

1. Company Profile

1.1 About Company

Sarda Metals & Alloys Limited (SMAL) is one of India's largest producers of manganese alloys and a trusted supplier to major steel manufacturers worldwide. Known for its commitment to quality, the company plays a critical role in providing high-grade manganese alloys (SiMn, FeMn) of various compositions essential for steel production.

SMAL is a 100% subsidiary of Sarda Energy & Minerals Limited (SEML). SEML was incorporated in 1973 as Raipur Alloys & Steel Ltd. and is listed on the Bombay Stock Exchange and the National Stock Exchange (SARDAEN). It has been recognized among the '*Top 500 Private Companies*' in India by the leading business daily *Business Today*. SMAL was set up as a greenfield state-of-the-art facility in Visakhapatnam, Andhra Pradesh, India in 2013-14 with 1x80 MW Captive Power Plant and 3x36 MVA Submerged Arc Furnaces, which enable an annual production capacity of 150,000 metric tons. This positions SMAL as one of India's largest alloy producers, playing a key role in the global steel industry. This unit is envisaged to become the most technologically advanced, sustainable and the largest single location Ferro Alloy complexes in India. Spread over an area of 281 acres in APIIC Kantakapalli Industrial Park, the plant is strategically located just 40-45 KM from Vishakhapatnam & Gangavaram Ports and only 2 Kms from Kantakapalli Railway siding on Chennai-Kolkata main line.

Sarda Metals has earned ISO certifications for its production facilities, including ISO 9001, ISO 14001, ISO 45001, and ISO 50001. These certifications reflect the company's commitment to quality, environmental management, occupational health and safety, and energy management. The company's high-quality standards are further ensured by its NABL-accredited lab and BIS certification, which guarantee that the products meet international quality benchmarks. Additionally, Sarda has been recognized with a 3 Star Export House status by the Ministry of Commerce, Government of India, underscoring its strength in international trade.

1.2 TPM Management Organization and Staffing Structure

At the core is the TPM Steering Committee headed by Mr. Neeraj Sarda who is Deputy Managing Director of Sarda Metals and Alloys Limited and senior management, including plant managers, and department heads, responsible for setting TPM objectives, allocating resources, and monitoring progress to ensure alignment with organizational strategies. Mr. Venu Thalluri who is the TPM Facilitator/Coordinator acts as bridge between the steering committee and pillar teams by coordinating activities, guiding efforts, and providing feedback on the program's effectiveness.

The structure also includes dedicated Pillar Teams, each focusing on one of the core TPM pillars, such as Autonomous Maintenance (AM), Planned Maintenance (PM), Quality Maintenance (QM), Focused Improvement (FI), Education and Training (E&T), Safety, Health, and Environment (SHE), Office TPM, and Development Management (DM). These teams are supported by department-level teams, comprising cross-functional members who execute TPM activities at the operational level. Operators and shop-floor staff play a crucial role, particularly in activities like Autonomous Maintenance, where they take ownership of equipment, identify problems, and implement solutions.

Roles and responsibilities are clearly defined to ensure accountability, with well-established communication channels facilitating smooth interaction across all levels of the organization. Regular meetings, progress reviews, and feedback sessions are conducted to track performance and address challenges. Key Performance Indicators (KPIs) are used to measure progress and evaluate success in each pillar. This structured approach enhances teamwork, promotes employee engagement, and ensures sustainable TPM practices, driving the organization toward operational excellence and continuous improvement.

2. Milestone on the Journey of Manufacturing Excellence

The Ferro Alloys industry faces distinct operational challenges, ranging from procuring high-quality raw materials to overcoming process inefficiencies and achieving finished product quality. Internally, the constraints include workplace safety concerns, a dusty environment, frequent equipment breakdowns, cost reduction pressures, waste elimination, and difficulties in maintaining and implementing 5S practices. Externally, the industry contends with market-driven price volatility, raw material dependency, and competitor practices.

Sarda Metals and Alloys Limited (SMAL) is committed to continuous improvement and has been implementing Total Productive Maintenance (TPM) since August 2019. To initiate this journey, we introduced the Managerial Model Machine (MMM) framework, focusing on four key areas:

- Raw Material Handling System (RMHS)
- Mudgun Drill Machine
- Slag Granulation Unit
- Coal Handling Plant (CHP)

Across these areas, all 8 pillars of TPM were systematically implemented. We successfully completed JH Step 1 to JH Step 3 in these areas despite challenges posed by the COVID-19 pandemic, which delayed our TPM kick-off activities. However, through consistent teamwork and determination, we overcame these obstacles. By April 2022, under the guidance of the Confederation of Indian Industry (CII), we conducted our TPM kick-off assessment.

Key milestones include:

- November 2022: TPM Strong Commitment Award by CII
- November 2023: TPM Significant Achievement Award by CII
- Currently pursuing: JIPM TPM Excellence Award

The journey has been challenging but deeply rewarding, offering us invaluable lessons and opportunities for growth. From the outset, we established a robust TPM Organogram headed by Deputy Managing Director, Mr. Neeraj Sarda, as the Steering Committee Chairman. The plant was divided into three zones and 17 circles, each supported by cross-functional teams (CFTs). A 4-tier review mechanism was introduced for effective governance:

- Circle leaders meet daily with their teams.
- Circle leaders and their CFTs meet weekly.
- Pillar Chairmen and Vice Chairmen review circle activities fortnightly.
- Monthly Steering Committee meetings are held to review overall progress.

Best Practices Implemented During the TPM Journey:

- Developed a Daily Management Information System (MIS) Report.
- Established a Technical Training Centre.
- Created a Plant Performance Report with dynamic dashboards for tracking RM & FG inventory levels, unsafe conditions/acts, near misses, abnormalities, Kaizens, and OPLs etc.
- Defined 8 KMIs (Key Management Indicators) and 40 KPIs (Key Performance Indicators) for SMAL.
- Deployed the Hoshin Kanri (X-Matrix) for strategic planning.
- Implemented a Daily Management System (DMS).
- Standardized MRM (Management Review Meetings) for Tier 1 and Tier 2.
- Established an RCA (Root Cause Analysis) Tracking System.

- Enhanced visual management across the plant.
- Introduced an E-Learning Portal for employee development.
- Created a Total Safety Index for safety performance tracking.
- Set up an Obeya Room for collaborative decision-making and reviews.

3. Benefits Achieved

Through consistent implementation of TPM activities, we achieved numerous tangible and intangible benefits:

3.1 Tangible Benefits:

- EBITDA has improved from 2.41% to 12.25% in FY 2024-2025.
- ROCE has increased from 0.22% to 7.32% in FY 2024-2025.
- Availability has risen from 80.24% to 97.61% in FY 2024-2025.
- OEE has improved from 60.37% to 75.53% in FY 2024-2025.
- Breakdown incidents have decreased from 65 to 22 in FY 2024-2025.
- Mean Time Between Failures (MTBF) has increased from 152.78 hours to 544.67 hours in FY 2024-2025.
- Mean Time to Repair (MTTR) has decreased from 3.65 hours to 2.83 hours in FY 2024-2025.
- Productivity has improved from 0.24 MT/Man-day to 0.34 MT/Man-day in FY 2024-2025.
- First Aid cases have reduced from 10 to 2 in FY 2024-2025.
- Customer complaints have been eliminated, dropping from 8 to 0 in FY 2024-2025.
- Work in Progress (WIP) inventory levels have been reduced from 10.02% to 8.26% in FY 2024-2025

3.2 Intangible Benefits:

- Reduced minor stoppages, leading to smoother operations.
- Enhanced visual management across the plant.
- Strengthened Kaizen and OPL culture, with an increase in Kaizen contributions per employee.
- A more hygienic workplace achieved through consistent 5S practices.
- A clutter-free and organized environment, boosting employee morale and efficiency.

4. Key Items of our Manufacturing Excellence in Future

a) Deepen TPM Practices

- i. **Sustainment of 8 Pillars:** Strengthen the eight TPM pillars and focus on areas with gaps or inconsistent implementation.
- ii. **Enhance Autonomous Maintenance:** Sustaining JH Step 4 and implement the further of JH. Shift from basic operator engagement in equipment care to advance problem-solving and decision-making by operators. Focusing on reducing breakdowns through improved root cause analysis.
- iii. **Focus on Preventive Maintenance:** Integrate advanced condition-monitoring tools like IoT sensors and AI for predictive maintenance to reduce downtime further.
- iv. **Continuous Improvement in Workplace Organization (5S):** Build a culture where 5S is not just a standard but a habit ingrained in every process.

b) Digitalization and Industry 4.0

- i. **Smart Manufacturing Tools:** Adopt smart tools like digital dashboards, automated data collection, and analytics for real-time monitoring and decision-making.
- ii. **Real-Time KPIs Monitoring:** Track and display Key Performance Indicators like OEE in real-time to facilitate immediate corrective action.

c) Focus on Energy Efficiency and Sustainability

- v. **Energy Audits:** Conduct regular energy audits and tie TPM initiatives to energy conservation goals.
- vi. **Green Manufacturing Practices:** Use TPM principles to reduce carbon footprints, minimize waste, optimize energy consumption, and improve environmental compliance.

d) Develop a High-Performance Culture

- i. **Leadership Engagement:** Foster leadership involvement to sustain TPM practices and ensure alignment with organizational goals.
- ii. **Cross-Functional Collaboration:** Enhance interdepartmental collaboration (production, operations, maintenance, and quality etc) to drive integrated improvements.
- iii. **Employee Engagement and Recognition:** Recognize individual and team contributions in achieving milestones related to TPM and manufacturing excellence.
- iv. **Training and Mentorship:** Continuously provide training programs to align employees' skills with emerging trends and best practices.

e) Expand the Scope of TPM

- i. **Office TPM:** Extend TPM principles to non-manufacturing areas like procurement, HR, finance & IT to create a company-wide culture of efficiency.
- ii. **Supply Chain Integration:** Collaborate with suppliers and logistics teams to improve end-to-end efficiency using TPM approaches.
- iii. **Focus on Quality Assurance:** Build deeper integration between TPM to reduce in-process deviations and improve consistency of products.

f) Target Zero Losses and Process Innovations

- i. **Elimination of Minor Stoppages and Waste:** Focus on micro-losses that impact productivity and profitability.
- ii. **Continuous Kaizen Initiatives:** Drive process improvement through innovation and the adoption of new techniques, tools, and workflows

g) Global Benchmarking and Knowledge Sharing

- i. **Benchmark Against Industry Leaders:** Learn from best practices in world-class TPM organizations to refine your approaches.
- ii. **Internal Best Practices Sharing:** Create platforms for sharing TPM successes and lessons learned across teams and sites.

5. ACHIEVEMENT RECORD

- Productivity: Productivity has increased by 42%, from 0.24 MT per manday to 0.34 MT per manday. Additionally, Overall Equipment Effectiveness (OEE) has improved significantly by 25.11%.
- Cost: EBITDA has risen from 2.41% to 12.25%, and Return on Capital Employed (ROCE) has increased from 0.22% to 7.32%.
- Quality: Customer complaints have been reduced from 8 in the benchmark year to zero in FY 2024-25.
- Delivery: We have achieved 100% delivery compliance consistently over the past two years.
- Safety: There have been no Lost Time Injuries (LTIs) reported in the last two years, and First Aid cases have decreased by 80%.
- Morale: Employee morale has significantly improved, with employee suggestions increasing by 495% compared to previous years.