

RCM APLICADO AL PROCESO DE LUBRICACION

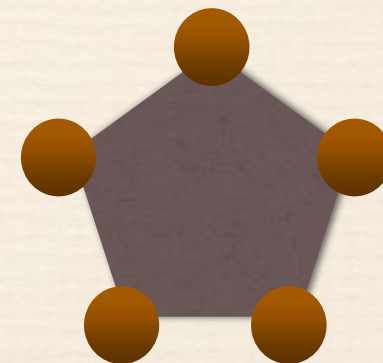


Luis Urrutia - CLS, OMA-1 STLE



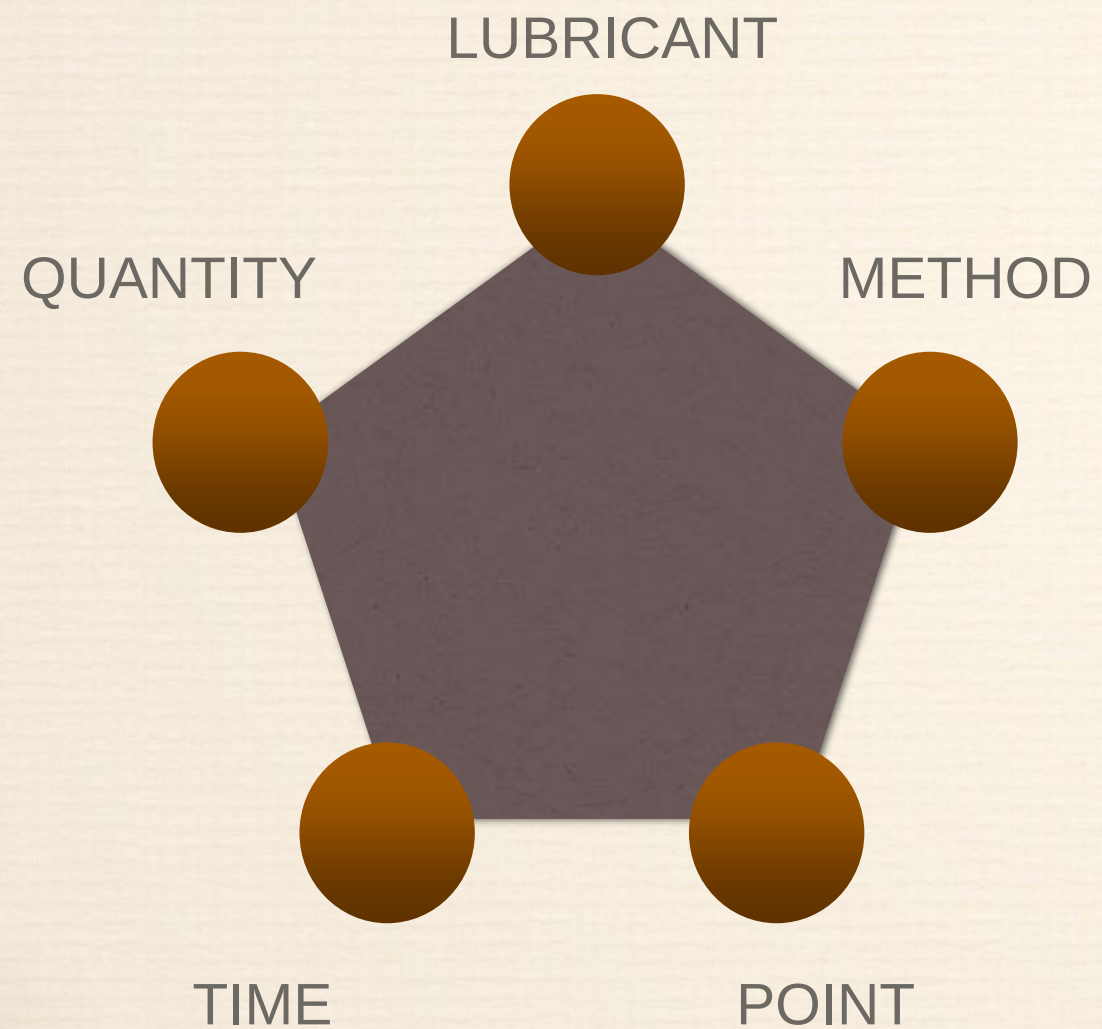
RCM Aplicado al proceso de Lbricación

- ❖ Mantenimiento Centrado en la Confiabilidad (RCM):
 - ❖ Máquina: Analisis de riesgo de falla. —> Solucion Proactiva
 - ❖ Categorías de riesgo RCM: bajo, medio y alto.
 - ❖ Analisis de Criticized —> Alto Enfoque
 - ❖ Realizacion de FMEA/RCA —> detectar y prevenir
 - ❖ Rediseño de la Maquina y el sistema (Las 5 Rd's)





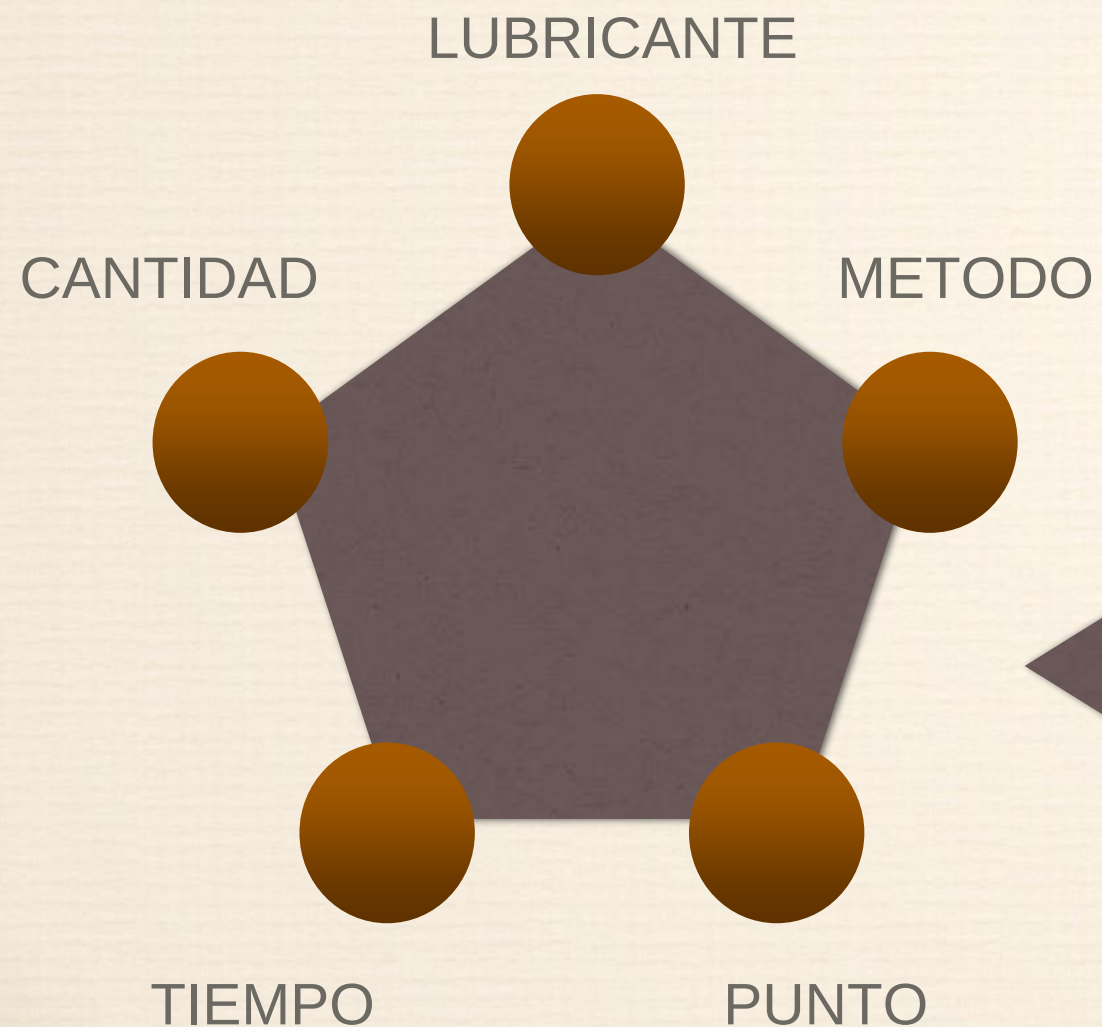
5 R'S TRADICIONALES



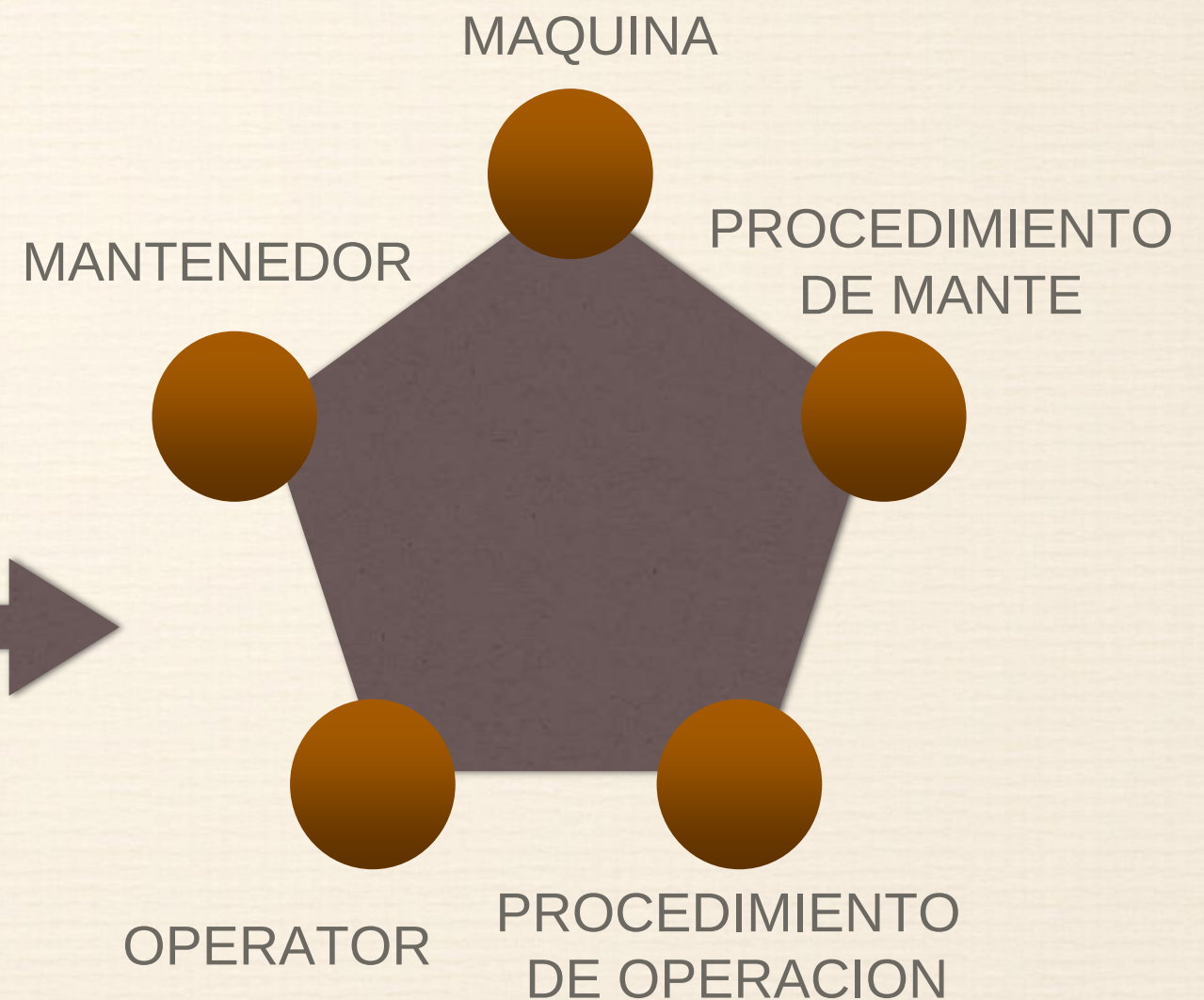


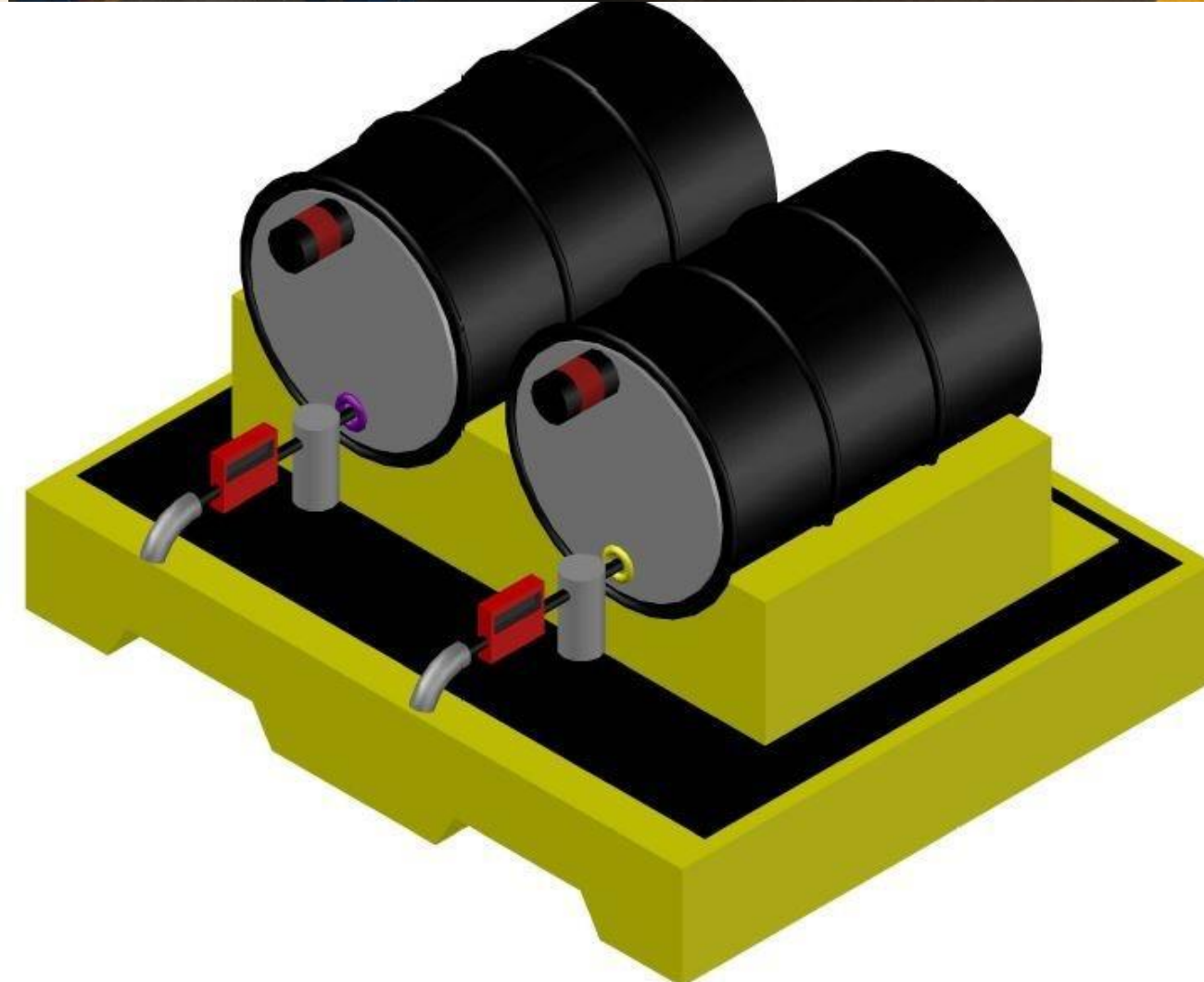
5 R's & 5Rd's

5 R'S TRADICIONALES



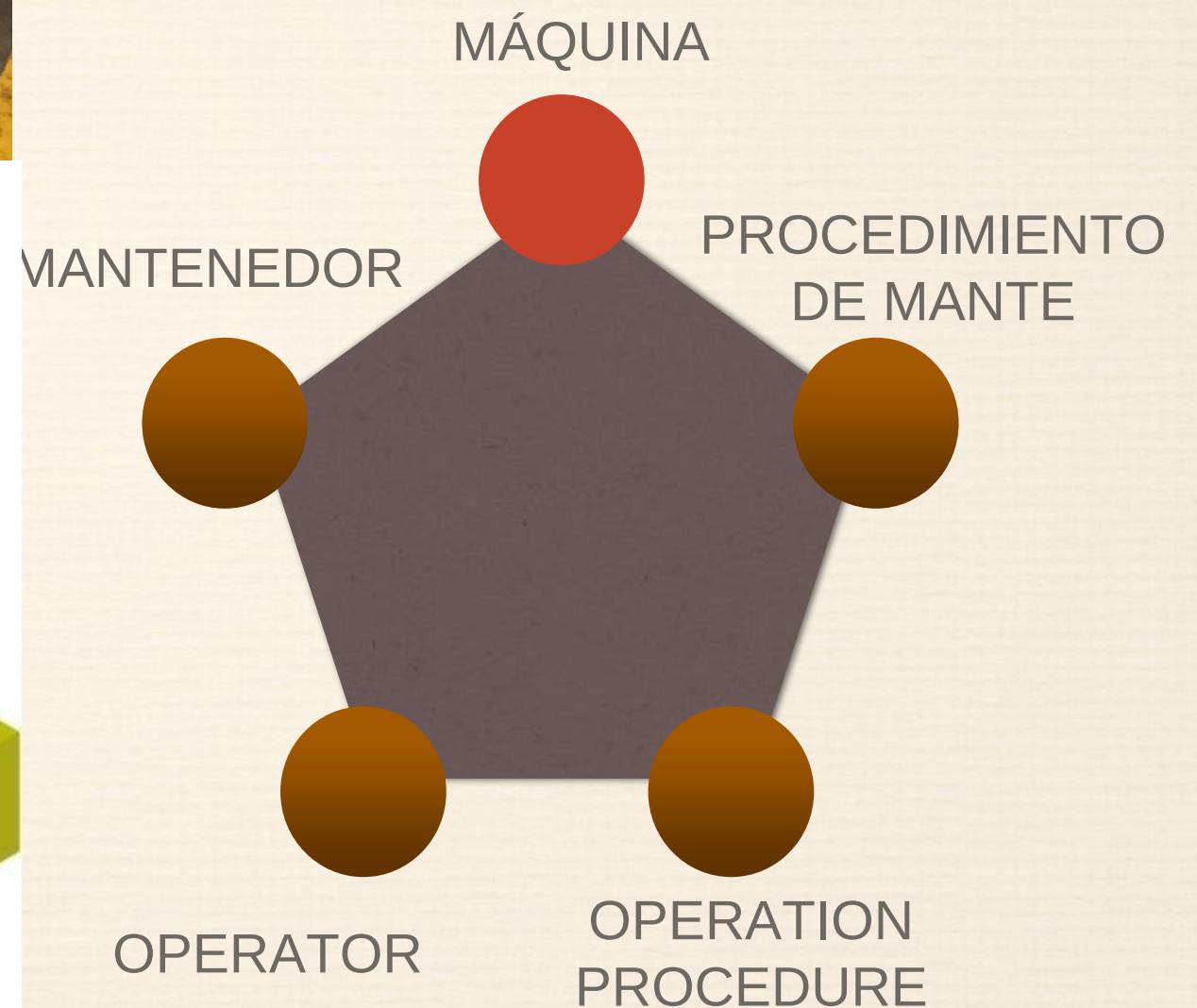
RCM 5 Rd'S





Máquina Rd

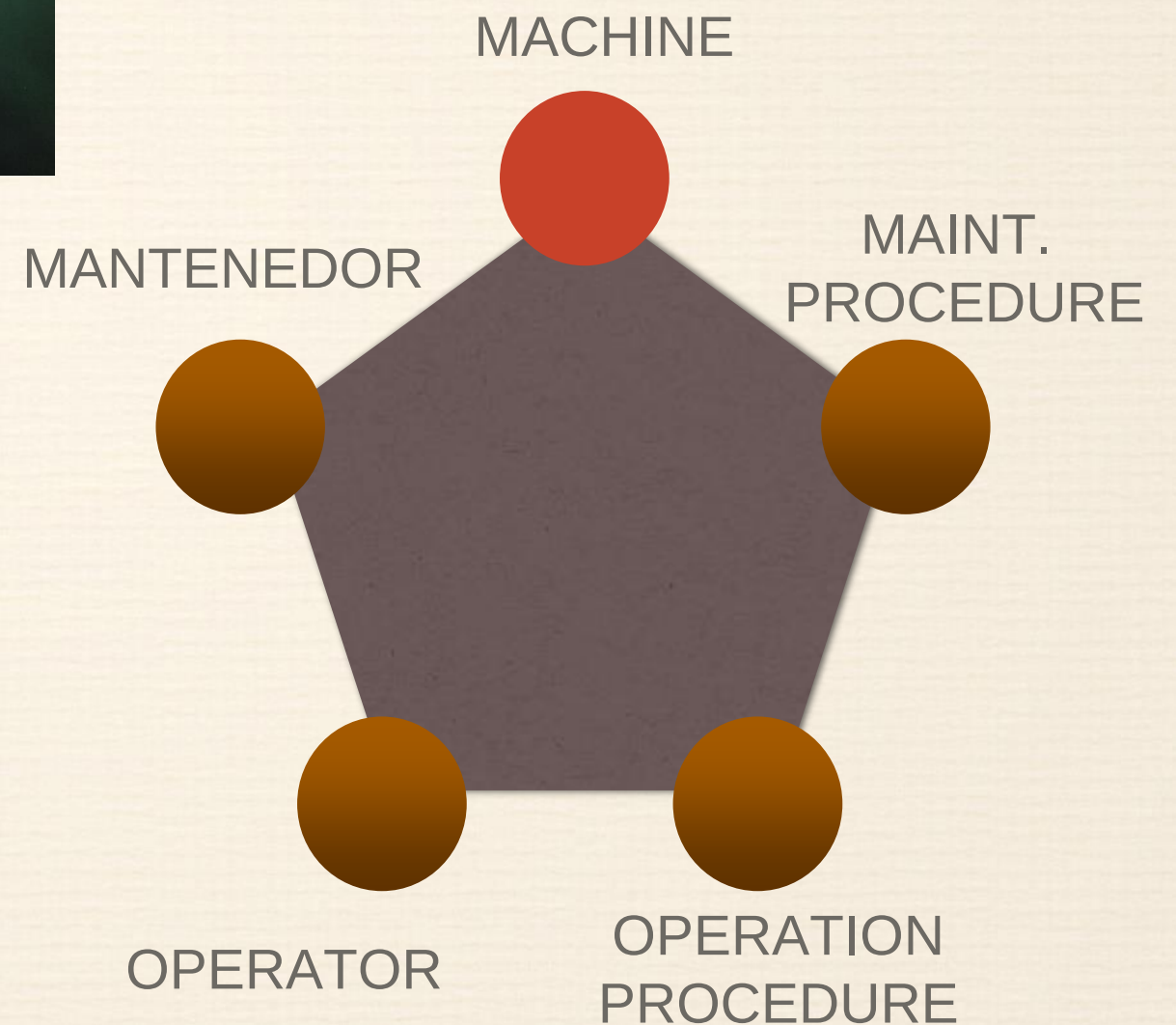
RCM 5 Rd'S





Máquina Rd

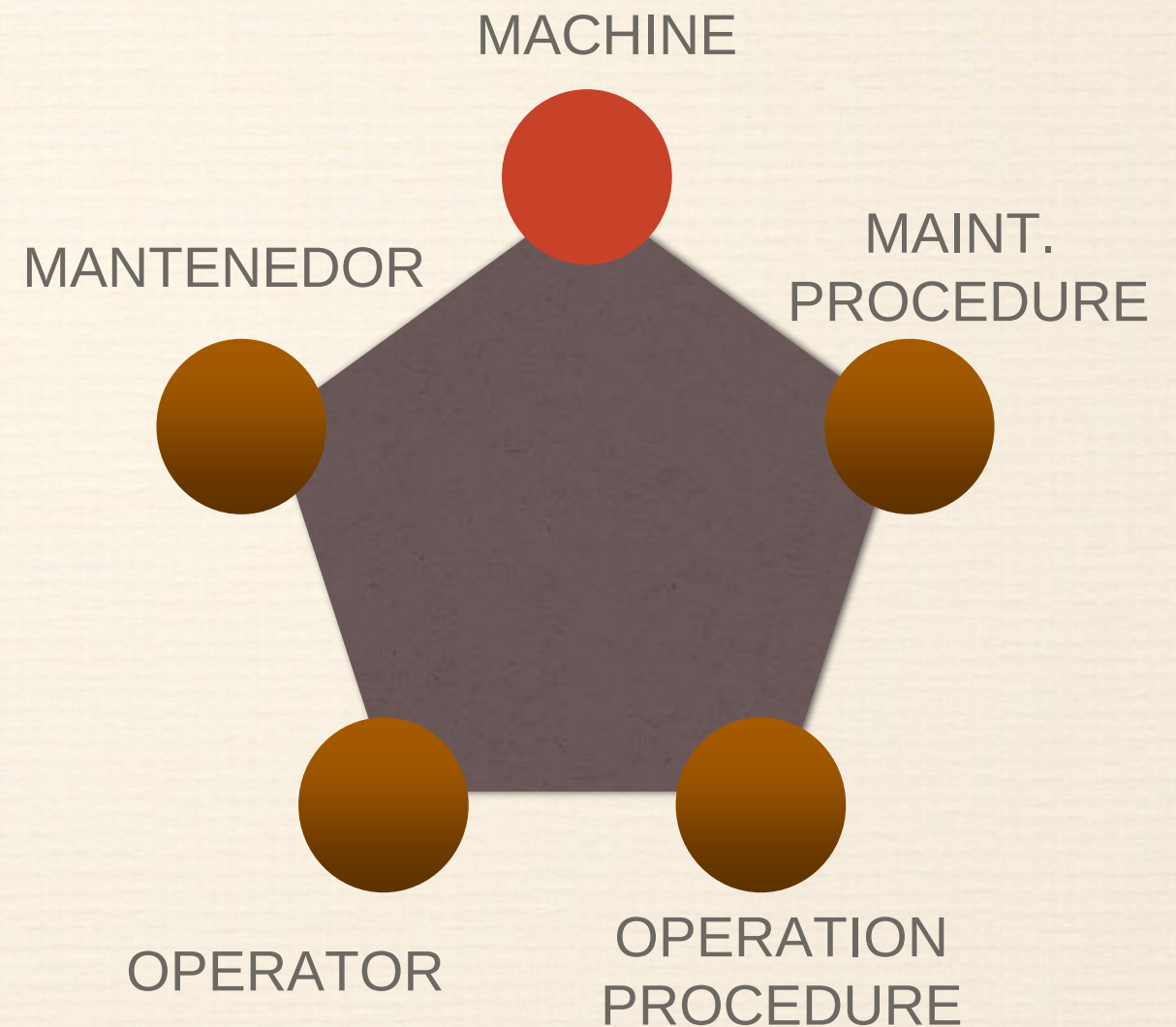
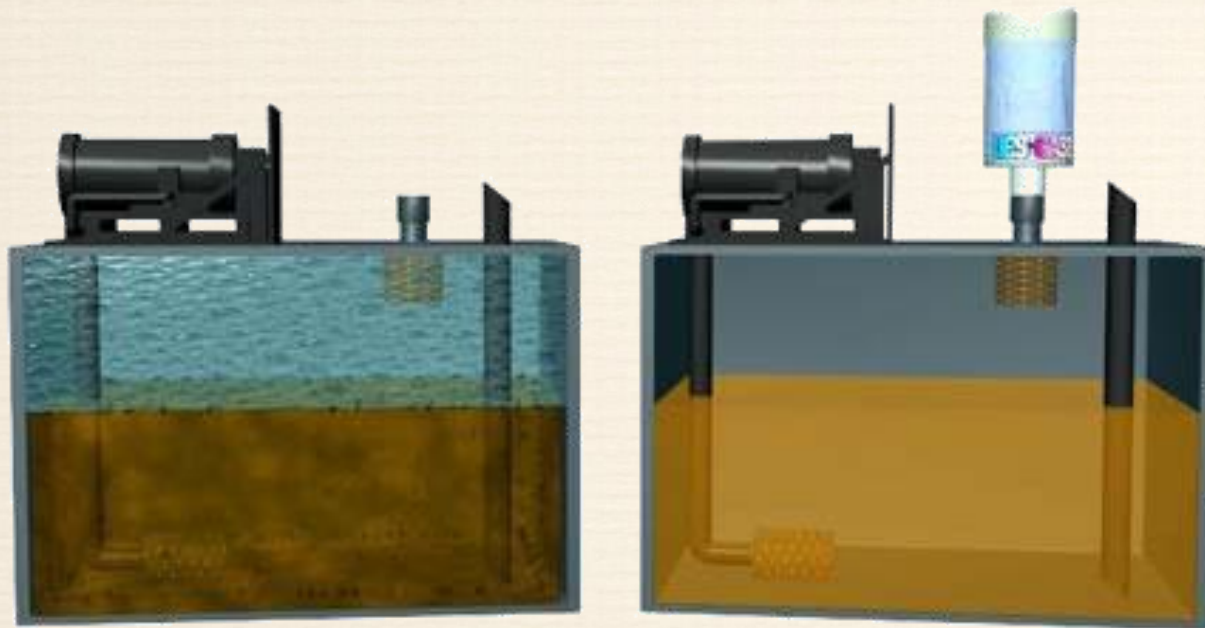
RCM 5 Rd'S





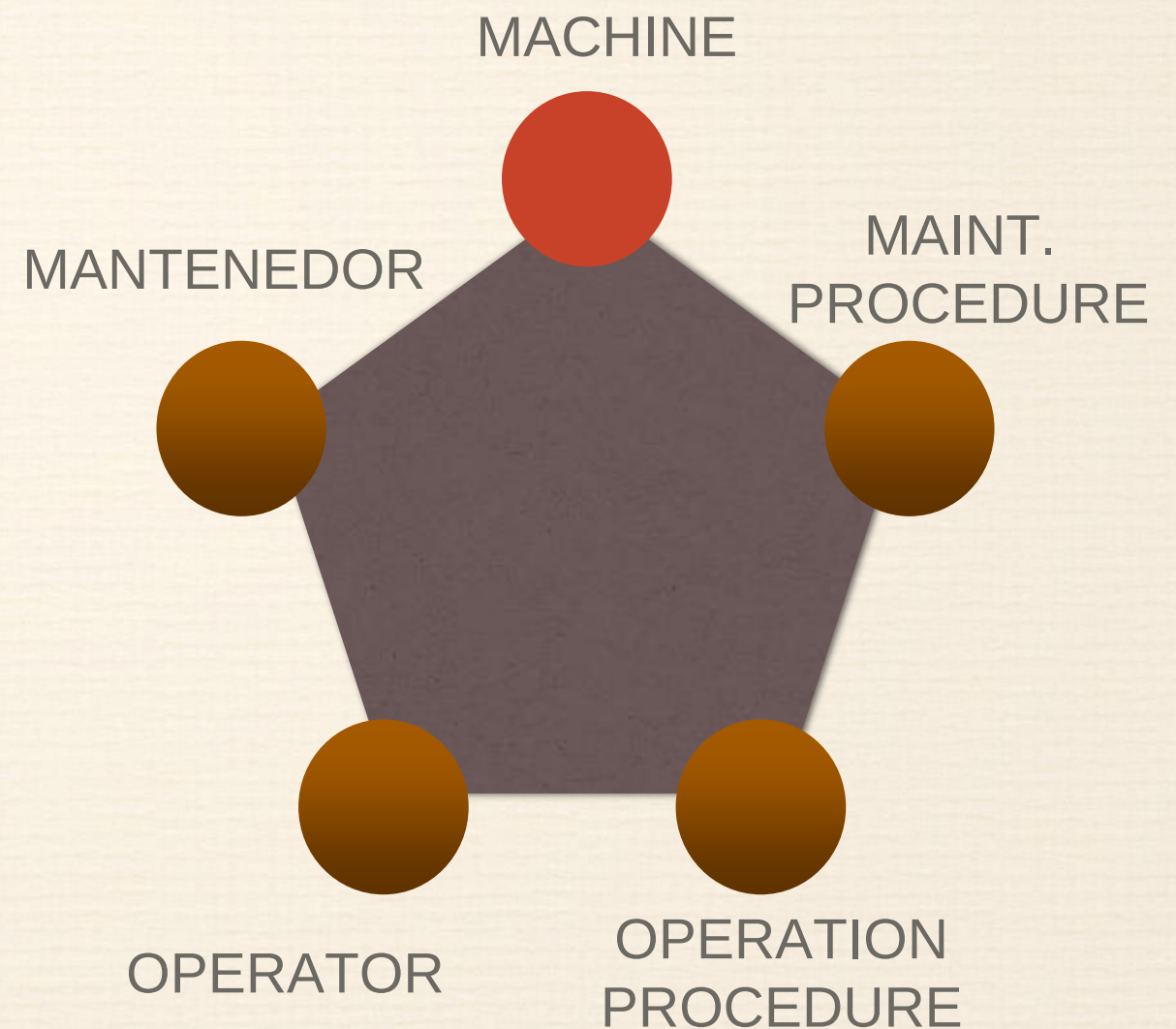
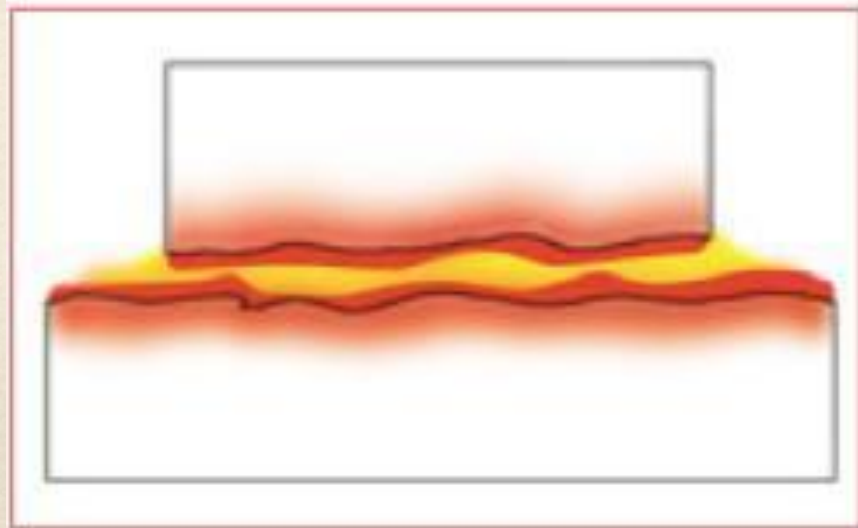
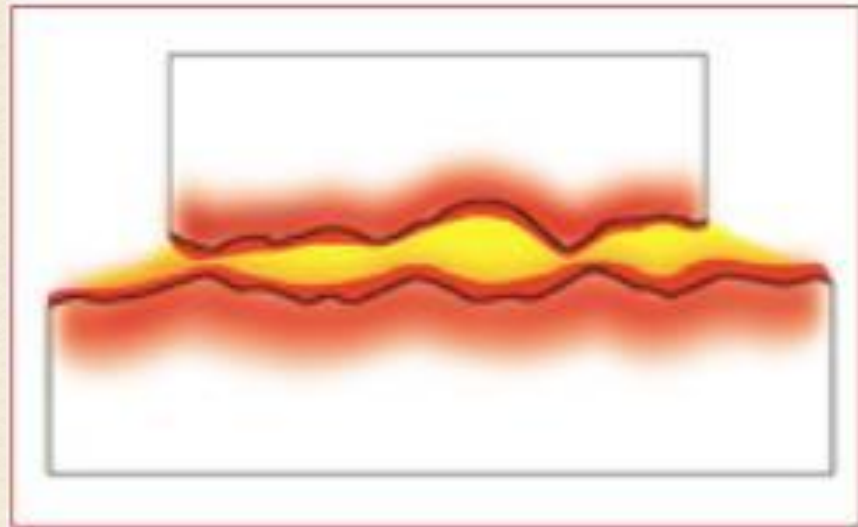
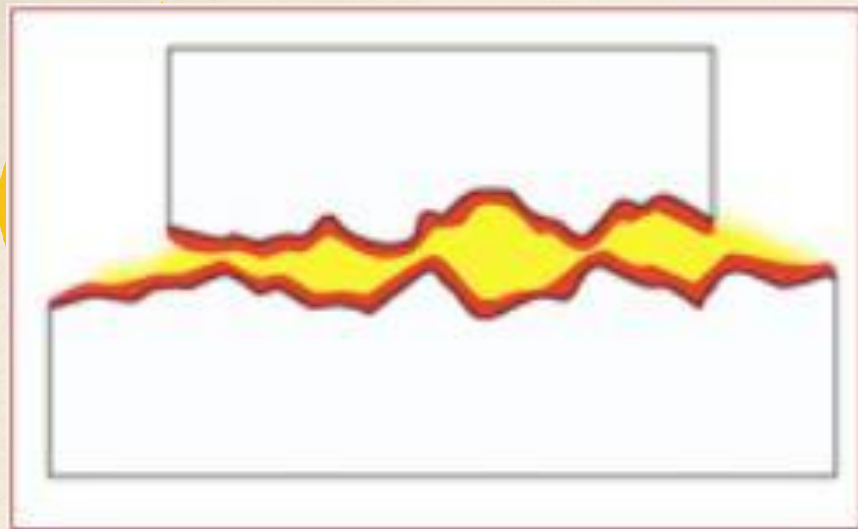
Rediseño Máquina

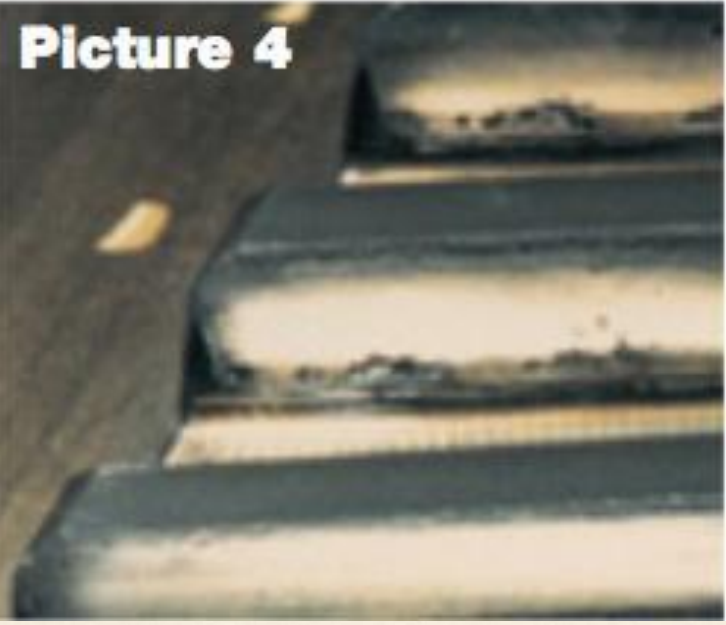
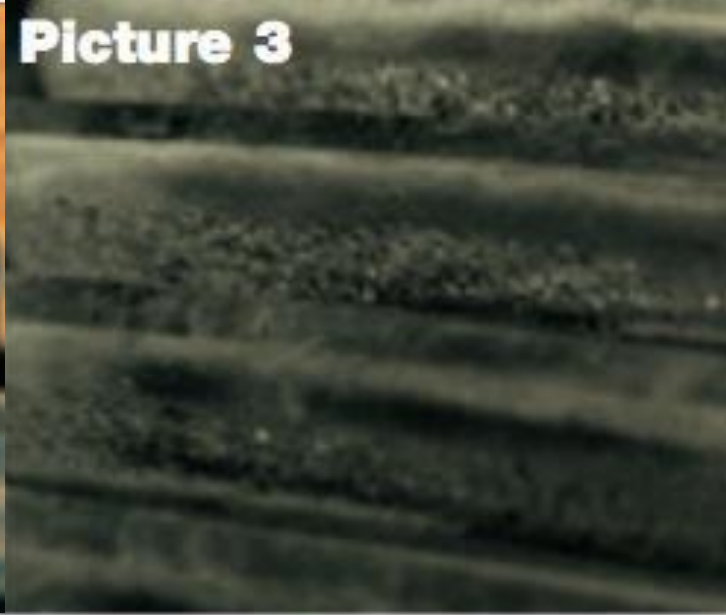
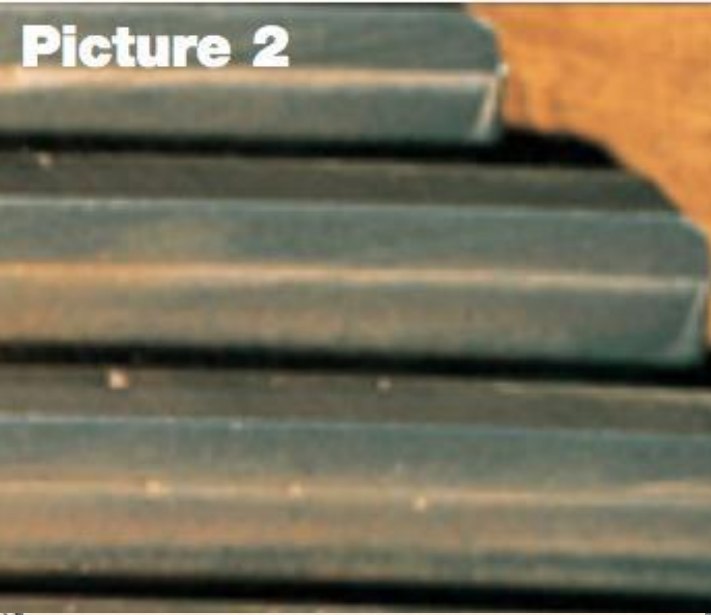
RCM 5 Rd'S



Máquina Rd

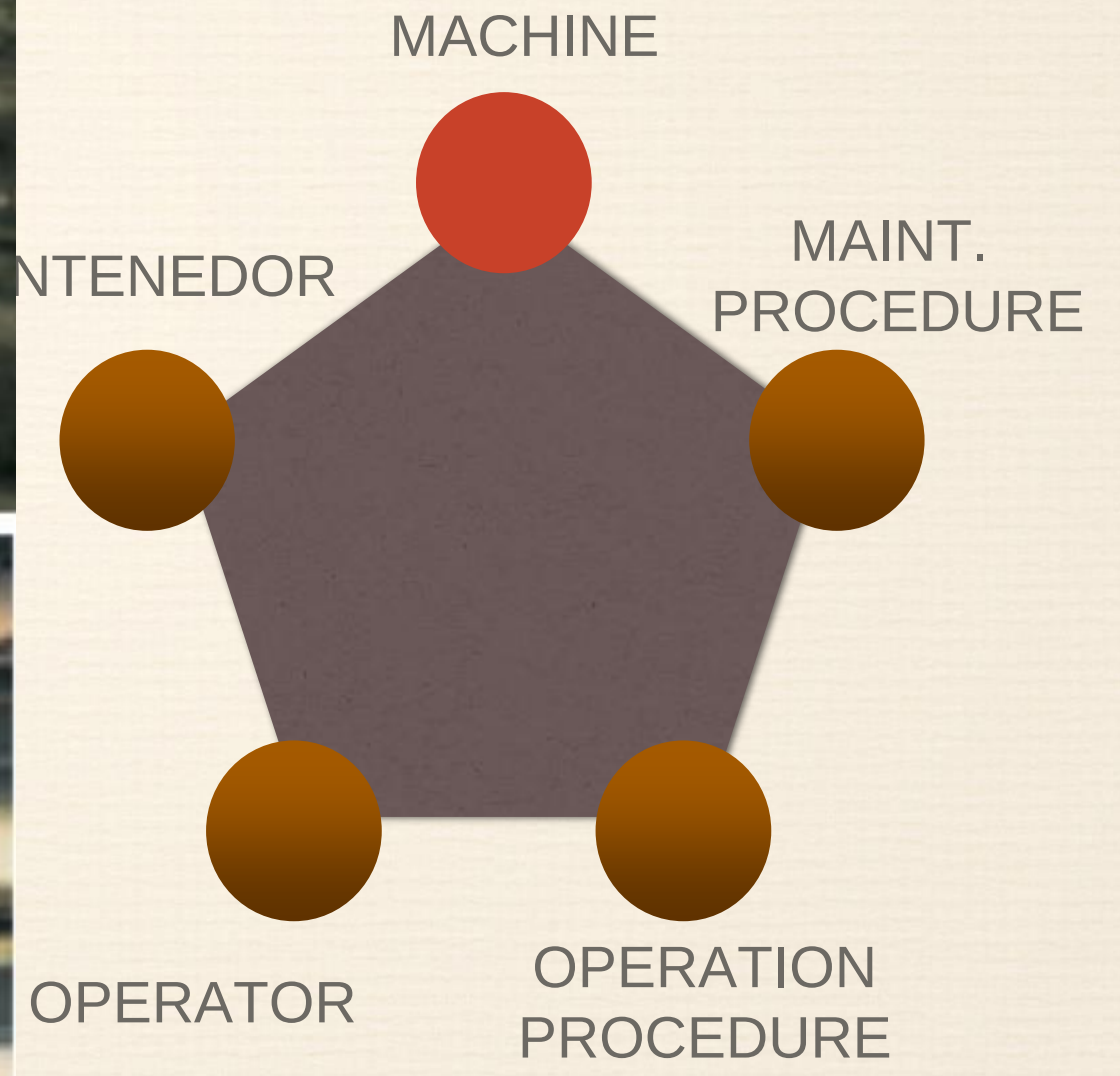
RCM 5 Rd'S





Mejorar Lubricante

RCM 5 Rd'S





TOTAL
COMMITTED TO BETTER ENERGY

PRUEBA DE CAMPO

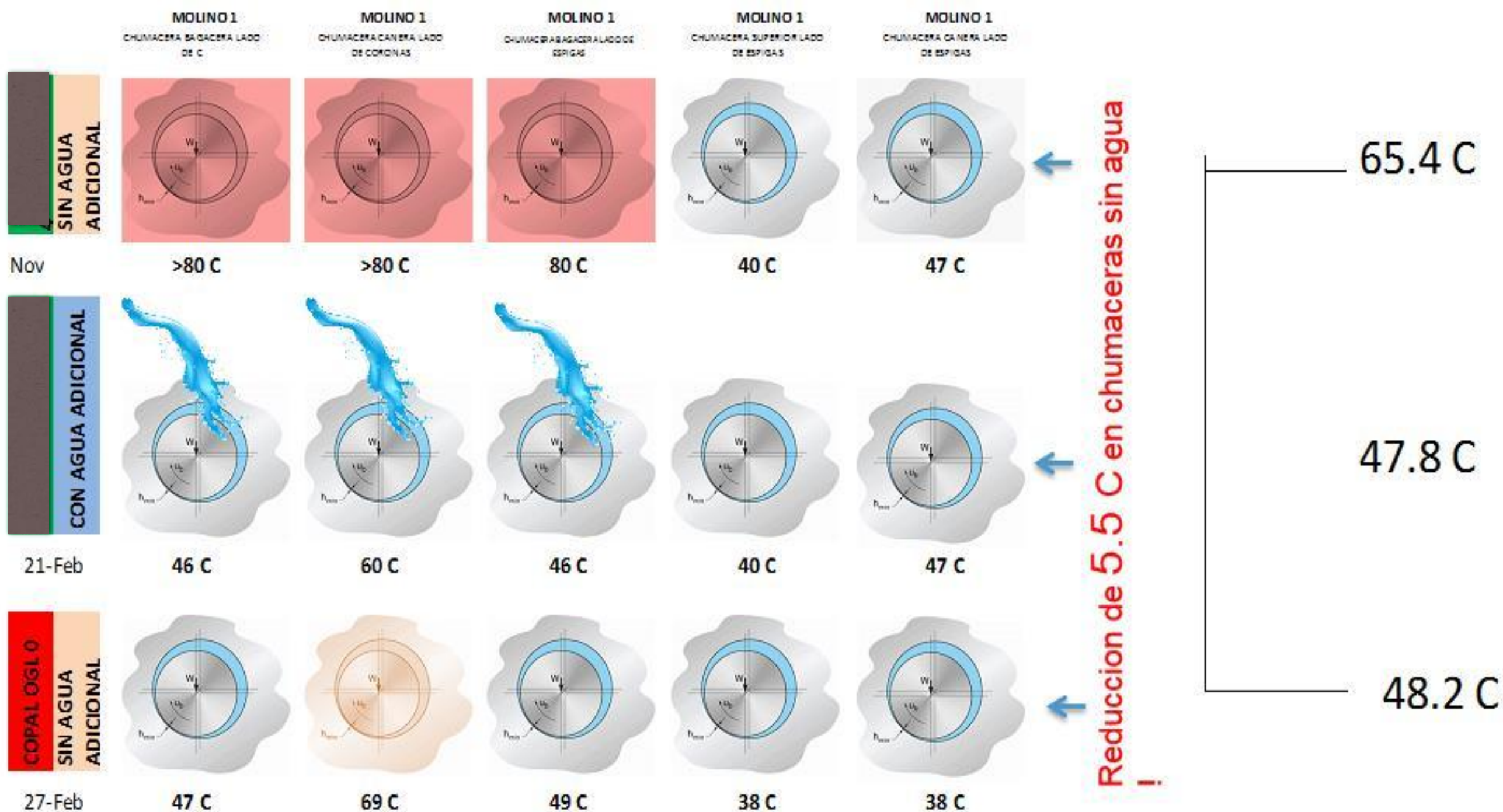


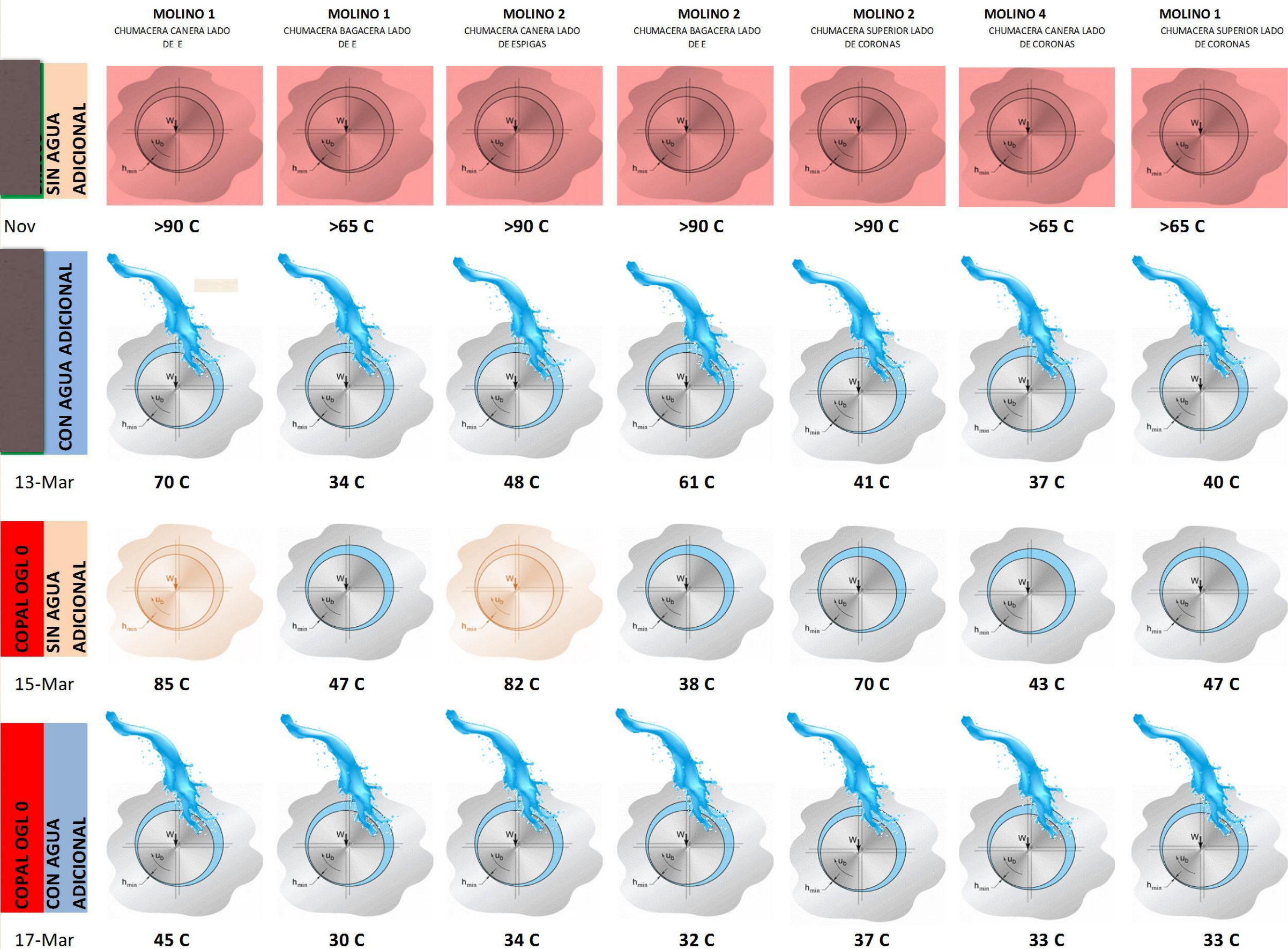
TOTAL COPAL OGL # 0
AMERICA CENTRAL

RESULTADOS EN TEMPERATURAS – ELIMINACION **TOTAL** DE AGUA ADICIONAL DE ENFRIAMIENTO



PRUEBA DE CAMPO - COPAL OGL 0 - SER SAN ANTONIO
RESULTADOS OBTENIDOS EN TEMPERATURAS
FEBRERO 2017





79 C

47 C

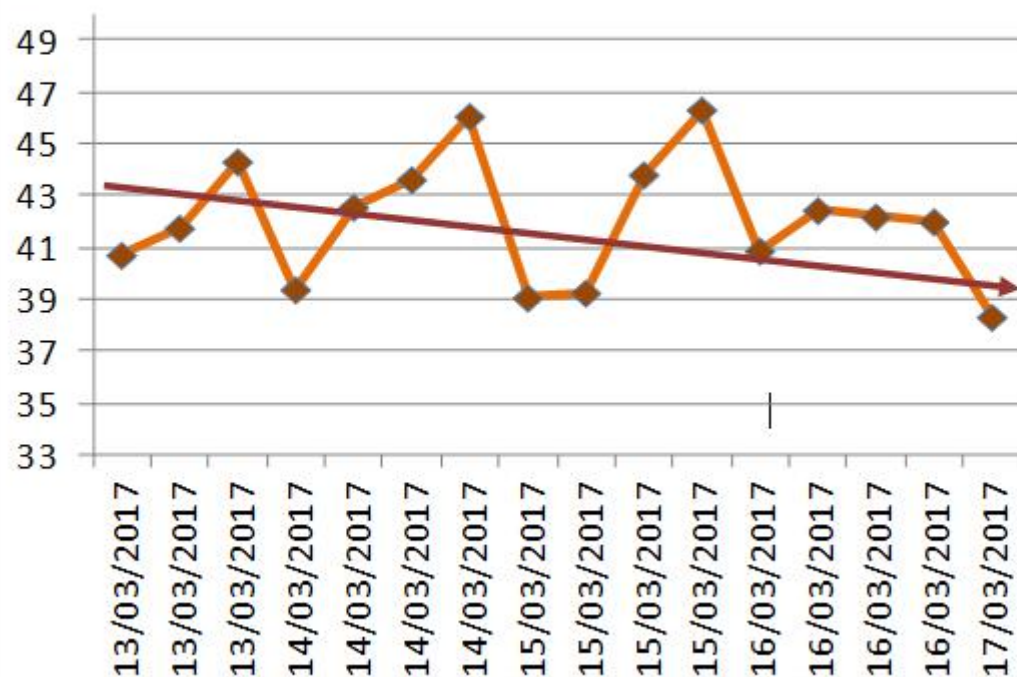
59 C

35 C



Temperaturas la Choluteca

Temp. Chumaceras grados C.



Se observa un descenso de 3.9 grados C. en la temperatura promedio de Operación con Copal OGL 0

Temp Chumaceras

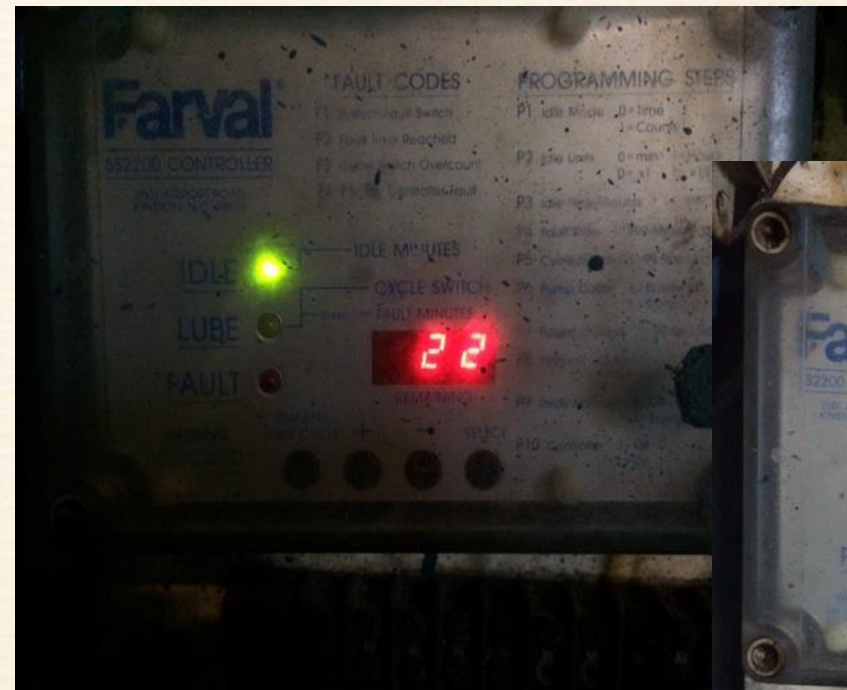


La chumacera en cuestión, solía permanecer irrigada con agua como se muestra a continuación:





Aumento en tiempo de ciclo





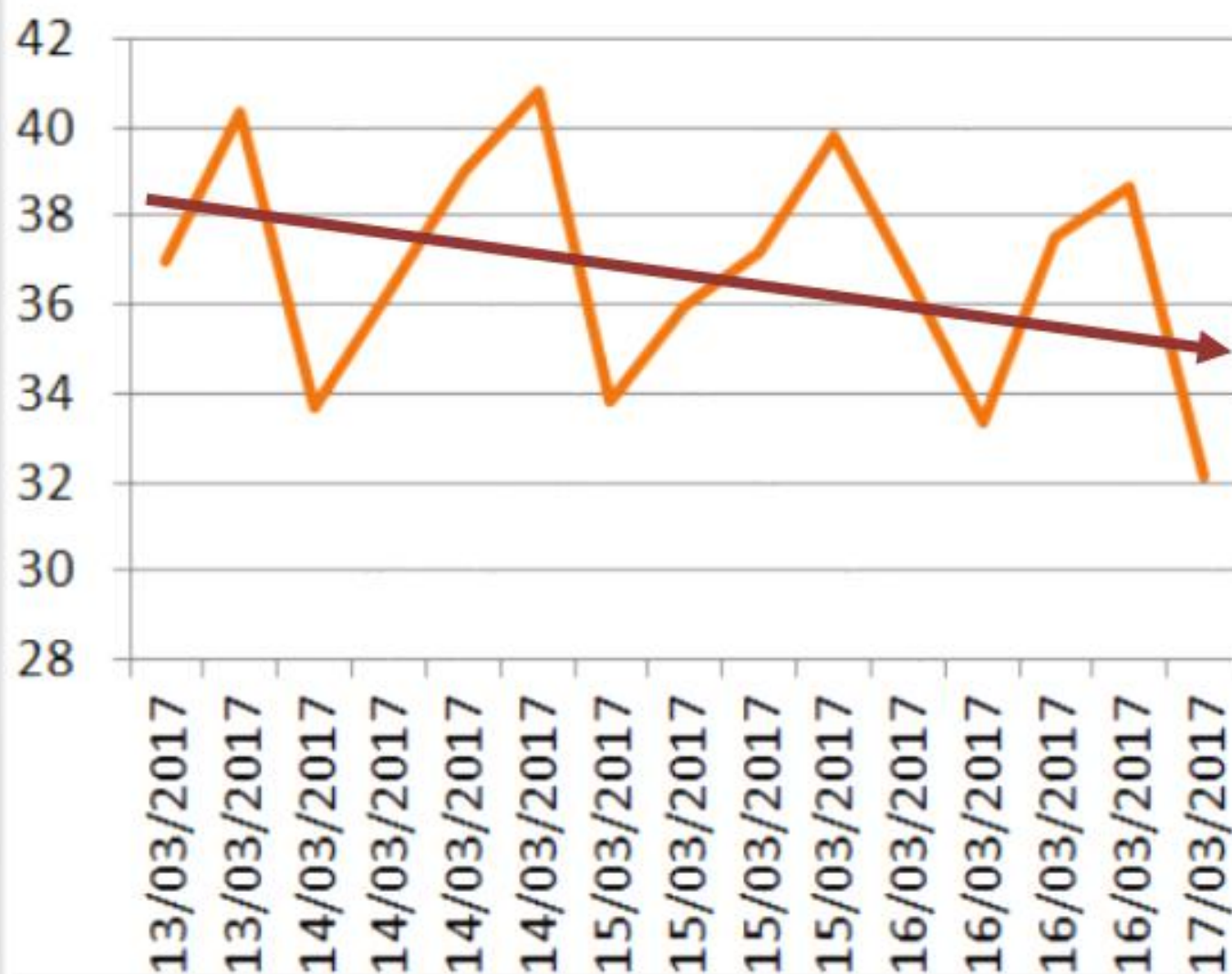
SELLO Y RESISTENCIA AL JUGO DE CAÑA





Coronas la Cholulteca

Temp. Coronas grados C.



La capacidad de adherirse al metal y la formulación con aditivos sólidos de la grasa TOTAL COPAL OGL 0, permiten a los engranajes permanecer protegidos con una capa lubricante mucho más resistente a la que se obtiene con un aceite de alta viscosidad y en los casos de extrema presión, los aditivos sólidos mantienen una fricción mas baja en las zonas de contacto entre los dientes.





TOTAL
COMMITTED TO BETTER ENERGY

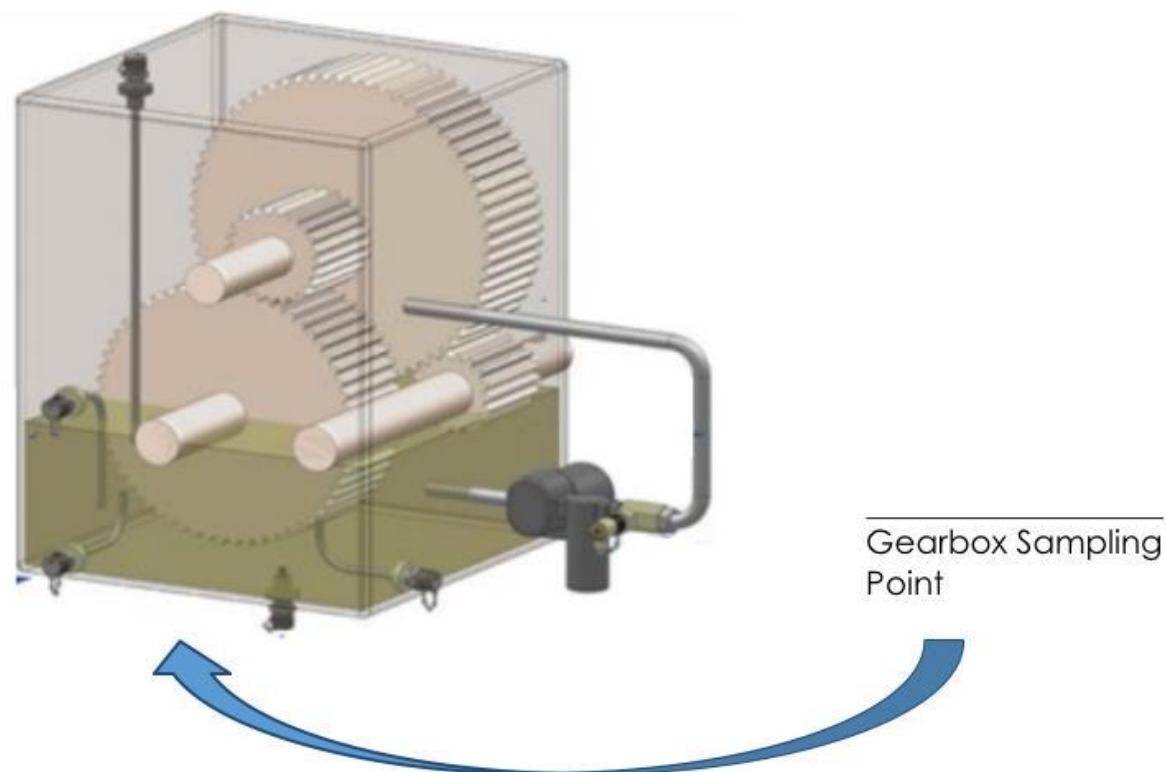
PRUEBA DE CAMPO



TOTAL COPAL OGL # 0
AMERICA CENTRAL

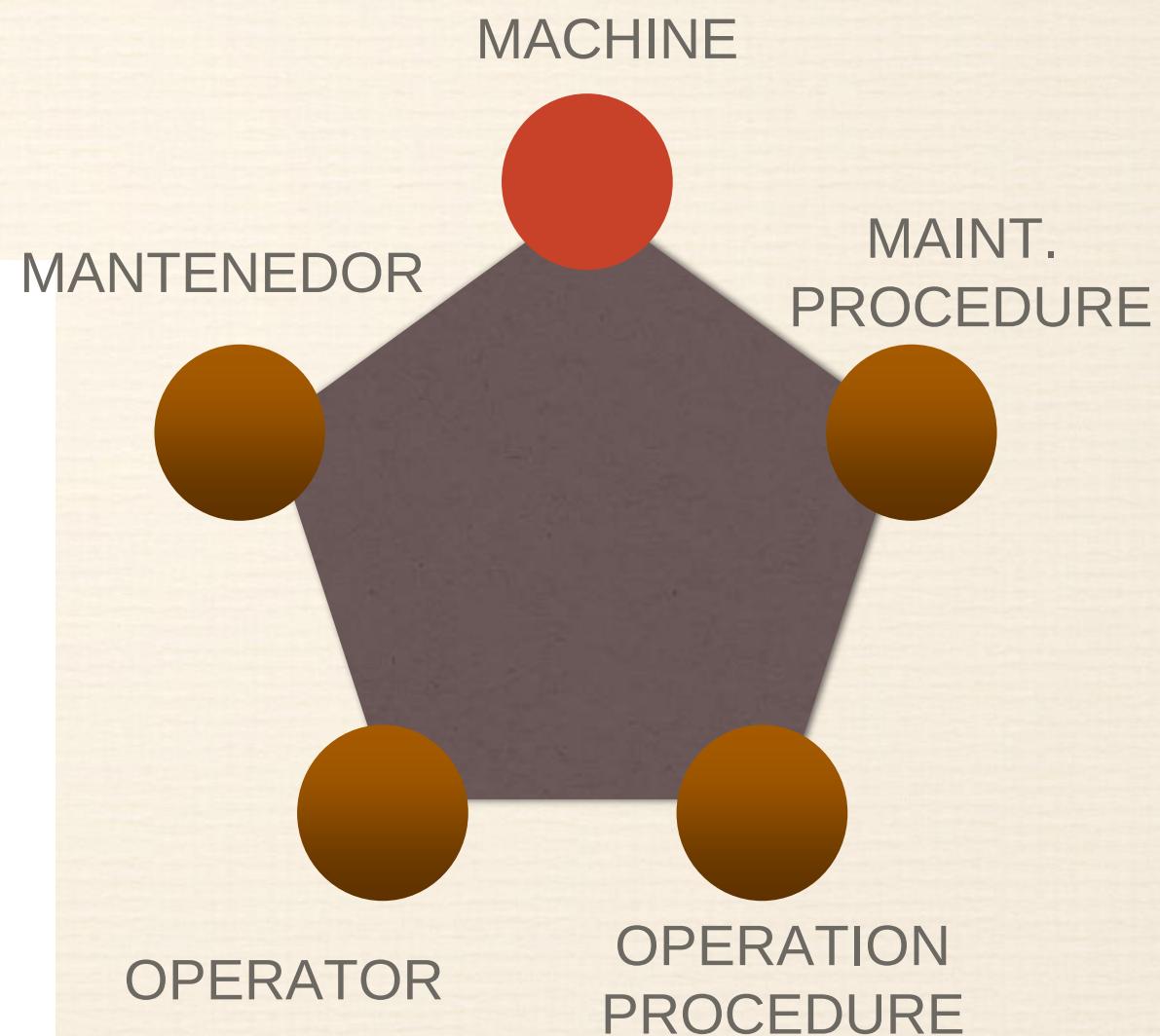


Adding a Sampling Valve to a Standard Tee-Fitting In Gearboxes



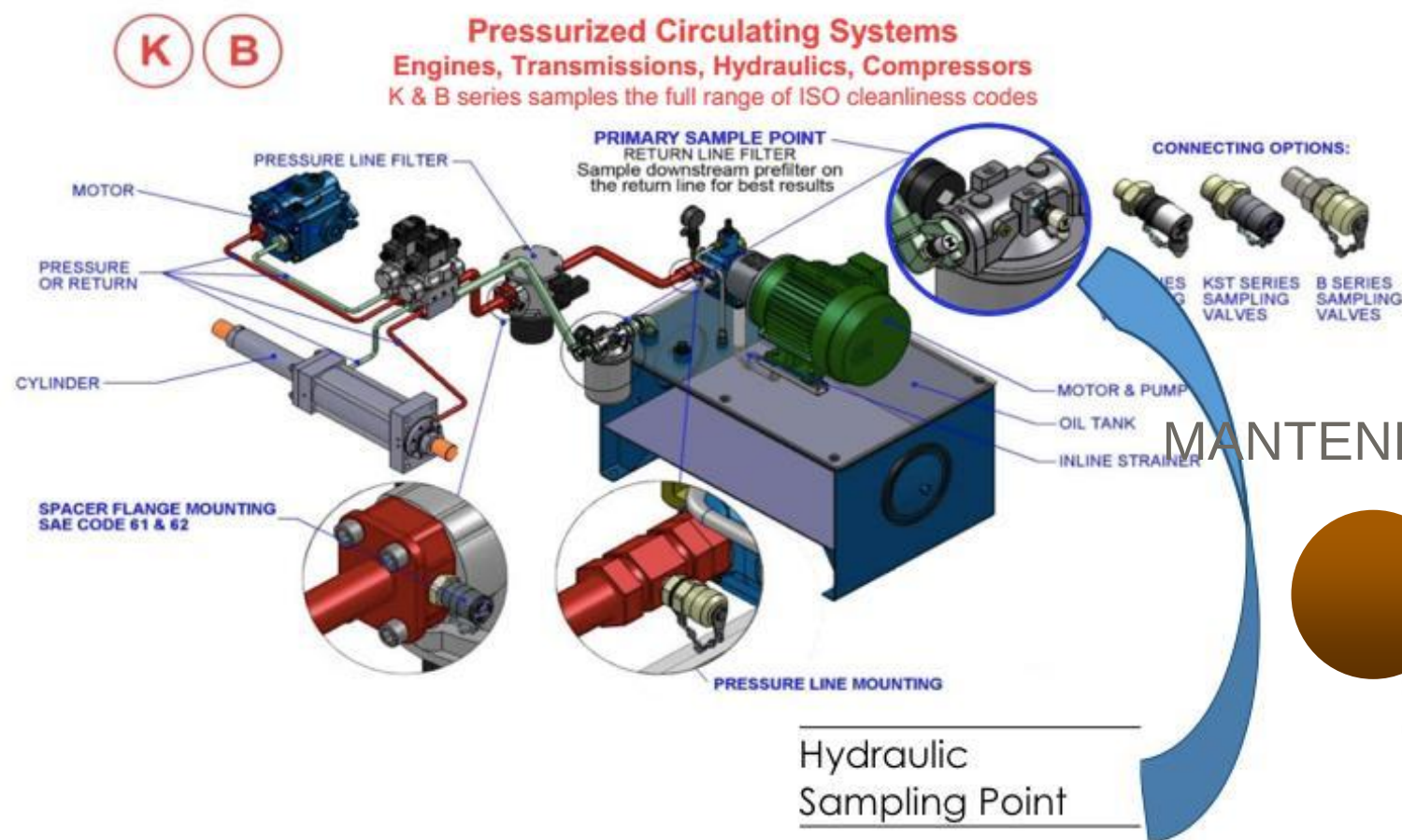
Nuevos Puertos de Muestreo

RCM 5 Rd'S

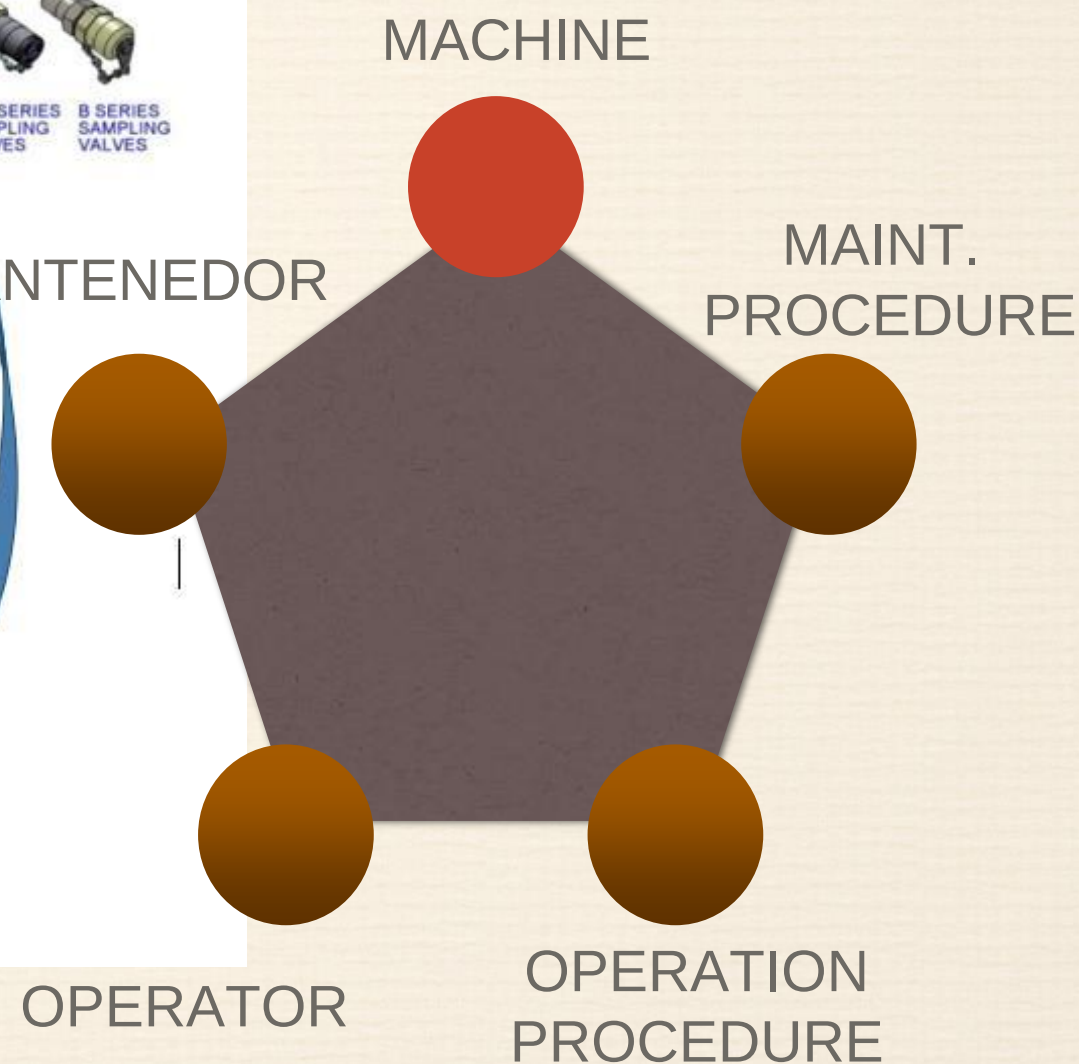




Adding Sampling Valves to the hydraulic system



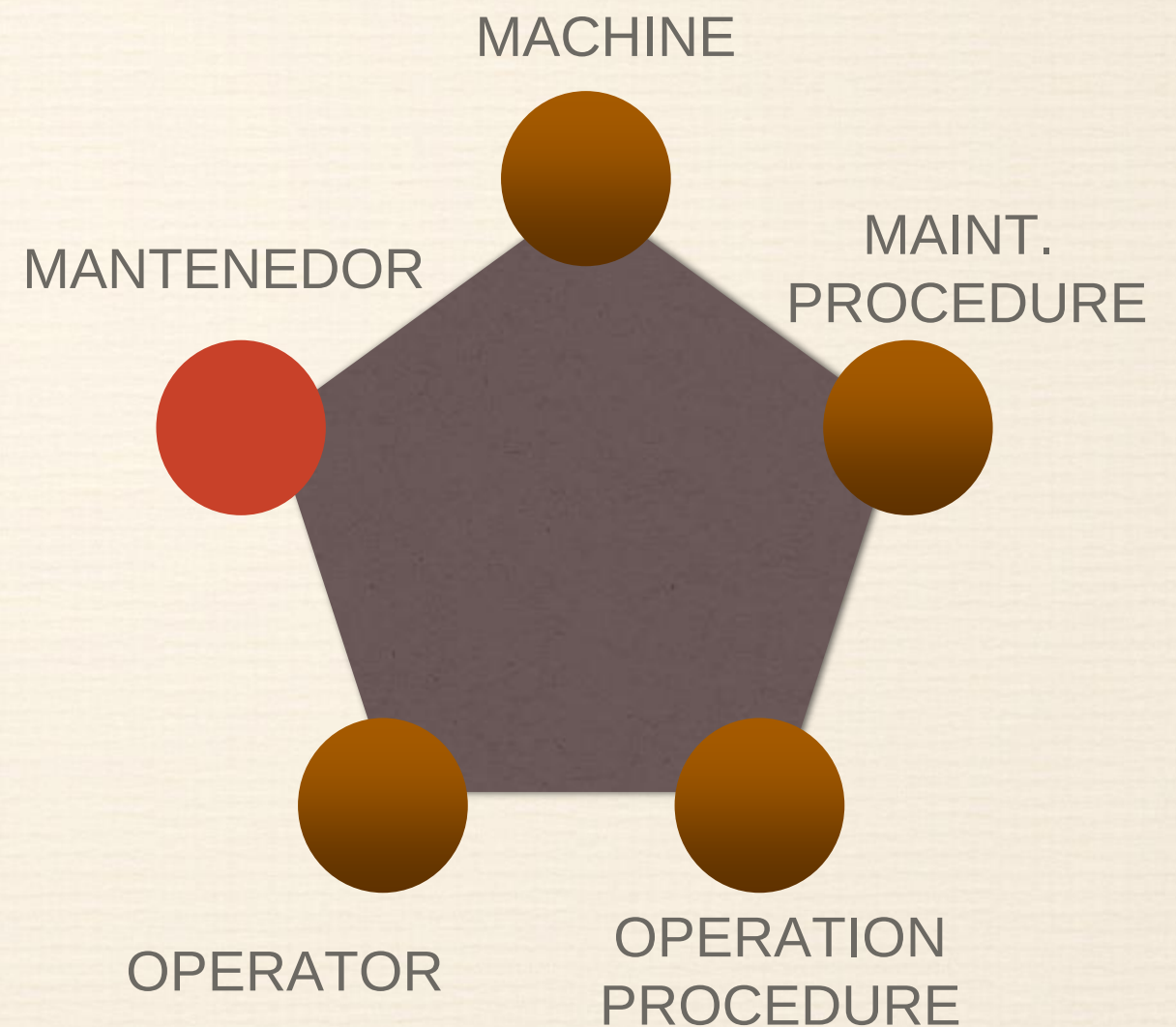
RCM 5 Rd'S





Es un buen mecánico un
buen mantenedor?

RCM 5 Rd'S

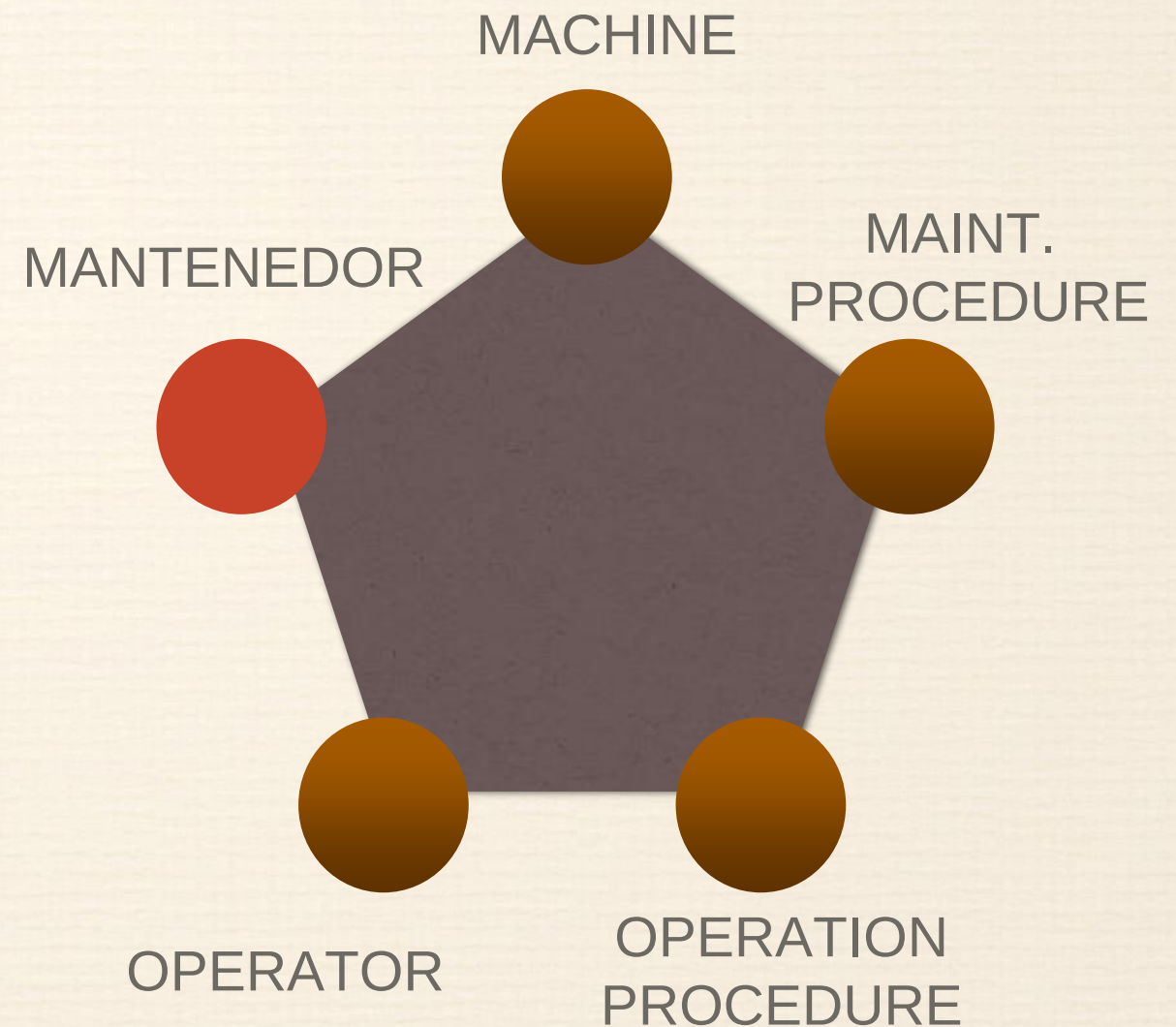




Las tareas de lubricación son delegadas
a las personas con menos
entrenamiento



RCM 5 Rd'S

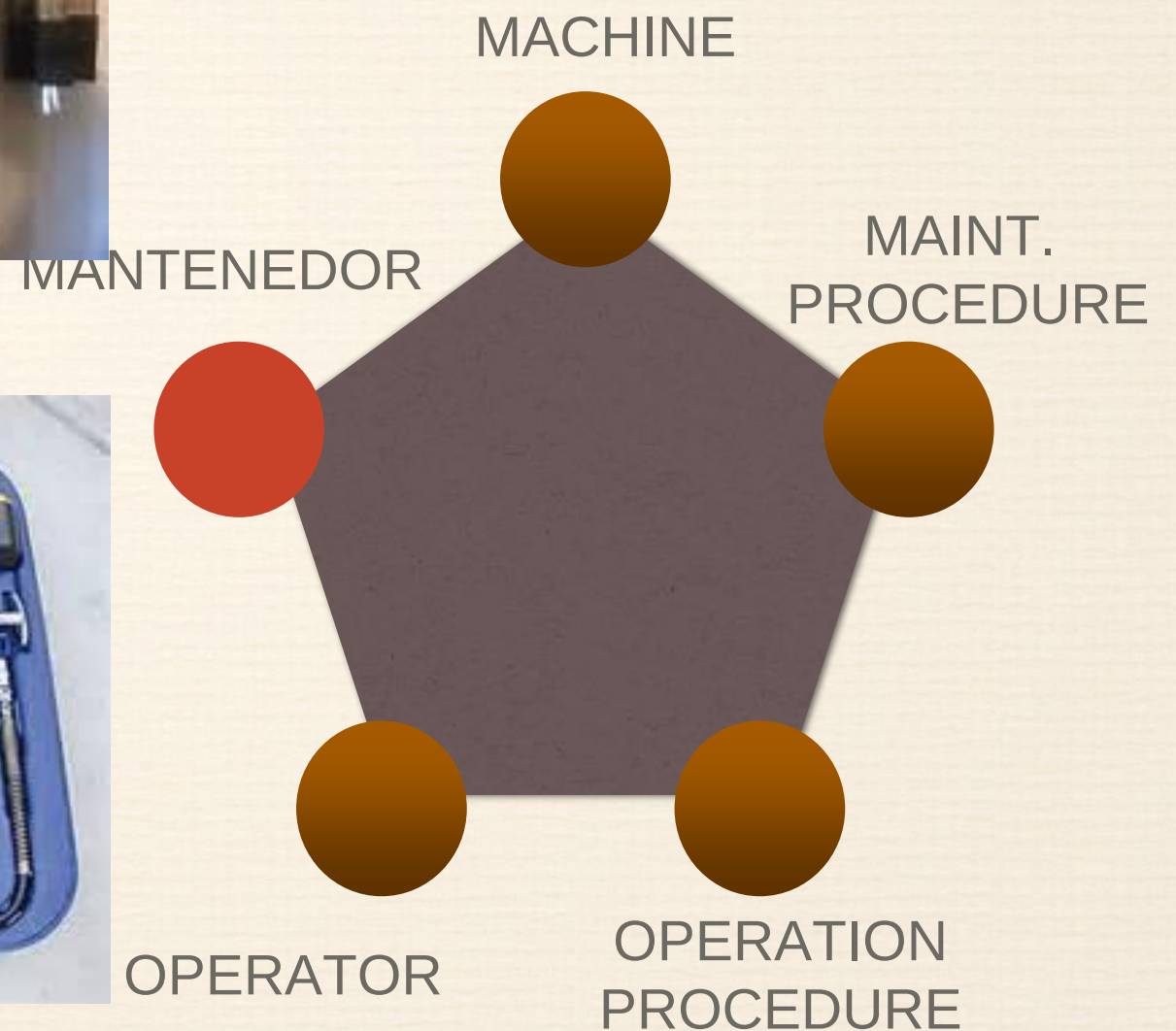


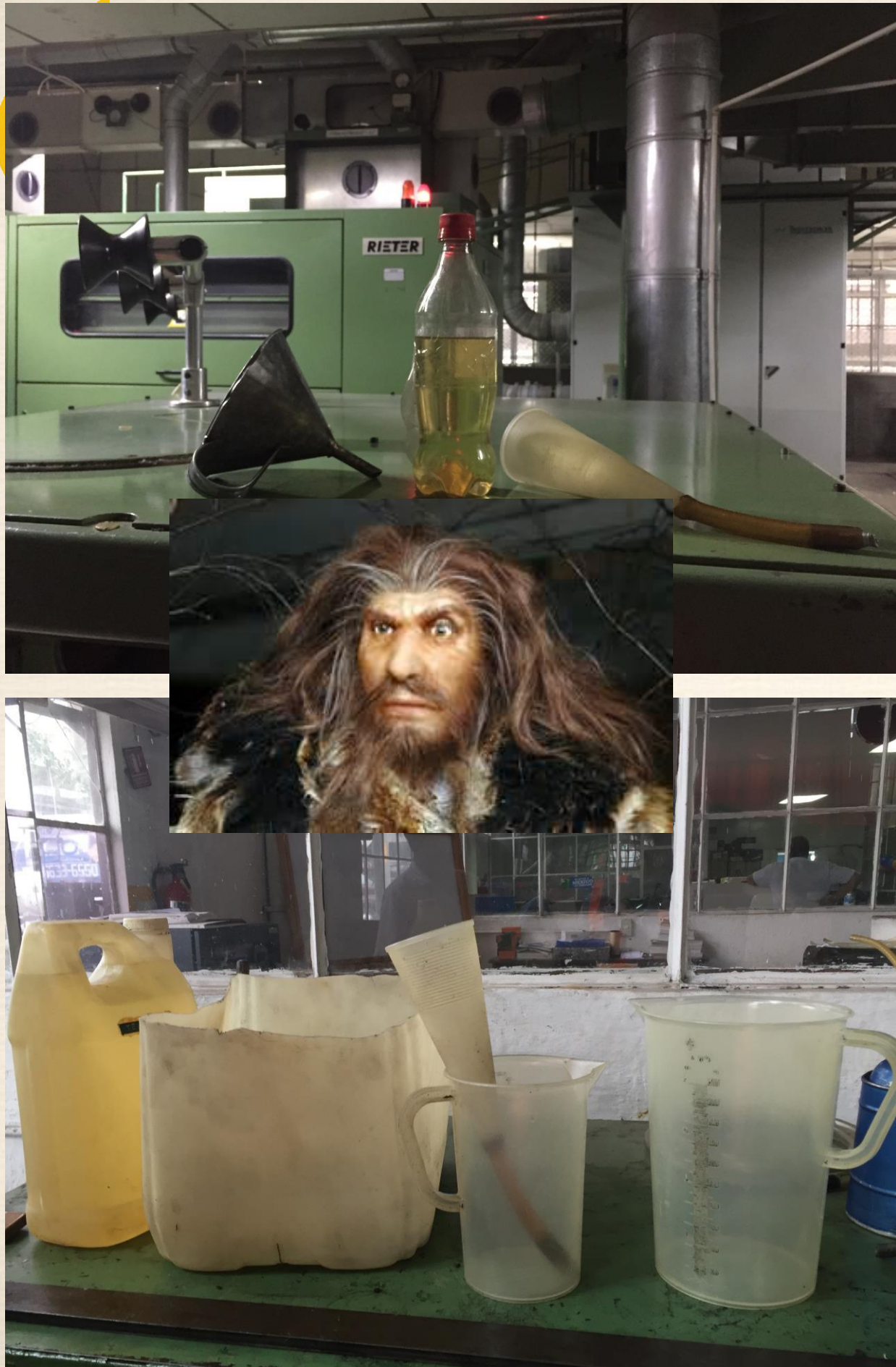


La tragedia de la mina



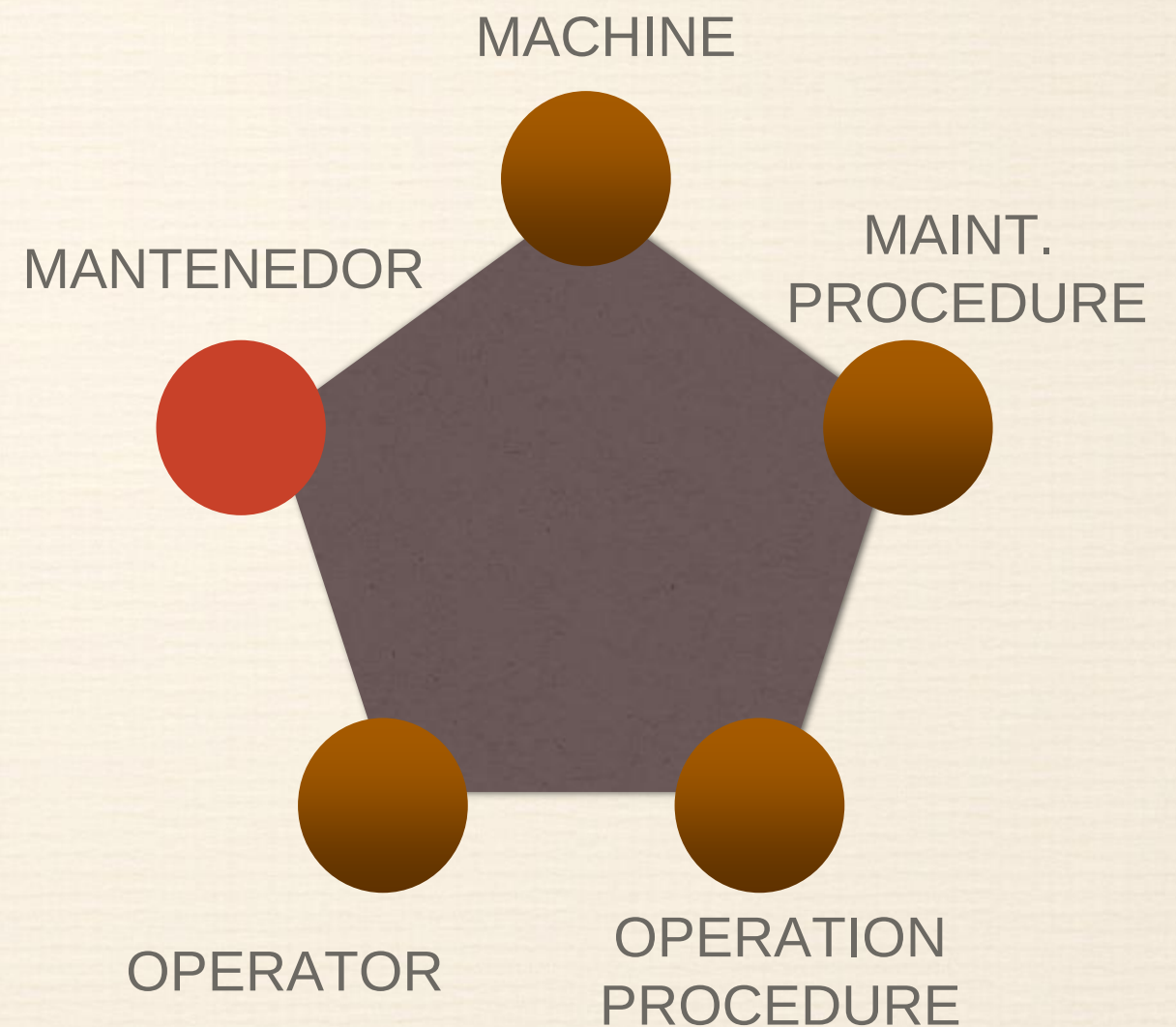
RCM 5 Rd'S





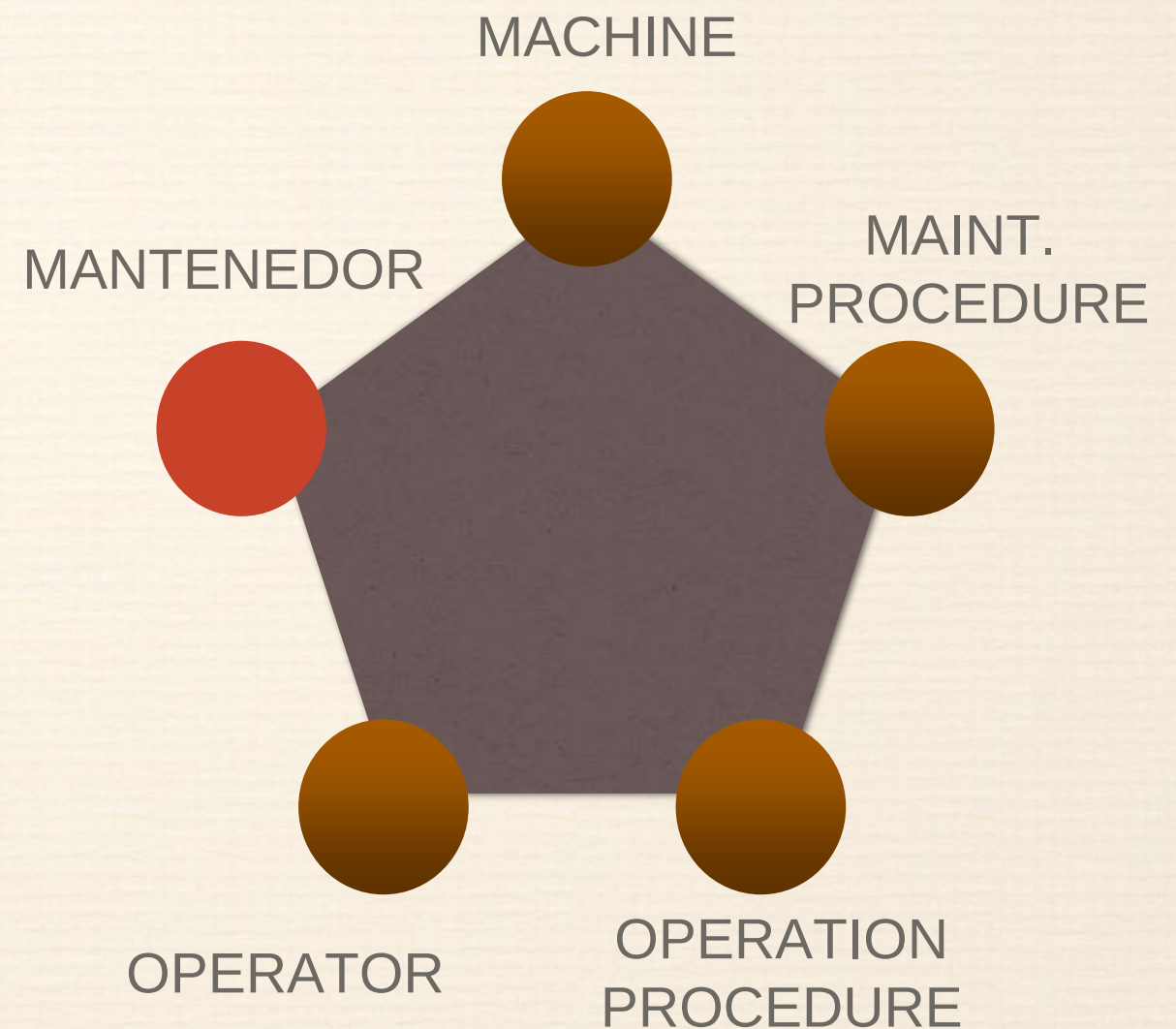
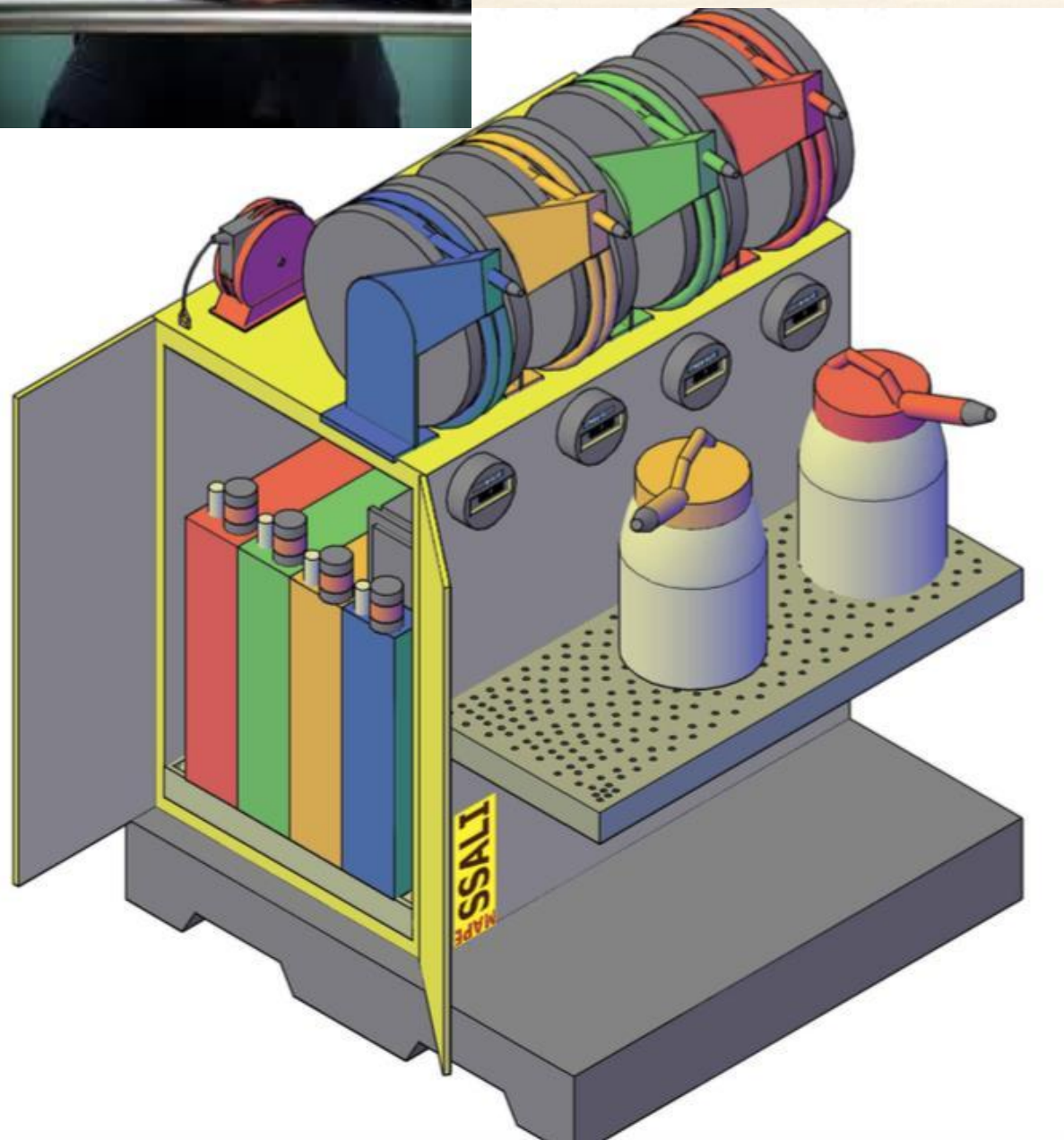
Produce coca cola equipo de lubricación?

RCM 5 Rd'S



En RCM —> Entrenamiento es el
rediseño de la Gente

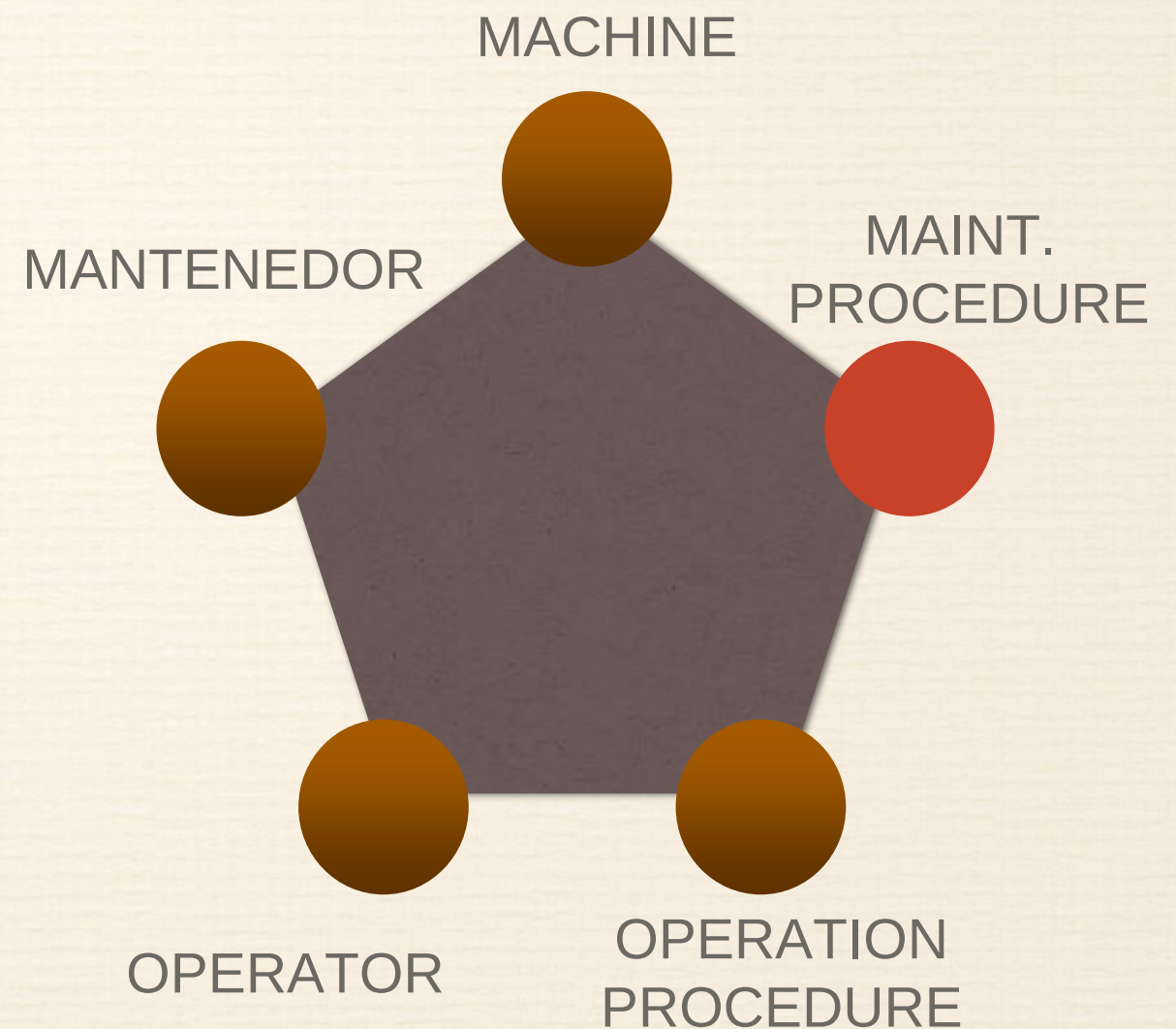
RCM 5 Rd'S





Siga el procedimiento

RCM 5 Rd'S

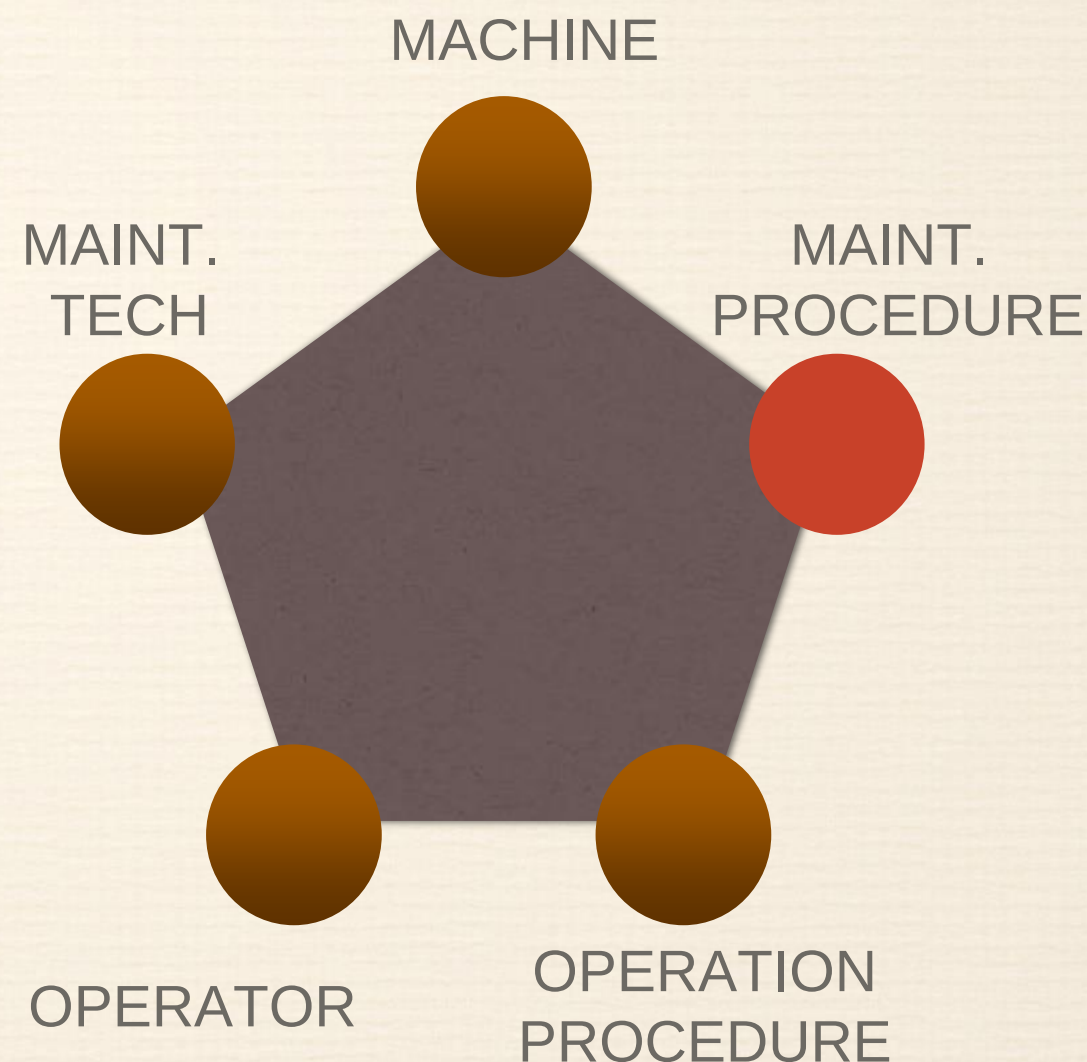




46 Oils

1	1	64643	Clariant Antifrigen	1	CLARIANT ANTIFRIGEN
2	2	18570	Aceite Mobil Velocite oil No.6	2	SPINDLE OIL ISO 10 IV > = 100
3		189408	Aceite Shell crucolan 10		
4		18570	Aceite Mobil Velocite DX 6 ISO 10		
5	3	111772	Supra 32	3	ACEITE PARA COMPRESOR ROTATIVO ISO 46 100% SINTETICO PAO. IV>= 130
6	4	190179	Aceite Sintetico Hyperion Syn blend ISO 46 (55 gls x tonel)		
7	5	54797	Aceite SHC 626 sintético		
8		54797	CUBETA DE ACEITE SINTHETICO MOBIL SHC-626 R&O,AW-GEAR-&BEARING (RCJ).	4	ACEITE DE ENGRANAJE ALTA TEMP ISO 68 IV>130 SINTETICO PAO.
9		605	OIL GEAR COMPOUND EP ISO-68 CHEVRON.		
10	7	6580	Aceite Tellus 22 Hidraulico		
11	8	3442	Aceite Shell Tellus 32	5	ACEITE HIDRAULICO ISO 32 IV>130 ANTI DESGASTE (AW) MULTIGRADO MINERAL O SEMI.
12		178453	Aceite Hidraulico VG 32		
13		3442	Aceite Tellus 32		
14	9	178453	Aceite Hidraulico VG32	6	ACEITE HIDRAULICO ISO 68 IV>130 ANTI DESGASTE (AW) MULTIGRADO MINERAL O SEMI.
15		629	Aceite tellus 46 = Aceite Mobil DTE 25 grado46		
16		629	Aceite tellus 46		
17	10	3365	Aceite Hidraulico Tellus 68 / Mobil DTE 26 grado 68	7	ACEITE DE ENGRANAJE ALTA TEMP. ISO 150 IV>140 100% SINTETICO PAO
18	11	632	Aceite tellus 100		
19	12	624	Aceite delo 400 sae 30 chevron		
20	13	12719	ACEITE SYNTHETIC R & O, AW GEAR & BEARING OIL ISO-100 RCK-55 Marca: AMSOIL.	8	ISO 150 R&O IV > 130 MULTIGRADO MINERAL O SEMI.
21	14	41143	Aceite Mobil SHC 629		
22		41143	Aceite en cubeta SHC629 Synthetic-baring Marca Mobil . (uso en peñadoras)		
23	15		Aceite Regal 100	9	ACEITE ISO 220 EP IV > 130 MULTIGRADO MINERAL O SEMI.
24	16	601	OIL DELO 400 SAE 40 Che.		
25	17	112677	ACEITE MORLINA 220 - MORLINA 220		
26	18	44188	Aceite KLUBER La Mora 220	10	ACEITE DE ENGRANAJE ISO 320 IV > 130 100% SINTETICO PAO
28	19		Aceite Shell Omala 150		
27	20	608	Aceite Chevron ISO 150		
29		608	OIL GEAR COMPOUND EP ISO-150 CHEVRON. (No aceptamos otra marca)	11	ACEITE DE ENGRANAJE ISO 460 IV > 130 MINERAL O SEMI SINTETICO
30		608	OIL GEAR COMPOUND EP ISO-150 CHEVRON		
31	21	675	Aceite Tribol 1100/150		
32	22	4269	Aceite Omala 220	12	ACEITE PARA CADENAS ISO 220 IV>=100 MINERAL
33		4269	Aceite shell Omala Oil 220		
34	23	637	Aceite omala # 320		
35	24		Aceite Mobil SHC 632	13	ACEITE DE ENGRANAJE ISO 320 IV>200 SINTETICO POLIGLICOL
36	25		Aceite sentinel 320		
37			Aceite sentinel sintetico #320		
38	26	638	Shell Oil Omala 460	14	ACEITE DE ENGRANAJE ISO 680 IV > 130 MINERAL O SEMI SINTETICO
39	27	611	OIL GEAR COMPOUND EP ISO 460 Che.		
40	28	112337	ACEITE MOBILGEAR 600 XP 680		
41	29	641	Aceite Omala EP 680 / = Chevron Gear Compound EP ISO 680	15	ACEITE PARA CADENAS ISO 220 IV>=100 MINERAL
42	30	609	Ch.Oil Vistac ISO 220		
43	31	40324	Oil Viskogen G (Cubeta de 5 Gl.)		
44	32	32812	Aceite Tribol 800/320	16	ACEITE DE ENGRANAJE ISO 680 IV>200 SINTETICO POLIGLICOL
45		32812	Aceite sintético tribol 800/320		
46	33		Aceite Mobil Glygoyle He 460	17	ACEITE DE ENGRANAJE ISO 680 IV>200 SINTETICO POLIGLICOL

RCM 5 Rd'S





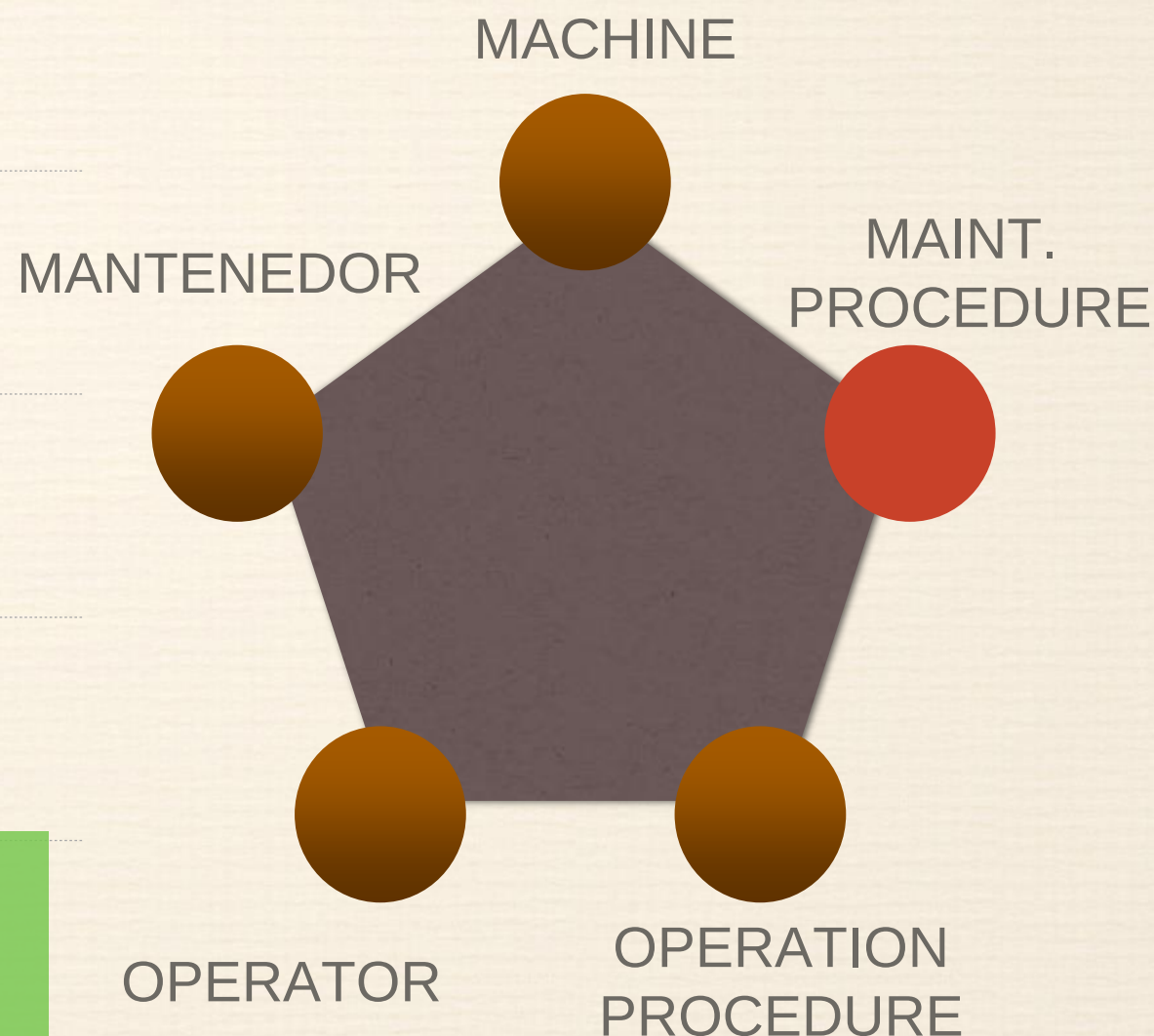
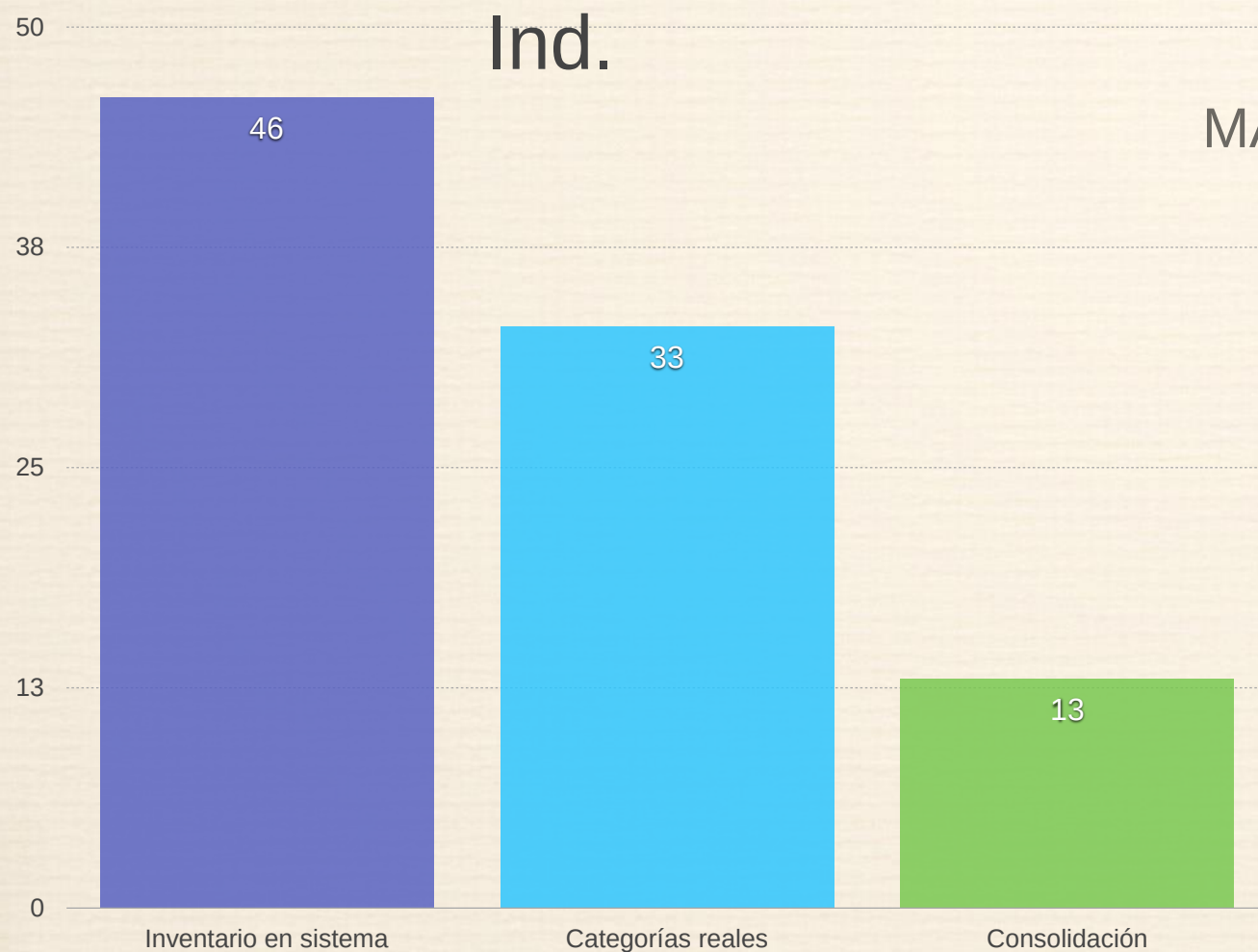
Consolidacion de aceites

DESC.	LUBRICANTES
system sku's Qty	46
real diff categories	33
Consolidation	13

Reduccion de Sku's de lubricantes

RCM 5 Rd'S

Consolidacion de aceites Ind.

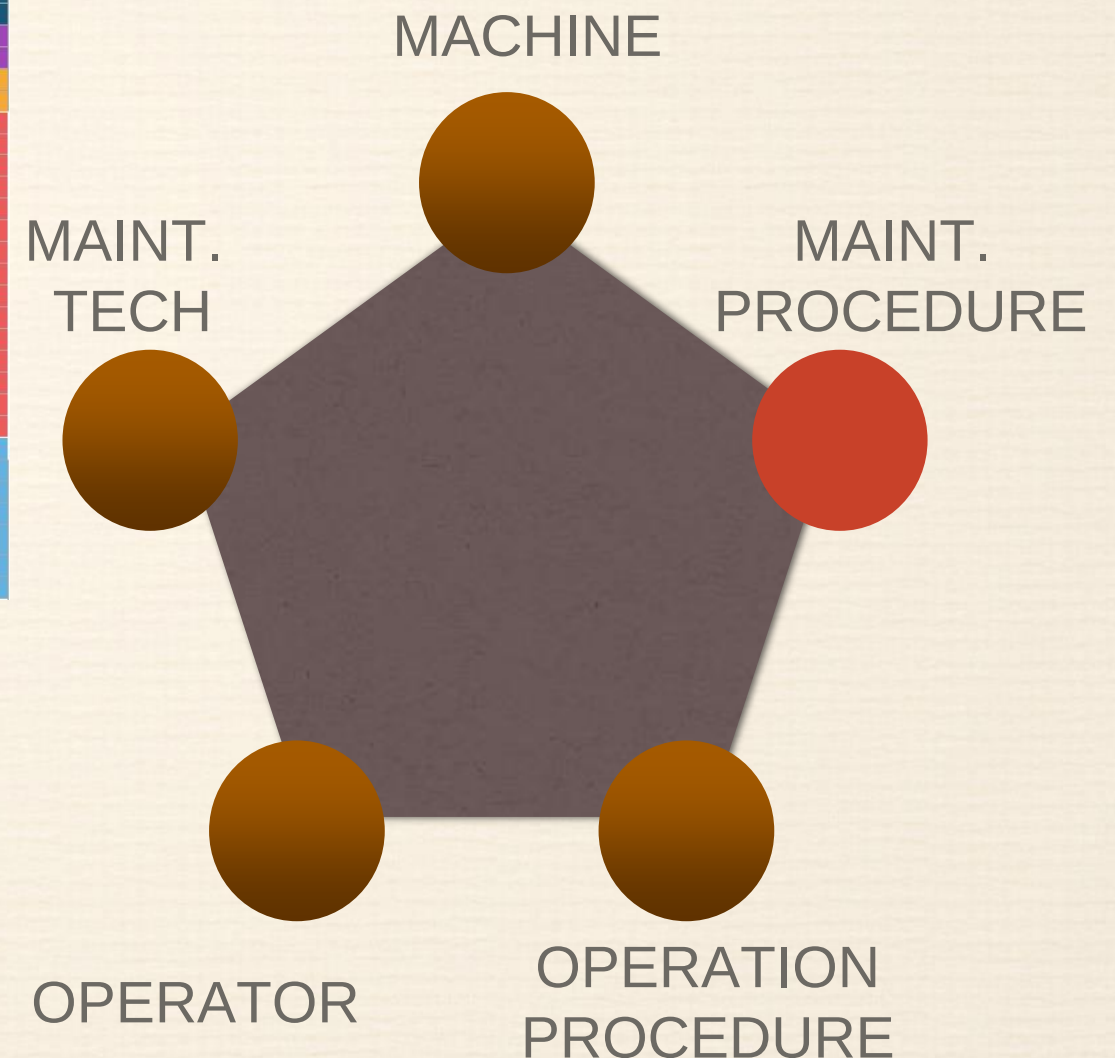




Reduccion de Sku's de Grasas

RCM 5 Rd'S

1		69180	Grasa kluber DLS 18 especial		Grasa para Alta velocidad
2	1	69180	GRASA KLUBER ISOFLEX LDS18 SPECIAL		1 NLGI 2 aceite base ISO 15 - ISO 22
3	2	66020	Isoflex NBU 15 Kluber		Espesante Litio, ó Bario.
4		69016	Grasa Kluber staburags NBU 8 EP		Grasa Extrema presión NLGI 2
5	3	69016	GRASA KLUBER STABURAGS NBU 8EP		2 Aceite base ISO 80-120
6	4	156797	Lata de Grasa de 18 Kg. SKF LGMT-2/18		
7	5	156947	Cubeta de grasa LGMT 3/5 SKF.		
8	6	614	Grasa Perla Negra		3 Grasa Espesante Poliurea NLGI # 2
9		614	Grasa Perla Negra NLGL2 Che.		Aceite Base ISO 130 - ISO 160
10	7	109658	Grasa Mobilux EP 0		4 Grasa Semifluida EP-2 NLGI 0
11	8	51041	Gear grease Hep 370		Para acoples. Aceite base ISO 160 - ISO 190
12		674	Grasa Mobilux EP2		
13	9	15093	Tubo de Grasa Multipurpose		
14	10	618	Grasa Luboil EP2 (es la mobilux ep-2)		
15	11	644	Grasa Alvania EP0		
16		645	Grasa Shell Alvania EP2		
17	12	645	Grasa Alvania EP2. (Shell)		GRASA ep-2
18		645	Grasa Alvania Shell EP2		Espesante Complejo de Litio
19	13	688	Grasa Staburags N12MF		5 Aceite base ISO 160 - 250
20	14	172271	Grasa Kluber B-31 222		
22		69154	Grasa Kluber Staburags NBU 12/300KP		
23	15	69154	Grasa Kluber NBU 12/300 KP		
24	16		Grasa chevron EPNLG 12 (es la delo grease)		
25	17	55546	Starplex EP 2		
26	18	159727	grasa Délo Grease EP NLGI2		
27	19		Grasa protex ce 222		
21	20	38100	Grasa Ulti plex NGLI 2 Chevron/ Mobilith SHC 220 * Cubeta *		
28	21	37684	Grasa molub alloy de 36 libras 6040-460-1.1/2.		
29	22	169363	Grasa Mobilith SHC Serie 460		GRASA EP-2
30	23		Grasa MATRIX LC2		6 Espesante Sulfonato de Calcio ó Complejo de litio. ASTM D 2596 >= 700Kg. Punto de Soldadura.
31	24	648	Grasa Darina		Aceite base ISO 460
32		676	Grasa Mollub Alloy 777-2		MINERAL O SEMISINTETICA.
33	25	676	Grasa Molub alloy #777-2		

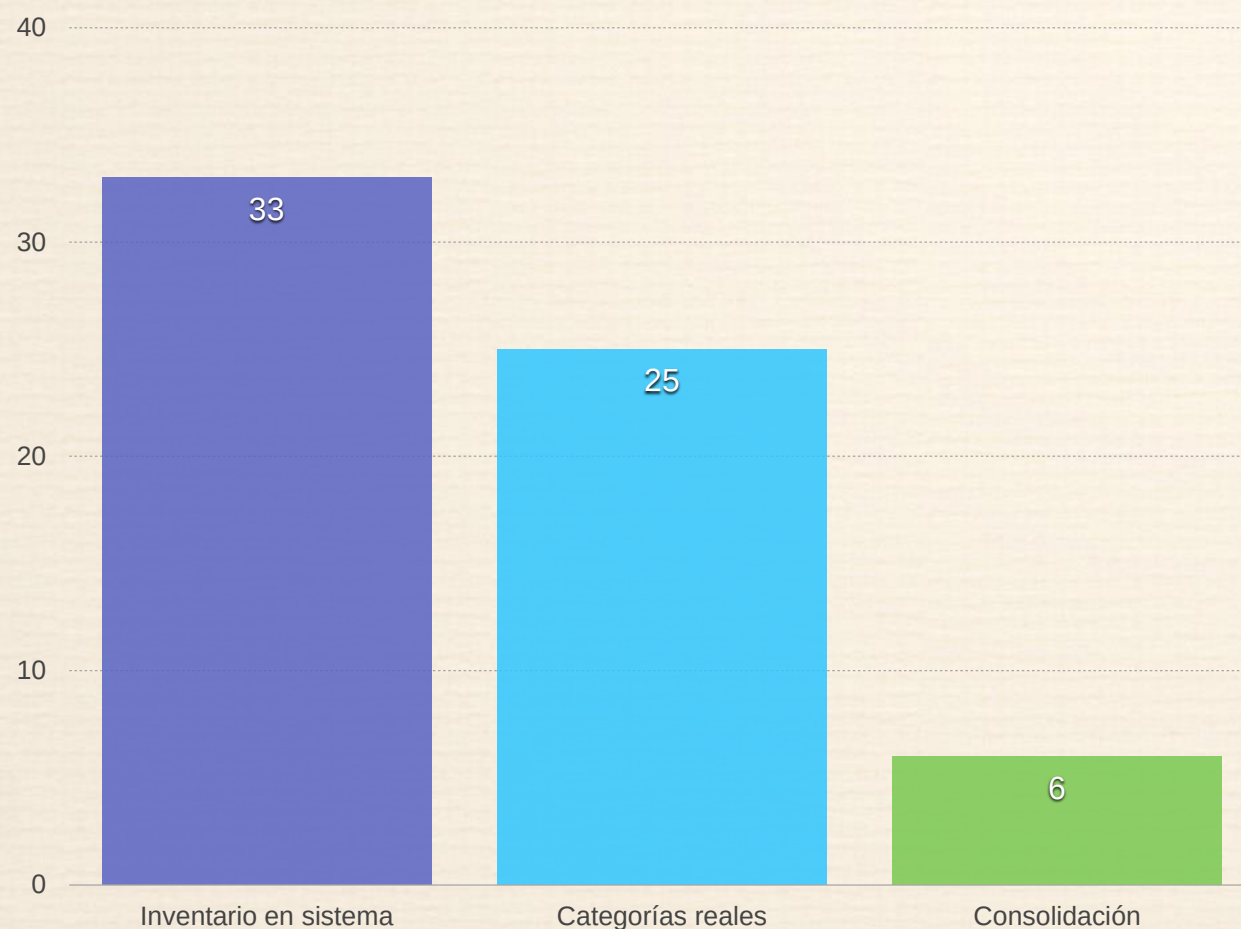




Consolidación Grasas

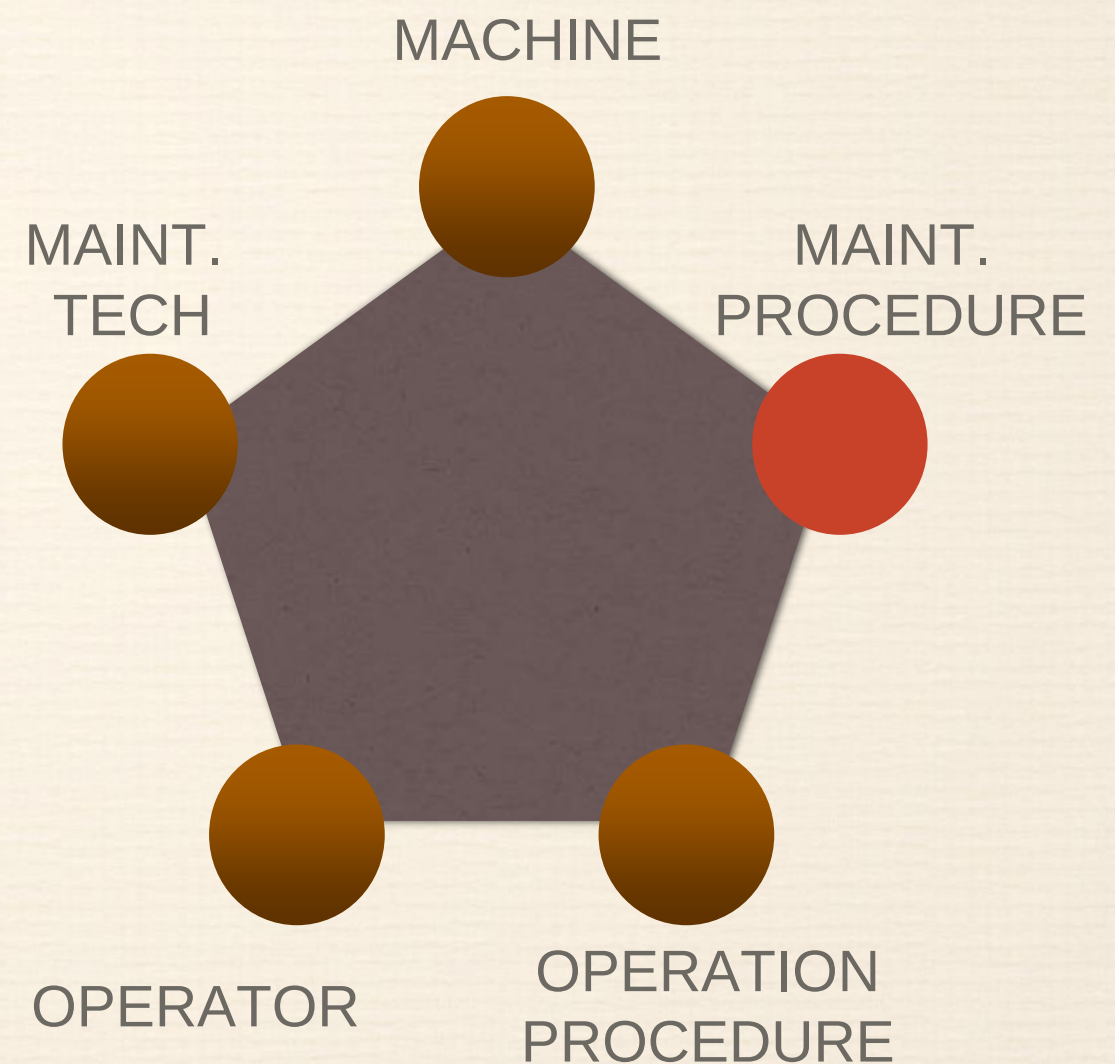
DESC.	
System sku's Qty	33
Real Diff Categories	25
Consolidation	6

Consolidación de Grasas



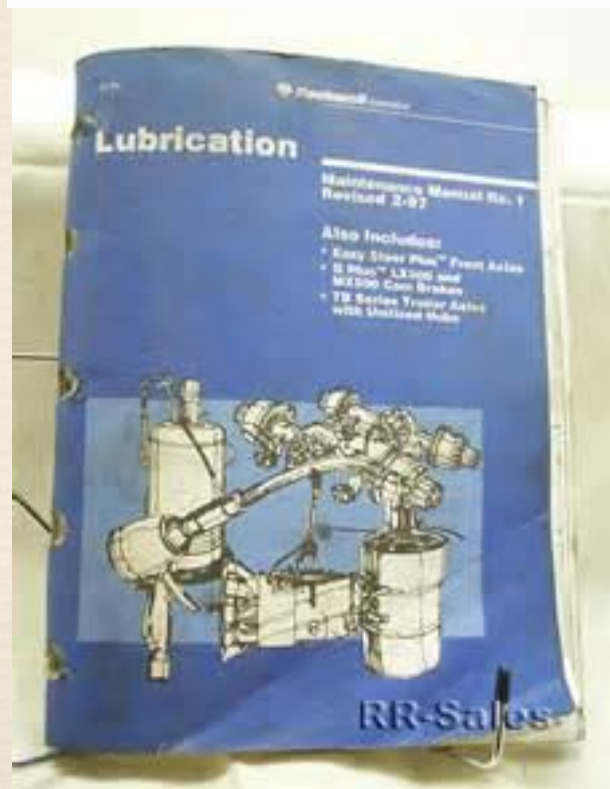
Nuevos inventarios

RCM 5 Rd'S

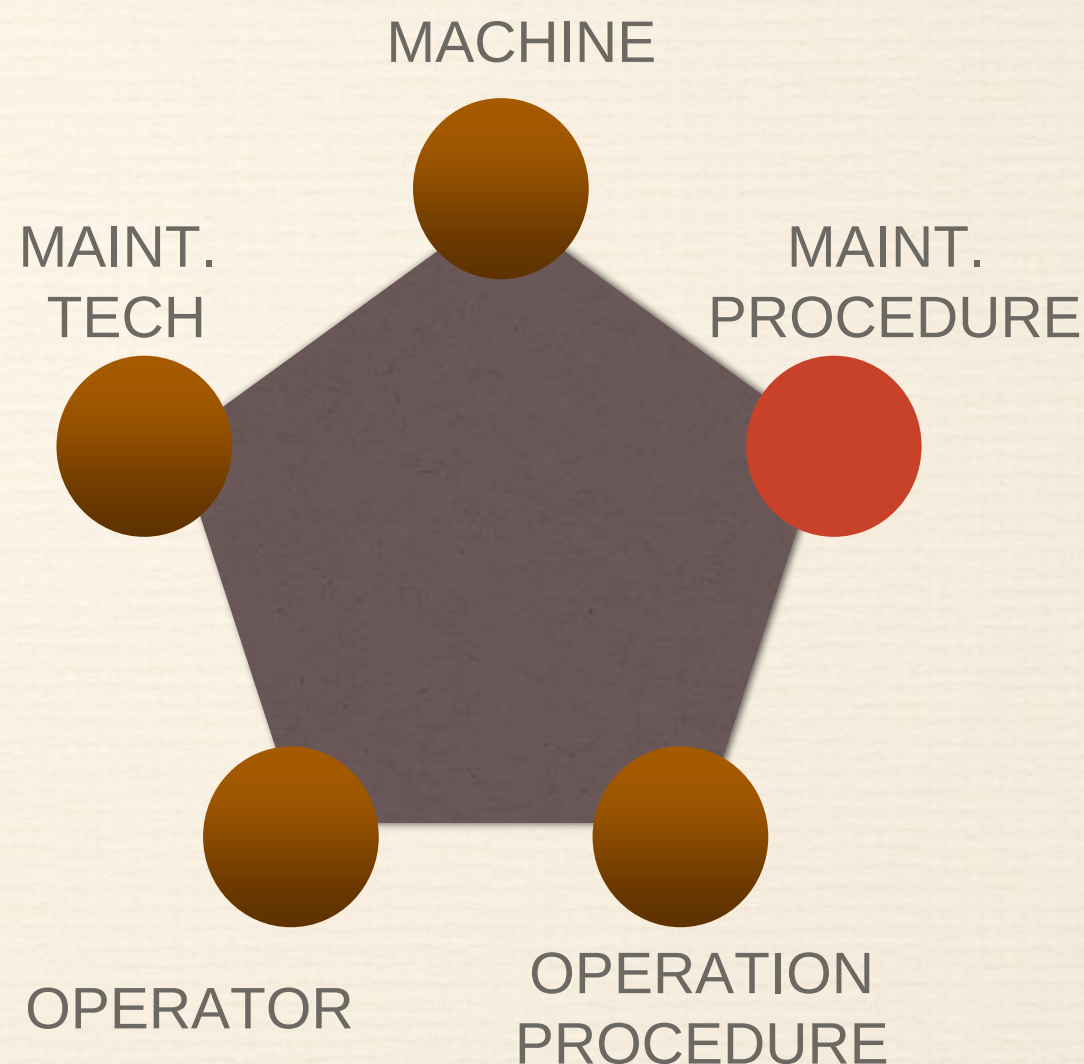




Tenemos los procedimientos de Mantenimiento en el sistema, impresos en la orden de trabajo?

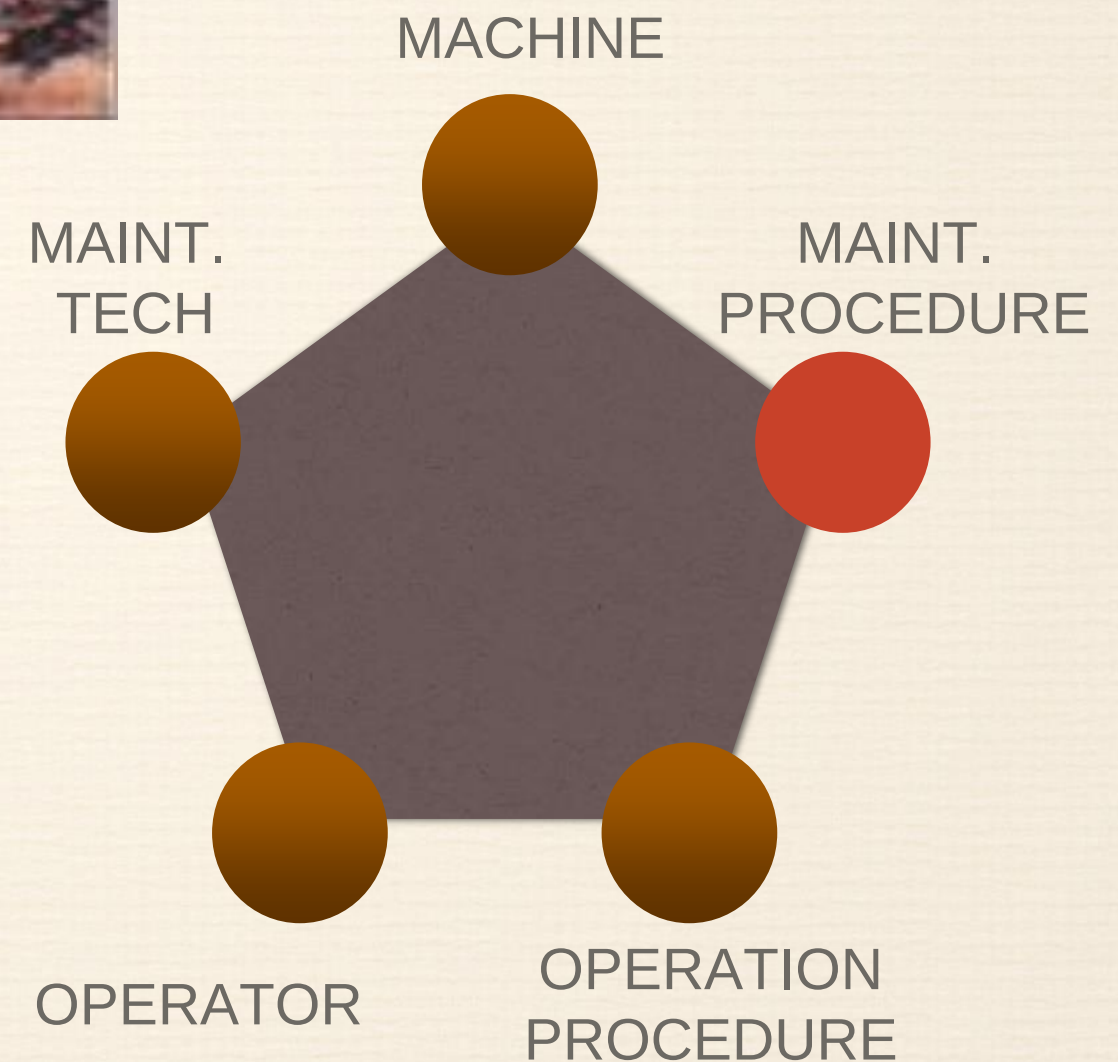


RCM 5 Rd'S





RCM 5 Rd'S



4

MAINTENANCE PROCEDURES AND TROUBLESHOOTING

4.1 LUBRICATION INSTRUCTIONS

No lubrication is required.

4.2 TROUBLESHOOTING PROCEDURES

4.2.1. TROUBLESHOOTING

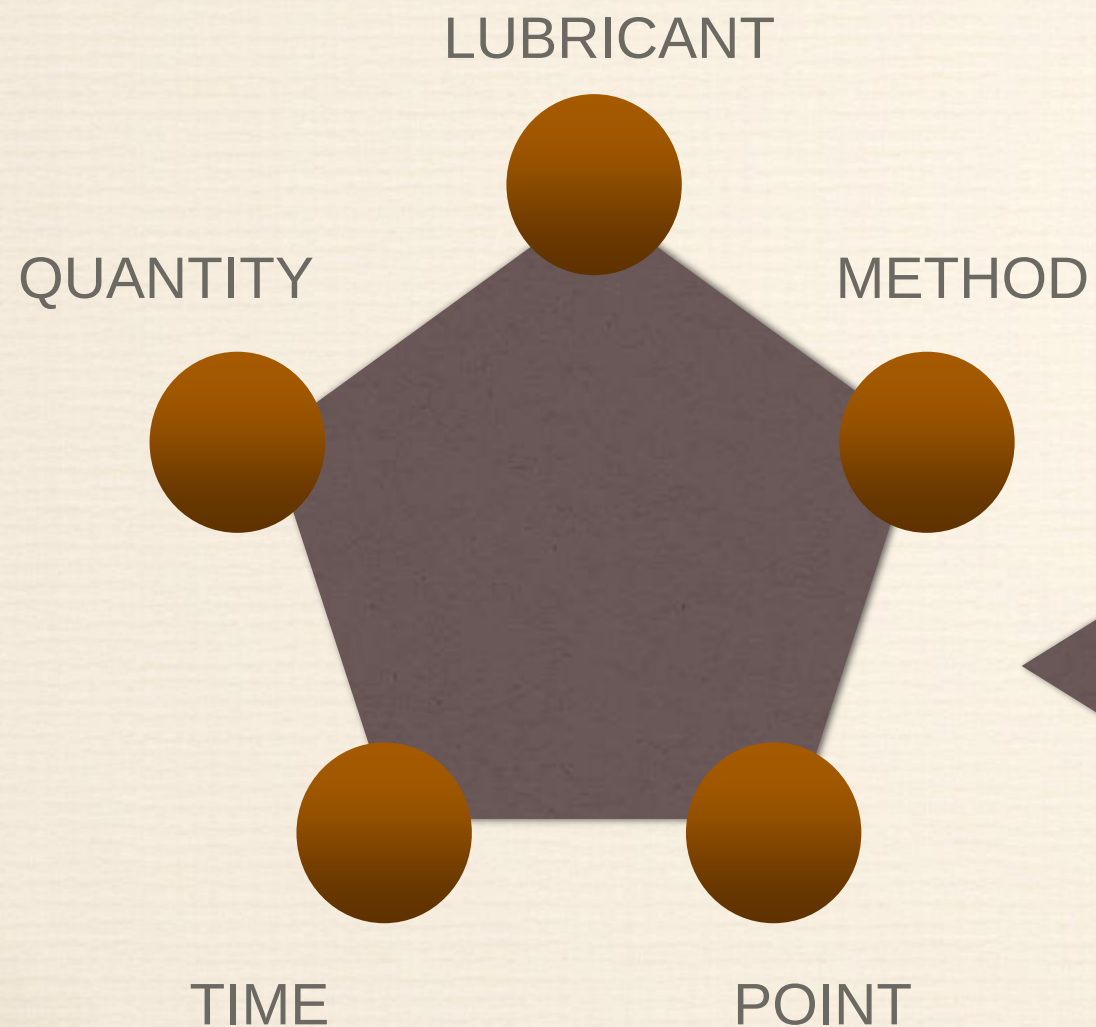
Table 4-1 lists operational malfunctions that may occur with the equipment. Perform the tests, inspections, and corrective actions in the order they appear in the table. This table does not list all information that may be necessary to identify and fix defects. If you experience an equipment malfunction that is not listed, or suggested corrective actions do not correct the fault, please contact Customer Support.

Malfunction	TEST OR INSPECTION	CORRECTIVE ACTION
1. Motor will not start.	Visual	Wait the power switch is OFF (000), and then turn it ON. Replace faulty electrical components.
2. Motor will not start.	Visual	Check for electrical problems (e.g., loose wires, bad connections). Check for mechanical problems (e.g., jammed parts, broken belts). Check for fluid level problems (e.g., low oil, low coolant).
3. Motor will not start.	Visual	Check for electrical problems (e.g., loose wires, bad connections). Check for mechanical problems (e.g., jammed parts, broken belts). Check for fluid level problems (e.g., low oil, low coolant).
4. Motor will not start.	Visual	Check for electrical problems (e.g., loose wires, bad connections). Check for mechanical problems (e.g., jammed parts, broken belts). Check for fluid level problems (e.g., low oil, low coolant).

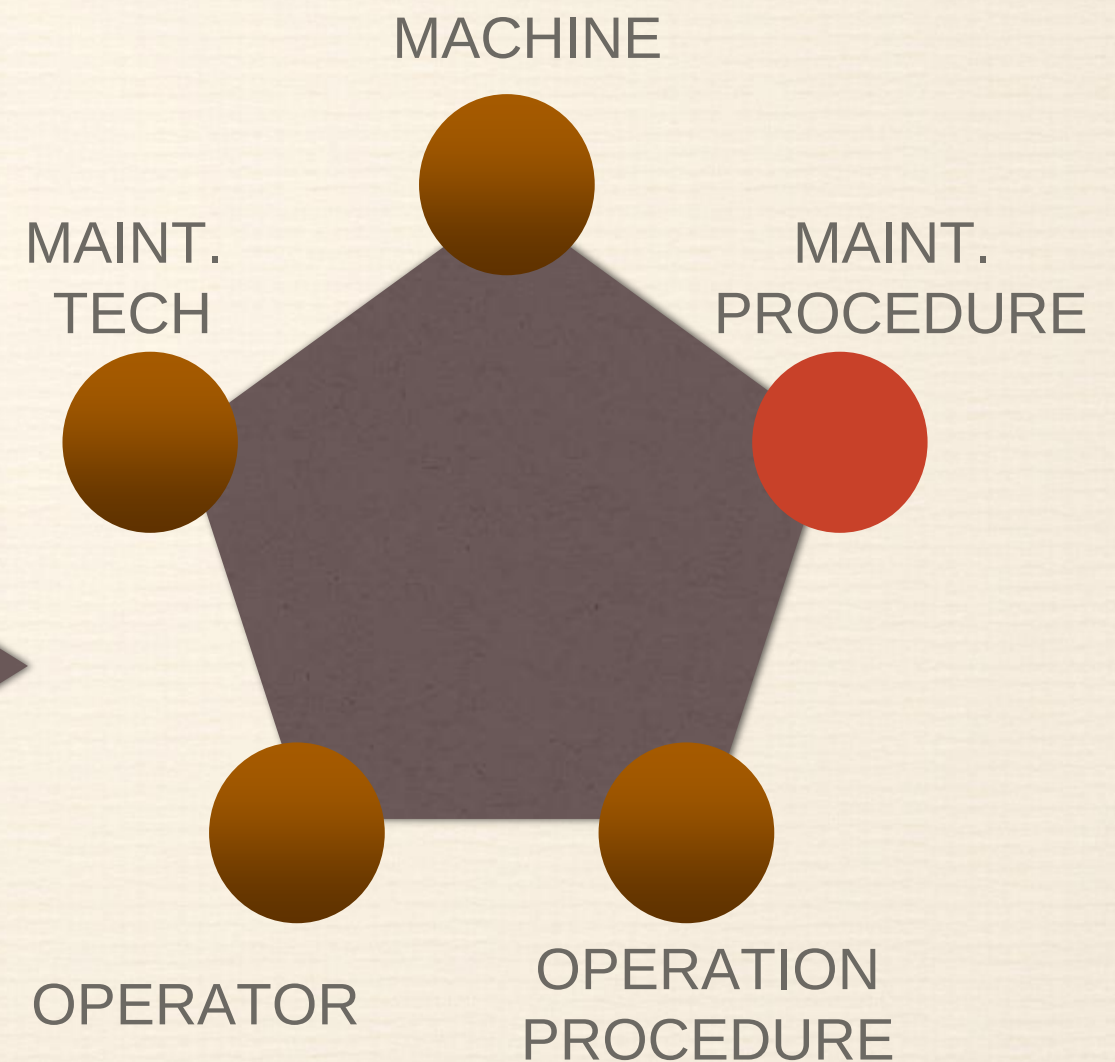


Que debería tener un procedimiento de Lubricación?

TRADITIONAL 5 R'S



RCM 5 Rd'S





Impacta el operador en el mantenimiento de una máquina?

RCM 5 Rd'S



MAINT.
TECH

MACHINE

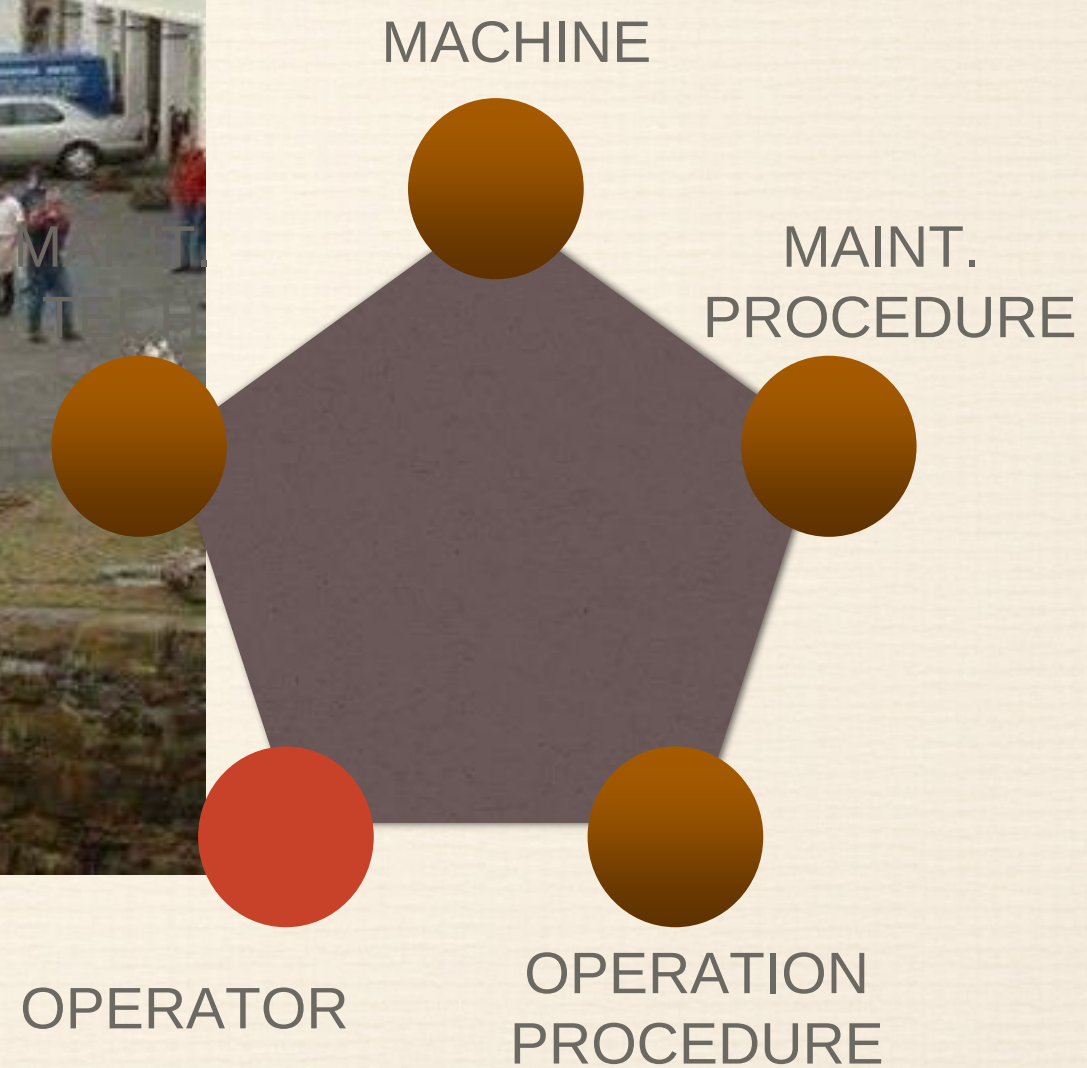
MAINT.
PROCEDURE

OPERATOR

OPERATION
PROCEDURE



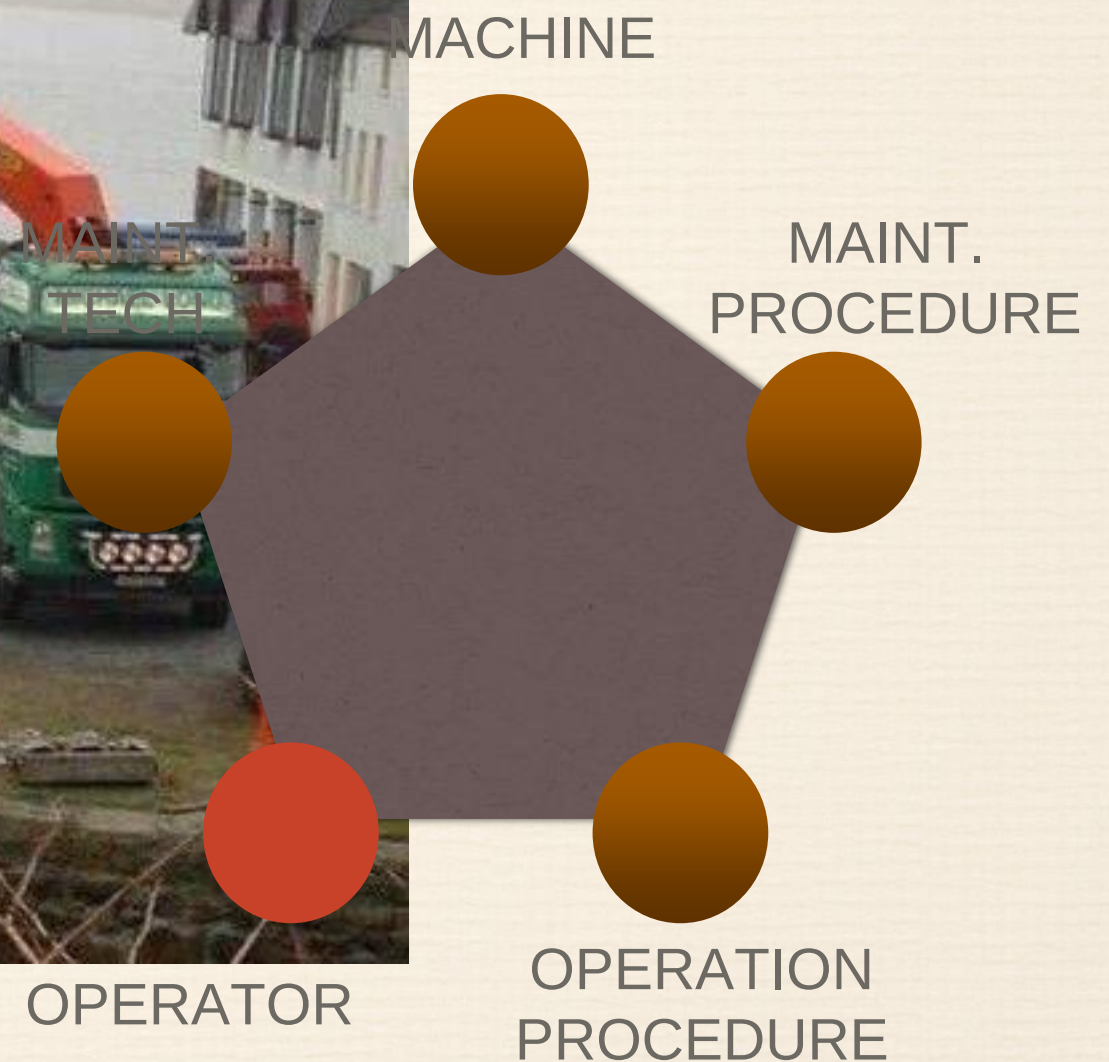
RCM 5 Rd'S





Pedir Ayuda

RCM 5 Rd'S





Mantenimiento bajo el agua?

RCM 5 Rd'S



MAINT.
TECH

MACHINE

MAINT.
PROCEDURE

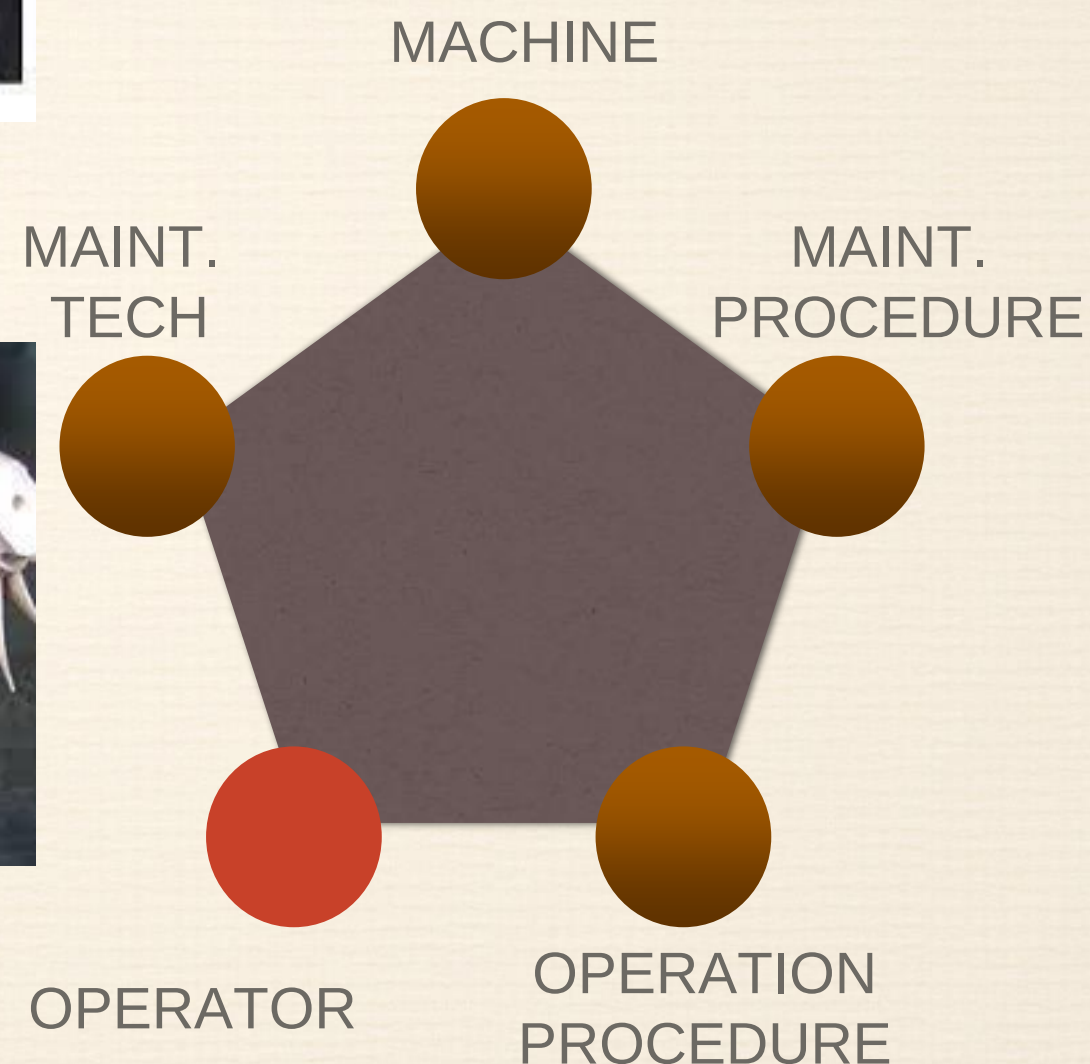
OPERATOR

OPERATION
PROCEDURE



Acelerar antes de Apagar el motor ?

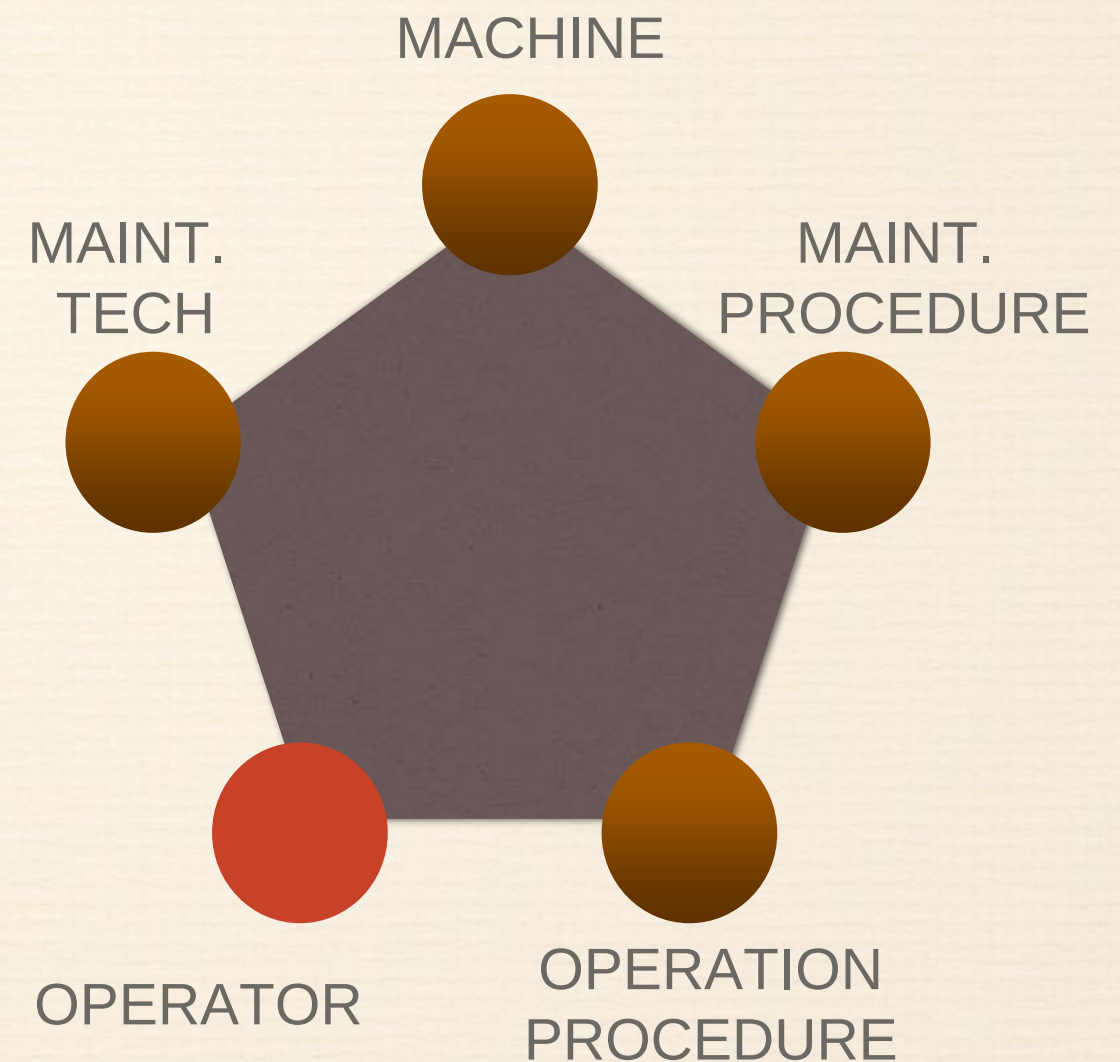
RCM 5 Rd'S





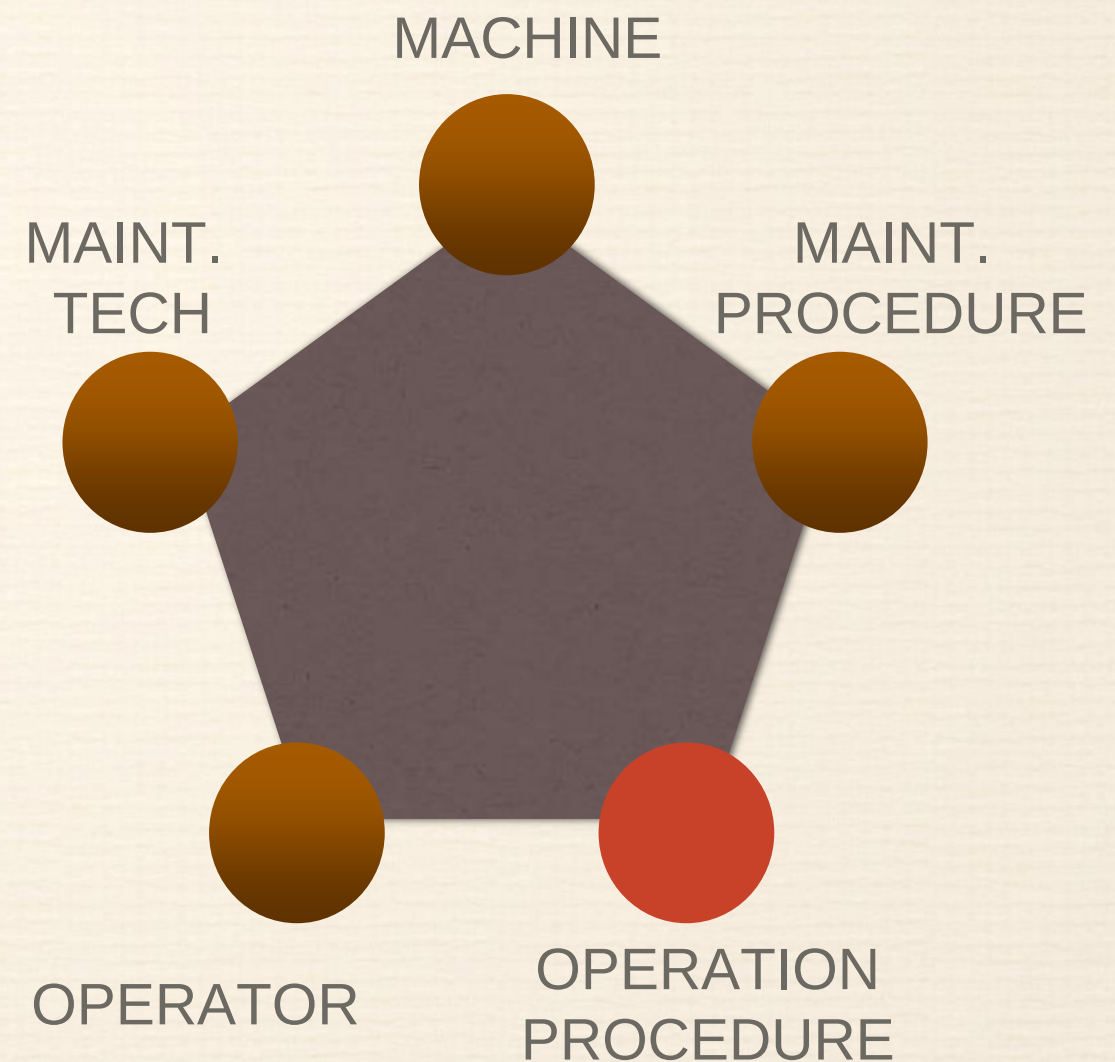
Influyen las condiciones de operación la lubricación y el mantenimiento?

RCM 5 Rd'S



Diferentes procedimientos de lubricación
para diferentes condiciones de
operación:

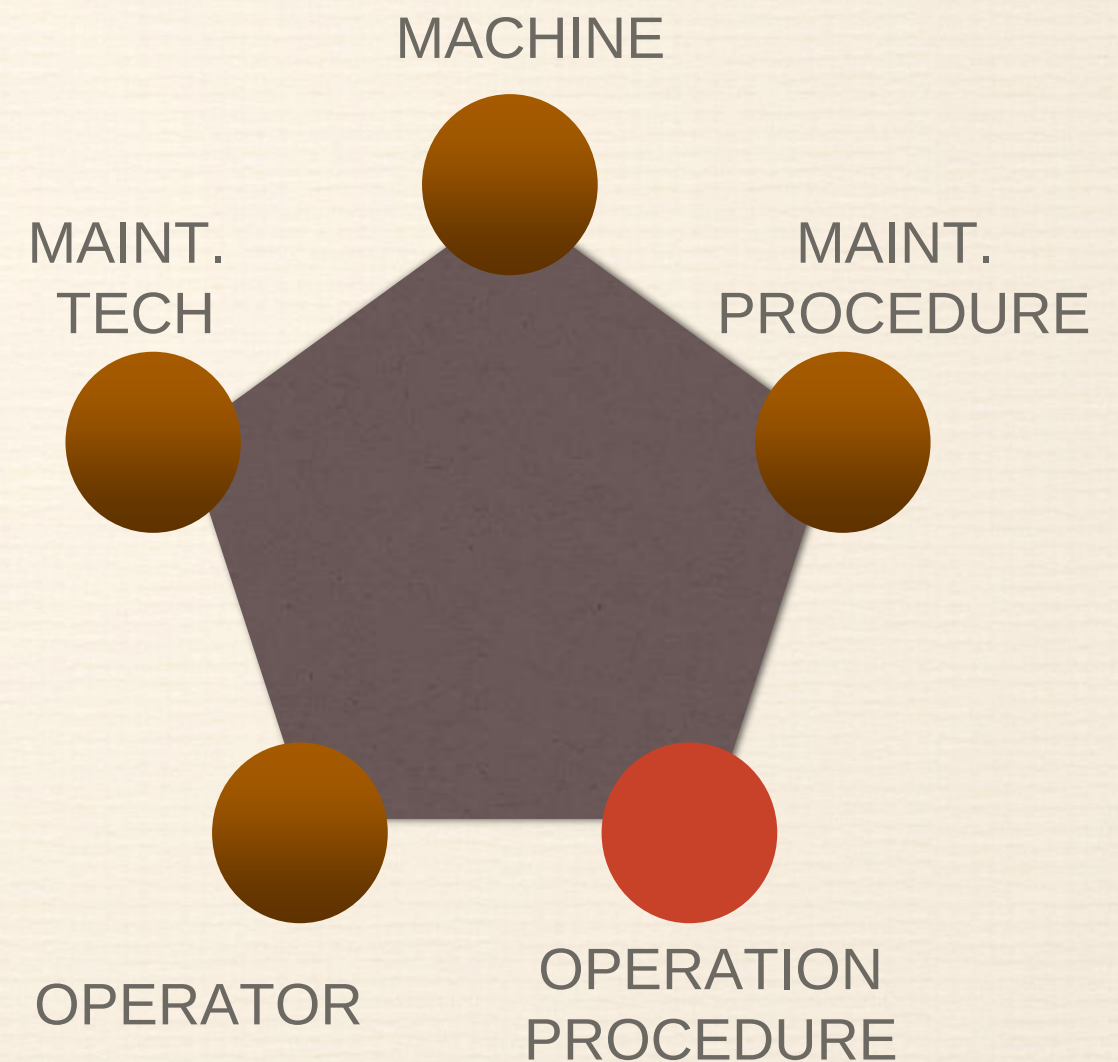
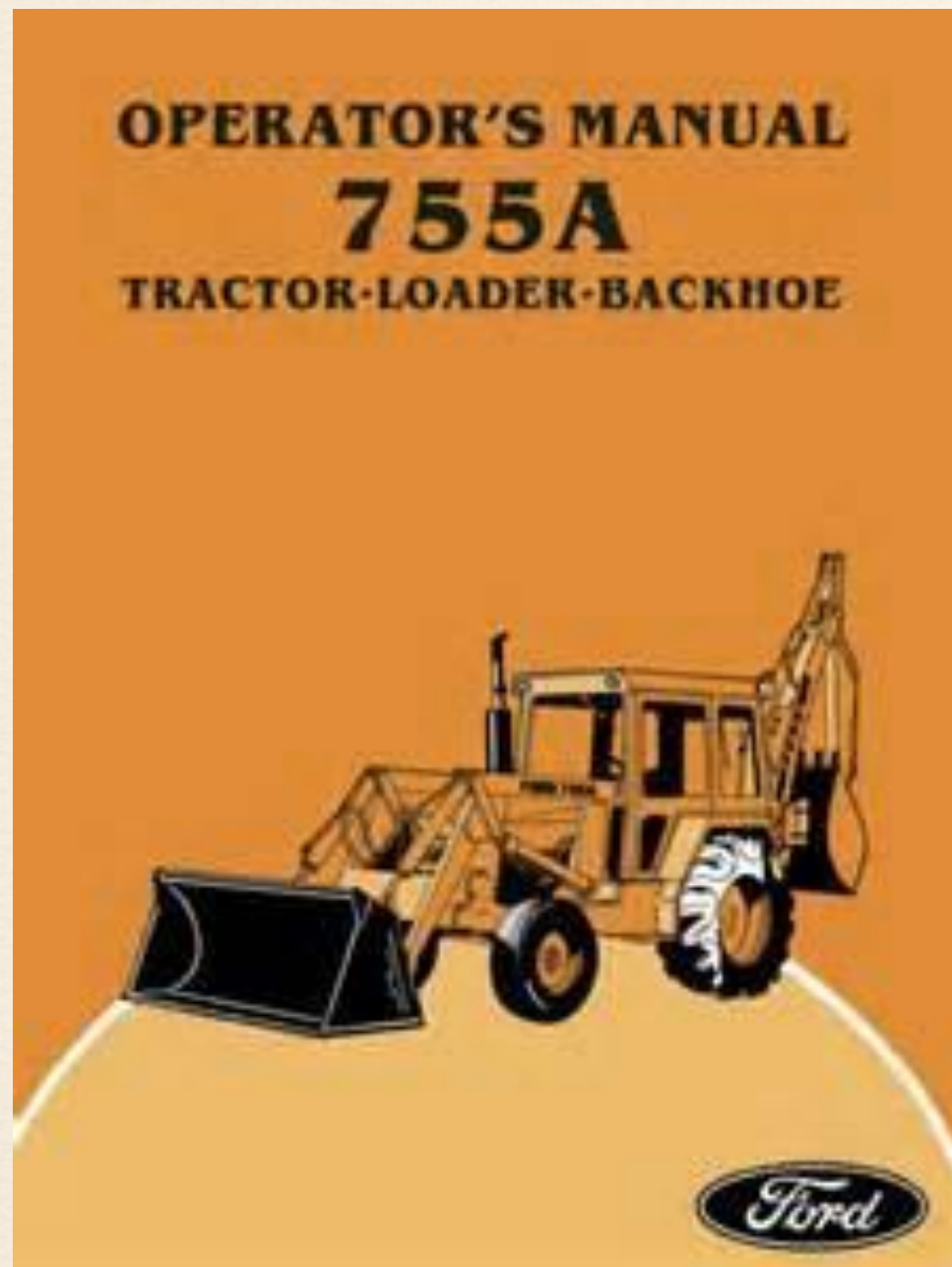
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Manual de Operación

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Juntos Máquinas y Evolución de la gente es la clave para la confiabilidad.

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