







To access profitable material deposits located near the surface, heavy machinery and blasting techniques are used to remove overburden soil and rock which would normally impede extraction of materials. Depending on the material extracted, the ore or raw mineral is conveyed to a processing plant where it is either washed, beneficiated, concentrated or refined to achieve the saleable product.

As the extraction and processing of the raw material is done in the most demanding of environments, components on the machinery used need to excel in these conditions. For these applications Tsubaki offers a wide variety of tried and tested heavy duty roller chains, conveyor chains, reclaimer chains, engineering class sprockets, back stops, electric actuators and protection devices for use on equipment or in plants such as :

- Drill Rigs
- Feeder Breakers
- Rotary Breakers
- Shovels
- Diverter Chutes
- Coal Port Loading Facilities
- Bucket Wheel Reclaimers
- Drag Lines

- Rail Loading Stations
- Wash Plants
- Refineries
- Smelters
- Conveyors
- "A" Portal Reclaimers

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7 MINING SHOVEL

Surface Mining

Drill Rigs

Drill rigs create deep surface holes which are then filled with explosives and blasted to allow for the removal of the overburden. Other applications include extracting core samples for exploration purposes. To overcome the heavy shock loads associated with this type of drilling, Tsubaki offers the Super Chain Series: HT Series, Super Series, Super-H Series, Ultra Super Series. To protect against pitting corrosion, Tsubaki offers APP surface treatment, which is highly effective in outdoor environments. To help create a safer work environment, Tsubaki provides Super Long Length Formation for Large Size Roller Chain, allowing for a continuous length chain void of any connecting links in the entire length of the chain.

SANDVIK

Super Chain Series

ANSI standard roller chains are widely used in various industries. To meet growing industry demands for cost efficiency, stronger and higher performing chains which can replace the corresponding ANSI standard chains are necessary. Tsubaki offers a line of Heavy Duty Super and Ultra Super Chains to solve your specific problems associated with heavy shock loads and other operating issues.

HT Series

HT Series chains have a greater ultimate tensile strength (+15~30%) over ANSI standard roller chains by using through hardened pins and link plates of the next larger chain size. These chains also provide greater shock load resistance. The dimensions of the chains are identical to ANSI Heavy Series standard roller chains.

Super Series

The dimensions of this series are identical to those of ANSI standard roller chains. Link plates of the Super Series have a special design and the pitch holes are critically formed to improve their allowable load by 25-30%. The pins are through hardened for greater shock load resistance.

Super-H Series

The thickness of the link plates of Super-H Series is the same as that of the next larger size of Super Series chains and the pins are through hardened. As a result, the chains have a greater ultimate tensile strength and allowable load than Super Series Chains.

Ultra Super Series

Field test results show that Tsubaki Ultra Super Series has greater ultimate tensile strength and allowable load than any other roller chain manufactured. As the allowable load is 170% of that of ANSI RS Roller Chain, using Ultra Super Series allows selection of chain up to two sizes smaller than the suitable standard chain. Excellent for applications where heavy shock loads or space limitations pose problems.

Tsubaki Super Chain Features



If you've had problems such as fatigue breakage of link plates, or generally poor performance, we recommend that you try the Tsubaki HT Series, Super Series, Super-H series or the Ultra Super Series, where you can dramatically increase the strength of your chain without having to make major modifications to your existing equipment.

Drilling Machine





HT Series

Super Series

Super-H Series

Drill Rigs

Corrosion Resistant and Surface-Treated Drive Chains APP Series

Outstanding performance in atmospheres conducive to pitting corrosion.

Pins are treated with a special surface treatment to protect against pitting corrosion that leads to fatigue breaks, thus preventing strength loss. This treatment is highly effective in environments that readily promote corrosion, such as outdoor or coastal applications. Note: Pitting is a type of localized corrosion affecting metal surfaces. Pits form toward the interior, and if pitting occurs on pin surfaces, that pin can quickly to fatigue breakage and chain failure.

Features

No strength loss!

Same as standard steel chain.

Eco-friendly chrome-free!

Special surface treatment does not use hazardous hexavalent chromium.

Example Applications

APP Chains are ideal for atmospheres that readily promote corrosion. • Outdoor uses • Coastal or riverside uses • When regular lubrication is difficult



Because equipment is used outdoors, rain can infiltrate equipment, creating conditions that promote pitting corrosion Also, pitting readily occurs in equipment exposed to salty air or saltwater spray.

Example of fatigue breaks caused by pitting corrosion

Chain: BS160HHHT-2 Equipment: Drill Rig Pitting corrosion of the pin due to insufficient lubrication and corrosive atmosphere — Fatigue breakage



Applicable Models

Single/Double Strand **RS Roller Chain**

Except for the surface-treated pins, dimensions and other specifications are the same as other roller chains.

Single Strand **Heavy Duty Roller Chain** (For other models, contact Tsubaki.)

Super Long Length Formation for Large Size Roller Chain

Removes the hassle of connecting chain from the user and contributes to a safe work environment.

As chain size increases, so does the burden of connecting it for the user. By connecting and delivering chain of the desired longer length, we can increase our users' work productivity and help maintain a safe working environment.

Safer

The entire chain is connected, meaning no connection work for the user and more stable product quality.



Simpler

The chain is delivered folded over itself in a special made wooden box for easy removal.

* Tsubaki can supply wooden boxes using heat treated materials for

exports. (Complies with ISPM Guidelines.) * Case mark for export can also be affixed to the box.

* Box is delivered horizontally. Box must stand upright to lift out chain.



More Reliable

Reliable installation - No more worries about on-site connection or twisting.

Super long length formation makes installation safer, simpler, and more reliable.



Chain is packaged in a special wooden box and delivered horizontally.



Stand wooden box upright when removing chain. (Be careful when standing wooden box.)



Chain is packaged folded on top of itself. Attach one end to a crane and lift out for easy removal.



Safer, simpler, and more reliable installation on equipment!



Rotary Breakers are large cylindrical tumblers that are used to break feed material into workable sizes. During rotation the material is lifted and dropped inside the structure, which causes the material to be broken into pieces. During the rotation, the smaller, softer broken pieces pass through the screen openings onto a conveyor belt below and are conveyed to the next stage of processing. The harder rock and uncrushable materials are discharged from the end of the cylinder with the aid of a discharge plough and other methods.

Rotary Breakers

To facilitate the rotation of these large machines, Tsubaki offers their Heavy Duty Drive Chain. Specifically designed for use in oil rigs, power shovels hoists and other heavy duty construction equipment, Heavy Duty Drive Chain is perfectly suited for rotary breakers and other heavy duty applications.



Tsubaki Heavy Duty Drive Chain

Keep Your Operation Moving with Tsubaki Heavy Duty Drive Chain

Tsubaki Heavy Duty Drive Chain is designed to exceed the listed ultimate strength ratings. These ratings are very significant. Chains with greater ultimate strength have higher actual yield and greater fatigue strength. With Tsubaki Heavy Duty Drive Chain, you get extra reserve strength to withstand high shock loads.

Precision Manufacturing Means Greater Fatigue Strength

Tsubaki Heavy Duty Drive Chain is built to withstand the most rugged conditions. We use the latest manufacturing and heat-treatment techniques to manufacture every component. Each component is carefully machined to close tolerances to ensure precise pitch control for smooth sprocket/chain interaction. That means longer service life for chain and sprockets.

Add the Power of Alloy

When parts require extra hardness, we use alloy steel to make the components. This provides more uniform core strength, which is particularly important for heavy duty applications. Every Tsubaki Heavy Duty Drive Chain with an ultimate strength rating higher than 50802.35kg (112,000 pounds) is made entirely of alloy steel. All Tsubaki Heavy Duty Drive Chains are furnished with alloy steel pins.

Reduced Maintenance Costs and Downtime

Tsubaki Heavy Duty Drive Chain stands up to the toughest environments for hour after hour of uninterrupted service.
-Optimum strength
-Fatigue resistant
-Pre-tested
-Alloy steel parts
-Press fit construction
-Accurate pitch control

Heavy Duty Drive Chain Produced by U.S. Tsubaki

Sprockets and Thrust Rollers

Rotary breaker sprockets and thrust rollers are subjected to the highest load demands. The operating parameters for these components demand the most stringent level of engineering and machining know-how.

Tsubaki sprocket and thrust roller components are designed to exacting standards and the highest safety factor ratings to ensure optimal operating performance.

Your equipment is on the line. Count on Tsubaki Heavy Duty Drive Chain.





ROTARY BREAKERS

Special Features

-Grease nipple pins -Special pin coatings -Stainless steel pins



Feeder Breakers are primary crushers designed to break ore into smaller sizes via a deck and chain conveyor system. The chain conveyor feeds the crushed ore onto belt conveyors where it is sent for further processing or stock piling.

Feeder Breakers

For the conveyor mechanism, Tsubaki offers our proven Feeder Breaker (Steel Bushed) conveyor chain and flight bars for this application. Sizes include 88.9mm $(3.5^{"})$, 76.2mm × 101.6mm $(3^{"} \times 4^{"})$, 114.3mm $(4.5^{"})$, 139.7mm $(5.5^{"})$, 152.4mm $(6^{"})$, or we can custom make a size suitable for most applications.

Also, to help overcome rapid wear from the severe working environments found in the mining industry, Tsubaki is also proud to provide its industry proven corrosion resistant surface treatment, greatly extending a chain's wear life in even the harshest of conditions.

Feeder Breaker Chain

(Steel Bushed Chains)

Tsubaki Feeder Breaker Chains (also known as Steel Bushed Chains) are especially designed and manufactured to provide excellent service in severe working conditions. Our chains are manufactured to close tolerances with the most modern equipment in the industry. Each component is made from high-quality alloy steels (pins are made of select alloy steel or high-quality carbon steel) and then specially heat-treated to provide maximum performance

and long wear life. Joint parts are hardened to provide greate strength and wear resistance. Link plates are hardened to achieve ultra-high strength throughout.

Available Sizes	
88.9mm (3.5")	139.7mm (5.5")
76.2mm × 101.6mm (3" × 4")	152.4mm (6")
114.3mm (4.5")	Custom sizes also available

Feeder Breaker Chain Components & Features

Strong, Tough Pins

Pins are hardened to achieve superior strength and extend wear life. This creates the ideal combination of surface hardness for wear resistance and core toughness to resist impact.

Long-Lasting Bushes

Bushes are manufactured to rigid specifications for optimum wear resistance and strength. Select steels are precision machined to maintain consistently high link plate interference. This results in positive link plate hold and favorable residual stress to resist fatigue. Bushes are case-hardened and heat-treated to extend wear life.

Fatigue-Resistant Link Plates

Link plates are through hardened to achieve ultra-high strength. This keeps the chain hanging failure-free, ensuring consistent service life. Tsubaki has developed superior techniques to ensure hole quality and pitch control. The result is fatigue resistance and premium performance.

Sealed Joint Chains

Tsubaki has developed a special triple sealing arrangement for the bearing areas of the chain. The incorporation of pin and bush greasing and precision chain assembly all play a part in the increased life this chain can offer in moist or heavy dust environments.

Feeder Breaker Chain is produced by U.S. Tsubaki.

Corrosion Resistant Chain Pin Technology Stainless Steel, Nickel-Plated, Zinc-Plated, UWP, NEP, Chrome Coating, and Triple Plated Chrome Coating

Combining the proven strength of alloy steel with superior corrosion resistance, these special corrosive resistant surface treatments deliver significantly extended service life for reduced total operating costs. Tsubaki offers a complete corrosion resistant package for roller chain, engineering chain, and sprockets.

If your drive or conveyor chains are exposed to intermittent water, occasional wash-downs, outdoor conditions, or even chemicals and salt water, your chains and sprockets need to be surface treated to keep your equipment moving.

The advanced performance of Tsubaki's corrosion resistant surface treatments is the result of a revolutionary mechanical plating system treatment that forms a lasting bond to the steel. It protects the chain and extends its service life by resisting corrosion longer than ever before.

Tsubaki's corrosion resistant surface treated chains stand up to water better than other types of plated chain.

Corrosion eats up more than chain - it eats up your profits! Choose strong, long-lasting corrosion resistant surface treatment and protect your bottom line. For more information, please contact your local Tsubaki representative.





In-house Salt Spray Test Results





Tsubaki: 700H NO BUST

Company A: 100H





Company B: 300H Company C: 400H

Reclaimers

Designed to transfer the coal stock pile to the Coal Handling Pre-Plant (CHPP) or to the Coal Loading Facility, these machines are critical to any CHPP. Demands for product availability and higher feed rates require the power transmission components to exceed the industry standards now and into the future.

Operating conditions like this require the best in design and innovation, and Tsubaki is the proven name in the field for delivery on performance and increased profitability.

For these machines Tsubaki has designed a made-to-order Stacker Reclaimer Chain. With a wide variety of options, these chains are specifically designed and manufactured to meet the unique challenges of your operation. To help battle against potential dust build up between bushes and rollers, Tsubaki is proud to introduce the improved anti-dust capabilities for the Bearing Roller Conveyor Chain. Also widely utilized are Tsubaki's highly customizable Large Size Conveyor Chains. With a wide variety of base materials, corrosion resistant coatings, attachments and rollers available, Tsubaki is confident we have a Large Size Conveyor Chain that can meet the unique challenges of your mining site.



Stacker Reclaimer Chains

Stacker Reclaimers are popular when heavy industrial processes require large stockpiles of raw material. Reclaimer chain and flight assemblies function like scraper conveyors, less the trough, with flight blades that push material toward a belt feeding conveyor. The reclaimer conveyor's chain with digging flights are supported by rails and structure which span over or across the pile being reclaimed for transfer to plant processes.

Chain for this demanding application should provide the longest service life to achieve the best overall value. Chain must have large bearing areas, high hardnesses and deep case depths to provide the best performance. Tsubaki engineers have used these principles while retrofitting many reclaiming conveyors with chain and sprockets, achieving longer service life than OEM chains. For superior value and performance, Tsubaki chain is your best choice.

Note that due to their complex requirements, reclaimer chains are normally manufactured on a made-to-order basis, designed and manufactured to meet the specific unique requirements of each site. Please contact your local Tsubaki representative to obtain certified prints for design and construction.

Improved Anti-Dust Capabilities

3x the wear life of Bearing Roller Conveyor Chain Standard Specs

Tsubaki's Bearing Roller Conveyor Chain Anti-Dust Specifications solve the problem

- of dust causing early wear between bushes and rollers that afflicts standard conveyor chains. - Exhibits the same performance and efficiency of the Bearing Roller Conveyor Chain, even in dusty environments.
- Same dimensions as standard R or F rollers and RF Conveyor Chains

Please contact your local Tsubaki representative for further details.

Large Size Conveyor Chains

Along with the above mentioned Stacker Reclaimer Chain, Tsubaki is proud to offer its large line up of highly customizable Large Size Conveyor Chains. As these conveyor chains are highly customizable, with a variety of materials and corrosion resistant coatings, attachments, and roller types available to match the unique conditions of your mining site, we at Tsubaki are confident that our Large Size Conveyor Chains can meet any challenges your site has to offer. Furthermore, because many of our innovative products are a direct result of answering specific challenges presented by our customers, please do not hesitate to contact your local Tsubaki representative if your mining site has unique challenges other chains just can't stand up to.

Please refer to the following pages for information regarding chain base material, corrosion resistant coatings, as well as types of attachments and rollers available.

Features and Benefits

- Made to order custom chains to suit individual applications, and customized upgrades for problem applications.
- Specialized materials and heat treatment applications for every pitch size.
- Matched chain and sprocket assemblies for smooth chain operation.
- Specialized coatings for corrosion resistance, enhancing chain life and reducing maintenance costs.
- Special lube ports and greasing ports for easy maintenance and longer wear life.
- Outboard bearing rollers to reduce wear to the base chain roller.
- Special sealing arrangements for harsh environments to improve wear life.





Reclaimers – Large Size Conveyor Chains

Tsubaki's Wide Selection of Large Size Conveyor Chains

Tsubaki Conveyor Chain is made from carbon steel, high tensile structural steel, or stainless steel (300 / 400 Series) parts to satisfy any application.



Raises the corrosion resistance of general use and wear resistant/heavy duty conveyor chain. (Coated Conveyor Chain)

Attachment Types

Attachments can be placed at any link spacing.

Standard Attachments (A1, A2, K1, K2, GA2, GA4)

Standard attachments are both economical and versatile.

A Attachments

A attachments have a bent link plate on one side. They are referred to as A1, A2, or A3 attachments, depending on the number of bolt holes. *Tsubaki may send an A3 attachment for some A1 attachment orders. Contact a Tsubaki representative for more information.

K Attachments

K attachments have a bent link plate on both ends. They are referred to as K1 or K2 attachments, depending on the number of bolt holes.

*Tsubaki may send a K3 attachment for some K1 attachment orders. Contact a Tsubaki representative for more information.

GA Attachments

GA attachments have holes in the link plate itself. They are referred to as GA2 or GA4 attachments, depending on the number of bolt holes.

Please note that other non-standard attachments and special "Outboard Roller" (OBR) bearings are available. Furthermore, special sealed, long life outboard rollers to suit highly contaminated areas are also available upon request. Please contact your local Tsubaki representative for more details.

Roller Types

Tsubaki Conveyor Chains use three basic roller types.

1. R Rollers

The outside diameter of the roller is larger than the height of the link plate.Tsubaki's most basic, versatile roller type. It has a large allowable load and low frictional resistance.

2. F Rollers

There is a flange on the roller, attached on the T-pin side, that acts as a guide. Flange rollers are a simple way to prevent side oscillation. They are perfect for rough usage conditions and regular slat conveyance. Be careful when using K attachments, as the attachment area may contact the roller flange.

3. S, M, and N Rollers

These rollers are effective in alleviating the shock and wear the chain would normally suffer during sprocket engagement.

S Rollers: The outside diameter of the roller is smaller than the height of the link plate. M Rollers: The outer diameter of the M Roller is slightly larger than that of the S Roller. N Rollers: The roller diameter of the M and N rollers are the same, but the pin diameter is larger, increasing its strength. (RF26200N and above)





GA4 Attachment



Coal Handling Preparation Plants (CHPP)

Coal Handling Preparation Plants (CHPP) are large facilities used to remove (wash) the grime and sediment (soil, rock, etc) from coal in order to prepare it to be transported to market. The cleaner the coal is able to become, the higher the market value will be, plus less waste material means less weight, resulting in lower overall transportation costs. Widely utilized within CHPPs is Tsubaki's full lineup of RS® Roller Chain G7 and lube-free Lambda Chains. As conditions can make chain lubrication difficult, these chains allow for long wear life without addition lubrication, keeping your CHPP running longer, cleaner, and reduce the impact on the environment.

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BS® Roller Chain G7

Pursuing the Ultimate in Quality...

Our 7th model upgrade, celebrating 90 years of quality. Pursuing the ultimate in quality, Tsubaki has created the world's highest standard of roller chain.



Generation

"TSUBAKI" and the "RS" brand are stamped together on the chain. (Applicable sizes: RS40 to RS240)

Smaller Size and a Longer Wear Life

- Twice the life means a dramatic reduction in maintenance costs. (Applicable sizes: RS80 to RS140)
- kW ratings increased by 33%.

The world's top-class kW rating is achieved by increasing strength in the M-type connecting link through Ring Coin (RC) processing and improvement in the two-pitch offset link. This enables the reduction of chain and sprocket sizes (one size down), downsizing equipment. (Applicable sizes: RS80 to RS240)

Tsubaki Lube Free Lambda Chains

Tsubaki's Lube Free Lambda® Chains were the first in the industry to use a special oil-impregnated bush. Since their launch in 1988, they have been adopted for diverse industries and applications, and their performance has been highly rated.

Lube-free and Long-life

Longer lasting chains made possible by special oil-impregnated bushes.

Compatibility Compatible with RS Roller Chains.

Operating Temperature -10°C to 150°C / 14°F to 302°F

Selection Use the General Selection Method.

Basic Construction

- Lambda Chain (Normal specification) Black inner and outer ring plates
- · Lambda Chain (Nickel-plated specification) Special nickel plating (Excluding bushes)



Products

Tsubaki has a wide line-up of lube-free, long life products that help customers reduce costs, while also reducing their impact on the environment. These include Standard Lambda Chain, Surface Treated Lambda Chain (NP/NEP specification) Heavy Duty Lambda Chain, Curved Lambda Chain, BS Lambda Chain, etc. For conveyance needs a wide variety of specialized attachments are also available. Please contact your local Tsubaki representative for more details.

LG Solid Bush Patented



Note: The wear life and kW ratings of sizes RS60 and smaller have not changed

effects of lubrication longer.

More than 7 Times the Wear Elongation Life of RS Roller Chain



⁰ Running Time In-house testing lube-free operation Performance in ambient temperature (-10°C to 60°C / 14°F to 140°F)

RS120-LMD-1 and RS140-LMD-1 wear elongation life are 2.5 times longer.

Superior Performance through the Combination of Superior Parts



For smoother rotation **High-Performance** Sintered Bush Impregnated with

lubricant

Ring-Coined Connecting Link (Patented)

A ring-shaped groove is provided around the connecting link plate hole. This creates positive residual stress that keeps the

same strength as the base chain, even with slip fit between pins and holes.

Tandem Drive Road Graders

Mining Shovels

(Excavators)