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“DISEÑO E IMPLEMENTACIÓN DE LA METODOLOGÍA 9’S PARA LA
OPTIMIZACIÓN DE SERVICIOS EN EL TALLER MECÁNICO
AUTOMOTRIZ EA MOTORS”.

Autora: Jesenia Pineda

Director: Ing. Rodrigo Matute

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**" DESIGN AND IMPLEMENTATION OF 9'S METHODOLOGY IN
OPTIMIZATION SERVICES TALLER MECÁNICO AUTOMOTRIZ
EA MOTORS".**

Author– Jesenia PINEDA **Coauthor** – Rodrigo MATUTE

*Engineering Faculty of Applied Science, Universidad Técnica del Norte, Av. 17 de Julio 5-21 Ibarra City,
Imbabura, Province*

Author: jesse_andi@hotmail.com

Summary

The methodology of the 9'S initially was raised with the formation of the 5'S, developed by the Japanese firm Toyota in the sixties, trying to get work spaces and warehouses to be fitted with an organization and cleaning that make the work more efficient. (Judith, 2010)

4 "s" which was later added to achieve greater effectiveness in personal, thus the phases are complete, the 9 "s" are evoked to understand, implement and maintain a system of order and cleanliness in the company, remuneration have to apply a continuous improvement, better conditions of quality, safety and environment of the entire company. (Judith, 2010)

With the implementation of the 9 "s" can be obtained the following results:

- Increased customer satisfaction and / or workers
- Fewer accidents
- Less loss of time to find tools or papers
- Higher quality of the product or service offered
- Reduction of waste generated.

- Increased customer satisfaction. (Judith, 2010)

Resumen

La metodología de las 9'S inicialmente fue planteada con la conformación de las 5'S, desarrollado por la firma japonesa Toyota en los años sesenta, pretendiendo conseguir que los espacios de trabajo y almacenes estuvieran dotados de una organización y limpieza que hicieran más eficiente el trabajo. (Judith, 2010)

Las 4 "s" que se agregaron posteriormente fue para lograr una mejor efectividad en el personal, de esta forma las fases quedan completas, las 9 "s" están evocadas a entender, implantar y mantener un sistema de orden y limpieza en la empresa, al aplicarlas tenemos retribuciones como una mejora continua, unas mejores condiciones de calidad, seguridad y medio ambiente de toda la empresa. (Judith, 2010)

Con la implementación de las 9 "s" se pueden obtener los siguientes resultados:

- Una mayor satisfacción de los clientes y/o trabajadores

- Menos accidentes
- Menos pérdidas de tiempo para buscar herramientas o papeles
- Una mayor calidad del producto o servicio ofrecido
- Disminución de los desperdicios generados.
- Una mayor satisfacción de nuestros clientes. (Judith, 2010)

Keywords

Quality, Methodology , classify, sort , clean , personal, discipline, perseverance , commitment , coordination, standardization.

1. Introduction

Ensuring the quality of service is the basis for continuous improvement in a company, the 9'S methodology, named nine Japanese words beginning with s: Seiri, Seiton, Seiso, Seiketsu, ShitsukeShikari, Shitsukoku, Seishoo and Seido. The meaning of these words is: Classification, Order, Cleanliness, Visual Control, Discipline and Habit, Perseverance, Commitment, Coordination and Standardization. In recent years, it has become a boom in business because its implementation involves cost savings and resources, the reduction of accidents, increased staff motivation, quality and productivity, generating an increase in their income, reduction in waste of time and the development of teamwork to reach a common goal which is the Customer Satisfaction

Automotive Mechanical Workshop "AD MOTORS" is located microenterprise

Roque Street Enrique Egas and Valdospinos Cdla. Rumiñahui city of Otavalo Imbabura Province.

The development of this work is done in order to optimize their services through the implementation of the methodology 9'S achieving a better work environment and providing quality service.

2. Materials and methods

Population and Sample

Automotive Mechanic Workshop " AD MOTORS " consists of a total of 5 people ; Two mechanical technicians , 2 mechanical assistants and a secretary , for this investigation the entire population was used.

Through an initial assessment and analysis of the initial situation, holds determine the problems facing using quality tools such as: Pareto diagram and Bar Graph .

All this is given by gathering information : direct observation , interviews, check list , take time and photographs .

The development of each of the different S ' through training, sensitization and awareness of employees working in the workshop. With the implementation of the methodology major changes in the field of work environment that helps employees to work efficiently to provide quality service they are achieved.

2.1. Initial diagnosis of Methodology 9's in the machine shop Automotive "AD MOTORS".

Through a tour of the Automotive Workshop EA MOTORS we could demonstrate the problems that keeps this workshop, the lack of order and cleanliness of each of the activities being performed therein. Disorder in the workplace, office and warehouse tools; all this leads us to the same point which is the loss of time to find the tools and perform assigned tasks, the bad impression you can give customers for cleaning the workplace, debris scattered everywhere; to frame all this was taken as reference the methodology of quality 9S, which will help us to provide a good working environment and a good quality of service.

So we can verify the elements of order and cleanliness of the workshop and achieve focus on different objectives for each of the service areas of the garage, and thereby ensure that our study has a correct application in relation to the 9S methodology .

Evaluation Area 1 (office, warehouse and dressing tools) .

Checklist on a total of 36 items was set to establish a baseline of the Methodology 9 S in the Automotive Workshop MOTORS EA with a maximum rating of 180, the score in Area 1 shown in Table 1

Table 1: Scores of 9S initial assessment of the methodology applied in Area 1 Taller Automotriz "EA MOTORS"

9S	VALORACIÓN	MÁXIMO	%
CLASIFICACION	6	20	30
ORDEN	4	20	20
LIMPIEZA	6	20	30
BIENESTAR PERSONAL	9	20	45
DISCIPLINA Y HABITO	6	20	30
CONSTANCIA	6	20	30
COMPROMISO	7	20	35
COORDINACION	8	20	40
ESTANDARIZACION	8	20	40
TOTAL	60	180	33

As we can see in Area 1 that comprise (office, warehouse and dressing) get a 33 % compliance level of 9S . We can also analyze what concerns the fourth S we have a 45 % compliance, we will work with the other S , especially the second S that is order, and we got a 20% compliance with this power ensure the service provided at the workshop .

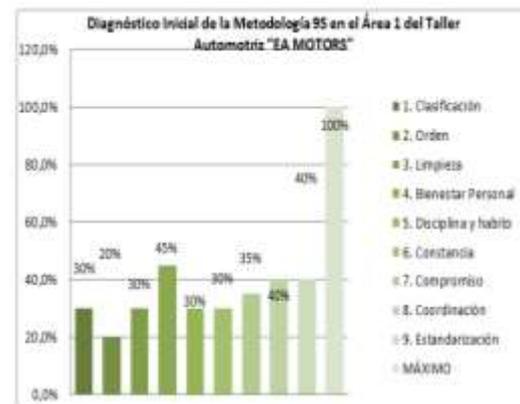


Figure 1: Bar chart - Initial Diagnosis Methodology 9S in Area 1 Taller Automotriz "EA MOTORS"

EVALUATION AREA2 (AREA Repair 1 Repair Area 2 Area Repair 3 Storage (Oils ,Garbage, Scrap Area .)

The score in Area 2 is shown in Table 2

Table 2: Scores of 9S initial assessment methodology applied in Area 2 Taller Automotriz “EA MOTORS”

9S	PONDERACIÓN	MÁXIMO	%
CLASIFICACIÓN	5	20	25
ORDEN	4	20	20
LIMPIEZA	5	20	25
BIENESTAR PERSONAL	7	20	35
DISCIPLINA Y HÁBITO	6	20	30
CONSTANCIA	5	20	25
COMPROMISO	7	20	35
COORDINACIÓN	6	20	30
ESTANDARIZACIÓN	6	20	30
TOTAL	51	180	28

In Area 1 that comprise (repair Area 1 Area Repair 2 Repair Area 3 Storage Area) get a 28 % compliance level 9 's. The area will get more attention by 9S to improve methodology. As above area have much in mind to try to improve in regard to the second S is order and that leads to the third S is cleaning these points have the following percentages of 20 % and 25 % , these meet the minimum conditions that should have a company in relation to the quality of the service .

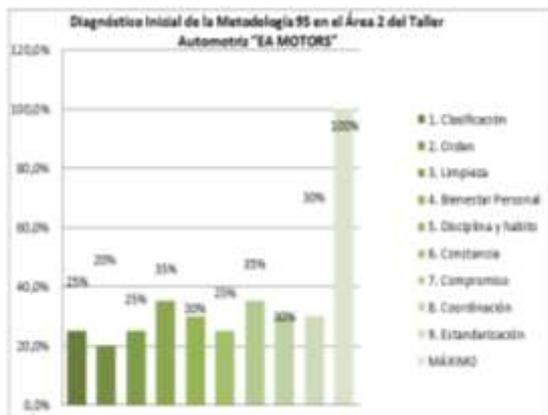


Figure 2: Bar chart - Initial Diagnosis Methodology 9S in Area 2 Taller Automotriz “EA MOTORS”

3. Results

After completing the implementation stage of the 9's verification is performed again to measure the results of the application of the methodology within the workshop through the evaluation form used for initial analysis of it.

The current level of compliance in this area and of 94.44 % , which shows that

increasing the initial workshop compliance percentage 33.33% 61.11 % considering a significant improvement in the tabulated data on the implementation of the 9's methodology , making a deeper analysis we can say that most application points that housekeeping did an excellent job with the elimination of unnecessary items , this gives us a better picture of the workshop.

Table 3: Area evaluation scores : 1 (Office , warehouse and dressing tools) after implementation 9's

CATEGORIA	VALORACIÓN		MÁXIMO	PORCENTAJE	
	INICIAL	ACTUAL		INICIAL	ACTUAL
CLASIFICAR	6	19	20	30	95
ORDENAR	4	19	20	20	95
LIMPIAR	5	20	20	30	100
BIENESTAR PERSONAL	9	19	20	45	95
DISCIPLINA Y HÁBITO	6	18	20	30	90
CONSTANCIA	6	20	20	30	100
COMPROMISO	7	18	20	35	90
COORDINACIÓN	8	18	20	40	90
ESTANDARIZACIÓN	8	19	20	40	95
TOTAL	60	170	180	33	94

The current level of compliance in this area and of 89.44 % , which shows that increasing the initial workshop compliance percentage 28.33% 61.11 % considering a significant improvement in the tabulated data on the implementation of the 9's methodology

Table 4: Evaluation Scoring Area 2: Area Repair 1 Repair Area 2 Area 3 and repair Waste storage after implementation 9's

CATEGORIA	VALORACIÓN		MÁXIMO	PORCENTAJE	
	INICIAL	ACTUAL		INICIAL	ACTUAL
CLASIFICAR	5	17	20	25	85
ORDENAR	4	17	20	20	85
LIMPIAR	5	18	20	25	90
BIENESTAR PERSONAL	7	18	20	35	90
DISCIPLINA Y HÁBITO	6	20	20	30	100
CONSTANCIA	5	18	20	25	90
COMPROMISO	7	17	20	35	85
COORDINACIÓN	6	16	20	30	80
ESTANDARIZACIÓN	6	20	20	30	100
TOTAL	51	161	180	28	89

After application of the first 5 S service automotive maintenance they were seen rapid and effective results , because the service improved his time moving the toolbox near the jobs , so we avoid a waste of time move to hold and search tools .

Table 5: Comparison Chart measurement and evaluation of results in maintenance services .

Nº	DESCRIPCIÓN	TIEMPO UTILIZANDO EN LOS SERVICIOS DE MANTENIMIENTO DE MOTORES		
		INICIAL	ACTUAL	REDUCCIÓN
1	Cambio de Correas de Distribución	99,37	58,53	40,84
2	Cambio de pastillas de freno	66,45	40,45	26
3	Cambio de aceite y filtro de motor	61,11	43,11	18
4	Arrajo bomba de frenos	88,36	69,36	19
5	Cambio de disco a las ruedas	56,94	39,94	17
6	Cambio de termostato	44,55	26,55	18
7	Lavado de inyectores	63,81	47,81	16
8	Calibrar válvulas manuales	48,9	28,9	20
9	Cambio de sello de válvulas	73,75	55,75	18
10	Cambio de trompo de temperatura	53,48	21,48	12
11	Cambio de bujías del motor	32,72	21,72	11
TOTAL		669,44	453,6	215,84

With the change of location of the tool shelf was removed time activities addressed to winery and return to the workplace, time is also decreased in search of tools because the tools are in place to view employee and no longer in disarray.

3. Conclusions

- With the design and implementation of the methodology 9`S in Automotive Mechanical Workshop "AD MOTORS" was obtained obvious results in improving quality of service vehicle maintenance. The current level of compliance in this area is 89.44%, which shows that the workshop increased the initial percentage compliance 28.33% 61.11% considering a significant improvement in the tabulated data on the implementation of the methodology, plus a makeover in infrastructure getting a pleasant working environment and well-marked according the provisions of the NTE INEN-2013 ISO 3864-1 standard; based habits of discipline and perseverance and commitment to work in compliance with the 9`S.

- Training for workers, company staff on issues caution and safety standards was conducted to create awareness among the workers in their thinking when working and the use of appropriate personal protective equipment PPE, leading a habit of compliance with certain rules.

- The time is reduced 669,44min search tool at baseline to 453,6min in the current situation 215,84min giving a reduction in maintenance services by housekeeping, with this employee streamlines its activities that is classified tools.

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6. Sobre el Autor

Jesenia PINEDA, Born in the city of Mira April 04, 1990, currently he lives in Ibarra (Barrio Moras de Chorlavi 13-12 San Antonio de Ibarra), graduated from the Universidad Técnica del Norte

