

HARDOX[®]
WEARPARTS

YOUR ONE STOP WEAR SHOP



HARDOX WEARPARTS

Keeping all industries
up and running



We are constantly evolving. For the latest listing of all Hardox Wearparts® centers,
please visit www.hardoxwearparts.com



MINING



CEMENT



QUARRIES



CONSTRUCTION



AGRICULTURE



ENERGY



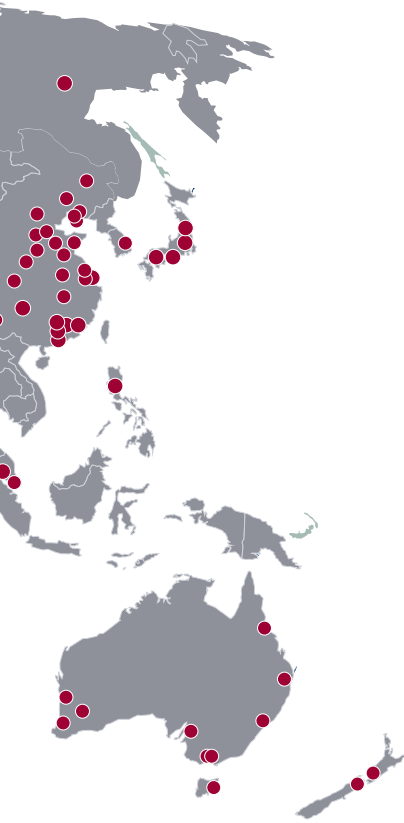
METAL WORKS



RECYCLING



PULP AND PAPER



Hardox Wearparts® is the world's leading provider of wear parts and wear services. More than 350 centers in over 80 countries are strategically located to provide you with fast and competent access to wear products and services.

Every Hardox Wearparts® center has a certified workshop with wear specialists, skilled craftsmen and production resources to ensure your wear parts and repair work meet the highest standards.

We service all industries providing wear products for situations where steel meets abrasive material. Whether you are in mining, quarry, construction, forestry, coal or any other industry where abrasion is an issue, Hardox Wearparts® will keep your production running with thousands of wear products to meet your needs.

Our wear solutions are your guarantee of maximum performance and service life for all your wear-critical applications.

We're your *one stop wear shop*—all you need to fight wear is available from one source.



MASTERS OF UPTIME

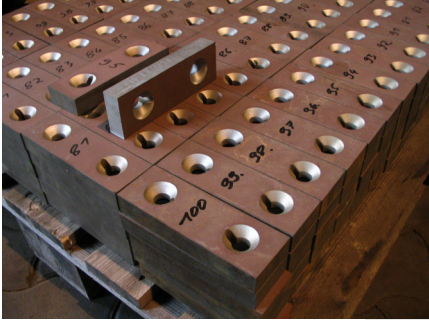
Fighting wear with knowledge,
products and services





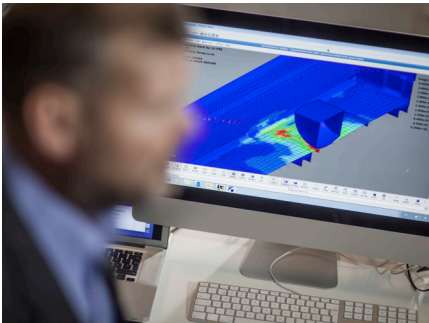
WEAR PRODUCTS

Hardox Wearparts® produces thousands of wear parts to meet your needs for buckets, crushers, dozers, feeders, shredders and many more applications. For our complete product offering, visit www.hardoxwearparts.com and select the location nearest you.



TOP OF THE LINE WEAR MATERIALS

Wear parts are manufactured using the optimum material for your needs, whether it is Hardox® wear plate, Toolox® engineering and tool steel, Duroxite™ overlay products or a combination.



CONSULTING SERVICES

We can offer you world-class advice from material selection to forecasting wear, from designing to producing wear products suitable for your processes and equipment. Experienced design engineers work with CAD, FEM (finite element method) and WearCalc simulation software to produce new parts from scratch or based on your drawings and instructions.



IN-HOUSE PRODUCTION

The production capabilities at Hardox Wearparts® include different cutting methods, machining, bending and roll forming, as well as general fabrication.



ON SITE SERVICES

To minimize downtime we can measure, manufacture and install your wear parts on site, as part of our scheduled or emergency repair services. For large and production-critical equipment we can also use 3D laser scanning to speed up the process and make sure the new parts fit perfectly.



UPTIME MANAGEMENT

Hardox Wearparts® uptime management services help companies evolve from reactive to proactive repair strategies, resulting in a more cost-efficient production process. Our wear specialists can suggest ways to optimize maintenance routines through wear monitoring solutions and service agreements.

TECH TALK

Hard facts about optimizing the choice of wear materials

Hardox Wearparts® centers specialize in selecting the most suitable wear material for virtually all kinds of equipment and wear environments. The centers work with what are probably the world's most advanced abrasion resistant materials. Hardox® wear plate, tubes and round bars, Duroxite™ plate, pins, tubes and repair wire, and Toolox® engineering and tool steel give unique opportunities to optimize productivity and service life.

ENGINEERED EXPERIENCE

Choosing the most suitable wear material is a mix between service life, operating conditions and cost. Just looking at nominal hardness values is seldom enough. There are a multitude of other parameters that need to be considered in order to reach the optimal wear solution.

If the wear conditions call for a very hard material such as Hardox® Extreme or Duroxite™ there is a high risk of cracking if the wear parts cannot be installed and supported properly. If oxy-fuel flame cutting is used when a water jet would have been a better choice, the heat can degrade the material's original properties, leading to excessive wear and unscheduled maintenance stops.

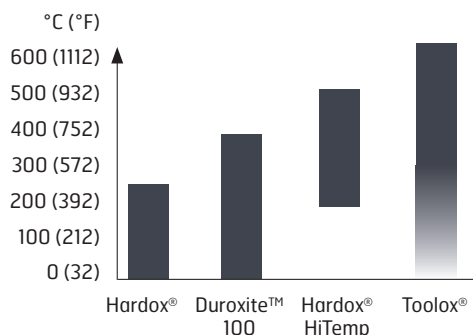
Processed volumes, size and type of abrasive material, if the dominant wear is sliding, rolling, impact or squeezing, corrosive environments, operating temperatures, ease of installation and access for maintenance are only a selection of the many issues that ultimately will decide if the wear solution is optimized for both performance and cost. It's a complex process involving engineering expertise and solid experience from all kinds of industries and equipment. At Hardox Wearparts® we are proud to give you both.

HARDOX® PERFORMS CONSISTENTLY

Hardox® wear plate forms the basis for most of our wear parts and repair work. Hardox® has delivered extreme wear resistance for more than 40 years. It is an extremely versatile material since it comes in many grades, thicknesses and shapes. Hardox® outperforms other wear-resistant (AR) materials on the market thanks to a unique combination of hardness and toughness.

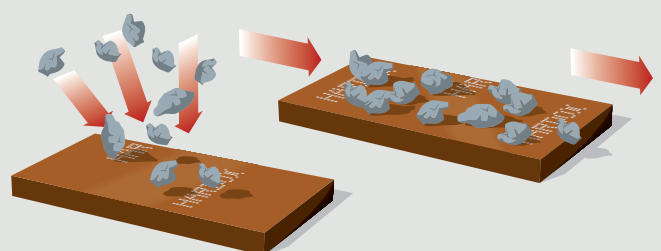
Hardness maximizes service life since it is difficult for the 'edges' of abrasive material to cut into the steel's surface. Hardness also means it has excellent yield and tensile strength, which helps maintain the structure's shape. Its toughness makes it possible for Hardox® to withstand heavy impact without cracking. Plus, you can trust Hardox® to have consistent properties from one plate to the next. Superior cleanliness and low carbon equivalent also make Hardox® easy to weld.

RECOMMENDED TEMPERATURE INTERVALS



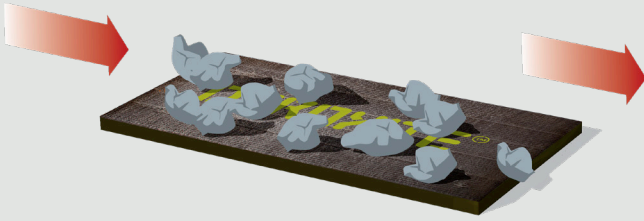
The recommended maximum working temperature for most Hardox® grades is around 250°, except for Hardox® HiTemp. Duroxite™ 100 overlay plates in sliding and moderate impact wear work up to a temperature of around 350°C. Above this temperature, special high temperature Duroxite™ grades are available. Toolox® engineering & tool steel is a versatile high-temperature choice up to 600°C.

IMPACT AND SLIDING WEAR



Hardox® wear plate has excellent wear resistance for soft and hard rock at all impact angles.

SLIDING WEAR



Duroxite™ is particularly well suited to fighting sliding wear from exceptionally hard particles such as minerals containing quartz.

DUROXITE™ IS RIGHT ON TARGET

Duroxite™ overlay products come in different grades to give optimum performance in specific wear environments. Duroxite™ is mainly used in severe sliding wear conditions when large volumes of material are processed. Welded chromium carbides or complex carbides on top of a base plate make an extremely wear-resistant compound material. The optimized carbide concentration gives consistently high wear resistance from the top surface down to 75% of the overlay thickness. This results in wear parts with longer service life than other similar overlay products.

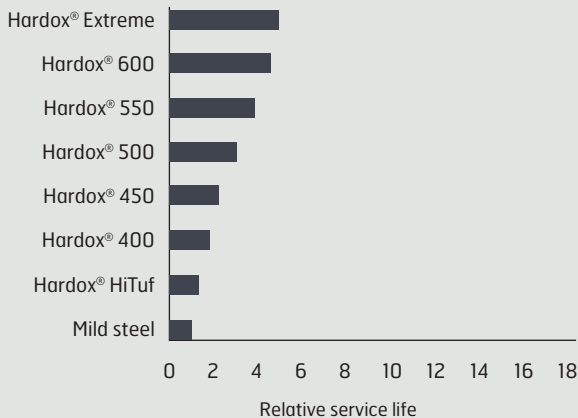
WEARCALC PREDICTS WEAR

We use WearCalc software to predict wear for almost any combination of abrasive material and grade of Hardox® wear plate, Duroxite™ overlay plate or Toolox® steel.

Relative service life is calculated based on hardness, wear conditions and the type of abrasive material sliding across or impacting the surface.

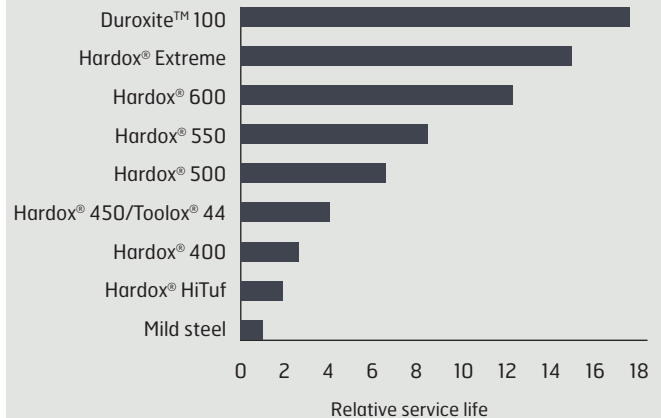
With the help of ultrasonic wear measurements and comparing the actual wear rate with the predicted values from WearCalc we can monitor your equipment for improved maintenance planning.

IMPACT WEAR



The charts show relative service life calculated with WearCalc and hard rock for impact wear at 20 degrees angle of incidence and sliding wear. In real applications the service life depends on volumes, size and hardness of

SLIDING WEAR



the processed material and size of the machines used. Very hard materials have higher material and processing costs and are more sensitive towards impact, vibrations and stress levels.

TOOLOX® STAYS IN SHAPE

Toolox® engineering and tool steel is a high-alloyed wear-resistant material with no residual stresses.

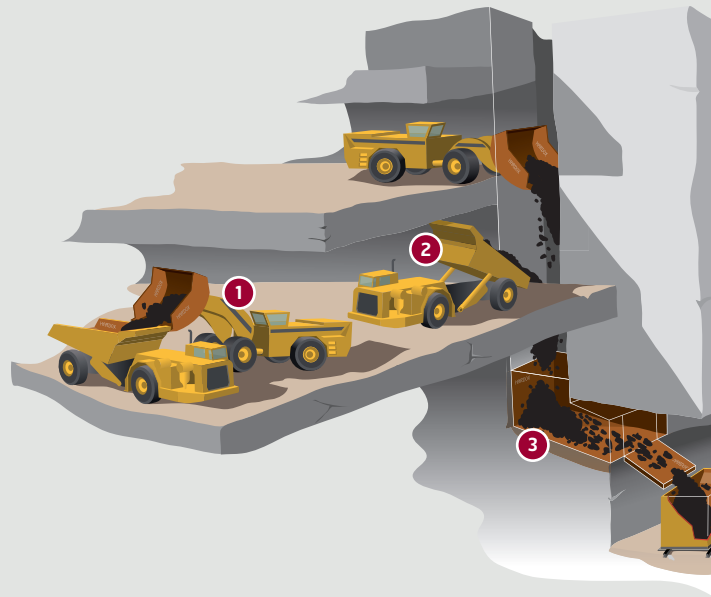
This makes it perfect for wear parts that need to have tight tolerances, for example cog wheels. Toolox® also has higher wear resistance compared to Hardox® at temperatures above 250°C.

HIGH-TECH IN 3D

3D laser scanning is a tool that can minimize downtime by shortening the time it takes to measure the equipment and fit the new wear parts. Scanning data from a worn bucket is used to create an accurate 3D model of the equipment, ensuring that the replacement wear parts will fit instantly. In some cases, laser scanning can also be used for wear monitoring.

UNDERGROUND MINING

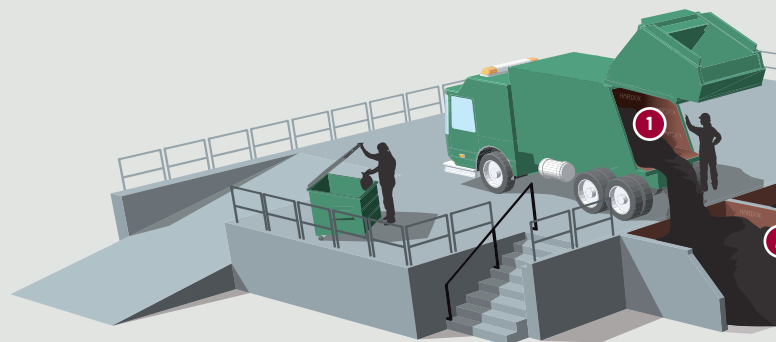
- 1. Front loader**
 - Cutting edges
 - Bucket side cutters
 - Bottom
 - Connector
 - Pins
 - Wear bars and strips
- 2. Dump truck**
 - Structural wear plate
 - Liner package
- 3. Buffer bin**
 - Liner plates
- 4. Mine trolley**
 - Bottom and side walls
- 5. Discharge site**
 - Liner plates
 - Grizzly bars
- 6. Transfer chute**
 - Liner plate
- 7. Feeder**
 - Liner plate
- 8. Screener**
 - Screening plate
- 9. Crusher**
 - Liner plate
- 10. Conveyor**
 - Side plates
- 11. Measuring bin**
 - Liner plate
- 12. Skip**
 - Liner plate

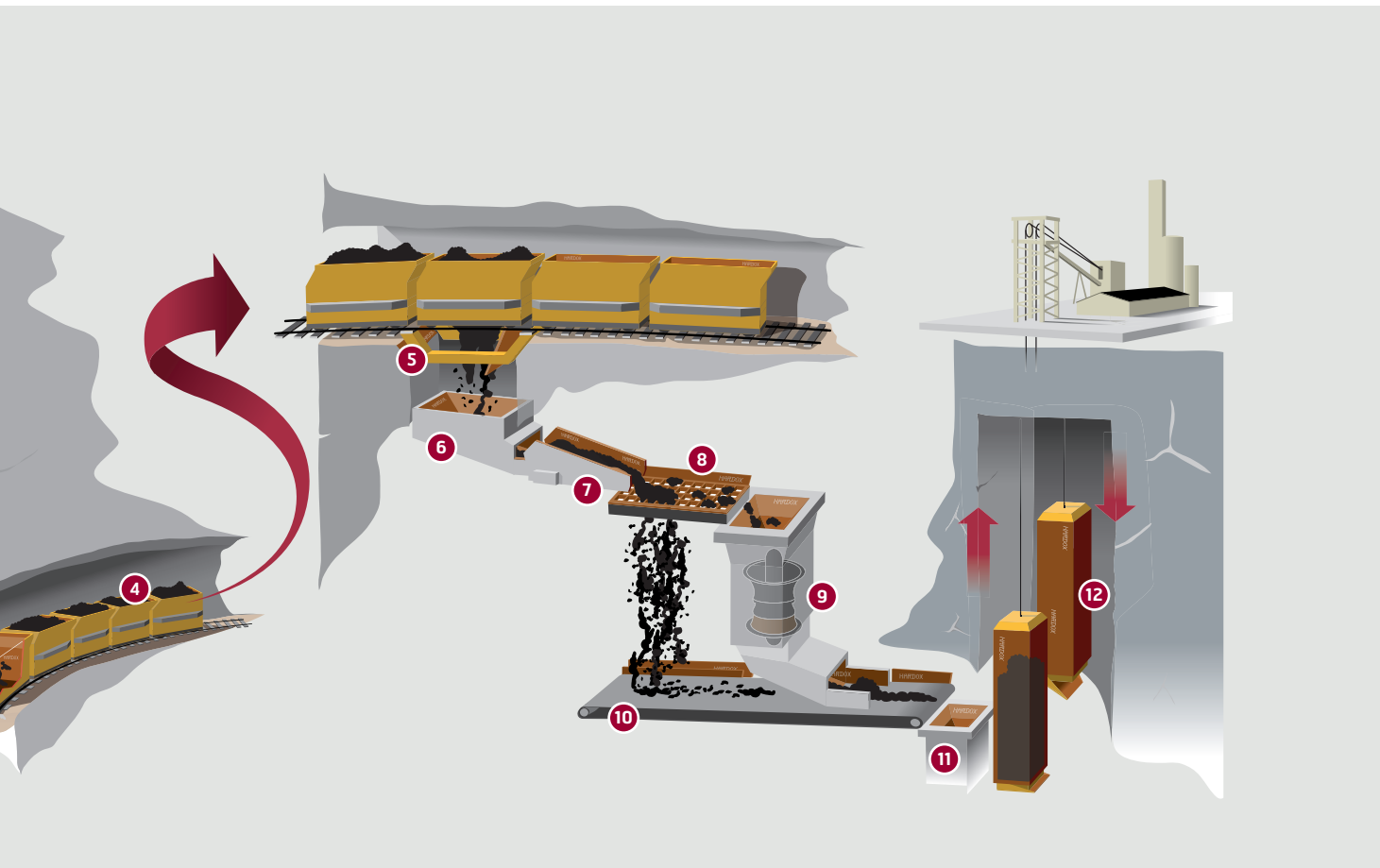


HARD-WORKING

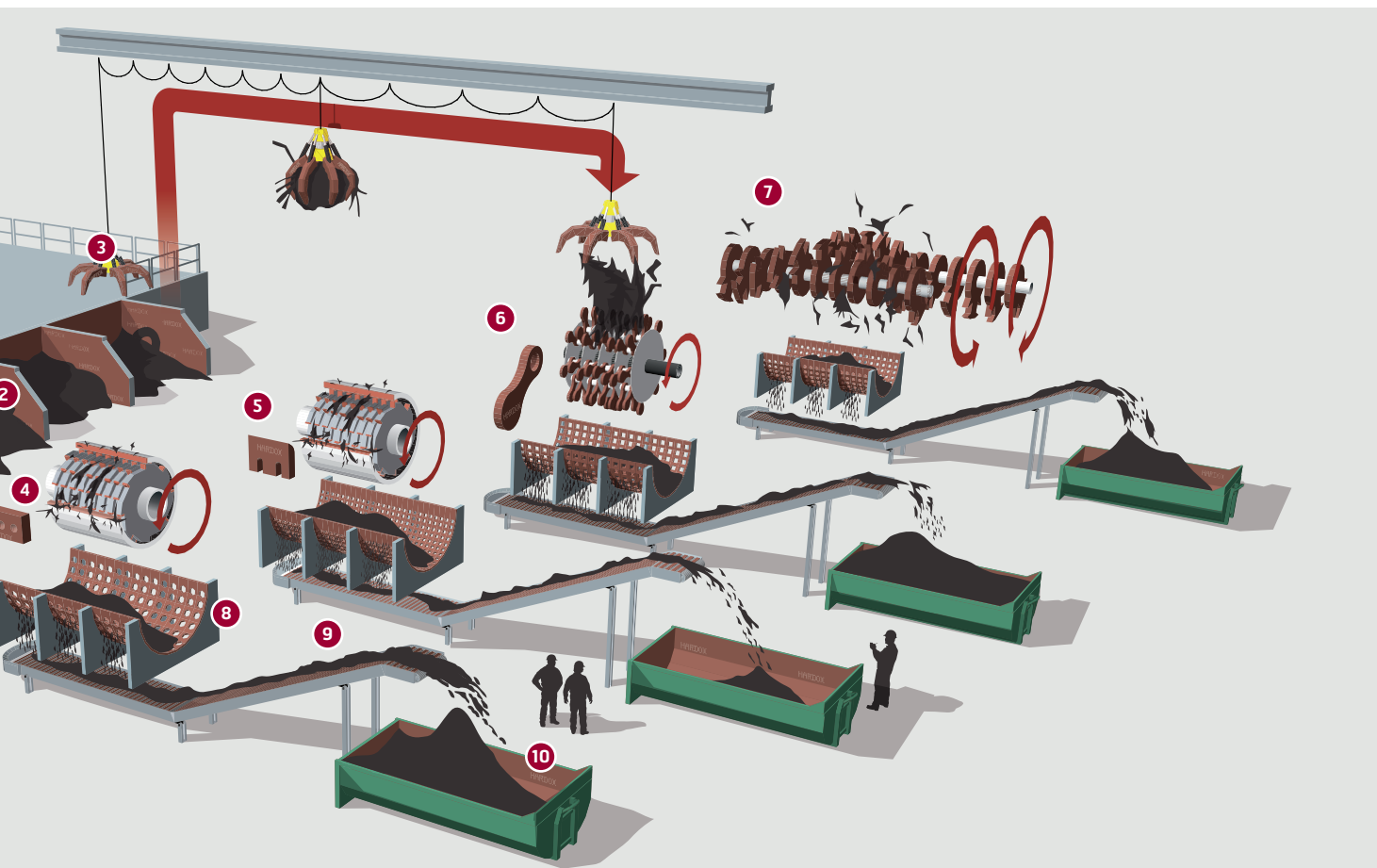
RECYCLING

- 1. Garbage truck**
 - Structural wear plate
- 2. Storage bin**
 - Liner plates
- 3. Grapples**
 - Wear liners
 - Pins
 - Bushings
- 4. Prismatic knives**
 - Knives
 - Blow bars
 - Lining plates
 - Screens
- 5. Granulator knives**
 - Knives
 - Liners
 - Screeners
 - Axle
- 6. Hammer mill**
 - Hammers
 - Liners
 - Grizzly bars
 - Screens
 - Spacer disc
 - Axle
- 7. Shredder**
 - Shredder knives
 - Spacer disc
 - Liners
 - Axle
- 8. Sieves/Screens**
- 9. Conveyor belt**
 - Side liners
- 10. Container**





WEAR PARTS



QUARRY AND OPEN PIT MINING

1. Dipper shovel

- Inside floor
- Inside shell lining
- Inside wear bars
- Outside side protection
- Wear blocks and bars
- Outside floor protection (exterior)
- Door liner protection
- Teeth protection (cover adaptors)
- Dipper

2. Bulldozer

- Blade
- Cutting edge
- Rippers

3. Dump truck

- Dead bed solution
- Floor wear bars
- Side wear bars
- Wear plate in sliding area
- Wear plate in impact area

4. Excavator buckets

- Shell
- Pins
- Wear pads
- Liner plates
- Cutting edge
- Bucket side cutters
- Bucket side jaw shrouds
- Wear bars and strips
- Lip shrouds

5. Dump pocket

- Liner plate

6. Feeder

- Lining plate
- Grizzly bars/screens

7. Screens

- Mid bars
- Grizzly bars
- Screen

8. Jaw crushers

- Lining plates
- Wedges
- Hopper and outlet
- Cheek

9. Conveyor

- Bottom liner plates
- Side liner plates
- Sprocket wheels
- Paddles
- Pans/flights

10. Transfer chute

- Lining
- Hopper to primary crusher
- Lower part hopper

11. Hammer crushers

- Hammers
- Liners
- Grizzly bars
- Screens
- Spacer disc
- Axle
- Crusher rotor segments

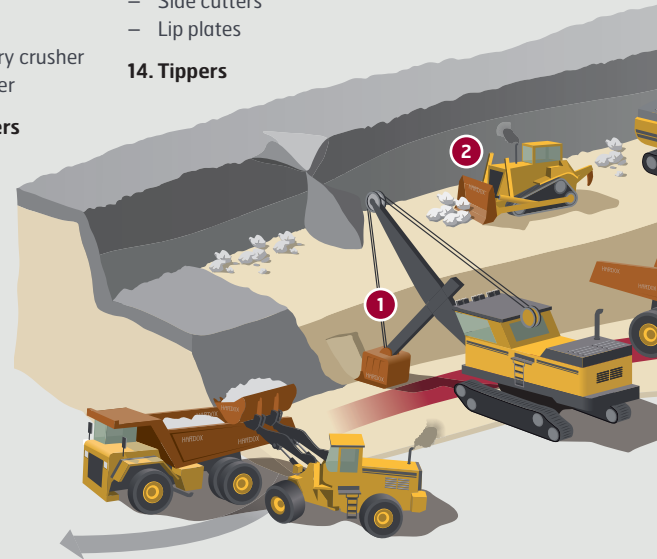
12. Final screening

- Crusher screens

13. Loader

- Shell bottom
- Side plates
- Wear ribs
- Side cutters
- Lip plates

14. Tipper



LONG-LASTING

CEMENT

1. Open pit

2. Loader and tipper

- Loader
- Wear pads
- Bucket side cutters
- Cutting edge
- Wear bars and strips
- Lip shrouds
- Tipper
- Structural wear plate

3. Excavator and dump truck

- Excavator
- Shell
- Pins
- Wear pads
- Liner plates
- Cutting edge
- Bucket side cutters
- Bucket side jaw shrouds
- Wear bars and strips
- Lip shrouds
- Dump truck
- Liner plates
- Dead bed

4. Hopper

- Liner plates

5. Conveyor belt steel/apron feeder

- Bottom liner plates
- Side liner plates
- Sprocket wheels
- Paddles
- Pans/flights

6. Jaw crusher

- Cheek liner plates
- Hopper/outlet liner plates

7. Conveyor belt rubber

- Sprocket wheels
- Side liner plates

8. Crusher screen

- Grizzly bars
- Grizzly bar seats
- Screens

9. Cone crusher

- Liner plates for inlet and main frame
- Protector ring – cone head
- Liner plates hopper and outlet

10. Chute

- Liner plates

11. Conveyor belt rubber

12. Storage bins

- Liner plates

13. Elevator buckets

- Shell
- Wear pads
- Wear bars and strips
- Cutting edge
- Side cutters
- Sprocket wheels

14. Hopper

- Liner plates

15. Conveyor belt rubber

- Guide vanes
- Liner chute
- Liner plate reject cone
- Liner plate mill house
- Rotor liner plates
- Side liners grinding table

17. Preheating in cyclones

- Liner chutes
- Cyclone lining
- Tubes

18. Rotary kiln

19. Clinker cooler

20. Conveyor belt rubber

21. Hammer crusher

- Hammers
- Liners
- Grizzly bars
- Screens
- Spacer disc
- Axle

22. Hopper

- Liner plates

23. Screw conveyor

- Tubes and trough
- Liner plates

24. Silos

- Liner plates

25. Ball mill

26. Elevator bucket

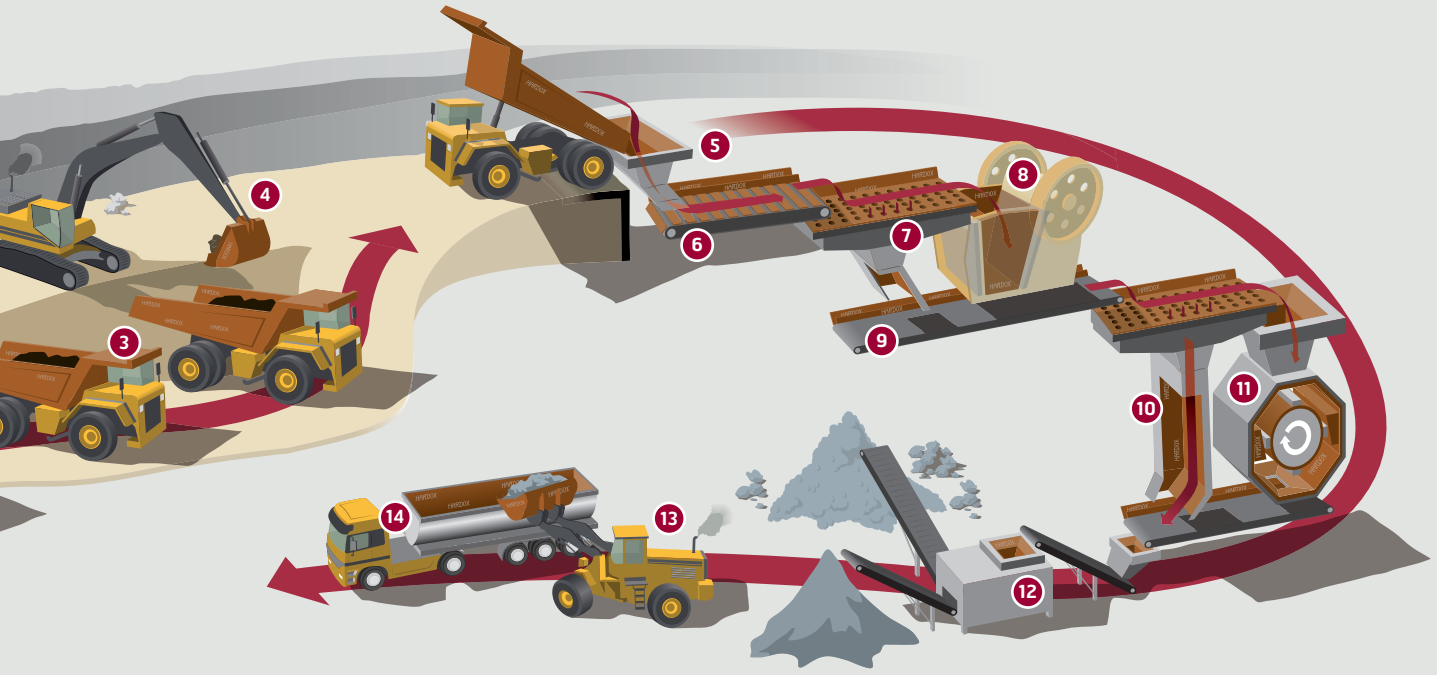
- Liner plates

28. Silo

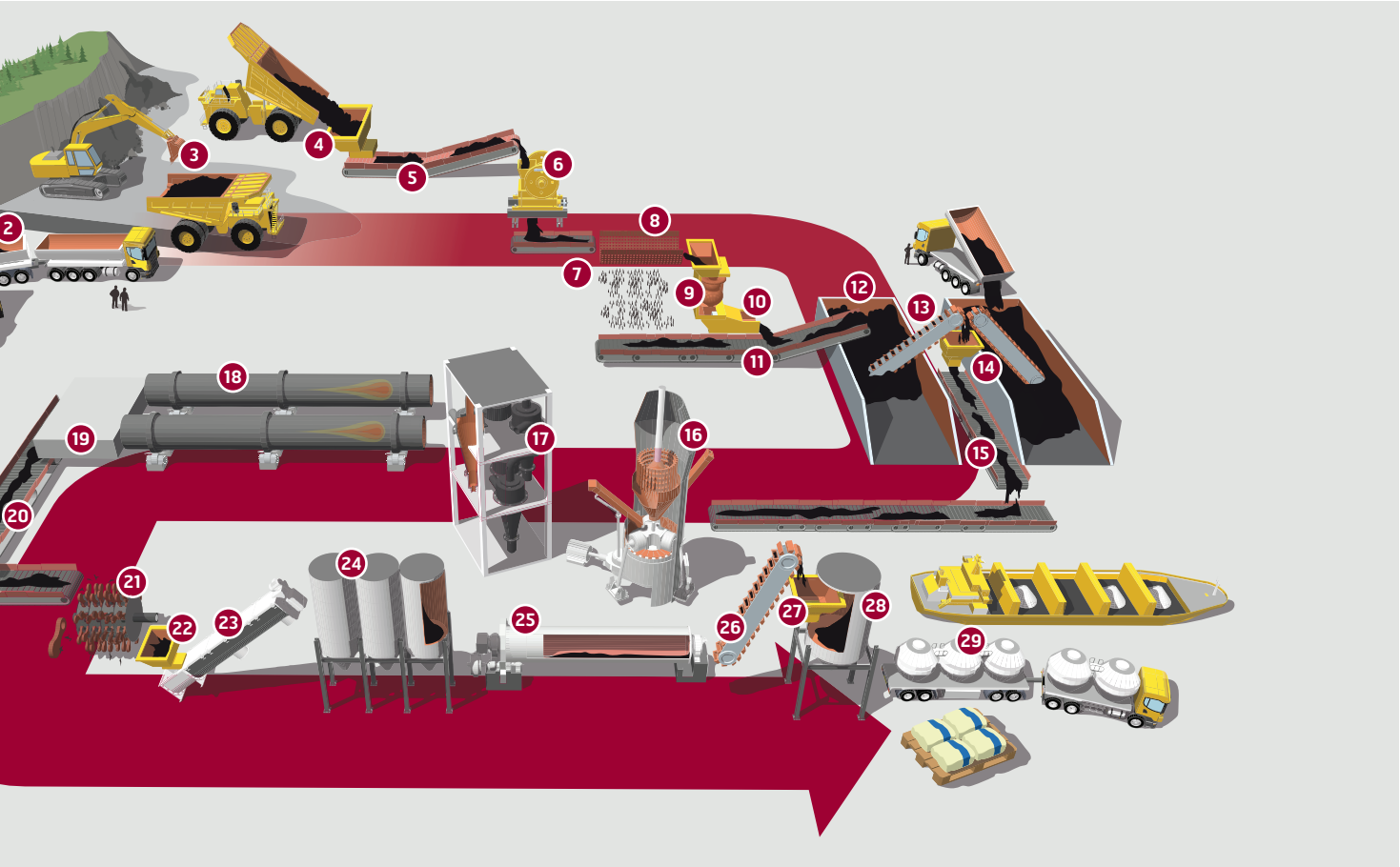
- Liner plates

29. Transport of finished product





PRODUCTIVITY





PEOPLE MAKING A DIFFERENCE

With a promise of excellence

Hardox Wearparts® has been in business for more than 15 years, steadily adding new local full-service centers that provide wear solutions. That's all we do, and we are determined to do it better than anybody else.

The service you get when contacting Hardox Wearparts® should be the best service you have ever received. The performance of our products should amaze you and your delivery be received as promised.

The people working at Hardox Wearparts® back up these claims. In a brochure, we can only say it. In real life, you can experience it. To qualify as a Hardox Wearparts® center, having adequate equipment is not enough. The center has to live up to strict standards on staff expertise and skills, ensuring best practices in quality, productivity and wear knowledge.

To ensure top performance, every Hardox Wearparts® center has access to wear specialists providing the latest knowledge in wear, design and production of wear parts using hard materials. Training and skills transfer is done on a continuous basis. By sharing experiences, our Hardox Wearparts® centers likely have the largest wear knowledge base in the world.

We have been working with Hardox® wear plate, the industry-leading material, from the start. This has given us unparalleled power to tackle wear challenges and reach maximum performance and service life. Whatever your application, our materials and design experts will support you in creating new and smarter wear solutions. That's a promise.

TITAN AMERICA AVOIDS \$50,000 RISK



NEW LINER PACKAGE INCREASES SERVICE LIFE 2 TO 3 TIMES

Titan America, a leading cement and building materials manufacturer in the U.S., was concerned that the lip and jaw shrouds on its buckets would come off during production. This could result in up to \$50,000 in damages to their crusher and wear parts. The Hardox Wearparts® center in Northport, Alabama suggested welding on a liner package made of Hardox® wear plate with Duroxite™ overlay lip and vertical jaw shrouds. This solution resolved its concern and also increased the service life of its lip shrouds (A) and jaw shrouds (B) 2 to 3 times. Titan America was pleased with the results and it has since ordered Duroxite™ overlay liners for additional dragline and loader buckets.

CEMENT MILL DOUBLES SERVICE LIFE

HARDOX® WEAR PLATE SOLVES THE GRATE BASKED PROBLEM

A major cement mill in Malaysia was experiencing frequent maintenance shutdowns due to its grate bars and segments wearing out quickly. The Hardox Wearparts® center in Langkawi, Malaysia collected samples of the limestone material, conducted a wear analysis and recommended Hardox® 400 and 450 to replace the AR plate it was using. The service life of the grate basket assembly has doubled from six months to a year as a result. In addition, the wear rate is very predictable and no chips or cracks occur during high impact, which had been a major problem in the past. The improved grate performance has resulted in the customer ordering solutions for other wear applications, including liner plates for chutes, elevator buckets, clinker crusher casing liners, and hammers for crushers.





ON SITE, ON CALL

For urgent and proactive wear services

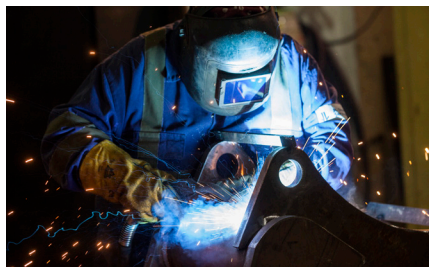
Come rain or shine, snow or sleet, heat or cold—you can trust the people from Hardox Wearparts® to show up on site with the right parts, tools and spirit to keep you working.

We call Hardox Wearparts® a *one-stop wear shop*. Calling it a non-stop wear shop would be equally fitting. You can reach us 24/7 if that is what your production requires.

If you face a sudden and unplanned stop, our experienced service crew can come to the rescue with on-site replacement and repair work.

Naturally, a proactive approach to wear is recommended. Regular wear monitoring and scheduled maintenance are the bread-and-butter of our services.

Whatever your industry, Hardox Wearparts® is committed to keeping you going—delivering the best wear solutions and peace of mind at the same time.



Hardox Wearparts® is a worldwide network of service centers providing wear parts and wear solutions for optimized productivity and service life. Hardox Wearparts® is a part of SSAB, the manufacturer of Hardox® wear plate.

We would love to hear about your uptime needs



Find a center near you at
www.hardoxwearparts.com/find-supplier



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www.hardoxwearparts.com

