

SSAB



Cement & Concrete industry

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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)

Marc Simon , France

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 x 1800 = 345 kg)

Marc Simon , France

Cem - Primary crusher grating



Grating HARDOX 500

Weight 100 kg

Marc Simon , France

Cem - Crusher Screen

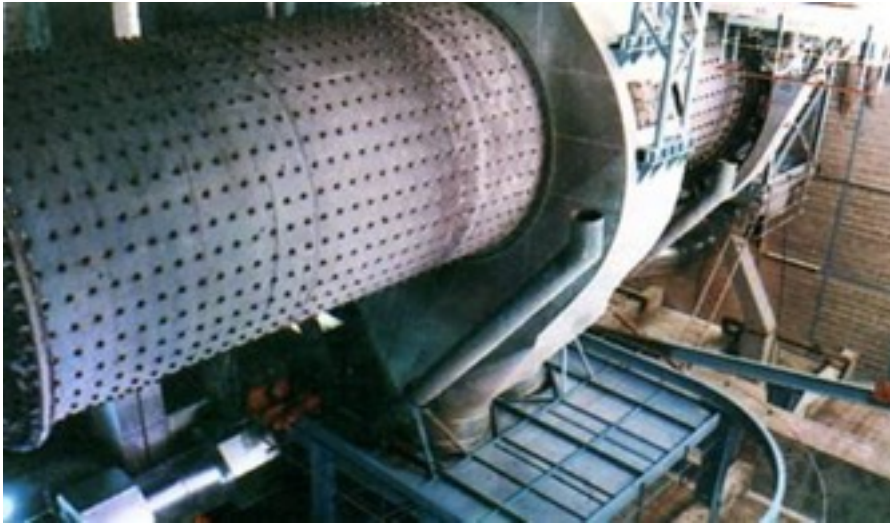


Crusher screen. HARDOX 400,

Thickness 20 mm, Weight 840 kg

Marc Simon , France

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.

Marc Simon , France

Cem - Storage & prehomogenization



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

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

Marc Simon , France

Cem - Elevator bucket



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

Weight 5 x 800 x 400 x 60 buckets
= 768



Marc Simon , France

Cem - Clinker grinder



Clinker grinder. HARDOX 500 or 600 for the walls.

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

Marc Simon , France

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

Marc Simon , France

Cem - Conveyors



Other type of chain conveyor or
Screw conveyor HARDOX 400

Marc Simon , France

Cem - Roller mill to grind clinker



The millstone Hardfaced



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

Marc Simon , France

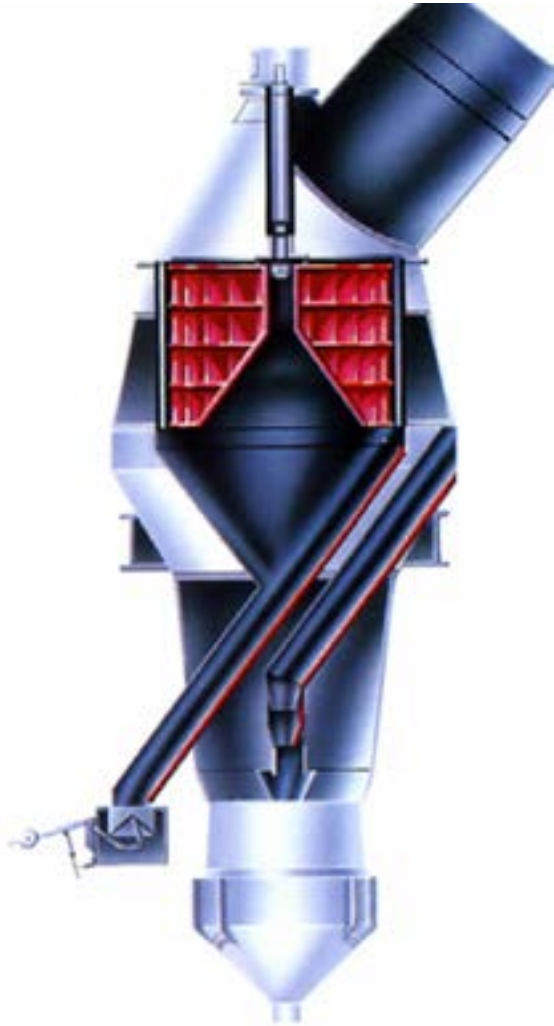
Cem - Roller mill for clinker



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

Marc Simon , France

Cem - Separator (Air classifier)



Separator some of a diameter of 4 meters.

Ceramic is mainly used Price: Euros 1000 / m². Also hardfaced material 6+4 mm

HARDOX 500 for the parts in red.
Parts of 10 x 120 x 700 = 6.7 kg.
Also Hardox 500 for repairs

Marc Simon , France

Cem - Hoppers and drain chutes



Hoppers and drain chutes. HARDOX 400.

Marc Simon , France

Cem - Transportation



Harbors. HARDOX 400 Chutes and Repairs.

Marc Simon , France

Con - Loader



Loader Bucket – HARDOX 400

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

Wear life: 2 to 3 years

Marc Simon , France

Con - Hopper



Hopper. HARDOX 400 for edge lining

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

Wear life 10 years.

Marc Simon , France

Con – Mixer Floor



Floor. HARDOX 500.

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

Wear life 1 to 2 years

Marc Simon , France

Con – Mixer Side Wall parts



Side walls HARDOX 400

Thickness 10 mm. Diameter 3 meter. Weight 370 kg

Wear life 3 to 4 years



Marc Simon , France

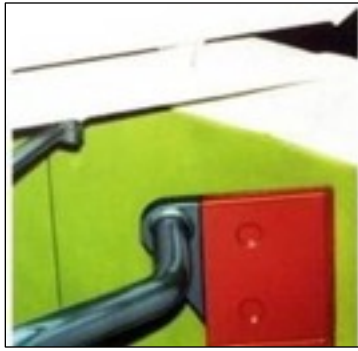
Con – Mixer paddle



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



Marc Simon , France

Con – Drain chute



Drain chute to load the trucks.
HARDOX 400

Thickness 10 mm, Weight 70 kg

Wear life 10 years

Marc Simon , France

Cem - Separator



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.

Ugo Marenzi – Italy

Con – Linear plates for armor



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



10 – 12 – 15 mm

Ugo Marenzi – Italy

Con – Linear plates for armor



CLINKER CRUSHER. HARDOX 500.

15 – 20 mm.

2 times per year - maintenance (6 month)

Ugo Marenzi – Italy

Con – Linear plates for armor



VERTICAL MILL for limestone /
marl – Repeating business
HARDOX 500

8 – 10 – 12 mm.

2 times per year – maintenance (6
month)

Ugo Marenzi – Italy

Con – Linear plates



CEMENT PIPE LINES –
SEPARATORS. Repeating business
HARDOX 500

6 mm.

2 times per year – maintenance (6
month)



Ugo Marenzi – Italy

Con – Linear plates for armor



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

20 mm.

Ugo Marenzi – Italy

Con – Linear plates



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

10 - 15 mm.

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

Ugo Marenzi – Italy

Con – Linear plates



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

2 times per year – maintenance (6
month)

Ugo Marenzi – Italy

Con – Valve for pumping element

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

35 mm. Cut with Water jet



Ugo Marenzi – Italy

Con – Part concrete loading sist.

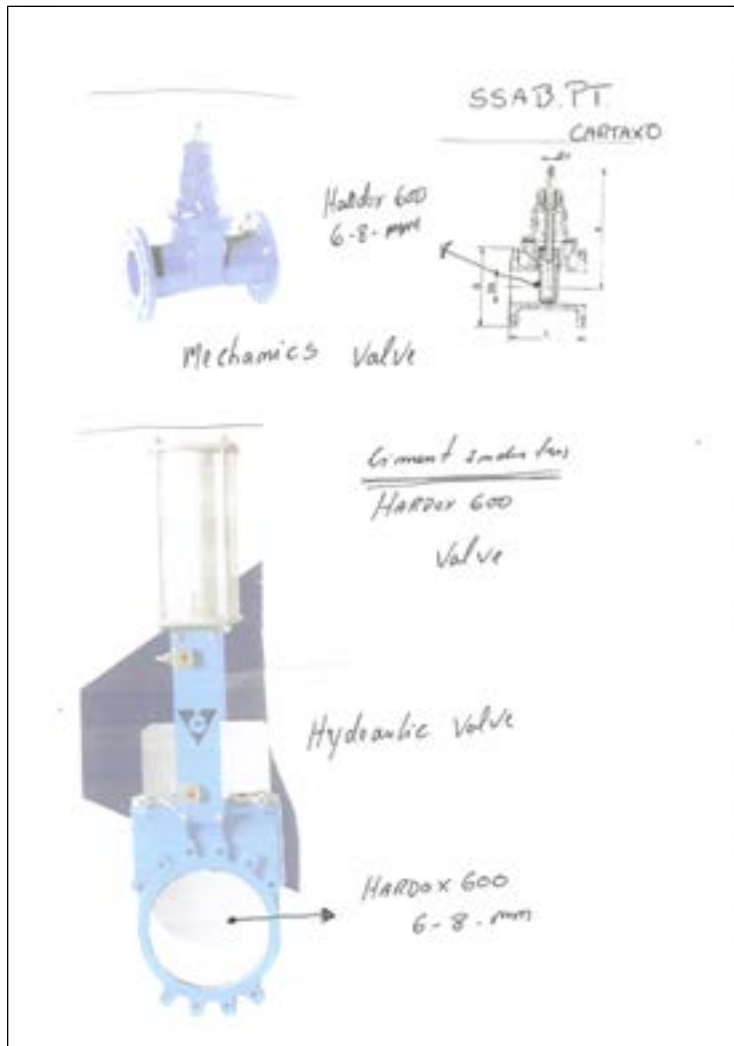


TRUCK - MIXER Replaced
WELDOX700E wrong app. From.
The O.E..M.– Repeating business
HARDOX 400.

4 mm.

Ugo Marenzi – Italy

Con – Valve



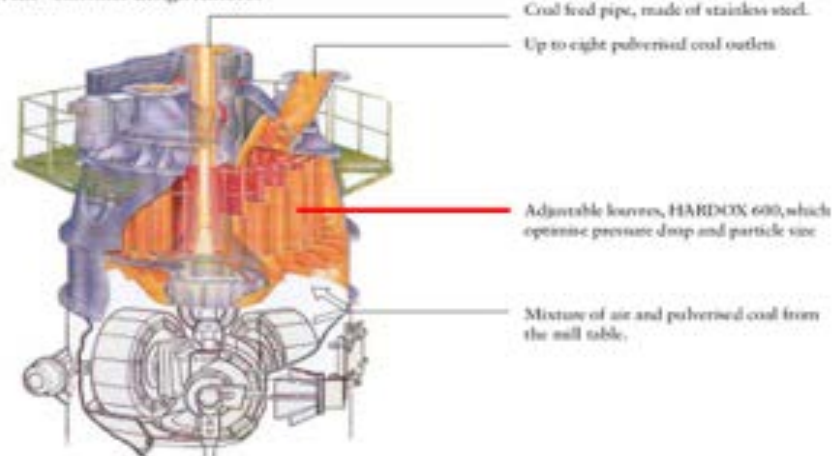
Valve in HARDOX 600

6-8 mm

Antonio Ramos, Portugal

Louvres in wind screen

HEP® classifier design features



Coal feed pipe, made of stainless steel.

Up to eight pulverised coal outlets

Adjustable louvres, HARDOX 600, which optimise pressure drop and particle size

Mixture of air and pulverised coal from the mill table.

FUNCTION

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

MATERIAL

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

ABRASIVE MATERIALS

Milled cement clinkers

LOCATION

Portugal, 1999

MACHINE MANUFACTURER

FL Smith

CONTACT PERSON

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Phone: +351-43-70 42 72

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



Con - Mixers



Concrete Mixer ELBA Model 2000G
Drum Type linings

Con - Mixers

- ▶ Concrete Mixer ELBA MODEL 2000G
- ▶ Mixing paddles



Con - Mixers



Concrete Mixer Liebherr Model
BETOMIX 2.0 S Bottom Linings

Con - Mixers



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



Hammers in Hardox 600

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 hopper

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 Conveyor



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 abrasive 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.

Iannis Paptsisis – Greece

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)

Iannis Paptsis – Greece

Cem - Screen feeder



About 1000 hours for the blades

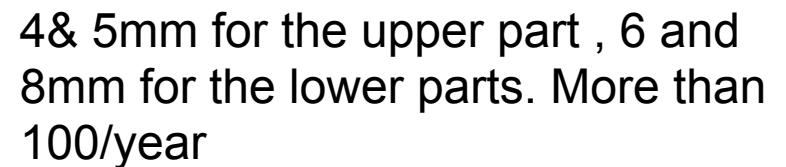
Crushed lime stone separation.
HARDOX 400 8mm(side plates)
12-25mm (blades)

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.

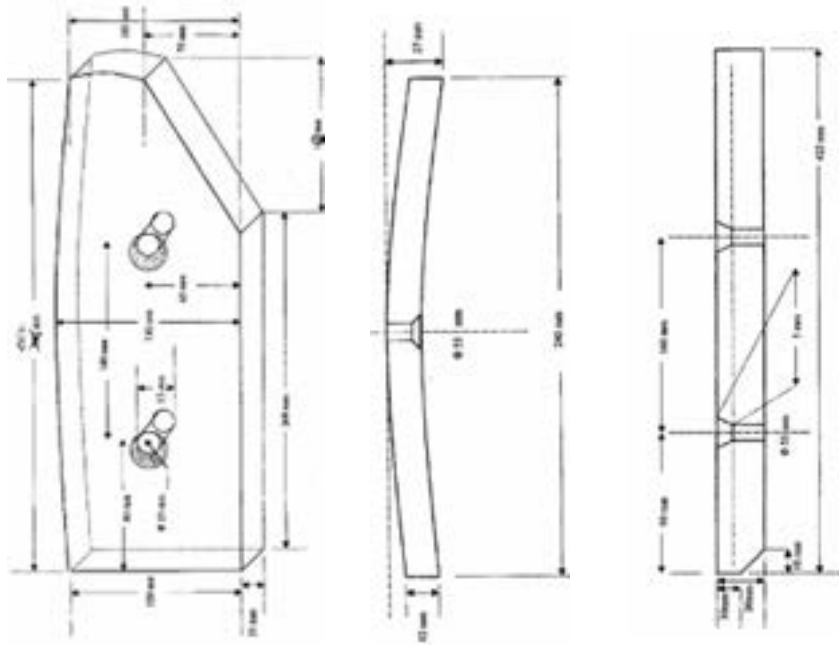
Iannis Paptsisis – Greece

½ shifts of 8 hours perday. Working in the open air. Most of the constructions are made S355



Fully replaced in 1-2 years depending on the material stored in the hoppers (gravel, sand)

SSAB



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

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

SSAB

Con - Mobile batching plant



Used by public works construction companies.

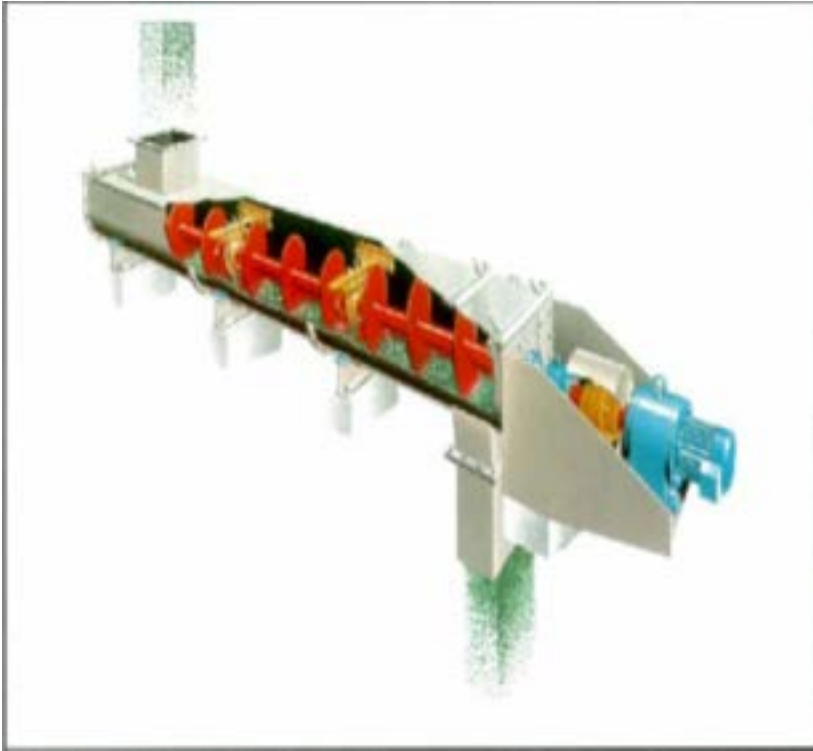
Working production: 60-65 cubic meters/hour

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

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

Iannis Paptsis - Greece

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)

Iannis Paptsis – Greece

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

D P Khullar - UAE.

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

D P Khullar - UAE.

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

D P Khullar - UAE



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 .

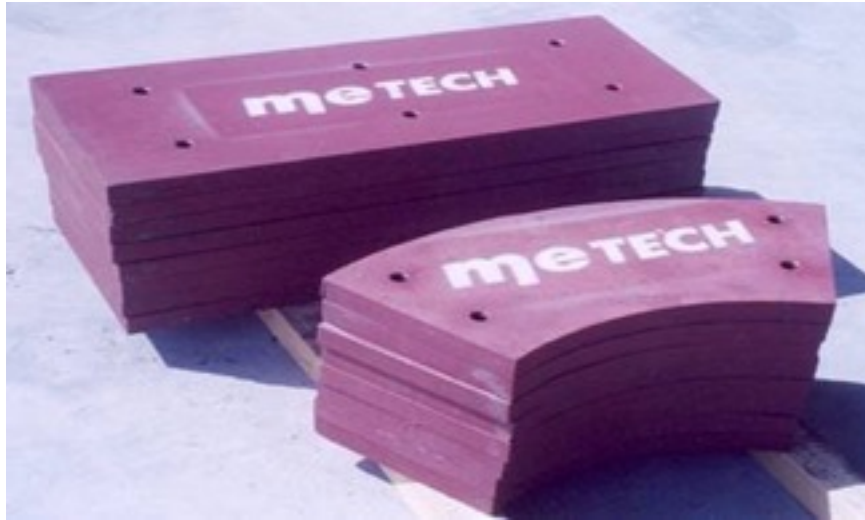
Service Life and Status:

Service life of 6 months.

Contact person

D P Khullar - UAE.

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

D P Khullar - UAE.

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

D P Khullar - UAE.

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:

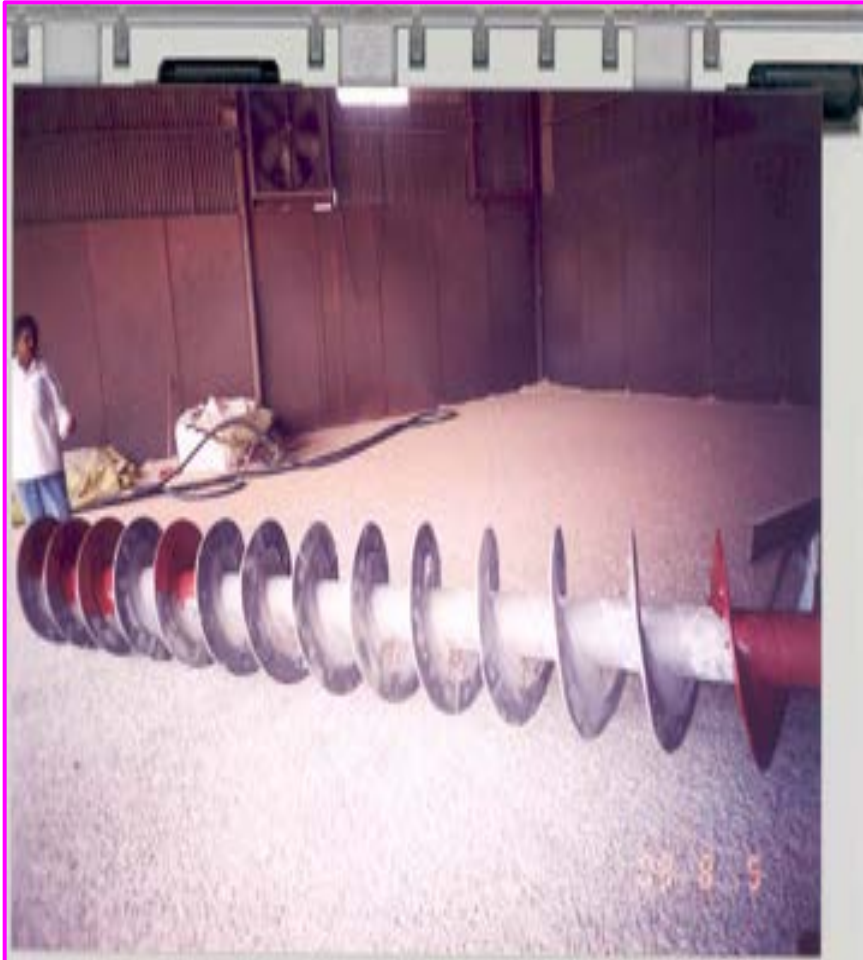
18 months.

Contact person

D P Khullar - UAE.



Cem - Screw Conveyor



Description :

Feeder Screw Conveyor

Technical Data :

Wears Due to Abrasion.

Dimensions and Quantities:

Various Sizes and Length.

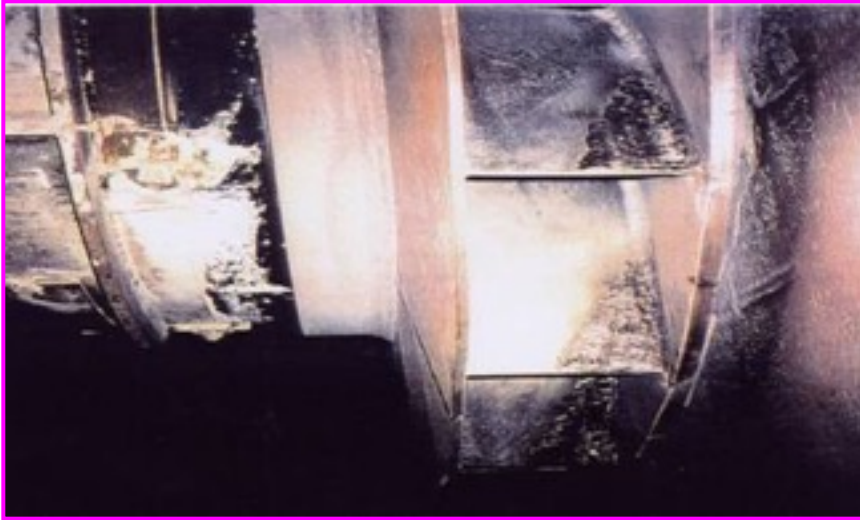
Service Life and Status:

16 months.

Contact person

D P Khullar - UAE.

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

D P Khullar - UAE.



Cem - Separator Ring



Description :

Separator Ring

Technical Data :

Wears Due to Abrasion & Erosion.

Dimensions and Quantities:

Various Sizes Depends upon the Capacity .

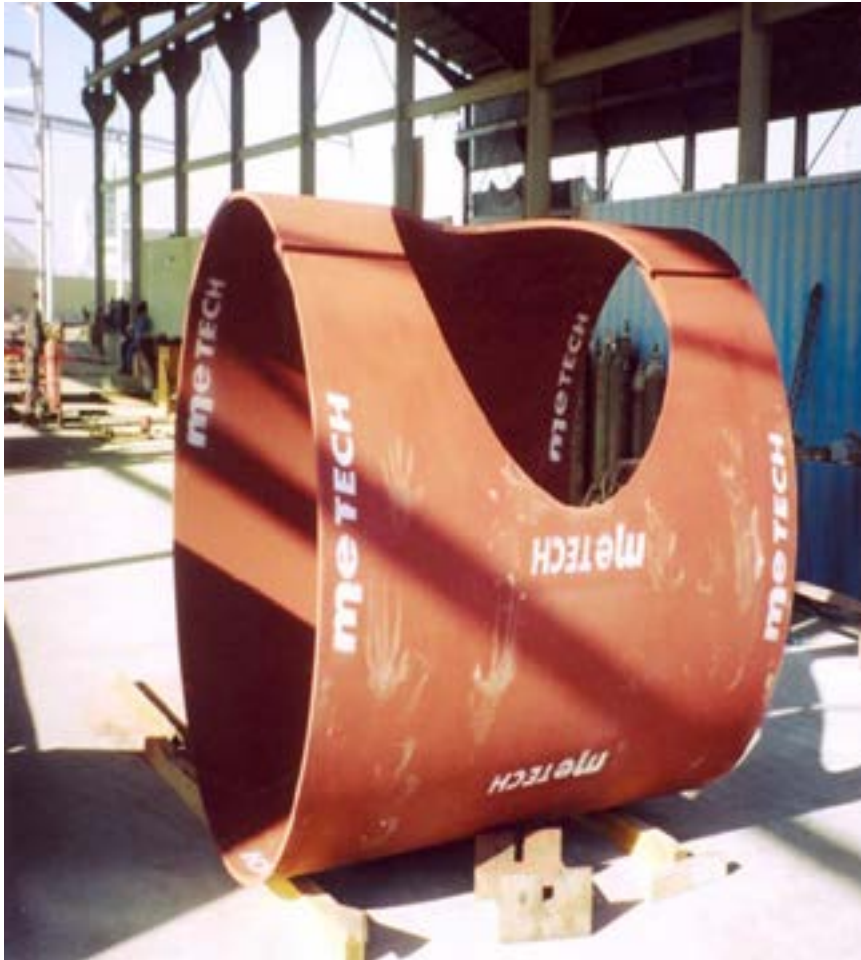
Service Life and Status:

In function since 9 month.

Contact person

D P Khullar - UAE.

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

D P Khullar - UAE.

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

D P Khullar - UAE.

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

D P Khullar - UAE.

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

D P Khullar - UAE.

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

D P Khullar - UAE.

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.

Juan Reyes (SSAB employee), Spain
Mobil: +34 609 90 48 00

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 one 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.

Juan Reyes (SSAB employee), Spain
Mobil: +34 609 90 48 00



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.

Juan Reyes (SSAB employee), Spain
Mobil: +34 609 90 48 00

Con - Paddles in mixer



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.

Juan Reyes (SSAB employee), Spain
Mobil: +34 609 90 48 00

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.

Juan Reyes (SSAB employee), Spain
Mobil: +34 609 90 48 00

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.

Juan Reyes (SSAB employee), Spain
Mobil: +34 609 90 48 00

Con - Moulds



MATERIAL: HARDOX 400
ESPESOR: 4 mm



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

Hardox-400 in 4 and 5 mm.

Customer repeat business.

Juan Reyes (SSAB employee), Spain
Mobil: +34 609 90 48 00

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.

Juan Reyes (SSAB employee), Spain
Mobil: +34 609 90 48 00

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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SSAB

