

SUPERIOR™ Primary Gyrotory Crushers

# Upgrades for better production, reliability & maintenance

Matched to  
your goals  
and resources

# From MK I to MK nXt

Whether old or new, we can help bring your Superior gyratory to the **nXt level**. Metso has a wide variety of upgrades available to have your crusher performing like a modern-day machine.



**One size doesn't fit all and it doesn't have to.  
Why move from an MK I to II to III?  
Create your very own MK X.**

Mix and match upgrades to suit your unique goals and desired investment levels.



## nXt level **Production**

Upgrades to help you  
ramp up capacity



## nXt level **Reliability**

Upgrades to increase  
equipment life



## nXt level **Maintenance**

Upgrades to simplify and  
speed up maintenance

In addition to driving nXt level results from your crusher, all upgrades are designed to:

- Help create safer working conditions for your employees
- Perform as expected, as all upgrades are carefully simulated and tested to our strict OEM standards
- Straightforward to implement, either by your maintenance crews or with the support of our service teams

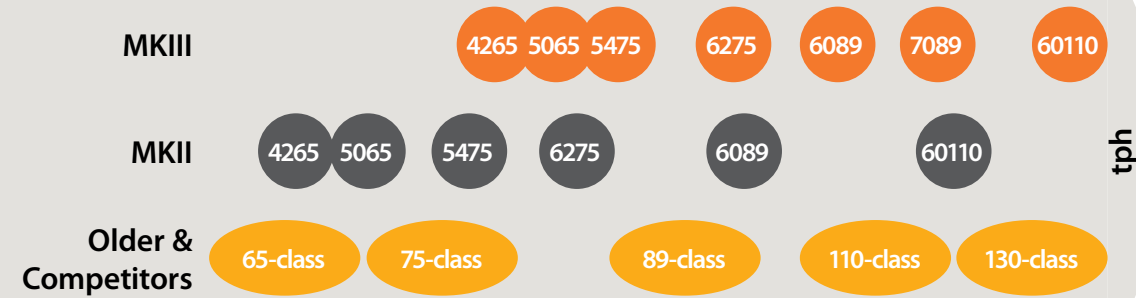


# nXt level **Production**

Primary gyratory crushers are the initial driving force for the entire mineral processing circuit. Adding extra production capacity here can have significant effects downstream. Over the years, Metso has introduced many advancements that bring increased speeds, higher installed power and mechanical improvements – all designed to provide you with next level production.

These features are all available in the Superior™ MKIII – but you can also achieve those same benefits with your previous generation crusher through integrating one or all of our three production upgrade options.

## Capacity comparison by size at same OSS



### 1 Arched / Super Spider



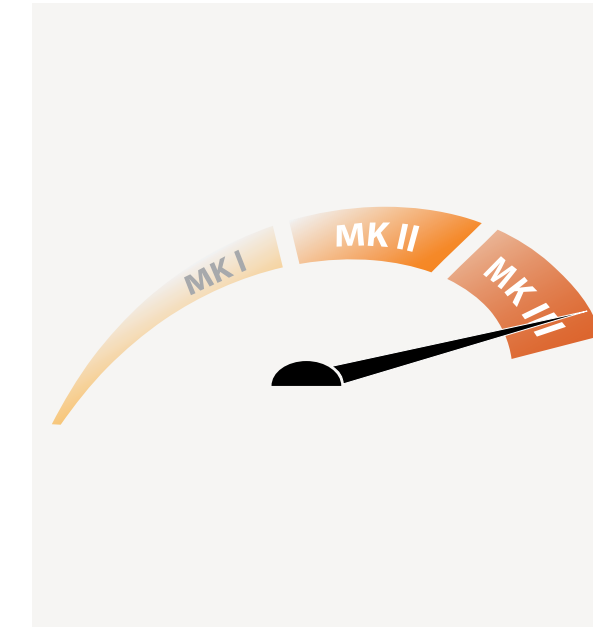
#### Reduced bridging downtime

The Arched Spider geometry changes the available feed opening for better flow of material into the crushing chamber, reducing bridging and increasing productivity.

The Super Spider builds further on these improvements by increasing the feed opening.

Investment ———  
Complexity ———

### 2 Speed Increase



#### More capacity

Increasing the speed and horsepower of the drive motor facilitates higher throughput ability of the crusher. To provide a complete package for long term production, this solution typically involves upgrades to lubrication and cooling systems, along with internal operating parts.

Investment ———  
Complexity ———

### 3 Mainshaft Positioning Sensor



#### Better protection

The mainshaft positioning sensor (MPS) probe enables operators to monitor and adjust mainshaft position to compensate for wear parts quickly and efficiently. Data of mainshaft position can be used to determine wear rates along with providing feedback if mainshaft position is dangerously high or low in its operating range.

Investment ———  
Complexity ———



## nXt level **Reliability**

If your first stage of crushing is not performing, it will have effects throughout all mineral processing stages. This makes reliability a key concern. Metso has developed five upgrade options that not only minimize wear but also help to ensure a long and productive life for your crusher and its key components.

### 1 Shimmed Spider Bushing



#### Reduced wear

The shimmed spider bushing comes standard with more robust metallurgy to stave off wear that can be detrimental to components throughout the crusher. A key feature to the bushing is its shimable design that compensates for wear to the spider bushing bore. This allows for long term operation and planning for future repairs once all shims are removed.

**Investment**

**Complexity**

### 2 Pinion Bearings



#### Longer life

The re-designed pinion bearings are capable of higher load handling as well as increased operating speed. This upgrade brings benefit alone, however it becomes more critical if you are considering a speed or production upgrade in the future.

**Investment**

**Complexity**

### 3 Large Upper Journal Mainshaft & Sleeve



#### Increased strength

Through design changes, the crusher mainshaft has undergone numerous updates in geometry and manufacturing methods. This combination of changes have increased the strength of the mainshaft by up to 70%. Increased strength improves long term reliability of your machine for current operation and future production increases.

**Investment**

**Complexity**

### 4 Balance Cylinders



#### Added flexibility

Over the life of a mine, changes to operation or ore characteristics can lead to the need for increased balance cylinder capacity. Proper balance cylinder capacity keeps internal crusher components in proper alignment during tough crushing events. This allows your machine to continue operating at peak efficiency for reliable long term operation.

**Investment**

**Complexity**

### 5 Offset Eccentric Gear



#### Longer wear life

The offset eccentric gear allows for better gear to pinion contact, which in turn distributes the load across the complete tooth. This provides for longer wear life and better power distribution.

**Investment**

**Complexity**



# nXt level **Maintenance**

As equipment ages, production efficiency and reliability can decline. Proper maintenance is key to reduce the signs of aging to ensure that your production goals are met. Maintenance can be a costly and labor-intensive job, which is why Metso has engineered six upgrades to simplify and speed up these tasks.

## 1 Exterior Gear Backlash Adjustment



### Simplified process

This upgrade allows for quicker maintenance thanks to the ability to now adjust the gearing backlash outside of the crusher. The result is a simplified, faster, and safer process for all involved.

Investment

Complexity

## 2 Pinion Bearing & Oil Level Sensors



### Improved planning

With sensors built-in, you now have the capability to monitor the pinion shaft assembly. This increased visibility allows for better maintenance planning as you can now get ahead of potential issues.

Investment

Complexity

## 3 Rotable Top Shell



### Maximized uptime

This solution saves time as you do not need to install concaves during shutdown. Fewer components are being lifted during the outage period, allowing for maintenance to be done in a more controlled and safe environment. During the shutdown, the shells are separated (optionally with hydraulic shell separators), lifted, and replaced with the relined shells.

Investment

Complexity

## 4 Hydraulic Shell Separators



### Faster removal with less manpower

These easy to install kits allow for faster and safer separation of spider and top shells minimizing needed maintenance manpower during component removal. Hydraulic jacking components are used at each shell separation reducing the downtime for their removal.

Investment

Complexity

\*Based upon having machined provisions.

## 5 Spider Bushing Auto Lube



### Consistent lubrication

Improvements to spider lubrication systems have provided a more maintenance-friendly alternative to previous generations. New systems have integrated lubrication level sensing into the spider cavity providing feedback to automatically replenish oil to the spider cavity as needed. Built-in alarms to the system will alert maintenance personnel to potential issues.

Investment

Complexity

## 6 Flow Meter Stations



### Monitoring capabilities

Flow meter stations on your primary gyratory provide insight into the health of the lubrication system and assures monitoring of lubrication flow into the machine.

Investment

Complexity

## Services built for performance

Metso offers a robust portfolio of services to ensure that every part of your operations is maximized and working to its true potential. With over 100 years of experience designing and supplying hard-working equipment, our services reflect what we've learnt in the shop and in the field.



### Labor services

Metso offers labor services as well as the parts required for major maintenance events, such as shutdowns. Metso personnel can help by fully executing the project, or supplementing your on-site maintenance staff. Metso crew personnel are safety oriented, fully equipped with appropriate PPE and trained to perform efficient component change-outs. Installation services are backed by Metso's OEM engineering and expertise from having supervised and overseen thousands of crusher shutdowns globally.



### Maintenance and repairs

Proper maintenance is key to running your equipment effectively. Metso offers end-to-end services ranging from crusher inspection and diagnostics, equipment and part repairs, shutdown solutions, optimization, and planning, as well as emergency services. With over 80 service center worldwide, you can count on us to always be nearby.



### Life Cycle Services

Metso's pre-packaged solutions are designed to assist you in meeting your business goals, from start-up to shutdown to end-of-life. We can support you on a specific activity or over a larger scope, combining elements from our large portfolio of services with unique commercial models. Through Life Cycle Services, numerous financial models are available as well, including payment deferrals, and cost per ton payment plans.

## Case in point

# Rotable Top Shell

As a global mining OEM, Metso has decades of experience in collaborating and driving results for our customers. Here is one of many examples:



### Excessive downtime hurting productivity

A gold and copper mine in Australia

**Challenge:** This high-producing mine in Australia, utilizes the Metso SUPERIOR® MKII 50-65 at their primary plant. Each reline at the primary plant took over 140 hours, which significantly decreased productivity. Additionally, with safety as a top priority, this mining company is continuously on the search for ways to reduce potential risks to their crews.

**Results:** With the Rotable Top Shell program, this mine saw major results right away. From the start, they were able to reduce their primary gyratory crusher downtime by approximately 92 hours. Safety risks were reduced significantly as well as all work previously carried out in confined spaces were eliminated. Given the additional flexibility in scheduling plus the reduction in total shutdown time, they also experienced a 43% decrease in labor costs.

#### Metso solution

After a detailed consultation, the customer opted for the Rotable Top Shell. With this solution, a spare top shell with new concaves installed was held on site, ready to replace the worn concaves in a single intervention with minimum machine downtime.



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