

HARDOX[®] HiACE



DEFINITION OF THE PRODUCT – SAME GOOD PROPERTIES AS HARDOX® 450

- Thickness
 - Plate 4-25.4 mm
- Hardness 450 HBW
 - 425-475 HBW
- CVT minimum 27 J at -20 °C
- Product information sheet available

HARDOX®
WEAR PLATE

SSAB AB, Box 121, S-400 12, Göteborg, Sweden

Hardox® HiAce

General Product Description

Hardox® HiAce is a high strength, low alloy steel with excellent wear resistance. It is a 450 HBW steel with a minimum thickness of 4 mm. It is suitable for use in a wide range of applications where high wear resistance is required.

Hardox® HiAce is a high strength, low alloy steel with excellent wear resistance. It is a 450 HBW steel with a minimum thickness of 4 mm. It is suitable for use in a wide range of applications where high wear resistance is required.

Dimension Range

Hardox® HiAce is available in thicknesses of 4-25.4 mm. Hardox® HiAce is available in widths up to 3500 mm and lengths up to 14500 mm. For detailed technical information, please refer to the technical drawing.

Mechanical Properties

Thickness (mm)	Hardness (HV)	Typical Yield Strength (MPa) (minimum)
4-25.4	425-475	475

CVT minimum 27 J at -20 °C. For detailed technical information, please refer to the technical drawing.

Impact Properties

Grade	Transverse Charpy Energy (J) at -20 °C
Hardox® HiAce	27

Chemical Composition (heat analysis)

C (%)	S (%)	Mn (%)	P (%)	S (%)	Si (%)	Ni (%)	Al (%)	Cr (%)	Mo (%)
0.24	0.005	1.40	0.008	0.010	0.10	0.05	0.05	0.05	0.05

Carbon Equivalent CET(CEV)

Thickness (mm)	CEV (%)
4-25.4	0.41

$$CET = C + \frac{Mn}{10} + \frac{Cr+Cu}{20} + \frac{Ni}{40}$$

$$CEV = C + \frac{Mn}{6} + \frac{Cr+Mo+V}{5} + \frac{Cu+Ni}{15}$$

SSAB

Where to look for application

Recycling

Handling of house waste

Slurry

Wood and bark

Timber

Bark

Wood chip

Growth

Agriculture

Manure

Hay and animal food

Slaughter waste

Fertilizer

Marine

Sea water

Combination of wear and corrosion

Technical Information



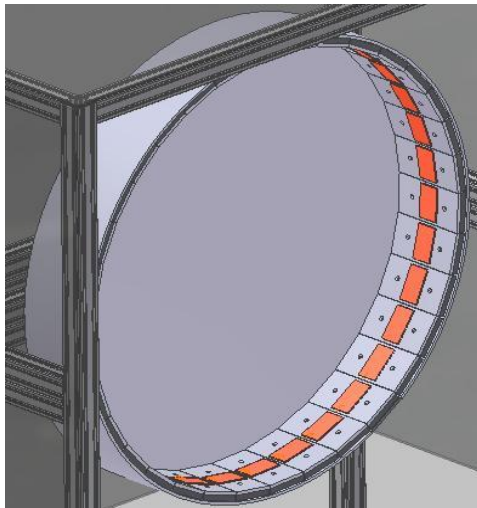
Wear corrosion testing in bark and wood handling

- ▶ Bark water, sand and clay
- ▶ pH: 4-6
- ▶ 300ppm NaCl

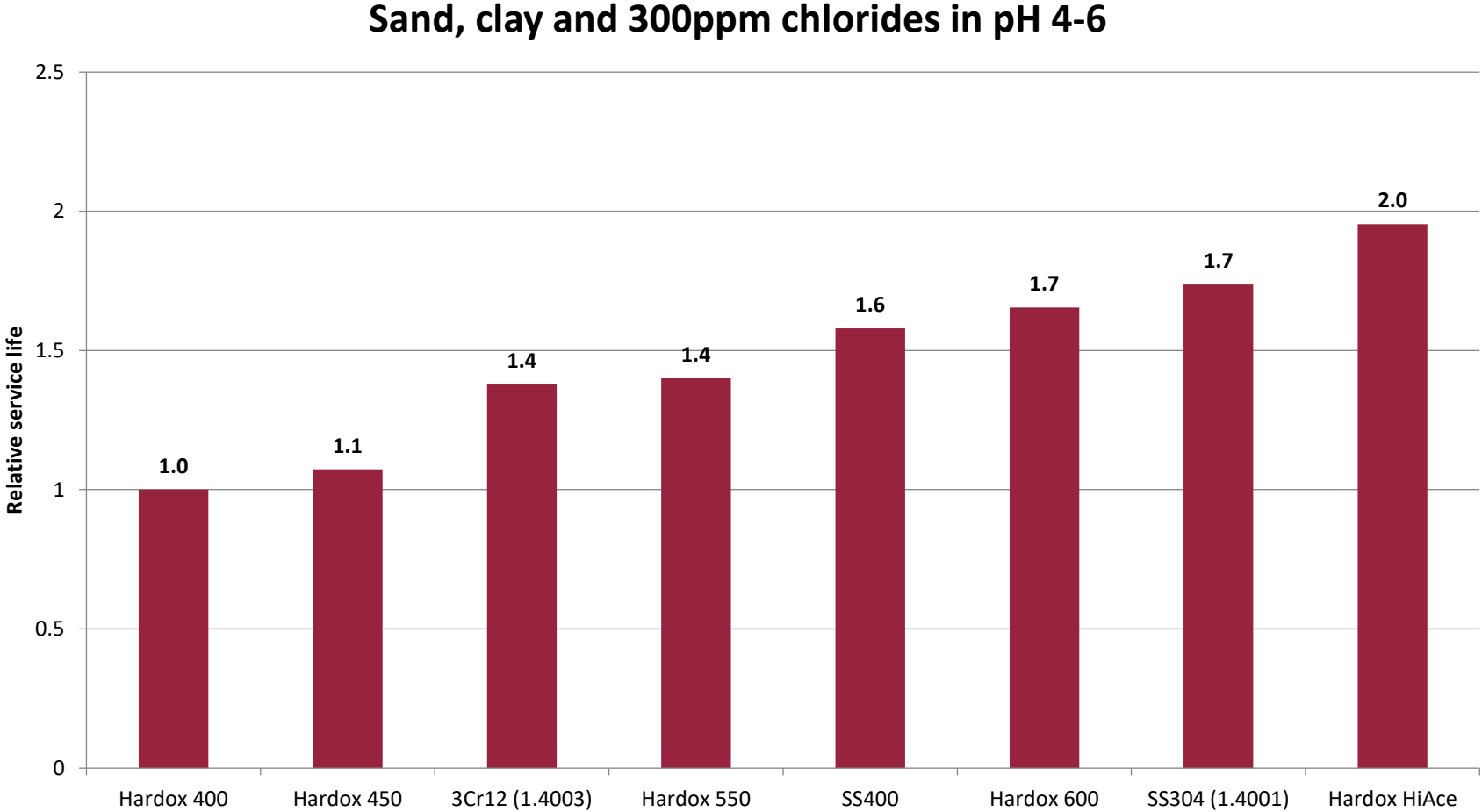


Bark and water soaked for 3 months – pH 4

Adding sand and clay to introduce some wear



Wear corrosion – Bark and wood handling



Wear corrosion testing in House Waste

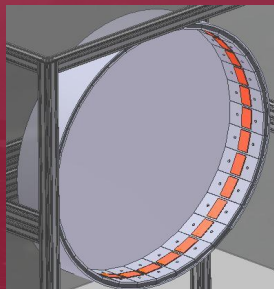
Acetic acid

pH: 4.5-6

Abrasive material:

50% steel shot balls (40-51 HRC)

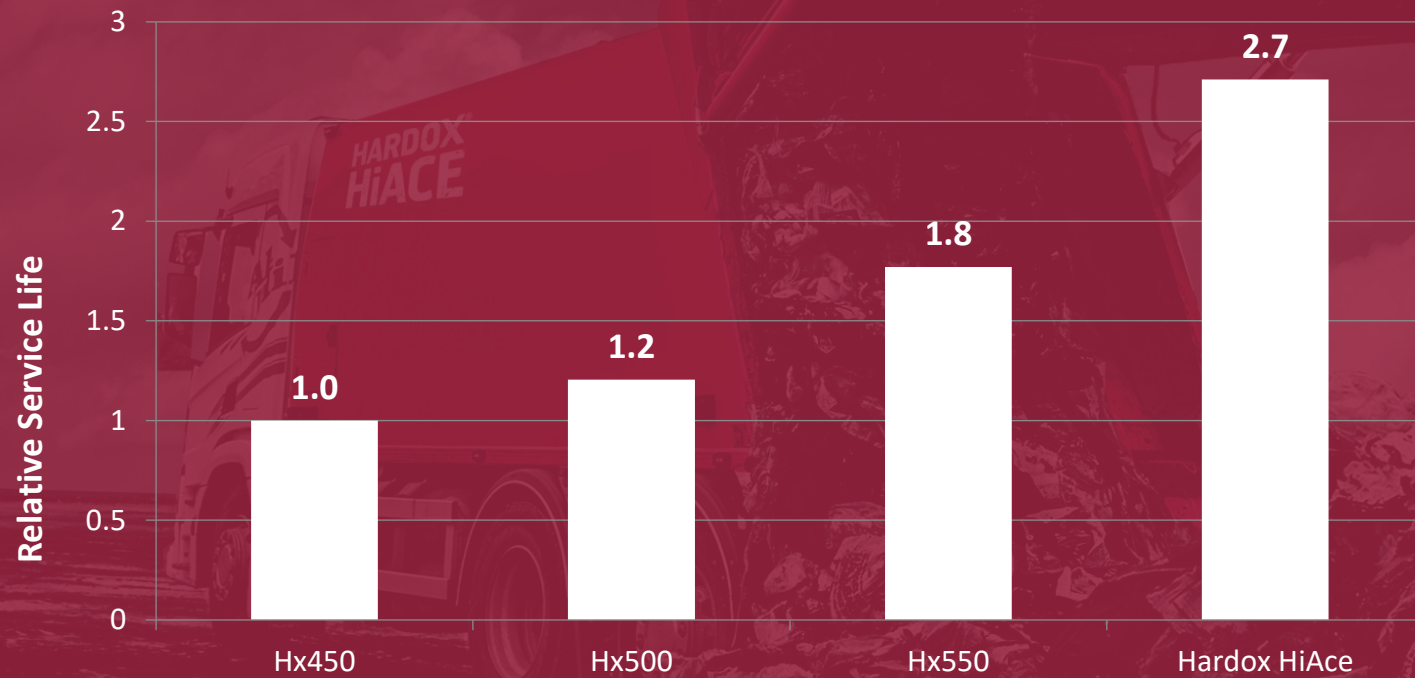
50% steel grit (60 HRC)



Analysis from recycling plant	
Formic acid	4 mg/liter
Acetic acid	400 mg/liter
Propionic acid	70 mg/liter
Sodium chloride	12 mg/liter
Sodium sulfate	9 mg/liter
pH of solution is 4.5	

Wear corrosion – House waste

Test with acetic acid



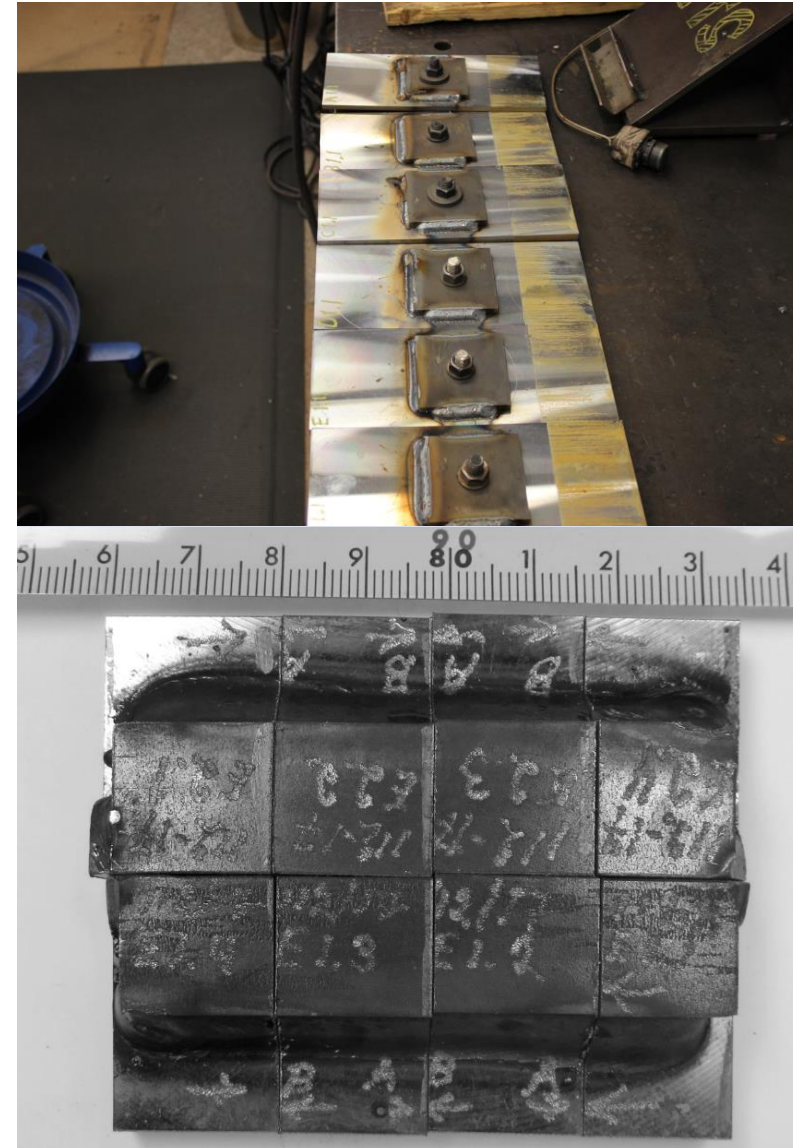
Workshop Recommendations – Bending and welding

► Bending is the same as for Hardox® 450

Hardox HiAce	Thickness	Transverse	Longitudinal	Die opening width
Plate	t<8	3.0	3.5	12
	8≤t<20	3.5	4.5	14
	t≥20	4.5	5.0	16
Sheet	3≤t<4	3.0	4.0	12
	t≥6	3.0	3.5	12

► Welding

- No preheat for 8mm plate according to CTS test
- **Thicker material needs to be welded with stainless consumables (AWS307) (no preheating)**



Workshop recommendations

- ▶ Laser cutting tests have been carried out by a CO₂ laser with oxygen as process gas
- ▶ Plasma or oxu-fuel cutting same as for Hardox 450

Hardox[®] HiAce cuts beautifully

Plate 6 mm



Plate 12 mm



Plate 20 mm

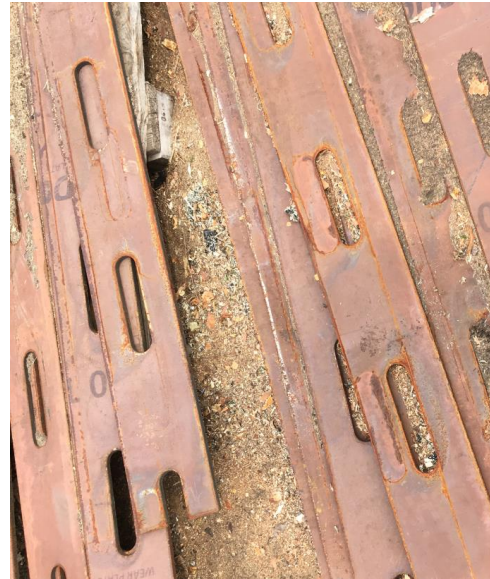
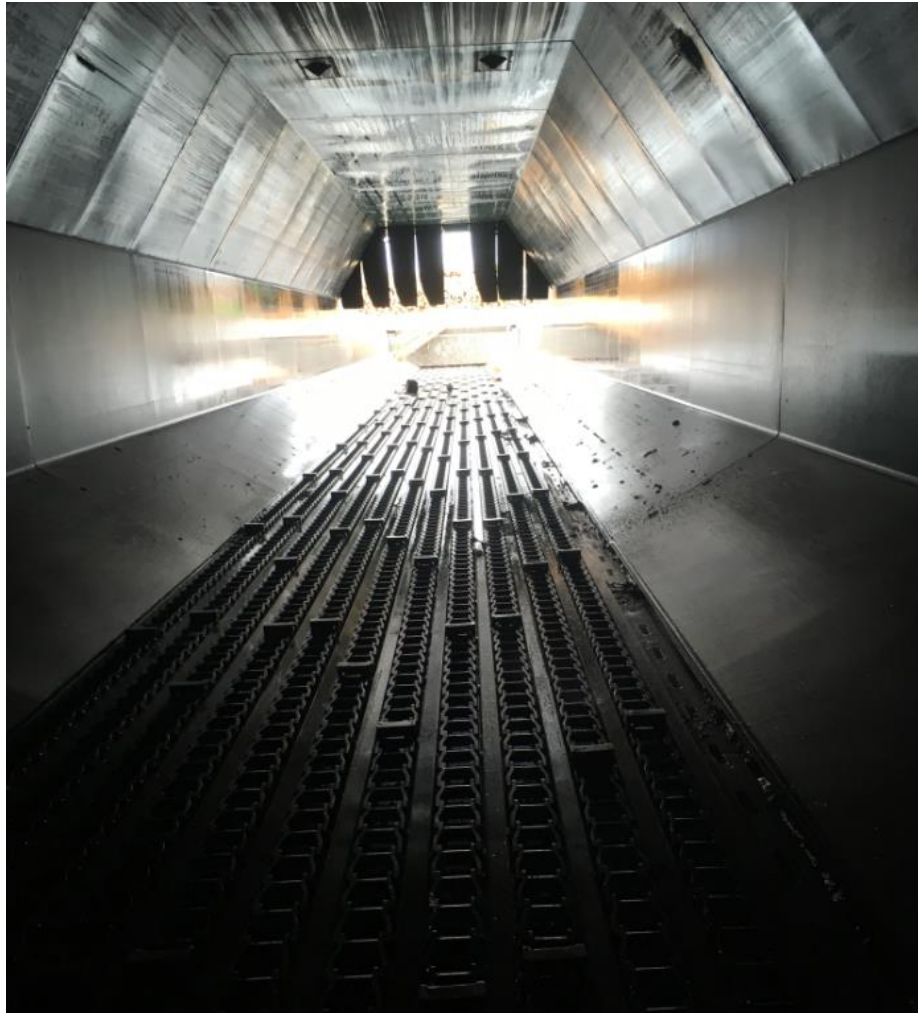


Available material – SSAB Oxelosund

Length mm [in.]	Width mm [in.]	Thickness mm [in.]
6000 [236.22]	2500 [98.43]	4 [0.157]
6000 [236.22]	2500 [98.43]	5 [0.197]
6000 [236.22]	2500 [98.43]	6 [0.236]
6000 [236.22]	2500 [98.43]	8 [0.315]
6000 [236.22]	2500 [98.43]	10 [0.394]
6000 [236.22]	2500 [98.43]	12 [0.472]
6000 [236.22]	2500 [98.43]	15 [0.591]
6000 [236.22]	2500 [98.43]	20 [0.787]

Sodra cell (Sweden)

HARDOX[®]
WEAR PLATE



Wear plate under chain before debarking drum

Environment: pH 4-6

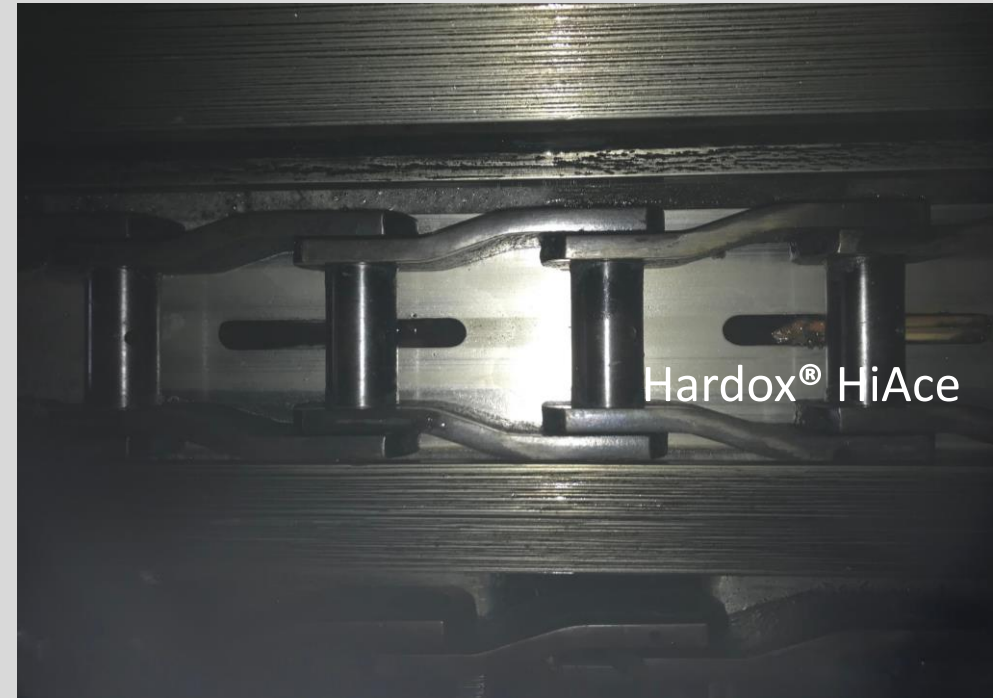
Previous material: Hardox 450

Material subjected to corrosion and wear



SSAB

Chain transporter liners: 40ton order



- ▶ Chain transporter handling bark – pH 4-6
- ▶ Operation 36 months
- ▶ No signs of pitting corrosion on Hardox® HiAce

HARDOX®
WEAR PLATE

HARDOX® HiACE IN REAL LIFE

**HARDOX®
HiACE**



COMPANY:
**Bruce Rock Engineering,
Australia**

Mining tipper body

The body is made entirely of Hardox® HiAce to fight corrosive wear from ore in a tropical climate.

Result:

An expected increase in service life by 20 to 30%.





COMPANY:

Soarvamil Quarry, Portugal

Washing buckets in sand quarry

Sorting of wet quartz-rich silica sand, which is both abrasive and corrosive, causing premature failure of the buckets.

Result:

New buckets in Hardox® HiAce have already lasted 3 times longer and are still in good condition.

HARDOX®
WEAR PLATE

Customer:

- Fabricator: Heshun (HWP)
- End User: Copper Mine in Myanmar

Application:

- Bucket handling corrosive material

Material:

- 20mm Hardox HiAce for Shell
- 30mm Hardox HiAce for Side Cutter
- 50mm Hardox HiAce for Cutting Edge

SSAB





COMPANY:

Allmiljö, Sweden

Garbage truck floor plate

Allmiljö has been operating garbage trucks with floor plates of Hardox® HiAce for 20 weeks.

Result:

Very low wear, no signs of pitting corrosion.



COMPANY:

Wong Fong, Singapore

Container body

Hardox® HiAce was chosen for handling waste, biomass, wood chips and other acidic and low pH loads

Result:

A container that is 10% lighter and lasts longer.

COMPANY:

FB Kedjor, Sweden

Chain conveyor liners for wood

FB Kedjor manufactures chain conveyors for pulp and paper mills and recycling plants.

They switched to Hardox® HiAce for conveyor liner plates and saw a great leap in wear performance.

Result:

After more than a year of operation, the wear is very low, and there are no signs of pitting corrosion.



COMPANY:

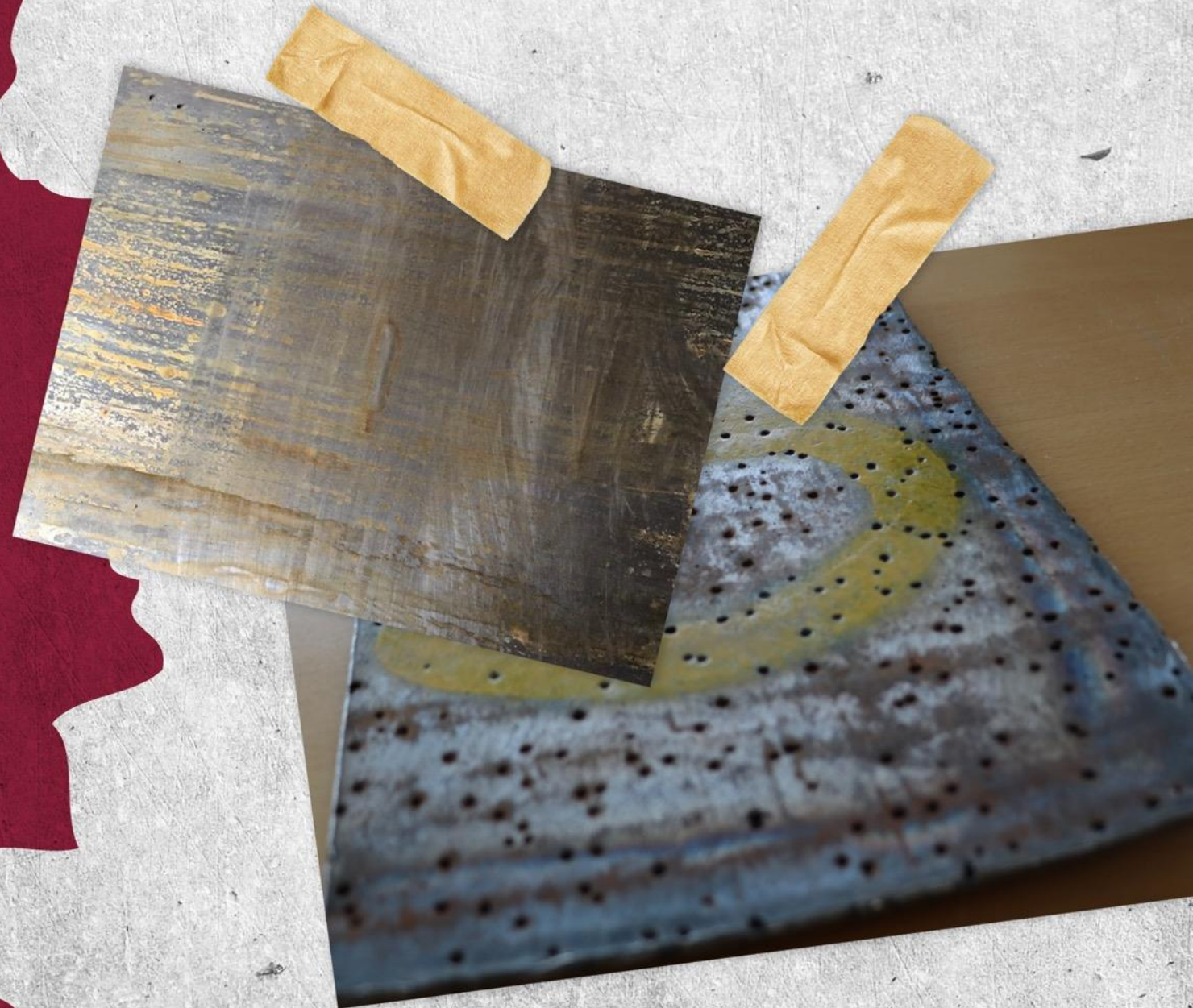
Fanalca, Colombia

Garbage truck floor plate

Fanalca had a serious pitting problem in the floor plates of its garbage trucks.

Result:

Switching to Hardox[®] HiAce proved to be the solution.



COMPANY:

Stena Recycling, Sweden

Cyclones in recycling

Hardox® HiAce replaced the earlier solution using structural plate and wear plate in S355 (A36) mild steel.

Result:

Now Hardox® HiAce provides both wear resistance and structural performance, resulting in a long service life and low maintenance.



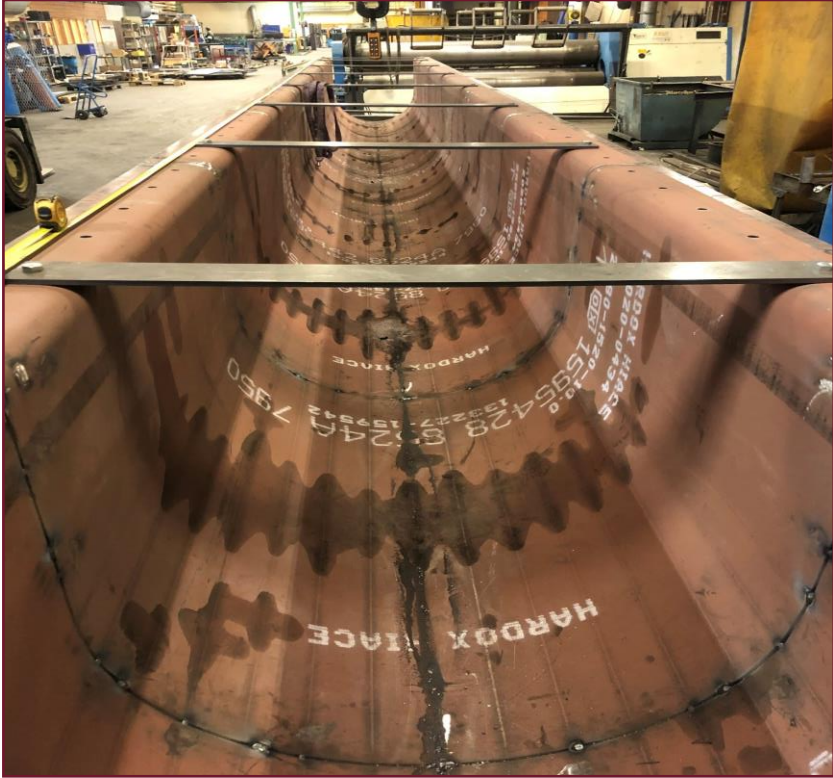
HARDOX® HiACE

HARDOX®
WEAR PLATE



Applications in wood and bark handling

HARDOX[®]
WEAR PLATE



SSAB

Power plant – 23 ton order

HARDOX[®]
WEAR PLATE



SSAB

Applications in recycling

HARDOX®
WEAR PLATE



SSAB

Applications in Agriculture

HARDOX[®]
WEAR PLATE



SSAB