

PRODUCTOS TUBULARES DBR IMPLEMENTATION



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PT Production Manager

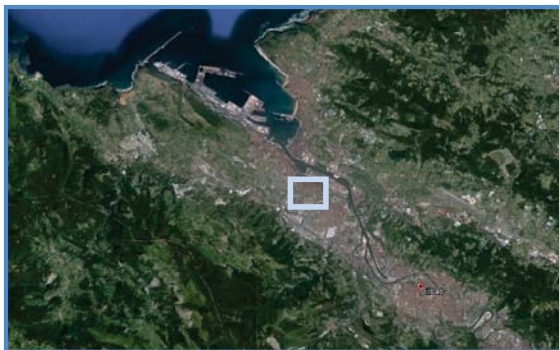


Who We Are and What We Do

PRODUCTOS TUBULARES – DBR IMPLEMENTATION

From Efficiency Driven to Demand Driven

PRODUCTOS TUBULARES (PT), owned by holding **GRUPO TUBOS REUNIDOS (TR)**, is a manufacturer of Hot Finished Seamless Steel Pipes and Tubes.

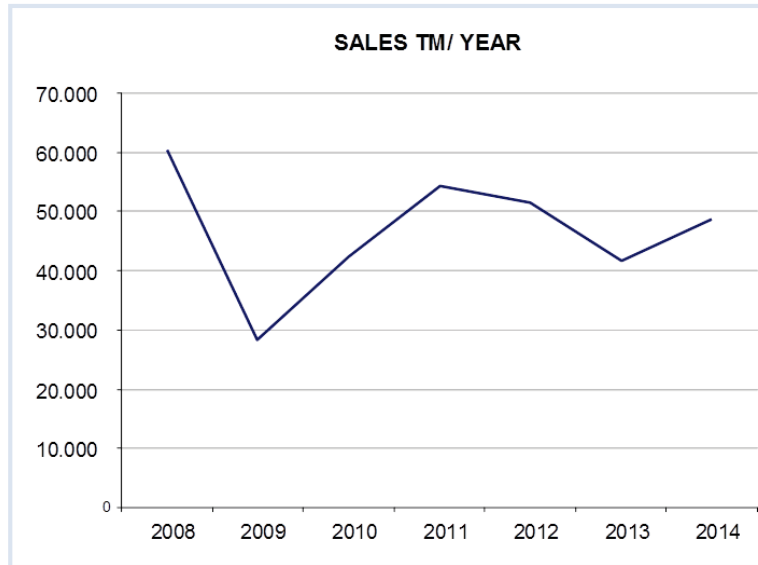


Located near **Bilbao** seaport



2015 in numbers for Productos Tubulares

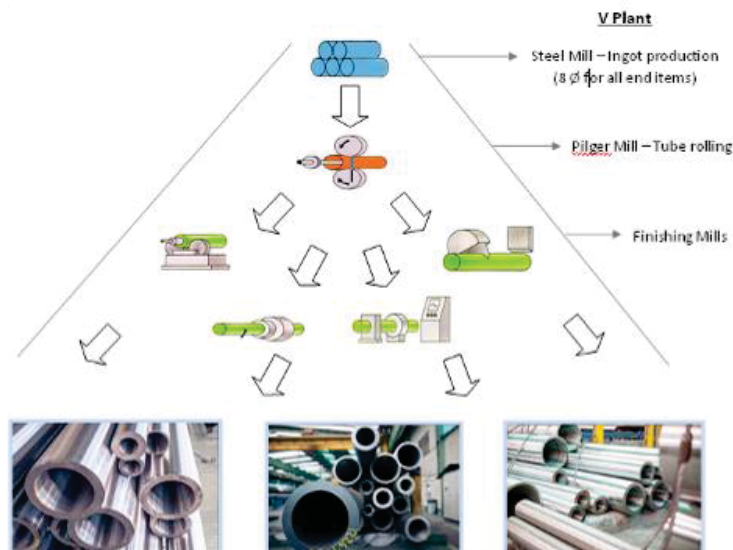
- the Turnover was \$114 million US Dollars
- EBITDA of \$4.55 million
- Production reached 47,155 tons of steel pipes
- Sold in 70 different countries around the world.



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We are an Integral Manufacturer of Seamless Steel Pipes

- Outside Diameter from 190 mm to 635 mm (7 1/2 - 25 ")
- Walls up to 125 mm (5")



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Before the World Economic Crisis (2007) steel pipe market was flooded with demand and manufacturers.

- Standard products.
- Processing large batches.
- Purchased by intermediaries. Stock positioned close to end of the supply chain.

By the end of 2008, this scenario vanished.

- Intermediaries got rid of their inventory and became more concerned about service level.
- Construction companies of hydraulically fractured oil & gas wells became a more important customer.
- Customized products.

Was it possible for Manufacturers to compete in this New Scenario with the same vision, business rules and technology that led to great results in the past?



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When – Who – What – How

PRODUCTOS TUBULARES – DBR IMPLEMENTATION From Efficiency Driven to Demand Driven

When? In **November 2014**, PRODUCTOS TUBULARES Board took the decision of implementing DBR concepts to improve the Operations Supply Chain.

Who? The Managing Director assigned this project leadership to **PT's Production Manager**, who contacted **CMG Consultores** to develop a solution.

What? The GOAL of the project was:

To improve the flow of materials and information to deliver a better service level.

How? DBR rules and tools were implemented in three key areas, Planning, Execution and Control.



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Old Policy 1 : Rolled Tons (Ton/Month) is the main productivity metric.**Associated Behaviors**

- Increase “rolling loads” per Matrix Diameter.
- Customer Orders rolled ahead of time to Optimize setups and batch sizes
- Pipes with low finishing work load are pushed to production ahead of time.
- Delay smaller diameters as much as possible

Negative Effects

- WIP Inventory increases.
- Temporary bottlenecks in finishing resources.
- It seems finishing resources capacity is scarce
- Low Customer Service Levels.



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Old Policy 2 : Monthly customer due date batching**Associated Behaviors**

- Monthly batching rolling loads
- End-of-Month syndrome: all work orders are expedited too late
- Delays of 1 month or multiple

Negative Effects

- WIP Inventory increases.
- It becomes very difficult to prioritize orders.
- Low Customer Service Levels.



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New Policy 1 : The main productivity metric should be monthly cashflow.Associated Behaviors

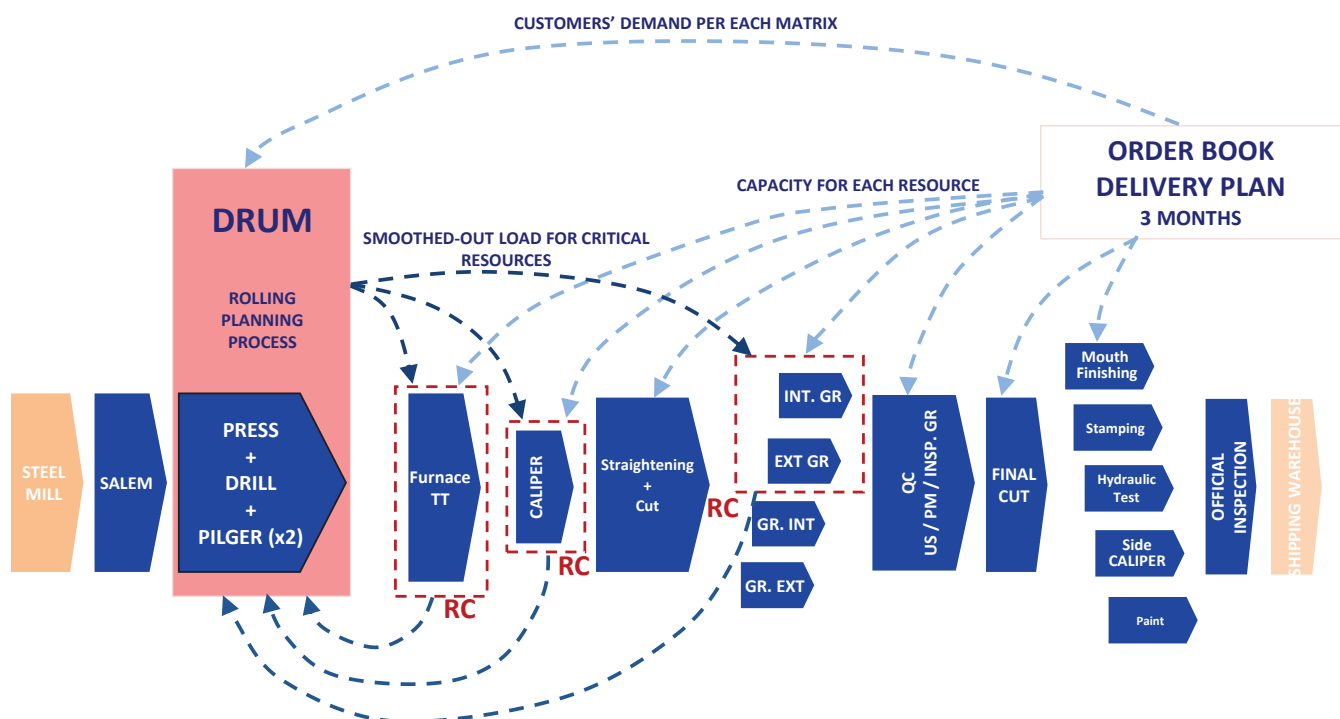
- KPI: On time Orders in items and euros.
- Delays are measured in Gross Margin Euros that cannot be invoiced on time.
- Objective criteria to prioritize orders.
- Rolled Tons metric is ERRADICATED- Invoiced /Shipped TONS, new main metric.

Associated Effects

- The whole system is subordinated to customer's demand: Service Level improve.



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Manufacturing ProcessPRODUCTOS TUBULARES – DBR IMPLEMENTATION
From Efficiency Driven to Demand Driven

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A- Each Matrix has to enter production more frequently

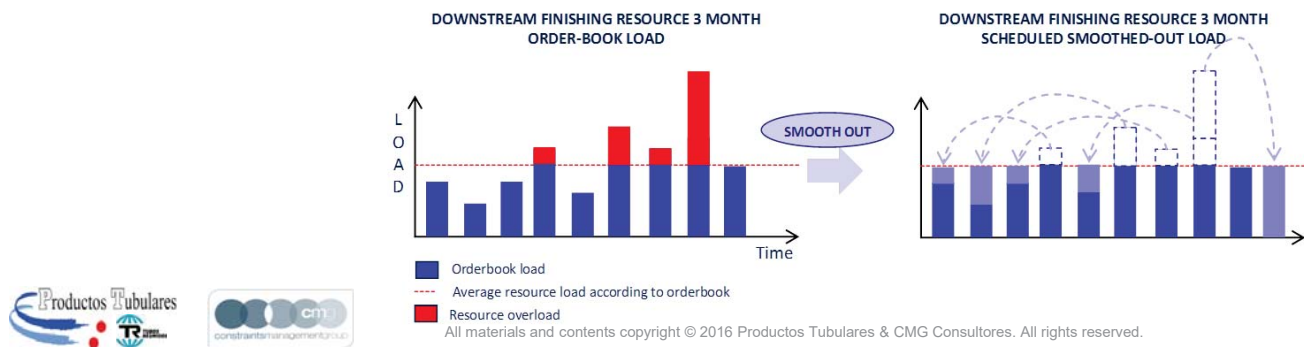
Goal

Increase the rolling frequency of each pipe type to stagger the work load for the resources downstream.

B- A Uniform work load for each critical resource downstream has to be delivered from Rolling, according to the order book

Goal

Delay or bring forward work orders' start dates only for those pipes that allow critical resource work load to be staggered and avoid flow obstructions.



New Planning Policies

New Policy 2 : Minimum of 5 rolling loads per week to improve flow.

Associated Behaviors

- Rolling Plan has to consider downstream critical resource load: Heat Treatments, Grindings, Straightening.
- Rolling Plan must assure a minimum work load for critical resources.
- Orders can only be pushed to production ahead of time to achieve the minimum work load for the critical resources.

Associated Effects

- Material input plan is stable.
- No artificial bottlenecks are generated downstream
- Hidden capacity emerges
- WIP inventory reduced
- Less overtime hours are required in downstream resources

New Policy 3 : Daily due dates for managing shop floor priorities.Associated Behaviors

- Weekly batching in Rolling Plan, instead of monthly batches.
- Lead times are managed according to 6 different product families.
- A Shipping Buffer is assigned to Each Rolling Order to obtain an End-of-Production due date.

Associated Effects

- WIP inventory reduced
- Customer Service Level increases
- It becomes easier to prioritize between orders.
- Material moves faster and in a more organized manner.



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New Policy 4 : Due Dates are tracked thru Shipping Buffers.Associated Behaviors

- The Rolling Plan is synchronized taking into account each pipe Shipping Buffer.
- Resource production schedule execution is controlled by managing priorities in critical resources according to Shipping Buffer Status.

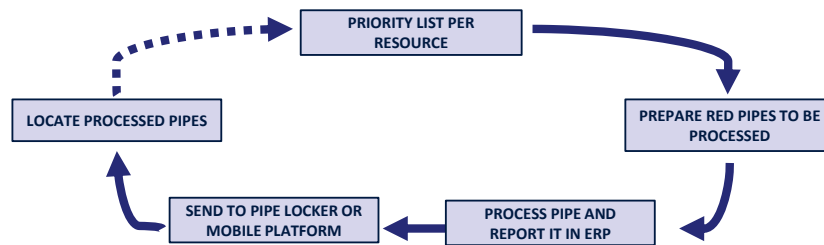
Associated Effects

- Less data, more information
- Less schedule modifications.
- Stable execution priorities.
- Early warnings if due dates are in risk.

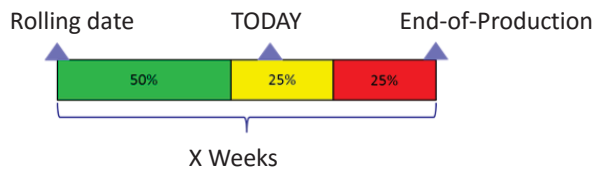


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Prioritization, Preparation & Location of RED PIPES is Key for FLOW



Prioritization System: Buffer Consumption



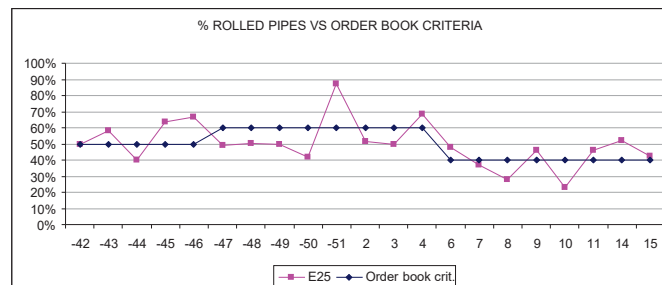
$$\% \text{Buffer Cons.} = \frac{(\text{Today} - \text{Rolling Date})}{(\text{End of Prod Date} - \text{Rolling Date})} \times 100$$



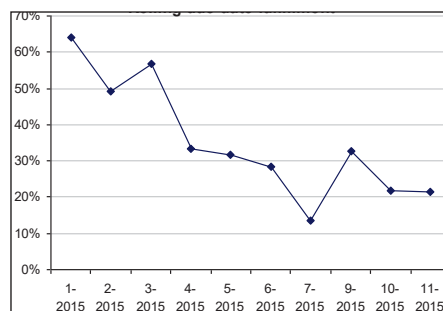
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Process Control - KPIs

A - Planning Criteria-Downstream Critical Resource Pipe %

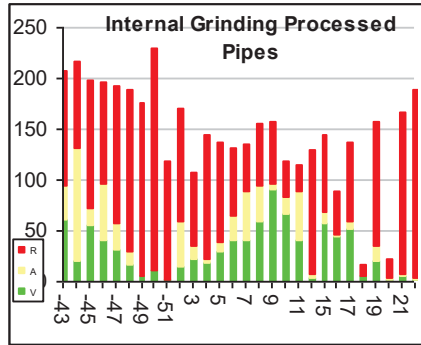


B - Rolling due date delay

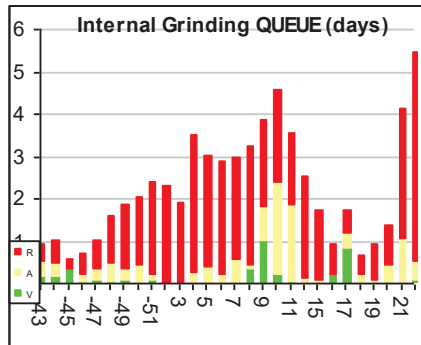


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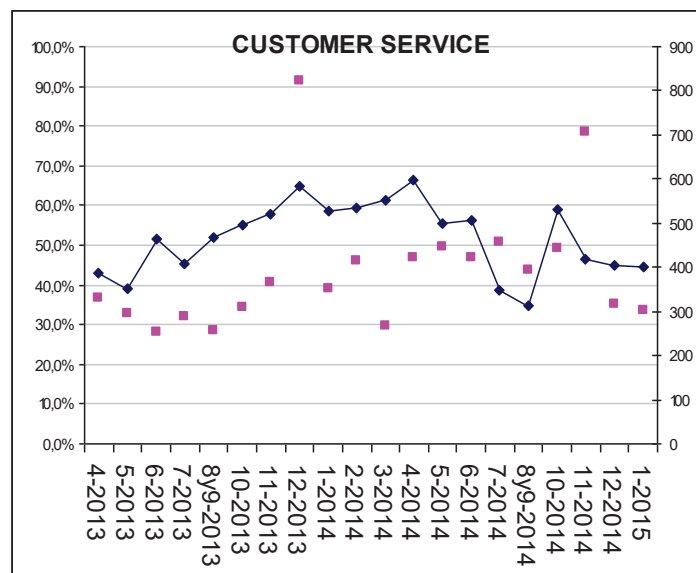
C - Daily Production Control



D - Critical Resource Queue Trend.



F - Service Level



-



PRODUCTOS TUBULARES – DBR IMPLEMENTATION

- Pendiente por Operación**

Estado Taller en Situación Actual

Estado Operaciones

Visualizar En Grupos No Incluir tubos en CF No

No Seleccionar Ninguno Seleccionar Todos

Sel	Descripción	Tubos	R	A	V	S/C
12	Tratamiento Termico	65	16	16	33	0
60	Tratamiento Termico Ext.	10	10	0	0	0
61	Tratamiento Termico Inox.	90	6	14	70	0
16	Enderezadora M.G.H.	112	43	50	19	0
17	Corte Previo Pegas Onda	29	15	12	2	0
63	Enderezadora ONAPRES	31	5	25	1	0
20	Enderezado Rotativa	47	30	12	5	0
68	ESMERILADO EXTERIOR Inoxidable	55	10	9	36	0
18	Corte Previo Ravensburg / PPT	41	11	29	1	0
19	Corte Previo Danobat	3	2	1	0	0
64	GRANALLA INTERIOR	74	17	56	1	0
69	ESMERILADO INTERIOR Inoxidable	92	34	58	0	0
73	GRANALLA INTERIOR Fuera Fabrica	6	5	1	0	0
22	ESMERILADO INTERIOR Laminacion	17	16	0	1	0
58	GRANALLA EXTERIOR	2	1	0	1	0
23	ESMERILADO EXTERIOR Laminacion	11	2	9	0	0
24	Liquidos	7	2	5	0	0
70	Ultrasonidos Inoxidable	9	9	0	0	0
25	3ª Inspeccion Laminacion	307	301	1	5	0
27	Ultrasonidos Laminacion	52	31	20	1	0
65	Particulas Magneticas	15	12	0	3	0
39	Esmerilado Fino y Lija	24	24	0	0	0
31	3ª Inspeccion Inoxidable	11	11	0	0	0
Totales Tubo		1110	613	318	179	0

Exportar Excel

BUSCAR

Búsqueda por... PEDIDO / - TUBO - ZONA TODAS

Tubos

Buff	Real/Ti	Buff Ini	Buff	Inac Dias	Origen	Operacion
0	4/2	22/06/2016	999999	1	RUITA	:00 EXTERIOR INOX
0	4/2	21/06/2016	999999	1	RUITA	:00 EXTERIOR INOX
0	4/2	08/06/2016	999999	0	RUITA	:00 EXTERIOR INOX
0	4/2	21/06/2016	999999	0	RUITA	:00 EXTERIOR INOX
0	4/2	06/06/2016	999999	0	RUITA	:00 EXTERIOR INOX
19	4/2	11/03/2016	547	27	RUITA	:00 EXTERIOR INOX
3	4/2	07/06/2016	533	1	RUITA	:00 EXTERIOR INOX
33	4/2	26/02/2016	350	55	RUITA	:00 EXTERIOR INOX
33	4/2	26/02/2016	369	17	RUITA	:00 EXTERIOR INOX
30	4/2	13/04/2016	237	0	RUITA	:00 EXTERIOR INOX
23	4/2	07/06/2016	70	1	RUITA	:00 EXTERIOR INOX
47	4/9	24/05/2016	64	13	RUITA	:00 EXTERIOR INOX
47	4/9	24/05/2016	64	3	RUITA	:00 EXTERIOR INOX
47	4/9	24/05/2016	64	3	RUITA	:00 EXTERIOR INOX
47	4/9	24/05/2016	64	3	RUITA	:00 EXTERIOR INOX
49	4/9	24/05/2016	61	7	RUITA	:00 EXTERIOR INOX
36	4/2	09/06/2016	39	0	RUITA	:00 EXTERIOR INOX
42	4/2	08/06/2016	36	15	RUITA	:00 EXTERIOR INOX
24	4/2	21/06/2016	8	1	RUITA	:00 EXTERIOR INOX
24	4/2	21/06/2016	8	1	RUITA	:00 EXTERIOR INOX
24	4/2	21/06/2016	8	1	RUITA	:00 EXTERIOR INOX
24	4/2	21/06/2016	8	1	RUITA	:00 EXTERIOR INOX
39	4/2	21/06/2016	5	1	RUITA	:00 EXTERIOR INOX
39	4/2	21/06/2016	5	1	RUITA	:00 EXTERIOR INOX
39	4/2	21/06/2016	5	1	RUITA	:00 EXTERIOR INOX

Ruta

Operacion

Enderezar 14/03/2016 15:18:01

Uno Consejo

SALEM

Presna

Perforadora

Laminacion

1ª Inspeccion

1º TT MM en "IN" Temp. 920 Perm. 225 Enfri. "AI"

2º TT RE en "IN" Temp. 750 Perm. 225 Enfri. "AI"

Enderezada ONAPRES ONAPRES (IN)

Corte Previo Pegas Onda en PEGAS GOND (IN)

ESMERILADO EXTERIOR Inoxidable

GRANALLA INTERIOR Fuera Fabrica

INSPECCION DE GRANALLA

Ultrasonidos Laminacion

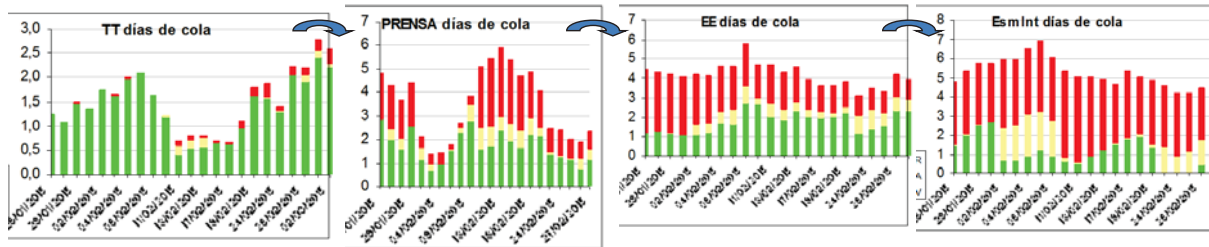
Operaciones Realizadas

Fecha	Mquina	Descop
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✓ It is possible to estimate the End of Production Date. Adding total queue days ahead of the critical resources in the items route.



We can estimated a real delivery date

- Good Customer information
- Less Sales Dpmt. noise

PurchaseOrder				PIPE CODE	Week Delivery		
					25	26	28
681	171	167	1	9708	6	2	
				9709	11	2	2
				9710	4		4



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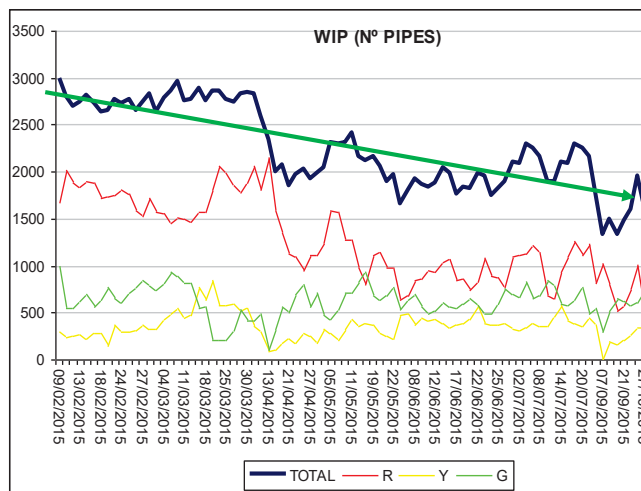
DBR IMPLEMENTATION RESULTS

PRODUCTOS TUBULARES – DBR IMPLEMENTATION From Efficiency Driven to Demand Driven

DBR policies Go Live date was January 2015, achieving results before the end of Q1 2015

Work In Process reduction

- Rolling stopped for 1 week in March 2015
- After that the WIP remained stable with a 30% inventory reduction



Lead Time reduction

- Dramatically reduced after DBR policies.
- Dropping from 35 to 14 days on average.



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BEFORE IMPLEMENTATION

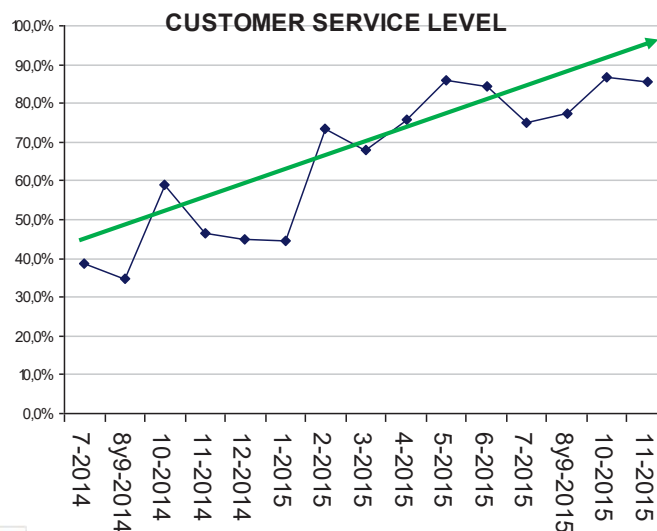
AFTER IMPLEMENTATION



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Customer Service Level % of full orders shipped on time to the customer

- Before DBR implementation CLS oscillated between 30-50%.
- After ONLY 3 MONTHS of planning, executing and controlling according DBR policies, 80%+ was achieved.



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ECONOMIC conclusion

- PT Top Management was very concerned about the impact inventory reduction would have in the balance sheet.
- However, Turnover improved (+60%) with less Rolled Tons (-7%) and just a slight increase in Finished Tons (+8%).

	Q4 2014	Q1 2015	Q2 2015
Rolled TM	20,175	18,686	18,865
Finished TM	13,832	14,905	14,412
WIP variation TM	1,115	-2,090	-883
Total Stock Variation (€)	6,100 €	-7,100 €	-5,351,000 €
Turnover (€)	21,715,000 €	35,027,000 €	27,400,000 €

The right Customer Orders were being manufactured to be shipped and invoiced on time, increasing the Turnover and improving the balance sheet despite the inventory reduction



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QUESTIONS ?



Thank you!

