

COMPANY NAME: SOLAR INDUSTRIES INDIA LIMITED

PLANT NAME: SOLAR INDUSTRIES INDIA LIMITED, CHAKDOH

1. COMPANY PROFILE:

SIIL is one of the leading explosive groups of manufacturing companies founded by Shri Satyanarayan Nandlal Nuwal and has crossed annualized production of 4,00,000 MT of explosives. Solar Group has evolved from a single site manufacturing company in 1995 to a globally recognised industrial explosive manufacturer. With extensive experience and expertise in Industrial Explosive segment, entered in Defence sector for manufacturing as per their requirement.

Company's innovation edge is rooted in a strategic blend of talented manpower and technological prowess with rich experience to create sustainable value with an intent to accelerate towards excellence and impressive pace.

The company employs comprehensive, robust and best practices, and is also committed to the safety, health and wellbeing of the people, Communities, and the environment. Solar group is the topmost explosive manufacturer in India having 24% market share. Having a strong workforce of 7500+ employees.

Solar has 34 Manufacturing facilities Worldwide & Global presence in more than 65 Countries

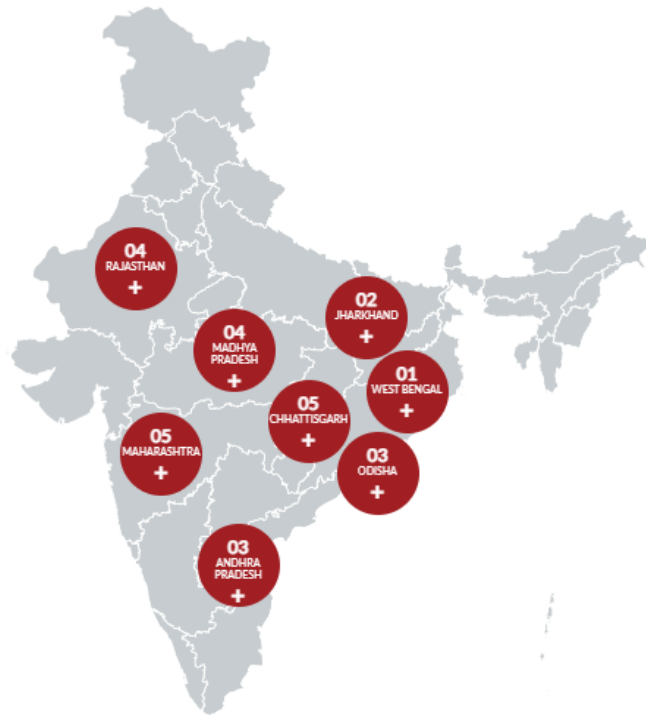
Global Manufacturing Base:

- India
- Zambia
- Nigeria
- Turkey
- South Africa
- Ghana
- Tanzania



Manufacturing Locations in India:

- Rajasthan (4 Plant)
- Madhya Pradesh (4 Plant)
- Telangana (2 Plants)
- **Maharashtra (6 Plants)**
- West Bengal (1 Plant)
- Chhattisgarh (5 Plants)
- Odisha (3 Plants)
- Jharkhand (2 Plants)
- Tamil Nadu (1 Plant)



Upcoming Manufacturing facilities

- Australia
- Indonesia
- Thailand

Sectors of Solar's presence:

Solar have established footprints in:

- Construction
- Road & Infrastructure
- Mining
- Quarries
- Seismic Exploration
- Tunnelling
- Defence
- Hydro Projects



Construction



Road & Infrastructure



Mining



Quarries



Seismic Exploration



Tunnelling



Defence



Hydro Projects

PLANT PROFILE: SOLAR INDUSTRIES INDIA LIMITED, CHAKDOH

SIIL, Chakdoh plant was established in 1995 and started production in Apr-1996. This plant manufactures & exports explosives and initiating systems to over 25 countries. The plant has number of facilities for producing various types of products which includes Slurry, Emulsion, Cast Booster, HMX, RDX, TNT, etc. SIIL, Chakdoh located near Bazargaon, Amravati Road (NH-6). This location is 37 KM away from Nagpur city. Chakdoh plant covers 550 acres area of land. At SIIL, there are currently 3,445 number of employees.

MAIN PRODUCTS:

SIIL Chakdoh has been a manufacturer of Industrial explosives like- Packaged Explosives, Bulk matrix as well as Initiating systems. Below mentioned are some of the key products are:

- **Industrial Explosives:**



Packaged Explosives



BULK Explosives



Initiating Systems

- **Defence Explosives:**



TNT



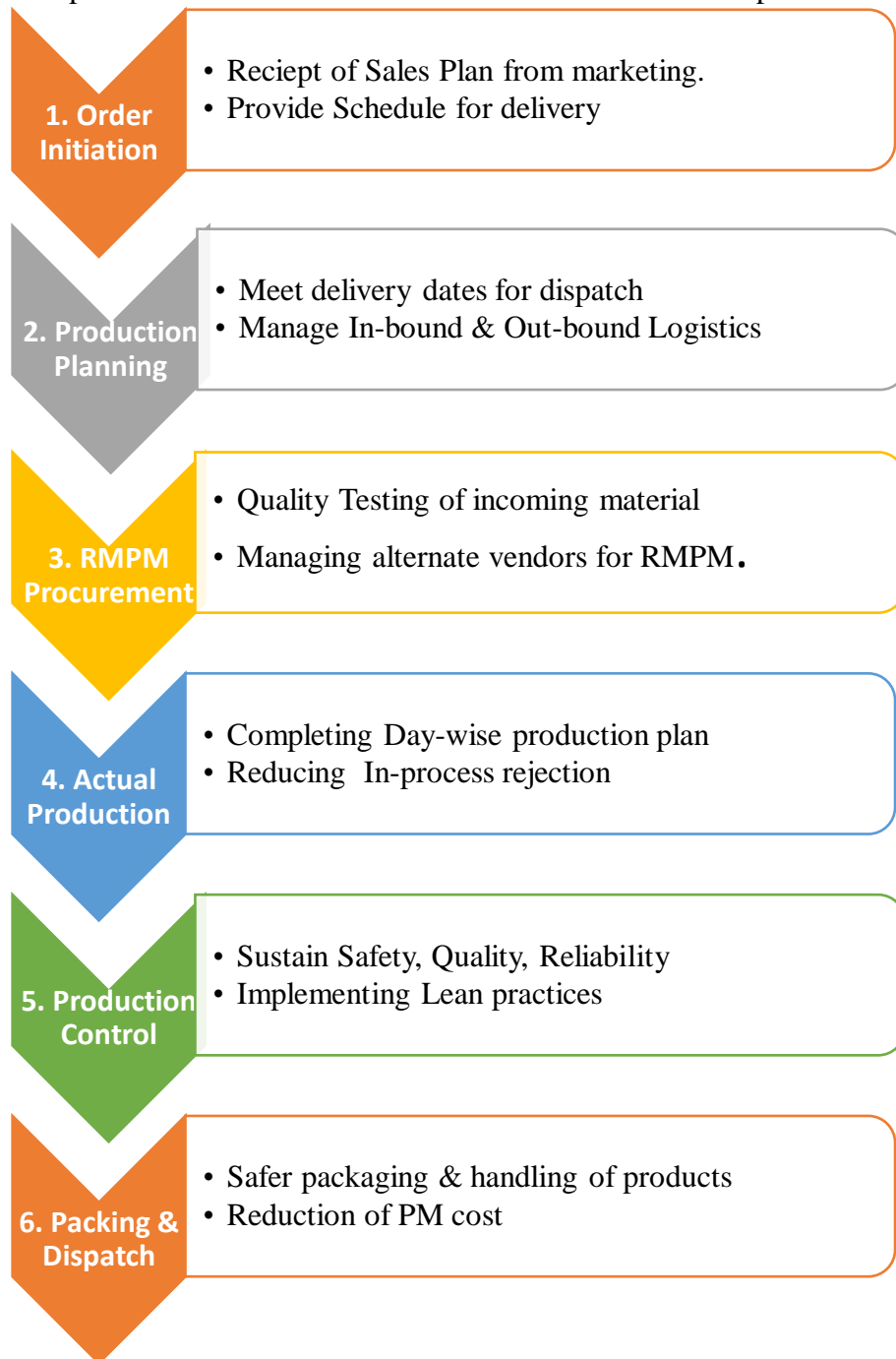
RDX



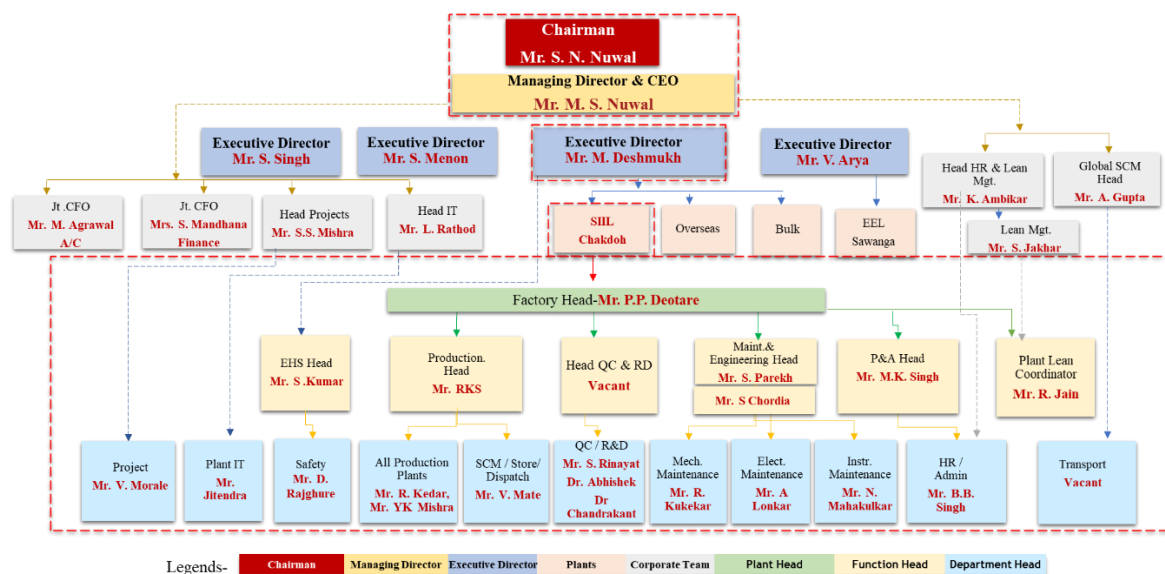
HMX

PRODUCTION SYSTEM:

Given below is the production process followed at SIIL Chakdoh. It starts with the order initiation by customer followed by its production planning by the SCM team. After this, purchase dept. procures required Raw Material & Packaging Material for the actual production. At SIIL, along with the actual production, several lean practices are also taken care like 5S, TPM with an objective to make all the processes waste-free. After this, finished goods are packaged and dispatched to the customer or to the site of actual consumption.

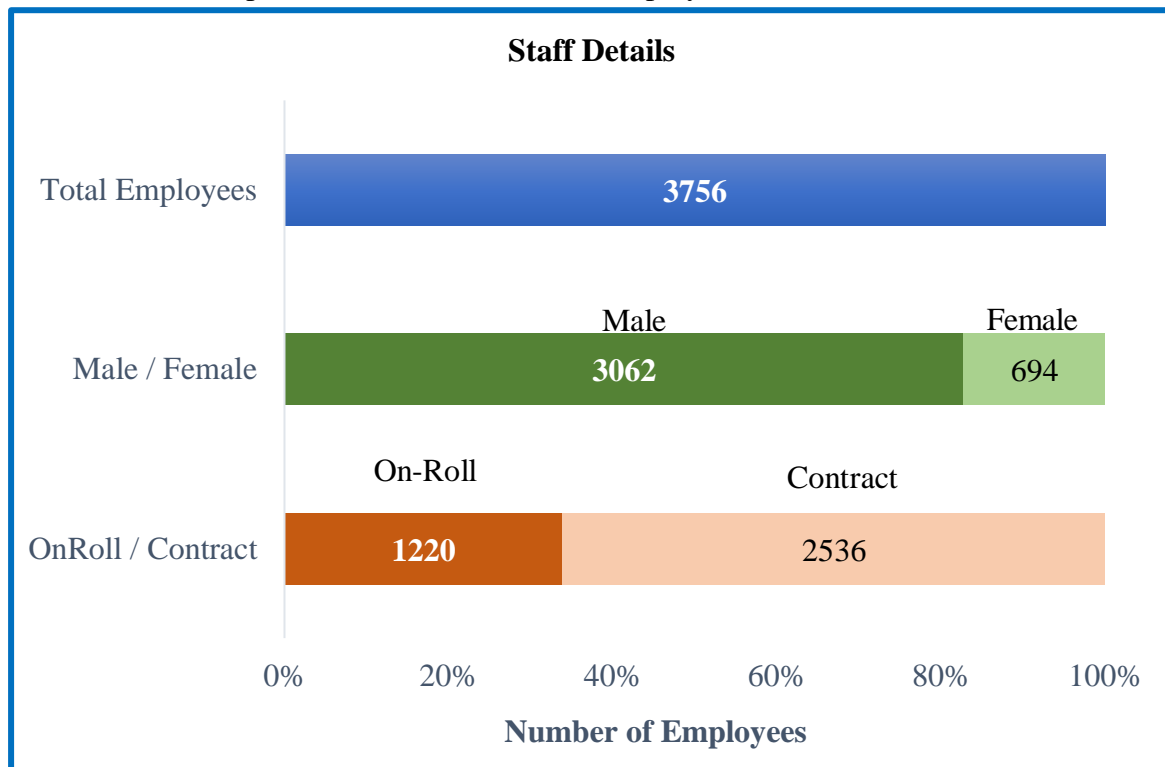


PLANT ORGANIZATION:



STAFF:

There are currently 3445 number of employees out of which 1167 number of employees are On-Roll while the rest are on contract basis. Considering the various departments, the charts below show the department-wise allocation of employees.



Employees work in four shifts. The detailed shift times along with working hours are given below:

Shift	From	To
G	09:30 hrs 10:00 hrs	18:00 hrs 18:30 hrs
A	06:00 hrs	14:30 hrs
B	14:30 hrs	23:00 hrs
C	23:00 hrs	06:00 hrs

2. MILESTONES ON THE JOURNEY OF MANUFACTURING EXCELLENCE:

Solar management decided to adopt TPM as companywide policy to address following challenges:

- Machineries and Equipments were not available in basic condition
- Machine Operators were mainly responsible for only production activities with the concept of “I Operate, You Maintain”
- No practices applied for maintaining equipment at optimal condition
- Maintenance activities carried out only when machines were not available for production
- Majorly Breakdown maintenance was followed
- Target & analysis for reducing breakdowns were not recorded
- Standard practice for breakdown management was not documented
- Primary information and knowledge transfer about basic conditions of machineries and equipment’s, types of losses & analytical tools were not implemented
- Systematic method for cost and loss reduction was not followed

TPM Journey started through plantwide launch on 22nd May 2018. Initially to start with TPM was initiated on selected Manager Model Machines. TPM implementation is a continuous process now and since May 2018 it is horizontally deployed.



TPM Kick Off: Based on the results achieved on MMM, the plant “kicked-off” the program. MD & CEO along with other Management team officially kick off the program for deployment of all eight pillars in all divisions of the plant on 21st January 2019.



JIPM Assessment's–

1st Stage Assessment TPM Excellence Award – Category A was held on 2nd Jun'2023
Assessed By – Prof. Tetsuo MIYAMURA San & Kimio ISHIKAWA San

2nd Stage Assessment TPM Excellence Award – Category A was held on 23rd Nov'2023
Assessed By – Prof. Tetsuo MIYAMURA San & Kimio ISHIKAWA San



3. BENEFITS ACHIEVED:

- Cultural Change:
 - Workmen have started owning responsibility for operating and maintaining the equipment.
 - Team working culture is inculcated by breaking down departmental barriers. We have CFT's working effectively.
 - Culture of waste elimination is getting inculcated. Reduction in breakeven point for off highway was achieved on the back of Kaizens implemented on the shop floor.
 - Improvement in skill level of the operators in terms of multi skilling.
 - Review mechanisms set up for tracking performance parameters.
- 5S activities improved shop floor. This gave a positive image about the company to visiting customers and has resulted in more business enquiries to our company.
- S-D-C-A cycle has started due to formulation of checklists. This has resulted in benchmarking of key indices for further improvement.
- Disciplined approach to problem solving is demonstrated by use of Why-Why analysis, 10 step methodology, etc.
- KMI-KPI-KAI connect enabled to harness the efforts of everyone to goal of Zero accidents, Zero defects and Zero break downs.

To improve the total employee involvement & promote TPM activities, management has prepared R & R policy to recognize & motivate the people who are actively contributing into the TPM implementation.

4. KEY OF OUR MANUFACTURING EXCELLENCE:

Aim of manufacturing excellence is to implement the best practices for improving key results in terms of PQCDsME. SIIL involved all employees to work for manufacturing excellence. Continual improvement activities and periodic review of the results are enablers to meet the key strategies and Business parameters. Following are few highlights noted herewith:

- Development of proactive approach to address break down, accident & defect incidences.
- Strong condition base maintenance approach for enhancing equipment's reliability.
- Continual focus on Quality Management System through ISO 9001.
- Continual focus on Environment Management System through ISO 14001.
- Continual focus on Occ. Health & Safety Management System through ISO 45001.
- Green energy focus through uses of renewal energy and improving Green Belt area.
- Focus on improving knowledge and skill of people through competency development.
- Emphasis on 5'S principal.
- Low-cost automation to eliminate losses in product realisation process.

5. ACHIEVEMENT RECORD:

Category	Index	Unit	BM (TPM Started)	Target	Actual
			April '19 - June'19	FY 23-24 (April'23 - Nov'23)	FY 23-24 (April'23 - Nov'23)
P	OEE	%	68	85	84
P	OEE: Availability Rate	%	79	90	88.54
P	OEE: Quality Rate	%	100	100	95.10
P	OEE: Performance rate	%	86	100	99.64
P	OPE	%	76	90	86
P	Manpower Efficiency	%	84	99	99
P	Breakdown due to weak JH	Nos.	132	0	0
P	BD Hrs -A	Hr	91	0	9
	BD Hrs -B		31.68	10	10.18
P	BD Occurrence-A	Nos	53	0	13
	BD Occurrence-B		35	14	16
P P P P	MTTR- A	Mins	102.6	0	42.87
	MTBF- A	Mins	771	3500	3094
	MTTR- B	Mins	54.3	40	38.18
	MTBF- B	Mins	1152	2500	2520
Q	Customer Complaint	Nos.	6	0	1
Q	In-process rejection	PPM	250	0	42
Q	Defects due to weak JH	Nos.	59	0	0
C	Cost index	---	Cannot be disclose due to Defence related items		
S	Major Accident	Nos.	0	0	0
S	Minor Accident	Nos.	4	0	0
S	Accident due to weak JH	Nos.	0	0	0
M	Kaizens	Nos.	-	500	689
M	Employees recognized thru R&R	Nos.	50	546	550
M	Skill level of Production & Maintenance workmen	%	64	85	83
M	Equipment Competent Operator	Cum No	0	1300	1280

Other	<p>1. Do you have a program where all employees can participate in TPM? Yes, Through trainings, Quiz, Suggestions Scheme, Kaizen implementation, etc.</p> <p>2. Do you have a program allowing employees to be recognized their achievements? Yes, there is scheduled "Rewards & Recognition" program to facilitate employees for achievement.</p> <p>3. Are top management involved in the audit/verification of completion of TPM pillar steps? Yes, Top management holds, review and monitors the progress periodically.</p> <p>4. Are all pillar activity boards displayed and reviewed by top management? Yes, Boards are</p>
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