1) Sidel Company Profile

Sidel, one of three industry groups of Tetra Laval, is a leading provider of equipment and services solutions for packaging beverage, food, home, and personal care products. Founded in 1965, it currently ensures the operation of almost 40000 equipment in 190 countries, employing more than 5000 people and guaranteeing a turnover of EUR 1.4 billion in 2021.

Sidel has over 170 years of history in terms of experience and innovation in blowing, filling, labelling, material-handling, end-of-line, and line-engineering solutions.

(https://www.sidel.com/en/about/corporate/who-we-are-pa-47)

Sidel's industrial system consists of seventeen plants located around the world, while the headquarters is in Parma, Italy. As Headquarter we host central functions as Customer Management and Marketing, R&D, Engineering, Services, Finance and HR as well local ones as Industrial Engineering, Procurement, Project Management Supply and Plant organization.

In Parma Site we have more than 900 employees while 180 of them are part of Parma Plant organization.

Company organization in Parma Wet Block Plant is composed by direct subfunctions and others as support:



TPM Project Scope Organization

Manufacturing area is part of Plant Organization and is composed by Light Parts department (LP) & Heavy Parts department (HP).



We selected the Light Parts Department as pilot area to practice and integrate the methodology in our processes.

Light parts department produce several core components for Fillers and others Sidel's products, as:

- Components for Filling Valve (Filler Platform)
- Components for Rotary Union (Filler Platform)
- Components for Vacuum Drum (Labeler Platform)
- Component for Stretching Unit (Blower Platform)





Medium Size Components for Vacuum drum (Labeler Platform)





Medium Size Components for Rotary Union (Filler Platform)

- Consisting of 46 items: • 14 Made in in LP
 - 17 Catalog materials
- 15 Outsourcing
- Medium Size Components for Stretching Unit (Blower Platform)
 - Consisting of 37 items: 2 Made in LP
 - 29 Catalog materials
 - 7 Outsourcing

In Light Parts department we have 13 CNC machine and the 7 class A machine are involved in the TPM initiative. Production processes are characterized by high variability of parts numbers: more than 70.000 pieces and 350 different parts numbers produced in 2021.



Class A machines in Parma Light Parts

Production process is determined by the working cycle on our system SAP, and SOP are defined for each code according to the complexity. Standard are dedicated to each code; complex one processed by several machines within the department, and sub furniture phases done outside the company.



Light parts department production process example

2) Milestone on the Journey of Manufacturing Excellence

Sidel since 2008 has been updating its production and methodological system with the aim and to improve and make processes more efficient. First step made in Pre-Assembly and Final Assembly were:

- 2008: Preassembly lines parallel modules 'assembly
- 2010: Standard Work in Final Assembly
- 2013: Best Lean organization
- 2015: Modular assembly: Target LT 6 weeks

Sidel decided to implement TPM in the production department with the aim of optimizing production processes, gaining knowledge of the methodology to have a fruitful exchange with advanced customers who already apply it, and having the opportunity to share TPM for those who do not apply it. Light Parts Department had first touch on TPM activities in 2014, but in 2019 the department decided to undertake the implementation in a structured manner. Implementation was an opportunity to improve process performance in terms of efficiency, quality, cost, and delivery performance and involve operators in the machine knowledge and improvement identification.



Parma Site & Continuous Improvement Journey

For the TPM introduction, a detailed plan was created to implement the six pillars (AM, PM, FI, E&T, QM, HSE) on the seven A-class machines in the department.



Light parts department TPM Roadmap

We started in 2020 with **the initial cleaning** on the pilot machine and the beginning of the autonomous maintenance and planned maintenance pillar. The continuous monitoring losses highlighted opportunities for improvement from which the first focused improvements projects were born. Once a good level of stability was achieved, activities continued according to plan in the other areas.



Light parts department TPM master plan and progress.

Our TPM organization:



Light parts department TPM pillar organization

With AM Pillar, we have worked to stabilize and extend the AM approach to the whole department, on restoration of basic conditions and stabilizing OEE. AM pillar gave a strong impulse to operator's growth, involvement, and motivation on activities.

The Planned Maintenance Pillar helped Autonomous Maintenance first, so that we can maintain basic conditions where develop preventive maintenance and then predictive approach.

FI Pillar has allowed to introduce in the department a structured approach for define Pareto loss structure and conduct Kaizen projects with the involvement of the different functions and top management.

QM Pillar facilitated the involvement of different functions in updating processes and improving inprocess controls by identifying the link between critical components and quality problems.

Through E&T Pillar we have introduced a structured system for the evaluation and creation of personal training plans aimed at the growth and development of operators and maintainers by integration with the other pillars.

HSE Pillar gave more focus in the department on reactive, preventive, and proactive approach on safety related and environmental issues.

3) Benefits achieved

Sidel Production System works to improve KPIs related to Safety, Quality, Delivery and Cost

(SQDC), generating significant positive effects through TPM methodology implementation.

Our main improvement on business results is:

- The strong involvement of Employees both in production and in support processes, has enabled the department to achieve a result in terms of production equipment efficiency increase (OEE) as well as a consistent awareness on results and a strong team spirit oriented towards goals.
- Activities done with Autonomous and Planned Maintenance have had an impact on breakdown reduction and MTBF increasing.
- Quality aspects going on through this project and his method we can appreciate a decreasing
 of NC and related costs. From high level analysis we went into details that allowed to manage
 also small deviations, giving us the opportunity to intervene in production processes with
 proper improvements. This was possible by the strong effort of all areas involved as: Industrial
 Engineering, CNC Office, Technical Department, Quality Control and Production.

Employee involvement built during TPM Program:

- Weekly Communication with Operators about AM status
- Daily Communication with Operators about deviation from target
- Daily Communication with Maintenance about activities
- Weekly Communication with Maintenance about Breakdown and KPI
- Quality Communication on RCA
- Weekly OEE Review

For specific results achieved see the "Achievement Sheet".

4) Key of our Manufacturing Excellence

The Light Parts Department will be the reference for spreading the method initially to the rest of Parma Site and then to other Sites. The knowledge capitalized in Parma must be invested all around Sidel Organization triggering a process that allow to achieve expected results in term of SQDC. The knowledge capitalized is a way to create a common language between Customer and Sidel about TPM and improve TPM skills also on the side of the Customer.

The synergy between maintenance and production on tag resolution, training, and improvement identification, which has grown more and more over the course of this TPM journey, will be crucial to continue the growth path, maintain the ideal condition of the machinery and sustain activities over time. TPM activities are crucial to strengthen the collaboration between production departments and upstream support functions to achieve ideal effectiveness and move the focus also to upstream processes.

The level of standardization must be improved to sustain the results achieved so far and Job Observation must be strengthened.

The goal zero accidents, zero defects, zero stoppages must be pursued by analyzing all events and determining their root-causes trough the involvement of all functions.

Continuously increasing people's level of knowledge by involving them in problem solving trough Education & Training Pillar support and integration with the remaining pillars.

Focused Improvements approach, initially sustained by a production bottom-up flow, shall be consolidated in the Light Parts Department, and extended to the rest of Sidel as a model.

For Quality aspects must be stabilize the results achieved with this methodology by continuing to work on processes and links between other pillars other company areas.

TPM Award Assessment Achievement Sheet

Company &	
plant name	
TPM Slogan/	
Objectives	

Sidel Parma S.p.A. Manufacturing Lights Parts

Become the worldwide referent model for TPM Methodology in Sidel Group

Category	Index	Unit	BM TPM Started 2019	2022 YTD November	Target 2023	2023
S	Number of work-related accidents requiring days off work	Cases/ year	0	1	0	1
s	Number of work-related accidents not requiring days off work	Cases/ year	1	3	0	1
s	Frequency rate	Number of occupational accidents with leave for 1 000 000 worked hours	0	31,53	0	26,9
S	Severity rate	Number of day lost due to LTA for 1 000 worked hours	0	0,19	0	0,17
Q	Number of complaints (QM)	Number/year	43	11	10	6
Q	NC costs (QM) / Product value	%	2,14%	0,95%	0,90%	0,90%
D	Production Lead time (Rapresentative Valves Family)	Days (internal and external lead time)	45	43	40	30,6
D	Production Lead time (Rapresentative Rotary Unions Family)	Days (internal and external lead time)	88	101	96	51,5
D	Delivery performance	N° of Customer request delivered on time / Total customer request	71,4%	72,3%	75,9%	92%
с	Internal Cost index (Rapresentative Valves Family)	Cost/Unit	49,15€	42,15€	40,04€	33,90€
с	Internal Cost index (Rapresentative Rotary Unions Family)	Cost/Unit	139,34€	99,66€	94,68€	99,70€
Р	Productivity	Comulated Net value	79.900,58€	358.649,25€	438.649,25€	490.464,91€
Р	Productivity on product value	Net Value / Product Value	4,41%	7,67%	5,6%	6,7%
Р	OEE (or Overall Plant Efficiency)	%	58,59%	67,58%	69,28%	72,3%
Р	Availability	%	63,30%	70,40%	71%	72,5%
Р	Performance Rate	%	93,10%	96,8	98,10%	99,8%
Р	Quality Products Rate	%	99,00%	99,20%	99,50%	99,9%
Q	In-line defect rate (scrap)	%	0,11%	0,09%	0,05%	0,0%
Q	In-line defect rate (rework)	%	0,89%	0,71%	0,45%	0,12%
Р	Number of breakdowns	Breakdowns/ year	60	45	43	27
Р	МТВЕ	Hour	485:06:46	558:52:23	637:12:27	985:54:46
Р	MTTR	Hour	18:35:01	15:06:41	13:31:50	33:46:50
м	Number of Employee Suggestions	Number/year	0	13	25	59