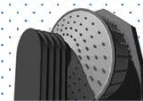




## EL FUTURO DE LOS REVESTIMIENTOS PARA MOLINO SAG EN MINERIA

### SAG MILL

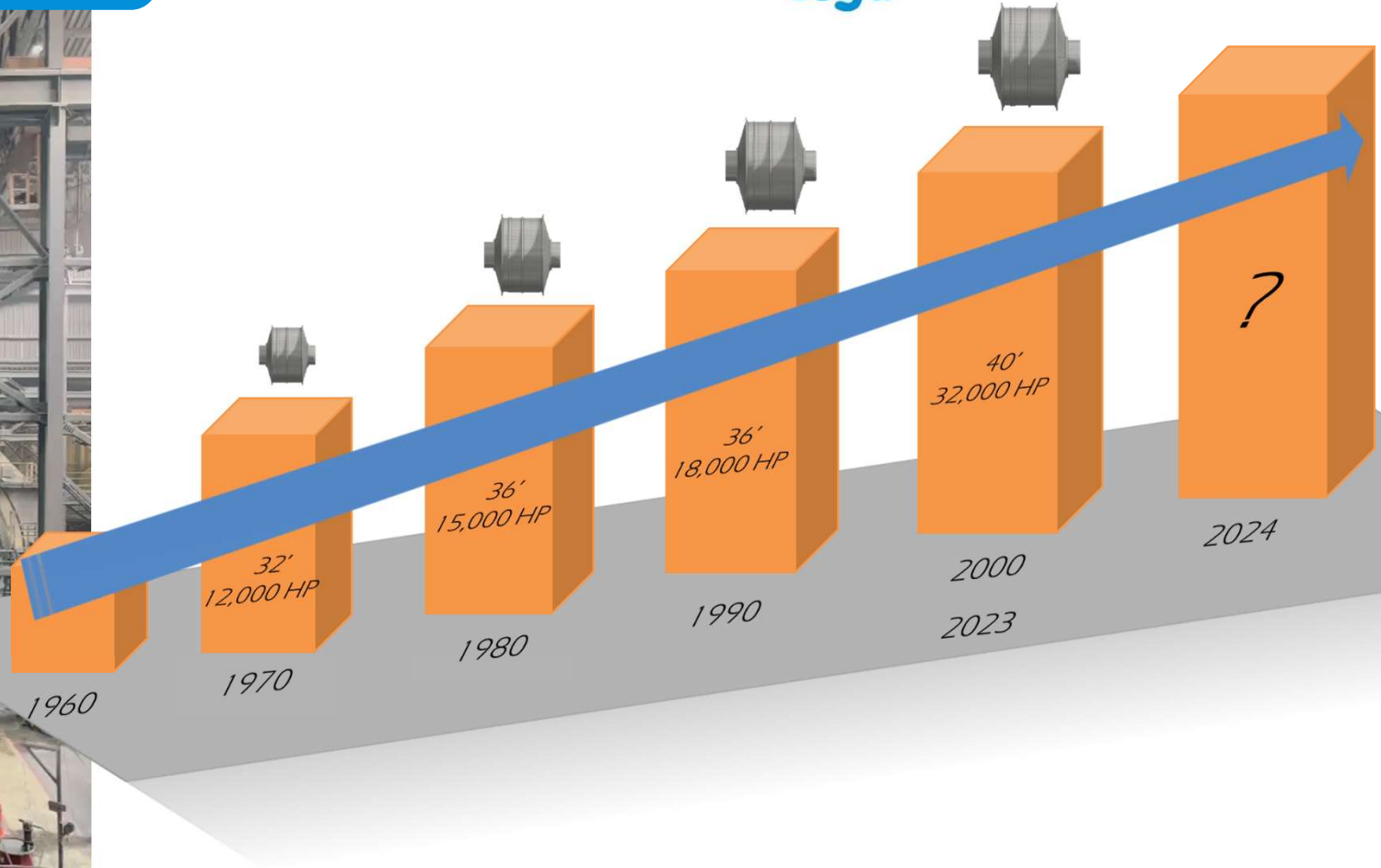
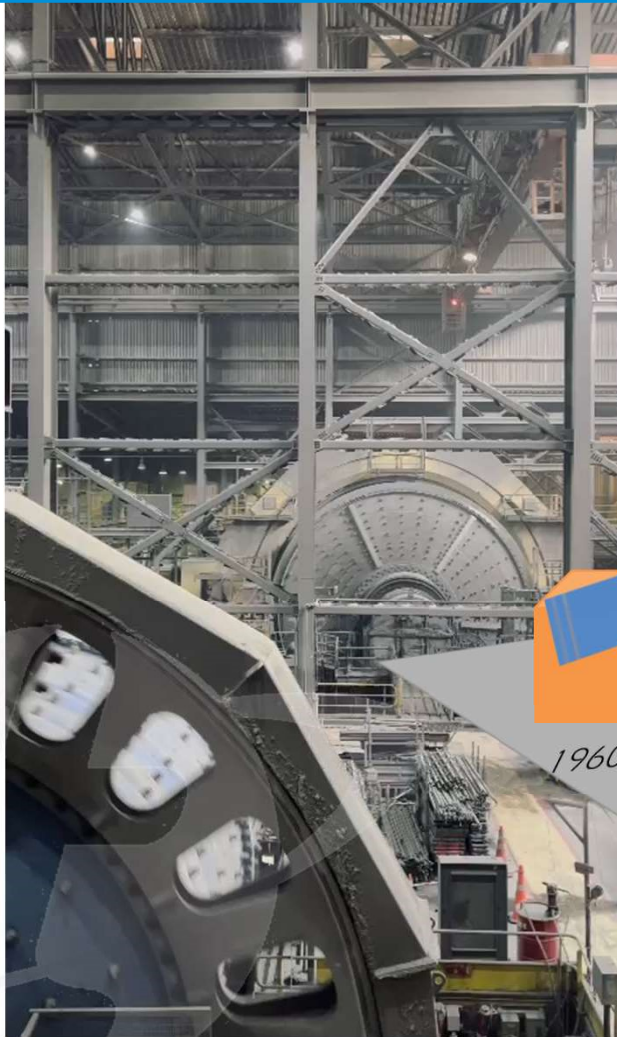


Mill Lining Engineering

Date: 29-08-2024  
Rec : 04

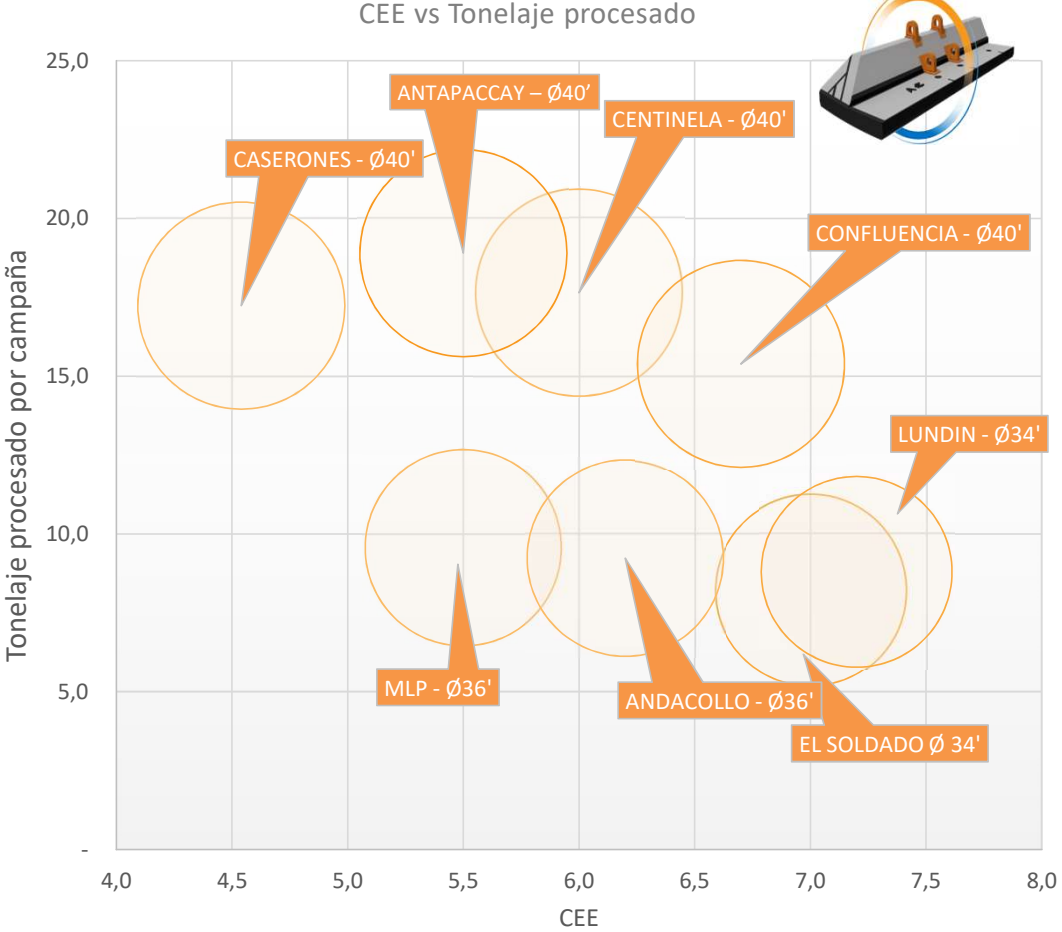
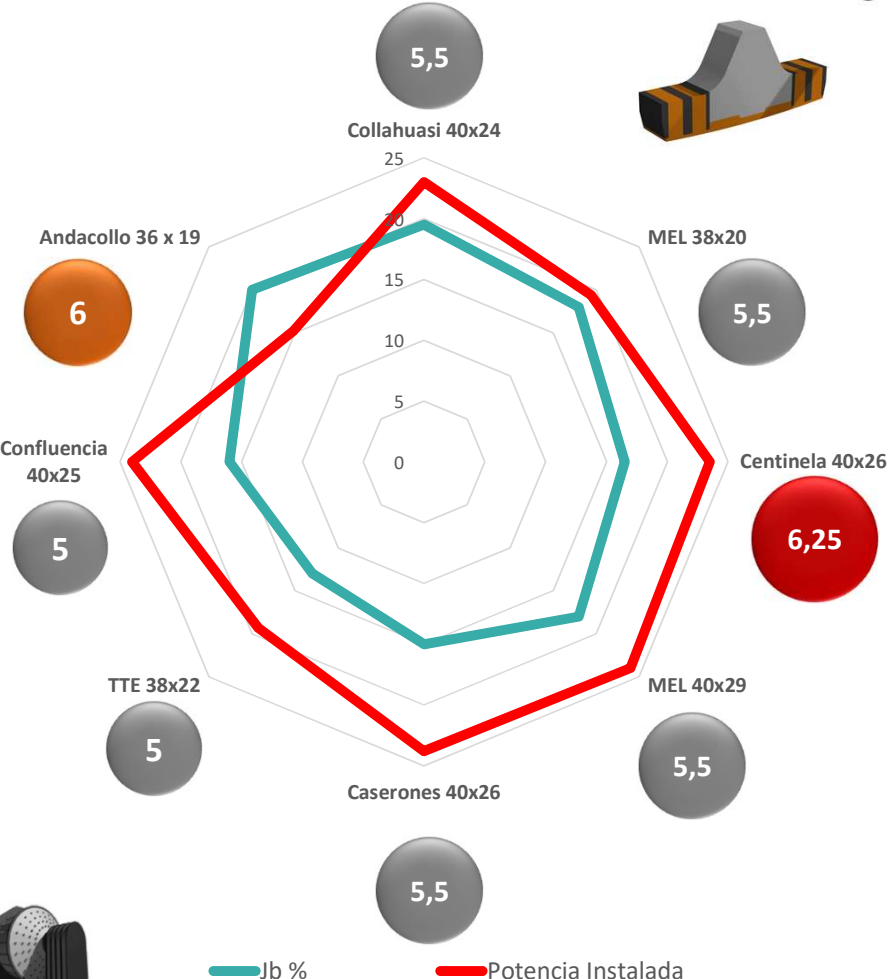


MOLINOS SAG





SAG MILL – AMERICA DEL SUR





 **REVESTIMIENTOS**

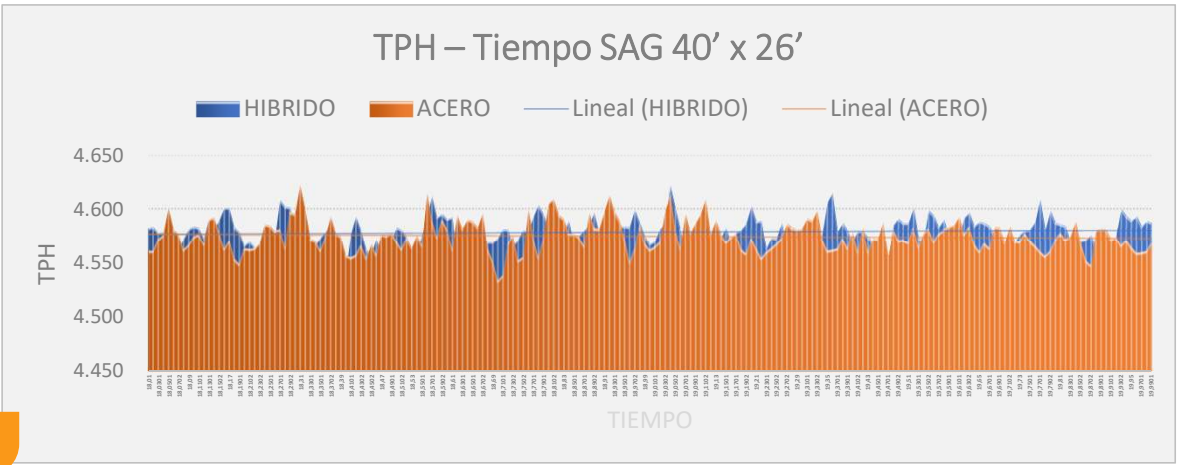
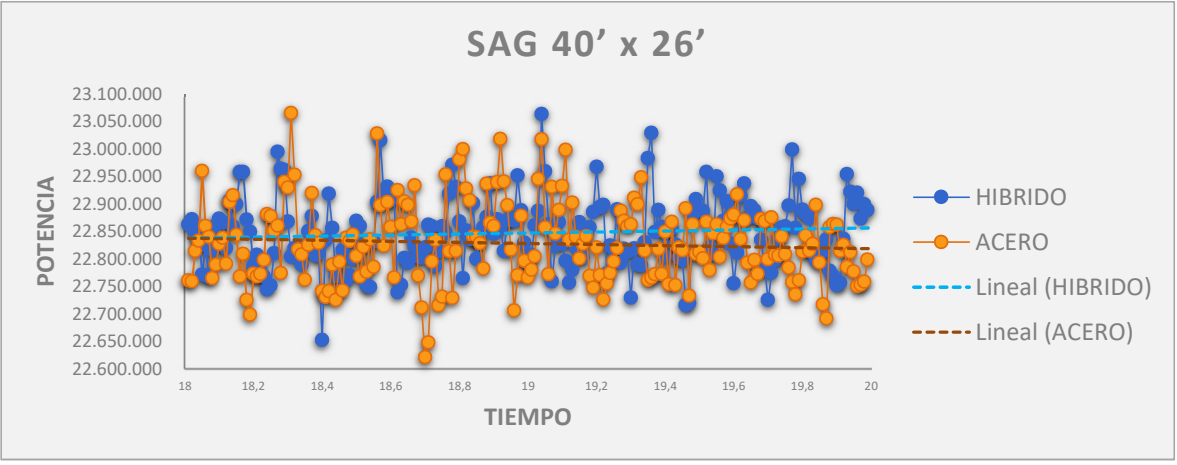
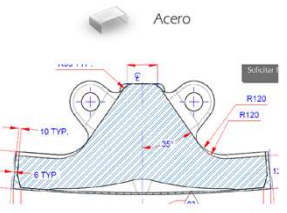
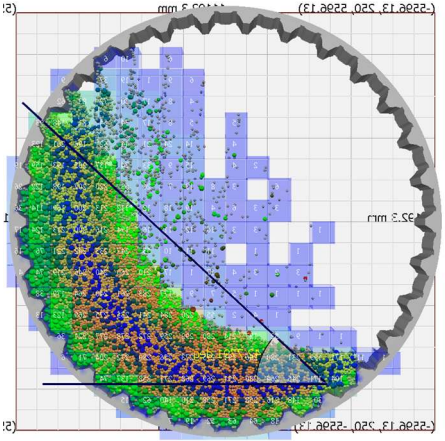
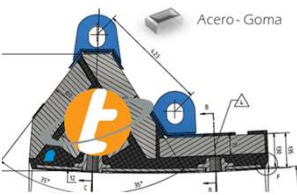
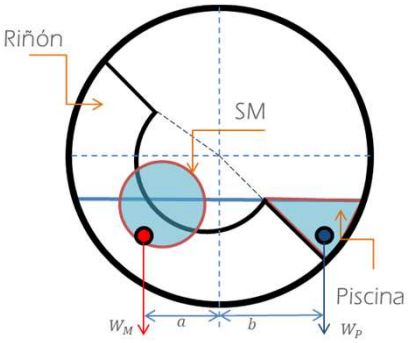
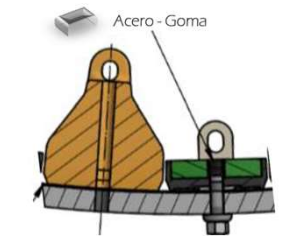






REVESTIMIENTOS

TIPOS - GEOMETRIA



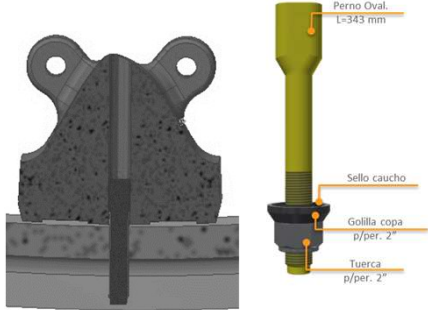
OPTIMIZAR RENDIMIENTO



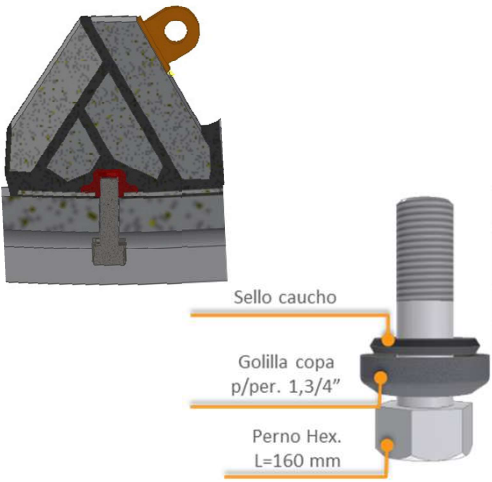


REVESTIMIENTOS

TIPO DE FIJACIONES

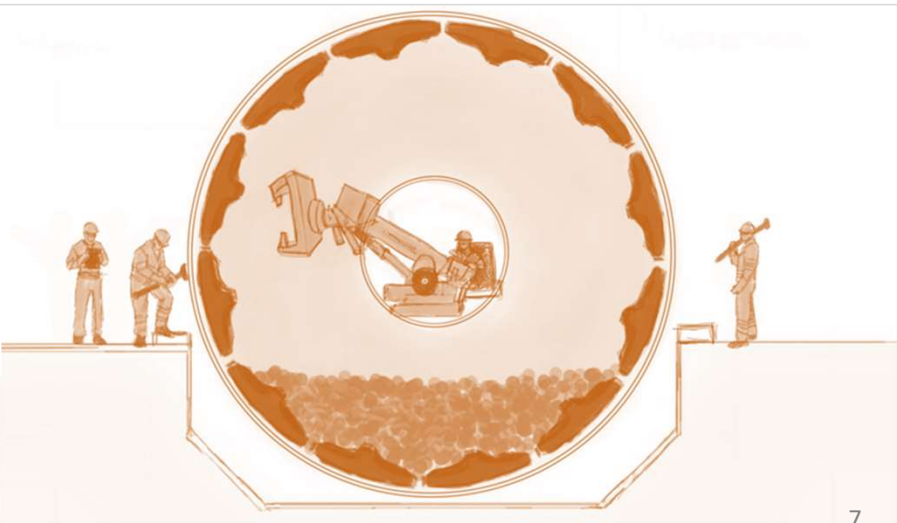


DATOS TÉCNICOS	
Descripción	Perno Cabeza Ovalada
Norma	ASTM A-193 Gr B7
Material	AISI 4140 templado revenido
Diámetro	2"
Paso de Rosca	4,5



DATOS TÉCNICOS	
Descripción	Perno Hexagonal Cabeza Alta
Norma	ASTM A-193 Gr B7
Material	AISI 4140 con tratamiento térmico
Diámetro	1,3/4"
Paso de Rosca	5

CONTINUIDAD OPERACIONAL





 IMPACTO DE LOS REVESTIMIENTOS EN LA PLANTA

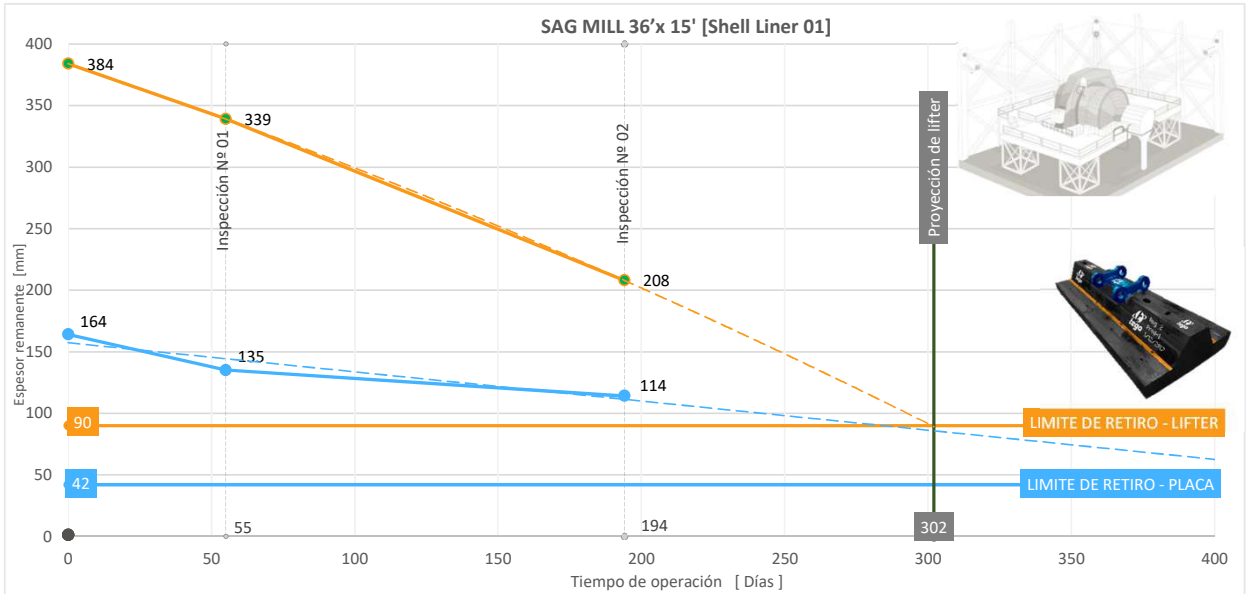
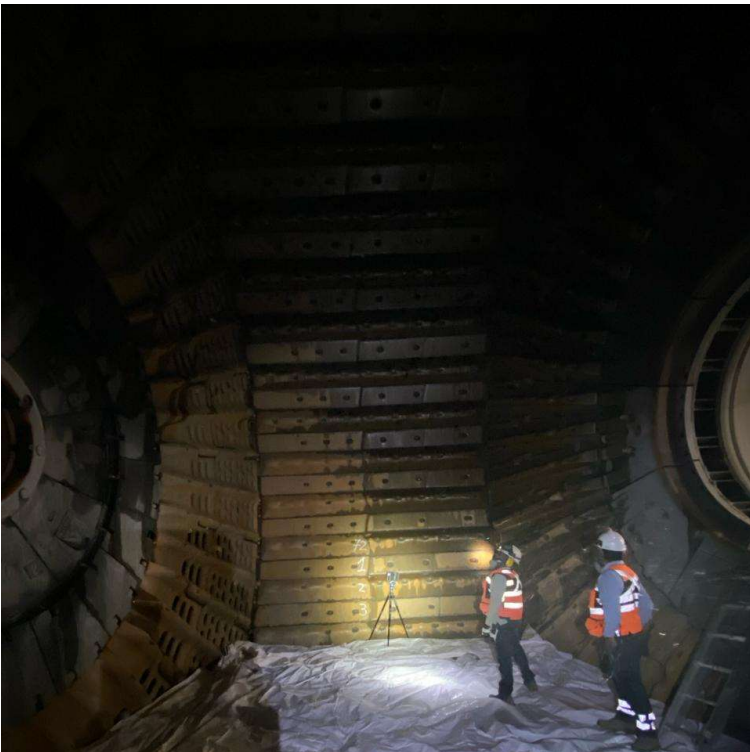






REVESTIMIENTOS

INSPECCIONES DE REVESTIMIENTOS



CONTINUIDAD OPERACIONAL



30 Hrs Planta

2022	ene22	feb22	mar22	abr22	may22	jun22	jul22	ago22	sept22	oct22	nov22	dic22
MOLINO SAG 1	580,0	4,0	4,0	24,0	4,0	4,0	100,0	4,0	4,0	24,0	4,0	4,0
MOLINO BOLAS 4	580,0			24,0			80,0			24,0		
MOLINO BOLAS 5	580,0				240,0		80,0			24,0		
MOLINO SAG 2	4,0	240,0	24,0	4,0	4,0	80,0	4,0	4,0	24,0	4,0	80,0	4,0
MOLINO BOLAS 6		240,0	24,0			80,0			24,0		80,0	
MOLINO BOLAS 7		240,0	24,0			80,0			24,0		125,0	
MOLINO SAG 3	4,0	24,0	240,0	4,0	4,0	24,0	4,0	4,0	80,0	4,0	4,0	170,0



REVESTIMIENTOS

MONITOREO OPERACIONAL

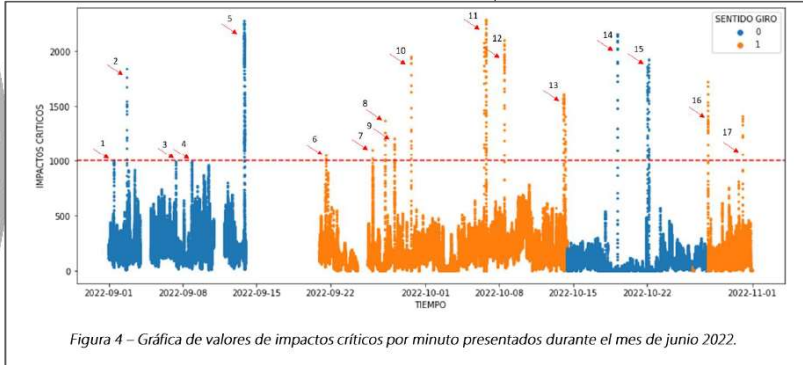
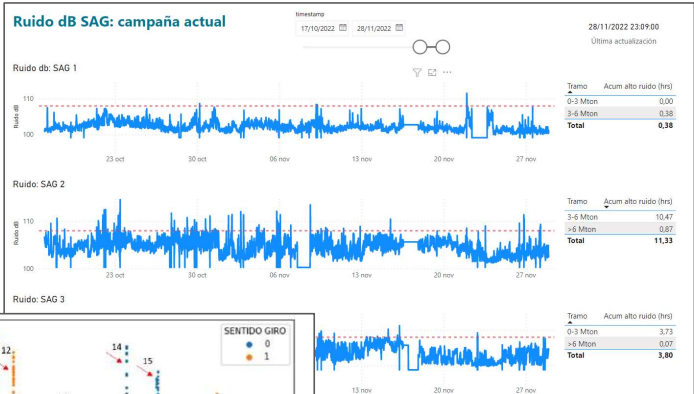
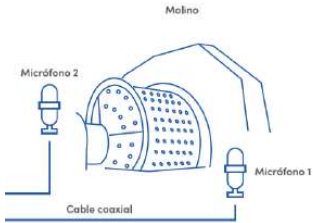
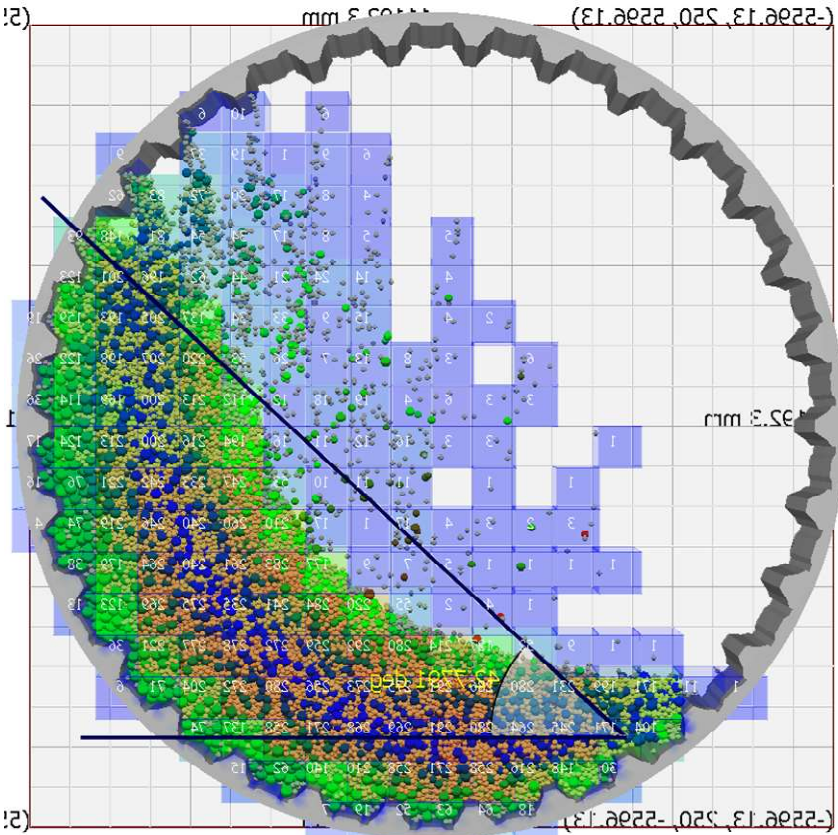
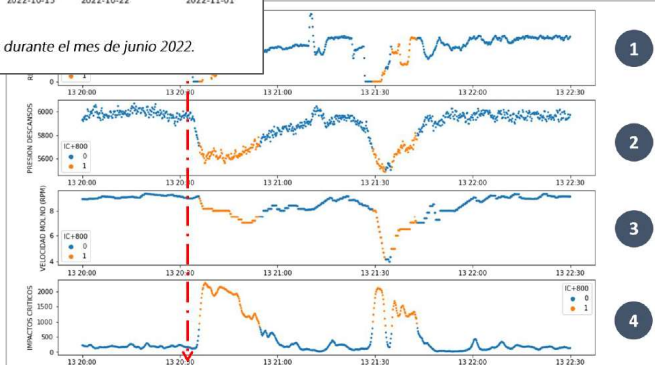


Figura 4 – Gráfica de valores de impactos críticos por minuto presentados durante el mes de junio 2022.



CONTINUIDAD OPERACIONAL



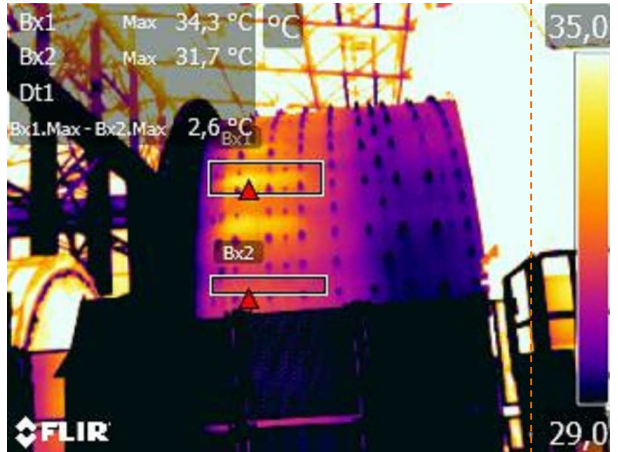


REVESTIMIENTOS

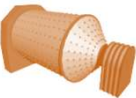
MONITOREO DE FALLA



TERMOGRAFIA



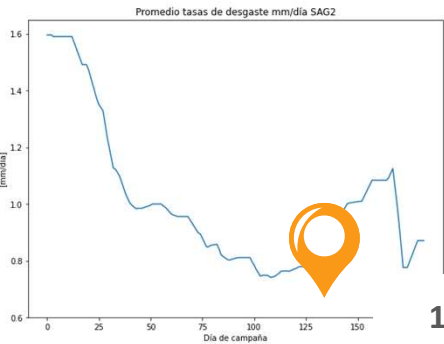
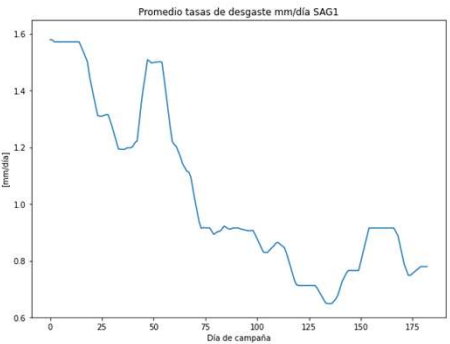
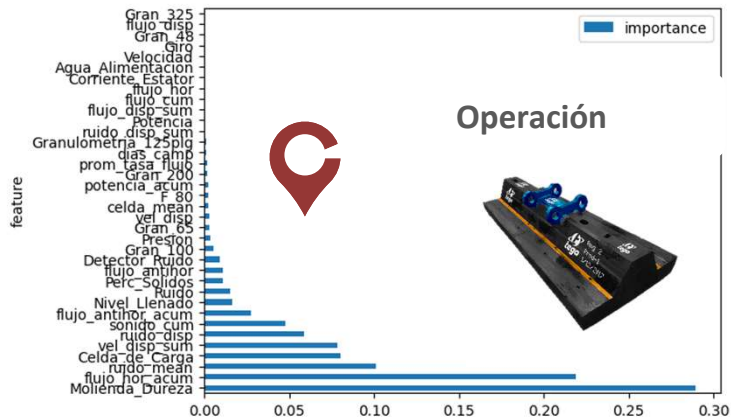
CONTINUIDAD OPERACIONAL





REVESTIMIENTOS

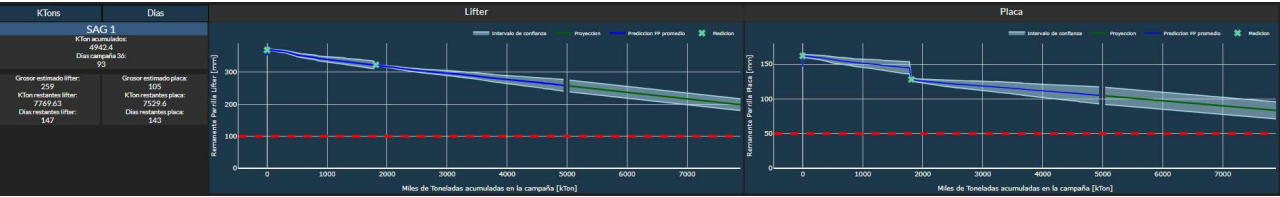
MONITOREO DE CONDICIONES



Material

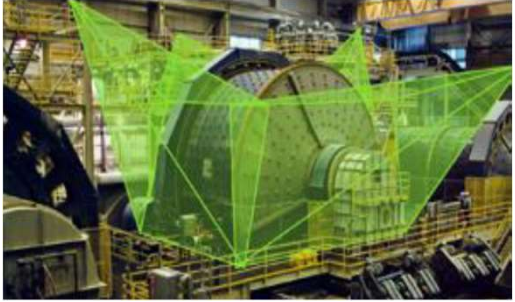


13 años de historia



CONTINUIDAD OPERACIONAL

ENERO-DICIEMBRE BUDGET 2023												
2023	ene23	feb23	mar23	abr23	may23	jun23	jul23	ago23	sept23	oct23	nov23	dic23
MOLINO SAG 1	4	75		4	24	4	75		4	24	4	4
MOLINO BOLAS 4	4	330		4	24	4	75		4	24	4	4
MOLINO BOLAS 5	4	75		4	24	4	75		4	24	4	4
MOLINO SAG 2	75		4	24	4	75		4	624		4	4
MOLINO BOLAS 6	75		4	24	4	75		4	624		4	4
MOLINO BOLAS 7	140		4	24	4	75		4	624		4	4
MOLINO SAG 3	24	4	75		4	24	4	75		4	24	4
MOLINO BOLAS 8	24	75				24			24			24
MOLINO BOLAS 9	24	4	128		4	24	4	75		4	24	4
MOLINO SAG 4							85		4	24	4	4
MOLINO BOLAS 10							85		4	24	4	4

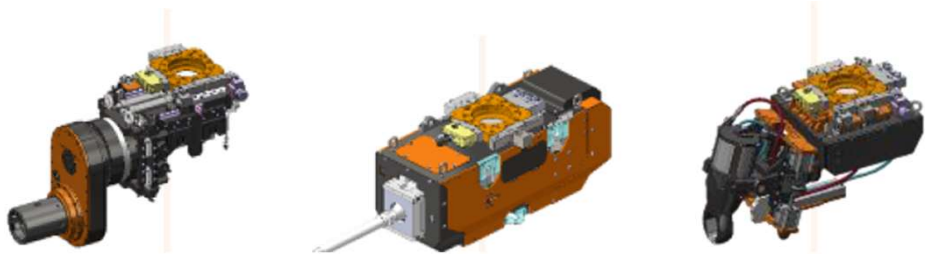
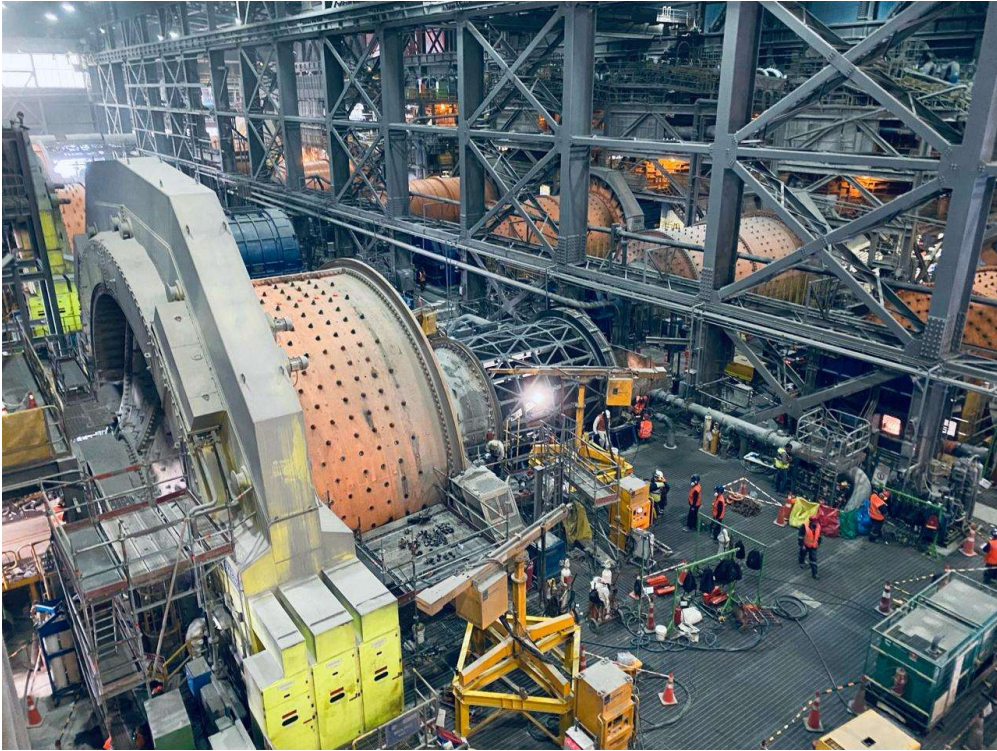






REVESTIMIENTOS

CAMBIO DE REVESTIMIENTOS



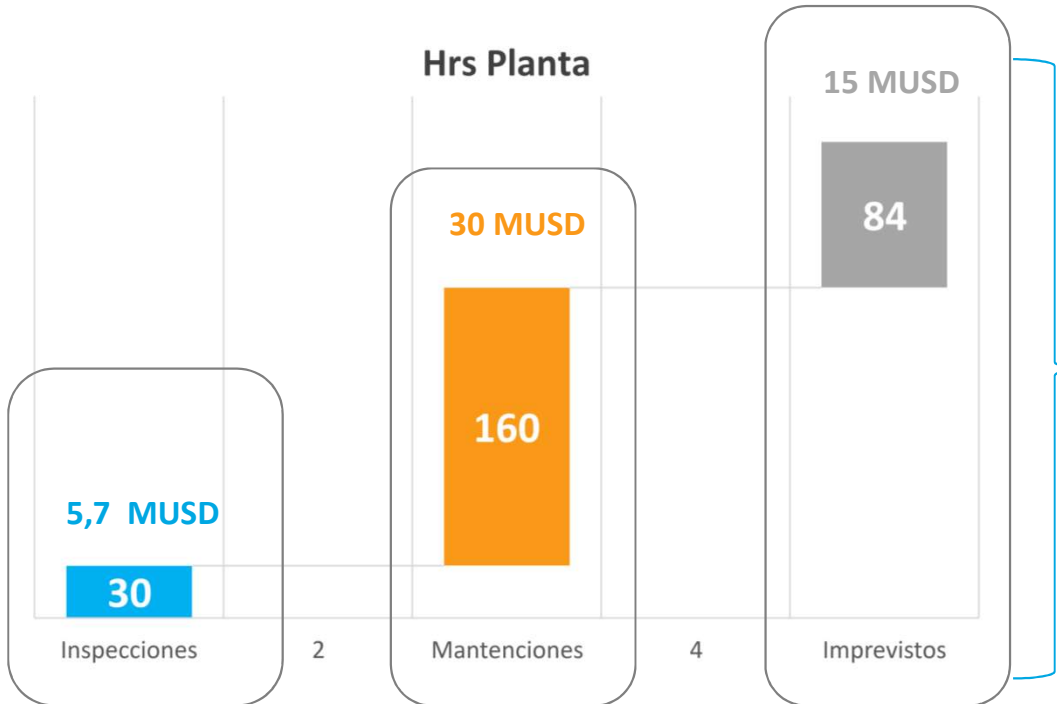
CONTINUIDAD OPERACIONAL





REVESTIMIENTOS

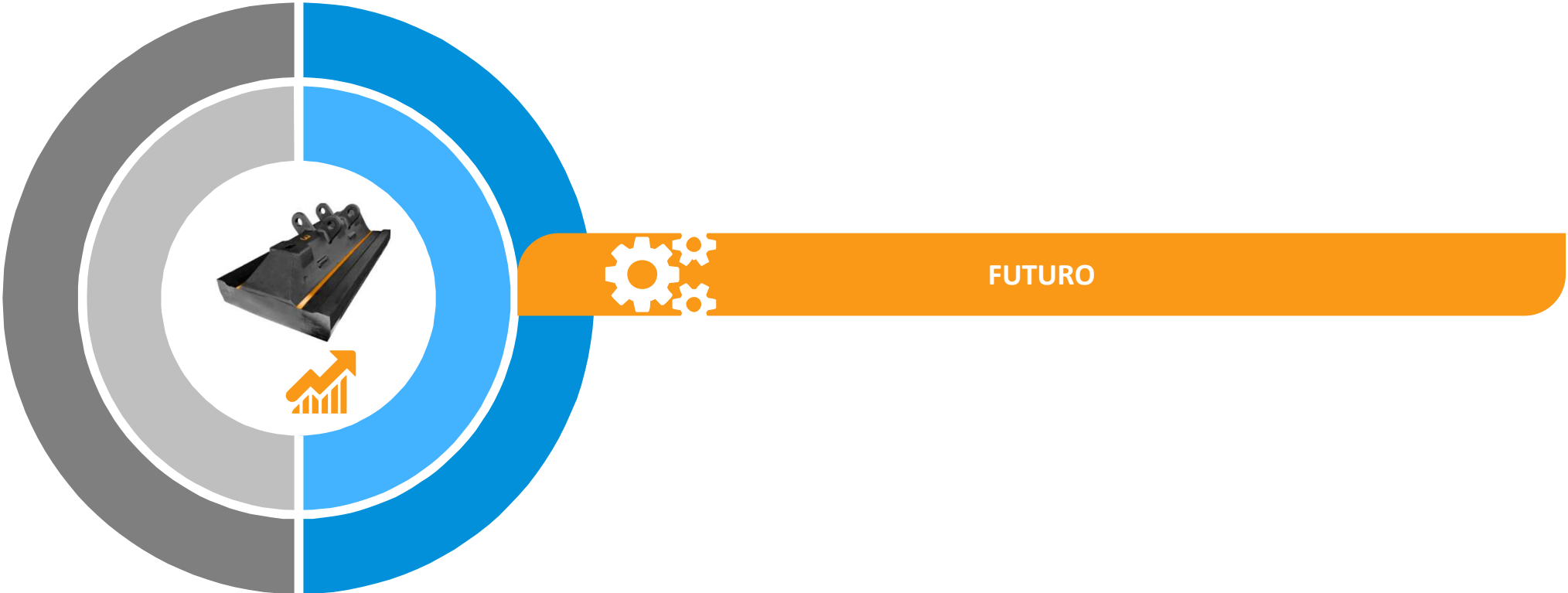
COSTOS ASOCIADOS PLANTA



274 hrs → Impacto en Disponibilidad Planta 3,1%.

CONTINUIDAD OPERACIONAL

CUAL ES EL DESAFIO?





REVESTIMIENTOS

FUTURO

MOLINO DETENIDO (COMUNICACIÓN INTERNA)

MOLINO OPERANDO (COMUNICACIÓN EXTERNA)

CONTINUIDAD OPERACIONAL

DETENCIONES PARA INSPECCIONES

TERMOGRAFIA

SENSORES EXTERNOS

ESTRATEGIA OPERACIONAL

ANALITICA AVANZADA

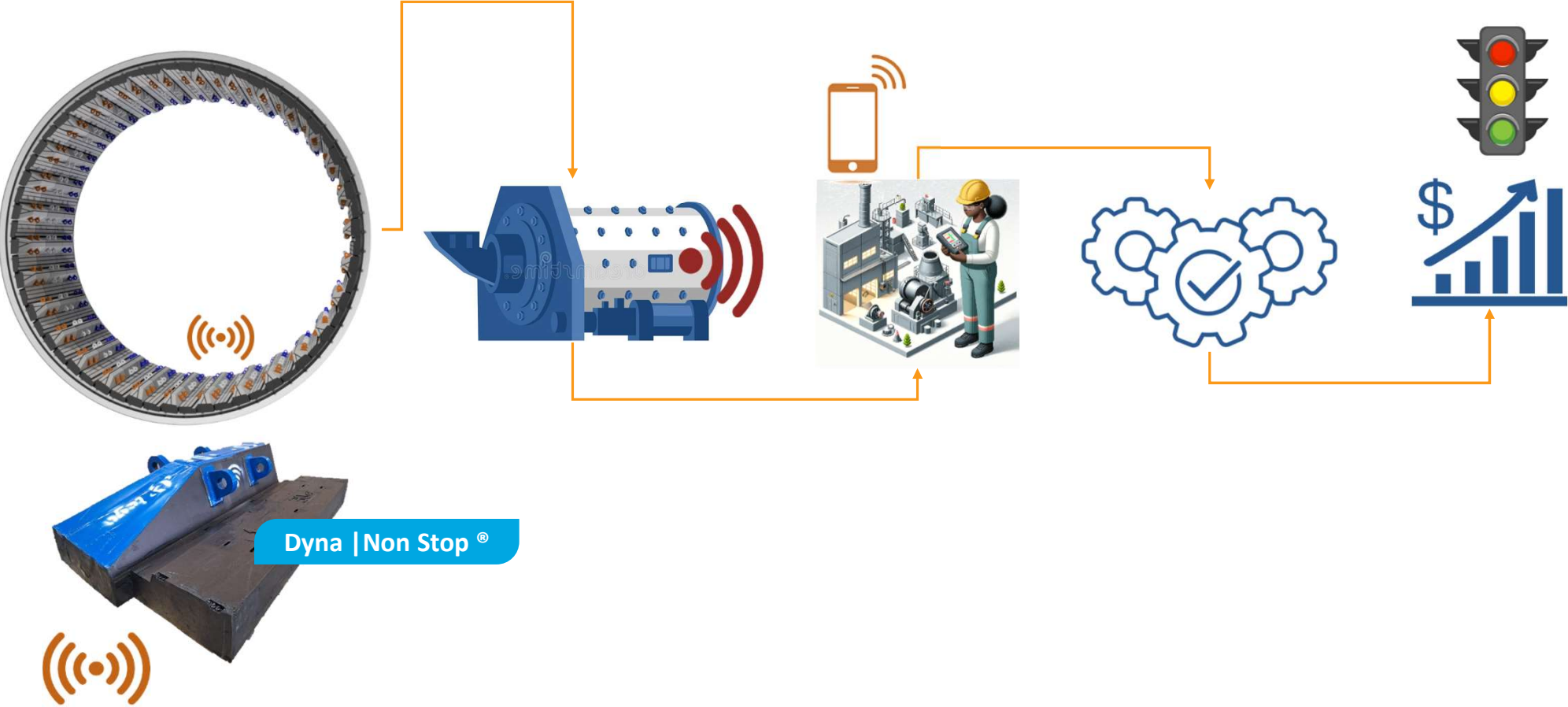


Dyna | Non Stop®



REVESTIMIENTOS

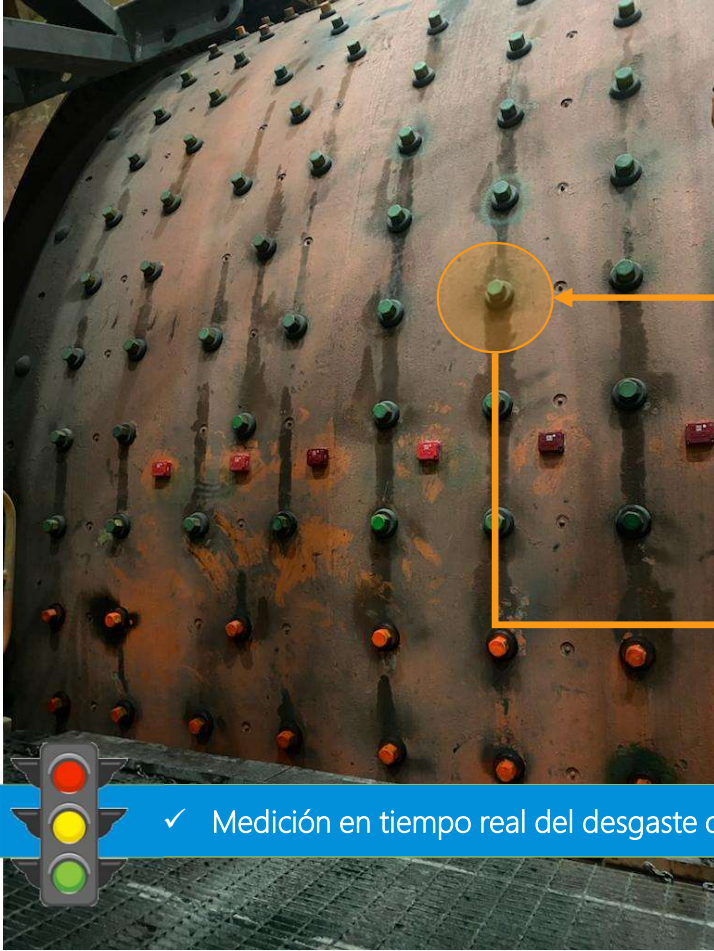
SENSOR



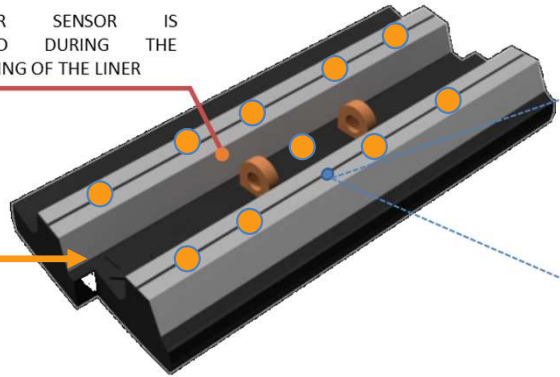


REVESTIMIENTOS

SENSOR



THE WEAR SENSOR IS INCORPORATED DURING THE MANUFACTURING OF THE LINER



EMISIÓN DE SEÑAL A TRAVÉS DE PERNO CON ANTENA INTEGRADA

RECEPCIÓN DE SEÑAL EN LAPTOP



✓ Medición en tiempo real del desgaste del Molino





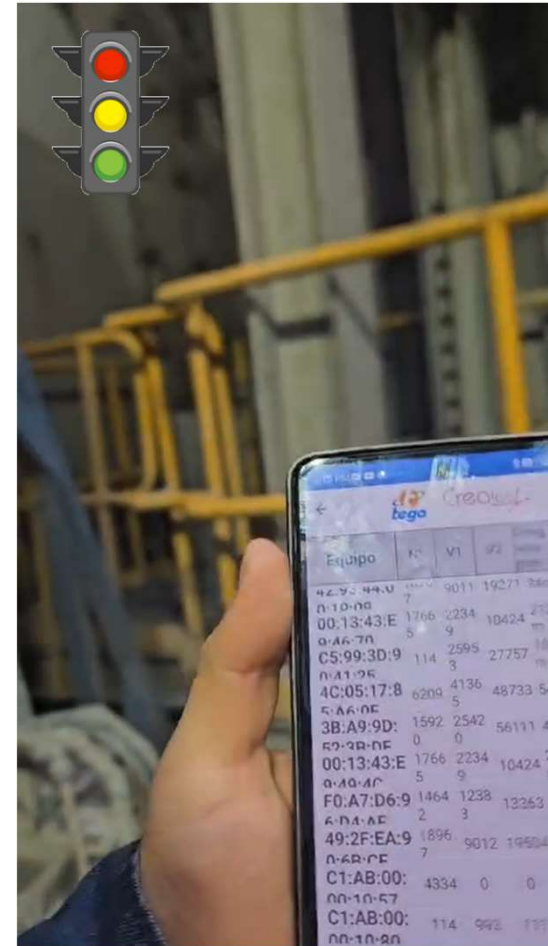
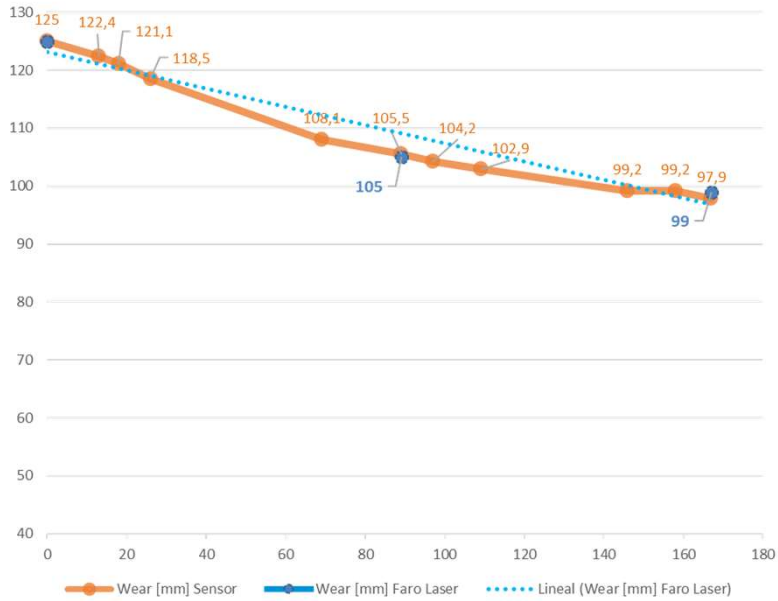
REVESTIMIENTOS

SENSOR



Dyna | Non Stop®

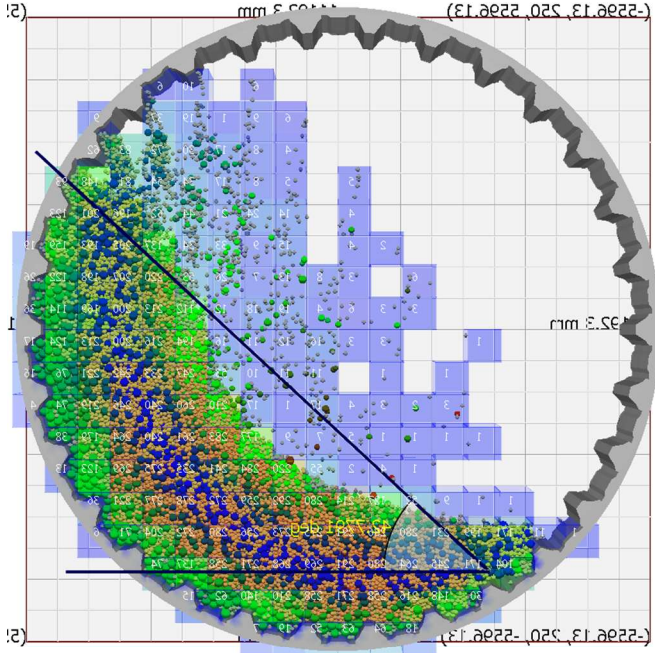
PLACA





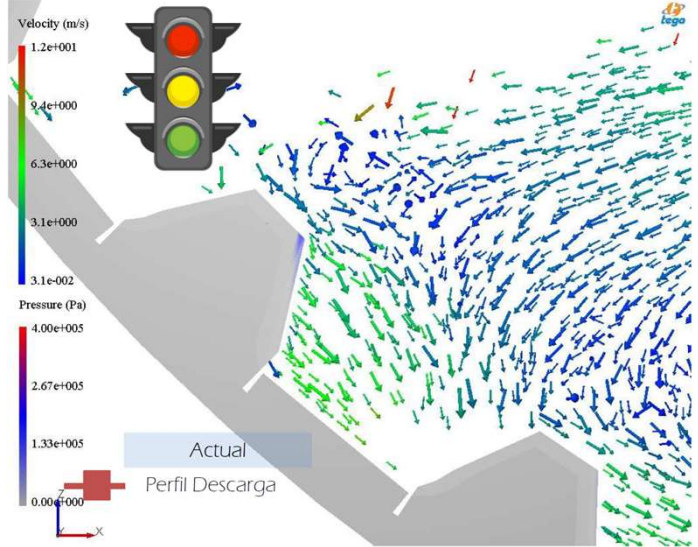
REVESTIMIENTOS

SENSOR



-  WEAR
-  JB
-  JC
-  MECANISMOS DE FALLA

ESTRATEGIAS OPERACIONALES



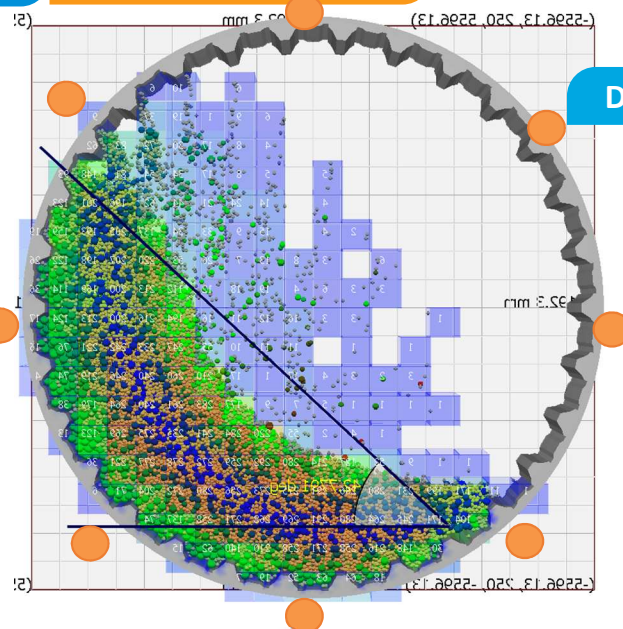
Dyna | Non Stop®





REVESTIMIENTOS

SENSOR



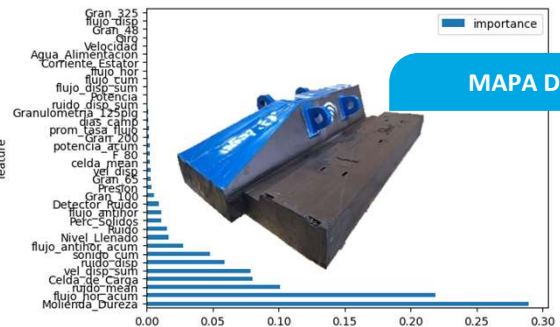
Dyna | Non Stop®

- JB
- JC
- MECANISMOS DE FALLA

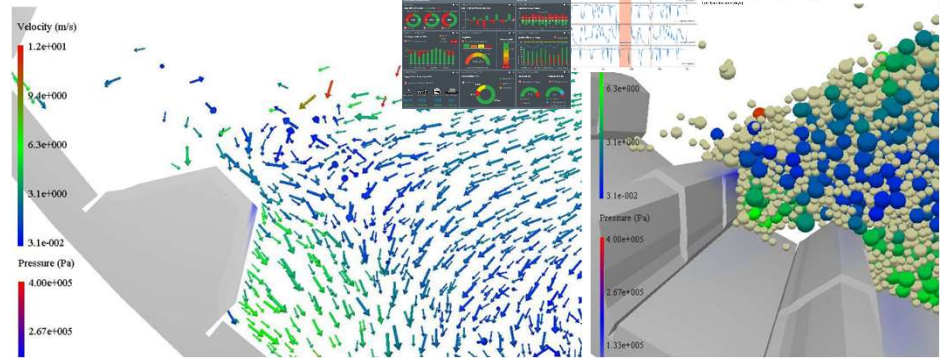
Optimize



Operación



- PRESIÓN SOBRE PIEZA
- FUERZA DE IMPACTO
- RETENCIÓN DE COMPONENTE

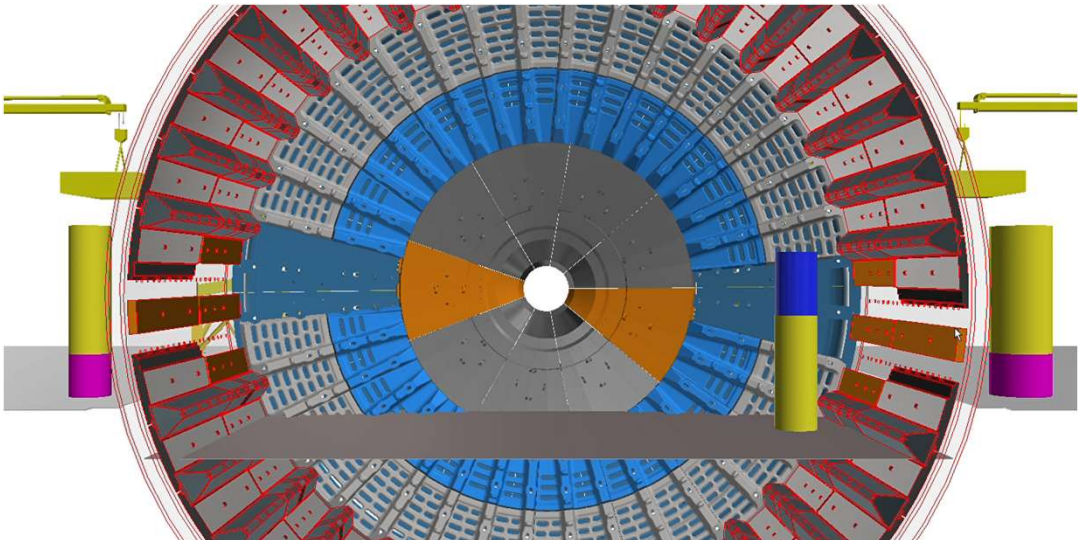






REVESTIMIENTOS

REALIDAD VIRTUAL



- ✓ Simulación de cambio de revestimientos.
- ✓ Mejora del estándar de cambio de Revestimientos.



REVESTIMIENTOS

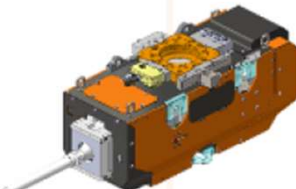
SENSOR Y APERNADO EXTERIOR



Dyna | Non Stop®



INSTALLATION PIECES WITHOUT PEOPLE INSIDE SAG MILL

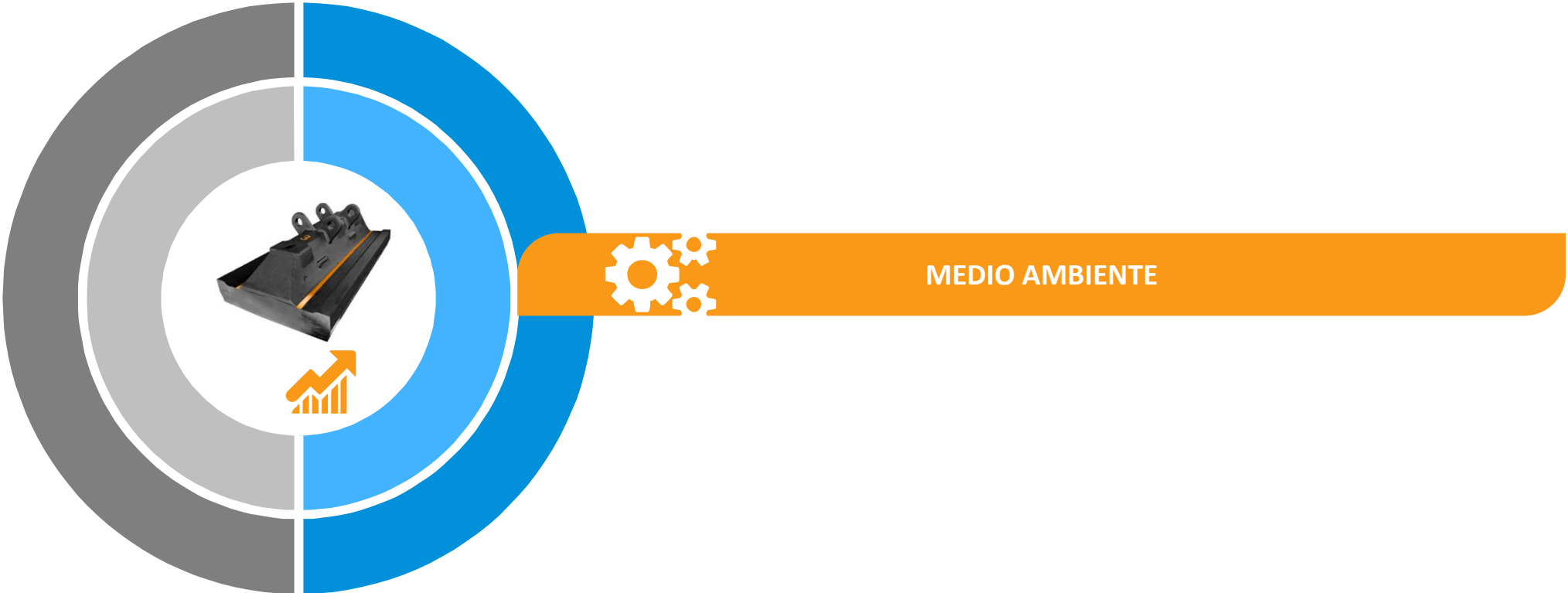


INSTALLATION PIECES WITHOUT PEOPLE OUTSIDE SAG MILL



- ✓ Full Automated Reline - Enabled by Hybrids.
- ✓ Installation Time 50 Hrs (SAG 36' x 17').





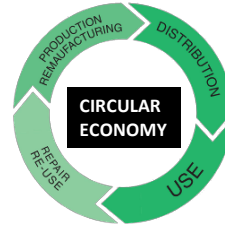
REVESTIMIENTOS

RECICLAJE

# DynaGreen®



- ✓ Reusable technology
- ✓ Carbon footprint reduction
- ✓ Less energy consumed per tonnage processed



SAG Mill 40'

- After 6 Months operation



SAG Mill 40'

- Separation of components



Rubber (Recycled)

Roller Steel (Recycled)

Mild Steel (Reused)



GRACIAS