TOOLOX®

PREHARDENED TOOL STEEL

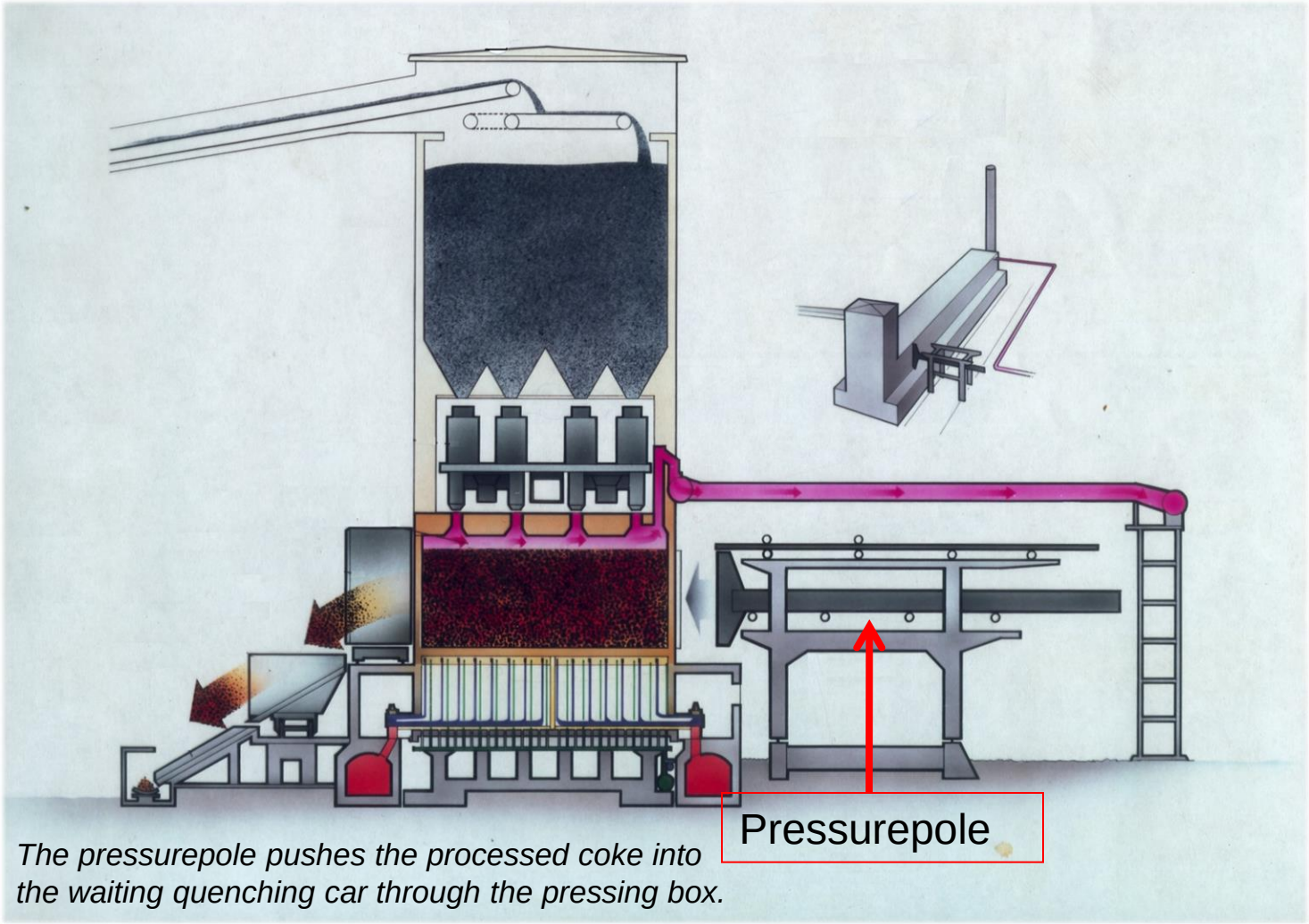
Toolox in cokeplant applications

Tomas Berglund

SSAB

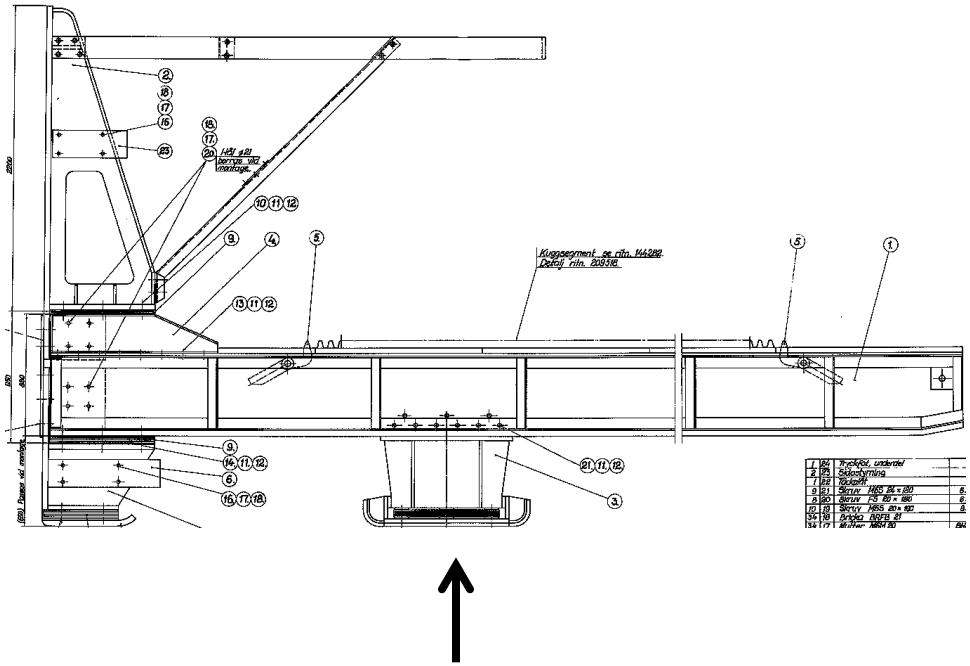
SSAB Oxelösund Cokeplant

Overview of machinery



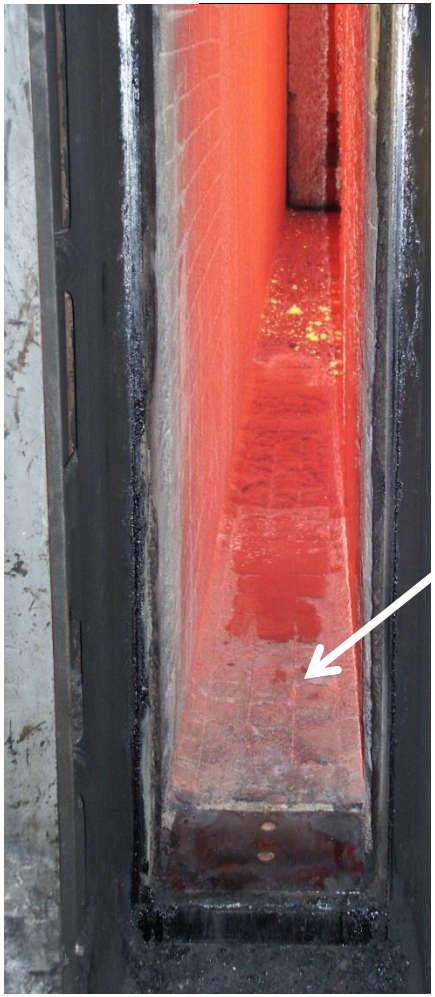
The pressurepole pushes the processed coke into the waiting quenching car through the pressing box.

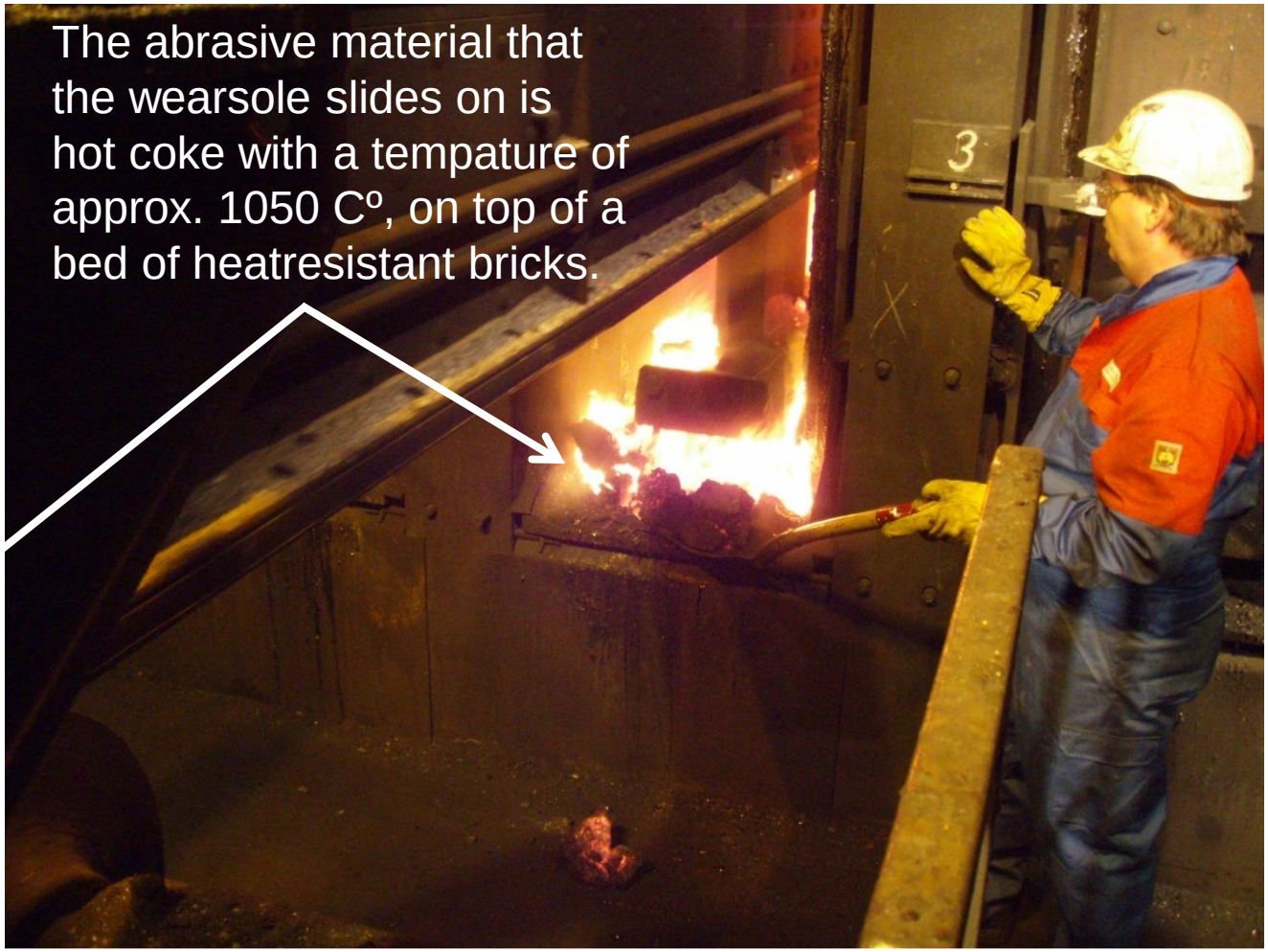
Wearsole for Pressurepole



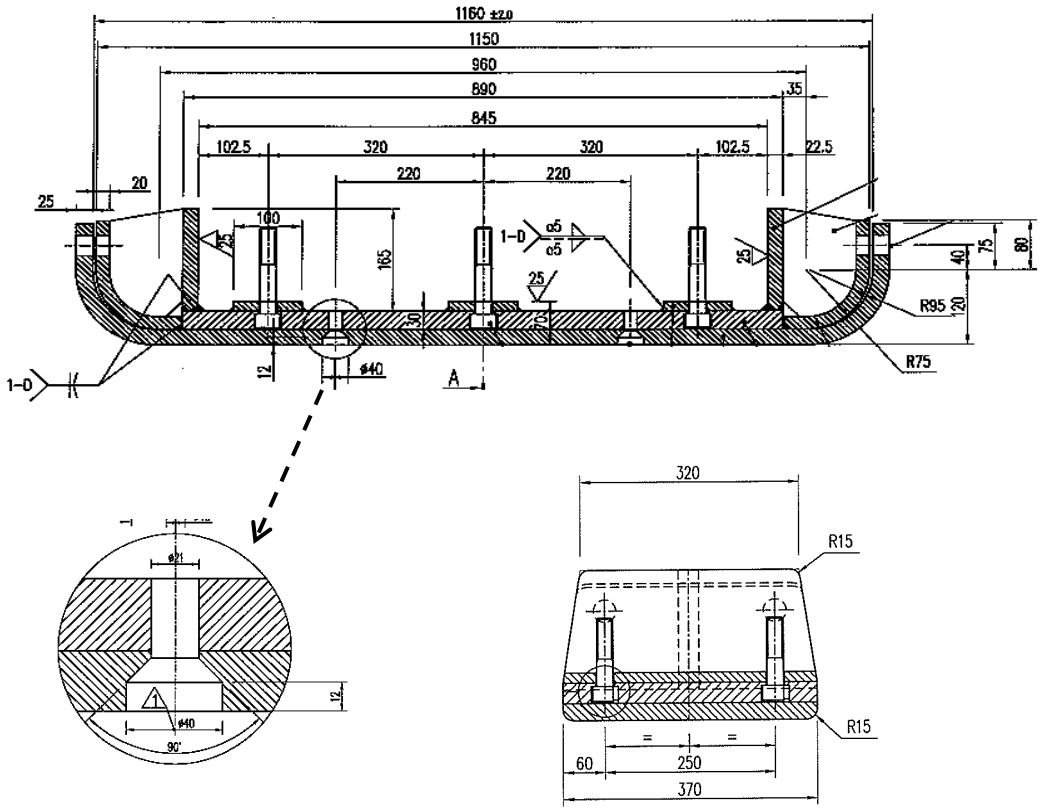
The weight of the pressurepole sits on a slider that slides on an interchangeable wearsole.

Hostile environment





Formating



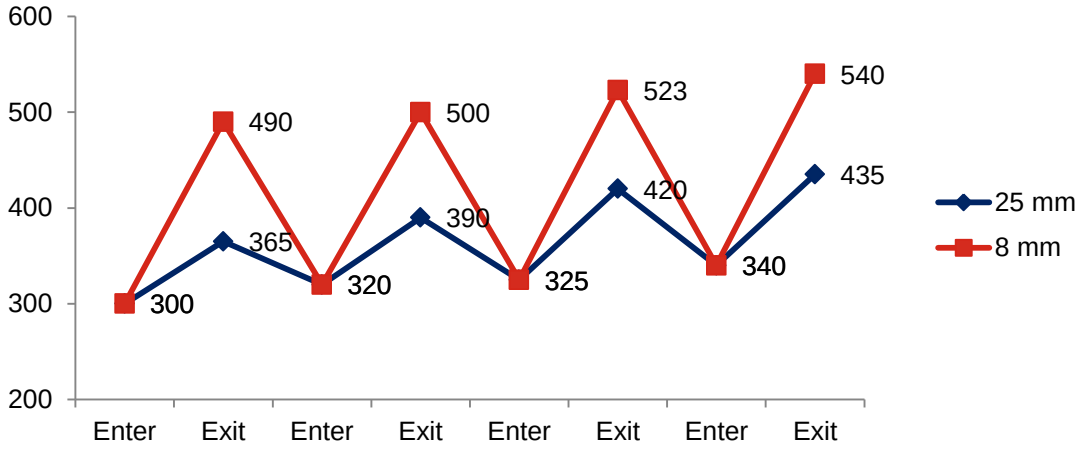
The present wearsole, made of Hardox 400, is cut, drilled and countersinked at SSAB Ox. mechanical workshop.

Because of the high bendingforce needed, the bending is performed by a subcontractor.

Working temperature

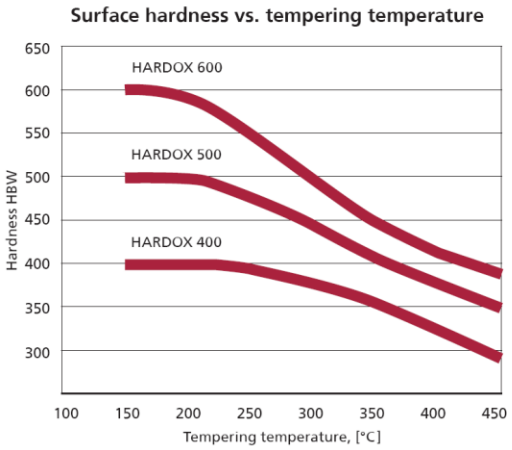
The sole is in the oven for 60 sec. per push and heats up to over 500 ºC during pushes.

With 120 pushes every 24 hours it is worn out in about 2 months.



Because of the high temperatures an upgrade within the Hardox series is not applicable.

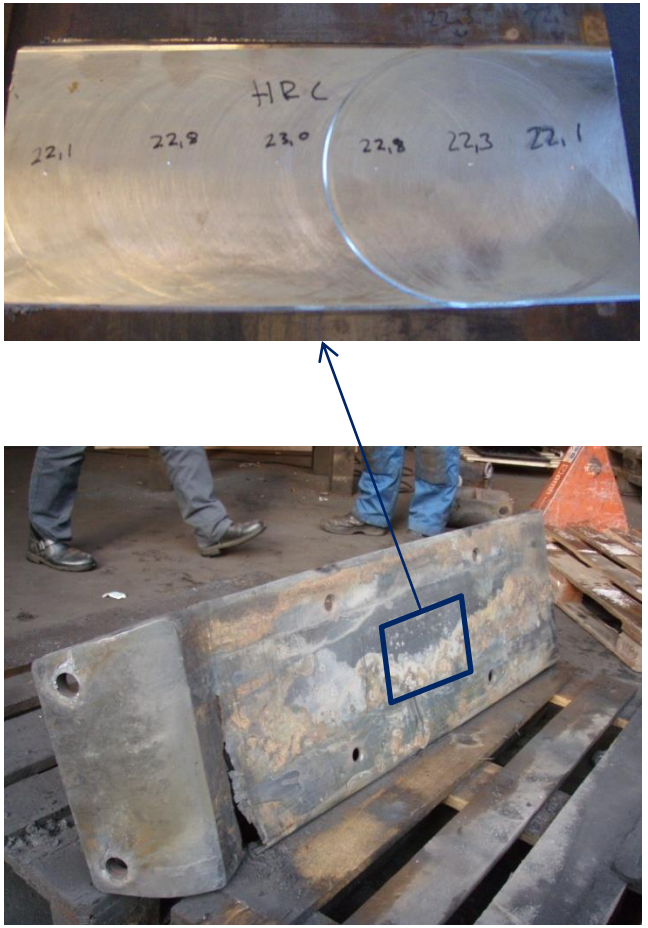
A possible candidate could instead be found in Toolox 44 Q/T at minimum 590 ºC.



Hardness vs. heat

Testing of the Hardox 400 plate after servicelife showed a decrease in hardness to 23 HRC ≈ 250 HB.
(milled 2 mm)

Testpiece taken from the center of the wearplate.

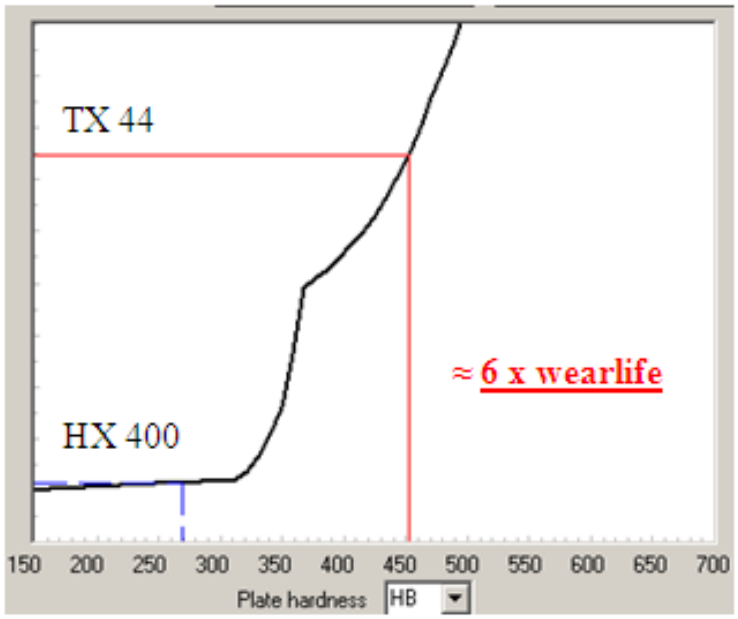


Wearcalc

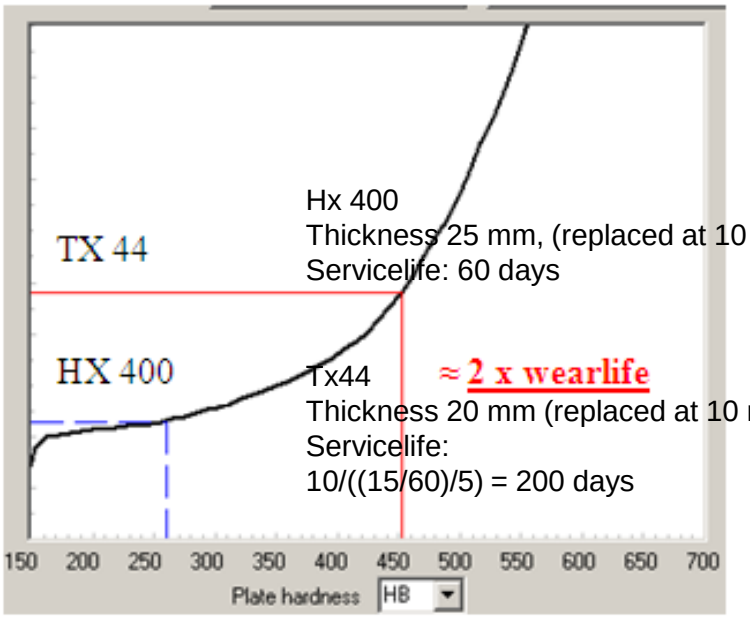
If we assume that the hardness of Hardox 400 is lost within the first trips through the oven and reduced to approx. 250 HB, while Toolox 44 retains its hardness of approx. 450 HB we get Wearcalc:

Coke 600 HV

50% / 50%



Coke 200 HV



Hx 400
Thickness 25 mm, (replaced at 10 mm)
Servicelife: 60 days

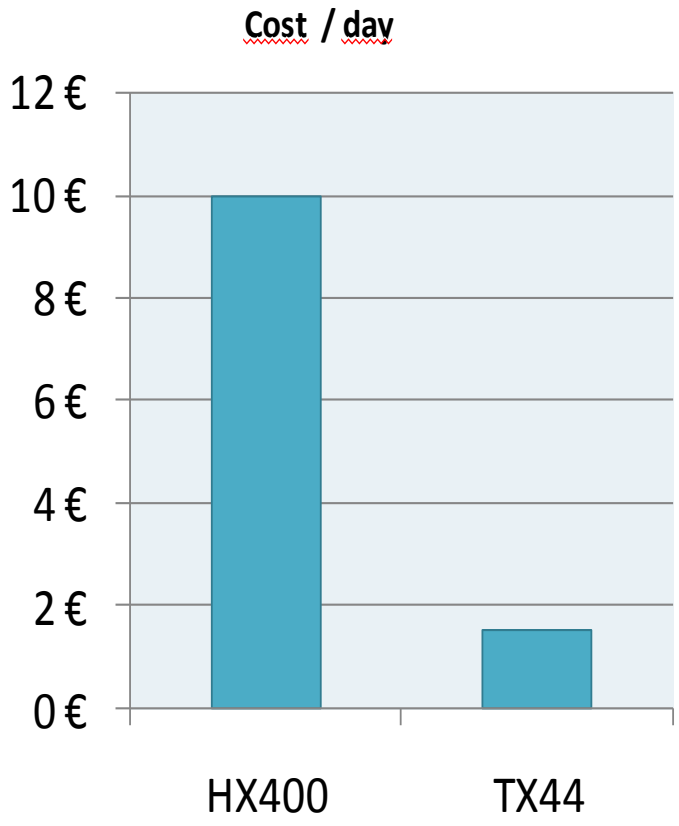
Tx44
Thickness 20 mm (replaced at 10 mm)
Servicelife:
10/((15/60)/5) = 200 days

Wearcalc assumes abrasive material sliding on plate. In this case the plate is sliding on the material.

Cost efficiency

- Improved servicelife according to *Wearcalc:*
  60 → 200 days
- Bendability:
  Reduced thickness allowing int. Formating.
- Higher price:
  1 500 € → 2 300 €

	HX400	TX44
Hardness	*250 HB*	450 HB
Plateprice Euro / ton	1 500 €	2 300 €
Ext. formating cost / ton	2 100 €	0 €
Servicelife / ton	360 days	1200 days
Thickness factor	1,0 factor	0,8 factor
Total cost / day	***10,0 €***	***1,5 €***
Cost exkl. formating	***4,2 €***	



Live testing

Testing in production starts during May 2009


SSAB