

PROBLEMS OF IMPLEMENTATION 5S PRACTICES IN AN INDUSTRIAL COMPANY

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Abstract:

5S is a one of the tools of Lean Management enabling to organize workplace in an effective way. It could be implemented in all the spheres of the company. The article provides the theoretic description of Lean Management and 5S and also shows a case study based on gained experience. The author also describe the problems occurred during the implementation of the 5S.

Key words: 5S, Lean Management

INTRODUCTION

This article presents the problems that occur during the implementation of the 5S. At the beginning generally the concept of Lean and 5S tools has been described and then presents an analysis of the application in 5S in a manufacturing company in the assembly department and in the office.

LEAN MANAGEMENT

Currently, a large number of companies which want to provide high – quality products or services and to minimize the cost of implementing management systems introduce the tools of Lean Management [9].

Lean concept comes from Japan. It is based on practices used in the mass production of Henry Ford's cars and the experience of Toyota (Toyota Production System). Lean management is based on the elimination of all kinds waste. T. Ohno identified seven categories of losses: overproduction, waiting, unnecessary transport, excessive or incorrect processing, excess inventory, unnecessary motion and defects. Later, he added eighth loss, unused creativity of employees. He believed that the workers must be respected, take care of their continuous development and put up challenges. All the waste that do not contribute to the creation of value and are not necessary for the proper functioning of the process should be eliminated immediately [2, 5, 12].

Lean management is aimed at: the flattening of the organizational structure of the company, working in interdisciplinary groups, transferring decision – making powers to lower levels of the organization, a strong customer focused orientation, continuous improvement within Kaizen, seeking the causes of defects and elimination of the very beginning continuous flow materials, orientation of the production of small batch production, observation of activities in places of their origin (to derive information about the process “from below” – from employees), flexible division of labor, orientation actions of people [6].

The basic tools of Lean Management, which are used in practice are [4, 10]:

- 5S – five steps allowing to organize the workplaces.
- Value Stream Mapping – identification of activities that comprises the flow of material, information and money in the process.
- SMED (Single Minute Exchange of Dies) – optimization of machine changeover time.
- TPM (Total Productive Maintenance) – maintenance management and machinery.
- Kaizen – entering in all process of gradual and continuous improvements.
- Kanban – method of production control.
- Poka Yoke – eliminating the possibility of committing, omission error.

TOOL 5S

Tool 5S is the number of uncomplicated rules that allow you to organize the workplace in a clean, orderly, ergonomic and efficient. Implementation of the five levels can reduce the amount of waste and errors, and increase productivity, improve safety and quality of products or services. The 5S is the basis for implementation of other tools of Lean Management, which is why it must be done in a precise and pre – planned way [1, 7, 8, 13].

5S took its name from the five Japanese words, which are characterized by different levels of the organization workplaces [3, 11]:

- 1 S – Seiri – Selection
- 2 S – Seiton – Systematic
- 3 S – Seiso – Clean up
- 4 S – Seiketsu – Standardization
- 5 S – Shitsuke – Self – improvement

CASE STUDY 5S

The 5S was applied in an enterprise of a production both in the assembly department, and in the office.

First the project manager was established and a group of people who was responsible for coordinating the

implementation of all five steps and was responsible for the maintenance of the 5S. The team consisted of people involved in the work and were responsible for improving the current status quo. One person was from the outside of the company and expressed its "fresh" opinions and asking questions about things seemingly irrelevant to the employees of the assembly, and incomprehensible to outsiders. The team also joined a person in a management position who had formal authority. So the group had to complete the first task – to plan the project. The ambition of the project was to determine the work breakdown structure, Gantt chart was prepared (a graphical representation of the sequence and duration of the activities in a given time), material resources, financial and human resources were assigned to the actions and an analysis of the potential risks that may arise in the project was carried.

Then the staff made aware of what is 5S system, how, when and why it is carried out, and what are the benefits. The training was conducted during the inventory, especially not to stop the installation process. At first multimedia presentation was presented with theoretical along with various examples of the application of 5S and conducted practical exercises showing the concept of the system. It was based on an early drawing a set number of pieces on the board with marker by two volunteers. Wherein the container contained 10 pens, including 9 broken markers. The task was divided into three stages. In the first, the container with all markers were placed at the end of the hall, in the second stage the broken markers leaving the pack with proper pen in the same place and in a third container was moved close to the table. In every stage of execution time stopwatch measured drawings. This exercise was to show how much time is wasted searching for the right things, which are often located in remote locations. At the end of the training, knowledge test was carried out between 5S and discussion with staff on the use of the system in the assembly department. To further motivate employees, head assembly declared that the action of 5S will also be performed in the office.

After the course of the assembling department staff began to implement the first step 5S, selection. The rule,

which was directed to leave "only what is needed, only as much as necessary and only when necessary". The key word was "delete". To facilitate the selection of subjects to unnecessary and necessary so – called red cards were used (Fig. 1).

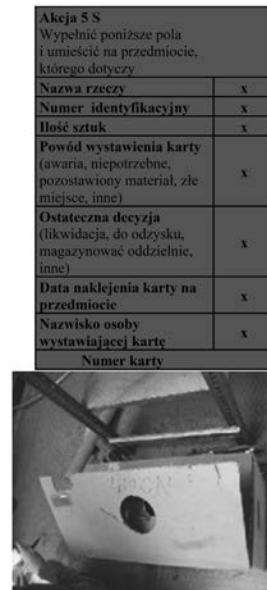


Fig. 1 Model of a red card and an example of its application

Each employee received a card to glue to the unwanted or damaged items. He also had to fill in each of its fields: the name of the objects, its identification number if any, number of pieces, the reason for marking the objects, date and enter his name. All marked objects gathered in one place, so as not to miss any of them. Appointed team made the decision what to do with them, or to remove, or move to another department, or maybe fix it. After conducting the first step the report of "red cards" was prepared and a comprehensive plan for the implementation of 5S (Fig. 2), which identifies the subject of improvement, the department and the person who has to deal with, the time and the statutes of the action. After eliminating all unnecessary items a significant part of the surface of the hall was recovered and has improved the flexibility of the workplace.

Akcja 5S odbyła się w dniu 18.09.2012

Zbiorczy plan poprawy 5S			Aktualizacja: 20.09.2012		
Nr	Przedmiot poprawy / działanie	Dział	Kto	Do kiedy	Priorytet / Status
1.	Wyznaczenie pola odkładczego na wodę mineralną	Dział Montażu	Kowalski	1.10.2012	○
2.	Wykonanie obrysów narzędzi na tablicy narzędziowej	Dział Montażu	Kowalski	1.10.2012	○
3.	Remont podłogi	Dział Montażu	Nowak	31.01.2013	○
4.	Odświeżenie ścian oraz sufitu	Dział Montażu	Nowak	31.01.2013	○
5.	Uporządkowanie kabli oraz przewodów	Dział Montażu	Rak	31.01.2013	○
6.	Zakup mat gumowych na półki	Dział Montażu	Kowalski	1.11.2012	○
7.	Zakup tablicy służącej do identyfikacji pomieszczenia	Dział Montażu	Nowak	1.11.2012	◐

Legenda:

- Nierozpoczęte prace nad przedmiotem poprawy
- ◐ Rozpoczęte prace nad przedmiotem poprawy
- ◑ Zakończone prace nad przedmiotem poprawy

Fig. 2 Comprehensive plan for the implementation of 5S




Karta utrzymania czystości na Dziale Montażu			
MIEJSCE	CZYNNOŚĆ	ODPOWIEDZIALNY	CZĘSTOTLIWOŚĆ
	Wycieranie blatów i półek stołu monterskiego na sucho	Monter/ Pakowacz	Codziennie (na koniec zmiany)
	Wycieranie blatów, półek, szafek stołu monterskiego oraz stojaków na mokro	Monter/ Pakowacz	Raz w tygodniu (w piątek na koniec II zmiany)
	Wyczyszczenie gumy z blatu stołu monterskiego	Monter/ Pakowacz	Raz w miesiącu (w ostatni piątek na koniec II zmiany)
	Zamiatanie stanowiska pracy	Monter/ Pakowacz	Codziennie (na koniec zmiany)

Fig. 3 Model of card keep workplaces clean

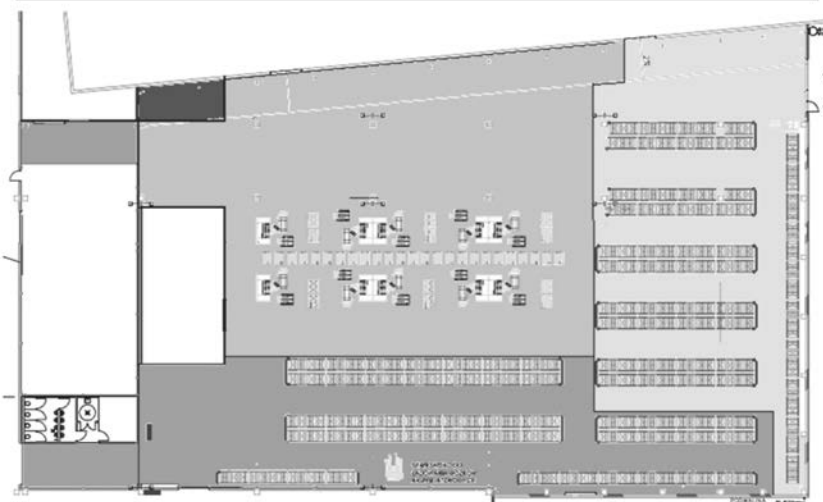
The second level, concerned cleaning the assembling tables, shelves, racks, desks, containers, tools, equipment and machines. Also the forklifts had to be cleaned that have not been washed since purchase, on average four years. In this step, cleaning card was designed (Fig. 3) indicating the place, the action that has performed, the frequency and the person responsible for the task.

Additionally the check list was created to verify on a regular basis and performed chores around with the map of liability assembly section (Fig. 4). Accurate cleaning up of workplaces and checking the status of plant and machinery breakdowns allowed to see the breakdowns and damages that were not visible before.

Dział Montażu - Check lista (kontrola czystości)				
TYDZIEŃ: 39		MIESIĄC: Wrzesień		ROK: 2012
Dzień	Uwagi**	Podpis Z. Nowak*	Podpis M. Rak*	Podpis A. Kowalski*
		13.00 - 14.00	15.00 - 16.00	
Poniedziałek				
Wtorek				
Środa				
Czwartek				
Piątek				

** - lub zastępujący brygadystów w czasie nieobecności *** - wpisać ok, jeśli nie ma uwag

Data aktualizacji: 20.09.2012



- Osoba odpowiedzialna:
Kierownik Działu Montażu
- Osoba odpowiedzialna:
Specjalista ds. Planowania
- Osoba odpowiedzialna:
Brygadzysta 1
- Osoba odpowiedzialna:
Brygadzysta 2

Fig. 4 Check list and map of responsibility

Zawartość szafki nr 3:



Zapasy minimalny:
 Klucze pneumatyczne – 2 szt.
 Nasadki na klucze – 3 szt.

Zapasy minimalny:
 Środki do konserwacji – 1 szt.
 Nasadki na klucze – 3 szt.

Zapasy minimalny:
 Rękawice ochronne – 3 szt.
 Maski ochronne – 3 szt.

Data aktualizacji: 20.09.2012



Fig. 5 Examples of systematic, from the left: description of the contents of racks, tool panel, clean tool panel

Systematic was to designate a place for each thing. These had to be laid in accordance with the frequency of use and according to criteria such as safety, quality and ergonomics. Then they were marked and described according to the location. In particular they drew attention to the assembling tables, racks and shelves. These were the places from which assemblers often uses. Also determined the minimum and the maximum number of raw materials, semi – finished products, tools and office supplies. As part of this step was organized corners called “clean tool panel”, indicated with a belt road handling and intermediate storage areas, which were later painted appropriate colors by an external company and bulletin boards were ordered with descriptions of intermediates that are in the hall. Taking these action (Fig. 5) allowed to save time and it improve safety. The editing process was so improved by proper organization of workplaces, eliminated unnecessary movement of workers and reduced fatigue.

It is worth noting that cleaning and systematic in the company were carried out in a reverse order. This is due to the fact that the assembly department was in very poor condition in terms of cleanliness and it was not possible in

the first place setting and describing the location of things without preparation.

In the fourth step, standardization has developed new rules for the operation of assembly department. Defined standards for assembly and packaging process were presented at the boards near assembling table in order to provide rapid access to them, which would result in a smaller number of errors made when fitting the data components. The brief instruction and AQC cards (Fig. 6) have been created for different equipment using drawings.

The final stage of the 5S is self – improvement. To maintain and develop the system different actions have been taken to ensure continuous improvement. First of all further training for staff has been planed so that they can develop their knowledge of the tools of Lean Management. Also a audit card was created with questions for each level S and audits (Fig. 7) were planned for the whole year. Also so – called improvement cards were designed to improve the reporting of problems and improvements suggested by employees. To encourage employees to participate in improving the stock 5S, director of the Enterprises agreed to establish a system of remuneration for the best ideas.

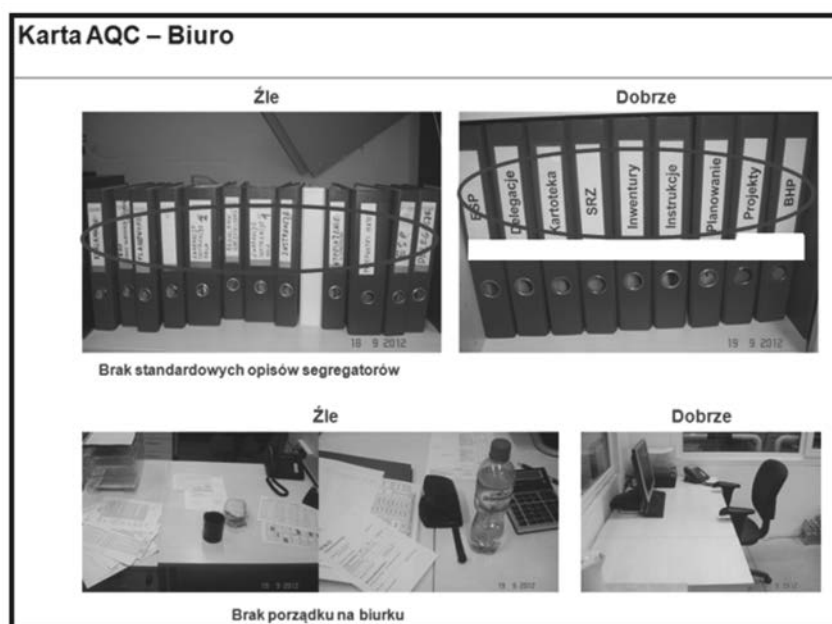


Fig. 6 AQC Card

Audit 5S&TPM - Karta auditu			
Auditowany obszar:		Data:	Auditor:
Skala ocen: 0-brak, 1-częściowo wdrożone/przestrzegane, 2- w pełni wdrożone/przestrzegane			
Lp.	Kryterium oceny	Ocena	Uwagi
SELEKCJA			
1	Potrzebne materiały i narzędzia są zidentyfikowane?		
2	Nie ma żadnych niezidentyfikowanych/zbędnych narzędzi, materiałów?		
3	Nie ma żadnych nieużywanych/zbędnych urządzeń, mebli, regałów?		
4	Na stanowisku pracy nie ma żadnych niepotrzebnych lub przedawnionych infor		
SYSTEMATYKA			
5	Wszystkie pola odkładcze są oznaczone i przestrzegane?		
6	Wszystkie szafy, regały, pojemniki są oznaczone?		
7	Wszystkie narzędzia, przyrządy pomiarowe są oznaczone?		
8	Wszystkie maszyny oznaczone i przypisana im odpowiedzialność?		
SPRZĄTANIE			
9	Maszyny i przedmioty pracy wolne od zanieczyszczeń?		
10	Otoczenie stanowiska pracy wolne od zanieczyszczeń (ściany, podłogi, parapet		
11	Czy są stosowane standardy utrzymania czystości (pracownicy, f.sprzątająca)?		
12	Czy istnieje segregacja odpadów, wyznaczono miejsca do segregacji są przest		
13	Instalacje elektryczne, spr.pow., hydrauliczne itp.(czyste i sprawne)?		
STANDARYZACJA			
14	Czy na oznaczonych miejscach znajdują się rzeczy, które powinny się tam znajd		
15	Czy istnieją i standardy czystości na stanowisku pracy i są przestrzegane ?		
16	Czy check listy(czystość) są prawidłowo i na bieżąco wypełniane?		
17	Czy istnieją standardy/ formularze do raportowania produkcji i czy są stosowa		
18	Czy istnieją standardy TPM i check listy są prawidłowo i na bieżąc wypełniane?		
SAMODOSKONALENIE			
19	Czy samocena została przeprowadzona a sugestie poauditowe zrealizowane		
20	Czy pracownicy biorą czynny udział w aktualizacji / rozwijaniu standardów?		
INNE			
21	Czy pracownicy używają odzieży ochronnej wymaganej na danym stanowisku?		
22	Czy standardy BHP są przestrzegane?		
23	Czy standardy PooZ są przestrzegane?		
24	Informacje na tablicach są jasne i czytelne?		
25	Czy pracownicy mają dostęp do KPI działowych i/lub KPI wszystkich pracowników?		
Suma		0	0%

Fig. 7 Audit Card

After carrying the 5S actions all the documents have been posted on a special table created for 5S system. So the staff could currently be informed about the improvement action, analyze departmental KPI (Key Performance Indicators), to sign a check list and recall the first steps of implementation, because their work is documented with photographs.

PROBLEMS OCCURRED DURING THE IMPLEMENTATION OF 5S

Among the many barriers two significant ones were identified. You have to pay special attention to them, because they interfere with the process of implementation, which may lead to abnormal functioning of the system. The

first problem is the resistance of employees towards making changes, and second the lack of involvement of top management in the concept of 5S. Examining the reasons for the identified problems charts cause – effect relationships Ishikawa were used.

In Figure 8 identifies four group of causes of worker resistance organization of work, man, the flow of information and training on 5S. In each set specific reasons for the problem were given. Poor organization of work of the project 5S often results in defective, unfair division of labor for employees, which may result in such excess of task. The cause may also be a lack of management support, lack of coordinators 5S, lack of the system of control of the work or the lack of cooperation between employees.

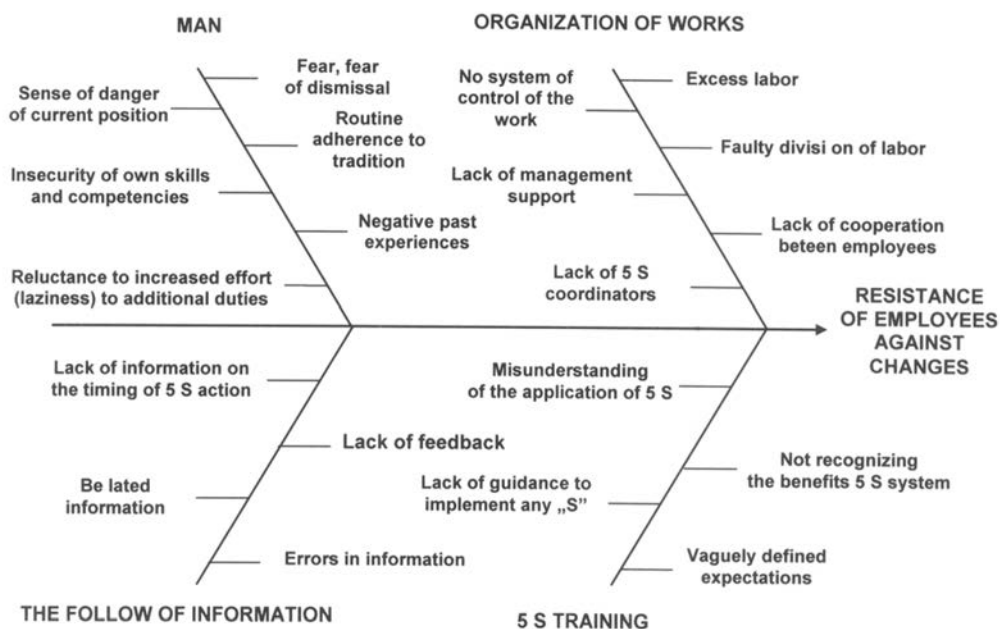


Fig. 8 Ishikawa chart analysis of the causes of resistance of employees against changes

Very important are the behaviors and feeling of people: fear and anxiety of being fired, a sense of danger of current position or own skills and competencies. Changes usually raise a variety of concerns and introduce uncertainty and ambiguity in place of what is well known. The causes of resistance is also a reluctance to additional responsibilities, adherence to tradition and the negative previous experiences.

Another group indicated the reasons is the flow of information. The fluctuation of communication must be kept, as any delays, errors in the information, or lack of response or lack of scheduling system 5S cause concern in employees. They do not know when or what to expect. The preferred solution is to put the most important information on the bulletin board.

The main problem that occurs in enterprises is the lack of training for employees to carry out before the 5S action or to carry it out in a way incomprehensible to others. This has a very negative effect on employees, because the purpose of the system 5S is not explain, the benefits also what are from the implementation and the expectations after the introduction of the concept. The current rhythm is often disturbed, and false rumors are increasingly being spread.

The effects of resistance of employees can be expressed in different ways, e.g. by denying, negating the need for change through prevention or through lack of interest in the topic. In extreme cases, it may occur in a worker depression. This happens when there are circumstances of pressure.

The second Ishikawa graph (Fig. 9) is the lack of involvement of top management in the implementation of the system 5S. Identified three main reasons for this phenomenon: management, man and 5S training.

In fact, the rational decision to work on implementation of 5S should result from the belief of management that the system will bring the particular results for the company. For

the concept to work properly it is therefore necessary management commitment. Unfortunately, it often is not. This is due to because improper management as excessive delegation of powers to lower levels of the organization, improper disposal of your time and inadequate planning and organizing work. It may be that manager is not able to focus on the priorities and deals with things less important for the company. In addition, the lack of cooperation with blue – collar workers and the lack of agreement among members of the board is conducive to non – interference in the implementation of changes.

Often managers do not have the abilities to handle different functions. It manifests itself in a lack of ability to effectively induce and maintain the involvement of employees, lack of awareness as to the decisive influence on their activity, lack of motivation for the implementation of the plane with subordinates, lack of knowledge on costs and risks of the project and the negative previous experiences.

Managers as well as lower – level employees should receive training in the 5S. Of course, these courses are different, but on the same issue, the system 5S. If supervisors do not possess knowledge about the system, the implementation schedule of 5S, do not understand the purpose of the system or not to notice the benefits, the entire project will fail. Managers should therefore in a special way to prepare for the implementation of the concept 5S.

For leaders and managers responsibility is to set a good example, so you should think about the positive aspects of a system of 5S across the enterprise. Increasingly popular is the Lean Office, it means less bureaucracy. The use of this concept allows the elimination of waste in the office, better organization of the workplace and improve the quality of the work. Workers who can see the involvement “at the top” are sure to be more motivated to make changes in their areas.

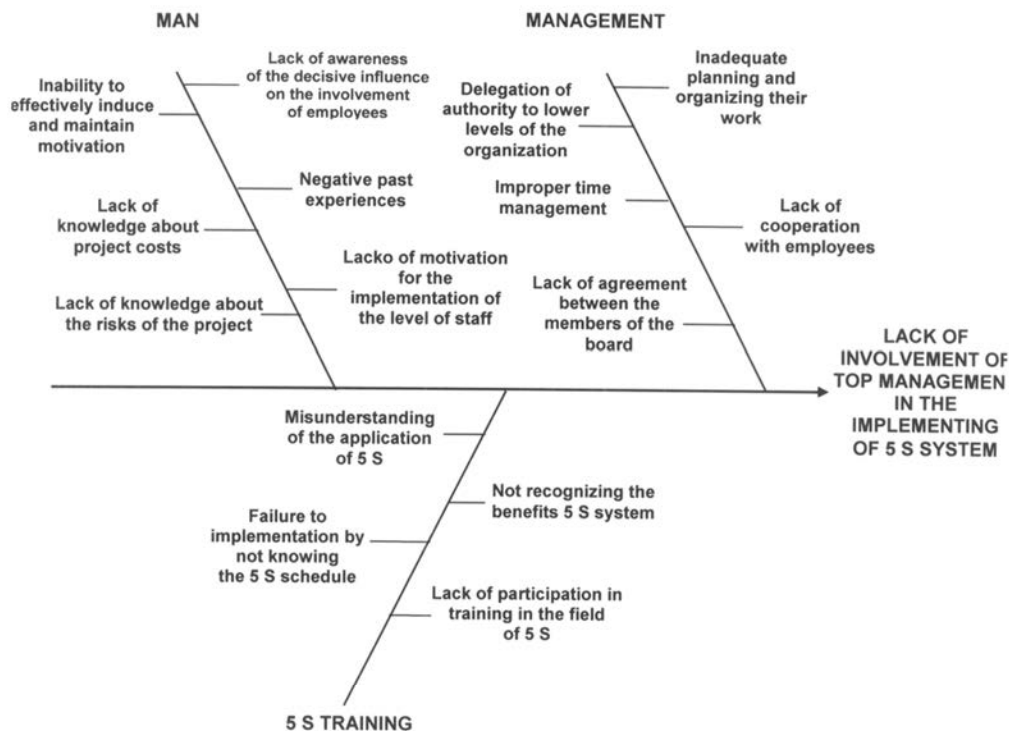


Fig. 9 Ishikawa chart analysis of the causes of the lack of involvement of top management in the implementing of 5S system

CONCLUSION

Proper implementation of 5S guarantees the real benefits that result in the increase of productivity and efficiency of the work, as well as improve the quality and safety requirements.

Keep in mind that success depend mainly on the aware participation in the 5S concept of the whole team, both employees and managers. That is what a man is called – driving force in carrying out the changes.

In order to maintain the level of earned 5S it should be a process of continuous improvement. Every employee should “take care” of the system by following the set standards, the development of improvements to the work report noted problems errors, and by actively engaging in training. While managers are required to prepare and implement a schedule of repeated internal and external audits.

Takashi Osada believed that if the organization manages to implement and maintain the system 5S, it is capable of dealing with other practices. However, a company that is unable to enter the home rules 5S, you will know how to perform other tasks that are required from a competing company.

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