Kawasaki
Powering your potential

Kawasaki CK MILL
Grinding Technology

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Kawasaki

CK MILL

Grinding Technology

01

02

A KEY PLAYER IN THE CEMENT INDUSTRY:

KAWASAKI CK MILL

SERVING CEMENT PLANTS WITH EFFORTLESS OPERATION AND MAINTENANCE

CK Mill, is the product of Kawasaki Heavy Industries, Ltd., designed in Japan.

Kawasaki CK Mill is one of the most energy efficient and cost-effective Vertical Mills.

Since 2009, more than 100 units of the 2nd Generation CK Mill have been supplied for raw material, clinker, slag and coal grinding.

Subsequently, the CK Mill has gained recognition from our worldwide customers for easy maintenance and higher production efficiency.

CK MILL KEY FEATURES

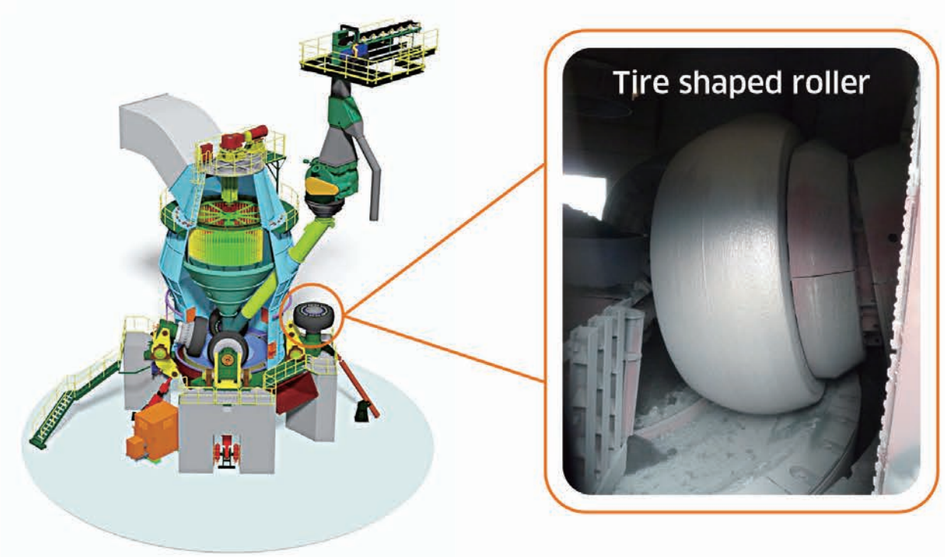
1 Economical Operation

Kawasaki's CK Mill is a highly efficient vertical roller mill that is used for raw material grinding, coal, slag and finish grinding in the cement manufacturing process. The CK Mill reduces energy consumption by as much as 30% to 50% compared to the conventional process (tube mills system).

No Grinding aid is required for Cement Grinding.

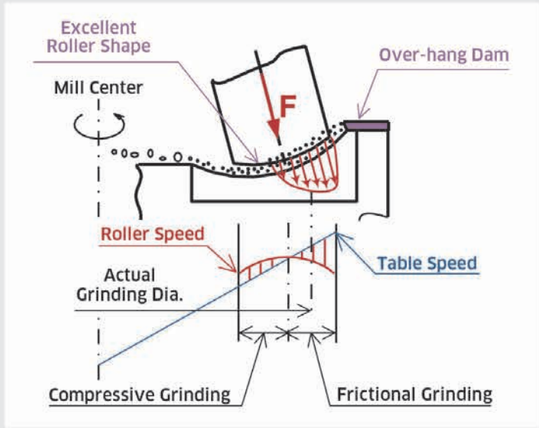
2 High Quality Products

Grind High Blaine cement and slag products will be produced by the tire shaped roller.



ADVANTAGE

Technical advantages of CK Mills' grinding mechanism



Tire-shaped rollers

By using the tire-shaped rollers it achieves the principle wherein compressive grinding is effective for coarse grinding and frictional grinding is effective for fine grinding.
Compressive grinding occurs mainly on the mill center side (inside) of the roller, while the frictional grinding occurs on the mill outer side of the roller under a high pressure force.

Clearance between roller and table

Inside of roller: larger clearance at material feed side
Outside of roller: constant clearance
As smooth material flow and stable material bed on table are assured at the inside of the roller, efficient high pressure frictional grinding at outside of the roller is accomplished.

Overhanging Dam Ring

Overhanging Dam Ring is designed to achieve the most efficient grinding with minimum material bed thickness under a higher grinding pressure.

[1] Optimized material bed thickness

- Higher grinding efficiency with a minimum material bed thickness due to lower height of the Overhanging Dam Ring with the over-hang depth.
- Reduction in driving power loss due to lower material thickness.

[2] Higher grinding force

- Due to a smaller gap between inside of Overhanging Dam Ring and roller edge, a higher grinding force can be applied to a firm and stable material bed even for fine-grinding.

3 Modular Design for Roller and Arm assembly

Modular design for Roller and Arm assembly can shorten delivery time and reduce manufacturing cost. The Roller and Arm assembly are manufactured in modular components at Conch Kawasaki's Wuhu factory in China.

MODULAR DESIGNED ROLLER ASSEMBLY

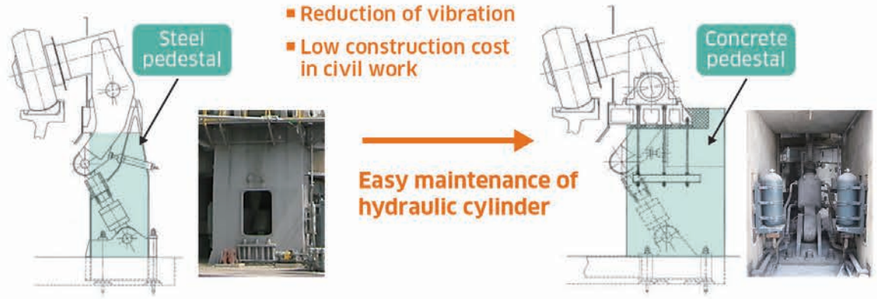
MODULAR DESIGNED ARM ASSEMBLY

4 Concrete Pedestal

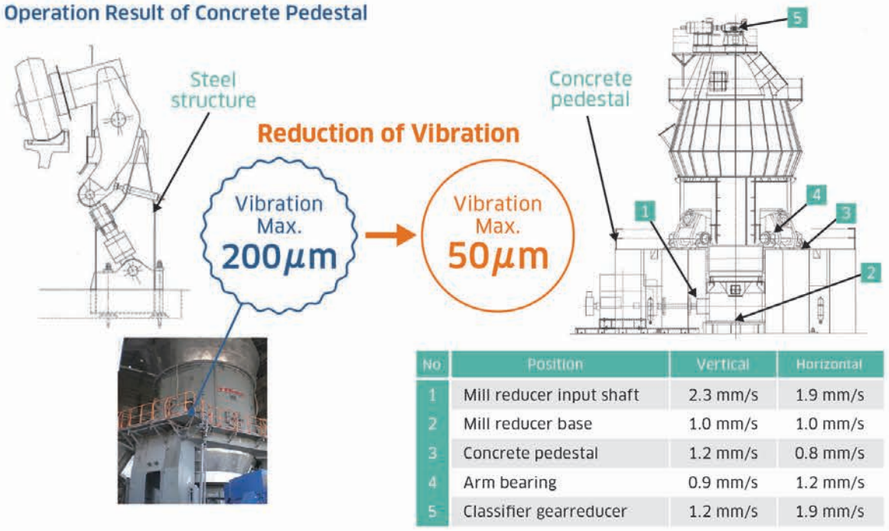
One of Kawasaki's technology developments is the use of a Concrete Pedestal, typically the arm bearing is designed supported on a steel structure. Kawasaki developed a rigid two-in-one Concrete Pedestal with a solid mass foundation, which ultimately contributed to:

- More rigid pedestal than a steel pedestal which also led to reduced vibration at arm bearing, primary operating conditions for vertical roller mill.
- **Reduction in manufacturing costs and CAPEX** in many countries.
- **Easy maintenance** and easy access to hydraulic cylinder area.
- **Shorter construction** period without compromising quality and performance.
- Basic engineering for Concrete Pedestal is part of CK mill engineering.

Technical advantages for Concrete Pedestal



Operation Result of Concrete Pedestal



No	Position	Vertical	Horizontal
1	Mill reducer input shaft	2.3 mm/s	1.9 mm/s
2	Mill reducer base	1.0 mm/s	1.0 mm/s
3	Concrete pedestal	1.2 mm/s	0.8 mm/s
4	Arm bearing	0.9 mm/s	1.2 mm/s
5	Classifier gearreducer	1.2 mm/s	1.9 mm/s

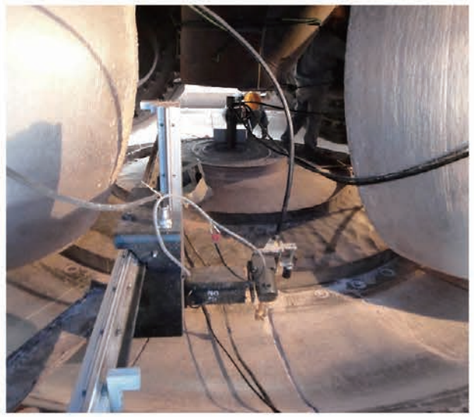
Process of Concrete Pedestal Construction

After pouring concrete

After installation of arm

5 Easy Maintenance

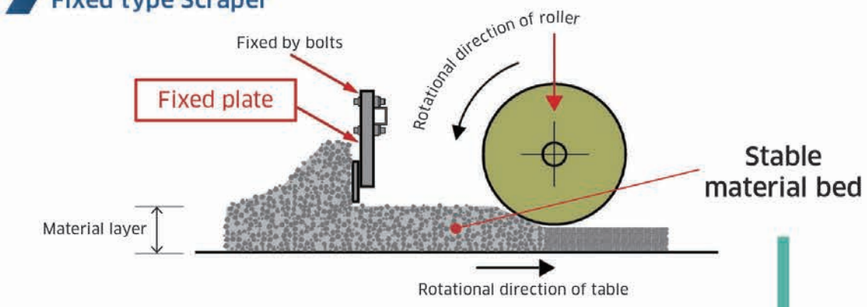
Hard facing used in the wearing elements is another Kawasaki technology development. Wearing elements for CK mills are made of normal cast steel + Hard Facing, having overcome the disadvantages of High Cr Alloy, today Hard Facing used for wearing elements options is widely used due to **convenience, cost effectiveness and longer useful lifetime.**



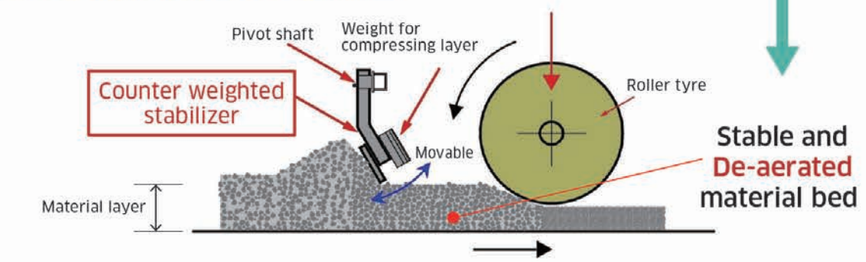
New Material Stabilizer for Fine Grinding

The material scraping plates are installed in front of each roller in order to form a continuous layer of material to each roller, designed especially for slag and clinker grinding.

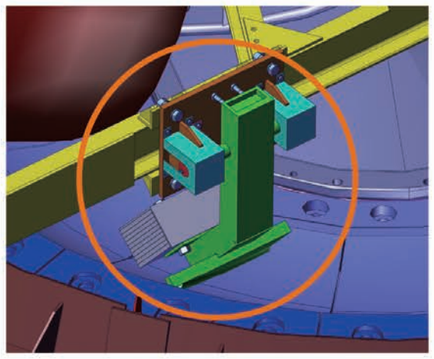
Fixed type Scraper

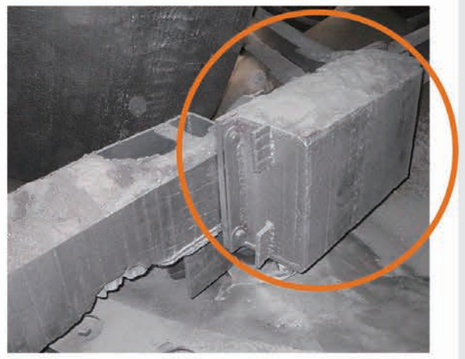


Counter-weight type Stabilizer



Counter-weight type Stabilizer





CK MILL NEW TECHNOLOGY

CONCEPT

New 6-ROLLER CK MILL

1. Identical module design Roller & Arm assembly

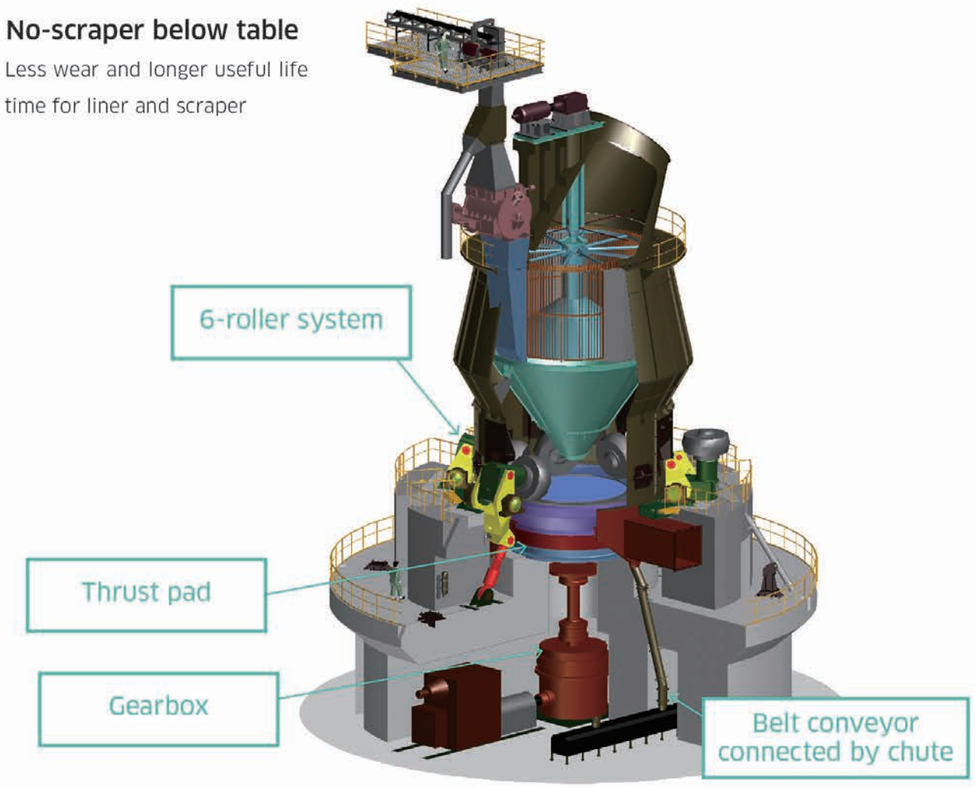
Apply our proven technology for high quality products

2. Independent design for thrust pad and gearbox

Optimum design for gearbox and concrete pedestal

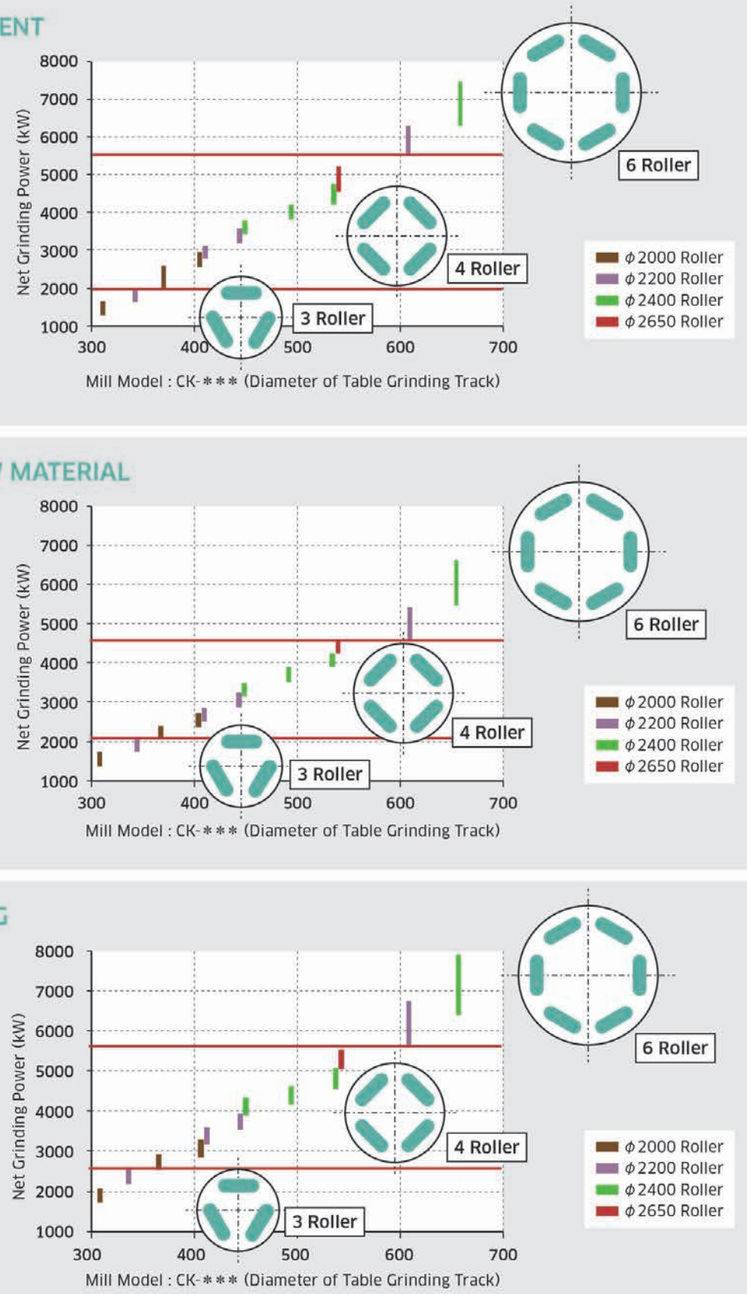
3. No-scraper below table

Less wear and longer useful life time for liner and scraper



LINEUP

FOR CEMENT



FOR RAW MATERIAL

FOR SLAG

KAWASAKI CK MILL HISTORY

1980 Started Development of CK mill for Fine grinding
[Development with Chichibu cement (CK mill stands for **C**hichibu **K**awasaki mill)]

1984 Commissioned Proto-type CK mill for Cement Grinding & Slag Grinding

1987 Commissioned First Industrial CK mill for Slag Grinding (CK260)

1989 Commissioned First Raw Grinding CK mill (CK200)

1996 Commissioned First Cement Grinding CK mill (CK310)

1999 Application of a High Efficiency Classifier for Slag Grinding CK310

2006 Developed 2nd Generation CK mill
[Applied Modular design, Concrete Pedestal, Hard facing wearing element]

2007 Established Anhui Conch Kawasaki Energy Conservation Equipment Manufacturing Co.,Ltd(CKM) jointly with the Anhui Conch Group

2009 Commissioned First 2nd Generation CK mill (CK450) for Raw Grinding

2013 Secured 100 CK mills

2017 Commissioned Large size slag mill (CK490) with Material Stabilizer

VARIETY OF SOLUTIONS

KAWASAKI TUBE MILL

SLIDE SHOE TYPE

TRUNNION TYPE

KAWASAKI CKP MILL(Pre-Grinding)

Kawasaki CKP mill is installed in the upper stream of the existing tube mill for increasing grinding capacity and energy saving.