# SSAB



# Cement & Concrete industry

This presentation contains general suggestions. SSAB hereby expressly disclaims any liability for their suitability for individual applications. It is the responsibility of the user of this brochure to adapt the recommendations contained herein to the requirements of individual applications

### Cem - Quarry

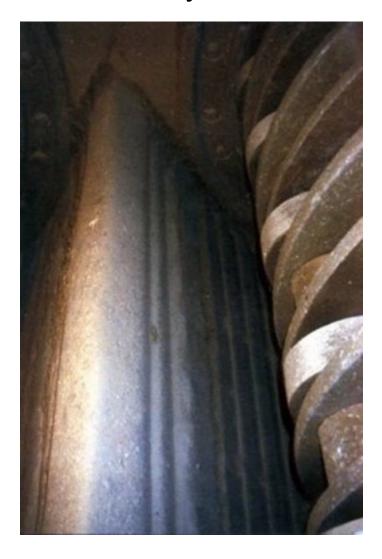


#### **Buckets and Dumper floor**

Buckets HARDOX 400 and HARDOX 500. Weight 10 x 3000 x 1200 ( 288 kg)

Dumper floor Hardox 500 and Hardox 550. Weight Floor 10 x 3000 x 6000 ( 1440 kg). Sides 10 x 1500 x 6000 x 2 (1440 kg)

#### Cem - Primary crusher



Anvil and Hammers are made of cast material but: They can be made of Hardox Hammers HARDOX 500 or 600 (30 kg x 25 pi. = 750 kg/ crusher) A

lamellar structure is a good solution

Lining HAESOX 400 (Surf. 20 x  $1200 \times 1800 = 345 \text{ kg}$ )

# Cem - Primary crusher grating



Grating HARDOX 500

Weight 100 kg

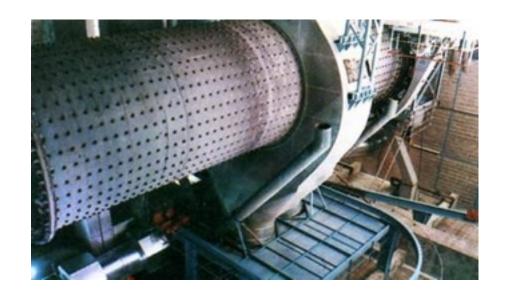
#### Cem - Crusher Screen



Crusher screen. HARDOX 400,

Thickness 20 mm, Weight 840 kg

# Cem - Grinding raw material



Raw material grinder (Double rotator)
Casing and Chute HARDOX 400

Many chutes in cement works can be made of HARDOX when the heat permits it.

# Cem - Storage & prehomogenization



Storage. To move the raw material. Elevators or buckets in HARDOX 400

Chute 6 mm x  $1000 \times 500 \times 300$  mm. Weight of the chute 70 kg

#### Cem - Elevator bucket





Elevator buckets. Body HARDOX 400. Front edge in HARDOX 500

Weight  $5 \times 800 \times 400 \times 60$  buckets = 768

# Cem - Clinker grinder



Clinker grinder. HARDOX 500 or 600 for the walls.

Weight  $30 \times 2000 \times 1000 = 480 \text{ kg}$ 

## Cem - Drag chain



Drag chain HARDOX 400 or HARDOX 500

Length 30 meters
Floor width 400 mm in 15 mm
Side walls height 300 mm in 10
Scraper 20 x 300 x 400 mm

Floor: 1440 kg Walls: 1440 kg Scraper: 1152 kg

# Cem - Conveyors



Other type of chain conveyor or Screw conveyor HARDOX 400

### Cem - Roller mill to grind clinker









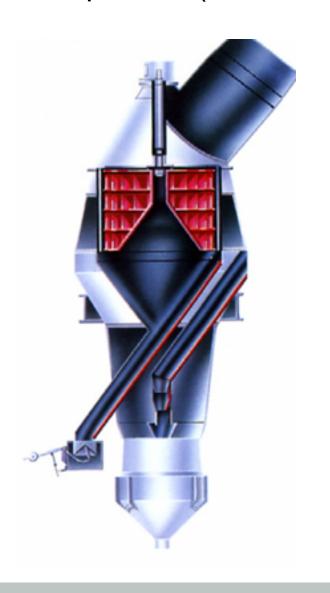
The main parts are: Two pairs of rollers, The table with segments and The chute under the table Table in cast material Segments fixed on the table. For the segments competition Hardfaced cast material thickness 50 mm + hardfaced material 28% Cr Hardness 60 HRC (660 HB). You can find different types of systems

#### Cem - Roller mill for clinker



Chute under the table of the roller mill. HARDOX 400.

### Cem - Separator (Air classifier)



Separator some of a diameter of 4 meters.

Ceramic is mainly used Price: Euros 1000 / m<sup>2</sup>. Also hardfaced material 6+4 mm

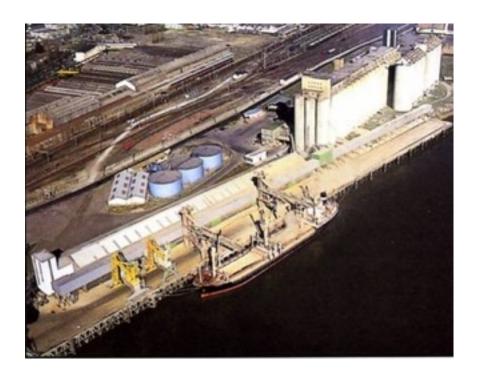
HARDOX 500 for the parts in red. Parts of  $10 \times 120 \times 700 = 6.7 \text{ kg}$ . Also Hardox 500 for repairs

# Cem - Hoppers and drain chutes



Hoppers and drain chutes. HARDOX 400.

# Cem - Transportation



Harbors. HARDOX 400 Chutes and Repairs.

#### Con - Loader



Loader Bucket – HARDOX 400

Dimension 8 x 1200 x 3000 mm. Weight: 230 kg

Wear life: 2 to 3 years

# Con - Hopper



Hopper. HARDOX 400 for edge lining

Thickness 4 mm.  $10 \text{ m}^2 = 640 \text{ kg}$ 

Wear life 10 years.

#### Con – Mixer Floor



Floor. HARDOX 500.

Thickness 15 to 20 mm. Diameter 3 meter. Weight 1500 kg

Wear life 1 to 2 years

# Con – Mixer Side Wall parts





Side walls HARDOX 400

Thickness 10 mm. Diameter 3 meter. Weight 370 kg

Wear life 3 to 4 years

# Con – Mixer paddle







HARDOX 600 or HARDOX 500 hardfaced.

Dimension 20 x 200 x 400. Weight 12 kg / paddle. 5 paddles / mixer = 60 kg

Wear life 1 year

#### Con – Drain chute



Drain chute to load the trucks. HARDOX 400

Thickness 10 mm, Weight 70 kg

Wear life 10 years

# Cem - Seperator



Linear plates in Cement plant. Used to be a HARDOX 500 application.

Thickness 6 and 10 mm.

Wear life 1 years.

Tisson Li, China

# Con - Pump truck



WELDOX 700 and 900 in its body.

Tisson Li, China

#### Con - Form





Concrete mooring towers. Replaced ST52. Repeating business. Long service life. HARDOX 400

20 mm. – big pieces for steel construe.

In function since 1 year – No info from the O.E.M.





CEMENT MIXER— Repeating business — Long service life HARDOX 400.

10 – 12 – 15 mm



CLINKER CRUSHER. HARDOX 500.

15 – 20 mm.

2 times per year - maintenance (6 month)



VERTICAL MILL for limestone / marna – Repeating business HARDOX 500

8 - 10 - 12 mm.

2 times per year – maintenance ( 6 month )

# Con – Linear plates



CEMENT PIPE LINES – SEPARATORS. Repeating business HARDOX 500

6 mm.

2 times per year – maintenance ( 6 month )



CEMENT MIXER – Replaced Mn/Cr castings HB 500 – Repeating busines. HARDOX 600.

20 mm.

## Con – Linear plates



VERTICAL MILL for limestone/ marna – Repeating business HARDOX 500.

10 - 15 mm.

2. Times per year - maintenance (6 month).

## Con – Linear plates



VERTICAL MILL for limestone/ marna HARDFACING plates (WEAR Resistant)

2 times per year – maintenance ( 6 month )

# Con – Valve for pumping element



PLACING BOOM – Replaced Castings. HARDOX 600 – Advantages: Cost

35 mm. Cut with Water jet

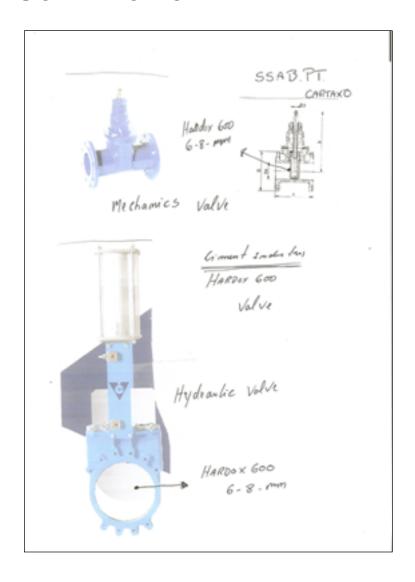
## Con – Part concrete loading sist.



TRUCK - MIXER Replaced WELDOX700E wrong app. From. The O.E..M.— Repeating business HARDOX 400.

4 mm.

#### Con - Valve



Valve in HARDOX 600

6-8 mm

Antonio Ramos, Portugal

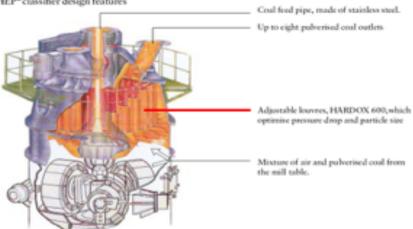
#### HARDOX® 600

#### applications

manufacturing cement

#### Louvres in wind screen

HEP\* classifier design features



#### FUNCTION

Screen milled cementclinker particles in different sizes. Has been used in shotblasting equipment to separate the scale from the shots.

HARDOX 600 replaces HARDOX 500, since customer's looking for something else.

#### ABBASIVE MATERIALS

Milled cement clinkers

#### LOCATION

Portugal, 1999

#### MACHINE MINUFACTURER

FL Smith

#### CONTACT PERSON

António Ramos, SSAB Portugal Phone: +351-43-70-42-72

Christer Offerman, SSAB Oxelosund Phone: +46-155-25 46 12







Concrete Mixer ELBA Model 2000G Drum Type linings

- ► Concrete Mixer ELBA MODEL 2000G
- Mixing paddles





Concrete Mixer Liebherr Model BETOMIX 2.0 S Bottom Linings



Jonson Mixer drum type Body and mixing paddles made out of HARDOX 400.

8 mm.

### Con -Truck Mixer



Body made out of HARDOX 400.

4 mm.

### Con – Truck Mixer



Complete body and mixing blades made out of HARDOX 400

#### Con – Truck Mixer



Extended body from size 4m3 TO 7m3, Made out of HARDOX 400. Internal mixing blades made out of HARDOX 400

# **Earthmoving Equipments**



Cutting edge for grader made out of HARDOX 500.

### Cem

### ► SEPOL SEPARATOR GUIDE VANES



#### Cem – Guide Vanes



SEPOL SEPARATOR GUIDE VANES – Made out of HARDOX 400.

# Cem – Conveyor sprocket



Clinker conveyor sprocket – Made out of HARDOX 500.



56 mm.

### Cem

▶ Side Linings for cement crusher



# Cem - Screw Conveyor



HARDOX 400.

# Steel plant



Deducting fan in steel mill made out of HARDOX 400

### Aerofoil Fan blades



HARDOX 400

# Cem - Separator



HARDOX 500 to HARDOX 600 using 8, 10, 15 and 20 mm.

#### Cem - SEPARATOR AT HOLCIM



Today using hard facing Vaulted.



# Cem - GK equipment



Carring aggregates.

#### Cem - GK equipment



Carring aggregates.

HARDOX 450



122 pieces of 10 mm HARDOX 450 replacing St52. Two years without any wear.

#### Cem - QUARRY AT A CLIENT



HARDOX 500.



Linears out of HARDOX 500, 30 or 50 mm. In separators AWJ 30 mm HARDOX 500.

HARDOX 500 replacing C60.

#### Cem - Blow Bar



Blowbars in limestone quarry.

Blowbars in HARDOX 450, 100 mm. Originally MG Magotteaux.

#### Cem – Hammers



HEAT TREATMENT HAMMER



Limestone quarry 20 mm AWJ HARDOX 600 is now used to replace other material.





HARDOX 600 compared to C60 20 % better, Mg 15 % better, Cr -10 %, Bimetal -35 %, Martensitigue +-0%.

Hammers from Hardox and Magotteaux

#### Con – Ready mix



Floor HARDOX 400 and HARDOX 450..



#### Concrete pump valves



20 mm AWJ HARDOX 600.

### Con - Stone Moulds



6 mm HARDOX 450.

### Con - Moulds



Wear inside concrete moulds



Material end product

Wear after 50 000 stones.

#### Cem – Raw material chute



Raw material chute, side walls

**HARDOX 400 replaced ST-37** 

10 mm. Thickness has been used

Much better compared to mild steel

**Hasan Aydemir, Turkey** 

# Cem - Hopper



Raw material hoper

**HARDOX 400 replaced mild steel** 

15 mm. thickness has been used

**Much better service life** 

**Hasan Aydemir, Turkey** 

### Cem - Throat





Kiln mill entering throat

HARDOX 450 will replace mild steel

The thickness is 4 mm.

Much better service life is expected

**Hasan Aydemir, Turkey** 

### Cem - Elevator



Raw material elevator

HARDOX 450 will replace mild steel

Thickness is 4 mm.

**Much longer service life is expected** 

Hasan Aydemir, Turkey.

# Cem - Dumper Trucks





**Dumper Trucks transporting limestone** 

HARDOX 400.

Thickness is 10 and 12 mm in the bottom. 6 and 8 mm in the sides.

Hasan Aydemir, Turkey.

# Con - Screw Conveyer



#### **Material transportation**

Continuous working, replaced C45, longer life time, more difficult to manufacture.

Customer uses a few screw conveyers, plate is HARDOX 400 thickness 5 mm.

In service since 8 months.

### Cem - Fan



Material handling.

Continuous operation, longer life time, abrasion at and near welds.

10-12 mm HARDOX 400.

At present, 2-3 weeks till wear holes occurs. Under study.

# Con - Transport





Half pipe as duct for concrete transport.

HARDOX 400 bent in segments to transport concrete for a major project in south Iran.

HARDOX 400 in 6mm. 46 segments each 2m long.

20000 m3 of concrete instead of 175000 m3 expected.

Kjell Bäckmann

# Cem – Chute and crusher





# Cem – Hammers and discs





# Cem - Transportation





### Cem - Buckets



Carrying abbrasive material like limestone, pozolana and gypsum. In some cases quarrying is performed by bulldozers

Verry difficult environment, in many cases wet Hardfacing is verry popular eventhough the cost is more than double and the effectiveness not satisfactory.

Thiknesses of HX400 20 – 120mm. HX 500 20-25 & 30mm. More than 300 new buckets/year

3-6 months without need of repair for new buckets.

## Cem - U shape Tipper Bodies





Carriage of all kind of Highly abrasive material. 2-5 tons more material carried.

Less fuel consumption. Easier unloading. Safest carriage. 2400Hours / year working hours. Replaces S355 8-12mm (or constructions with weight of more than 5 tons)

4,5,6 and 8mm HX400 & 450

4-5000 hours (before less than 2000)

### Cem - Screen feeder



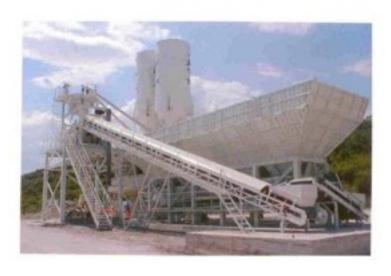
About 1000 hours for the blades

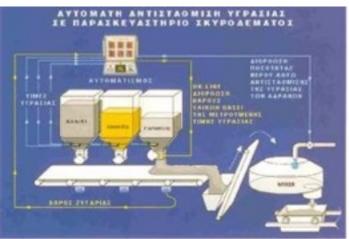
Crushed lime stone separation. HARDOX 400 8mm(side plates) 12-25mm (blades)

It is working after or before crushers in a quarry, usually 8-10 hours a day. Due to its position the humidity (from the rain) is some times a bigger enemy than the wear.

The material used ,especially for the blades was manganese steel. Its motion is linear and vibrating at the same time.

# Con - Ready mix line





Hoppers, Guides for the conveyors

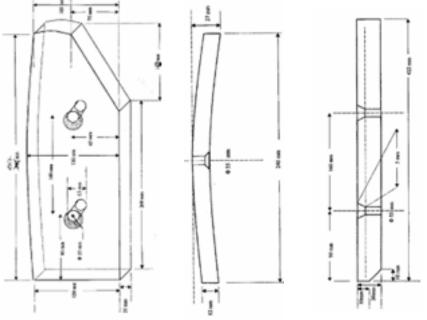
1/2 shifts of 8 hours perday. Working in the open air. Most of the constructions are made S355

4& 5mm for the upper part, 6 and 8mm for the lower parts. More than 100/year

Fully replaced in1-2years depending on the material stored in the hoppers (gravel,sand)

### Con - Mixer





Mixer for the preparation of the concrete. Processed material :gravel(2 sizes), sand, cement and water

Since most of the mixers are imported from Italy and Germany only repairs take place in Greece. Most of the original spareparts are of manganese steel. Blades usually from WRsteel

20mm blades (HX 400). 12mm side plates (HX400). 20mm bottom plates (HX500)

Blades 2-3 times/year. Side plates once a year

Bottom plates once a year.

## Con - Mobile batching plant



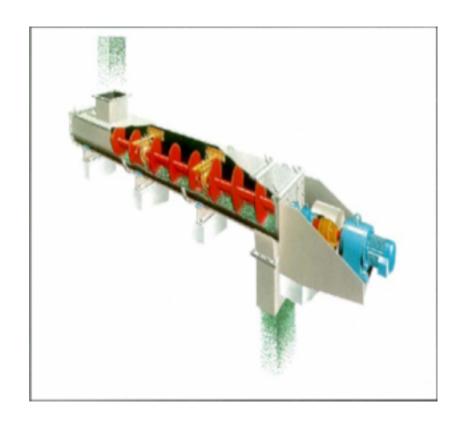
Used by pulic works construction companies.

Working production: 60-65 cubic meters/hour

4 & 5mm for the upper part, 6 and 8mm for the lower parts.

2000-3000 hours for hoppers 1500-2000 hours for the mixer

## Cem - Screw conveyor



Screw conveyor for clinker (cement industries)

Rotation speed 20-30rpm. Working hours 24h per day. Made of steel S355 (the blades on the screw shaft)

Thickness 4,5,6mm HARDOX 400

4-5000 hours (before less than 2000)

## **Quarry Truck**





Description:

**QUARRY DUMP TRUCK** 

Technical Data:

**Wears Due to Abrasion &Impact.** 

**Dimensions and Quantities:** 

Various Sizes Depends upon the Capacity.

Service Life and Status:

Service life 12 month.

Contact person

### **Excavator Bucket**



Description:

**Excavator Bucket** 

Technical Data:

Wears Due to Abrasion & Impact. Stiffeners with Hardox.

**Dimensions and Quantities:** 

Various Sizes Depends upon the Capacity.

Service Life and Status:

**Depends upon the operating Hours minimum 6** months

Contact person

## Cem - Grizzly Feeder





Description:

**Grizzly Bar & Screen** 

Technical Data:

**Wears Due to Abrasion and Impact** 

**Dimensions and Quantities:** 

1 set of Grizzly and 2 sets of Screen in Each Quarry

Service Life and Status:

In function since 9 month.

Contact person

### Cem - Crusher Rotor



Description :

**Crusher Rotor** 

Technical Data:

Wears Due to Impact& Abrasion.

Manufacturing with Hardox and Hard facing.

**Dimensions and Quantities:** 

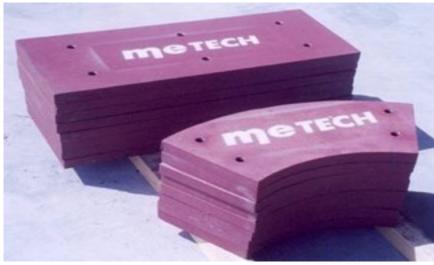
Various Sizes Depends upon the Capacity .

Service Life and Status:

Service life of 6 months.

Contact person

### Cem - Liners





Description:

**Crusher Liners.** 

Technical Data:

**Wears Due to Abrasion and Impact.** 

**Dimensions and Quantities:** 

Various Sizes and Shapes Depends upon the Make of the Crusher.

Service Life and Status:

3 months.

Contact person

### Cem - Crusher Liners





Description:

**Crusher Liners** 

Technical Data:

**Wears Due to Abrasion &Impact.** 

**Dimensions and Quantities:** 

Various Sizes Depends upon the Capacity.

Service Life and Status:

Service life 3 month.

Contact person

### Cem - Crusher & Chutes





Description:

Chutes.

Technical Data:

**Wears Due to Abrasion and Impact.** 

**Dimensions and Quantities:** 

Various Sizes and Shapes Depends upon the Make of the Crusher.

Service Life and Status:

18 months.

Contact person

## Cem - Screw Conveyor



Description:

Feeder Screw Conveyor

Technical Data:

Wears Due to Abrasion.

**Dimensions and Quantities:** 

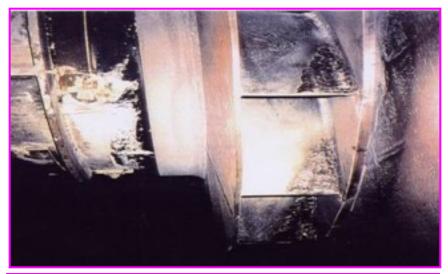
Various Sizes and Length.

Service Life and Status:

16 months.

Contact person

### Cem - Id fan





Description:

**FAN** 

Technical Data:

Wears Due to Abrasion & Erosion.

**Dimensions and Quantities:** 

Various Sizes Depends upon the Capacity.

Service Life and Status:

9 months.

Contact person

## Cem - Separator Ring





Description:

Separator Ring

Technical Data:

Wears Due to Abrasion & Erosion.

**Dimensions and Quantities:** 

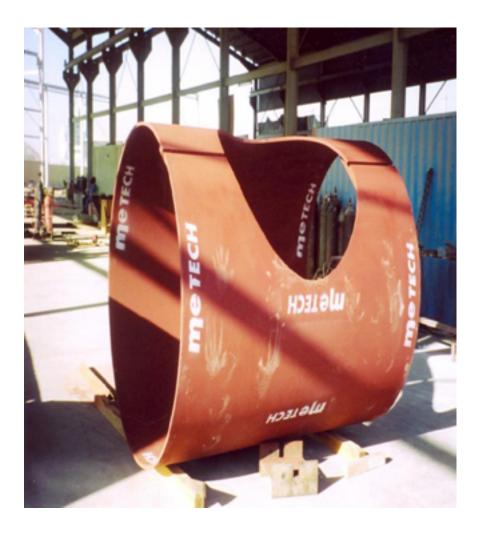
Various Sizes Depends upon the Capacity.

Service Life and Status:

In function since 9 month.

Contact person

### Cem - Chute



Description:

Chute

Technical Data:

Wears Due to Abrasion & Erosion.

**Dimensions and Quantities:** 

Various Sizes Depends upon the Capacity.

Service Life and Status:

In function since 5 month.

Contact person

## Con - Scrappers





#### Description:

Scrappers in Concrete Industry

Technical Data:

**Wears Due to Abrasion with Mild Impact.** 

**Dimensions and Quantities:** 

Various Sizes Depends upon the Capacity of Plant.

Service Life and Status:

In function since 4 month.

Contact person

## Cem - Moulds - Block Industry



Description:

**Block Moulds** 

Technical Data:

Wears Due to Abrasion & Impact..

**Dimensions and Quantities:** 

Various Sizes Depends upon the Capacity.

Service Life and Status:

In function since 8 month.

Contact person

### Cem - Circular Chute



Description:

**Aggregate Chute** 

Technical Data:

**Wears Due to Abrasion & Mild Impact.** 

**Dimensions and Quantities:** 

Various Sizes Depends upon the Capacity.

Service Life and Status:

In function since 12 month.

Contact person

### Cem - Skid bucket





Description:

SKID BUCKET

Technical Data:

**Wears Due to Abrasion & Mild Impact.** 

**Dimensions and Quantities:** 

Various Sizes Depends upon the Capacity.

Service Life and Status:

Service life 12 month.

Contact person

### Con - Scratcher I



To clean lateral walls in concrete mixer.

The rotation speed is around 30- 40 rpm. Paddles produced in cast iron with 500 HB. The temperature of work is around 20-25 °C. Cast iron is replaced by Hardox-500 in 25 mm.

Thickness 25 mm.

It works, customer repeat business. Cast iron is too brittle.

#### Con - Scratcher II





To clean lateral walls in concrete mixer.

The rotation speed is of 30 rpm. Paddles produced in cast iron with 500 HB. The temperature of work is around 20-25 °C. Cast iron is replaced by Hardox-600 in 25 mm.

Original thickness 23 mm. Dimensions 610 x 275. Weight aprox. 29 Kg. The mixer have one outside scratcher and or inside scratcher more smaller.

With Hardox-600 in 25 mm, the extreme doesn't break. The service life with cast iron is 350 hours and with Hardox-600 is 1.400 hours and it is still working.

### Con - Blades for moulds



HARDOX-600





Cutting edges to manufacture concrete moulds.

Hardox-600 replaced tool steel with a cement heat treatment of 1-3 mm on surface. The problem with this steel is when it is worn out this 1-3 mm, then this material get a black colour and dirty the concrete moulds.

The mould that are testing with Hardox-600 fixed 5 pieces of 474 x 224 x 12 mm. These pieces have been cut by Abrasive Water Jet Cutting.

The service life of the tool steel is 5-6 months, Hardox-600 have slightly the same service life and the same cost.

### Con - Paddles in mixer



03/03/2005

To mix concrete.

The rotation speed is around 25 rpm. The material that is used is Ni-Hard. But they have crack problems. The work temperature is around 20-25 °C. Hardox-600 in 25 mm replacing cast iron Ni-Hard.

Thickness 25 mm. The size of the paddles are 393 x 280. Cut by AWJ cutting. The weight is 14 Kg. The mixer fixed 20 insides paddles and 4 lateral scratchers.

Service life with Ni-Hard 330 hours. Working with Hardox-600 since June 2004.

## Con - Plates in ready mixer



To protect the inside walls of a ready mixer.

Hardox-400 in 15 mm replaced Xar-400.



It works. The customer repeat business.

### Con - moulds



To produce concrete vaults, to construct the outside wall of a house.

Hardox-400 in 10 mm is bended, like the picture below. After bending you need to cut one of size.



It works, customer repeat business.

## Con - Moulds



To produce moulds, that are putting after on the floor of the flats.

Hardox-400 in 4 and 5 mm.

Customer repeat business.

### Con - Screw





To transport concrete with a screw where it is needed. This machine is on a truck.

Hardox-400 in 6 mm on the hopper.

Hardox-400 in 5 mm on the cot of the screw.

Hardox-400 in 6 mm to protect the axel of the screw.





Customer is very happy. Repeating business.

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

#### **SSAB**

SE-613 80 Oxelösund, Sweden, T + 46 155 255 006 techsupport@ssab.com, www.ssab.com

