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SECRETS OF SUCCESSFUL IMPLEMENTATION OF 5S

Oleksandr Lysenko, Dmytro Lebedev, Volodymyr Davydenko, Anatoliy Miroshnychenko. "Secrets of successful implementation of 5S". *The article is devoted to the analysis of the possibilities of implementing 5S at the organization. The component of the 5S system is considered. The article describes the theoretical and practical aspects of the transition to the 5S system. Classical approaches are highlighted, the main reasons that lead to the occurrence of resource losses are considered. An analysis of the basic tools and methods that can be applied during the implementation of the transition to the 5S system was carried out. The possibilities of obtaining benefits from the introduction of the 5S system are considered. Approaches to using the system of organization and rationalization of the 5S workplace in practice were proposed. Recommendations for further research are provided.*

Keywords*:* 5S system, phases of 5S application, sorting criteria, lean production, standardization.

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***Олександр Лисенко, Дмитро Лебедев, Володимир Давиденко, Анатолій Мірошниченко.* «*Секрети успішного впровадження 5S*».** *Стаття присвячена аналізу можливостей впровадження 5S на підприємстві. Розглядається складова системи 5S. У статті викладені теоретичні і практичні аспекти переходу на систему 5S. Висвітлено класичні підходи, розглянуто основні причини, які призводять до виникнення ресурсних втрат. Проведено аналіз базових інструментів та методів, які можуть бути застосовані при запровадженні при переході на систему 5S. Розглянуто можливості отримання переваг від запровадження системи 5S. Було запропоновано підходи до використання системи організації та раціоналізації робочого місця 5S на практиці. Надано рекомендаці подальших досліджень.*

Ключові слова: система 5S, фази застосування 5S, критерії сортування, ощадливе виробництво, стандартизація.

***Александр Лысенко, Дмитрий Лебедев, Владимир Давыденко, Анатолий Мирошниченко.* «*Секреты успешного внедрения 5S*».** *Статья посвящена анализу возможностей внедрения 5S на предприятии. Рассматривается составляющая системы 5S. В статье изложены теоретические и практические аспекты перехода на систему 5S. Отражены классические подходы, рассмотрены основные причины, приводящие к возникновению ресурсных потерь. Проведен анализ базовых инструментов и методов, которые могут применяться при внедрении при переходе на систему 5S. Рассмотрены возможности получения преимуществ от внедрения системы 5S. Были предложены подходы к использованию системы организации и рационализации рабочего места 5S на практике. Даны рекомендации дальнейших исследований.*

Ключевые слова: система 5S, фазы применения 5S, критерии сортировки, экономное производство, стандартизация.

Introduction. The term "5S" became popular in the 1980s in the Japanese manufacturing sector. At that time, the success of the Toyota Motor Corporation was reasonably associated with the Toyota Production System (TPS) - a production quality management system. One of the components of TPS was the regulated way of organizing the workplace - "5S". Currently, 5S is widely used all over the world [1-3], and is a recognized method that promotes productivity and occupational safety. What is its essence, practical benefit, as well as the difficulty of applying it in practice? In this article we will answer these questions.

Being, it would seem, a set of simple and obvious rules, 5S is designed to shape a certain culture. This is more than instructions, it is part of the ideology of caring for yourself and your work environment.

1. Sorting. Freeing the workspace from unnecessary items. In a standard scenario, all workplace items are divided into several groups, depending on the frequency of their use:

- unnecessary;
- sometimes necessary;
- needed often.

Based on the analysis, a decision is made to store the object (tool) at the workplace. At the same stage, a "Temporary warehouse" is created, on the territory of which items awaiting a decision on their further use or disposal are collected.

2. Observance of order. In the 5S workplace organization and rationalization system, this principle means the rational placement of objects within the working area (see Figure 2). It is important to ensure safe and convenient access to work items and objects. A lot of attention is paid to visualization: storage areas are signed, highlighted with color or light, etc.

3. Keep the workplace clean. Complete cleanliness of production and office premises, maintenance of equipment and tools in working order. It is important to ensure

regular inspection of workers to maintain order and the presence of malfunctions.

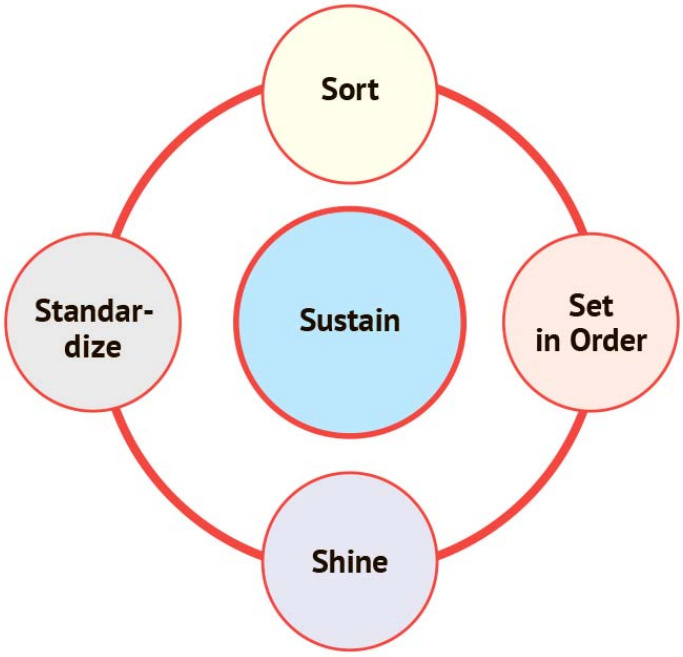

Figure 1 – What is the 5S system

4. Standardization. Regulation of gains of previous principles. It is necessary to form a package of documents, for example:

– information stands (Figure 2);

– schemes indicating the location of objects in the working area;

– signs indicating dangerous zones, zones of temporary warehouses and defective products;

– orders, check sheets of auditors;

– other warnings and important instructions;

– short instructions and reminders.

Figure 2 – An example of an information board

5. Improve. Support and improvement of the implementation of the established procedures of the first four points. The most important part of the 5S workplace

organization methodology. Usually, company employees are able to make a one-time heroic effort and implement complex processes. But the inevitable mistakes of the first application and the power of formed habits quickly return the processes to their original position.

This principle is designed to turn successful 5S solutions into a culture [4,5]. For this, it is necessary to continue to monitor the implementation of the provisions of the adopted regulations, to create conditions for proposals and their timely analysis, to be ready to admit one's mistakes and change.

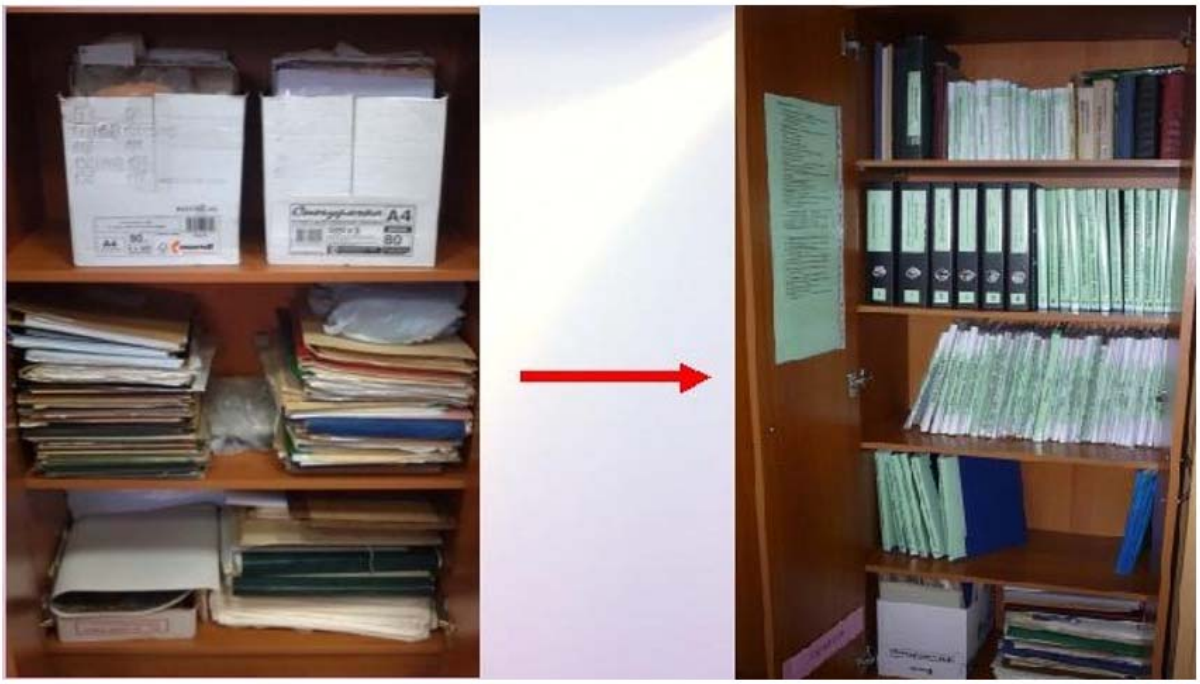

Figure 3 – Organization of work space in the office. Before and after 5S

The purpose and tasks of the research. The purpose of this article is to consider approaches to the introduction and management of the 5S system as a component of effective management of the company's activities.

Main material and results. The implementation of 5S principles in the company takes place in several stages, the structure and names of which are left to the discretion of the company. A good generalization of the possible options will be a presentation in the form of a standard P-D-C-A cycle (Plan/Prepare – Do – Check – Act, see Fig. 4) [6,7].

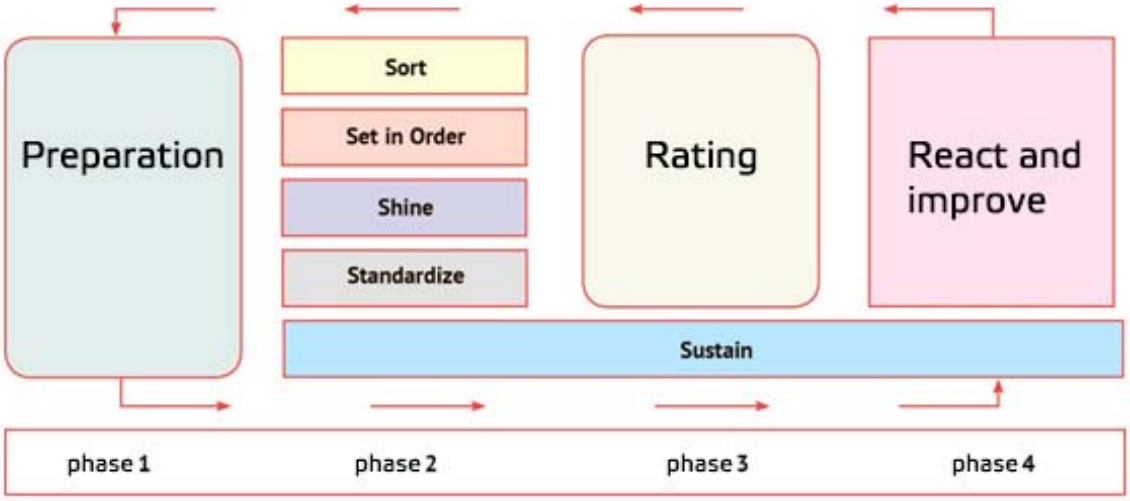

Figure 4 – Phases of 5S application

The result of the standardization should be a package of documents regulating the previous phases of 5S, a system of visual control and informing employees.

Phase 1. Preparation. Performs the following tasks:

1. A decision is made to implement 5S.
2. The project leader is determined.
3. A project team is formed.
4. Target areas of changes are determined.
5. A training plan is created and implemented.
6. The current condition is diagnosed, photo reports are created.
7. Target indicators are determined.
8. The staff is informed about the planned changes.

Each step is important. Emphasis should be placed on explaining how 5S can contribute to increased safety, prevention of workplace accidents, reduced costs, easier work, etc. The engine of change will be the top management of the company, so the project leader needs to build effective communications first of all with them.

Phase 2. Implementation. Detailed planning and implementation of 5S principles.

2.1. Sorting: sorting criteria are determined, temporary warehouses are organized for conditionally redundant items, sorting is performed, disposal of unnecessary items is organized (see table 2).

Table 4 – An example of sorting criteria

Decision	Frequency of use of the item	Criterion
Unnecessary	Hasn't been used in the last year	Temporary composition for further decisions
	Not used in workflow	Temporary composition for further decisions
Not subject to repair	Remove	
Rarely needed	It was used no more than 3 times in the last six months	Keep within the working area at a medium distance

	It is used no more than 2 times a year	Keep within the work area at a remote distance
Necessary often	Used weekly	Keep within the working area at a close or medium distance
	Used daily	Keep within the working area at a close distance
	Used every hour	Keep in close proximity or carry with you

2.2. Keeping order. The total inventory continues with the accompanying placement of things in certain positions. Examples of new rules can be as follows:

– marking tools, equipment and materials in any visible way, for example, using a color code *(For example, to place a sample to compare partially similar parts. The parts that are taken out or put in the box must be compared with the sample.*

Such parts should be kept at a considerable distance. If similar parts cannot be separated, inform the operator in advance about the location of similar materials, he should compare them with samples or photos);

– storage of objects near the place of their use in accordance with the sequence of the production process;

– similar objects (tools) are kept together;

– the stock of each type of required items is determined;

– it is forbidden to store objects in bulk, in deep containers;

– free access to frequently used items is provided;

– tool boards are used;

– placement of objects must be safe.

Items and their labeling should be prepared for employees who use them on a regular basis. Convenient access to the item and marking should be arranged for any employee who has the appropriate right to use the item (tool).

The result of the standardization should be a package of documents regulating the previous phases of 5S, a system of visual control tools and informing employees.

2.3. Keeping it clean. This point can play a key role in production sites with high requirements for cleanliness. For example, microbiological production is particularly sensitive to contamination by foreign microorganisms, including COVID-19. The degree of regulation and control is determined by the specificity of the technological process. Several common steps can be identified:

1. Assignments for waste collection and disposal are delegated. Cleanliness is the responsibility of each employee and workplaces are divided into different zones according to the degree of cleanliness requirements.

2. A schedule for equipment cleaning and diagnostics is formed.

3. Objects of cleaning and checking for functionality are detailed.

4. The methods, tools and materials used in cleaning and checking the equipment are determined.

5. Cleaning is practiced every day, but if possible it does not take much time.

The combination of cleaning functions and diagnostics of defects and breakdowns leads to a more comfortable and safe environment, creates better conditions for visits by third-party visitors (for example, customers).

2.4. Standardization. Not a big deal for companies. Decades of bureaucratization of processes have formed a high level of competence in regulating the actions of

employees. But often the meaning of the standardization stage, which consists in continuous improvement of the process, is lost behind the thick volumes of provisions and regulations. At this stage, the following are documented or improved:

– job duties to ensure cleanliness and safety of working with equipment;

– instructions for working with the equipment, operating rules;

– maintenance and diagnostics schedules;

– means of visual control;

– work area audit procedures.

The result of the standardization should be a package of documents regulating the previous phases of 5S, a system of visual control tools and informing employees.

Phase 3 and 4. Evaluation and improvement. The purpose of these phases is to transform the decisions made into a way of thinking, into a culture of lean attitude towards the production process, employees, materials and equipment. It is necessary to find a balance between discipline and the employees' own participation in the perception of new values.

3.1. Rating. The audit of the implementation of the adopted decisions is a mandatory part of the 5S project. An example is a check sheet that can be used at this stage.

3.2. React and improve. If the process does not work, then do not rush to look for reasons in the employees. Often there are objective reasons about which employees for various reasons cannot inform the management. It is important to stimulate employees to generate new ideas, but not to the detriment of the main duties. And here it is important not to leave initiatives unanswered.

When we talk about 5S, we are talking about a change in thinking. As a result, the reasons for unsuccessful implementation are often subjective. And it is primarily about the management of the company.

The use of the 5S workplace organization and rationalization system in practice has its own features and approaches.

5S is a soft transition to lean production. Ideally, lean production goals are achieved through training and team participation, but in practice control, orders, and the imposition of minor fines often prove effective. Why does this happen?

The fact is that when we talk about 5S, we are talking about a change in thinking. As a result, the reasons for the unsuccessful implementation of the new are subjective reasons. And it is primarily about the management of the company.

The use of 5S with the subsequent transition to the stages of applying lean production reveals most of the "diseases" common to one degree or another, but in all enterprises.

Let's formulate the most frequent limitations that we have to face in practice [8-10]:

– Lack of support from the first person of the company or its reluctance to participate in the project. Such an important issue should not be left to chance or the level of a formal approach.

– Inefficient combination of activities by managers. Executives who have income or interests "on the side" cannot devote adequate time to the company. Losses from hiring such workers do not necessarily exceed benefits, but are practically underestimated.

– "Management by phone". If you are building something new, prepare at least 70% of the time to be "in the field", in this case - on the production site.

– Misconception that culture is formed for subordinates, specialists, but not for management. Culture is formed for everyone in the company, team spirit is cultivated. The desire to draw an unnecessary line between top management and specialists can harm the project.

– Unpreparedness of the first person to make serious personnel decisions. In any enterprise there is a manager who passively or actively sabotages change. Sooner or later you have to get rid of such subordinates, but sometimes it happens in a timely manner.

– Unfair decision in favor of needy people. The decision is made not from the principle of "better for the company", but from the principle of "better for me". Whoever is more necessary is the right one. For example, a specialist in the occupational health and safety department at a furniture factory insisted on a significant reorganization of work and changing the positions of equipment, considering the current situation to be dangerous. However, the chief engineer flatly refused to make changes, citing disruption of production plans. The general director, understanding his dependence on the chief engineer, decided in favor of the current situation. As a result, there was an accident, as a result of which, thanks to a lucky chance, people were not injured, but the equipment was damaged. In the end, the occupational safety specialist's comments were taken into account, but the company suffered losses.

– Violation of discipline by the manager himself.

– Public replacement of the manager's decisions with another decision. If you do not like the decision of the subordinate manager, it is better to discuss with him personally. This is a problem of general management of the company, but it is often exacerbated during the implementation of 5S. For example, the chief engineer decided within his competence and 5S principles to replace obsolete equipment as unsafe. The CEO publicly overturned this decision, citing the budget, even though the cost of the equipment was small and the chief engineer was acting within his authority. As a result, the 5S implementation project was implemented without fully observing the principles of employee safety.

– Inability to delegate tasks. This is a general problem, but it is exacerbated during the implementation of the 5S project. The application of 5S affects all divisions of the company and is time-consuming. If you are unable to set priorities, the project risks being delayed, and may even cause absurd discussions. Using an example from real practice: at the working meetings of the 5S project, the general director paid priority attention to the rules for using the office kitchen and dining room. Instead of leaving the solution to the relevant services and focusing directly on the production site.

– Lack of resources to implement the 5S implementation project.

Reluctance of top management to change the rules and complete unpreparedness for risks. Working according to 5S standards always means additional costs and changes. In other words, it is an investment with its own risks. Rearrangement of equipment, loading of production personnel may seem too high risks and lead to abandonment of the project.

– Prejudice against certain employees, functions or departments. Let's give an example. In the mandatory inventory during the implementation of 5S, accounting employees participated, with whom the laboratory "did not develop relations". As a result of unnecessary clarification of relations, the decision regarding a simple task was delayed for a month.

– Misunderstanding of the principles of work of new methods by the first person and top management of the company.

– Non-fulfillment of promises and commitments by management.

– Open or covert sabotage of individual managers. In this case, the project manager implementing 5S is helped by working with one of the subordinates of such a manager "directly". At the same time, the order must fix responsibility on the manager himself to ensure his involvement. The general director requires a report not from a specialist, but from a sabotaging manager, without violating the principles of subordination.

– "Outsourcers in the state." It is about employees who are not focused on results. If there is a reason that will allow them to postpone the task, they will definitely use it. If possible, such employees will transfer the elimination of the causes to management, regardless of how serious the cause is. Because management is often overwhelmed,

solving an important issue is delayed, and the "outsourcer" gets a legitimate reason to do nothing.

Conclusions. 5S is a way of organizing the workspace, based on the principles of frugal treatment of employees, communications, equipment and materials. Implementation of 5S is a process of changing the mindset of all company employees. Most often, the success of the project depends on the availability of resources and the readiness of the company's management to change. Great attention should be paid to communicating with employees and monitoring the implementation of decisions.

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