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ANALYSIS OF THE PROCESS OF IMPLEMENTING THE 5S METHOD AT ZPS "LUBIANA" S.A.

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Abstract: The article presents the results of efforts aimed at improving the production process at a company, ZPS "Lubiana" S.A., through the implementation of tools and organizational practices associated with the Lean Management concept. The authors focused on discussing the effects of implementing the 5S analysis tools within the company as a management method where the main visual goal is the orderly organization of the workplace. Introduced primarily as part of Lean Manufacturing, it helps eliminate waste, increase work efficiency, and improve employee safety and morale.

During the implementation work, in order to obtain a comprehensive view of the processes, the authors also applied other tools in addition to the 5S analysis, such as: Kaizen, root cause analysis, value stream mapping (VSM), standardization, and the determination of the OEE indicator based on the analysis of manual work.

Results demonstrate significant workplace organization improvements including reduced search times, fewer errors, and enhanced safety compliance in the packaging department. The study reveals that successful 5S implementation in porcelain manufacturing requires extensive visual management systems, detailed cleaning schedules adapted to ceramic dust environments, and comprehensive audit frameworks with color-coded effectiveness tracking. This research contributes a practical implementation methodology specifically tailored for traditional manufacturing environments and identifies employee engagement through visual progress documentation as critical for sustaining 5S practices in established production facilities.

Keywords: Lean Manufacturing, 5S, Improvement.

1. INTRODUCTION

The 5S method originated in Japan as part of a production management system that gained worldwide recognition under the name Lean Manufacturing. The foundations of the lean management philosophy were laid in the early 20th century by Henry Ford, who as early as 1926 promoted the acquisition of knowledge through identifying waste, standardization, and preventing machine downtime. In the 1950s and 1960s, building upon Ford's approach, Taichi Ohno, the head of production at Toyota, initiated the development of the Toyota Production System (TPS), which became a unique model of production management adopted by manufacturing companies around the globe. A significant contributor to the current shape of lean management philosophy was also Edwards Deming, who introduced the 14 principles of quality. Managing a company in accordance with the principles of lean management is most feasible when the processes it oversees are stable, meaning they demonstrate high quality capability [Katayama 2017].

The transition from a traditional production management system to one aligned with the lean management vision is a typical example of change management. One of the most important factors and one of the main pillars of the production systems managed according to lean principles is the team-based work system. In a well-organized team environment, the synergistic effect of collective actions can be achieved [Elafri et al. 2022].

In the literature, the vision of Lean is not always clearly defined. Sometimes it is referred to as lean manufacturing, other times lean management, the Toyota Production System (TPS), and, previously, as Just in Time (JiT), Zero Inventory Production (ZIP), Kanban, or World Class Manufacturing (WCM). Today, the most commonly used term is Lean Management [Sinha and Matharu 2019].

Closely tied to the lean management methodology are the principles of work division within Toyota (known as "The Toyota Way"), a set of behavioral norms that are binding for all company employees. It presents the key elements of the company's organizational culture, as well as its mission and values, which are entrusted not only to employees, but also to business partners and the local community. This serves as the foundation upon which the Toyota Production System is built, defining the corporation's management style and its overall uniqueness. The two main pillars of the Toyota's work model are continuous improvement and respect for people [Piątek 2022], with the "Toyota Production System House" becoming one of the most widely recognized icons of modern manufacturing. This system is a composition of various techniques, concepts, and principles aimed at eliminating the 3 Ms: muri (overburden), mura (unevenness), and muda (waste). It emphasizes production and logistics organization while fostering strong relationships with suppliers and customers.

Given the roots of the lean management philosophy described in the literature, i.e. the assumptions of waste elimination and continuous improvement postulated by

Henry Ford, the error-resilient system at the core of the Toyota Production System, and the general arguments presented by Deming in his work *Out of the Crisis*, where he claims that it is not profit but process excellence that strengthens an enterprise and builds long-term competitive advantage, then it can be concluded that [Hamrol 2022]:

- Lean Management is a unique operational strategy whose core principle is the elimination of all forms of waste;
- the most important aspect of Lean Management is acting in accordance with customer expectations, requirements, and expressed needs;
- quality should be built into the proces;
- processes should be simplified to the greatest extent possible to make them less susceptible to disruptions arising from the external environment;
- conditions for continuous improvement should be ensured, not only for products and processes but also for employees.

In today's dynamic and demanding business environment, companies seek innovative management methods that allow them to remain competitive, achieve operational efficiency, and adapt to rapidly evolving customer expectations. In this context, the Lean Management concept becomes a crucial transformational tool, gaining strong support from both experts and practitioners [Gil-Vilda, Yagüe-Fabra and Sunyer 2021; Stronczek 2024].

Lubiana constitutes a modern Polish manufacturer of porcelain tableware. This ceramics company was founded in 1969 in the town of Łubiana near Kościerzyna. The company dates back to 1965, when potential products were found to be missing on the domestic market and a high level of unemployment in the potential locations. Thanks to the efforts of the regional authorities and MPs, it was possible obtain consent to build a plant near Kościerzyna. The company is today the largest producer of porcelain tableware in the whole European market, with an annual production capacity of approximately 15,000 tons. The company focuses on the production of high-quality, white porcelain of exceptionally high standards in quality and product hardness. These products are exported to many countries around the world, including Germany, France, Italy, the USA, and Japan. This company is known for its innovative technological solutions and modern design, making its porcelain products highly valued by individual customers as well as the hospitality and gastronomy industries. the company continues to expand its product range, adapting to the changing needs of the market and its customers [Blicharska and Szmaglik 2023].

2. 5S METHOD

The 5S method is an abbreviation of five Japanese words, and is a management method workplace that was developed in Japan and is today widely used in

companies all over the world. This method consists of five steps, each of which begins with the letter "S" [Hamrol 2018]:

1. Sorting (Seiri) – involves removing everything unnecessary from the workplace, including tools, documents and materials, which are no longer needed. Carrying out sorting allows you to remove any items that take up space and make work difficult.
2. Systematization (Seiton) – involves arranging other items. It is important that each item has its place and is properly marked and organized so that everyone can easily find what they need. Thanks to this, time is saved and work efficiency increases.
3. Cleaning (Seiso) – involves regular cleaning of the workplace to keep it clean and tidy. As part of this step, cleaning staff should be designated to ensure the work area is clean.
4. Standardization (Seiketsu) – involves establishing the standards that are to be observed in the workplace. These standards may concern the method of storing items, cleaning or organizing work. Thanks to this everyone knows what to do and how to do it.
5. Self-discipline (Shitsuke) – involves following standards and taking care of oneself to maintain order in the workplace. This is a step to consolidate the previous four steps and maintain them over time.

These five individual 5S stages are illustrated in Figure 1.

Fig. 1. Stages of 5S implementation

The goal of the 5S method is to improve work efficiency and productivity, ensuring occupational safety as well as improving the quality of the products and services. This method is used in various industries, such as production, logistics, customer service or administration [Werpachowski 2012]. The benefits of introducing the 5S method are listed in Table 1.

Table 1. Benefits resulting from the introduction of the 5S method

Measurable benefits	Immeasurable benefits
• Latency reduction and more efficient control of the production process • Improvement in quality and reduction of mistakes, errors and number of defects • Reducing the frequency of failures • Reducing the number of accidents in the workplace	• Employees benefit from more ergonomic and organized workstations • Increased discipline is observed and a higher level of security in the workplace • Employees are more actively engaged in teamwork • Employees are happy with the order and unique organization of the workplace • The company presents a favorable image in the eyes of contractors and business partners and guests

Source: own study.

When implementing the 5S method, many methods and techniques are used, including [Pająk, Klimkiewicz and Kosieradzka 2014]:

- red and yellow label action;
- photographic documentation of workstations, production halls and the enterprise area before and during the implementation of subsequent steps in the standardization of work;
- checklists;
- visualization, signage systems;
- Poka Yoke – a method used to treat deficiencies and errors.

3. 5S METHODOLOGY AS THE LIQUIDATION OF LOSSES IN THE ENTERPRISE

In today's manufacturing and organizational environment, where efficiency and process optimizationis are crucial to success, the 5S method is becoming increasingly significant. 5S is not only a set of tools and principles, but above all a culture and a way of thinking that can revolutionize workplace management and the organization as a whole. The aim of this work is to explore the 5S concept, to understand its fundamental principles and to define how to implement 5S in

the workplace in order to help to improve efficiency, quality, and the overall safety at work [Jędrzejak, Mazur and Piotrowska 2014; Szelerski 2023]. Here ZPS "Lubiana" S.A. is used as a practical example of the implementation of the 5S methodology [Deshpande et al. 2015; Blicharska and Szmaglik 2023].

The first step to implementing the assigned tasks is to establish a team implementation and to appoint a leader who will be responsible for the course of work, according to the scheme [Singh, Rastogib and Sharma 2014; Werpachowski 2018].

3.1. Photograph of the area before implementation

The production area, including the Packaging Department, was taken into account. On the appointed date a team member designated by the leader created the necessary photographic documentation to evaluate the current condition of this area (Fig. 2, 3, 4).

Fig. 2. Production stations at the Packaging Department

Source: ZPS "Lubiana" S.A.

Fig. 3. Production station in the Packaging Department

Source: ZPS "Lubiana" S.A.

Fig. 4. Communication route through the department's production stations

Source: ZPS "Lubiana" S.A.

3.2. Area snapshot analysis + spaghetti diagram

This is a measurement method where the purpose is to analyze the evaluation of an employee and their work equipment. It involves cyclical observation of the examined place or employee, and shows what kind of employee is doing the work at a given moment. The purpose of the survey is to determine how much time an employee spends on a given added activity, e.g. packing, and how much on activities that can be done to eliminate the "muda" [Singh, Rastogib and Sharma 2014; Werpachowski 2018]. The company uses an observation sheet for analysis via the Spaghetti diagram. The observation sheet covers work performance over a 60 minute period (Tab. 2), and then the results are placed on a figure (Tab. 3) [Deshpande et al. 2015]. A summary is made, including a breakdown of value-adding and non-value-adding activities at the packing station. While performing a snapshot analysis, a Spaghetti diagram is simultaneously created based on the area plan (Fig. 5).

Table 2. Snapshot analysis of the Packaging Department area

Snapshot analysis of the packaging process - 360 pieces of 210 mm Roma plates (3 codes per product, quality control tags, pea-type cardboard dividers), carried out on May 12th, 2020, between 10^{00} A.M. and 11^{00} A.M.

Time	Description of the activity/task											
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
10^{00}	√											
10^{01}	√											
10^{02}	√											
10^{03}	√											
10^{04}	√											
10^{05}	√											
10^{06}									√			
10^{07}		√										
10^{08}		√										
10^{09}				√								
10^{10}				√								
10^{11}				√								
10^{12}			√									
10^{13}					√							
10^{14}					√							
10^{15}						√						
10^{16}						√						
10^{17}							√					
10^{18}							√					
10^{19}								√				
10^{20}			√									
10^{21}					√							
10^{22}					√							
10^{23}						√						
10^{24}						√						
10^{25}									√			
10^{26}						√						
10^{27}							√					
10^{28}							√					
10^{29}								√				

Time	Description of the activity/task											
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
10^{30}			√									
10^{31}					√							
10^{32}					√							
10^{33}						√						
10^{34}						√						
10^{35}							√					
10^{36}							√					
10^{37}								√				
10^{38}			√									
10^{39}					√							
10^{40}					√							
10^{41}						√						
10^{42}						√						
10^{43}							√					
10^{44}							√					
10^{45}								√				
10^{46}			√									
10^{47}					√							
10^{48}					√							
10^{49}					√							
10^{50}						√						
10^{51}						√						
10^{52}						√						
10^{53}							√					
10^{54}							√					
10^{55}								√				
10^{56}			√									
10^{57}					√							
10^{58}					√							
10^{59}						√						

I – waiting (for goods, for a forklift operator), II – removing cardboard boxes and tags from the pallet, III – removing goods from the pallet, IV – applying labels on boxes, V – product coding, VI – interlaying with the divider, VII – packing cardboard boxes, VIII – stacking cardboard boxes on an EURO pallet, IX – interview with the leader, X – writing an instruction, XI – wrapping the foundation, XII – cleaning (cleaning the pallets, arranging tools on the workstand)

Source: ZPS "Lubiana" S.A.

Table 3. Snapshot analysis of the Packing Department area – summary

	NVA	NVA	NVA	VA	VA	VA	VA	NVA	NVA	NVA	NVA	NVA
Description of the activity/task	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
Time (minutes)	6	2	6	3	13	13	10	5	2	0	0	0

I – waiting (for goods, for a forklift operator), II – removing cardboard boxes and tags from the pallet, III – removing goods from the pallet, IV – applying labels on boxes, V – product coding, VI – interlaying with the divider, VII – packing cardboard boxes, VIII – stacking cardboard boxes on an EURO pallet, IX – interview with the leader, X – writing an instruction, XI – wrapping the foundation, XII – cleaning (cleaning the pallets, arranging tools on the workstand)

Snapshot analysis summary

		Time (minutes)
NVA	Activities that do not add value to the product or activities that waste time	21
VA	Activities that add value to the product	39

Source: ZPS "Lubiana" S.A

3.3. Sorting

The next step is to sort all the items on at the workplace, it should be clearly defined what is needed and what is unnecessary in the workplace. This helps to determine what needs to be kept and what can be removed (Fig. 6). The objects and tools at the workplace are categorized, which means that everything is grouped according to specific categories or criteria. Examples categories are the red and yellow boxes [Blicharska and Szmaglik 2023].

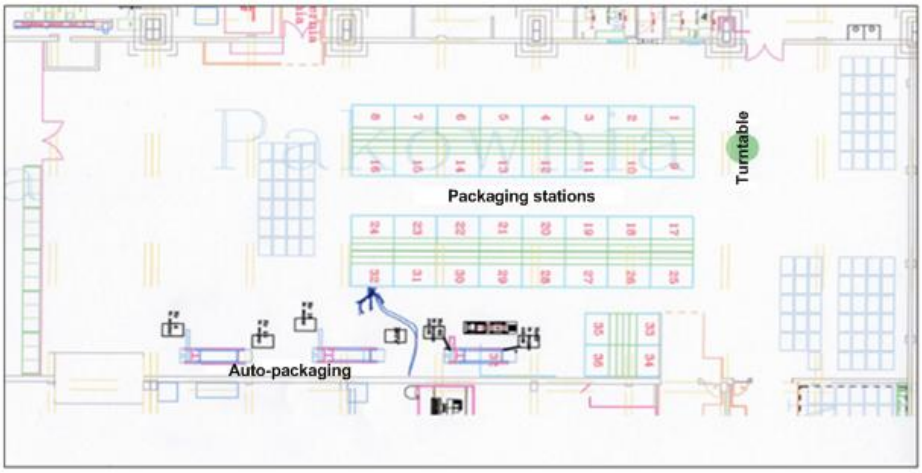


Fig. 5. Projection of the Packing Plant area where the Spaghetti diagram was created

Source: ZPS "Lubiana" S.A.

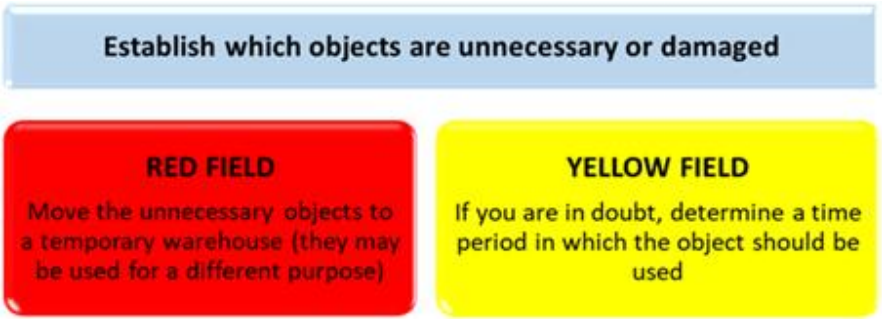


Fig. 6. Sorting categorization in 5S

Source: own study.

3.4. Systematics

Systematics in 5S helps to create an orderly and optimized position work, which in turn contributes to increased productivity, eliminated wasted time and improved overall resource efficiency. It isa key step in creating an effective work environment that defines constants locations for items and equipment needed to work at the packaging station (Fig. 7) [Deshpande et al. 2015].

3.5. Cleaning

Fig. 7. Systematization of storage of equipment, materials and accessories needed to work at a packaging station

Source: ZPS "Lubiana" S.A.

5S cleaning is an important step in the process of improving the workplace and helps to ensure that the state of order and cleanliness is maintained at a constant level, which contributes to improving efficiency, safety and overall work efficiency. A schedule was created to keep each workstation in good order and clean, as presented in the table below (Tab. 4, 5), where activities have been divided into two groups.

Table 4. Weekly cleaning schedule for the packaging department

Topic: 5S Location: Packing room		Cleaning schedule										
No.	Activities	When?	Monday		Tuesday		Wednesday		Thursday		Friday	
			change in work									
			I	II	I	II	I	II	I	II	I	II
1	Sweeping the floors	every day										
2	Taking out the trash											
3	Replenishing missing components at the station (tapes, foil, dividers)											
4	Putting aside excess porcelain and packaging											
5	Mopping the floors	once a week (on Friday during the 2nd shift)										
6	Cleaning tables and shelves											

Source: ZPS "Lubiana" S.A.

a) daily activities, including: cleaning packing tables, sweeping the workplace, sorting waste, etc.,
b) activities once a week, including: mopping the floor and organizing a shelf with dividers,
c) activities once a month, including: cleaning the shelf for small orders (review of commands, dusting of shelves),
d) activities once every 2 months, including: inspection of the turntable for the wrapping machine,
e) activities once every 3 months, including: fixtures lamp sockets,
f) activities once every 6 months, including: dusting pipes and lamp sockets requiring height authorizations.

Table 5. Annual cleaning schedule for the packaging department

Topic: 5S Location: Packing room		Cleaning schedule												
No.	Activities	When?	Months											
			I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
1	Cleaning the shelf for small orders (review of orders, dusting the shelves)	once a month												
2	Inspection of the turntable on the wrapper	once every two months												
3	Cleaning lamp sockets	once every three months												
4	Cleaning pipes and lamp fittings requiring qualifications for work at heights	once every six months												

Source: ZPS "Lubiana" S.A.

3.6. Standardization

As part of the standardization process, employees and direct superiors establish clear rules rules for performing tasks and processes. These standards describe what steps and how the steps should be taken to achieve specific goals and what tools or equipment should be used. This gives all employees a clear point reference that helps avoid errors and ensures consistency of actions. In the progress of implementing 5S in the Packaging Department, a number of standards have been created. This work includes several of them them (Tab. 6, 7), because the standards database is very extensive.

In short, 5S standardization is about establishing, maintaining and continuously improving work standards to ensure consistency, quality and effectiveness activities in the workplace. This is an important step in the process of improving the organization and leads to improved efficiency and the elimination of losses and errors [Deshpande et al. 2015; Blicharska and Szmaglik 2023].

3.7. Self-discipline

Self-discipline includes keeping the workplace clean, tidy and up to date. This means that employees should maintain their jobs and clean the surroundings, regardless of whether it is an office area, a production area or any other workspace. According to this principle, sheets have been created that help in the verification of the workplace in terms of self-discipline. Below is the weekly sheet (Tab. 8) in which information from the audited area are listed, such as:

a) Is the floor free from unnecessary things?
b) Is the floor swept properly?

c) Are all elements at their work stations?
d) Are all items on the shadow board included and in good condition?
e) Is the current status of the positions consistent with the standards?
f) Is the machine kept in good order?
g) Are all the things in the wardrobes in their place?

Table 6. Standard describing the cleaning schedule

wistil LUBIANA One page lesson (OPL)				Document registered wistilean
Name OPL: Cleaning schedule Packing room - everyday activities	Machine/area: Packing room / Production cells and packaging lines	Document number: OPL-L-DŁ Ł MWG-MW GP-00-41	Date of introduction: 01/12/2020	Total time [minutes]
	OPL-L-DŁ Ł MWG-MW GP-00-41 Harmonogram sprzątania Pakownia – comnoit i codiomn.xdix	Page: 1/1 / Version: 1	Author: Natalia G.	

Cleaning schedule

Packing room - production cells and packaging lines

Action	Sweeping the floor	Taking out garbage	Replenishment of missing components at the station (tapes, foils, dividers)	Releasing overstashes
When?	Every day, after work	Every day, after work	Every day, after work	Every day, after work
Who?	Employee on a given table	Employee on a given table	Employee on a given table	Employee on a given table

Symbol: BHP, Jakość, Pomysł, Porady & Triki	Shift champions			Technologist	Manager	Health and safety
		Brigade 1				
		Brigade 2				
		Brigade 3		Quality control		
		Brigade 4				

Source: ZPS "Lubiana" S.A.

Table 7. Standard for filling out 5S sheets

wistil LUBIANA One Page Lesson (OPL) wistilean				
Name OPL:	Machine/Area: The entire plant	Document No.: OPL-L-O-DW-WO-00-2	Date of introduction: 25.09.2017 / Version: 2	Total time [min]:
5S Control:		Side: 1/1	Author: Maria F., Marta G.	

The inspection must be carried out by the person responsible for the area.
We fill in field "1" according to the formula.
In field "2" we mark x the presence of a given brigade on a given day.
In field "3" we select the answer according to the legend:

1	Proces prawidłowy
0,5	Niewielkie odstępstwo
0	Proces nieprawidłowy

In field "4":
- sum of points - add the values ponding to individual questions
- % effectiveness is calculated according to: sum of points / maximum number of points * 100%
- The average daily effectiveness is calculated according to the formula: sum of the effectiveness of individual brigades / number of shifts* 100%

We transfer the % effectiveness from a given day to the 5S tube according to the legend:

90-100%	
70-89%	
<69%	

In field "5" we enter the average weekly effectiveness marked in orange on the sample sheet. We mark according to the legend as above.

Symbol: BHP, Jakość, Pomysł, Porady & Triki	Signatures:	shift master	Technologist	Manager	BHP
	Change 1				
	Change 2		Quality		
	Change 3				

Source: ZPS "Lubiana" S.A.

Table 8. 5S audit – weekly sheet

LUBIANA — 5S audit - weekly — wistilean

Month:	
Week number:	
Department:	
Area:	
Person responsible for the area:	

	Question	Area workers	Monday	Tuesday	Wednesday	Thursday	Friday	weekly average	External audit
1	Is the floor free from unnecessary things?	1							
		2							
2	Is the floor swept properly?	1							
		2							
3	Are all items in place at work stations?	1							
		2							
4	Are all items on the shadow board included and in good condition?	1							
		2							
5	Is the current status of the positions consistent with the standards?	1							
		2							
6	Is the machine kept in good order?	1							
		2							
7	Are all the things in the wardrobes on your place?	1							
		2							
	Total points	1							
		2							
	Maximum number of points								
	Signature of the person conducting the Audit	1							
		2							

1	Correct process
0,5	Minor deviations
0	Process invalid

Source: ZPS "Lubiana" S.A.

If a non-compliance is found, a corrective action sheet is completed (Tab. 9).

Table 9. 5S audit – non-compliance sheet

LUBIANA — 5S audit - non-compliance sheet — wistilean

Month:	
Department:	
Area:	
Person responsible for the area:	

No.	Non-compliance / remedial action	Person responsible for removing irregularities	Planned date for removing the irregularities	Status OK/NOK	Signature of the person responsible for the area

Source: ZPS "Lubiana" S.A.

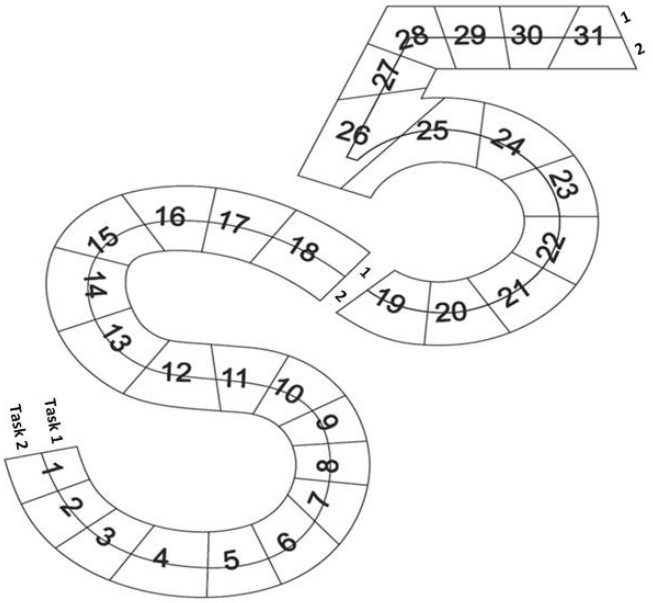
The monthly 5S sheet is also completed on the area board after each completed work shift (Tab. 10), in which the appropriate percentage is marked as effectiveness on a given day:

a) below 69% = red,
b) between 70–89% = yellow,
c) between 90–100% = green.

Table 10. 5S audit – monthly sheet

LUBIANA — **5S audit – monthly sheet** — wistilean

Month:	
Department:	
Area:	
Person responsible for the area:	



In the visualization, we mark the average daily effectiveness with an appropriate color:

90 – 100%	
70 – 89%	
≤ 69%	

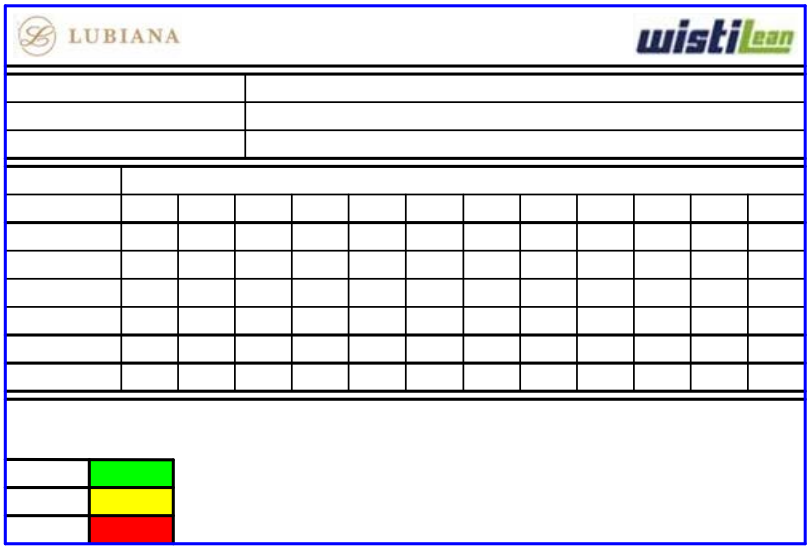
Source: ZPS "Lubiana" S.A.

In Table 11 we mark the average monthly effectiveness with an appropriate color calculated from the effectiveness in individual weeks.

To summarize the topic of keeping daily, monthly and annual records in accordance with the 5S principles, there are several important aspects and benefits resulting from this process [Blicharska and Szmaglik 2023]:

a) Awareness and Monitoring: Filling out worksheets is an effective strategy raising employees awareness of order and cleanliness workplace. Regular monitoring of the condition of work areas allows quick detection of potential problems and the taking of necessary corrective actions,
b) Culture of Continuous Improvement: Inclusion of daily, monthly and annual periods in the 5S process supports the development of a culture of continuous improvement. Regular analysis of the results and introduction of improvements allows the organization to become more flexible and ready to adapt to changes,
c) Employee Motivation: Monitoring progress and seeing positive results influence employee motivation. Progress documentation provides concrete evidence of achievements while providing an incentive to continue commitment.

Table 11. 5S audit – monthly sheet



Source: ZPS "Lubiana" S.A.

In order to improve the company in each area where the 5S methodology is implemented, internal 5S audits are carried out according to a detailed audit sheet.

3.8. Creation of an area board

After implementing the 5S tool in the Packaging Department for visualization and self-discipline, an area board was created (Fig. 8) that includes:

a) daily, monthly, and yearly sheets,
b) cleaning schedule,
c) standards,
d) visualization of the "before and after" area,
e) current information.

3.9. Photograph of the area after implementation

The final stage of implementing the 5S tool is a photograph of the area after implementation. This should encourage the following question:

Why set fixed shooting points?

The answer is simple:

a) to visualize employee achievements,
b) to always remember to act,
c) to never return to the state before the implementation of 5S.

Fig. 8. Example of an area board

Source: ZPS "Lubiana" S.A.

Fig. 9. Before and after the implementation of the 5S methodology

Source: ZPS "Lubiana" S.A.

Below are the effects (Fig. 9) of the activities of the entire 5S implementation team in the Packaging Department.

Among the most significant tangible benefits of implementing the 5S methodology in the Packaging Department are the reduction of delays and shortages, fewer mistakes and errors, and less time wasted on searching for items. Additionally, the implementation has led to improved quality, the reduction and elimination of unnecessary activities, increased workplace safety, and a decrease in equipment failures.

As for the intangible benefits, the implementation has resulted in better-organized and tidier workstations, as well as an overall improvement in workplace safety.

4. CONCLUSIONS

The work discusses in detail the course of introduction of the 5S method in the years 2018–2022 at ZSP "Lubiana" S.A, one of the important tools for implementing the rules Lean Management and which has led to improved production processes and organizational structures. Design work began with an analysis of the current state and the identification of areas for potential improvements. The main goal of the project was to adapt the lean management concept to the specificity of the company and develop an action plan aimed at the effective implementation of the tools.

In addition to the 5S method implemented at ZSP "Lubiana" S.A., other tools were implemented, such as Kai Zen [Blicharska et al. 2024], root cause analysis, standardization, value stream mapping [Blicharska et al. 2025] and the OEE indicator based on manual work.

The result of the activities was the achievement of specific benefits related to the elimination of waste, improved efficiency of the production processes and increased employee involvement. The work also took into account certain aspects related to monitoring and assessing the effectiveness of the implemented solutions, which is an important element for maintaining and further improving the Lean Management system.

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