
Award For Special Award TPM Commitment

China

Owens Corning Composites (China) 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 Yuhang Plant

Owens Corning Yuhang Plant started production in December 2010 with primary focus on fiber glass related products manufacturing. Our products have been exported to countries all over the world. The products are mainly applied in the markets of wind energy, pipes and tanks, automotive, boat, electric equipment, etc. The plant is designed featuring the high-performance organization philosophy, effective energy utilization and environmental friendly manufacturing formula. The key achievements and recognitions of the plant include Award for TPM Consistency, ISO 9001/14001 certification.

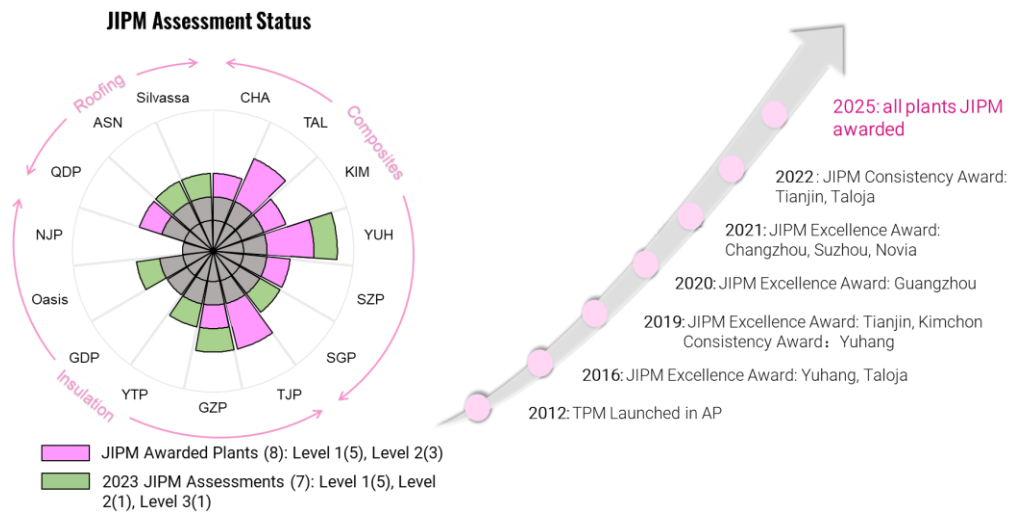


1.3 Sustainability in OC-TPM

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 aims to reach TPM excellence level in all Asian 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. Yuhang plant started TPM activity in 2012. In the last 12-year running, TPM become the way we operation, we manage and we develop. Especially when industry is down, cost down and profit increase activity become more and more critical and important, innovative and creative products are the key to success.

2.2 Plant TPM Journey

Yuhang Plant is one of the model plants within OC operation network. 2 years after the plant establishment, we realized that some equipment were seriously corroded by the chemical and bad conditions. We started TPM in 2012 to avoid potential deterioration down the path. The main goal for Yuhang Plant was to restore the initial condition of equipment. We utilized JIPM approach by steps in deploying TPM within the plant starting from pilot area - Batch house. After the pilot area, we expanded our efforts to the whole plant with the execution of 5 main pillars - SHE, AM, PM, FI and T&D. We initiated QM/OA/EM pillars in July 2016. We used TPM methodology to manage the plant with great progress, the same year we won the TPM Excellence Award of JIPM. And we won TPM consistency Award of JIPM in 2019. In 2020-2022, we fully drove 8 pillars with all employees deeply involved in TPM activities. We use PFD to manage our DMS and PMS system along with JIPM follow up coaching. Some innovative improvements were also driven in our plant. A lot of best practices emerged in TPM implementation journey, new downstream products developed with successful EM project, intelligent and digital engineer designed useful Apps, frontline employees developed a lot of low code apps, 131 process optimized, etc.

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 2012 to 2023 current the breakdown was reduced by 82%, the bottleneck equipment (Winder) breakdown decreased from 1.6 min/winder/day to 0.50 min/winder/day (best record in OC operation network). The NE (overall plant net efficiency) consistently ranked the first in the industry. Energy intensity achieved and maintained the first place in industry through FI project implementation.

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 intelligent and digital engineer are trained and can develop program by themselves,
 The working environment is more comfortable.

4. TPM Award Assessment Achievement Record

| Category | Index (Calculation Formula) | Unit | Y2019 | Actual Status 2022 |
|----------|--|--|-------|--------------------|
| S | Number of work-related accidents requiring days off work | Cases/ year | 0 | 1 |
| S | Number of work-related accidents not requiring days off work | Cases/ year | 4 | 2 |
| P | Productivity for main products | Kg/Operator hours | 129 | 161 |
| P | OEE (or Overall Plant Efficiency) | % | 95.0 | 94.4 |
| P | Availability | % | 98.1 | 98.4 |
| P | Performance Rate | % | 98.3 | 98.3 |
| P | Quality Products Rate | % | 98.5 | 97.6 |
| P | Number of breakdowns | Breakdowns/ year | 480 | 192 |
| P | MTBF | Hour | 8.3 | 6.9 |
| P | MTTR | Hour | 10.6 | 9.4 |
| Q | Number of customer complaints | Number/year | 7 | 4 |
| Q | In-line defect rate, scrap | % | 0.24 | 0.3 |
| Q | In-line defect rate, scrap and rework | % | 0.21 | 0.29 |
| C | Cost index | Cost/Unit Cost/Kilogram | 3.89 | 4.03 |
| D | Production Lead time | Days | 43.8 | 33.8 |
| D | Delivery performance | % | 96.7 | 97.4 |
| S | Safety index | Accidents per 1,000,000 operator hours | 5.17 | 3.60 |
| M | Number of Employee Suggestions | Number/year | 361 | 403 |

5. Key to Manufacturing Excellence

5.1 Policy Deployment and Vision Mission Objectives

After won the TPM consistency award in 2019, 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. We use cost deployment, OEE analysis, loss tree establishment, training and sharing to deploy the plant projects to improve. 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.

Advanced TPM methodology is also trained by JIPM and implemented in our plant. PFD is well driven to manage our daily activities. Through DMS management, we pursue and strive for Zero. We optimized identified and eliminated a lot of non-routing and high-loading tasks with WTC, spaghetti chart by video shooting analysis in 2022 with PMS management. More and more Paper free, automation and digitalization improvements are developed.

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 in that work towards this will make Yuhang plant a world-class manufacturing factory.