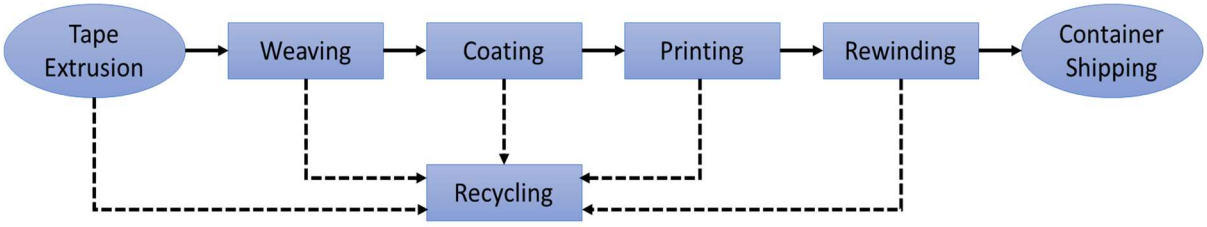
Company Values (Global in scope, human in scale): Caring, Curious, Collaborative, and Committed

1.2 Plant Information

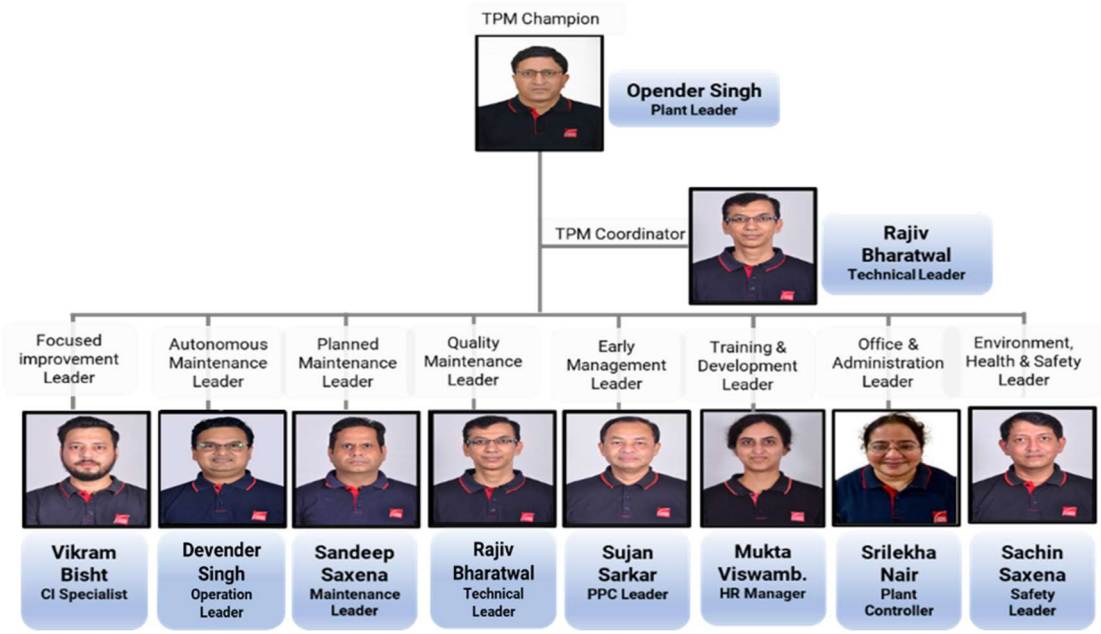
International Packaging Products Private Limited Plant (IPPPL) was set up in 2002 at Silvassa, India and acquired by Owens Corning in 2016 as part of their roofing business. It has two Plants in Silvassa, namely Dapada and Sayli, located close to each other, with total 6000 MT/Month capacity running 24x7 with strength of 932 employees. These two Plants are supported by the same IPPPL management. The main product manufactured in IPPPL is Coated Woven, categorized into Roofing underlayment, Lumber Wrap, Metal Wrap and Geo Membrane. IPPPL is essentially a manufacturing organization with 100% exports under Owens Corning roofing group, USA. New product development and R&D activities are carried out at Granville, USA.

The raw materials are homogenized in an Extruder and formed into Tapes. These Tapes are then fed into loom and woven into Scrim rolls. Next, the scrim rolls get coated and printed in Coater and Printer, respectively. Printed rolls are then converted into short rolls on Rewinder as per customer requirement and dispatched.

Process Flow



Management Team



Plant operation - 24x7 (3 shifts)

Employee strength - 932

a) Primary Head Count – 830
b) Salaried Head Count – 102

Plant Leader Opender Singh reports to Global Roofing Component Director Kevin Bohne.

2. Milestone on the Journey to Manufacturing Excellence

Coated Woven volume is expected to grow due to increased demand in US and European markets. At the same time, competition in the market is growing rapidly and fiercely boosting customer demand for better, faster, and reliable product. The ensuing scenario thus calls for continuous improvement for IPPPL in plant operations and asset utilization through loss reduction. Many OC Plants have adopted TPM way of working to improve operational efficiencies and reduce cost. This has helped IPPPL in its decision to adopt TPM for building an effective operating system and enable relentless elimination of waste.

Our TPM journey was initiated in the year 2019 with five Manager Model Equipment. Prior to introduction of TPM, Manager Model Equipment were characterized by numerous breakdowns, leakages, low OEE etc. With consistent efforts and systematic implementation of the five Pillar approach, we were able to reduce the number of breakdowns, improve equipment reliability and achieve target OEE in five Manager Model Equipment during the preparatory phase. The results were encouraging which led to Kick-off on 31st January 2021. Subsequently TPM has been rolled out from Managers Model Equipment to thirty-one circles covering both the Plants. The twelve steps of JIPM approach for deployment of Pillars have been followed since inception, significantly improving results in terms of SQPCDM.

The undermentioned activities have been implemented -

1. A detailed loss capturing system has been implemented covering all circles in the Plant and the Plant projects have been identified from OEE/Loss tree and prioritized through

Loss-Cost Matrix. Yearly review of loss-cost matrix, benchmarking, SWOT analysis, business expectation in terms of market share and profit are carried out during the Policy Deployment workshop, involving all functions, aligned with business vision, mission and objectives.

2. SQPCDM, KPIs and KAIs are aligned with business KMIs, and Plant Projects are identified to achieve three years target for KPIs. These are further cascaded down to the circles/task forces through eight pillar objectives/activities.
3. AM Step-0 to AM Step-4 have been implemented across the circles through the process of step-by-step audit involving the Plant leader. Six steps of PM and ten steps of QM have been implemented as per JIPM guidelines.
4. TPM tools have been applied to reduce/eliminate losses and cost. By following FI ten steps approach, key KPIs have been improved.
5. T&D pillar has taken initiative in development of trainers/facilitators for deep analysis tools like ECRS, PM Analysis, PPA, WWBLA and so on.
6. Reward and Recognition program has been implemented to enhance employees' engagement and motivation.
7. Employees' general and specific skills have been assessed to identify gaps and subsequently trainings are organized to bridge the gaps.
8. EPM and EEM learnings are used to develop MP information system for new product trial and new equipment installation.
9. Office related losses are addressed by the office team by using Makigami analysis.

3. Benefits Achieved

3.1 Tangible Benefits

TPM structured Pillar approach implementation has improved plant performance in SQPCDM, impacting OEE, equipment reliability, defect reduction, customer complaints, shopfloor hygiene, cost reduction, and employee skills.

Some of the key tangible benefits achieved in 2023 as compared to benchmark 2019 are:

- Number of first-aid injuries reduced to 4 in 2023 as compared to 29 in 2019
- Average OEE of Rewinding process improved by 75%
- Average equipment failures reduced by 70%
- Customer complaints reduced by 90%
- Overall Cost/KSM reduced by 12%

3.2 Intangible Benefits

TPM has helped us to improve ownership and confidence of operators. With continuous TPM workshops and trainings, operators' mindset has changed drastically for the better. This is evident in the significant improvements in the following areas in 2023 as compared to benchmark 2019:

- 5S score improved by 103%
- Attained AM ratio of 54% as compared to 8%
- Accomplished 49 Kaizen/month as compared to 0.5 Kaizen/month

- Achieved 859 OPL/month as compared to 64 OPL/month
- Employee engagement has helped in the reduction of absenteeism

4. Achievement Record

Category	Index (Calculation Formula)	Unit	Benchmark 2019	Actual Status 2023
S	Number of work-related accidents requiring days off work	Cases/ year	1	0
S	Number of work-related accidents not requiring days off work	Cases/ year	1	0
P	Productivity for main products	KSM/Operator hours	0.74	0.88
P	OEE (ex. Weaving)	%	52	77
P	Availability	%	76	95
P	Performance Rate	%	73	84
P	Quality Products Rate	%	95	97
P	Number of breakdowns	Breakdowns/ year	23616	6777
P	MTBF	Hour	0.37	1.31
P	MTTR	Hour	2.33	0.90
Q	Number of customer complaints	Numbers/year	36	4
Q	In-line defect rate (scrap)	%	2.89	1.10
Q	In-line defect rate(rework)	%	3.26	1.20
C	Cost index	Cost/KSM in USD	232	203
D	Production Lead time	Days	14	11
D	Delivery performance	%	95	99
S	Safety index	Accidents per 1,000,000 operator hours	0.24	0.00
M	Number of Employee Suggestions	Number/year	6	589

5. Key to our Manufacturing Excellence

TPM journey has given us an upper edge over competitors with regard to cost, productivity and quality. With proven results in shop floor, the entire team is inspired to take TPM to the next level. With FI approach, we have been able to reduce product lead time, thus improving productivity and delivery. Our aim is to set high standards to continue reaping benefits with enlarged capacity through unleashing of creativity and capability of people.

Our future plans for Manufacturing Excellence are:

1. Self-driven team across Plant with strong culture of Zero Accidents, Zero Defects and Zero Losses. To strengthen width and depth of TPM implementation, ensuring cultural change across the site and adopting/adapting to TPM way of life. Sustain continuous skill evaluation and impart trainings to reduce skill related losses.
2. Redefine quality from customers' point of view (Customer relevant quality standards) and develop programs for bridging the gaps of delivered quality to key customers.
3. Lead as a benchmark Plant for equipment reliability and maintainability in similar industries across Globe and also to be preferred Plant for new product trial.
4. Continue to be the leading and the lowest cost Component Manufacturing Plant.
5. Extend TPM outside manufacturing to our key Suppliers with the objective of further improving services to customers.
6. Partnership with community to contribute to Owens Corning purpose - "Our people and products make the world a better place."