

Owens Corning (Guangzhou) Plant

Apply for Award of TPM Excellence in Consistent TPM Commitment

## Company Profile

### 1. Company, Plant Profile

#### 1.1 Company Profile

Owens Corning (NYSE: OC) 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 2021 sales of \$8.5 billion. Founded in 1938, it has been a US Fortune 500® company for 67 consecutive years.

#### 1.2 Guangzhou Plant Profile

Owens Corning (Guangzhou) fiberglass co., LTD., was established in July 1994, located in Dongji industrial park of Guangzhou Economic and Technological Development Zone. It is the first production base invested by Owens Corning in China. The factory adopts the most advanced centrifugal technology in the world to produce all kinds of glass fiber products. Our plant occupies an area of 33,000 square meters and has production capacity of 24,000 T/Y.



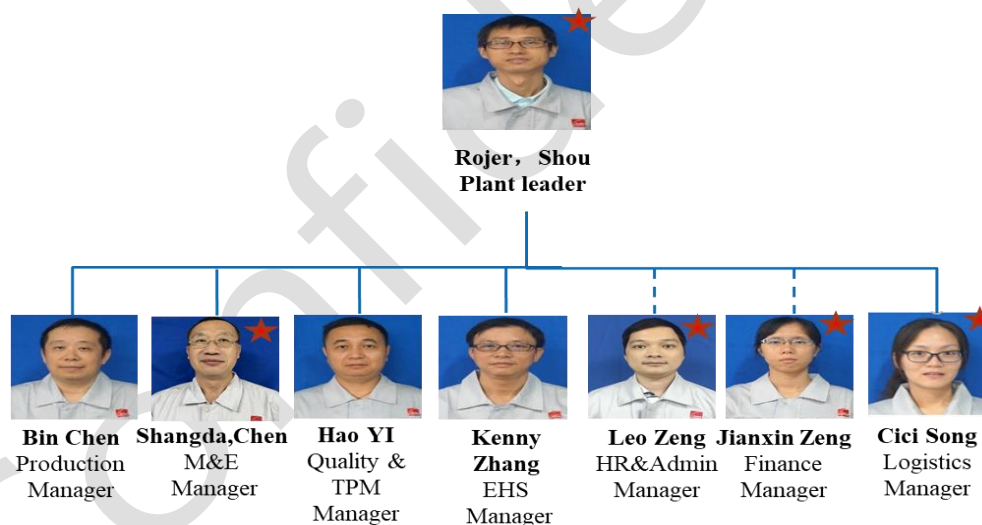
# Owens Corning (Guangzhou) Fiberglass Co., Ltd

## 1.3 Process and Technology

#	Process	Description
1	Batch system : 2 Materials	Mineral raw material is weighted and mixed then sent to furnace.
2	Furnace system : Gas	Mineral raw material is melted to create liquid glass at 1200 ~1300 °C.
3	Fiberizing system : Gas	Melted glass flow into rotating spinners and being fiberized
4	WW system : Recycled water 30~50Tons	Flush the forming chain and forming suction duct with water, the water is recycled to mix with binder
5	Binder system :13 Chemicals	Binder is applied to the fiberglass through binder rings
6	Forming system : 2 Suction boxes	Glass wool is collected onto the forming chain under forming fan suction
7	Oven & Cooling :Gas	Glass wool is heated to cure the binder and get cooled by cooling fan
8	Facing system : Facing materials	Product is covered with facing materials to meet customers need
9	Packing system : Packing material	Product is wrapped up by packing materials to meet requirements

Cullet is melted in furnace with borax, the molten glass flow into the rotating spinner and being fiberized, the fiber is collected by forming suction on the forming chain, during this process binder is applied on the fiber, then the fiber is sent to the oven for curing, cured fiber pack is cooled, then trimmed and chopped to desired size, finally the product is packaged and sent to warehouse.

## 1.4 Plant Organization Chart



This is the organization chart of Guangzhou plant. At present, we have 85 employees. On this organization chart, newly changed positions are marked with red star compared with 2 years ago.

## 2. Milestone on the Journey of TPM Excellence

### 2.1 Why we keep doing TPM

Through the implementation of TPM from top to bottom in the plant, TPM has become culture of our company. It is the way we operate our plant. All employees attend in activities. Talent growth activities and TPM incentive policy make people's attitude and skill improved significantly, all these bring operation excellence to our



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plant. Great change of shopfloor environment also gives people who work in this place a more comfortable and safer experience, Employees are proud of working here.



We applied for the Award for TPM Excellence (Category A) in 2020 and was officially certified in early 2021. We are proud of it and take it as a new start for our TPM journey



### 2.2 TPM Journey in Guangzhou Plant

Guangzhou plant has taken TPM as the policy of operation and management from 2016.

In 2017, launched FI, AM, PM, T&D pillars and 4 pilot areas were rolled out.

In 2018, 90% areas had achieved AM step2, zero break down projects were initiated, QM, EM, OA, EHS pillars were also launched.

In 2019, we focused on site improvement which aimed to reach AM step4 for all areas



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and TPM methodology training upgrade.

In 2020, 90% areas passed AM4 assessment.

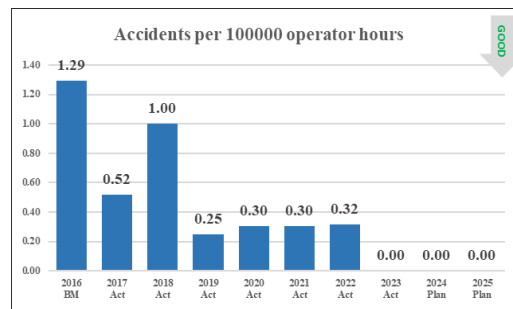
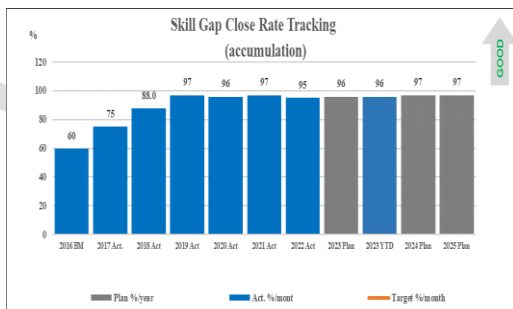
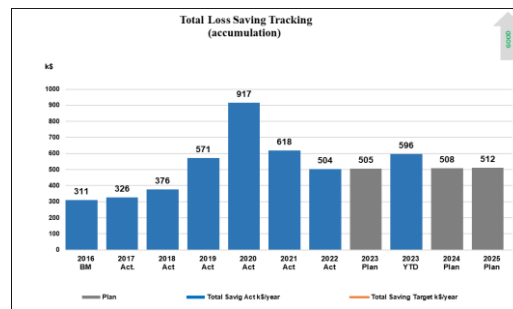
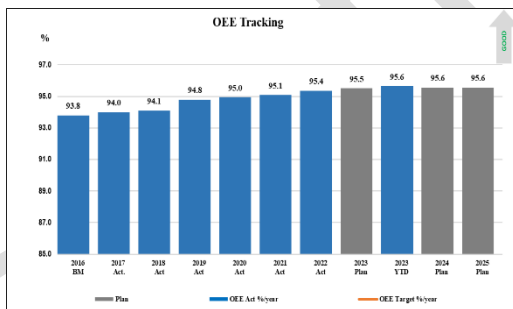
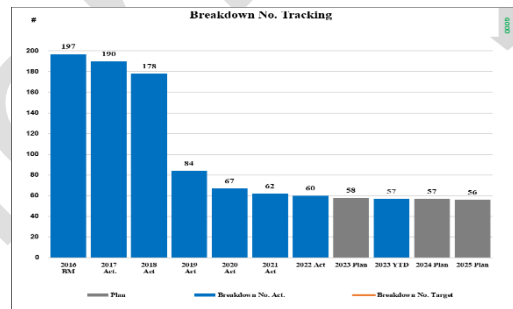
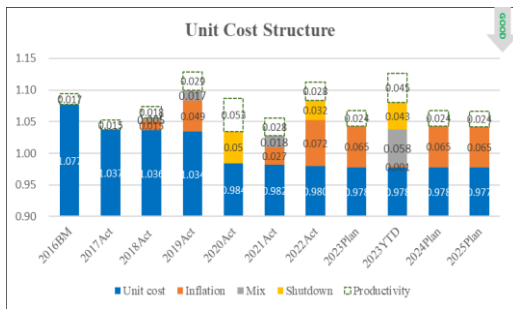
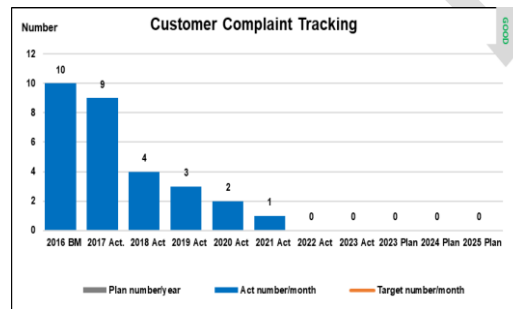
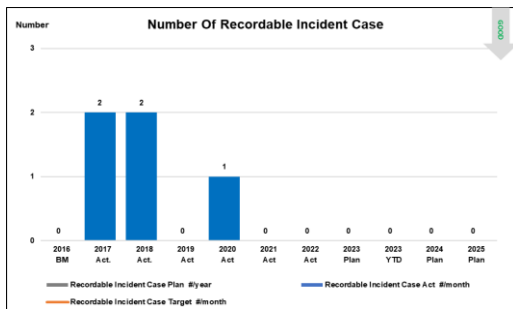
In 2021, 100% areas passed AM 4 and 22% areas passed AM 5 assessment.

In 2022, all areas passed AM 5 and 22% areas passed AM 6 assessment.

## 3. Benefit Achieved

### 3.1 Tangible Benefits

Since we kicked off TPM in 2016, all aspects of plant operation have been improved significantly. The main operation indexes are as below:





Improvement Project

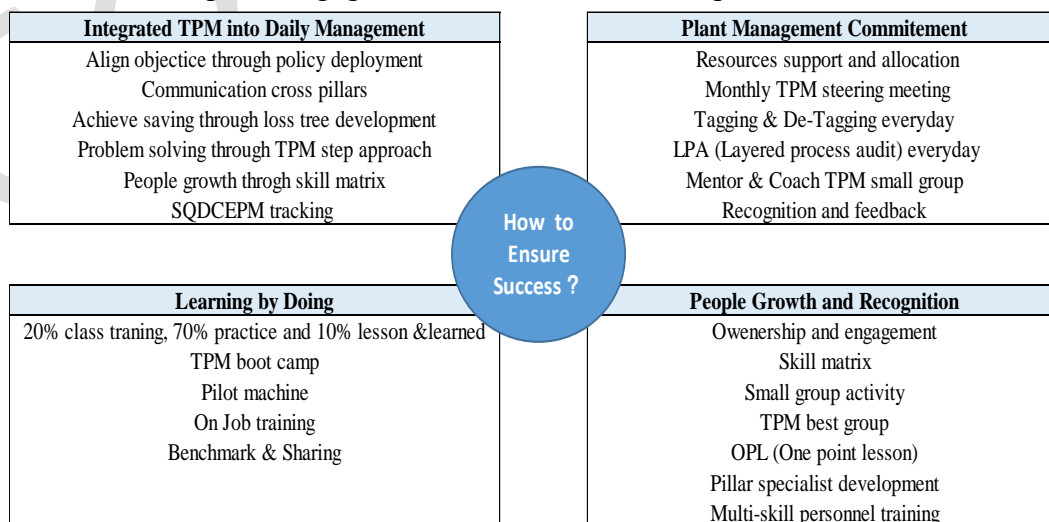
Project	Project Name	Expected Benefit	Annual Benefit	Project Leader
GZ-1	Labour savings	Reduced overtime cost about 35 K\$	37	Zeng Leo
GZ-2	Oven NG consumption optimization	0.076 Tce/T reduce to 0.069 Tce/ton	53	Thomas
GZ-3	Reduce Furnace NG consumption	Calorific value:2909 KWT/T reduce to 2718KWT/ton	145	Chen bin/Thomas
GZ-4	Reduce electricity consumption in Facing area	Reduce 40KWT/ton	63	Chen bin/Thomas
GZ-5	Reduce line breakdown time	Breakdown loss reduce 10 hours	9	Thomas
GZ-6	Optimise planning and reduce the product change cost	Efficiency increase 5%	9	Cui Yatao
GZ-7	BAE improve 0.5%	From 82% to 82.5%	11	Chen bin
GZ-8	Spinner efficiency improvement	From 90 tons/ea to 100tons/ea	26	Chen bin
GZ-9	Scrap improvement	From 10tons/month to 7tons/month	15	Chen bin
GZ-11	Facing efficiency improvement 0.2%	From 97.6% to 97.8%	10	Chen bin
GZ-12	MRO	3 diesel forklift change to electric forklift	33	Ray Huang
GZ-13	Labor efficiency	Fiberglass kg/manhour from 82 to 85	89	Zeng Leo
GZ-14	Process energy optimization by unit Elec consumption reduction	Reduce 10 M3/ton	9	Chen bin/Thomas
GZ-15	Process energy optimization by unit NG consumption reduction	Reduce 2 KWH/ton	11	Chen bin/Thomas
GZ-16	Bushing efficiency improvement	Number of bushing using reduce from 20 to 10	10	Chen bin

3.2 Intangible Benefits

Through continuous implementation of TPM, the working environment is getting better, the skills of employees are constantly improved and expanded. Employees have a deeper understanding of process, quality and safety after participated TPM activities. the morale, customers' satisfaction, competitiveness of product even image of our company is also greatly improved.

4.1 Experience & Gains

Plant operation has been improved comprehensively since we kicked off TPM in 2016. Plant ensure the successful TPM implementation through four aspects as below. 100% leadership and engagement are the basics for all pillars' success.





**4.2 Future Plan**

Set plant operation’s core objectives on loss and cost reduction and achieve them by deeply using TPM methodology.

Launch more improvement projects through the upgrading of personnel skills and the improvement of AM ability.

Use advanced technology to eliminate potential risks of our machine to achieve zero break down and prolong machines’ service life in all areas.

Use EM methodology in all new projects and new products.

**5. Achievement Record**

Category	Index (Calculation Formula)	Unit	Last time awarded 2020	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	Tons/Operator hours	0.062	0.064
P	OEE (or Overall Plant Efficiency)	%	95.0	95.6
P	Availability	%	97.7	97.8
P	Performance Rate	%	97.9	98.3
P	Quality Products Rate	%	99.3	99.5
P	Number of breakdowns	Breakdowns/ year	67	57
P	MTBF	Hour	110	120
P	MTTR	Hour	42	30
Q	Number of customer complaints	Number/year	2	0
Q	In-line defect rate, scrap	%	0.69	0.48
Q	In-line defect rate, scrap and rework	%	0.69	0.48
C	Cost index	Cost/Unit Cost/Kilogram	-	-
D	Production Lead time	Days	5.5	2.71
D	Delivery performance	%	100	100
S	Safety index	Accidents per 1,000,000 operator hours	0.30	0.00
M	Number of Employee Suggestions	Number/year	321	388