HARDOX®
TechSupport

Information from SSAB Oxelösund.

#37

HARDOX in Waste recycling industry

TechSupport is a series of publications about HARDOX wear plates and WELDOX structural steel plates from SSAB Oxelösund.
For more info, contact Customer Service, www.ssabox.com

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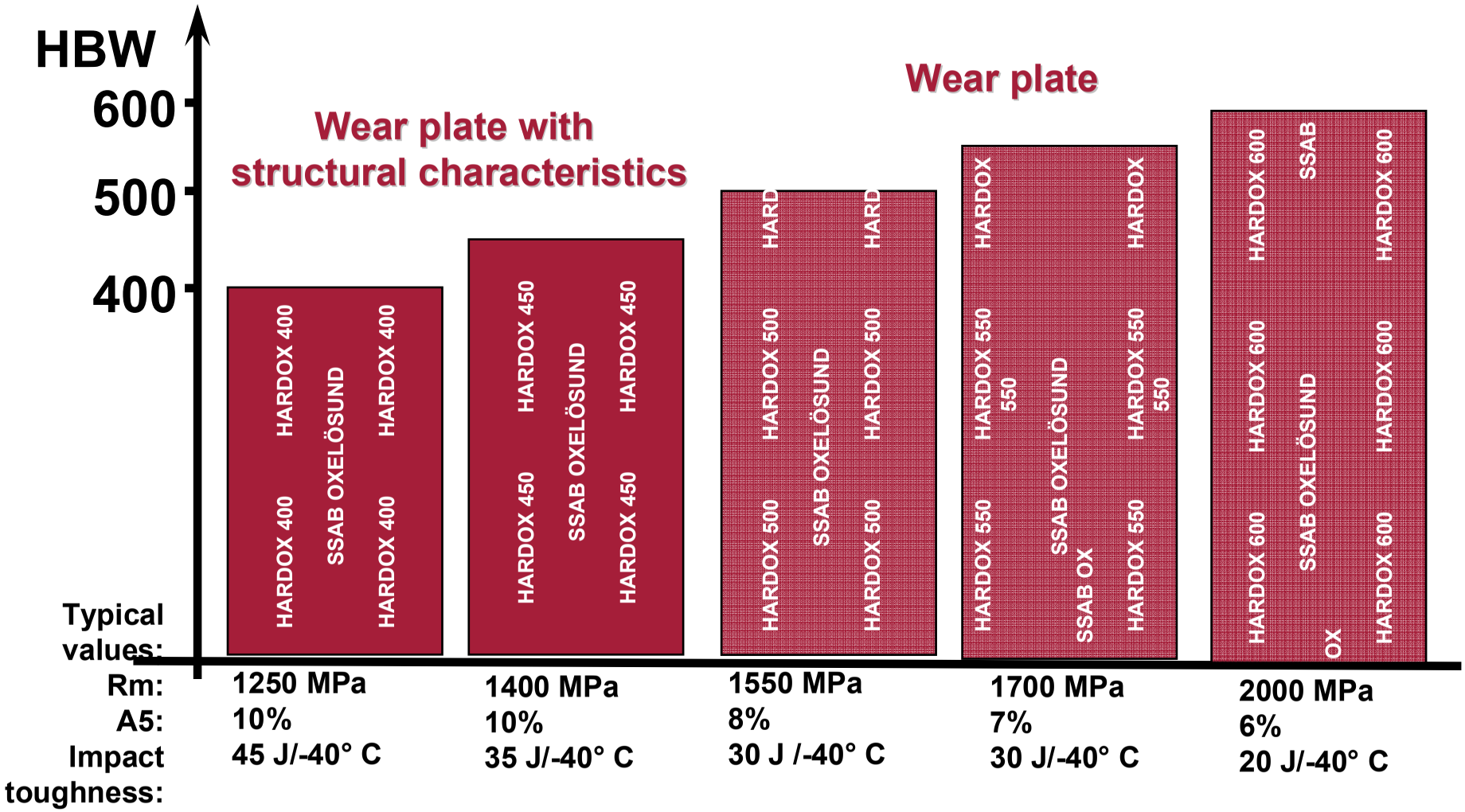
HARDOX® WEAR PLATE

Waste…

...Waste refer here to materials that are not prime products (i.e. products produced for the market) for which the generator has no further use for own purpose of production, transformation or consumption, and which he discards, or intends or is required to discard. Wastes may be generated during the extraction of raw materials during the processing of raw materials to intermediate and final products, during the consumption of final products, and during any other human activity…/ OECD/Eurostat Joint Questionnaire on waste...

...Trash, Garbage, Food, Clothes, Furniture and Gren waste

HARDOX



Cutting

- HARDOX Wear Plate is suitable for cold and thermal cutting methods.

Cutting method	Thickness, mm
Abrasive water-jet cutting	4-130
Laser cutting	4-20
Plasma cutting	4-50
Gas cutting	4-130

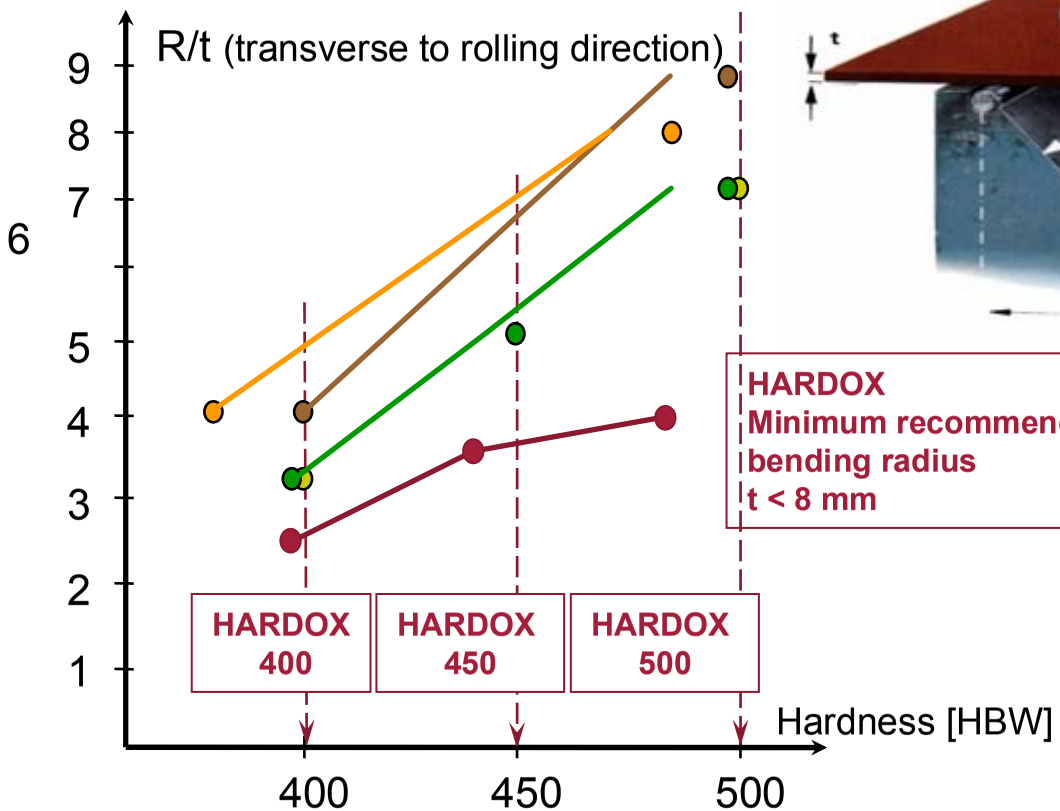
Welding

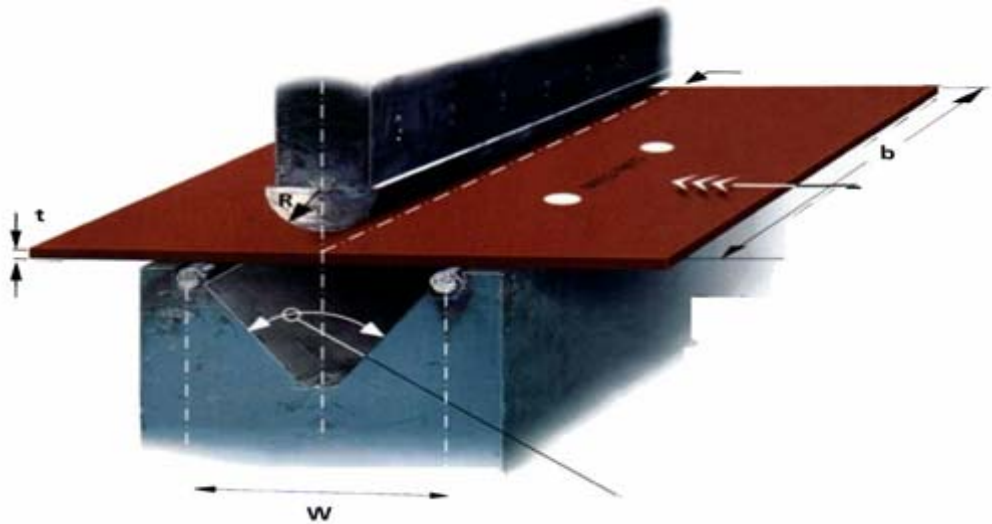
- HARDOX Wear plate is weldable with all common welding methods and to all weldable steels.

Steel grade	Thickness range (mm)	Carbon equivalent CE
HARDOX 400	4-130	0,32-0,73
HARDOX 450	4-80	0,36-0,70
HARDOX 500	5-80	0,58-0,73
HARDOX 550	10-50	0,72
HARDOX 600	6-30	0,72-0,84

Bending

Radius/thickness-diagram





HARDOX
Minimum recommended bending radius
t < 8 mm

Other wear plate grades
Minimum recommended bending radius
t < 8 mm

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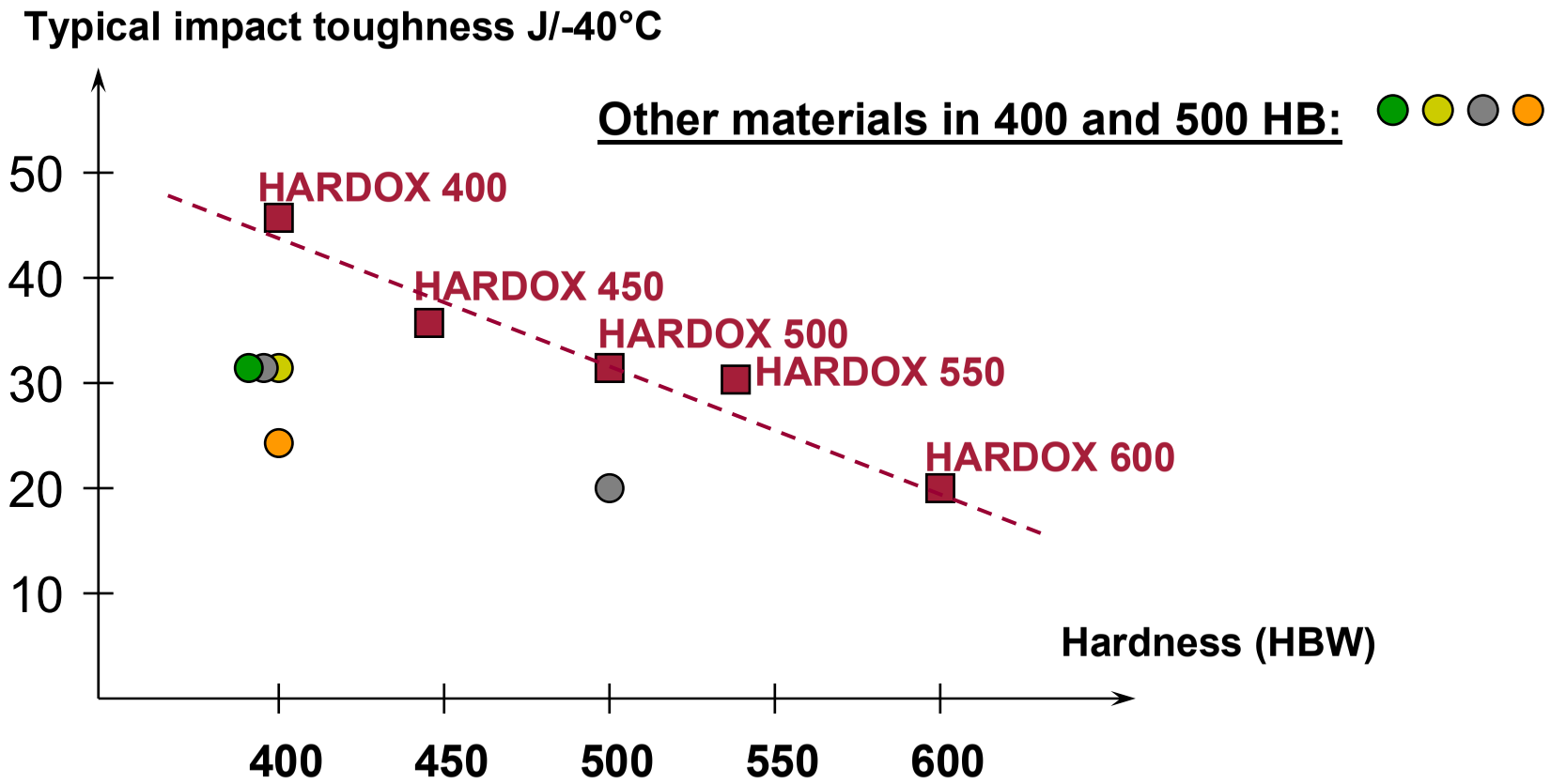
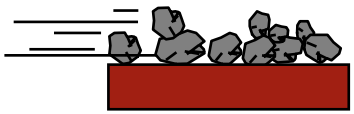
HARDOX® WEAR PLATE

Impact Toughness

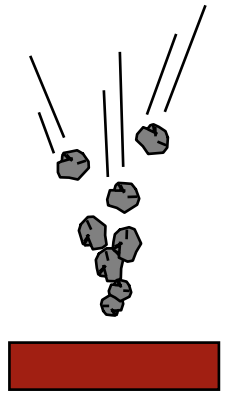


Abrasive wear

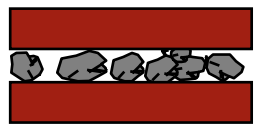
There are three types of abrasive wear, each of them with its own complexity



Sliding wear



Impact wear

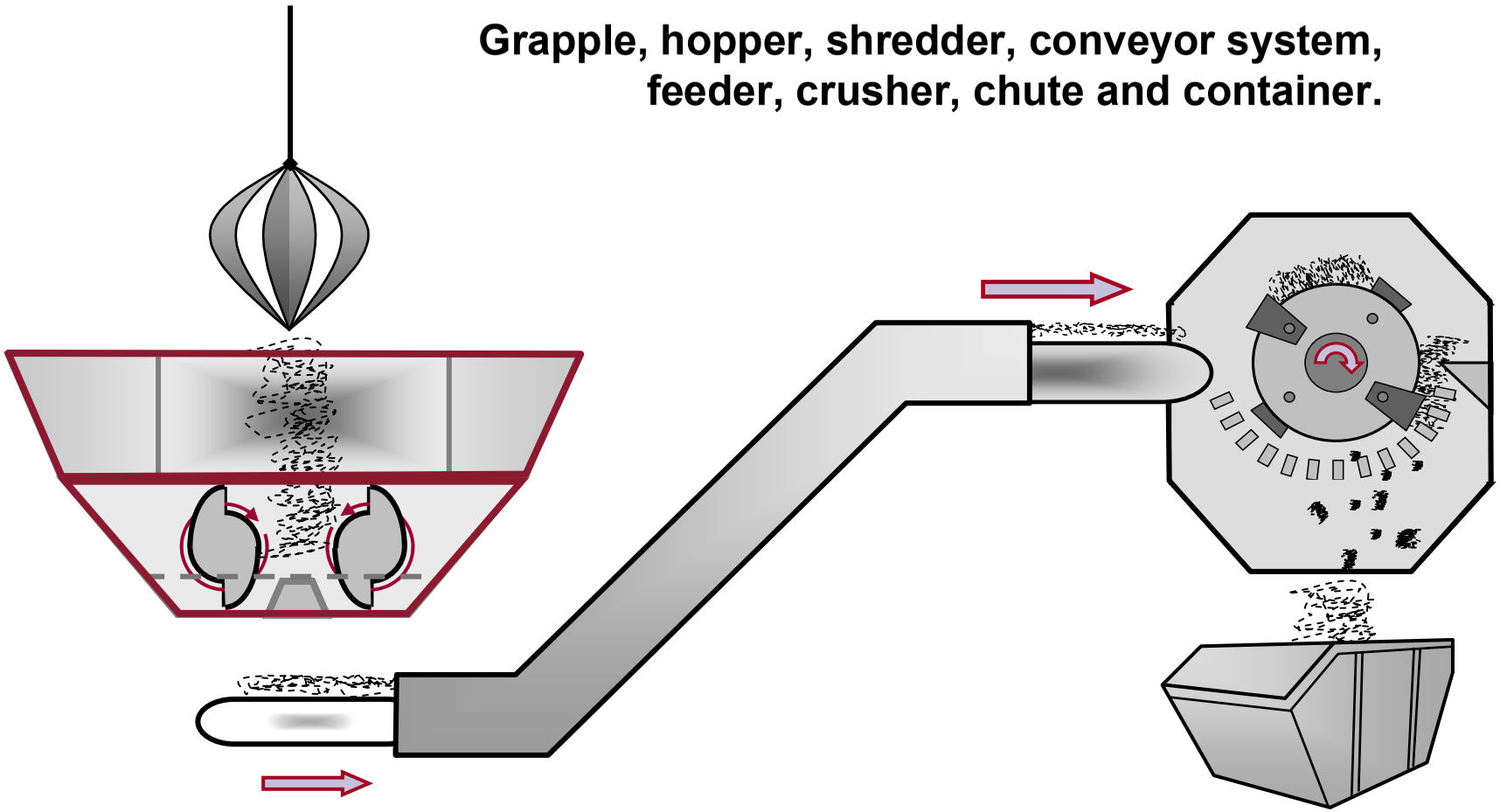


Squeezing wear

In waste recycling it's mainly sliding- and impact wear.

Recycling flow

Grapple, hopper, shredder, conveyor system, feeder, crusher, chute and container.



Shredder Knives and Anvils

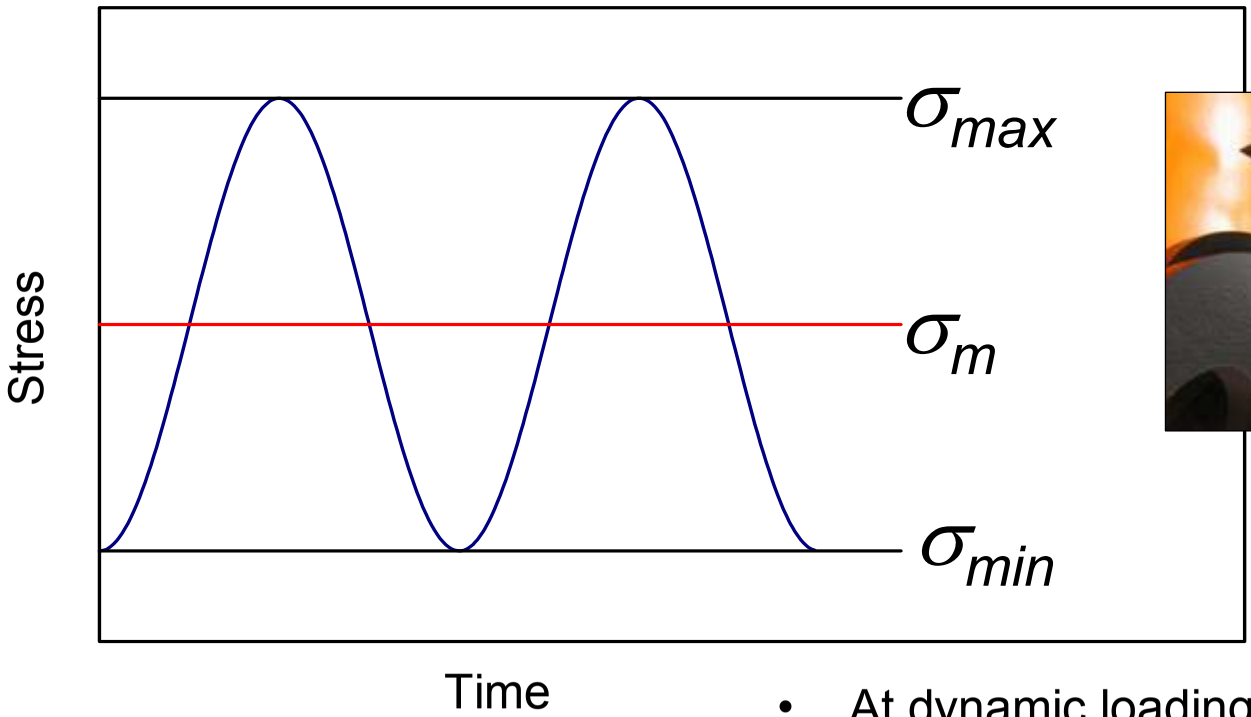
- Excellent sliding wear resistance
- High strength
- Good toughness
- Homogenous mechanical properties

  → **HARDOX 500 or HARDOX 550**

Always available

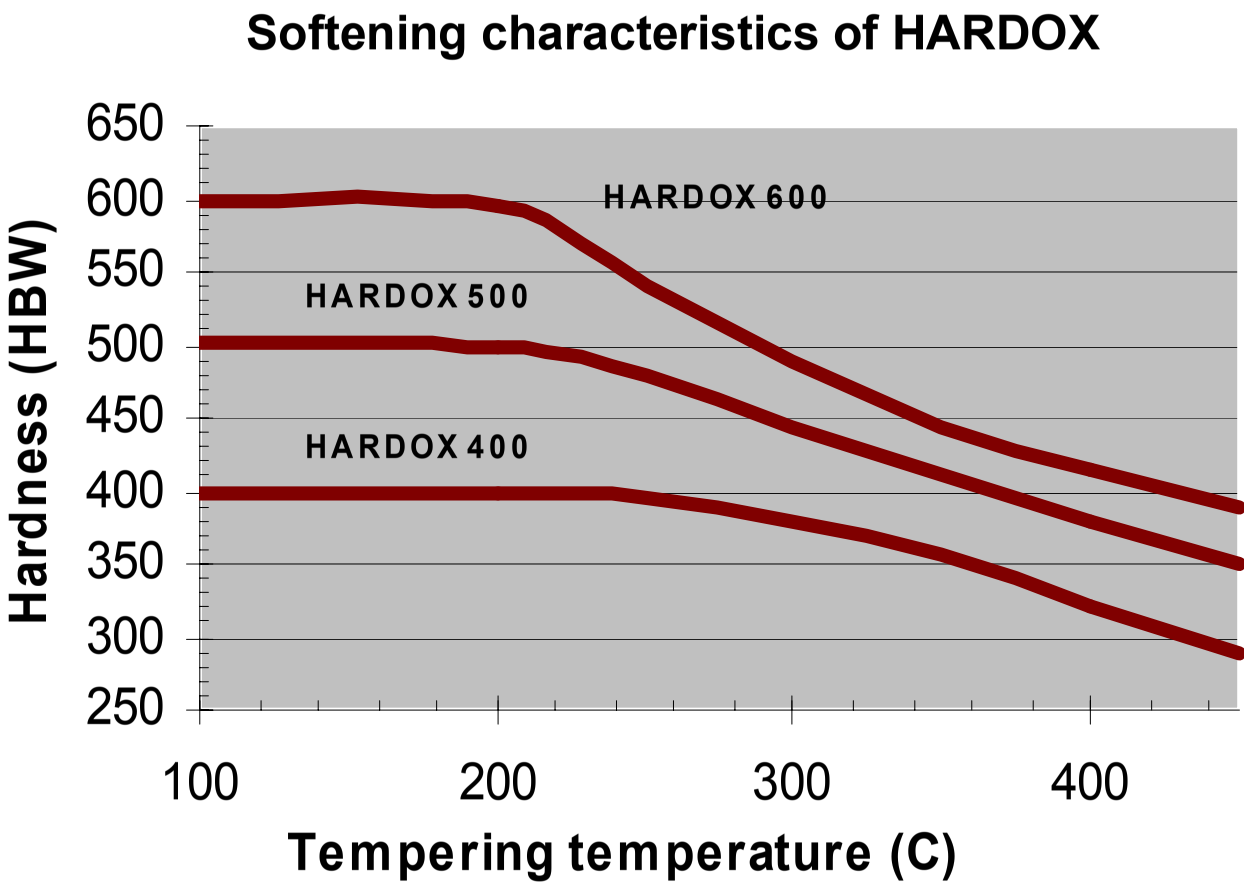
- Always available
- Lower storage costs
- Shorted lead time
- Possibility to modification

To be considered; fatigue and environment



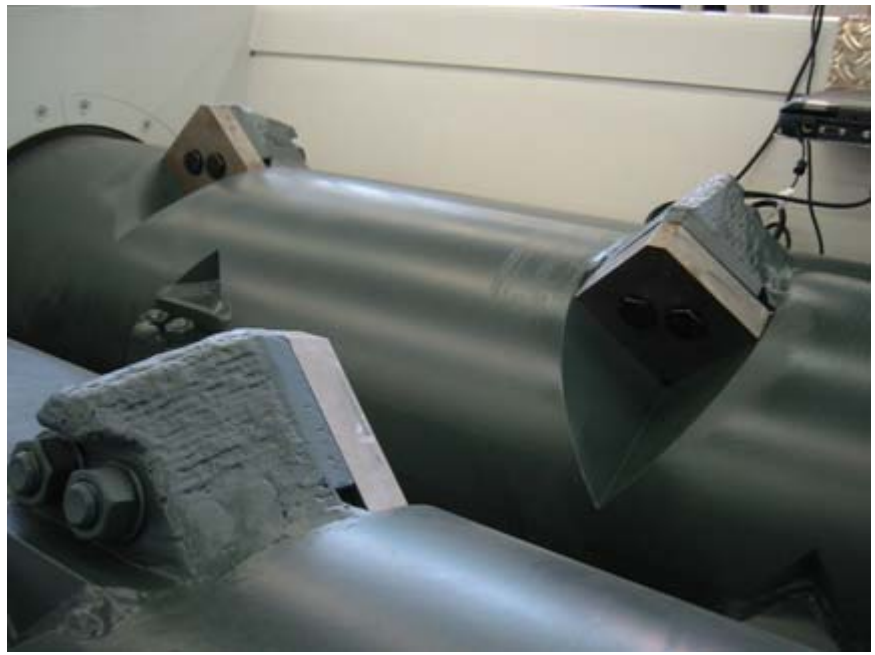
- At dynamic loading.
- At high stress levels.
- In non continuous processes.
- In acid environments.
- HARDOX Technical support.

To be considered; Temperature



- HARDOX Technical support.

Teeth or striker bars



- Impact wear resistance
- Good support for the teeth

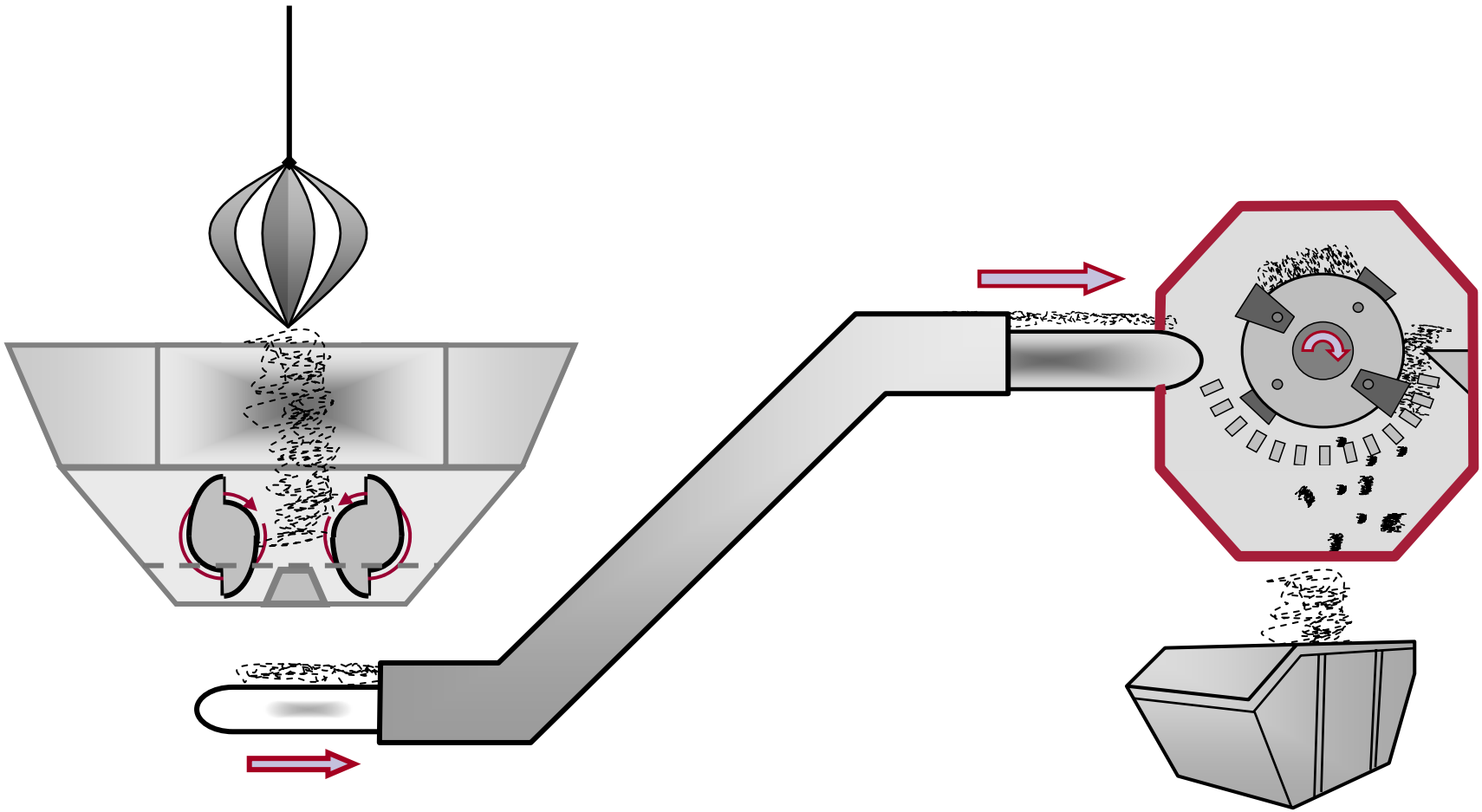
→ **HARDOX 600.**

Hoppers

- The impact wear resistance
- Increasing production accessibility
- Possibility to reduced weight

→ **HARDOX 450**

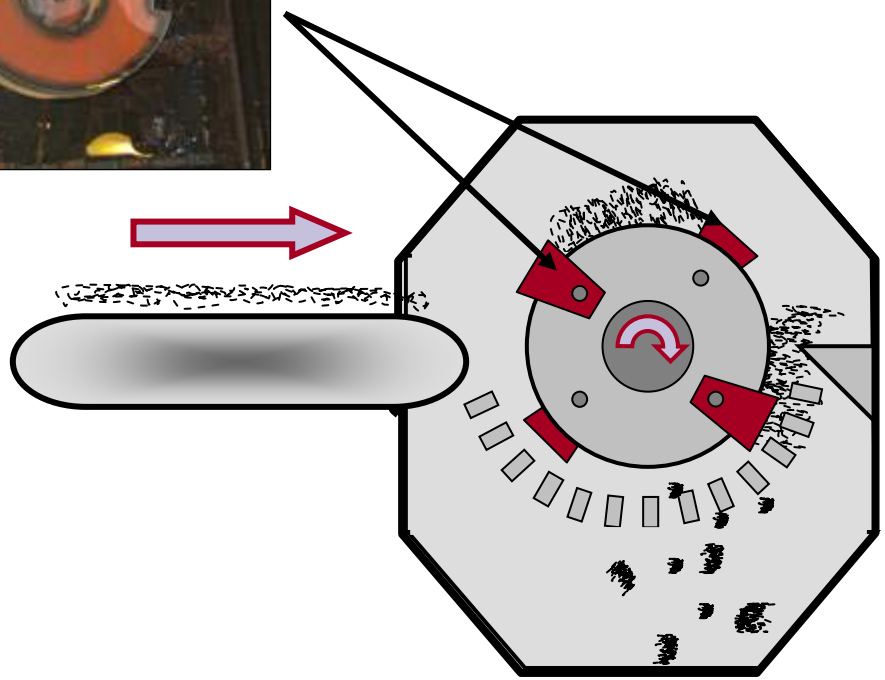
Recycling flow -crusher



Crusher -hammers

- Impact wear resistance
- Sliding wear resistance
- Good toughness

→ **HARDOX 550**



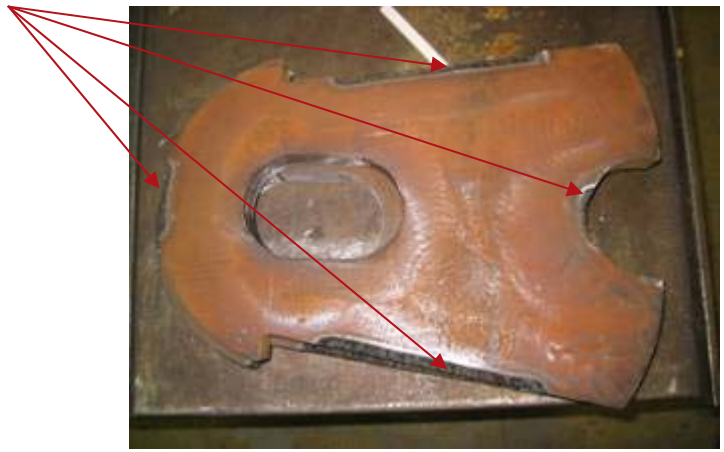
Hammers made out of plates

- The design is easily modified
- Homogeneous mechanical properties
- Constant weight
- Always available

Lamellar hammer design

- Tougher material
- Fracture arrest

Assembling



- Weld configuration
- Austenitic electrodes limits preheating

Optimal performance

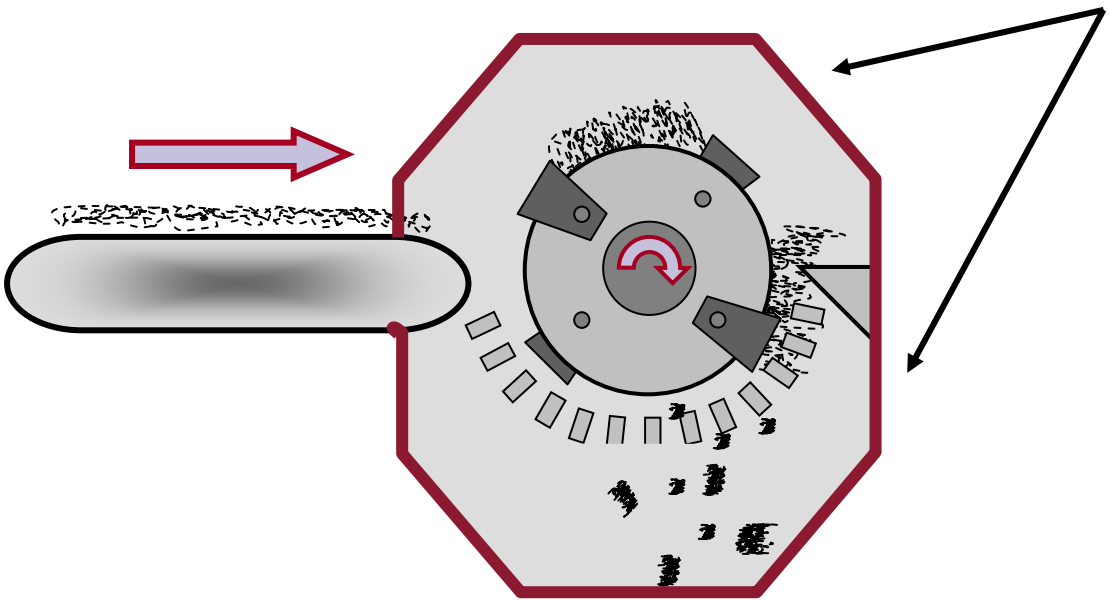
- Be observant on the hammer shaft. Grind notches and scale off the shaft opening of the hammer.

To reach optimal hardness;

- Use cutting under water or abrasive water jet.
- Always use cutting speed and sequences according to the HARDOX cutting recommendations.

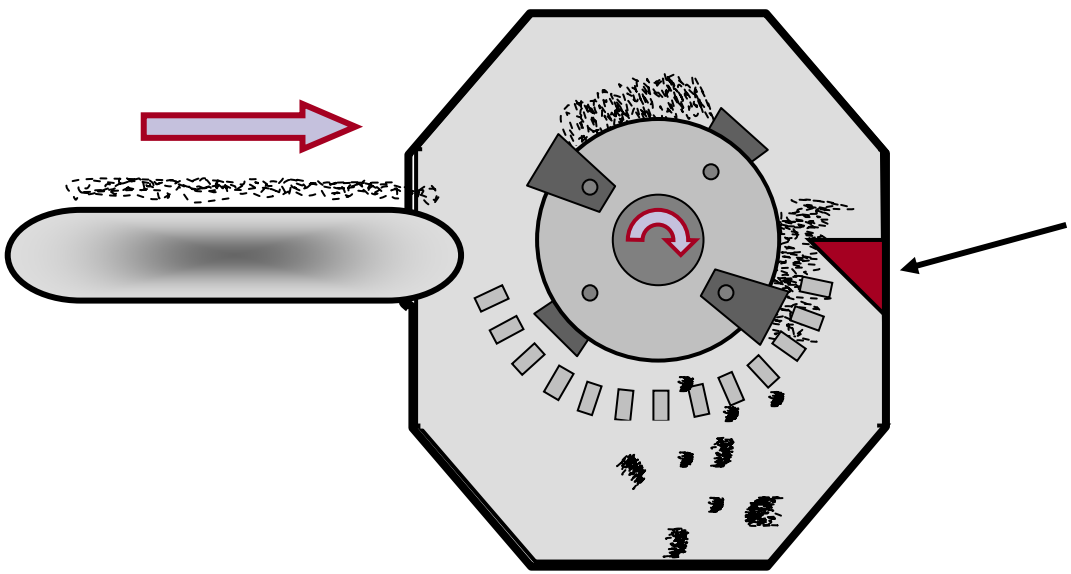
Crushers –liner plates

- Impact wear resistance
- Bending and welding properties
- HARDOX 450



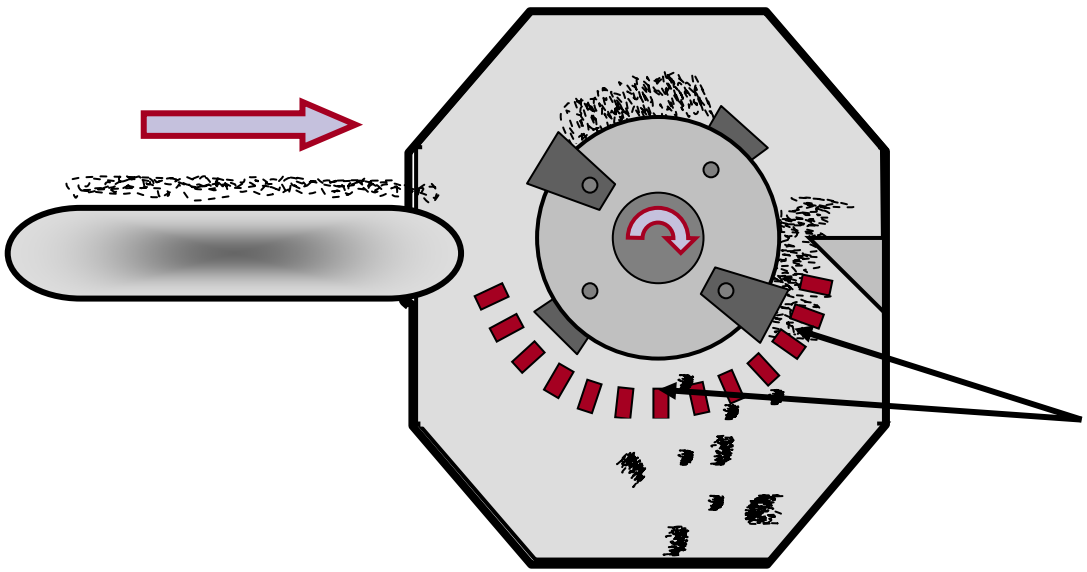
Crushers –anvil

- Sliding wear resistance
- Welding properties
- HARDOX 550



Crushers – grid screens

- Sliding wear resistance
- Welding properties
- HARDOX 500



Field study –hammers in HARDOX 550

- Field study at an incinerator plant processing 200 000 ton waste per year.
- In their crusher they previously used 75 tonnes of cast manganese steel hammers per year.

Conclusions Field study

ADVANTAGES : HARDOX 550 vs. Manganese steels

- HARDOX 550 hammers were harder and had longer service life than Mn hammers.
- HARDOX 550 hammers were hard from the beginning.
- The wear on HARDOX 550 was much less severe on the sides of the hammer, important for the cutting function.
- Less storage costs and less lead time due to local manufacturing.
- Less problems with health risks during cutting or repairing.
- All hammers had the same weight, no balancing of the machine was needed.
- Homogenous material, no material separations due to casting defects.
- Possibility to use twin hammers.
- The twin hammers could be shifted in order to increase the service life.
- The maintenance organisation appreciate one type of wear material in different applications.
- The design of the hammers could be modified depending on the processed material.
- The design of the hammers could be modified to give longer service life.

Field study – Economical result

Costs:

Material
Cutting
Grinding
\+ Welding

Totally <200 € each.

..which is less then the cast alternative.

- The maintenance cost was reduced by 100 000 € per year.
- The availability of each crusher increased by 6.5 %.
- The crushing process was improved.

Advantage HARDOX

Knifes, teeth, striker bars, anvils, chutes, feeders, hoppers, hammers, liner plates, sieves, compactors, bailing equipments, conveyor systems, rosters, drums, rotor discs…

Advantage HARDOX due to:

- Excellent wear resistance
- High impact toughness
- Homogenous mechanical properties
- Possibilities saving weight
- Work shop friendliness: cutting, welding and bending
- Professional technical support
- Good availability of plates