



# Tsubaki Power and Performance for the Steel Industry



# Product Introduction

## A product lineup that meets customers' demands

The Tsubaki products in use in the power transmission and material handling fields have all been created as solutions for customers.

### Chains

- Drive chains
- Small size conveyor chains
- Large size conveyor chains
- Top chains
- Sprockets
- Pin Gear Drive Unit
- Hose and cable carrier systems
- Timing belts & pulleys



Drive chains

### Power Transmission Units and Components

- Gear reducers
- Linear motion products
- Locking devices
- Shaft couplings
- Cam clutches
- Overload protectors



Gear reducers

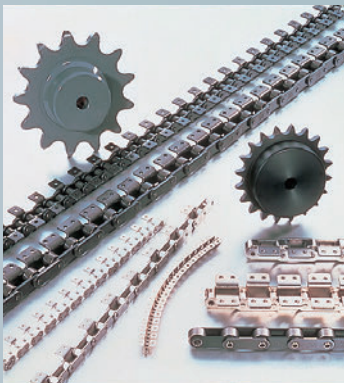
### Materials Handling Systems

- Steel industry systems
- Logistics industry systems
- Drug discovery systems
- Newspaper handling systems
- Other conveyance, sorting, and storage systems
- Modular conveyors
- Powder & granular material conveyors
- Metal scrap conveyance & coolant disposal equipment

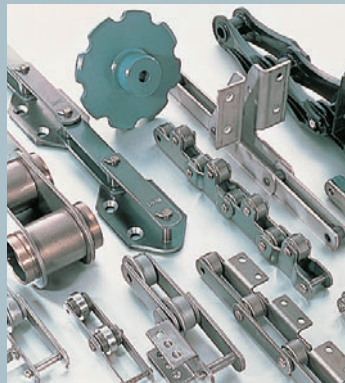


Coil Robo Systems

These parts, units, and systems are possible thanks to Tsubaki Group's customization technology developed to meet customer needs. The Tsubaki Group provides the best solutions with our advanced technologies and system development power to tackle your challenges, including increasingly-important environmental measures, constantly improving information systems and speed, and cost reduction.



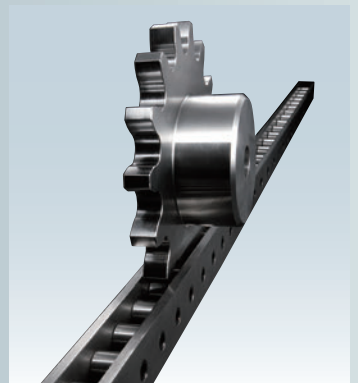
Small size conveyor chains



Large size conveyor chains



Hose and cable carrier systems



Pin Gear Drive Unit



Linear motion products



Shaft couplings



Overload protectors



Cam clutches



Coil Robo Systems



Bucket elevators  
(Tsubakimoto Bulk Systems)

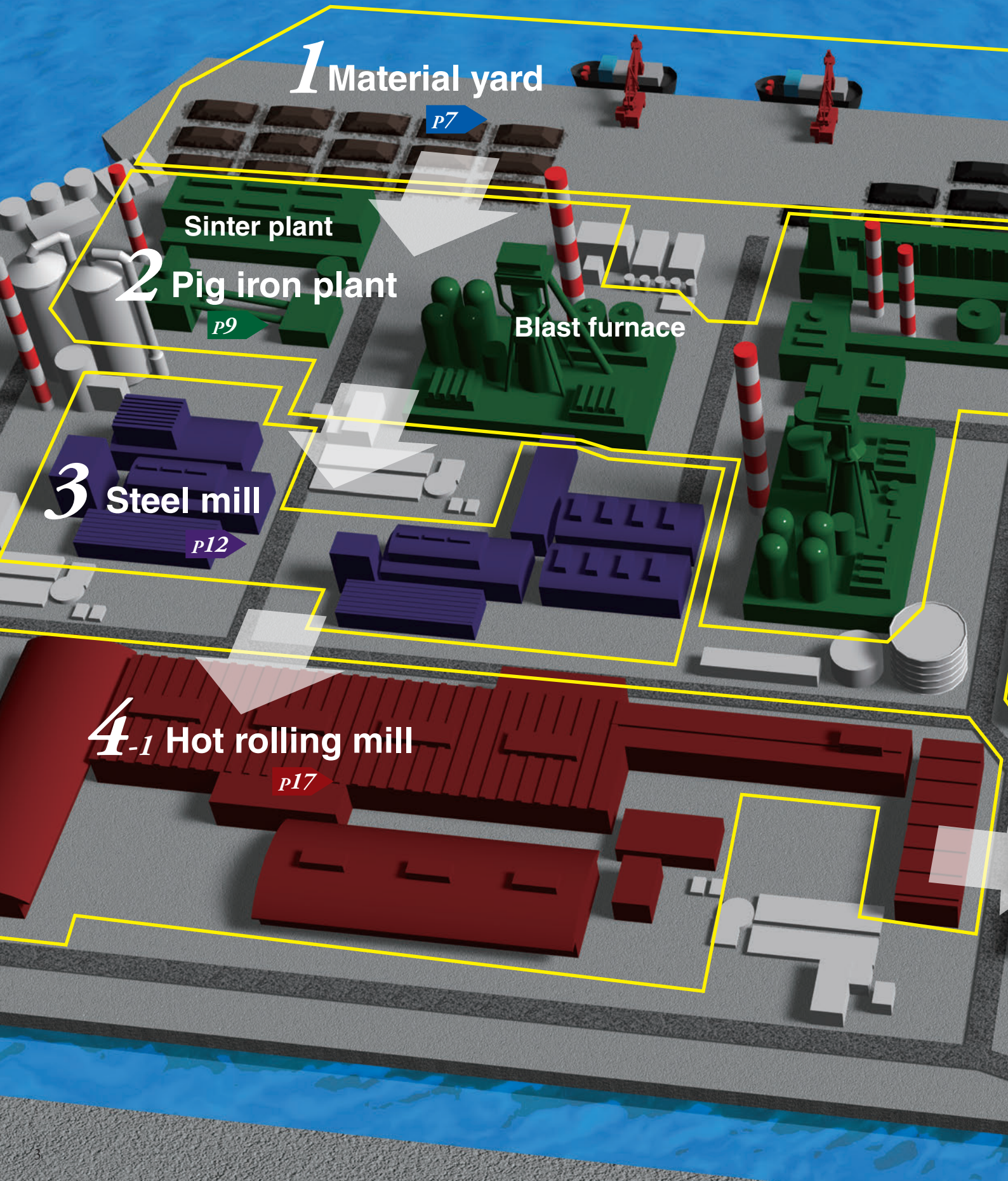


Powder & granular material conveyors  
(Tsubakimoto Bulk Systems)



Coolant & chip disposal equipment  
(Tsubakimoto Mayfran)

# Various Tsubaki products are



**1** Material yard

p7

Sinter plant

**2** Pig iron plant

p9

Blast furnace

**3** Steel mill

p12

**4-1** Hot rolling mill

p17

# used in the steelmaking industry.

Steelmaking involves various processes. You'll find Tsubaki products everywhere, from unloading iron ore and coal from ships to shipping coils of products. Based on the expertise, quality, and technological capability cultivated since 1917, Tsubaki contributes to the world together with steelmakers and steelmaking equipment manufacturers around the globe.



Coke plant

5 Product yard

p21

Cooling tower

4-2 Cold rolling mill

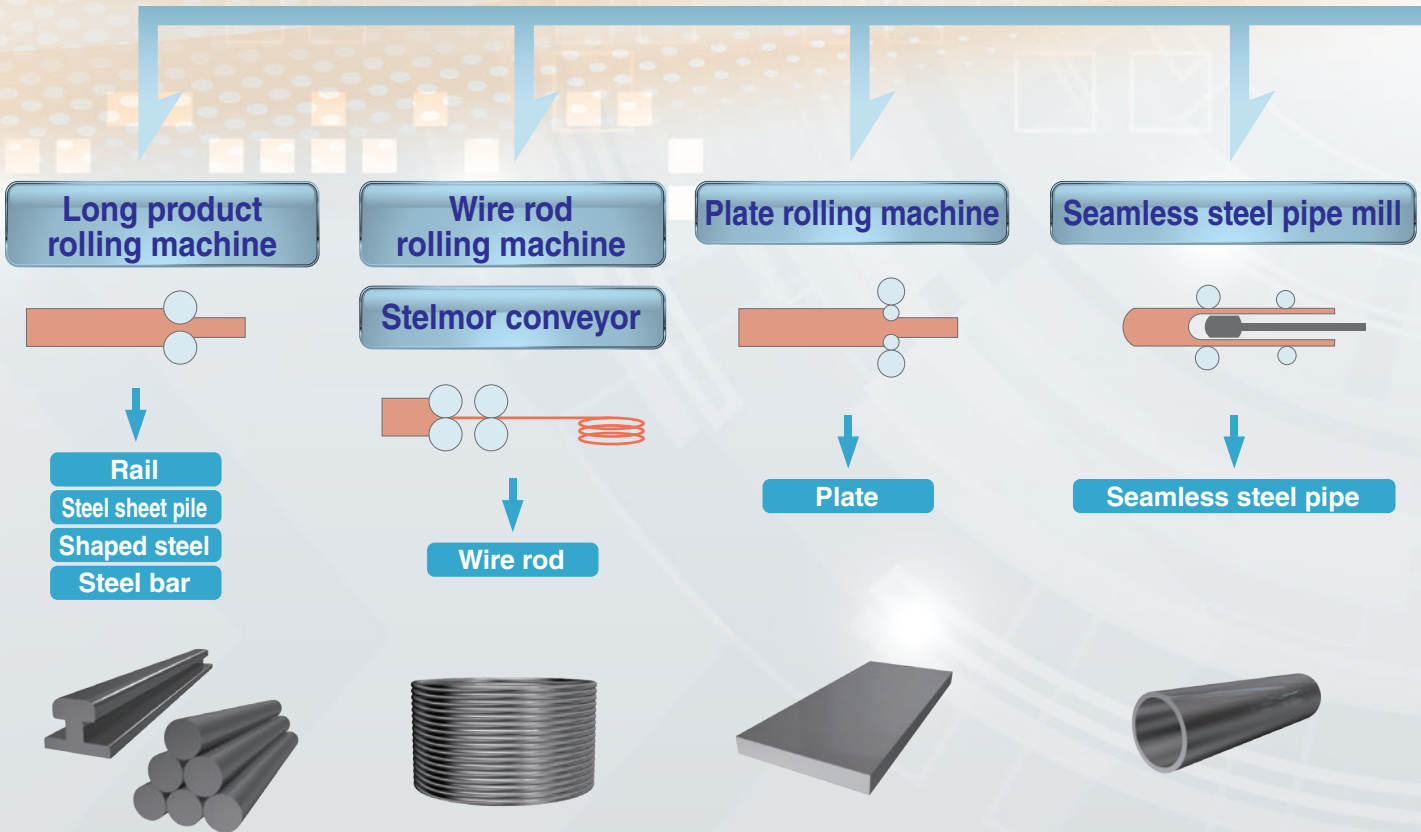
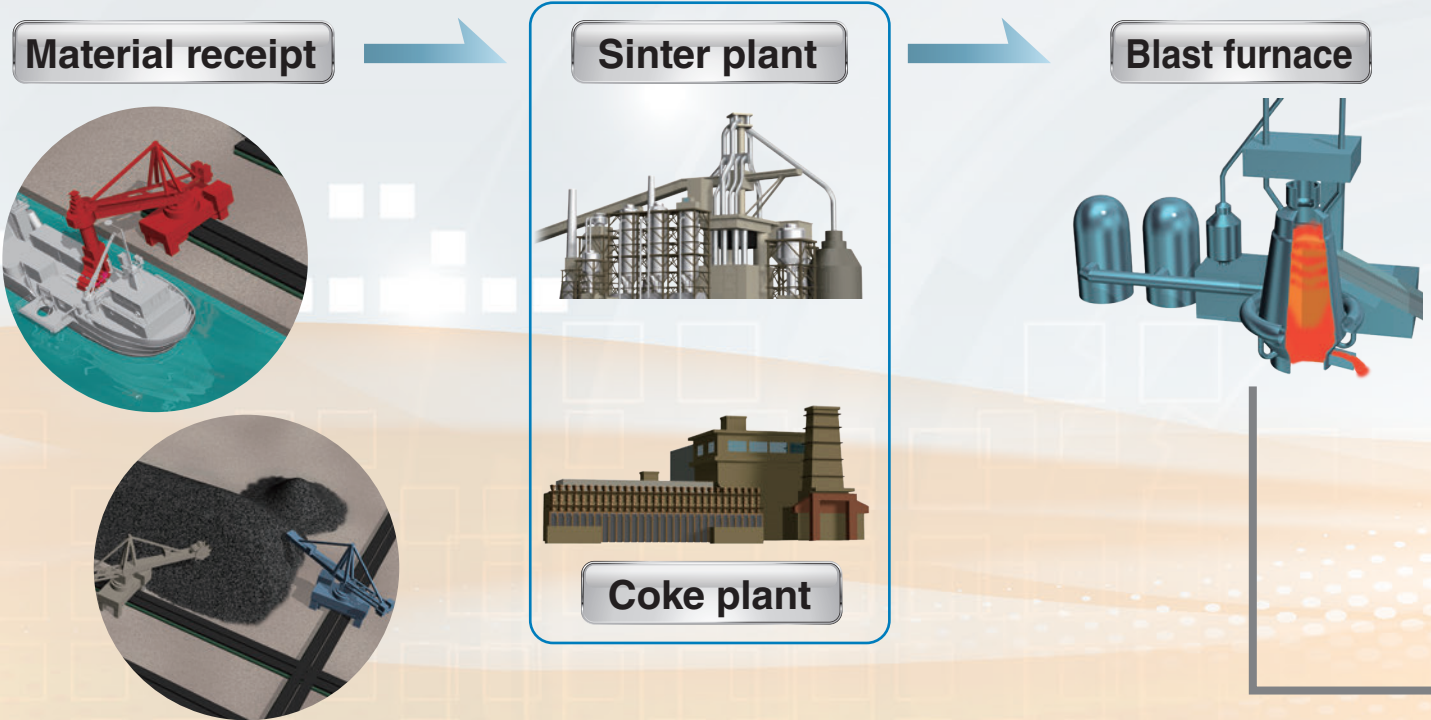
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# Steelmaking Processes and Main

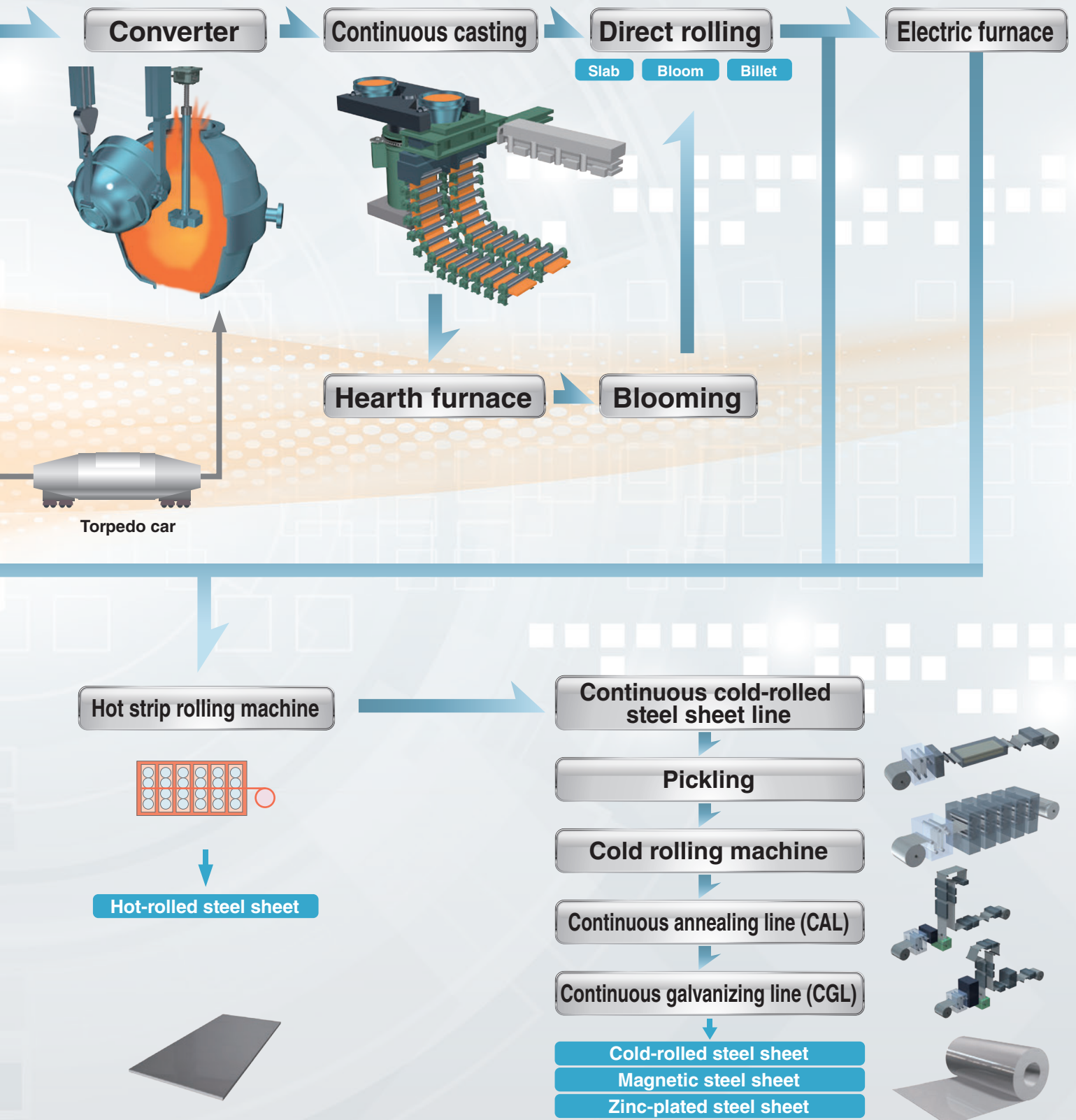
The steel items found around us are made through various processes.

First, raw materials such as iron ore, coal, and limestone, are received, then they are used to produce steel using blast furnaces and converters before the steel goes through continuous casting and rolling machines to become products.

Tsubaki products support these important processes.

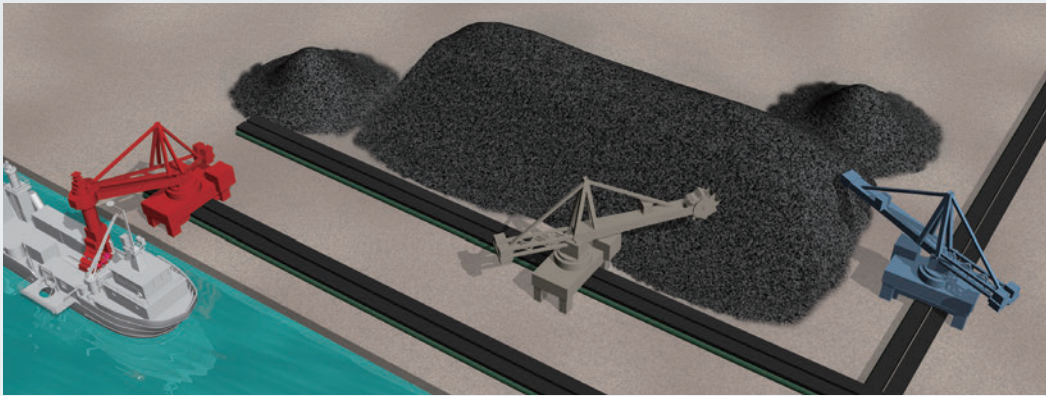


# Steel Products

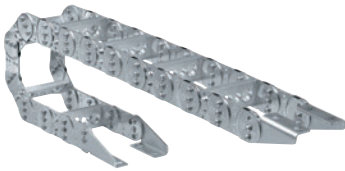


# 1 Material yard

The material yard plays the roles of unloading and storing iron ore, coal, and limestone from ships, and then supplying these to the sintered ore and coke production processes in the pig iron plant.



## Steel cable carriers



TK Series

Steel cable carriers with superior strength, rigidity, and heat resistance. Stainless steel types, special surface treated types with excellent cost performance, and horizontal types are also available.



Horizontal arrangement



Continuous unloaders

## Unloader chains



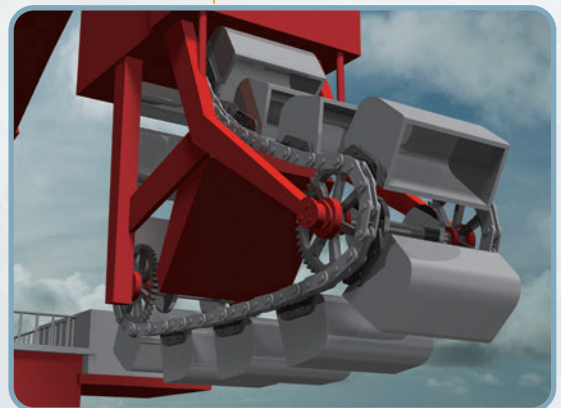
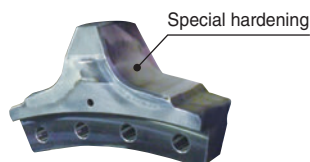
Tsubaki unloader chains are used by various customers that rely on their superb durability made possible by proprietary technology. They are designed and built specifically to transport particular material.



## Unloader sprockets



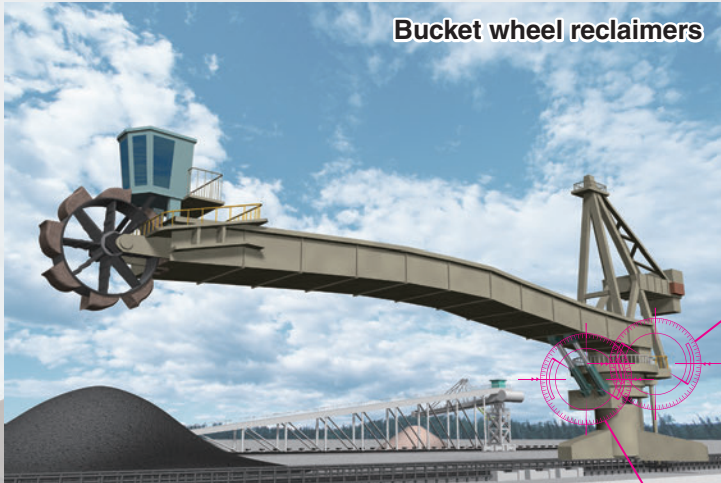
Unloader sprockets are optimally shaped to suit the chain. Special hardening is applied to provide very high resistance to wear.



## Continuous unloaders

Unloaders use buckets to unload bulk material, e.g. coal and iron ore, from ships. In particular, the continuous unloader performs unloading effectively in a short time, enabling large reductions of demurrage charges.





Bucket wheel reclaimers

## Bucket wheel reclaimers

A wheel with buckets is attached to the end of the boom for this type of reclaimer. The wheel is rotated to transport bulk materials, e.g. ores, piled in the storage yard to the next process.

## Chain scraper reclaimers

Designed specifically to reclaim bulk materials, e.g. ores, piled in storage yards. The material is delivered to the next process. Scrapers are attached to the chain to deliver the material.



Chain scraper reclaimers

### Overload protectors



The swivel ring gears of reclaimers are driven by pinions. Tsubaki's mechanical protection equipment instantly prevents overloads for even large machines due to clogging of coal or fragments in gears.

### Power Cylinders

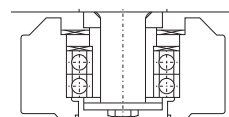
Tsubaki Power Cylinders are electric cylinders that can be put in service with just simple electric wiring. This means simple maintenance, eliminating the need for cumbersome piping required by hydraulic and pneumatic types. Standard types include both small and large thrusts designed for safe operation with built-in protectors, plus various options. U Series Power Cylinders exhibit their performance where much larger loads are required.



### Reclaimer chains



With reclaimer chains, abrasive inclusions tend to infiltrate between bush and roller or into outboard rollers. When roller rotation becomes faulty or wear occurs between bush and roller, the chain comes to the end of its service life. Tsubaki has achieved longer service life by employing bearing rollers with high debris resistance.



# 2 Pig iron plant

The pig iron making process extracts iron from iron ore. Here, sintered ore and coke are produced, and molten iron is taken out of the blast furnace.



## Coke plant

The coke plant fires coal in a furnace to produce coke. Coke provides a heat source for extracting iron by reducing iron ore with carbon, and for melting iron ore and limestone.

## Coke Dry Quenching (CDQ) facility

CDQ uses inert gas rather than water to cool coke, then recovers exhaust heat to generate electricity.

### Power Cylinders



Tsubaki's Power Cylinders are employed in many CDQs, contributing to energy savings at steel mills around the world. Compared to hydraulic cylinders, Power Cylinders allow for large reductions in CO<sub>2</sub> emissions and electricity usage, making them environmentally friendly actuators.



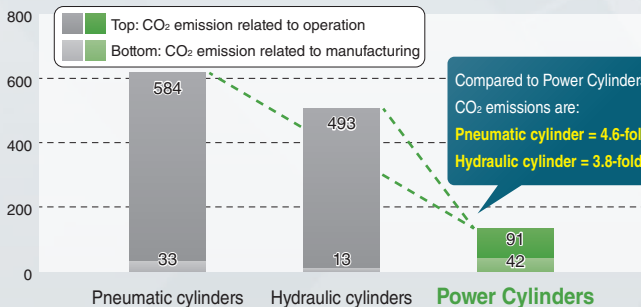
Coke Dry Quenching (CDQ) facility

## Power Cylinders vs. Hydraulic/pneumatic cylinders

### CO<sub>2</sub> emissions

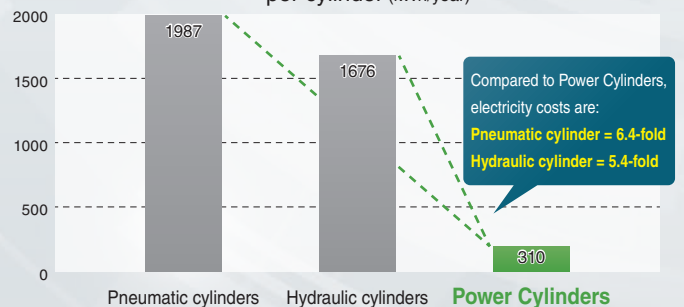
Result of comparative evaluation by Shinko Research Co., Ltd.

■ Yearly CO<sub>2</sub> emission (kg-CO<sub>2</sub>/year)



### Electricity usage

■ Comparison of yearly electricity usage per cylinder (kWh/year)



Comparison conditions:

- Thrust 3 kN ■ Velocity 200 mm/s ■ Stroke 500 mm
- 1 cycle/min × 12 hr/day × 250 days/year
- Drive systems (servomotor, hydraulic/pneumatic unit, etc.) is included

For purposes of comparison, LCA evaluation is omitted, assuming equal conditions of transport, disposal, and recycling. References: MilCA Ver. 1.0 by Japan Environmental Management Association for Industry, catalogs from manufacturers, etc.

Yearly electricity cost per plant

- Compared to pneumatic cylinders: **1.85 million yen in cost saving** **84% reduction**
- Compared to hydraulic cylinders: **1.5 million yen in cost saving** **82% reduction**

■ Conditions: 22 yen/kWh for electricity costs, and 50 cylinders used in the plant

## Sinter plant

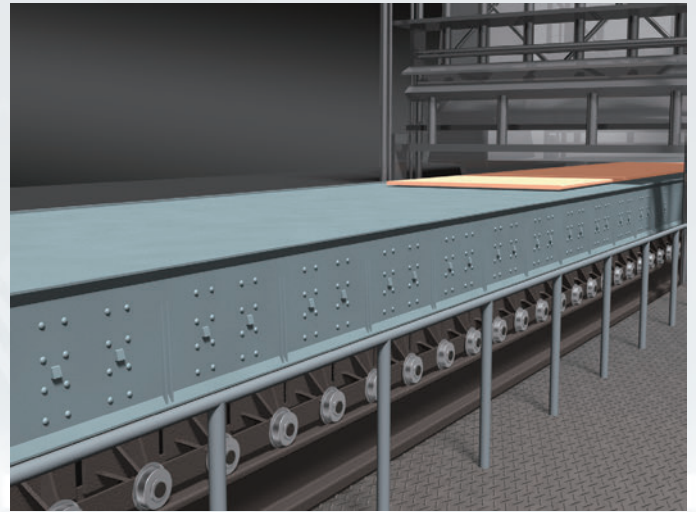
The sintering process fires powdered iron ore (which comprises the majority of iron ore received) to produce sintered ore.

### Indicator pins (replacement alert mark)



The service life limit is reached when teeth are worn to the point that they contact the mark. (Prepare for replacement if teeth come close to the mark.)

Sprockets equipped with Tsubaki indicator pins (replacement alert mark) are recommended when sprockets are used in dusty or otherwise severe environments. They indicate the impending need for replacement at a glance, enabling a large reduction in inspection time and labor.



### Scrap conveyors



This is a unique conveyor that can transport various objects by repeated reciprocating motion. Unlike vibrating conveyors, this conveyor is free of up/down bounding and vertical impacts, permitting conveyance objects to slide over the trays. Depending on the objects to be conveyed, this conveyor can transport hot and heavy objects and accommodate measures to minimize wear and rusting.



### One-Touch Door



Tsubaki One-Touch Door is a mass-produced inspection window developed by Tsubakimoto Bulk Systems based on its experience with bulk conveyors and on opinions from worksites. It is used at inspection and cleaning locations required for various equipment, e.g. conveyors, hoppers, and chutes.

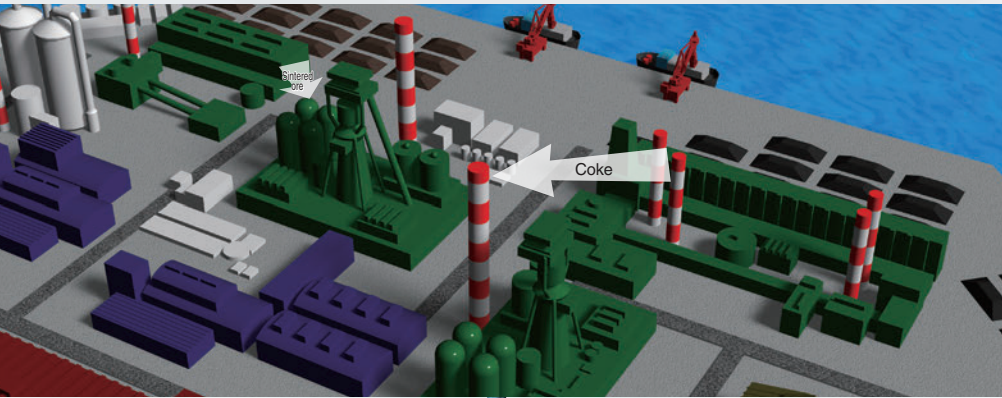
### Transport conveyor under dust collector



Tsubakimoto Bulk Systems proposes conveyors that best suit your needs for delivery from the dust collector. Based on extensive experience, Tsubakimoto Bulk Systems can work for you, from studying a layout tailored to the delivery route, to selecting a specification according to the characteristics of the target dust such as from coke or sintering. A type of conveyor that directly attaches to the dust collector is also available, eliminating the need for a volumetric feeder for the conveyor.

# 2 Pig iron plant

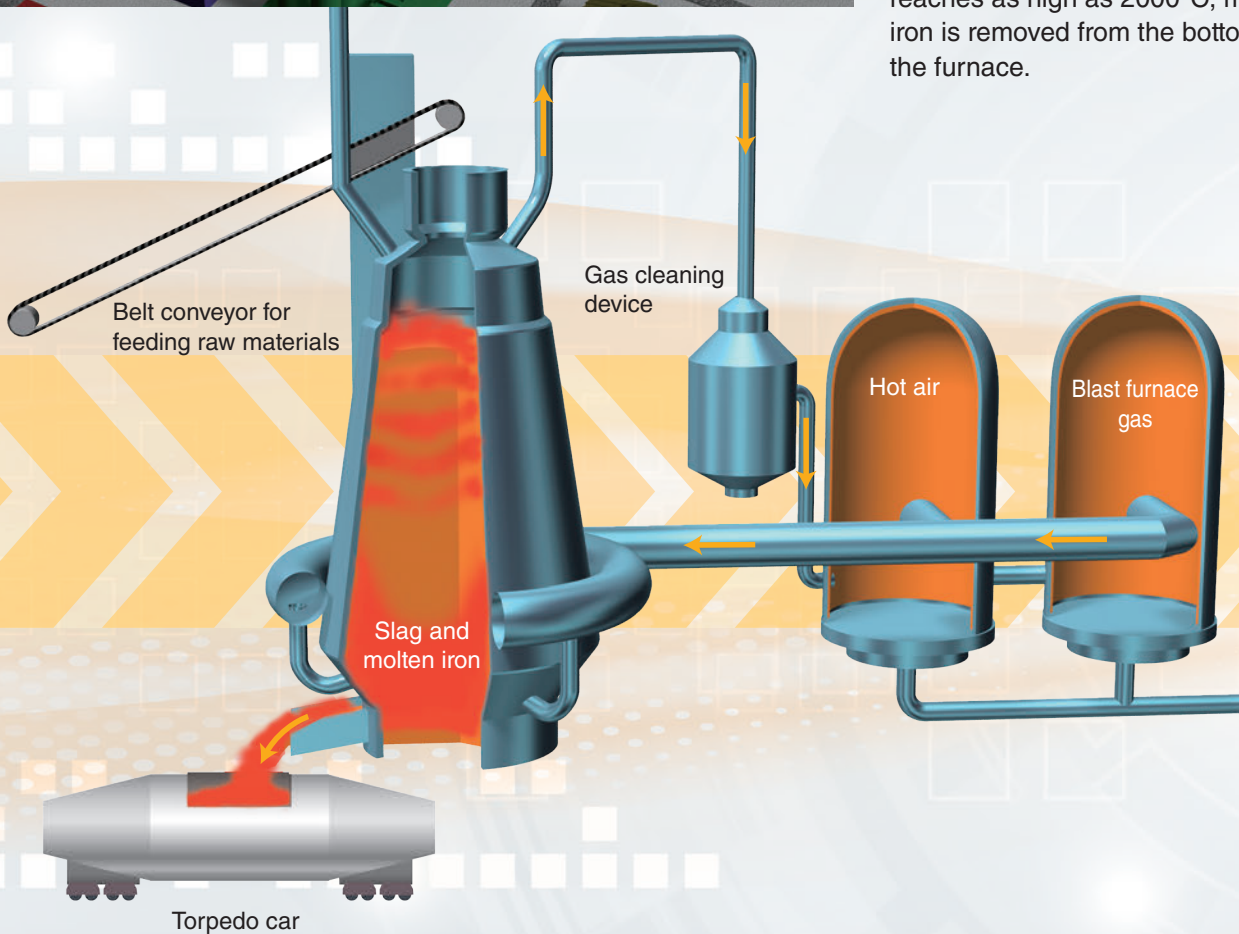
Blast furnace



## Blast furnace

The blast furnace produces iron from iron ore. Iron ore and coke are fed alternately from the furnace top, while a blast of hot air is blown from the furnace bottom. The  $\text{CO}_2$  gas generated by combustion of coke reduces iron ore to iron.

As temperature in the furnace reaches as high as  $2000^\circ\text{C}$ , molten iron is removed from the bottom of the furnace.



### Roller chain couplings



Each roller chain coupling consists of a double strand roller chain wrapped onto two sprockets. The chain is a durable type manufactured for coupling use. Standard roller chain couplings can be used in the whole range of general conveyance. In addition, heat-resistant, cold-resistant, and vertical types are available for severe environments.

### Cam clutches (Backstops)



Tsubaki backstops are used to prevent reverse rotation of belt conveyors and other inclined conveyors. A high-speed type featuring substantial increases in maximum overrunning speed and allowable torque is also included in the lineup.

### Miter Gear Boxes



Tsubaki Miter Gear Boxes are used with sorting machines for blast furnaces. Tsubaki proposes specifications that best suit the particular conditions, such as different seals and a forced lubrication types for use in hot environments.

# 3 Steel mill

In the steel mill, the pig iron (molten iron) produced in the blast furnace is decarbonized in a converter furnace to form molten steel. The next process is continuous casting, where molten iron solidifies and gets cast into billets of a given shape.

## Converter

### Converter

Here, the molten iron from the blast furnace is refined into molten steel. As molten iron contains large quantities of impurities, e.g. carbon, silicon, and phosphorus, it is transferred into the converter, where blasts of oxygen are blown from both top and bottom to oxidize and remove impurities. This produces steel of the required composition.

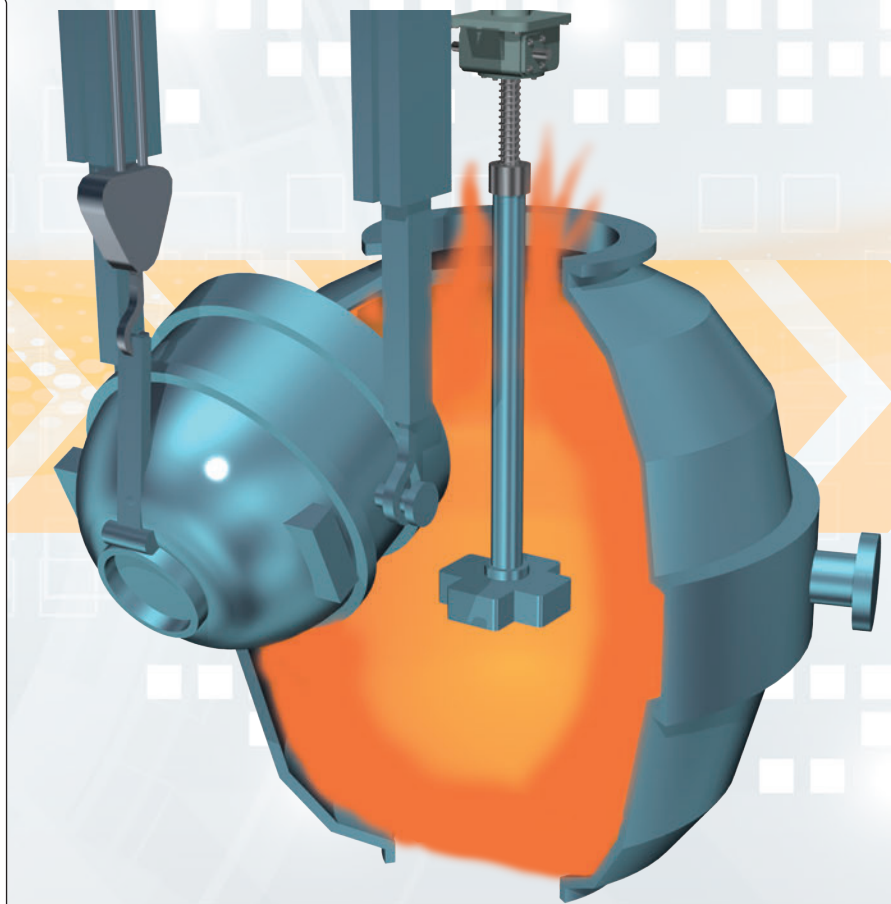


#### LINIPOWER® JACK LINISPEED JACK

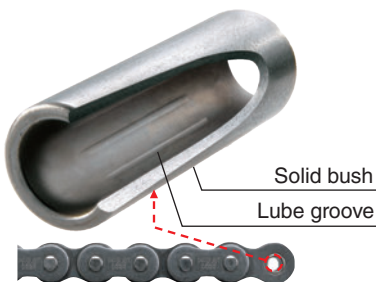


LINIPOWER® JACK    LINISPEED JACK

The LINIPOWER® JACK immerses the impeller into molten iron in order to agitate the molten iron and thereby remove impurities. A rich set of options are available, including gear reducers, with Tsubaki's LINIPOWER® JACK to meet your needs. The new LINISPEED JACK, featuring high speed, high frequency, and low floor operation, is an innovative jack that has achieved faster speed and easier operation.

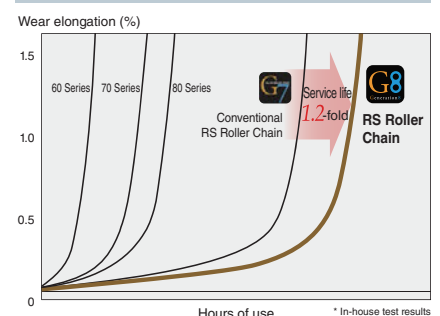


### G8 Series RS Roller Chain



On our 100th anniversary, Tsubaki renewed the trusted, proven RS Roller Chain G7-EX to the 8th-generation RS Roller Chain, the G8 Series. This new product uses a new lubricant for improved handling. As a result, chain tackiness has been reduced, with a 20% increase in wear resistance over conventional chains achieved.

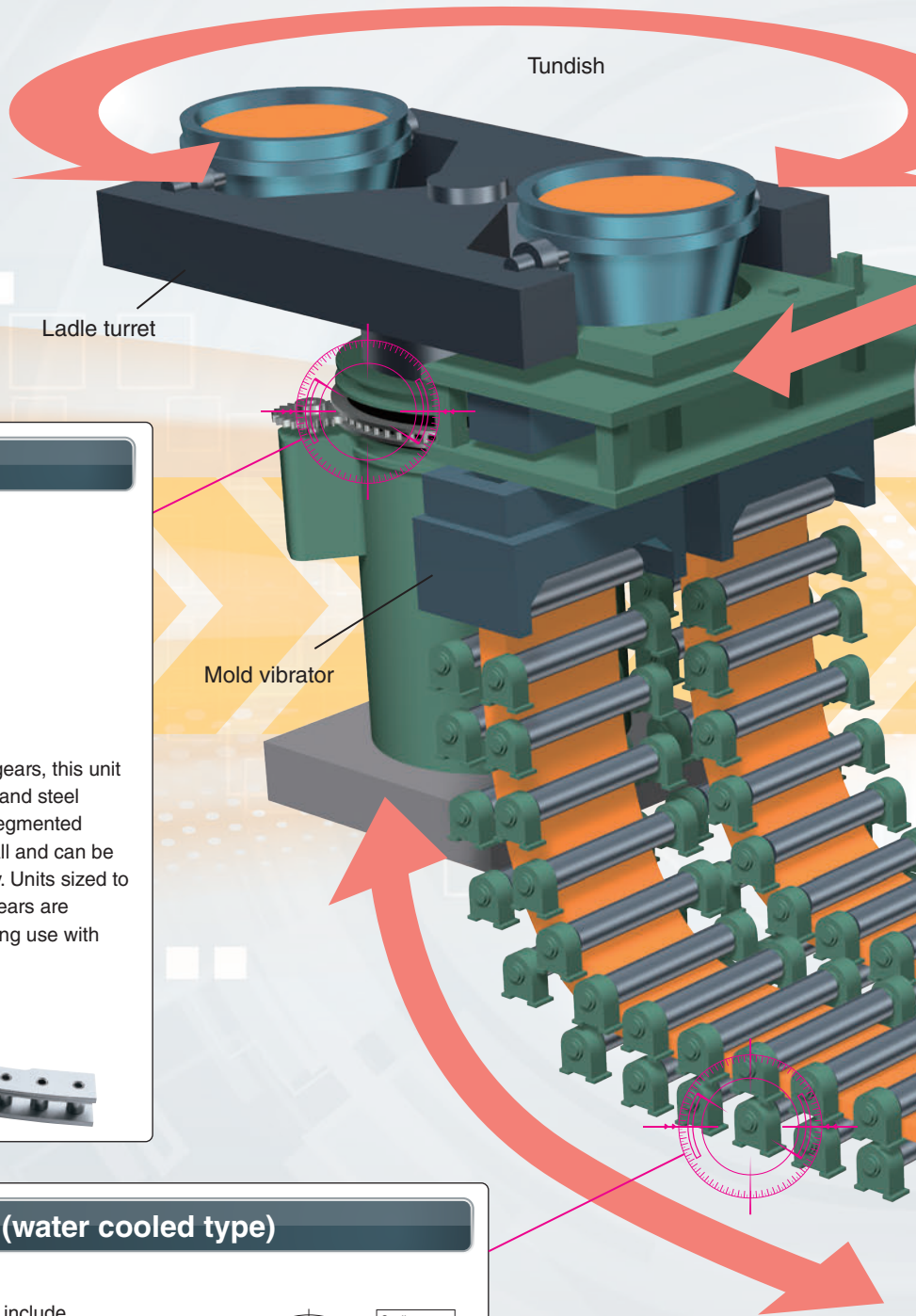
#### Evolution of chain wear life



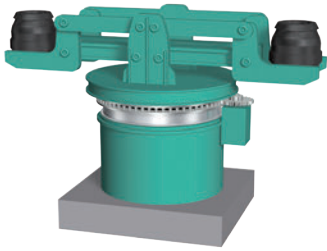
# 3 Steel mill

## Continuous casting

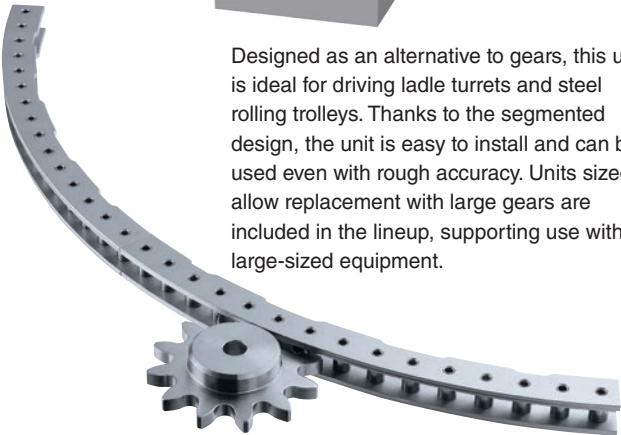
This process solidifies the molten steel refined in the converter to produce billets of a given shape. The molten steel discharged from the converter is continuously poured with a ladle into a mold below for cooling. After the steel is cooled and solidified, it is cut to a given length before it is transported to the rolling process for shaping.



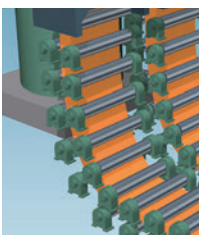
### Pin Gear Drive Unit



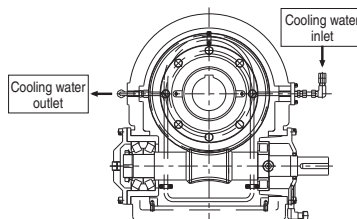
Designed as an alternative to gears, this unit is ideal for driving ladle turrets and steel rolling trolleys. Thanks to the segmented design, the unit is easy to install and can be used even with rough accuracy. Units sized to allow replacement with large gears are included in the lineup, supporting use with large-sized equipment.



### Worm gear reducers (water cooled type)



Tsubaki's worm gear reducers include double enveloping worms in addition to the cylindrical type, achieving high power with a light, compact body. In addition, various special types are supported, e.g. water cooled types for use in hot environments such as for driving pinch rolls.



### Dummy bar car chains



In continuous casting, this chain returns the dummy bar to the original position. The attachment is designed to suit your dummy bar. The portions that engage with the plate and attached dummy bar are quenched to enhance strength.

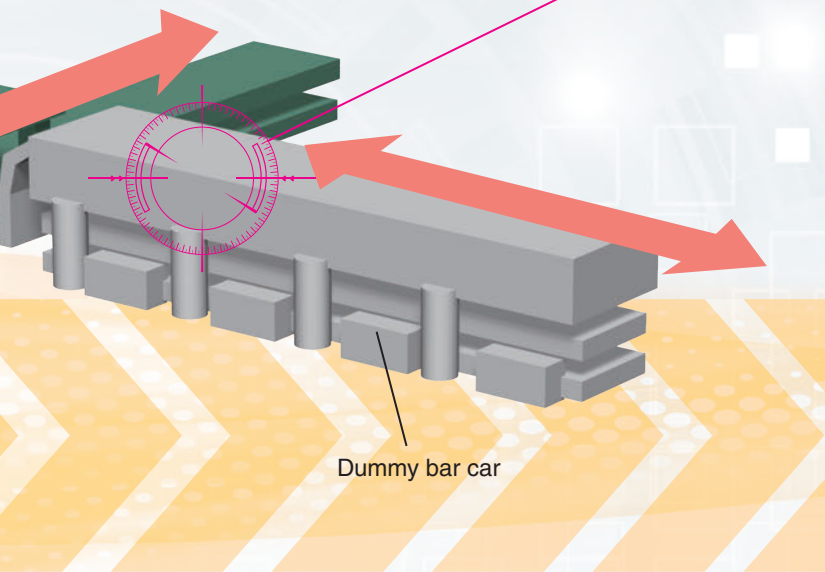


Dummy bar car chain in dummy bar car

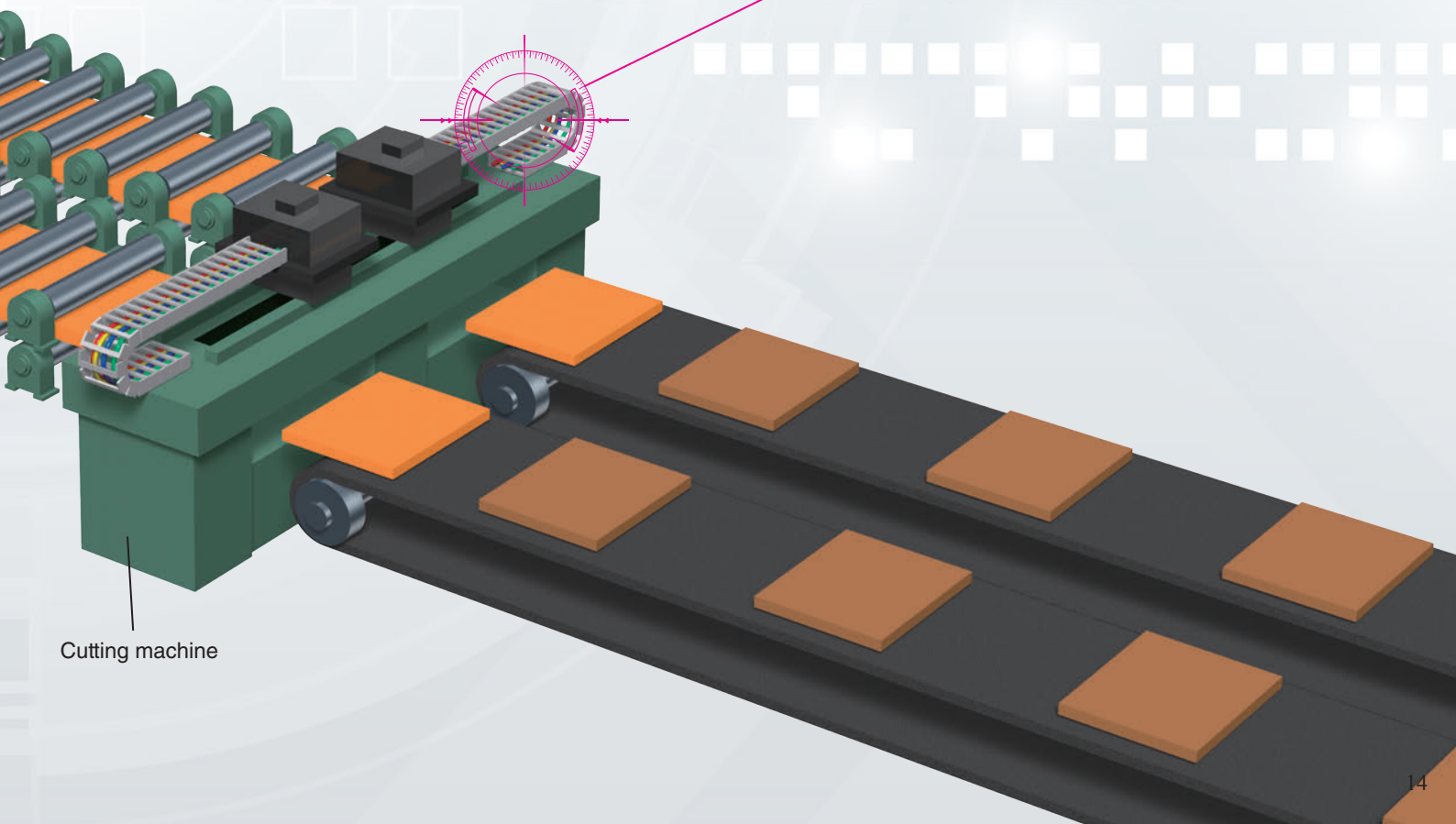
### Cable carrier (dust resistant type)



The two plates comprising the cable carrier can be set far apart to prevent clogging due to dust and chips, and improper bending and wobbling due to stuck dust. Cable carriers can be conditioned for smooth operation and improved durability even in environments where dust scatters or deposits.

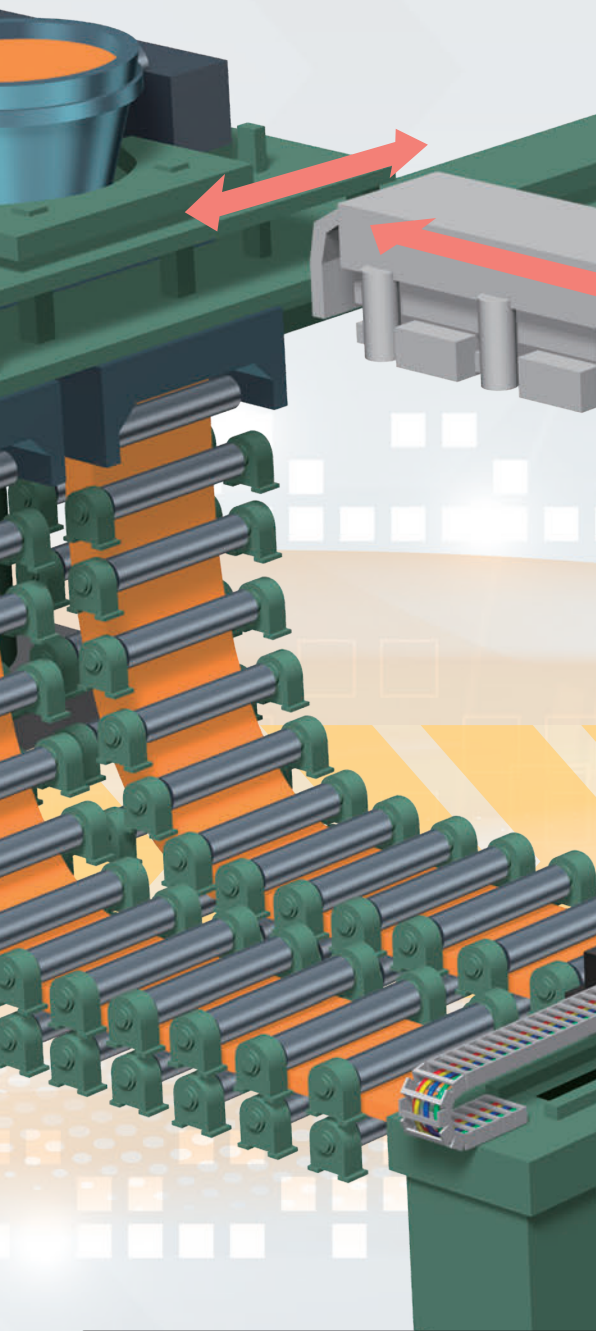


Dummy bar car



Cutting machine

# 3 Steel mill



### Cable carrier (special surface treated type)

**Results of salt spray test**  
Time to corrosion is three times longer compared to the standard type.

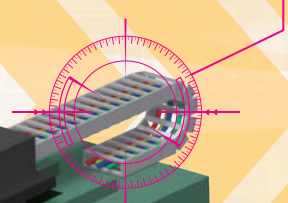
High  
Price

Stainless steel type  
Special surface treated type  
Standard type (glossy zinc plating)

Link plate of standard type    Link plate of special surface treated type

Corrosion resistance

Tsubaki's steel cable carriers offer high strength, rigidity, and durability. The stainless steel type exhibits corrosion resistance in hot environments, such as under direct water contact or in steam-containing atmospheres. A special surface treated type is also available. A special treatment is applied to the plate and connecting pins to prevent corrosion progression, improving durability and reducing replacement frequency.



## Corrosion resistant drive chains (Neptune/APP Series)

### High corrosion resistance

Standard type	Corrosion resistance (rust resistance)		Chemical resistance
	Salt spray test*	1000-ppm sodium hypochlorite 5%	Sodium hydroxide
	700 hrs	2,000 hrs	2,000 hrs
Neptune®			
Conventional type	700 hrs	200 hrs; red rust	15 hrs; flaking

\* Salt spray test methods as specified in JIS-Z-2371.



Tsubaki's corrosion resistant drive chains are the best choice for chains subject to severely corrosive environments. Stainless steel chains, as well as surface treated drive chains and Neptune chain, provide both long service life and high performance. Neptune chain offers superior resistance to salt water, weather, and chemicals (alkalis), and the APP Series provides special surface treatment on only pins, protecting pins from pitting (which induces fatigue failure), making them very useful in environments subject to water contact and steam.



## Advanced large size conveyor chains

Advanced models are now available, offering increases in wear resistance and allowable load over Tsubaki's conventional large size conveyor chains. Resistance and load specifications most suitable to specific uses can be selected for further extension of chain service life. The reduction in replacement expenses and longer life of ancillary equipment and parts contribute to total cost reduction.

**DTA Series** | Applicable sizes: RF03 to RF36 size (available for F and R rollers only)

**Wear resistance between bush and roller increased 3-fold over DT Series!**

1

Usually the roller rolls over the rail, but the bush and roller slide.

2

Consequently, wear progresses, finally reaching the end of its service life.

**This phenomenon can be greatly improved with the DTA Series.**

**Wear resistance between bush and roller**

In-house comparison

3-fold

Competitor A in Japan Equivalent to DT Series

Tsubaki DT Series

Tsubaki DTA Series

**Comparison of wear over a given time**

DT Series

DTA Series

Comparison of bushes

Comparison of rollers

Perforation

**GSA Series** | Applicable sizes: RF03 size to RF26 size

**Wear resistance and max. allowable load improved over GS Series!**

Wear resistance between pin and bush

**1.5-fold**

Wear resistance between bush and roller

**2-fold**

Max. allowable load and allowable roller load\*

**1.3-fold**

\* Available for F and R rollers only

Wear resistance between pin and bush (in-house comparison)

In-house comparison

1.5-fold

GS Series

GSA Series

Less prone to elongation!

Wear resistance between bush and roller\*

In-house comparison

2-fold

Tsubaki GS Series

Tsubaki GSA Series

Comparison of max. allowable load

RF10 size

For anti-corrosion measures for AT Series

AT Series 32.2 kN

GSA Series 23.0 kN

GS Series 17.7 kN

**ATA Series** | Applicable sizes: RF08 to RF36 size (available for F and R rollers only)

**Wear resistance and max. allowable load improved over AT Series!**

Wear resistance between pin and bush

**1.5-fold**

Wear resistance between bush and roller

**2-fold**

Max. allowable load

**1.2-fold**

Wear resistance between pin and bush

In-house comparison

1.5-fold

AT Series

ATA Series

Less prone to elongation!

Wear resistance between bush and roller

In-house comparison

2-fold

Competitor A in Japan Equivalent to AT Series

Tsubaki AT Series

Tsubaki ATA Series

**SSA Series** | Applicable sizes: RF03 size to RF26 size

**Wear resistance improved over SS Series!**

Wear resistance between bush and roller

**1.5-fold**

Allowable roller load\*

**1.3-fold**

\* Available for F and R rollers only

Wear resistance between bush and roller

In-house comparison

1.5-fold

Tsubaki SS Series

Tsubaki SSA Series

Comparison of wear over a given time

SS Series

SSA Series

Comparison of bushes

Comparison of rollers

Perforation

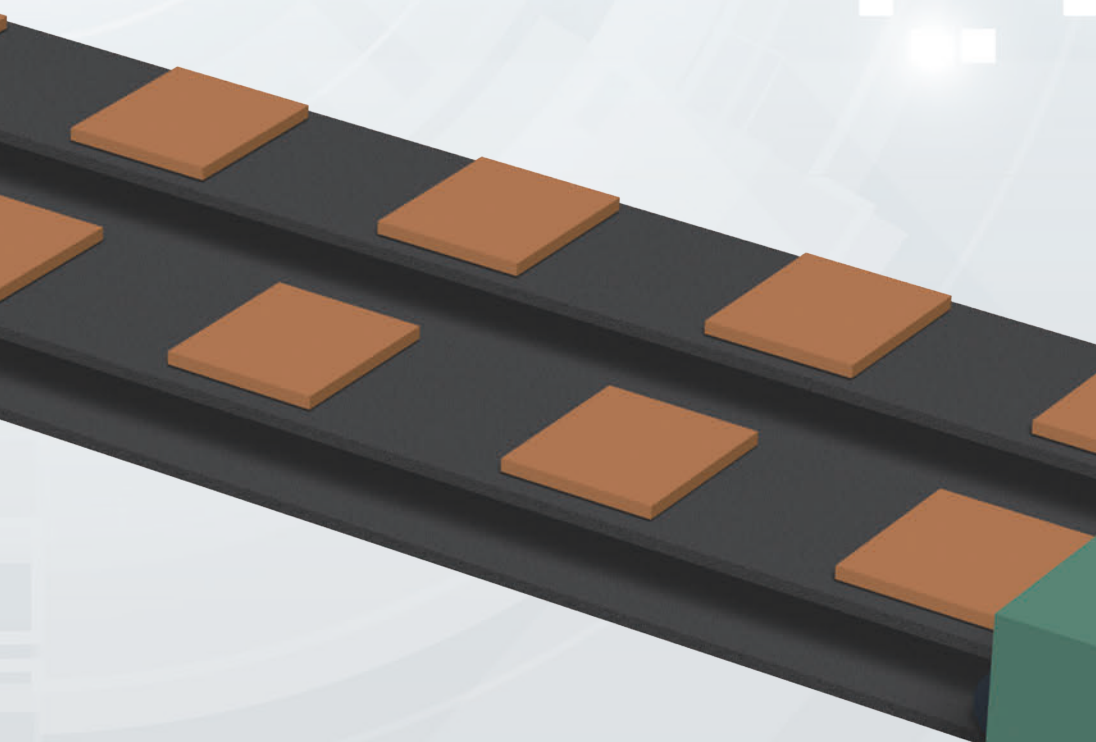
**Smart Conveyor Chain® - Special site for advanced models**

Opened January 2018

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- Advanced model introduction movies
- Introduction of advanced models
- Catalog download links, etc.

Smart Conveyor Chain



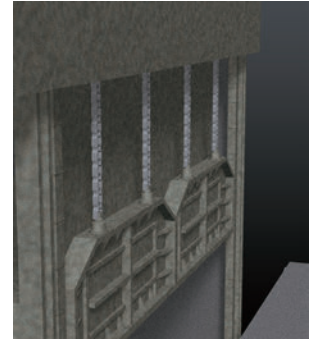
# 4 Rolling (hot rolling)

There are two types of rolling. In hot rolling, heated metal goes through a rolling machine where it is worked into a sheet or bar. In cold rolling, sheet steel is made thinner at normal temperatures, and its surface is made smooth and uniform.

## Hot rolling

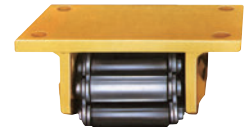
This process stretches a slab to a strip. The slab is reheated to approx. 1250°C and rolled in hot conditions. The resultant strip steel is wound into a roll like toilet paper (hot coil).

### Chains for lifting



Tsubaki chains are used in important areas, such as opening/closing heating furnace doors. In addition to trusted, proven heavy load chains, RF chains play an active role as they are compatible with heavy load chains and proven in many applications.

### Toughroller

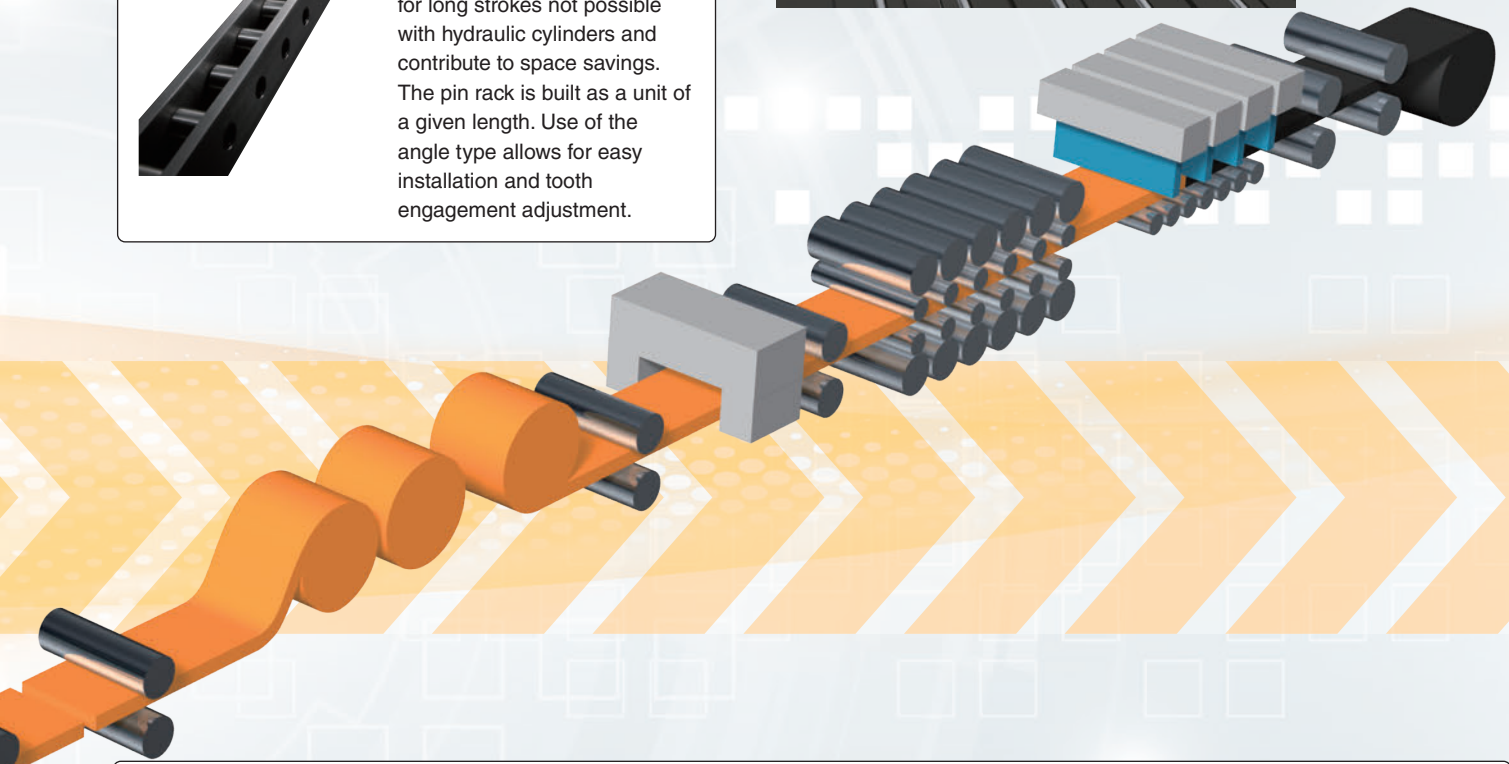
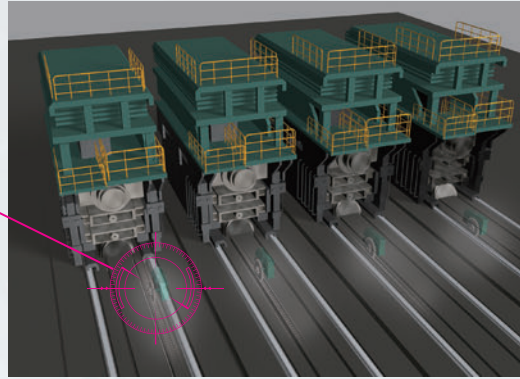


Tsubaki Toughrollers are ideal for moving, transferring, and transporting heavy objects. The rollers have a low center of gravity and are compact and highly circular, enabling transportation of heavy objects with small force.

**Pin Gear Drive Unit**



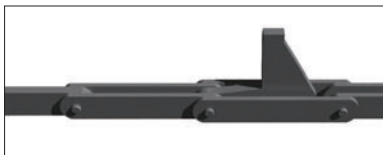
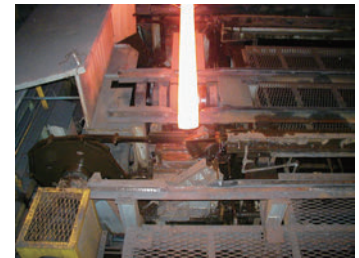
Tsubaki Pin Gear Drive Units play an active role in moving steel rolling trolleys. They allow for long strokes not possible with hydraulic cylinders and contribute to space savings. The pin rack is built as a unit of a given length. Use of the angle type allows for easy installation and tooth engagement adjustment.



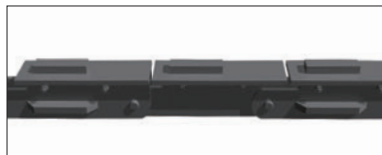
**Conveyor chains for transporting semi-finished products**



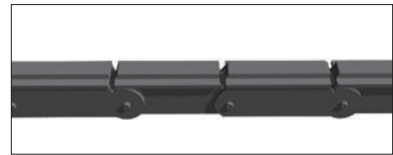
Chains for use with conveyors for transporting semi-finished products such as slabs and billets should be designed by considering, among other criteria, the shape, temperature, and conveying atmosphere of objects to be conveyed. Tsubaki proposes optimum specifications based on its wealth of experience.



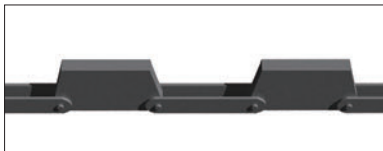
For transporting billets



For transporting slabs



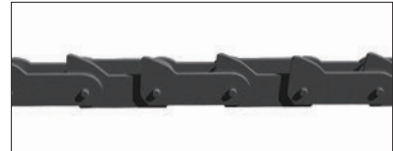
For transporting slabs



For use with cooling beds



For transporting wire rods



For transporting wire rods

# 4 Rolling (cold rolling)

Here, the thin sheet produced by hot rolling is rolled further to the final product thickness. The thinned sheet has a surface treatment applied before being shipped as a coil for use in automobiles, building materials, and beverage cans.

## Cold rolling

This process rolls hot coils at normal temperatures to the product thickness. In cold rolling, coils are made thinner to produce cold-rolled coils.

### Worm gear reducers

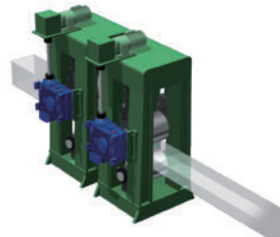


Hollow type



Solid type

Tsubaki Troi Drive, which uses a compact, double-enveloping worm gear is ideal for rolling machines. Designed with an efficiency-focused optimum tooth shape, the Troi Drive achieves high efficiency. The large number of teeth simultaneously in mesh reduces uneven rotation.



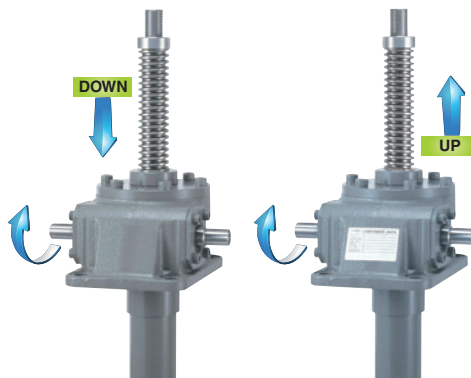
Rolling machine and roll drive for rolled sheet



Pickling

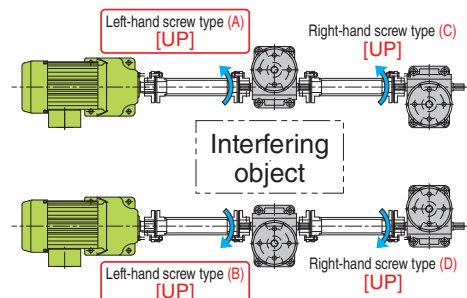
### LINIPOWER® JACK

**Right-hand screw type    Left-hand screw type**



Tsubaki's lineup of jacks consists of three types: trapezoidal screw, ball screw, and high-lead ball screw. Trapezoidal screws include a stainless steel type and a left-hand screw type as standard. Thus, Tsubaki jacks are available with short delivery times for various layouts and environments.

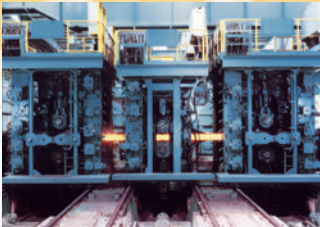
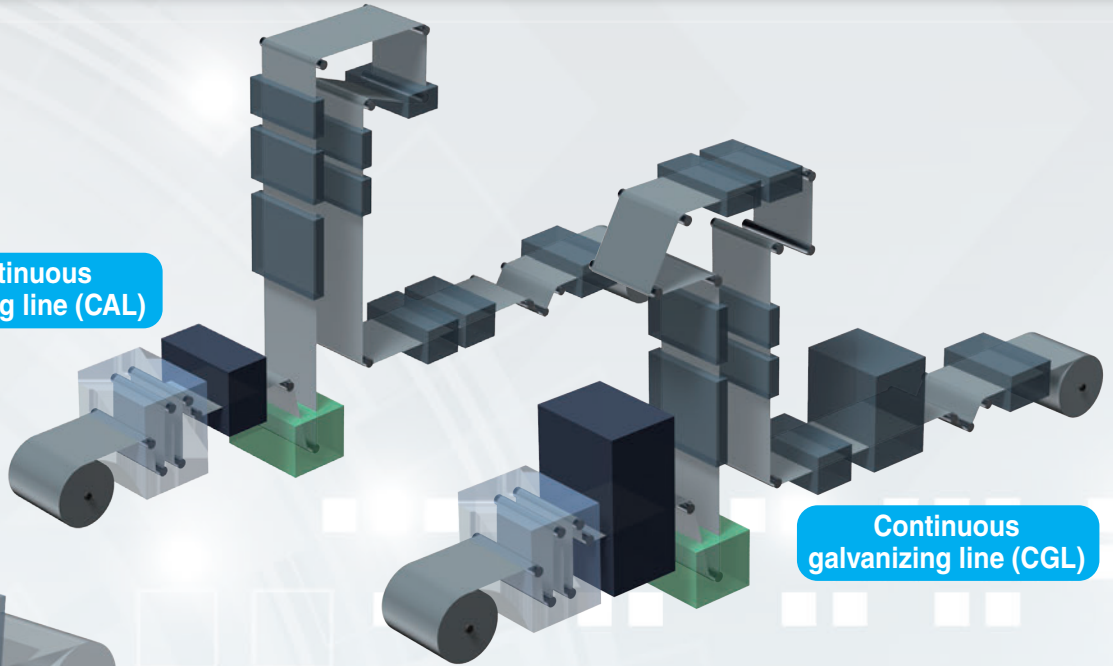
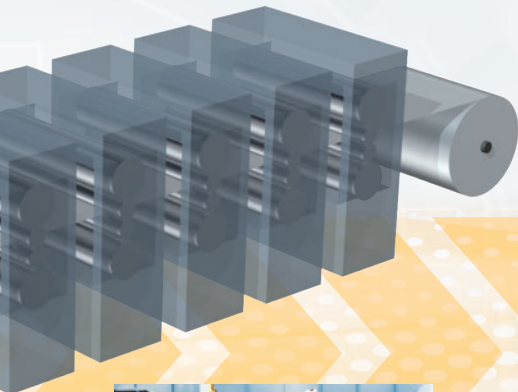
If (A) and (B) are right-hand screw types, the screw moves in the opposite direction [DOWN] to that of (C) and (D), respectively. The left-hand screw type gives the same direction [UP].



Continuous annealing line (CAL)

Cold rolling

Continuous galvanizing line (CGL)



## Looper equipment

Looper equipment refers to material accumulating devices used for transferring, winding, and unwinding rolled steel. In surface treatment lines such as CAL and CGL, the steel flow becomes discontinuous when the ends of coils are welded together on the inlet side or the wound coil is cut on the outlet side. For continuous surface treatment, the accumulated steel sheet needs to be fed out smoothly by elevating the carriage of the loop tower up and down. Tsubaki's trusted, proven G8 Series Heavy Duty Drive Chain is used successfully for elevating the carriage.

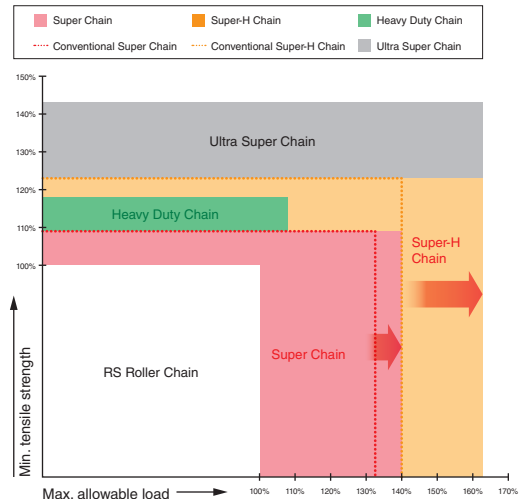
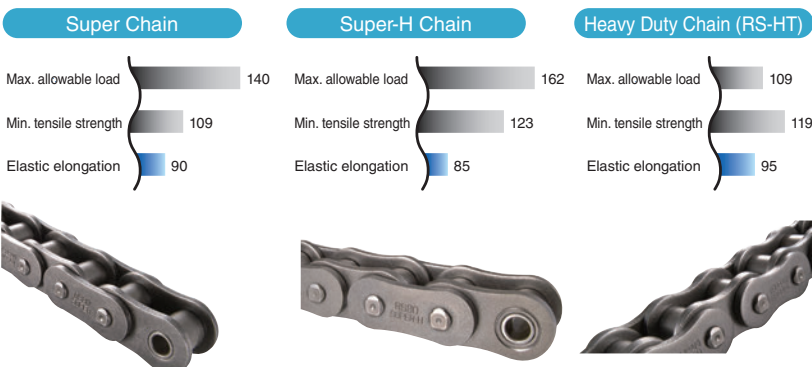
## G8 Series Heavy Duty Drive Chains

Heavy Duty Drive Chains, featuring larger plate shape and thickness, provide large kilowatt ratings and tensile strength while maintaining compatibility with general-purpose drive chains.

Various models are available: Heavy Duty Chain (RS-HT) offers enhanced tensile strength thanks to increased plate thickness of the RS Roller Chain; Super Chain offers enhanced maximum allowable load (transmission capacity); and Super-H Chain using the same shape as the Super Chain provides substantial improvements in both tensile strength and maximum allowable load by increasing plate thickness.



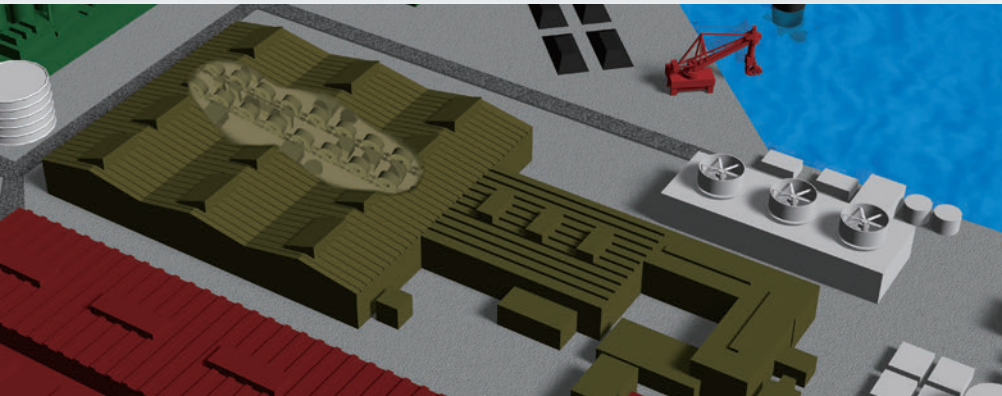
● Comparison of min. tensile strength and max. allowable load  
 \* The minimum tensile strength and maximum allowable load of RS Roller Chain are taken as 100%.



\* The above graphs assume that the general-purpose roller chain is 100. (Comparison for RS80 size)

# 5 Product yard

In the product yard, huge coils need to be transported efficiently. Fully automatic coil transport equipment is deployed in coil storage yards between production lines and in the product shipping yard. In the product yard, coils are transported with particular care because the next process is in the customer's plant.



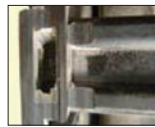
## Overhead traveling cranes

Overhead traveling cranes are able to cover broad workspaces with three motions: hoisting, traversing, and traveling. Thus, the cranes are used for transporting coils on storage and product shipping yards.

### Long span cable carriers



Comparison of wear condition \*After 130,000 cycles



Inner surface in link without glide shoe (wear progressing)



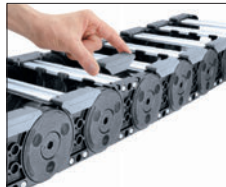
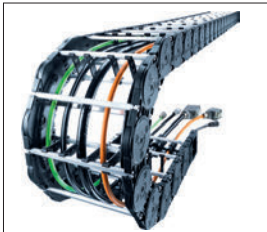
Glide shoe (slight wear)

Without glide shoe

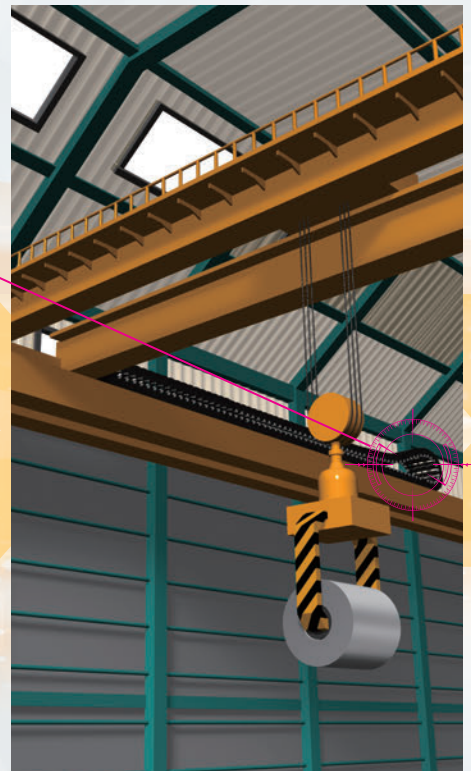
Service life 10-fold

With glide shoe

Plastic cable carriers are also used for overhead traveling cranes that travel long distances. Overhead traveling cranes are able to cover broad workspaces with three motions: hoisting, traversing, and traveling. Thus, the cranes are used for transporting coils in storage and product shipping yards. Plastic cable carriers provide up to 120 meters of travel stroke. With the availability of long-span rails and various options, they can be installed quickly and easily.



Long service life: Subjected to more than 3 million cycles of endurance testing



## Linear motion products

Tsubaki can propose mesh chain type actuators in addition to bolt/nut types. The Lift Master capable of bearing single-ended loads, and Zip Chain supporting high-speed, frequent use in limited spaces, bring innovation to the worksite.

### Lift Master

The built-in slide guide achieves high rigidity to bear single-ended loads!

The guide mechanism is contained in a compact frame. Assembly and installation man-hours are substantially reduced.

Bolt/nut type



Scan here to view the video.

### ZIP CHAIN ACTUATOR®

Space saving is now possible, far superior to conventional linear motion products!

Linear motion of the interlocking chain type achieves spacing savings far superior to other linear motion designs. Its excellent features include high-speed, high-frequency operation, and environmental friendliness and more.

Interlocking chain type



Scan here to view the video.

### ZIP CHAIN LIFTER®

Support for fast elevation and highfrequency operation

This revolutionary lifter transmits elevating thrust effectively, as the thrust is transmitted directly via linear motion using interlocking chains.

Interlocking chain type

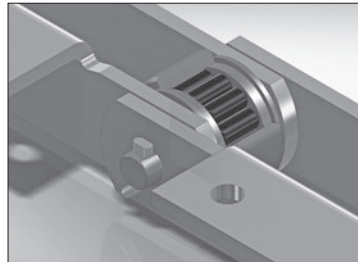


Scan here to view the video.

## Transport by chain



Bearing Roller Conveyor Chains have our proprietary structure containing cylindrical bearings in each roller. The lineup includes dust resistant, water resistant, and lube-free types, with the saddle shaped to the object to be transported.  
Superior shock resistance compared to ball bearings is ideal for transporting heavy objects.



Conventional type

General-purpose conveyor chain



Functions of bearing rollers

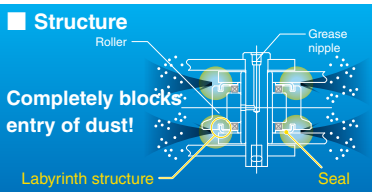
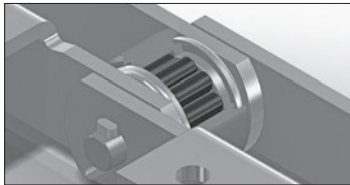
1. Reduced chain running resistance (one-third of general-purpose conveyor chains)
2. Substantially increased allowable roller load

Bearing Roller Conveyor Chain

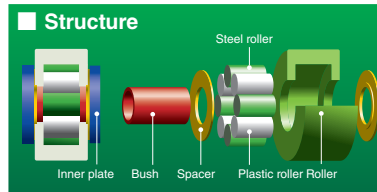
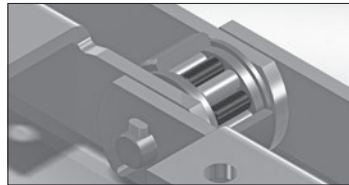


Effects of bearing rollers

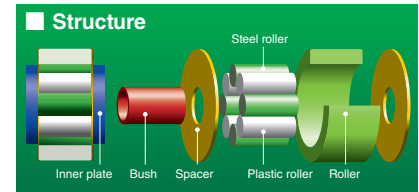
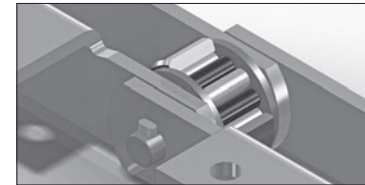
1. Decreased chain tension and less power requirement
2. Jerking prevented during operation of long machines or at low speed
3. Reduced roller rotation malfunction and rail abrasion
4. Improved wear life (between bush and roller)



Dust resistant type



Lube-free, general type



Water resistant type

## Transport by conveyor



2-stage trolley

A large number of fully automatic coil storage/transport systems are arranged on temporary storage yards or product management areas for hot-rolled or cold-rolled coils. Based on a wealth of proven experience, Tsubaki's Materials Handling Division works with you to achieve the stable operation and improved productivity you require.



Pallet car



Coil packing line



Coil turner



Storage robot



Liner robot



Skid robot



Shuttle robot



Coil lifter



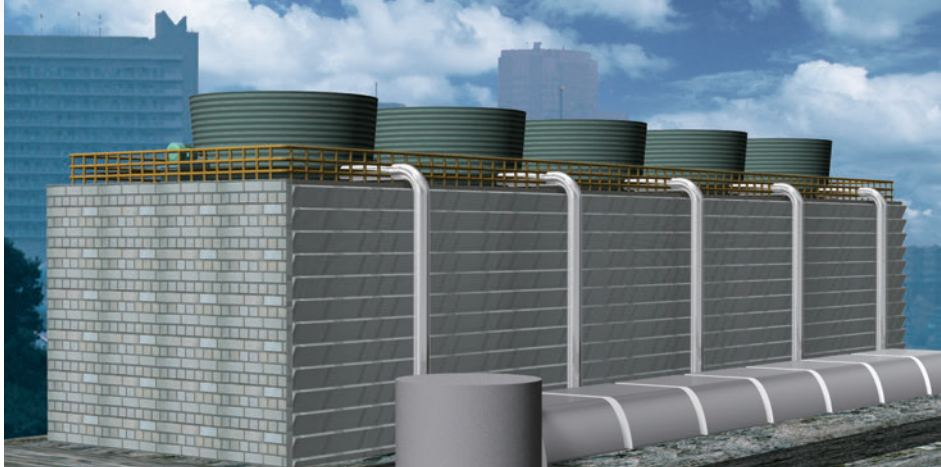
Feed trolley



Shuttle car

# Related Solutions

## Couplings for cooling towers



For cooling towers with large fan diameters, long spacer type Echt-Flex Couplings are ideal between the fan drive motor and gear reducer. The couplings provide flexible, lube-free connections between distant shafts.

### CFRP spacer type ECHT-FLEX® Couplings

The spacer pipe is made of CFRP (carbon fiber reinforced plastic) to prevent corrosion and achieve a substantial reduction in weight. You can select between the NER Series for easy installation and the NEF Series for easy disc replacement.

#### NER Series



Scan here to view a video of the structure.

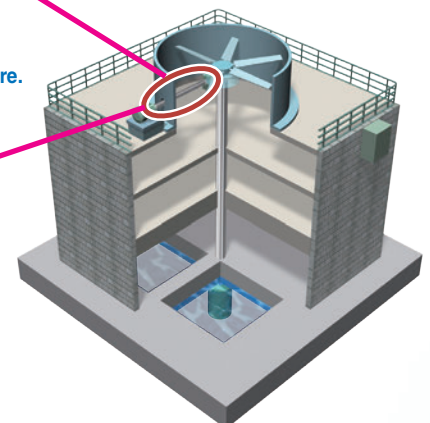
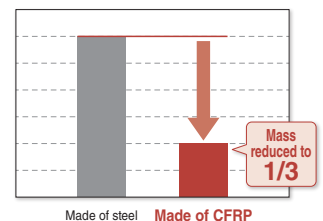
The coupling can be combined with the NER Series with a center unit structure to enable easy installation even in elevated, treacherous areas. A stainless steel type is also available.

#### NEF Series



The coupling can be combined with the NEF Series that allows for easy replacement of discs (plate springs) as in conventional couplings. The NEF Series can use CFRP discs (plate springs) to increase allowable misalignment for longer service life. A stainless steel type is also available.

Comparison of mass of NER230W spacer (at 2000-mm distance between hub surfaces)



Search products quickly and easily on the website.

Scan here





# Introducing TSUBAKI SMILE®

»»» Product maintenance support with two dimensional codes «««



Tsubaki Smart Information Link for Engineers



## Services

Scan the two-dimensional code, and you will be able view Tsubaki's registered product information (model number, quantity, drawing number, etc.) with a mobile terminal such as a smartphone or tablet.

Want **list management** for your products?

Want **quotations or technical support?**

Want to know **product information** for your products?

Want to manage **scheduled replacement date** for your product?

Email is sent to you before the replacement date you specify.

## Flow until start of use

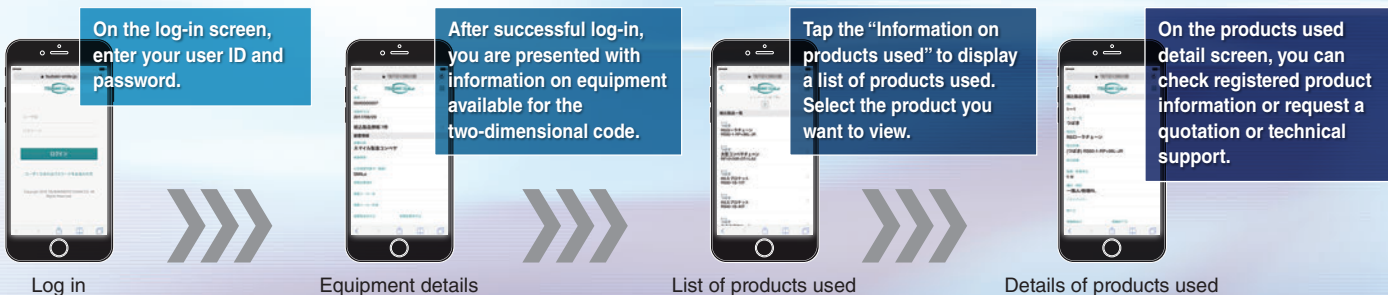
- 1 Tsubaki Receives Tsubaki product.
- 2 Tsubaki Tsubaki's personnel visits you and explains this service.
- 3 Tsubaki/Customer **An agreement is made about the service contents.**  
\* See the enclosed application form stating the terms of agreement.
- 4 Tsubaki Interviews you and enters registration information in the special registration form.

- 5 Tsubaki/Customer Attaches a **two-dimensional code** to each equipment subject to the service.
- 6 Tsubaki Information on your equipment and the information from the special registration form will be registered on the dedicated server.
- 7 Tsubaki We send you a temporary password (by email) for logging in to our website.
- 8 Customer **Upon initial log-in\*, please change your password.**  
\* Upon initial log-in, please agree to our privacy policy and security policy pertaining to this service.
- 9 Customer **Scan the two-dimensional code with a mobile terminal or enter the URL from the label into the web browser on a PC or mobile terminal.** You can now start using the service.



▲ Scan the two-dimensional code above to see a sample screen of the website of TSUBAKI SMILE® services. For a user ID and password, please call your contact person or the customer inquiry line.

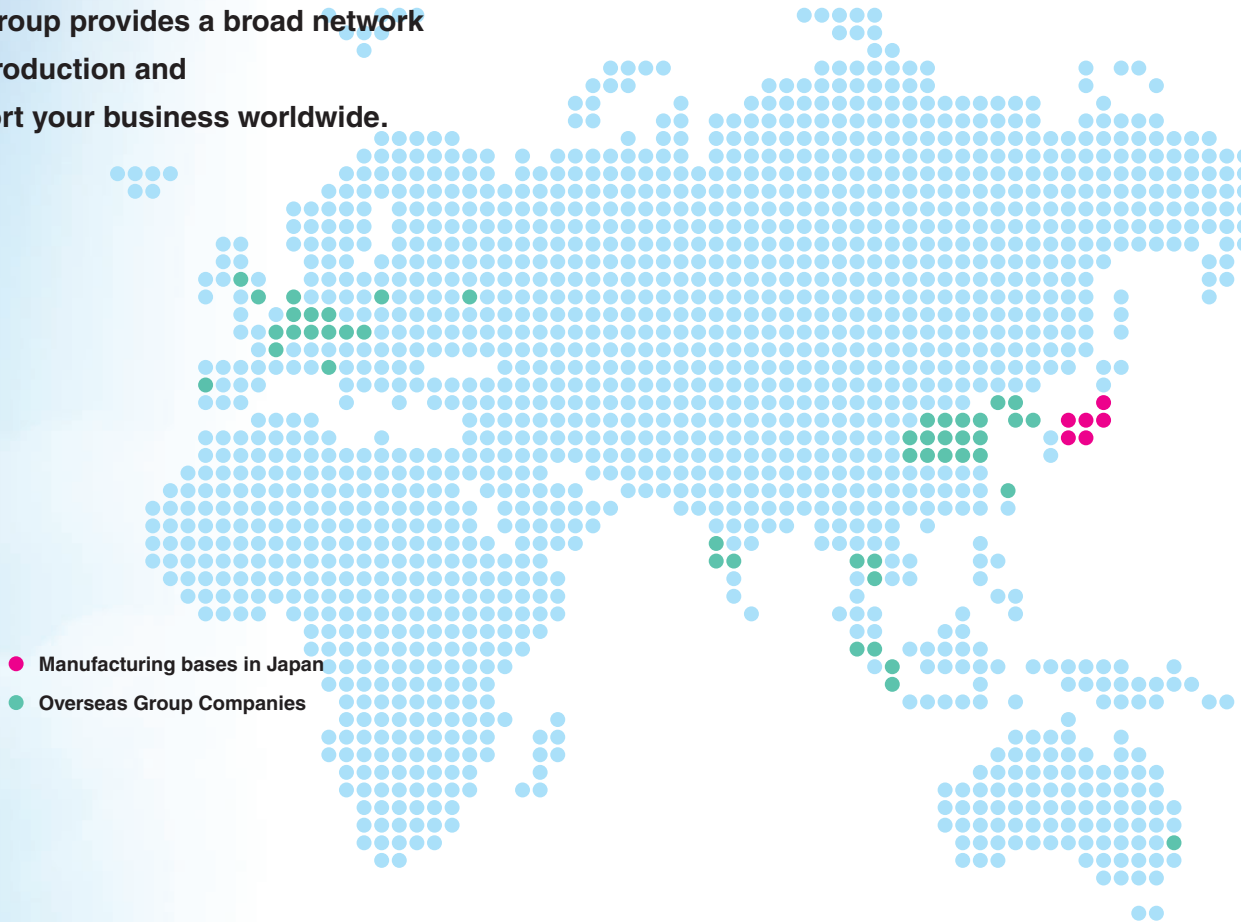
## How to check production information



# Tsubaki's Global Network

The Tsubaki Group provides a broad network for real-time production and sales to support your business worldwide.

(April 2018)



## Japan (15 locations)



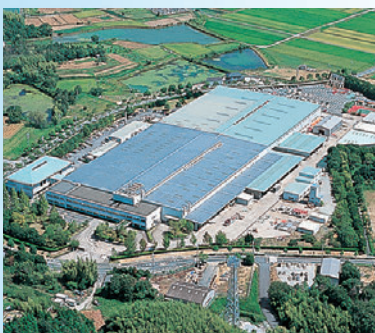
Kyotanabe Plant



Saitama Plant



Nagaokakyo Plant



Hyogo Plant



Okayama Plant



Tsubakimoto Mayfran



**North & South America** (11 locations)



U.S. Tsubaki Holdings, Inc.



U.S. Tsubaki Power Transmission, LLC.



U.S. Tsubaki Automotive, LLC.



Tsubaki of Canada Limited

**Europe** (20 locations)



Tsubakimoto Europe B.V.



Tsubaki Kabelschlepp GmbH

**Asia & Oceania** (32 locations)



Taiwan Tsubakimoto Co.



Tsubakimoto Singapore Pte. Ltd.



Tsubakimoto Automotive (Thailand) Co., Ltd.



Tsubaki Australia Pty Limited



Tsubakimoto Automotive (Shanghai) Co., Ltd.



Tsubakimoto Chain (Tianjin) Co., Ltd.



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