

HARDOX[®]

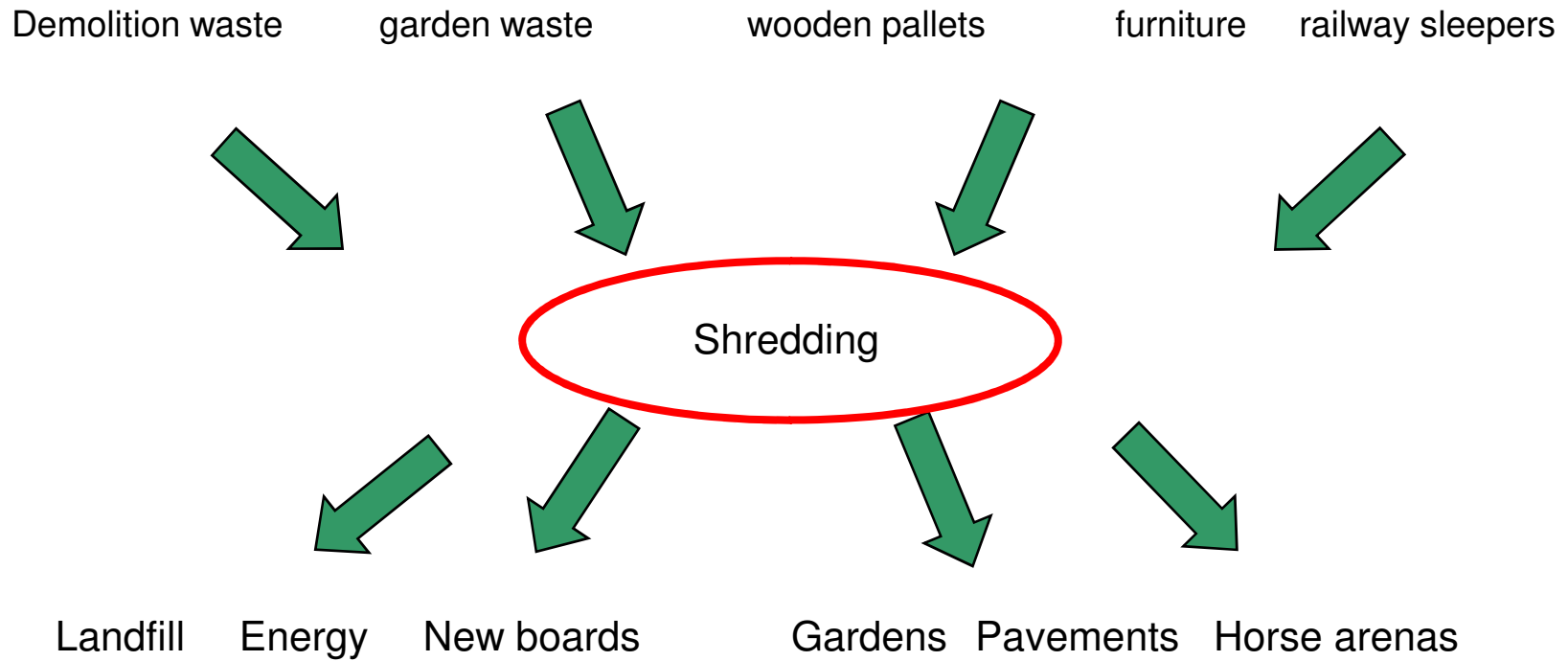
WEAR PLATE

Hardox in Wood recycling

Cases and Reports 2009

/ **SSAB**

The process



Applications

Shredders and Chrusher

- Mobile
- Stationary
- Portable



Shredders

Different types

- High speed
- Low speed high torque
- Crushing by hammers
- Shredding by flails
- Shredding by teeth



Other applications

Anvil, Screens, housing and different types of conveyers



Stump remover

Similar to demolition tools

Hardox 400

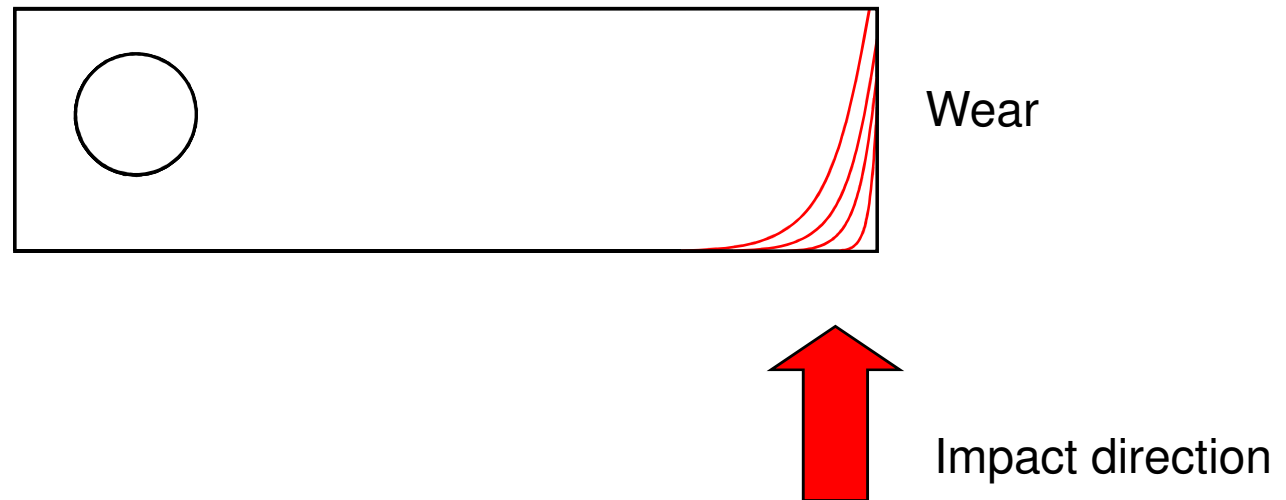
Hardox 500

Hardox 600



Wear

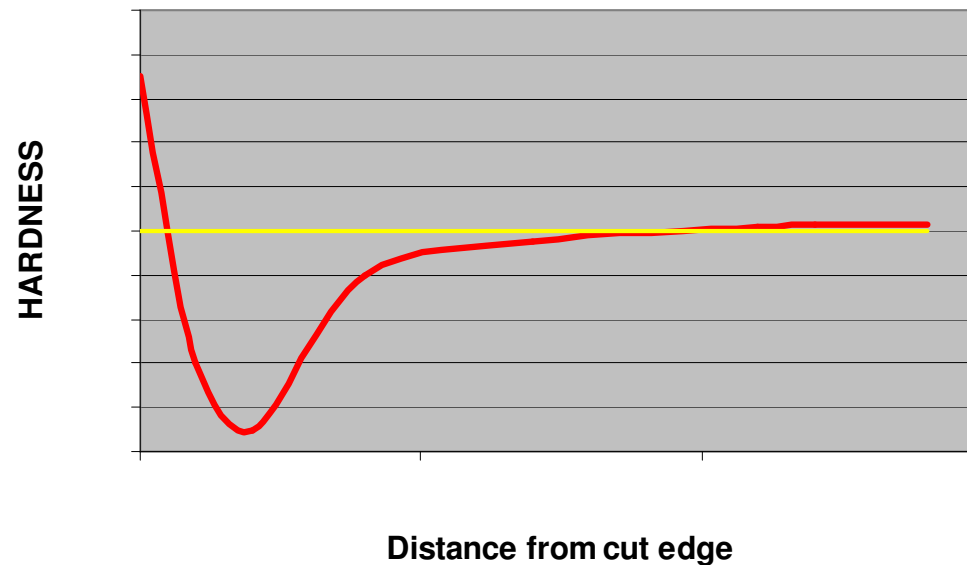
Hammers in shredders in general require hardness close to the edge. Thus choosing the right cutting method is of importance.



Cutting and soft zone

The width of the soft zone depends of:

- Steel composition and microstructure
- Cutting method
- Cutting speed
- Preheating temperature
- Surrounding medium when cutting (air or water)
- Dimensions of the cut part

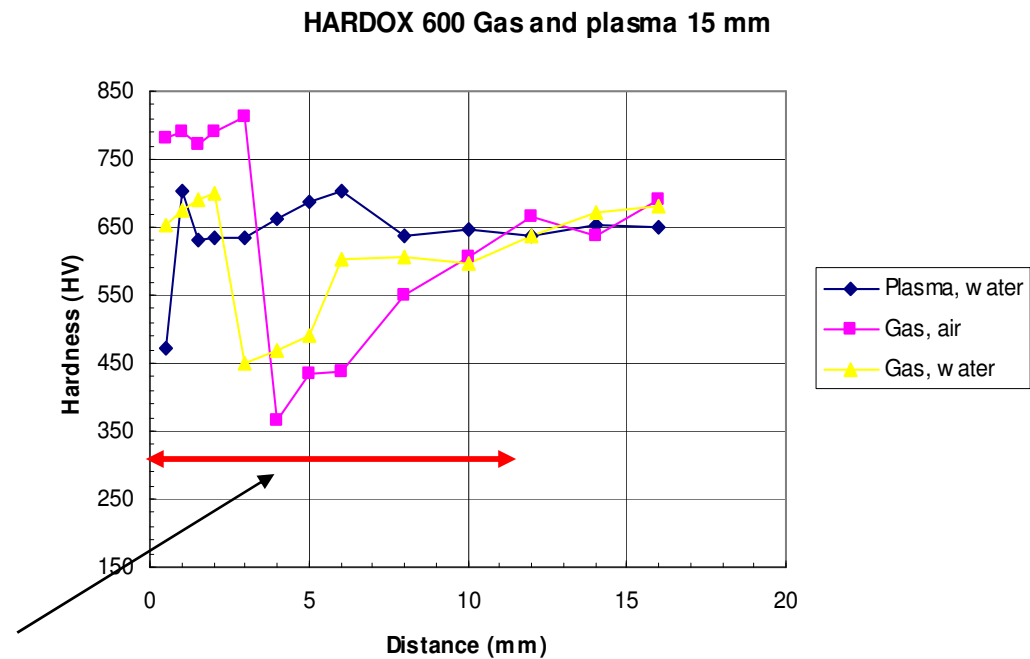


Cutting

Ranking of cutting methods as a function of the heat affected zone extension.

Method

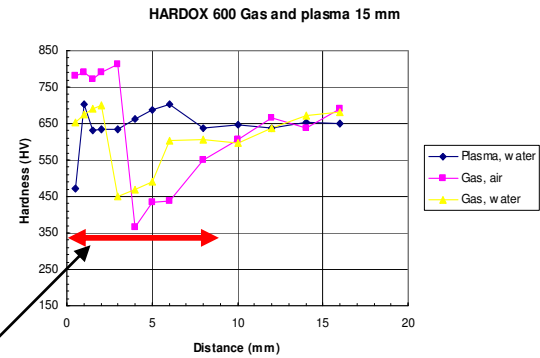
1. Abrasive Water Jet
2. Thermal cutting and machining
3. Laser
4. Plasma under water
5. Plasma
6. Oxy-fuel under water
7. Oxy-fuel cutting



Up to 12mm

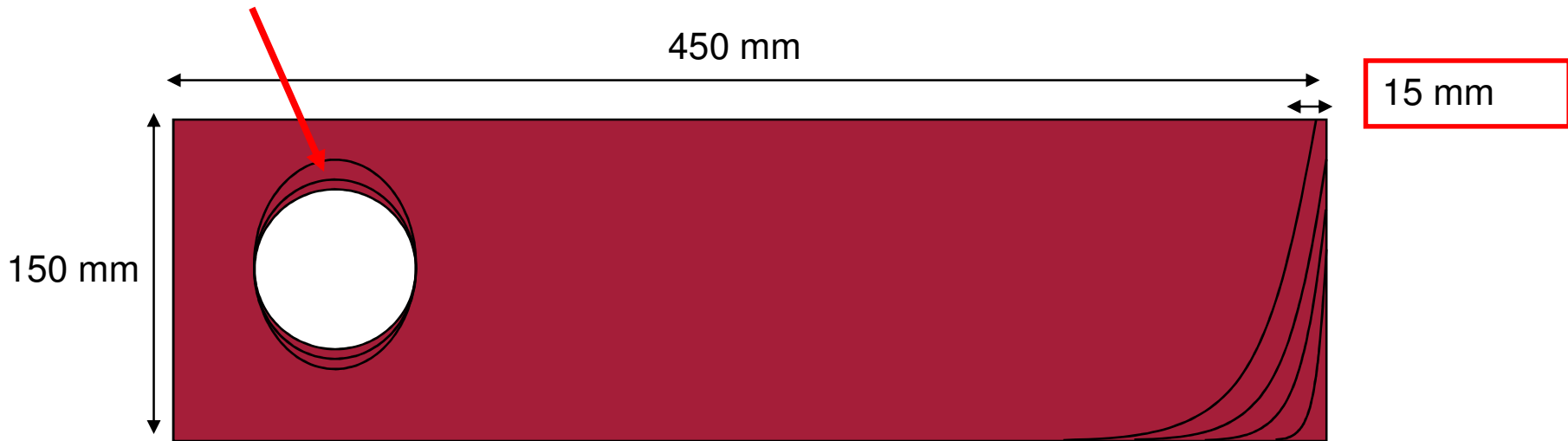
Wear contra Cutting

Real example:
Replacement are needed after 15 mm of wear



Up to 12mm

Pay attention to the axel connection

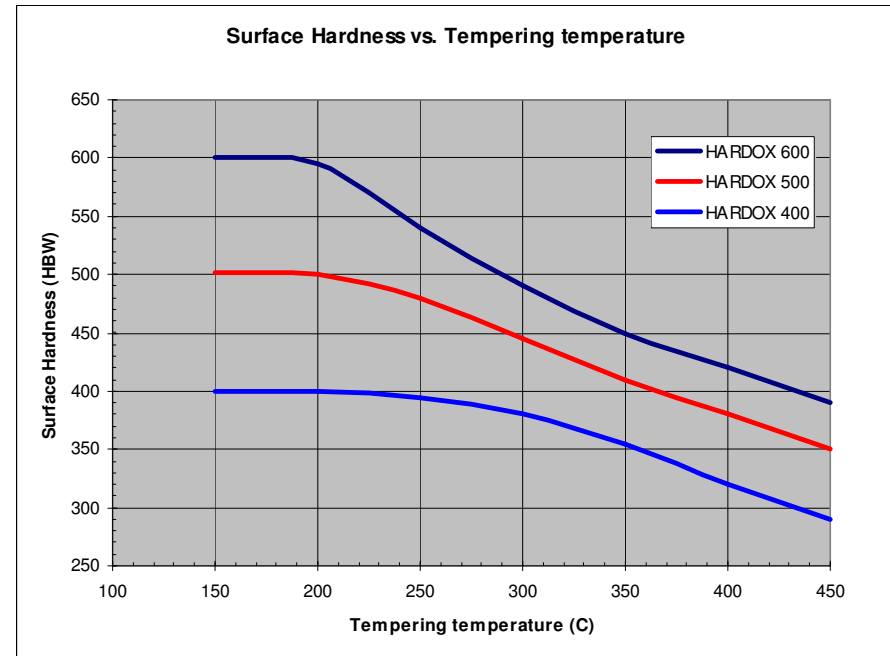


Heat during shedding

Heat is generated when shredding wood , this means that there is a risk that Hardox parts might loose hardness.

There are certain situations where the risk is higher:

- Different wood types generate more heat then others.
- Fresh wood generate less heat
- Small size of the resulting wood chips.



Generated heat -2



Case study - 1

Stationary crusher

Shredding:

Roots, demolition waste (wood), railway sleepers

Material:

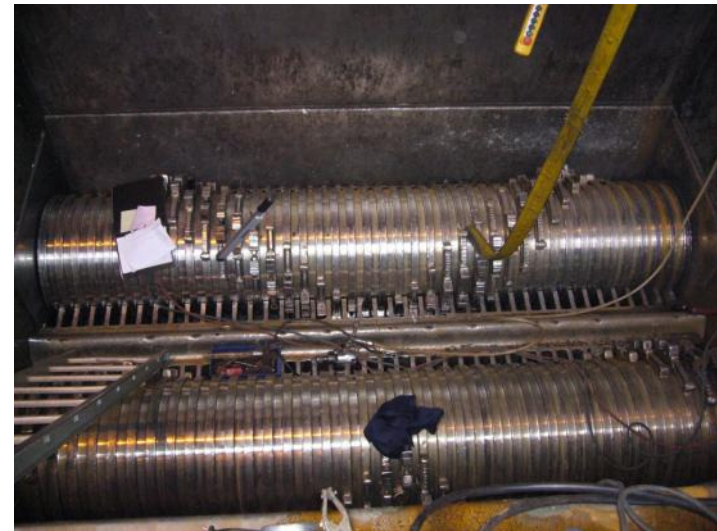
500 Brinell boron steel, 170 parts

Life time:

70 days, maintenance stop ones per week

Info:

50 % of shredded material is roots which severely increase the wear



Case Study – 1

Cons:

Complicated design =>

Small part =>

High manufacturing cost

Abrasive water jet is the only alternative

Pros:

Extra life time is important for the customer

Hardox 600 will give an increase in wear life.

Conclusion: Manufacturing cost is the critical factor.

Case study - 2

Mobile crusher

Shredding:

Wood pallets, demolition waste (wood)

Material:

600 High chromium casting

Life time:

Info:

Problems with hard objects entering the shredder



Case Study - 2

Very complicated design => high manufacturing cost

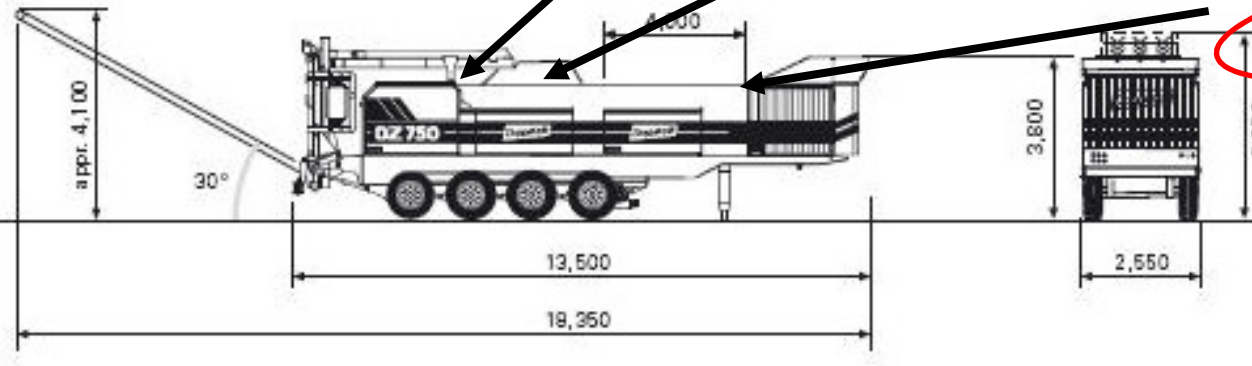
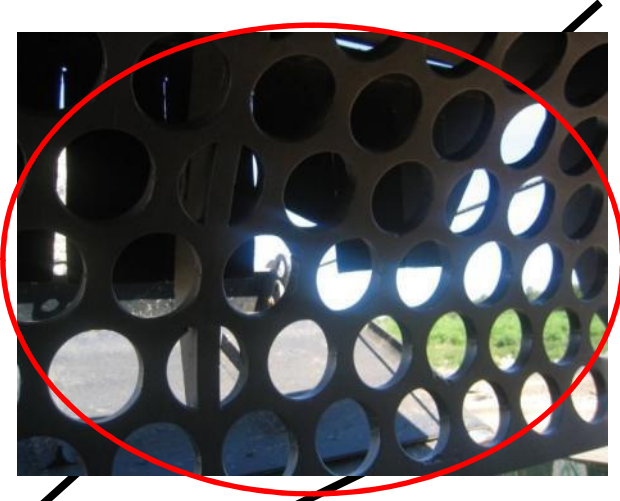
Possible solution => New design

Conclusion:

Manufacturing cost will be too high. New design only solution but is difficult.

Case Study - 2

**Conclusion:
See the whole picture**



Case study - 3

Stationary crusher

Shredding:

Garden waste, demolition waste (wood), pallets
paper

Material:

500 Brinell Q steel, 48 hammers

Life time:

3 weeks

Info:

Problem with hard objects entering the crusher



Case Study - 3

Simple design => low manufacturing cost

Utilizes Hardox excellent properties

**Conclusion:
Upgrading to Hardox 550 or Hardox 600
and using the right cutting method will
give a good result. Success**

Why Hardox in Wood recycling?



- High Hardness
- Excellent toughness
- Even properties
- No heat treatment is needed

- Longer life time
- Less sensitive to the purity of the waste
- Even wear, fewer maintenance stops
- Low manufacturing cost

Lower overall cost

- Better bendability
- Better weldability
- Better cuttability

- Less manufacturing problems

Lower overall cost

For further information on performance, production recommendations and selection of materials, please get in touch with your local technical SSAB contact.

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