Power and Performance
For The Steel Industry
At Tsubaki we know customers want the best. Indeed, we take pride in our ability to deliver an extensive product line up that satisfies these high expectations. We are also aware that each and every one of our customers has unique requirements. Therefore, we believe that in coming years there will be an increase in demand for products that can be readily applied to customers’ global operational strategies. In other words, we foresee a rise in the need for highly customized products.

Innovation in Motion. With an eye on future trends and lifestyles, we are committed to taking on the challenge of technical innovation. Based on our brand message, which incorporates that commitment and is shared by all Group members around the world, the Tsubaki Group provides solid support for the global business activities of its customers. You can count on Tsubaki.

**Tsubaki Mission Statement**

**Our Mission**

We will provide the best value to customers around the world by capitalizing on our technical strengths in power transmission products and materials handling systems.

**Our Vision**

We aim to be a leading company in the global market for our products.
**Product Line-up**

**Products to Match Your Needs**

From power transmission to materials handling, Tsubaki products started as our solution to your needs.

Tsubaki’s parts, units, and systems are all the results of Tsubaki Group’s personalized engineering support to solve the needs of our customers. While protecting the environment is a growing concern, our customers also face problems such as computerization, speeding up operations, and lowering costs. The Tsubaki Group is here to provide the best solutions to these problems through cutting edge engineering and system development capabilities.

---

**Global Industrial Steel Chain Market Share**

*Based on Tsubaki data

---

**Chain**

- Drive Chain
- Small Size Conveyor Chain
- Large Size Conveyor Chain
- Top Chain
- Sprockets
- Cable/Hose Protection Systems
- Timing Belts and Pulleys

![Drive Chain](image)

![Small Size Conveyor Chain](image)

![Large Size Conveyor Chain](image)

![Cableveyor®](image)

![Sprockets](image)

**Power Transmission Equipment**

- Reducers & Variable Speed Drives
- Linear Actuators
- Fasteners
- Couplings
- Clutches
- Overload Protection Units

![Reducers & Variable Speed Drives](image)

![Shock Relay®s](image)

![Lini Power Jack](image)

![Power Cylinders](image)

![Cam Clutches](image)

**Material Handling**

- Distribution Systems
- Pharmaceutical Systems
- Newspaper Printing Systems
- Other Conveyance, Sorting, and Storage Systems
- Modular Conveyors
- Bulk Handling Systems
- Metalworking Chip and Coolant Processing Conveyors

![Linisort®](image)

![Conveyance System for Automobile Painting Lines](image)

![Zip Chain Lifter®](image)

![Coolant/Metalworking Chip Conveyor](image)

![Bucket Elevator](image)
The Tsubaki Group’s extensive network of production and sales bases supports our customers’ businesses in real time around Japan and around the world. (As of July 2012)

**Tsubaki Global Network**

**Japan** (18 locations)
- Kyotanabe Plant
- Saitama Plant
- Kyoto Plant
- Hyogo Plant
- Okayama Plant
- TMF Plant

**North & South America** (6 locations)
- U.S. Tsubaki, Holdings, Inc.
- U.S. Tsubaki Power Transmission, LLC.
- U.S. Tsubaki Automotive, LLC.
- Tsubaki of Canada Limited
- Tsubakimoto Automotive (Shanghai) Co., Ltd.

**Asia & Oceania** (23 locations)
- Taiwan Tsubakimoto Co.
- Tsubakimoto Singapore Pte. Ltd.
- Tsubakimoto of Canada Limited
- Tsubakimoto Automotive (Thailand) Co., Ltd.
- Tsubaki Australia Pty Ltd
- Tsubakimoto Chain (Tanji) Co., Ltd.

**Europe** (10 locations)
- Tsubakimoto Europe B.V.
- Tsubaki Kabelschlepp GmbH
- Tsubakimoto Chain (Tanji) Co., Ltd.

Full-scale production planned from December 2012.
Making steel is a complex process. You’ll find Tsubaki products used throughout the steel mill, from offloading iron ore and coal from tankers to shipping coil steel products. Since 1917, Tsubaki has been using its accumulated know-how, quality, and technical expertise to help steelmakers and equipment manufacturers build the world.
Continuous Unloaders

An unloader uses a bucket to unload coal, iron ore, and other loose material from a tanker. A continuous unloader can unload even more efficiently and in a shorter time, meaning much lower landing costs.

Chain Scraper Reclaimers

A reclaimer reclains ore and other loose material stored in the stockpile. The shoveled material is then fed to the next process. Reclaimer types include chain scrapers and bucket wheel reclaimers.

Bucket Wheel Reclaimers

Bucket wheel reclaimers feature buckets attached to a wheel at the end of a boom. The wheel rotates and feeds material from the stockpile to the next process.
Steel Cableveroy® has excellent strength and heat resistance. Stainless steel and side mount specifications are also available. We also offer an extensive line-up of tube type Cableveyors for added cable/hose protection.

Helical Reducers

**Helical Power Drive**
Highly reliable Tsubaki Helical Power Drive series helical reducers are often used in crane travel and swiveling sections.
Tsubaki Heavy Duty Roller Chains provide proven performance even on amusement rides. The optimal material and perfect heat treatment give Tsubaki Heavy Duty Roller Chains unparalleled tensile strength and shock resistance.

When abrasive material infiltrates between bushes and rollers, and infiltrates outboard rollers, the rollers lock and wear accelerates between bush and roller, causing your chain to reach its wear life. Using Tsubaki’s dust resistant bearing rollers can extend the life of your reclaimer chain.

Power-Locks are friction-type fastening devices that simply and securely fasten to shafts and bosses for no backlash. You will find just the right type for your needs from our extensive line-up and multiple sizes.

These are flexible couplings made with two solid coupling-tailored roller chains wrapped around two sprockets. Used in standard drive situations.
In the sintering process, powdered iron ore, which makes up the majority of imported iron ore, is fused to create sintered ore.

Blast Furnace

Here, iron is created from iron ore. Iron ore and coke are alternately charged in the furnace from the top, while hot air is pumped in from below. The CO2 generated from the burning of coke reduces the iron ore to iron. Temperatures inside the furnace can reach 2000°C. The melted iron (hot metal) is removed from beneath the furnace.

Coking Plant

Coal in the furnace is distilled to manufacture coke. Iron is extracted by reducing iron ore in the presence of carbon, with also becomes a source of heat for melting ore and limestone.
Tsubaki’s standard RS Roller Chain G7-EX uses a seamless solid bush developed through unique Tsubaki engineering and processing. The special lube grooves* in our high precision solid bushes retain lubrication longer for twice the chain wear life.

*Lube grooves available for RS80 – RS140 only.

We ensure that our Tsubaki roller chain sprockets have a deep hardened layer over the entire sprocket – even the teeth bottoms. This ensures superb wear life for teeth bottoms and long life for the sprocket. We offer an extensive line-up of sprockets with a wide-ranging number of teeth, rows, and shapes, as well as finished bore sprockets and bore fasteners.

Tsubaki Power Cylinders are electric cylinders that can operate with just simple wiring. With no troublesome hydraulic or pneumatic pipes to worry about, maintenance is a snap. Standardized operation for small to large thrust forces, diverse options, and various built-in overload safety devices built-in give our users peace of mind. Highly efficient ball screws provide long service life even under high speed/high frequency use.

Hybrid cable carrier systems (sideband made of plastic and stays made of aluminum) are available in 1mm width increments to perfectly fit to the available mounting space. When operating on crane systems, the carriers run safely in guide channels made of steel sheet metal which are custom-made for any application. In doing so, we can accommodate almost any request for special shapes and fastening options.

Steel mills are using NAB 600QT Aprovators in their sintering gas treatment equipment. Recent years have seen the development of flue gas treatment technology using activated coke to treat the sulfur oxides, dioxins, and other chemicals found in flue gas. Activated coke is flammable when exposed to air, which is why the sealed Aprovator from Tsubaki Bulk Systems is so widely used. The Aprovator is a bucket-type conveyor that allows for horizontal – vertical – horizontal conveyance in just one unit. The vertical conveyance portion can reach heights over 50m. Put Tsubaki’s experience to work for you.
Here, the hot metal from the blast furnace is reduced to form molten steel. The hot metal contains carbon, silicon, phosphorus, and many other impurities, so it is transferred to the converter, where oxygen is blown in from above and below to oxidize and remove the impurities. This allows the required optimal components to be adjusted to make steel.

Here, the molten steel reduced in the converter is hardened and shaped into billets. The molten steel taken from the converter is continuously poured from the ladle into a mold below and cooled. The cooled, hardened steel is cut to specific lengths and carried to the rolling process to be shaped.
The T Series Power Cylinder is a heavy thrust type power cylinder that uses AC power. Tsubaki offers a wide range of models to match any application, thrust, or speed. Thrust ranges from 2.45 to 313kN (250 to 32000kgf), with a maximum stroke of 2000mm. All models use a braked motor for reliable load support and safety. Heat resistant and other special braked motors can be easily installed for high temperature environments.

This chain returns dummy bars used in continuous casting to their original position. The attachments are individually designed to match the customer’s dummy bars. The plates and the part of the attachment that engages the dummy bar are quench hardened for added strength.

TKV Series Cableveyors have a maximum stroke of 30m (100m for the TKI Series). The maximum travel speed of the TKV Series is 150m/min, and TKI Series 120m/min, so they are usable in high frequency, high speed, and long travel stroke ranges where previous steel Cableveyors were not.

The optimized geometry of S/SX 1252B and S/SX 1802B reliably prevent costly downtimes and maintenance breaks for the entire system – especially in environments, where large amounts of very fine, abrasive media are generated. Foreign bodies entering into the system are removed from the stroke system by the self-cleaning effect of the cable carrier in motion.
**Hot Rolling**

Here, slabs are pulled to make steel strips. The slabs are reheated to 1250°C and rolled while hot. The rolled strip steel is then wound up like a roll of toilet paper (called a “hot coil”).

**Cold Rolling**

Here, hot coils are rolled to a usable thickness at room temperature. Coils rolled even thinner during this process are called cold rolled coils.

**Pickling**

The surface scale (iron oxide) formed on hot coils in the hot rolling process are washed off (“pickled”) using hydrochloric acid.

**Zinc Plating**

Here, iron is dipped into and coated with molten zinc.
Chains used to convey slabs, billets, and other semi-finished products have to be designed in light of the product’s shape and temperature, as well as the conveying environment. Let Tsubaki’s extensive track record help find the right specifications for you.

- JOFTVCKFDUFEUPDPMEXBUFSTQSBZT
- IBWFQSPCMFNTXJUIDPSSPTJPO8JUI
- &14FSJFTUIFQJOTCVTIFTBOEQMBUFTIBWFBVOJRVFUSJQMFMBZFSDPBUJOHBOEUIFSPMMFSTBSFBMTPTQFDJBMMZDPBUFEGPSBEFEDEPSSPTJPOSFTJTUBODF
-$1IBJOEPFTOPUVTFIFYBWBMFOUDISPNJVN
- DBENJVN
- NFSDVSZ
- PSBSTFOJDBOETPJT3P
- )4DPNQMJBOU$PWFSFEPSDMPTFETUFFMDBCMFDBSSJFS
- TZTUFNTTIPVMECFVTFEGPSBQQMJDBUJPOTXIFSFIPUDIJQTPSTFWFSFDPOUBNJOBUJPOPDDVS5IFDPWFSTZTUFNTBMTPQSPUFDUTUIFMBZFEDBCMFTBHBJOTUTI ...
- $PWFSFETZTUFN3.%PSFDPOPNJDBMMZQSJDFEMZJOHTQBSLTBOETNBMMDIJQT

Slab conveyor
Cooling head
Wire rod conveyor
Billet conveyor
Slab conveyor
Cover system RMD
Steel band cover

Lines subjected to cold water sprays have problems with corrosion. With NEP Series, the pins, bushes, and plates have a unique triple layer coating, and the rollers are also specially coated, for added corrosion resistance. NEP Chain does not use hexavalent chromium, cadmium, mercury, or arsenic and so is RoHS compliant.

Covered or closed steel cable carrier systems should be used for applications where hot chips or severe contamination occur. The cover system also protects the laid cables against short-term radiant heat impact. Available as covered types with the robust Covered system RMD or economically priced, light covered types (steel band cover) for flying sparks and small chips.
The shape and thickness of heavy duty roller chain link plates are larger, allowing for more compact designs, excellent kilowatt ratings, and higher allowable load and tensile strength.

**SUPER Chain**
We’ve adjusted the size of the plate waist to give the chain 30% greater maximum allowable load over standard Roller Chain.

**RS-HT Chain**
By increasing the thickness of the plate, we’ve increased this chain’s tensile strength by 20% over standard roller chain over standard Roller Chain.

**SUPER H Chain**
SUPER H Chain has the same shape as SUPER Chain, but with a thicker plate. Ideal for applications requiring a higher allowable load, tensile strength, and shock absorption.

**ULTRA SUPER Chain**
The plates are oval and thicker than SUPER H Chain plates for the highest level of allowable load, tensile strength, and shock absorption for more compact designs.

**Worm Reducers**

- **Troi Drive® Worm Power Drive®**
Rolling mills use Troi Drives, drum shaped gears that have a high load capacity.

- Rolling mill and worm drive unit for rolled steel bars

---

**Rolling Mill**
Coil Conveyor
A coil conveyor runs between the equipment upstream and downstream of the hot rolling, pickling, and cold rolling lines, the temporary storage area for coils needing production adjustment, and between various other lines. The conveyor must convey efficiently to meet production schedules.

Ceiling Crane
Ceiling cranes can hoist, move laterally, and more backwards and forwards. They provide reliable performance in a wide range of work areas, and are often used in conveying coils in the storage yard, product shipping yard, and so on.

Pallet Car
There are many coil transfer systems in the coil storage yard and shipping yard.

Product Storage → Packing → Shipping
Coil Conveyor Chains use our unique bearing rollers to reduce running resistance. (Coefficient of friction = 0.03) The roller is also designed to be extremely resistant to cracking, and we manufacture the saddle to match your conveyor design.

A unique Tsubaki roller that features cylindrical bearings inside the roller itself. Our line-up includes dust-resistant, water-resistant, and lube-free series chains.

Shuffle Conveyors are a new type of conveyor that use a repeat back-and-forth motion to convey material. Unlike vibrating conveyors, Shuffle Conveyors are quiet during operation, and their simple construction makes maintenance easy. And unlike belt conveyors there is no way for conveyed goods to be returned.

Reduced chain tension and required drive. Eliminates stick-slip phenomenon on long lines and low speed operation. Suppresses poor roller rotation and reduces rail friction. Increased wear life (bearings/roller - bush).

---

Coil Conveyor Chain

Bearing Roller Conveyor Chain

Shuffle Conveyor
There are many automated coil storage and retrieval systems operating in the hot/cold rolled coil temporary storage yard and product management area of the shipping yard. Tsubaki Mayfran, Inc., with its proven performance in the field, works together with customers to provide the safe operation and increased productivity they need.

Long span specifications are a way of achieving longer travel strokes by having the Cableveyor glide on a guide rail. While normally this would cause wear on the tops and bottoms of the links, attaching glide shoes enables longer wear life, less energy required, and reduced running costs.

For very long travel lengths up to 200 m and over we also offer plastic cable carriers. Replaceable glide shoes made of a special, highly abrasion-resistant material with low friction coefficients increase the service life of the cable carrier systems many times over. For additional cable protection, covered types are available as well.
**Other Solutions to Your Problems**

**FB Series Bucket Elevator Chain**
A solid lubricant is bonded between the pins and bushes, and an O ring attached between links.

**Merits**
The solid lubricant minimizes chain elongation (pitch elongation), while the O ring prevents conveyed material from infiltrating between pins and bushes – and prevents the solid lubricant from escaping – giving FB Series twice the life of standard Bucket Elevator Chain.

**Tsubaki Lambda® Chain**
Lambda Chain uses special oil-impregnated bushes for lube-free operation.

**Merits**
Reduced maintenance and replacement costs.
Wear life is drastically increased compared to standard chain in lube-free operation.

**Thermally Sprayed Replaceable Tooth Sprockets**
The sprocket teeth are replaceable, and the tooth bottoms have been specially thermally sprayed.

**Merits**
The entire replaceable tooth is hardened and the bottom specially thermally sprayed, giving the sprocket twice the wear life.

**Dust Filtration Equipment Chain**
The right combination of materials allows us to provide the ideal chain to meet your needs.

**Merits**
Our line-up includes a wear resistant series, corrosion resistant series, and low noise series.

**Miter Gear Box**
Distributes power laterally and across multiple shafts. Functions as a line shaft drive.

**Merits**
Allows for simple simultaneous drive using just one motor. Equipment design can be made more compact.

**BS Series Cam Clutch**
Cam clutches prevent low-speed backlash on conveyors and other equipment. Highly reliable thanks to their complete dust-proof enclosure and special cams.

**Merits**
Specially developed cams and a unique cam – roller construction give the BS Series Cam Clutch high impact resistance, high wear resistance, and good lubricating performance.

**Lini Power® Jack**
A direct linear actuator (jack) that combines a trapezoidal or ball screw with a worm gear.

**Merits**
Choose from trapezoidal, ball, or high lead ball screws and multiple options to match your needs.

**Pin Gear Drive Unit**
Using our extensive experience with chain-type pin gear drives, Tsubaki’s high performance rotary and linear pin gear drives are easy to install and have high performance.

**Merits**
Easy attachment – even a rough attachment precision gives smooth drive, and has a much higher kW rating than chains, allowing users to go a size down. Segmented units can be connected for attachment to larger equipment.
Let Tsubaki’s Eco Products help you reduce energy costs and increase your bottom line

As a mechanical part and equipment manufacturer, the Tsubaki Group is working to develop environmentally-friendly products to reduce our environmental load (“ecology”) and increase your bottom line (“economy”).

**Tsubaki Group Eco & Eco**

Our Eco & Eco (Economy & Ecology) philosophy is to reduce our environmental load while giving our customers cost incentives and other measures to help their bottom line by providing them with environmentally friendly products.

**Eco & Eco Benefits**

By using Tsubaki’s eco-friendly Eco Products, you can reduce your environmental load, improve working conditions, and increase efficiency and quality. And by incorporating Tsubaki Eco Products into your products, you can increase your own business opportunities by providing environmentally conscious products.

**Tsubaki Group Environmental Activities**

A major goal of the Tsubaki Group is to expand our line-up of eco-friendly products to 20 products to serve as the cornerstone of eco-friendly operations. We are working hard to improve our products’ performance to give them longer life and increased power in your operations, which will help reduce waste.

**Points in developing Eco Products**

1. Use Tsubaki Eco Products to bring procurement cost incentives to your customers by simplifying your products, reduce running costs by providing a longer running life, lube-free operation, etc., and promote recycling and reduce disposal costs.

2. Pursue eco-friendly designs and reduce the environmental load of procured items.

3. Introduce LCA methodology and make our environmental approach logical.

4. Contribute to society through business activities grounded in Eco Products.

**Examples of Tsubaki Eco Products**

- **Power Cylinder LCA Evaluation**
  - Comparison evaluation results by Shinko Research Co.
  - **Power Cylinder**
    - **Comparison conditions**
      - Thrust: 3000N
      - Speed: 200mm/s
      - Stroke: 300mm
      - 1 cycle/min. x 12hrs/day x 250 days/yr.
      - Includes other drives (servo motor, hydraulic/pneumatic units)
    - **Transport, disposal, and recycling** are all considered the same for the purposes of evaluation and omitted from the LCA evaluation.
    - References: MILCA 1.0 software (Japan Environmental Management Association for Industry), company catalogs, etc.
    - **Comparison of annual power consumption per unit (kWh/yr)**
      - Electric bill comparison with Power Cylinders as 1:
        - Pneumatic: 6.4x
        - Hydraulic: 5.4x
    - **Energy bill comparison with Power Cylinders**
      - Pneumatic: 1.67
      - Hydraulic: 1.62
      - **Power Consumed**
        - Total: 1877 kWh
        - Power Cylinder: 4509 kWh
        - Pneumatic: 2937 kWh
        - Hydraulic: 5771 kWh

- **Bearing Roller Conveyor Chain**
  - **STEEL-LINE S/SX1252B AND S/SX1802B**
  - **Over three times the bush – roller wear life**
  - **Longer life means less maintenance and lower running costs.**
  - **Coefficient of friction is reduced by 1/3, greatly reducing the required power and allowing for a chain two sizes smaller to be selected.**
  - **Greatly reduced CO2 emissions thanks to lower required power.**
  - **Longer lifetime, no lubrication required, environmental-friendly.**
  - **Maintenance time is reduced, less waste generated.**
  - **Fits to the millimeter, no additional material or space needed, less downtime due to open construction.**
  - **Resource conservation, less waste generated.**