Quarry NZ

13 July 2022

Crusher economy for every business

Crusher Wear Parts from Metso Outotec

Metso:Outotec

MIMICO

MATAMATA INDUSTRIAL MACHINERY IMPORTS LTD

Why Metso Outotec?

Metso:Outotec

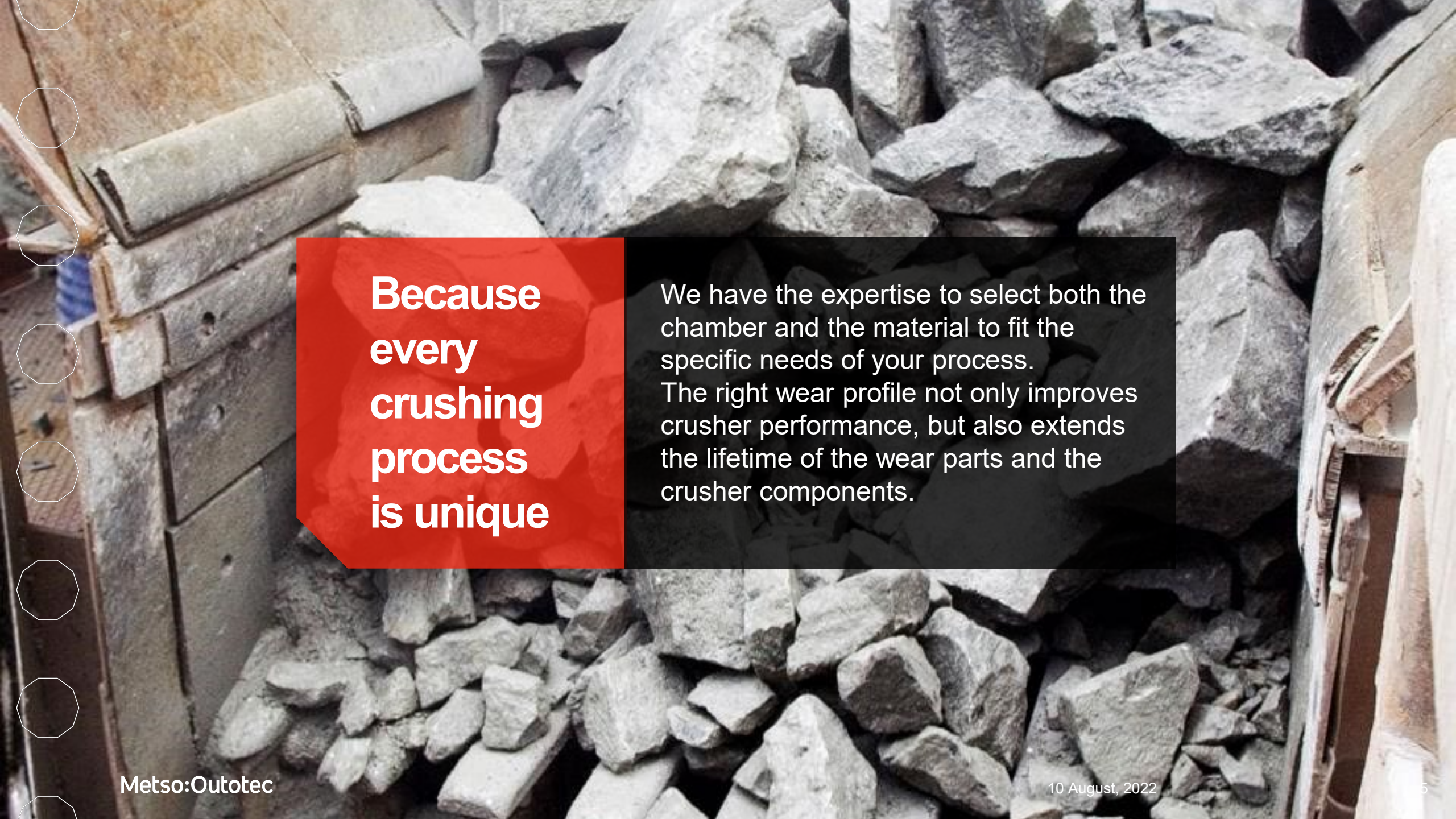
10 August, 2022

Because it’s the cost per ton that counts

Longer lifetime of wear parts directly reduces the cost per ton. One of the keys to maximizing production is to ensure that the crusher uptime is high. Less service work also increases safety, a crucial factor in the industry. This reduces total operating costs.

Because quality is more than just a shiny surface

It’s impossible to accurately inspect the true quality of a manganese casting without breaking the piece itself. Therefore process control is key. Metso Outotec has established a unique manufacturing process that we continuously monitor and develop.



Because every crushing process is unique

We have the expertise to select both the chamber and the material to fit the specific needs of your process.
The right wear profile not only improves crusher performance, but also extends the lifetime of the wear parts and the crusher components.

Because it’s not only about crushing

Metso Outotec is a crusher wear part manufacturer and crusher manufacturer with know-how and capabilities in the entire crushing process. We provide services that make a difference to the performance of the whole operation.

MIMICO
MATAMATA INDUSTRIAL MACHINERY IMPORTS LTD

Metso Outotec Foundry Process

Quality assurance and process control

At Metso Outotec, we never compromise on quality

High-quality manganese is the result of a specified and continuously monitored foundry process. Without consistent control, shortcuts are taken. This makes wear parts cheaper, but over time, weakens the quality and results in poor performance.

Process control is the most important part of quality assurance

Unlike with other steels, the quality of a manganese steel casting cannot be verified with ultrasonic inspection. The only feasible method is to break the casting.

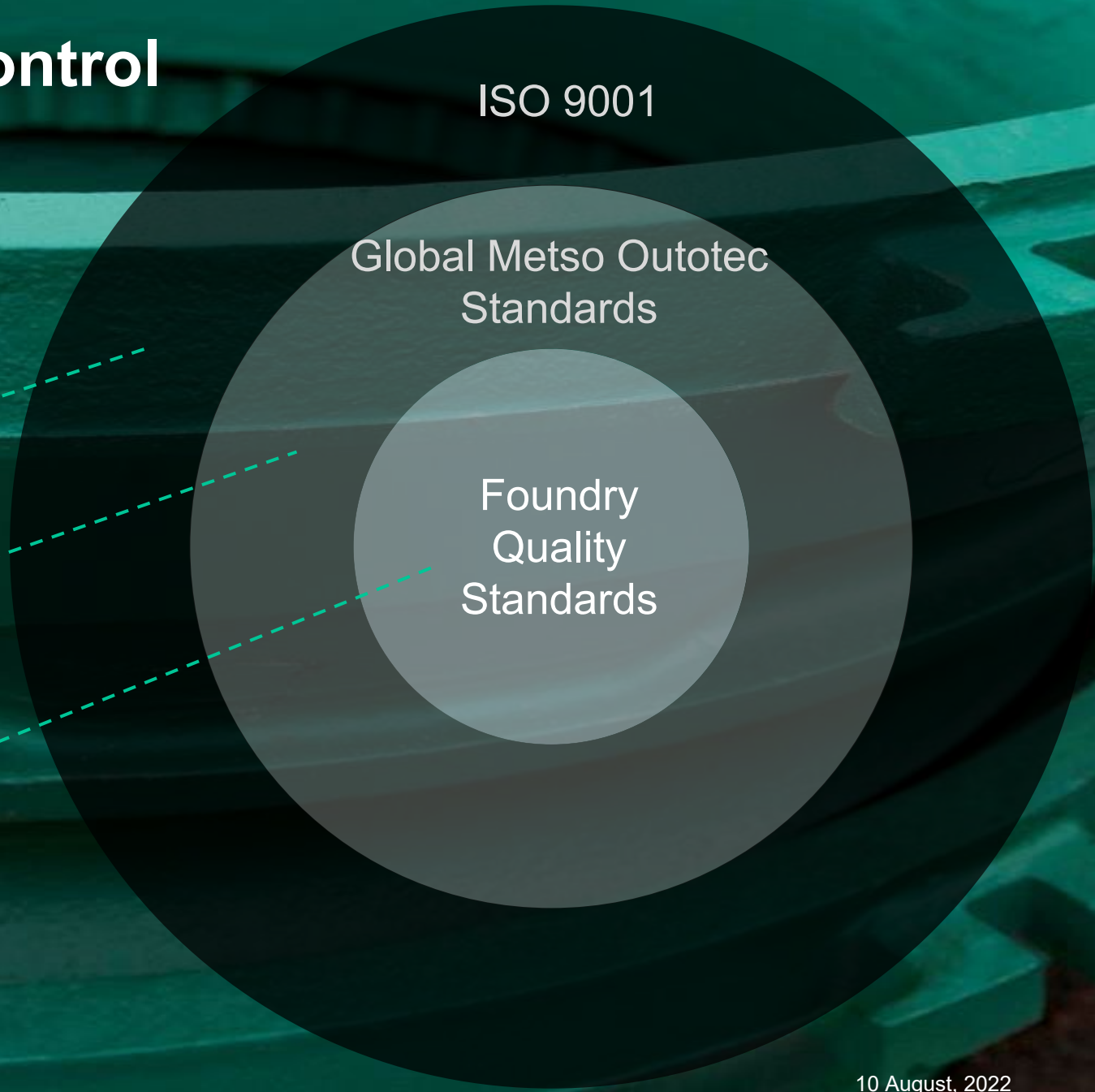
Casting and breaking a small test piece is not enough to verify the quality of a full-scale manganese casting, either, because the cooling rate on the surface of a small casting is very different than at the core of a large casting.

Process control is the most important part of quality assurance

Therefore, the only way to ensure high quality is to apply strict process control and measure and monitor key quality parameters during the process, such as the temperature distribution of the heat treatment furnace. In the final inspection, you can only check the surface quality and dimensions.

All Metso Outotec foundries follow a carefully specified 20+ step global quality control process in addition to their strict, local quality systems.

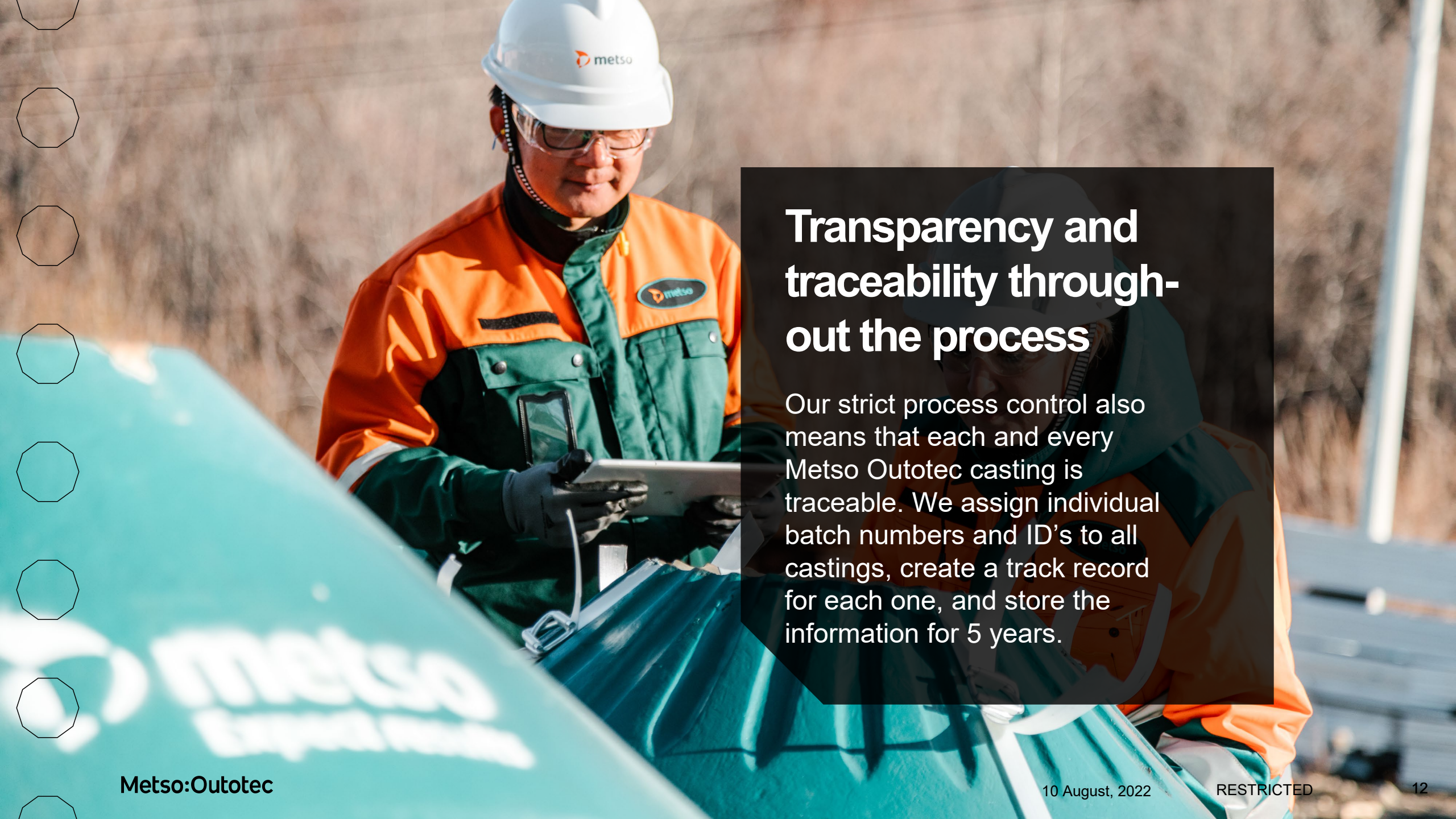
Our process control extends way beyond the mandatory



The ISO 9001 sets a minimum standard but is not enough to produce high-quality manganese.

Metso Outotec's global standards, audits and organization are the foundation on which our process control is built.

In the end, it's our strict foundry quality processes and standards that guarantee Metso Outotec's superior manganese quality. Daily quality meetings, clear procedure-specific instructions and continuous monitoring of key parameters ensure that deviations are caught and fixed before it's too late.



Transparency and traceability through-out the process

Our strict process control also means that each and every Metso Outotec casting is traceable. We assign individual batch numbers and ID’s to all castings, create a track record for each one, and store the information for 5 years.

MIMICO
MATAMATA INDUSTRIAL MACHINERY IMPORTS LTD

Metso Outotec Foundry Process

The methods that make a difference

What to look for in a foundry process?

On the following slides, we take a closer look at the three most important parts of the complex foundry process.

1. Metallurgy

Metso Outotec has been developing manganese steel grades for decades to provide the best solution for each crushing application. We never compromise on alloy quality to cut costs.

Raw materials are not the place for compromise

To provide optimal performance, steel must contain just the right amount of alloying elements such as manganese, carbon and chrome, and as little phosphorus as possible.

High quality raw materials tend to cost money. Low-quality steel scrap usually contains plenty of phosphorus or other impurities and is therefore cheaper. For example, high phosphorus content results into brittle castings that can easily crack.

2. Feeding

In a proper feeding process, shrinkage is taken into account. Manganese steel shrinks 8..12 % during solidification and cooling. To prevent hollow and weak castings, this has to be compensated. That's why, for example, it takes 2900 kg of liquid steel to produce a high-quality, 2135 kg Metso Outotec wear part.

Insufficient feeding makes castings hollow and weak

Metso Outotec method

At Metso Outotec, every cast is specifically planned and simulated, and high quality is ensured by using enough risers.

Low-quality method

Using only one riser saves costs, but results in hollow, weak products.

Simulation ensures proper fill and a solid end product

A simulation software is a standard part of our foundry method planning. It helps eliminate casting defects and ensures high quality of the final product by verifying the accuracy of the method plan.

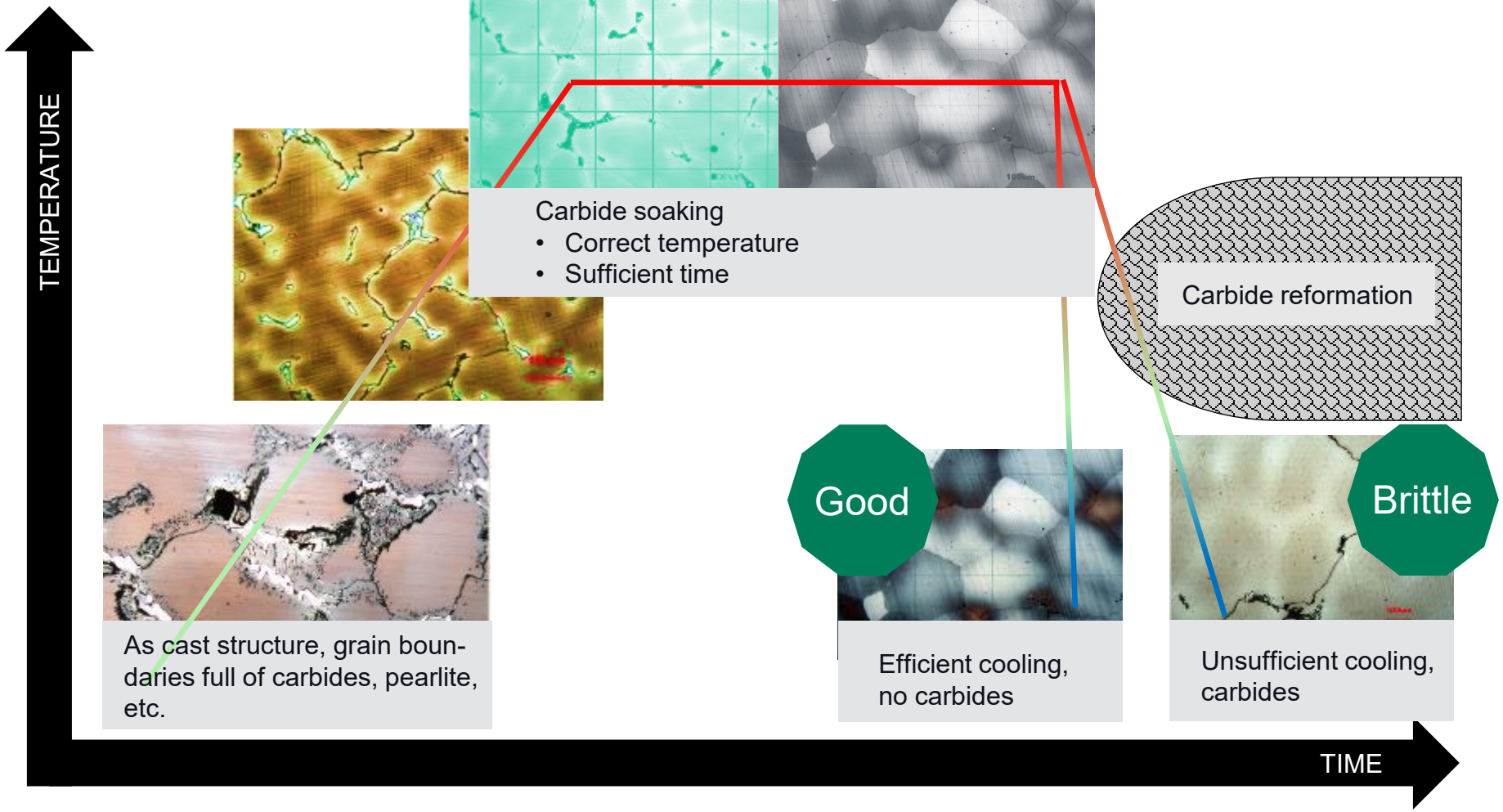
At Metso Outotec, we have a global team dedicated to simulation engineering, who specialize in simulating temperature, flow, spots with potential for defects, residual stresses, solidity and cooling rate, to name a few.

3. Heat treatment

Heat treatment is an essential part of the foundry process, with many important variables that each have an impact on the quality of the final product. Without proper heat treatment, castings are brittle and have a very short lifetime.

The purpose of heat treatment is to prevent carbide reformation

HEAT TREATMENT



Successful results require careful control of several factors

- Furnace calibration
- Temperature control
- Furnace loading
- Temperature ramp up
- Soaking time
- Transfer time from furnace to quenching pool
- Water temperature
- Water agitation

MIMICO
MATAMATA INDUSTRIAL MACHINERY IMPORTS LTD

Metso Outotec Wears and Service Offering

Crusher Wears and Services Offering

Products

- O-Series
- Expert Series
- Max Series

Services

- Chamber Selection
- Chamber Expert
- Chamber Optimization

Metso:Outotec

Crusher economy for every business

More than wear parts, more than service

Aggregates

Mining

Metso:Outotec

Crusher wears product offering at a glance

Aggregates

Mining

O-Series	Expert Series	Max Series
Sustainable	Sustainable	Planet Positive
"Just keep my crusher running"	*"Get my crusher producing"*	*"Exceed my targets"*
Fit and Function	Industry tailored chambers	Customer tailored chambers
Consistent end product	Widest offering in industry	Double wear life
Quarry and Standard Chambers	Coarse Corrugated and Thick Liners	MX and MAX Liners

C-Jaw product offering

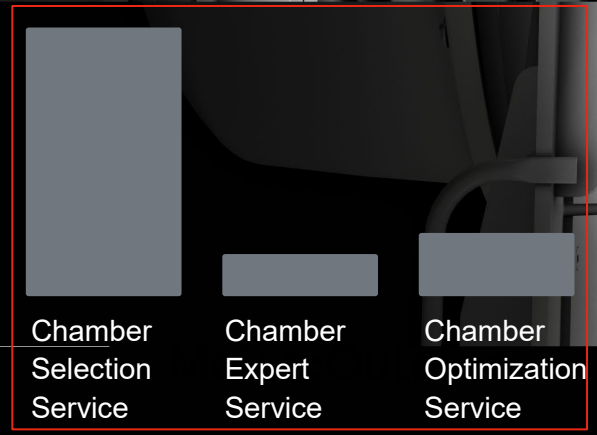
Aggregates

Mining

		O-Series	Expert Series	Max Series
Product types	Standard Protectives	✓	✓	
	FatBoy Cheekplate			✓
	Standard	✓	✓	
	Quarry	✓	✓	
	Supergrip		✓	
	Superteeth		✓	
	Thick Liners		✓	
	Coarse Corrugated		✓	
	MX			✓
	Customer Tailored Chamber			✓
Alloys	XC –series manganese	✓		
	XT –series manganese		✓	✓
	Composite materials (MX)			✓

Platform and lifting devices are available

MX available with different profiles



HP product offering

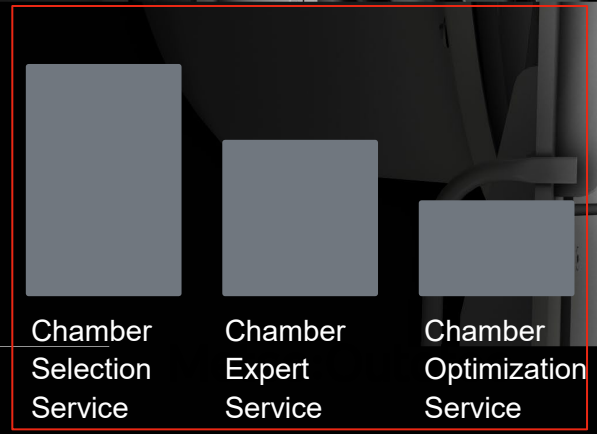
Aggregates

Mining

		O-Series	Expert Series	Max Series
Product types	Standard Protectives	✓	✓	
	HPX Chambers (EC – C – M – F – EF)	✓	✓	
	HPX00 Standard Chambers (EC – C – M – F)	✓	✓	
	HPX00 Shorthead Chambers (C – M – F – EF)	✓	✓	
	Industry Tailored Chambers		✓	
	Thick Liners		✓	
	MX (HP500 - HP900)			✓
	Customer Tailored Chamber			✓
Alloys	XC –series manganese	✓		
	XT –series manganese		✓	✓
	Composite materials (MX)			✓

Industry Tailored Chambers

Lifting devices and tightening device for the mantle



GP product offering

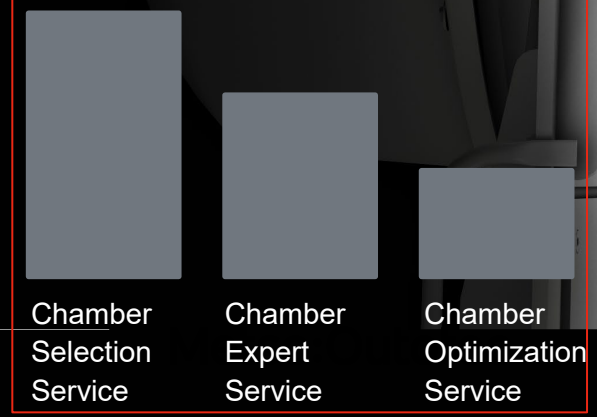
Aggregates

Mining

		O-Series	Expert Series	Max Series
Product types	Standard Protectives	✓	✓	
	Standard Chambers	✓	✓	
	Large setting		✓	
	Industry Tailored Chambers		✓	
	Thick Liners		✓	
	Customer Tailored Chamber			✓
Alloys	XC –series manganese	✓		
	XT –series manganese		✓	✓

Lifting tools available

Industry Tailored Chamber



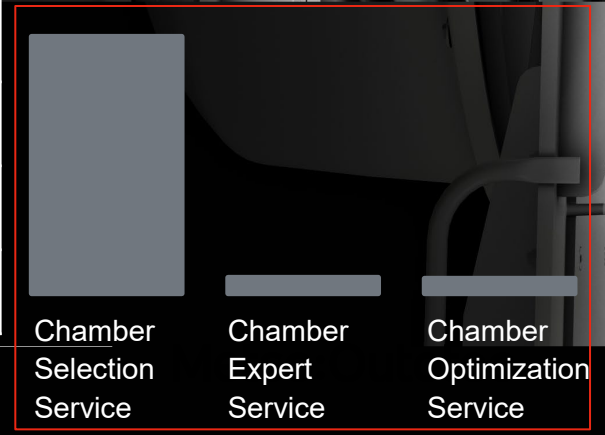
NP product offering

Aggregates

Mining

		O-Series	Expert Series	Max Series
FRAME LINERS	Medium Abrasive		✓	
	High Abrasive			✓
BLOW BARS	Manganese		✓	
	Martensitic		✓	
	High Chrome		✓	
	Martensitic Recyx			✓
	High Chrome Xwin			✓
	High Chrome Neox			✓
BREAKER PLATE LINERS	Manganese		✓	
	High Chrome			✓
	Martensitic Recyx			✓

Lifting tools available

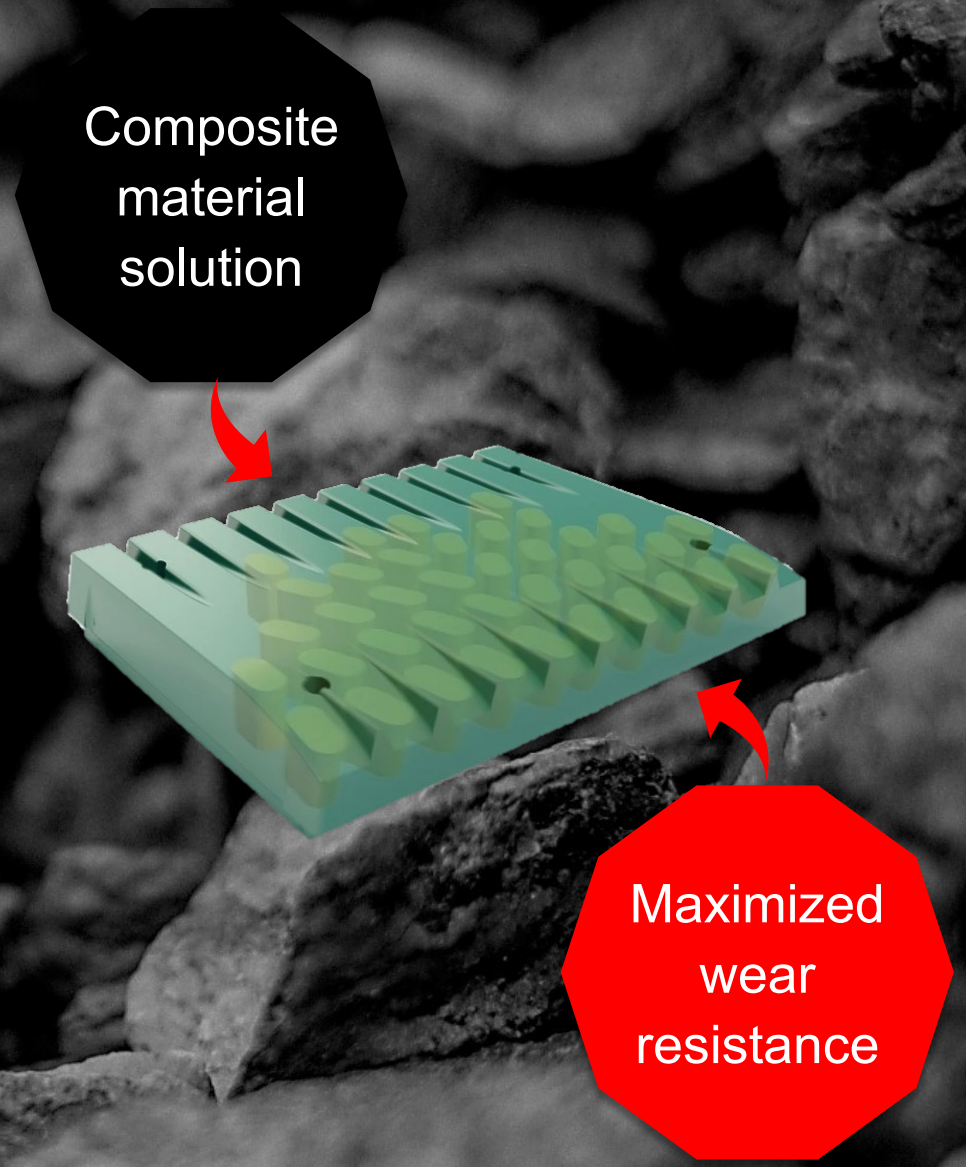


Our XT range of manganese alloys offers a solution for every crushing application

Metso Outotec grade	Alloying	Application	Structural strength
XT510	12% Mn	Standard option for large cone crushers and primary gyratories	High structural strength
XT520	12% Mn + Mo	Large cones, to prevent fatigue cracking in applications with long wear life	
XT525	12% Mn + Mo (low C)	Extremely heavy, large castings only (Metso MP2500 cone crushers)	
XT610	12% Mn + Cr	Select applications only	
XT710	18% Mn + Cr	Standard option for cone crushers and jaw crushers	High Abrasion Resistance
XT720	21% Mn + Cr	High wear rate cone crushers (Nordberg HP500 and smaller)	
XT750	21% Mn	High wear rate applications, large cone crushers and primary gyratories	
XT770	24% Mn + Mo	High wear rate applications, large cone crushers and primary gyratories	

MX jaw dies

- **Composite material**
  - Mn steel matrix (ductility)
  - Hard metallic wear resistant inserts for abrasion resistance
- **Several designs available**
  - Filled end, Fully grooved, Heavy duty, 1- or 2-piece designs, Special designs
- **MX jaw can be used with wide range of feed material. It performs well with tough and abrasive rock but works well with softer ores as well**
- **Care needs to be taken when selecting MX jaw to application**
  - Scalped or not scalped feed
  - Jaw cavity level
  - Feed drop height
  - Closed side setting



Every crushing application is different, so there is potential for improvement by choosing the optimal design of wear parts. If the crushing chamber is not working optimally, there are many negative consequences, such as uneven wear, power spikes and low capacity.

Crusher wear services provide the optimal solution for your crusher circuit to meet and even exceed your need. Our goal?

Better profitability for you.

Crusher wears services offering at a glance

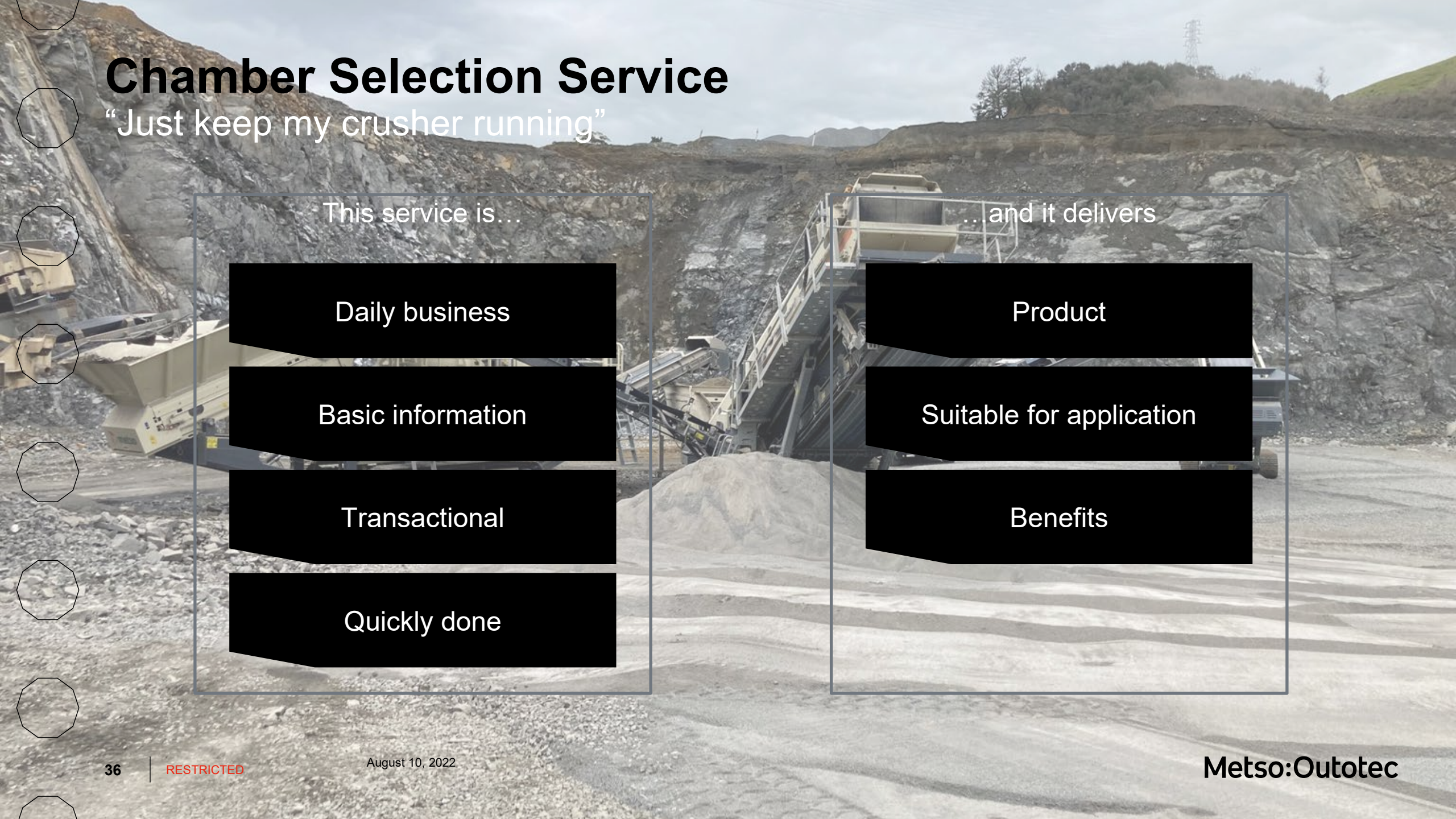
Aggregates

Mining

Chamber Selection Service	Chamber Expert Service	Chamber Optimization Service
Quick selection from catalogue	Simulated selection from catalogue	Custom made solution
"Just keep my crusher running"	*"Get my crusher producing"*	*"Exceed my targets"*
Delivers the part	Delivers a service	Delivers a partnership
Transactional business	Contractual business with commitment to KPI's	Contractual business exceeding KPI's
For all crushers	Mainly for HP and GP Series crushers	Customer designed profiles to suit application

Chamber Selection Service

"Just keep my crusher running"



This service is…

- Daily business
- Basic information
- Transactional
- Quickly done

…and it delivers

- Product
- Suitable for application
- Benefits

Case Example – GP550 Tertiary Crusher

Problem:
- No indication of problem: good wear profile, good throughput, steady power draw level

Solution:
- Changing chamber to be more suitable for the process, based on process specific data gathered on plant audit

Results:
- Increased wear life through better utilization of wear parts
- Wear part cost per produced ton down 18%
- Increased throughput because fewer liner changes per year

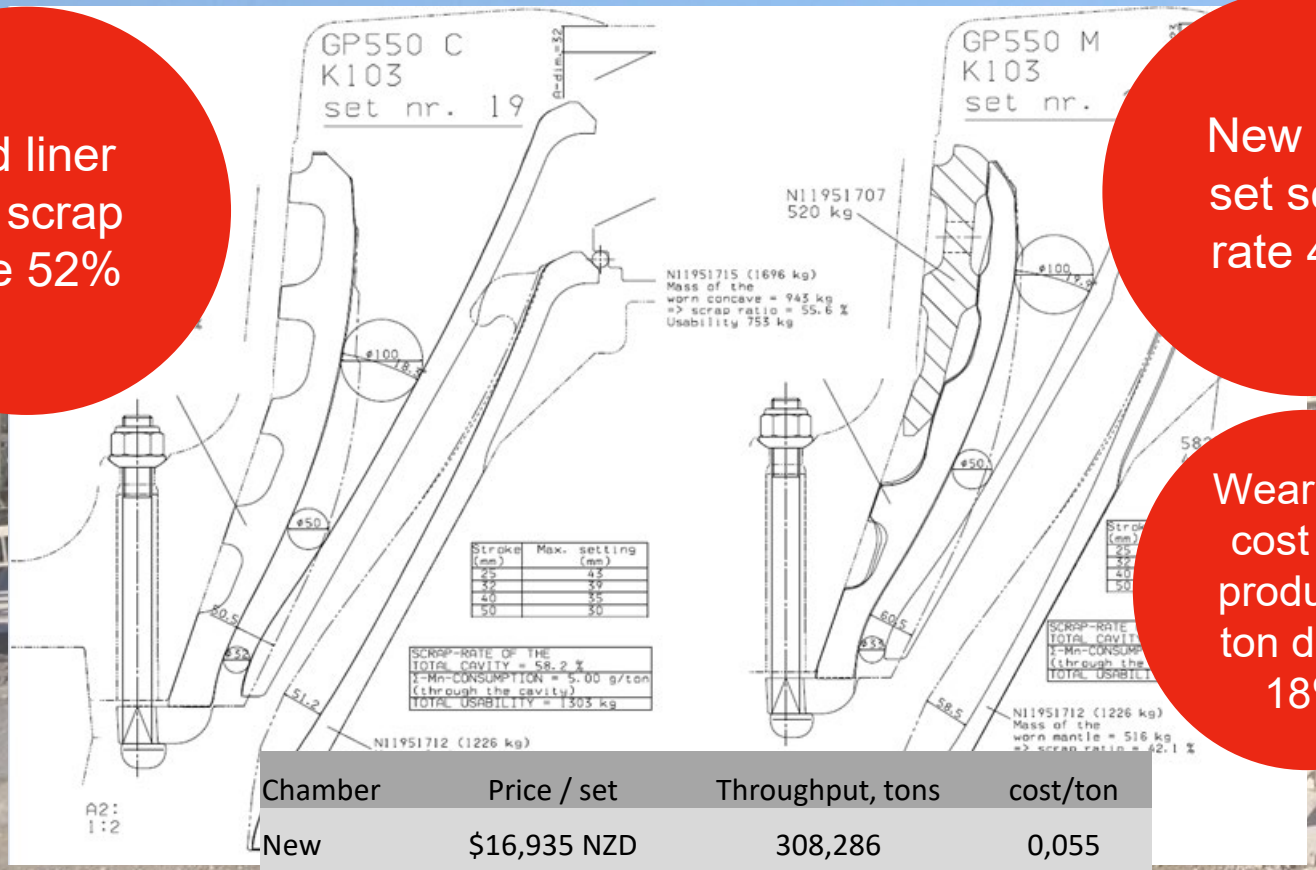
Wear part cost per produced ton down 18%

Case Example – GP550 Tertiary Crusher

Old liner set scrap rate 52%

New liner set scrap rate 42%

Wear part cost per produced ton down 18%



Chamber	Price / set	Throughput, tons	cost/ton
New	$16,935 NZD	308,286	0,055
Old	$18,120 NZD	271,051	0,067

Capacity on average 600 tph with both liner sets

Metso:Outotec

Every crushing application is different, so there is potential for improvement by customizing the design of wear parts. If the crushing chamber is not working optimally, there are many negative consequences, such as uneven wear, power spikes and low capacity.

Chamber Optimization is a service unique to Metso Outotec. We provide a customized solution to meet and even exceed your need. Our goal?

Better profitability for you.

Chamber Expert Service

"Get my crusher producing"

This service is…

- Contractual business
- Production and application information
- Site visitation
- Requires time

…and it delivers

- Product, service and crushing parameters
- Best performing chamber
- Performance targets and KPI's
- Customer meetings

New way for crusher optimization: Chamber Expert Service

Step 1

Audit

- Complete audit of the existing plant, data collection from crushers, including laser scans
- Identifying improvement areas and possibilities to optimize

Step 2

Solution

- Metso Outotec knowledge and expertise on crushing
- Proprietary chamber simulation software
- Most suitable cavity chosen from selection of optimized liners
- Correct crushing parameters to achieve optimized performance

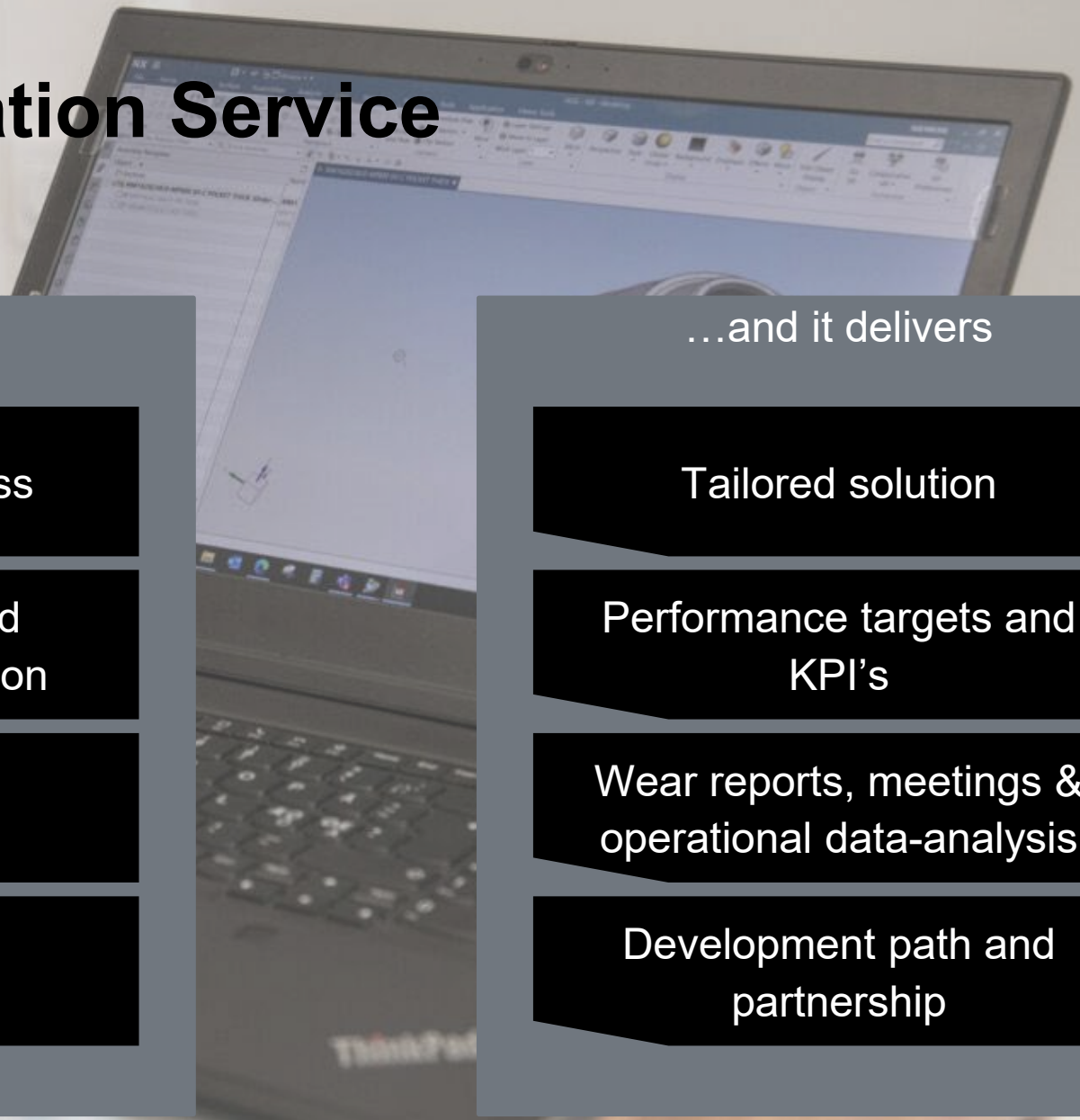
Step 3

Implement

- Metso Outotec and Metso Outotec's extensive partner network at your service, to implement the proposed changes and improvements

Chamber Optimization Service

"Exceed my targets"



This service is…

- Partnership business
- Production, ore and application information
- Site visitations
- Requires time

…and it delivers

- Tailored solution
- Performance targets and KPI's
- Wear reports, meetings & operational data-analysis
- Development path and partnership

The 5 steps of Chamber Optimization

1. Data collection

Metso Outotec specialist conducts plant audits to collect samples and data and to record wear profiles. This data is used to determine the development needs and set targets.

2. Data analysis

The collected data is analyzed and potential for improvement is recognized. An optimization plan, including geometry modification and alloy selection, is created to suit your needs.

3. Re-engineering

Tailor-made wear parts are designed utilizing advanced cavity simulation software, developed and owned by Metso Outotec. Even slight modifications to chamber geometry can lead to dramatic improvements.

4. Manufacturing

Customized wear parts are manufactured in Metso Outotec's own foundries utilizing the latest methods and technologies.

5. Follow-up

Optimized cavity performance is verified to meet your requirements and agreed-upon goals. The re-engineering process will be repeated for further development.


More than parts, more than service
Crusher economy for
every business