Award For Excellence Award TPM Commitment

China

Owens Corning (Hangzhou) Fiberglass Co., Ltd

1. Company, Plant/Factory Profile

1.1 About Owens Corning

Owens Corning is a global leader in insulation, roofing, and fiberglass composite materials. Its insulation products conserve energy and improve acoustics, fire resistance, and air quality in the spaces where people live, work, and play. Its roofing products and systems enhance curb appeal and protect homes and commercial buildings alike. Its fiberglass composites make thousands of products lighter, stronger, and more durable. Owens Corning provides innovative products and solutions that deliver a material difference to its customers and, ultimately, make the world a better place. The business is global in scope, with operations in 33 countries. It is also human in scale, with approximately 19,000 employees cultivating local and longstanding relationships with customers. Based in Toledo, Ohio, USA, the company posted 2022 sales of $9.8 billion. Founded in 1938, it has been a Fortune 500® company for 68 consecutive years.

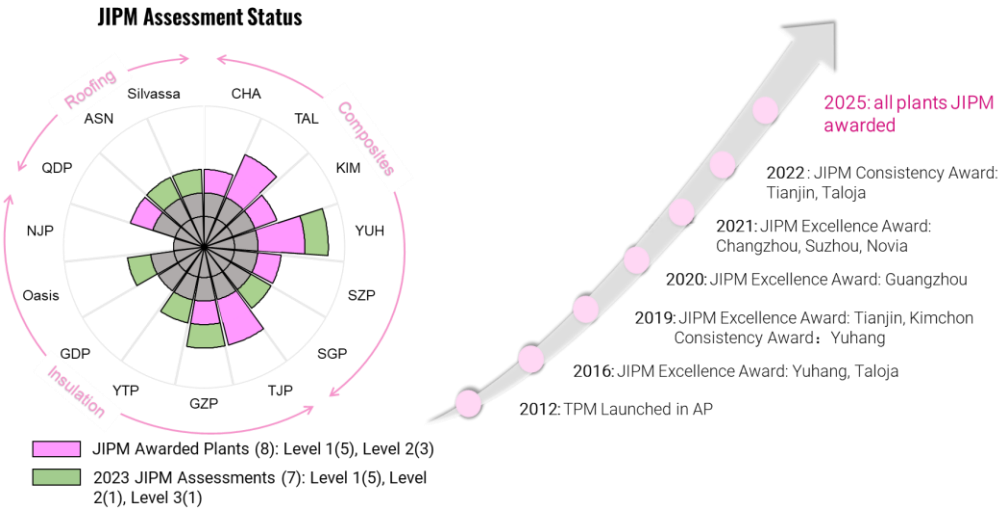
1.2 About Hangzhou Plant

Owens Corning Hangzhou plant was set up in 2020. In the early stage of project construction, intelligent technology was added to improve automation level. As a new production line, from raw material distribution, to process control and post-processing, automatic Production can be seen everywhereThe key achievements and recognitions of the plant include Award for TPM Consistency, ISO 9001/14001 certification.

1.3 Sustainability in OC-TPM

In Owens Corning, TPM is the way to drive operation to 'Zero' – zero accidents, zero defects, zero losses. It is introduced TPM since Y2012 in composites business, and in Y2017, made huge strides in launching and implementing throughout 3 business. Owens Corning aim to reach TPM excellence level in all Asia plants in Y2025.

Below is JIPM assessment status of AP plants, target to have all plants achieve JIPM awards in 2025. Nanjing plant's assessment delay is due to business adjustment.



2. Milestone on the Journey of Manufacturing Excellence

2.1 Why We Do TPM

TPM is the way to run our business. Hangzhou plant initiated TPM activities since project start. Based on Yuhang plant TPM management system, EM pillar kicked off EEM process with its Project timeline. As with the same management team from Yuhang plant, we all know the benifit from TPM implementation.

2.2 Plant TPM Journey

Hangzhou Plant started with new equipments and new employees. Especially the new winding machine which was first use in China. Due to Covid-19 supplier engineer can not be on site, our employees learn the function map and instruction map on their own to complete the installation and commissioning.

In the early stage, due to employees' skill gap, we always had minor stop and breakdown in operation. Through two years TPM journey, forced deterioration has been virtually eliminated, and equipment stability and reliability improved. Furthermore, we are keeping focused on zero breakdown, zero defect and zero injury.

We used TPM methodology to manage the plant with great progress, In 2020-2022, we fully drove 8 pillars with all employees deeply involved in TPM activities.

3.Benefits Achieved

3.1 Tangible Results

Safety as top priority in OC-wide, the engagement through hazards notification significantly improved in the tagging and de-tagging program under TPM structure. From 2020 to 2023 current the breakdown was reduced by 95%. Labor productivity improved from 69 to 99 kg/hour.

3.2 Intangible Results

Machine and workshop are cleaner and safer, equipment is more reliable,
Employees have morale and motivation to work better,
Employees have more confidence in company,
Employees have better skills to operate and improve,
New Digital engineer trained and can develop Apps by themselves,
The working environment is more comfortable.

4.TPM Award Assessment Achievement Record

Category	Index (Calculation Formula)	Unit	2020	Actual Status 2022
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	2
P	Productivity for main products	Kg/Operator hours	68	99
P	OEE (or Overall Plant Efficiency)	%	82.4	93.44
P	Availability	%	85.8	95.8
P	Performance Rate	%	97.3	98.3
P	Quality Products Rate	%	98.7	99.2
P	Number of breakdowns	Breakdowns/ year	184	20
P	MTBF	Hour	4	43
P	MTTR	Hour	1.06	1.1
Q	Number of customer complaints	Number/year	2	0
Q	In-line defect rate, scrap	%	1.38	0.85
Q	In-line defect rate, scrap and rework	%	1.3	0.7
C	Cost index	Cost/Unit Cost/Kilogram	1.03	1.11
D	Production Lead time	Days	13.44	8.76
D	Delivery performance	%	99.95	99.96
S	Safety index	Accidents per 1,000,000 operator hours	24.0	11.6
M	Number of Employee Suggestions	Number/year	85	238

5.Key to Manufacturing Excellence

5.1 Policy Deployment and Vision Mission Objectives

We follow seven steps to work out plant TPM policy including plant Strategy, pillar development , key projects , masterplan, governance and the methods of effective communication. Through policy deployment we integrated the vision mission and daily management and systematically sorted out the relationship between KPI/KAI of each pillar and KMI of the plant, defined the main activities and indicators of each pillar, optimized the TPM organizational structure, changed the small group structure to matrix group

structure which included all pillars. the GIVE & GET matrix was established across the pillars, formed the push into autonomous groups. Pillar Give & Gets apps was also developed by our employees.

5.2 TPM Advanced Methodology and Tools

In AM activities, we optimized the tagging and de-tagging process, organized NLT, supervisors, engineers and other employees to participate tagging activities and displayed the problems on the shop floor. AM pillar weekly meeting, group activities, OPL and equipment steps review help us to maintain the best condition. All people leaders are engaged in shopfloor and have daily Gemba walk to help our shopfloor employee to solve problems. We use cost deployment, OEE analysis, loss tree establishment, training and sharing to deploy the plant projects for improvement. Monthly KAIZEN comparison helps to encourage the staff to participate in the activities of improvements to achieve cost savings. By optimizing the table of error records, using EWO (Emergency work order) and root cause analysis, we constantly establish and revise the PM standards, replenish equipment FMECA and improve equipment reliability. The other pillars also made significant progress through the methodology of TPM system and the phased implementation steps. The reliability of equipment has been gradually improved and the skills of employees have been continuously strengthened.

5.3 Employees Has Root Analysis and Problems Solving Skills

To achieve the Zero goal is what we're challenging. The study and application of Why-Why analysis and PM analysis will help to improve the management. The ‘Zero Case’ study will teach us how to achieve the goal. We firmly believe that working towards this will make Hangzhou plant a world-class manufacturing factory.