



Deployment of OpEx strategy in a mature company - Lessons learnt

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Presentation content

- Introduction to Glencore Nikkelverk
- What we did
- How we did it
- Some achievements
- Highlights and learning



INTRODUCTION TO NIKKELVERK...



Where are we?

GLENCORE

Metals and minerals

- Copper
- Zinc/Lead
- Aluminum
- Ferroalloys
- Nickel
- Iron Ore

Energy products

- Coal
- Oil

Agricultural products

- Grains
- Oils/Oilseeds
- Sugar
- Cotton

- 90 commodities
- Revenue \$177,4 bn (2016)
- EBIT \$ 3,9 bn (2016)
- 155 000 employees (incl. contractors)
- 90 offices and 150 operational plants
- More than 50 countries





Nikkelverk refinery is the final unit in Glencore's Integrated Nickel Operations



**Canadian Glencore
Nickel Mine Feeds**

**Urban mining:
Batteries, Catalysts,
Scrap Metals, Residues**

**Sudbury Smelter
Canada**

**Third party
Intermediates**
- Ni matte
- Residues

**Nikkelverk Refinery
Norway**



General information



- Established 1910
- Kristiansand, Norway
- Western worlds largest Nickel refinery
- ISO 9001, 14001, 50001 and OHSAS 18001
- 550 Employees
- Main products: Nickel, Copper, Cobalt





Who we are-video





WHAT WE DID...



Need for change

Too many injuries

Stronger competition

Low nickel prices



**World class
Refinery**

**Improved safety
culture**

**Dedicated and
competent team**

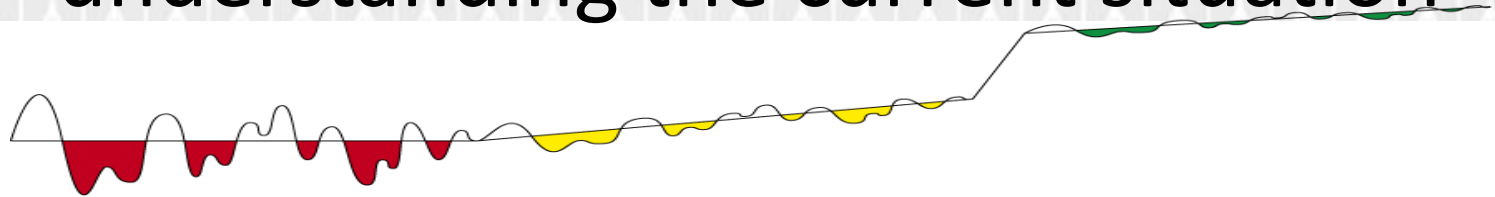
Example – firefighting



- Firefighting and instability
- Low degree of operator involvement
- Lack of systematic improvement work



Opportunities to improve performance, understanding the current situation





Introducing Nikkelverk Business System



Nikkelverk into the future!



Our NBS journey

Time period	Activities	Illustrations
2008-2013	Secure our “platform” <ul style="list-style-type: none"> Building stronger safety culture In-house competence in lean tools and methods 	
2013	Establishing “Need for change” <ul style="list-style-type: none"> Management ownership to NBS Union ownership to NBS 	
2014	Pilot phase <ul style="list-style-type: none"> Starting NBS pilots in the Nickel department NBS leadership training Visual targets - Nikkelverk Tracking and recognition of improvements 	
2016	NBS roll-out <ul style="list-style-type: none"> Development of NBS School Setting expectations for all departments and transfer of NBS ownership to line organization NBS principles being applied in all departments 	



NBS vs former BI initiatives

Nikkelverk Business System

Guiding principles

Enabling full participation in process stabilization and continuous improvement

Efficient use of proven tools and methods

Value stream mapping

IGS



ICCM



“LEAN”

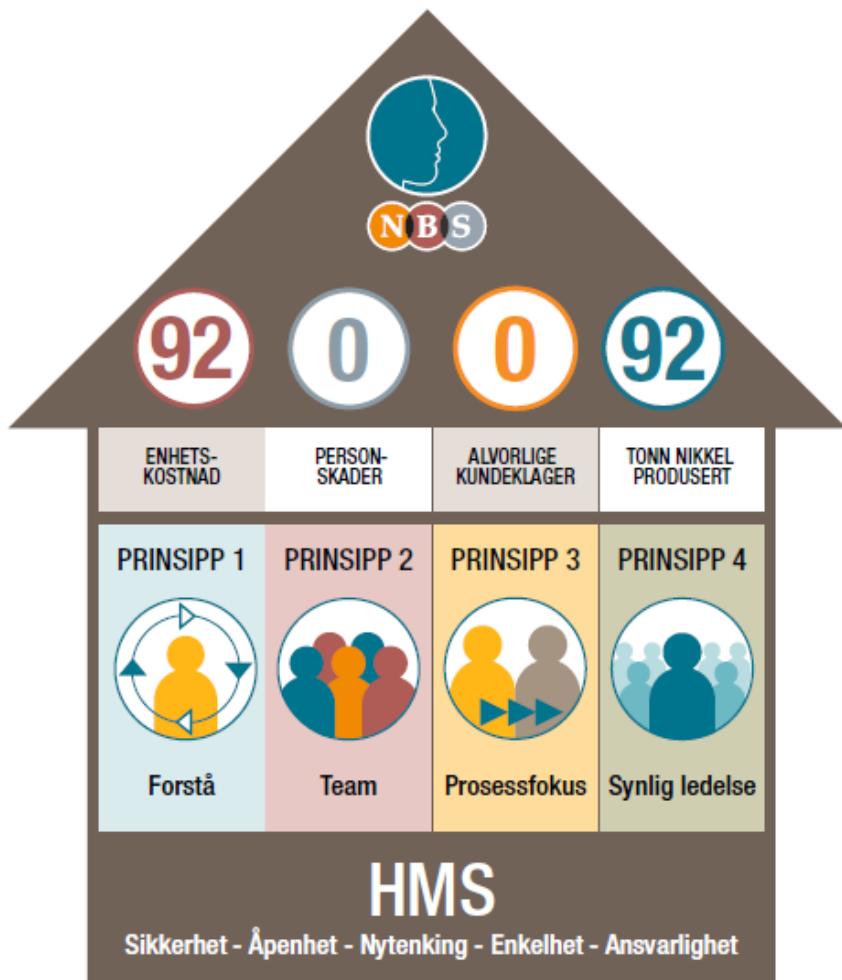


SS

A3



Nikkilverk Business System



Challenging and motivating targets

Key principles (*that are mandatory to follow*)

The foundation: safety culture and our values



HOW WE DID IT...



Application of NBS for our critical processes

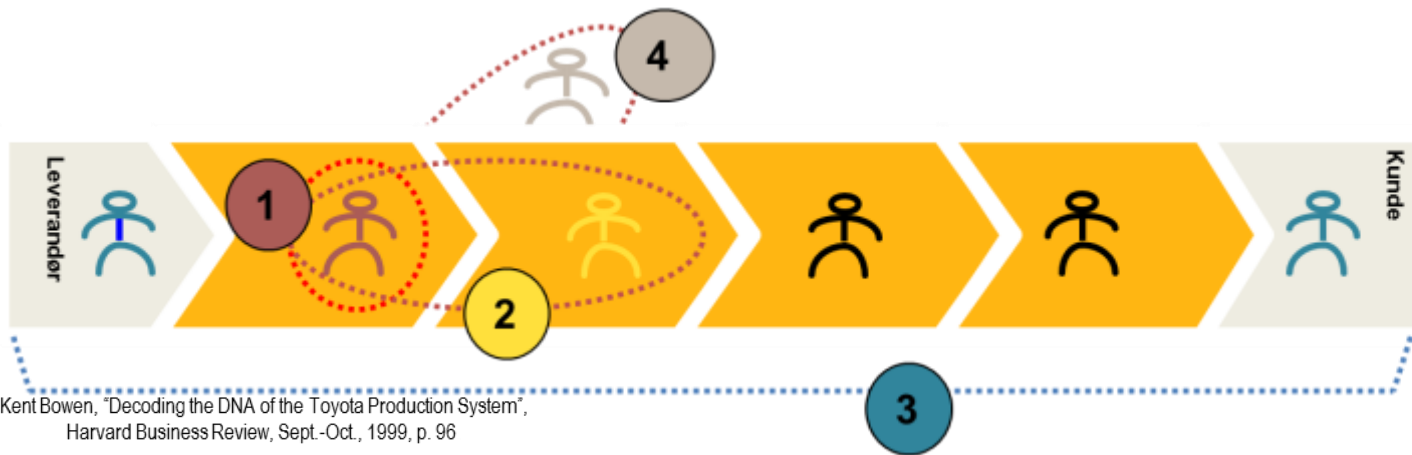


- 1 **Activity**
- 2 **Connections**
- 3 **Flow**
- 4 **Continuous improvements**

Basic design
of the system

Developing
the System

Standard
method
& execution



S. Spear and H. Kent Bowen, "Decoding the DNA of the Toyota Production System",
Harvard Business Review, Sept.-Oct., 1999, p. 96





Involve to drive performance

«Living» Standards



Continuous Improvement - Involvement



Customer/Supplier Connections



Process development



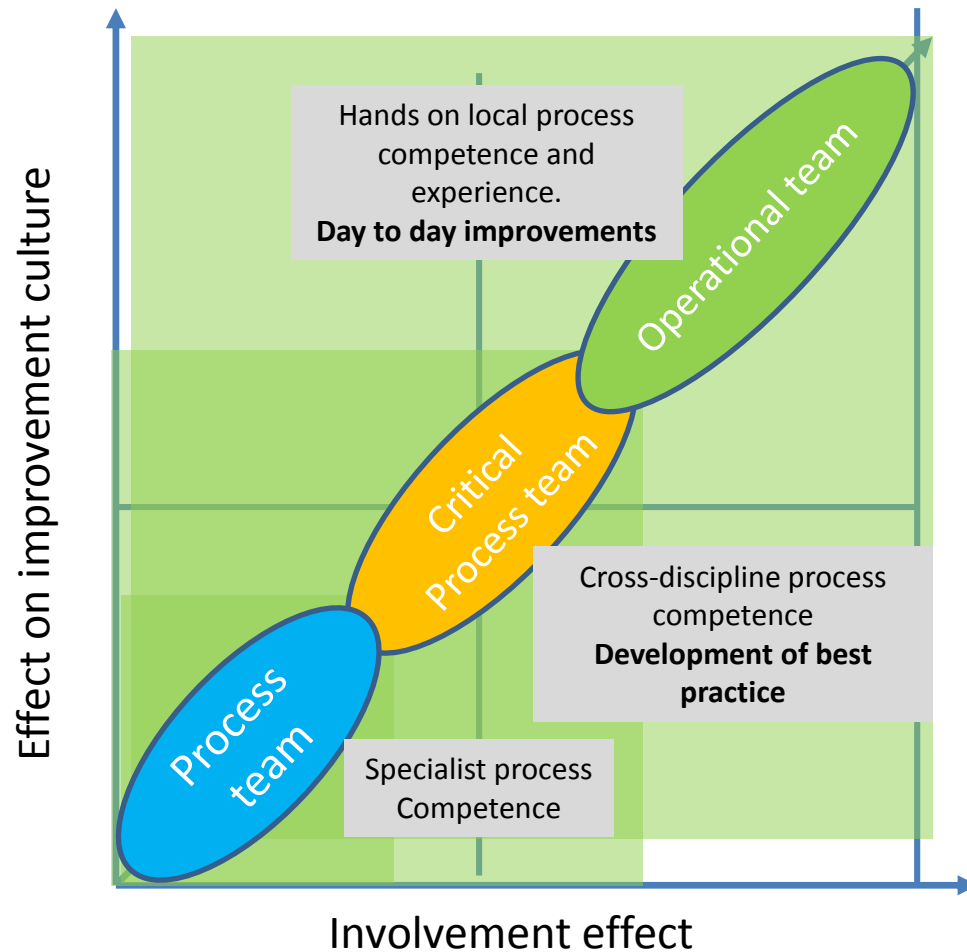
Living SOP's



Leadership Development – Practicing SOP observation in the Nickel Department



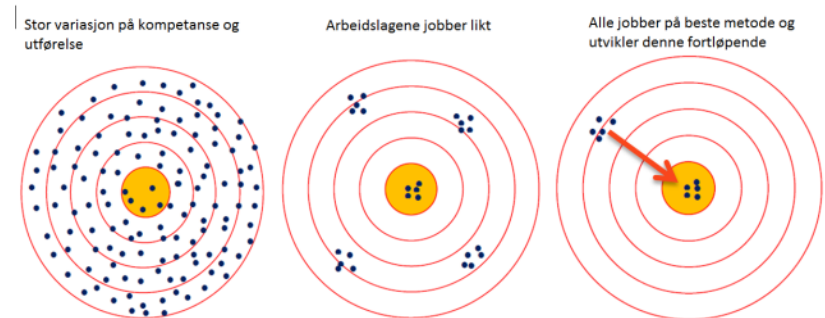
A clear structure and arenas for continuous improvement



Introduction of Critical Process Teams

Team organization

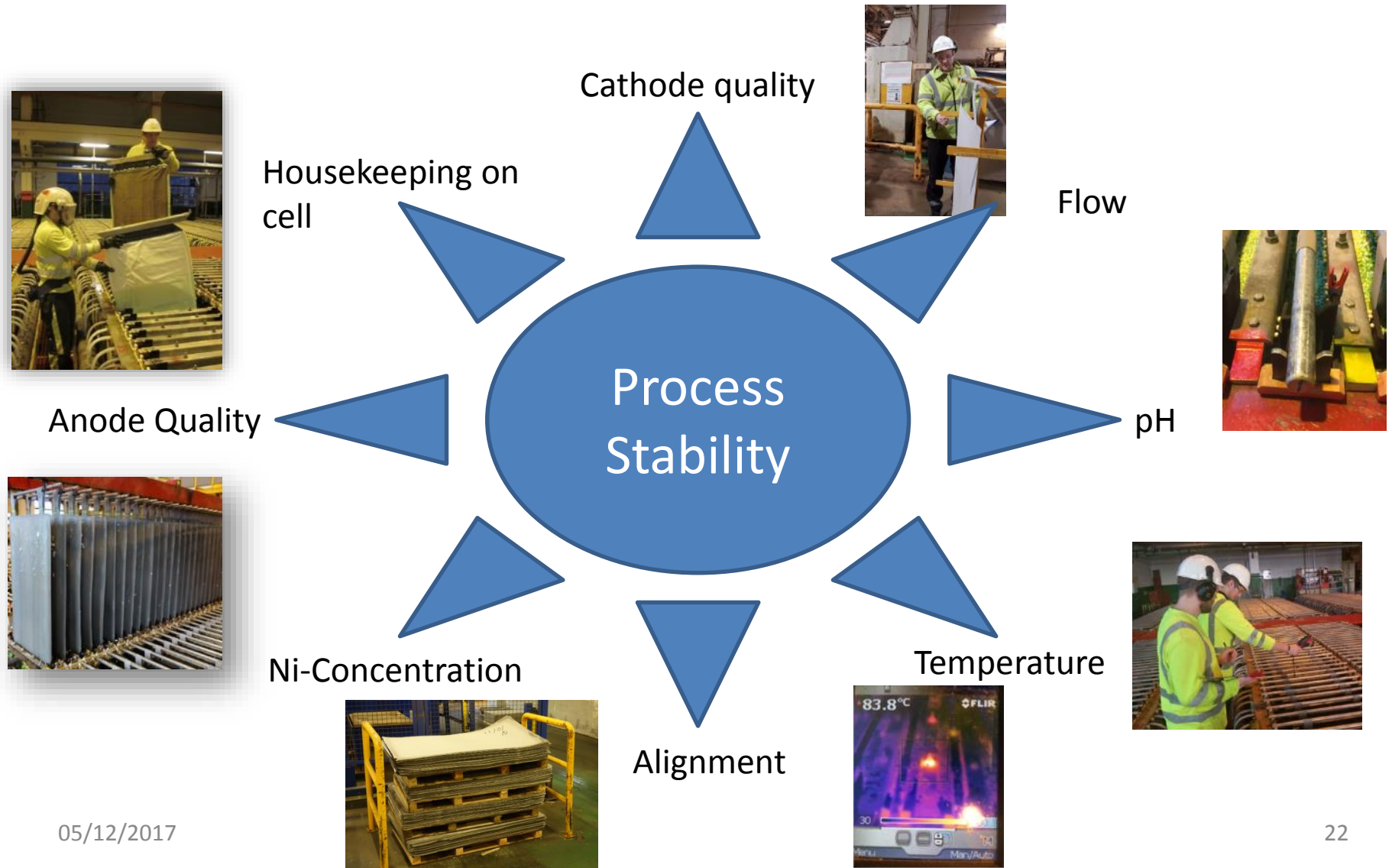
- **Shop floor participants (always)**
- Multi-discipline teams
- Supported by staff functions as needed
- Clear mandate, measureable targets and allocated resources
- Focus on improving SOP's for the «critical processes»





NBS

Focus on the details to get our processes under control





Improvements made by the Nickel Starting Team

BEFORE: many cathodes aligned by hand after insertion.



AFTER: Now cathodes are automatically aligned during insertion by the crane

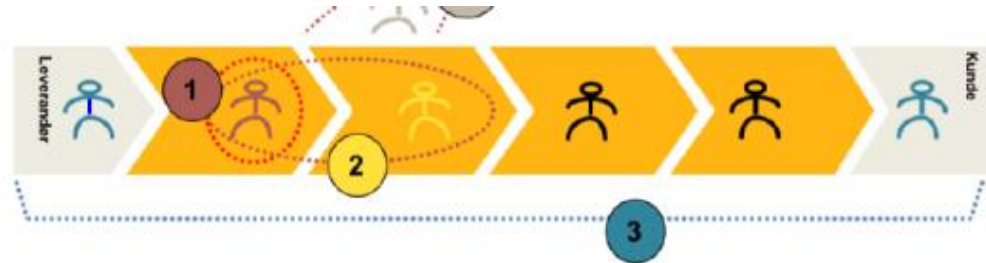


Better alignment is a critical factor for good current distribution and uniform thickness. Uniform thickness is critical to making a good starting plate for cathode production.

1 Million euros saved by improving critical drivers

Clear Customer/Supplier connections

- Visual
- Clear expectations
- Direct
- Measureable



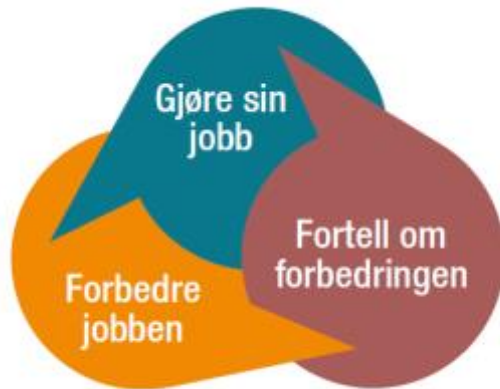
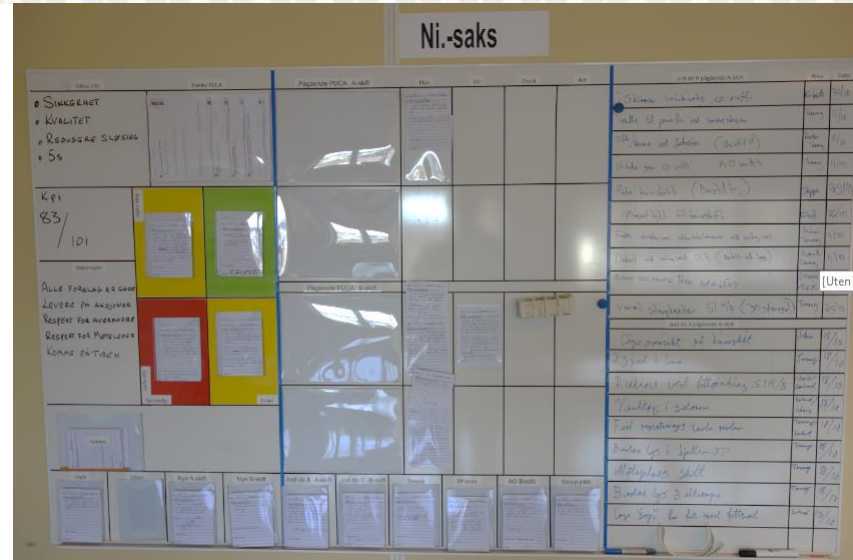
Funksjon:		Avklare forventninger mellom de aktuelle avdelingene		Avviksbehandling og ansvarshavende		M&E	
Ref./Dato/Signatur:		Oppfølging				<div> <div>KONTROLL</div> <div>1. TWB</div> </div>	
Versjon: 42 Dato: 08.04.2015 Elev: Magne Egebakken/Andreas H. Gulhaugen		Skift og Ni avd. kontrollerer om avvikene er oppfylt. Dette gjøres i partitasker og krysses av med grønt eller rødt på punktene.		Magne Egebakken og skiftsjefen er ansvarlig for at avvikene følges opp og sjekkes hver partitasker. Eventuelle avvik blir tema på KP team møtene og avklares der. Avvikene tas opp som en del av håndboksystemet og revideres etter gjeldende regler for håndboksystemet.			
Signaturer:							

24 hr drift EI-Rens

Nikkel elektrolysen

Uker i 2015:			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
M&E - elektrolyseutløst (Material)			Avviksbehandling		Ansvar																																																	
Elektrolyse utløst iht spec fra kjøreordre mhp Ni styrke og temperatur			Logges og følges daglig samt i analysesystem.		24h drift EI-Rens v/ Metallurg																																																	
Tiltak iht avvik fra kjøreordre utført?																																																						
Rett på Ni-3			Gult avvik (H/L1) på kjøreordre v/ side følges opp av hvert skift		24h drift EI-Rens v/ skift																																																	
Rett på Ni-4			Gult avvik (H/L2) på kjøreordre v/ side følges opp av hvert skift		24h drift EI-Rens v/ skift																																																	
Skumming utført iht prosedyre på 3012 tankene?			Avvik rapporteres til neste skift i loggbok og i skiftsjeflogg		24h drift EI-Rens v/ skift																																																	
M&E - utløst/utløst (Maskin)			Avviksbehandling		Ansvar																																																	
Sirkulasjonskontroll utført iht prosedyren?			ev. full rettes direkte til mekanisk og formann Elektrolyse (daglig) eller rapporteres til skiftsjef (utenfor vanlig arbeidstid)		24h drift EI-Rens v/ skift																																																	
I tillegg utføres Ni-elektrolyse sirkulasjonskontroll i dagaktuelle helsekontroll og følges opp neste dag			utbedres på stedet		Ni-avdeling																																																	
Tilstandskontroll på klorkasker i D-kontanter basert på analyserapport utløst tanker utført?			utbedres på stedet og kontrolleres på neste analyserapport		Ni-avdeling																																																	
Sikre at klorkassalærer er håndtert før arbeidsdagen avsluttes - ingen gule lampen			rapporteres til driftsdivisjonen Ni-elektrolyse		Ni-avdeling																																																	





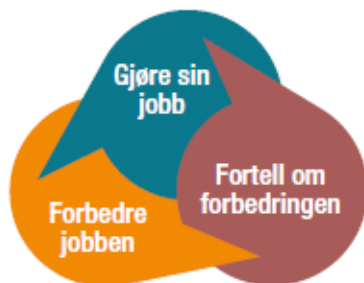
Improving is part of the job


- BUILD NEW CULTURE



Tell about the improvements

- NBS News (every week)
- Improvement of the month (every month)
- Improvement of the year (Leader- / Union meeting every year)



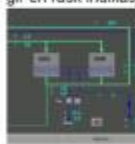



Sjøvanns-siler

Vi har sett nærmere på

Erfaringene man gjorde seg med H2SO4 var så gode at man valgte til ny kjøler 6323A

Rengjøring av kjølere er en jobb Erfaringene man har gjort seg med kjølere har vært et økende press på skifte av kjøler som reell seleksjon gir en rask indikasjon på hva som måtte gjøres for å gjøre de skjell-gjørene de til bruk i platevevskjell-fil

92

Månedens forbedring i oktober

I oktober ble det registrert 142 små og store forbedringer. Vi har et mål om 2000 gjennomførte forbedringer i 2016. Til nå har vi registrert 1006 forbedringer.

Registreringene for oktober er blitt gjennomgått av Nils Gjelsten, Harald Eik, Kai Johansen og Anne May Hagen.

Gruppen ønsker å fremme **Analyselaboratoriet og Elektro og Automasjonsavdelingen** som gode veivisere for bra forbedringsarbeid på Nikkelverket!



Analyselaboratoriet: Analyseprogram for sporelementer i råstoff

Det er laget nytt analyseprogram for sporelementer som skal kjøres på ICP. Flere har vært involvert i arbeidet og forbedringstavl og PDCA har vært brukt for å følge opp fremdriften. Den nye metoden gjør analysen mer effektivt og enklere. Et godt forbedringsprosjekt med god involvering og fjerning av slusing!

Ståle, Åse Aud, Hele, Turid og Cathrine er veldig fornøyd med resultatet av forbedringen.

Elektro/Automasjon: Forbedring på stiger og utlånstutstyr

Teamet har jobbet grundig med å utvikle en betydelig forbedring på sin SS standard rundt utstyr de har. Flere har vært involvert og gjennom denne jobbingen så har man fått god oversikt over stiger og utlånstutstyr. Det er også utviklet ett Access database for å følge opp utlån, kontrollrutiner og feil på utstyret. Aleksander Viken forteller at forbedringen gjør det lett å se hva man har tilgjengelig, hvor utlånt utstyr er og det synliggjør behov for mer utstyr.

Vi gratulerer med god NBS-jobbing.
Forbedringene er smarte og bidrar til vårt mål!

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NBS-Senteret

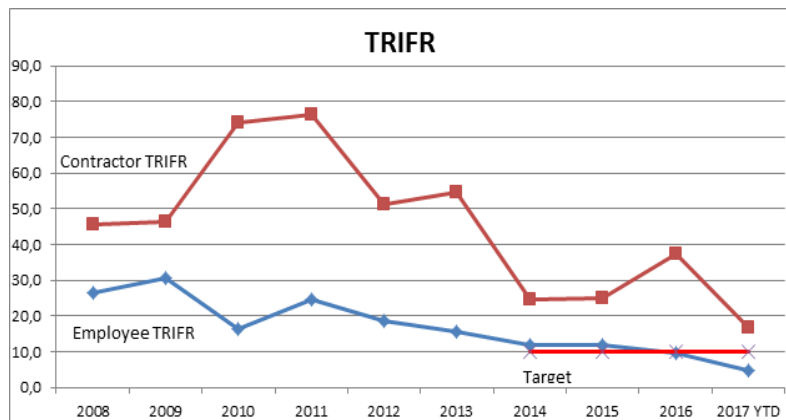
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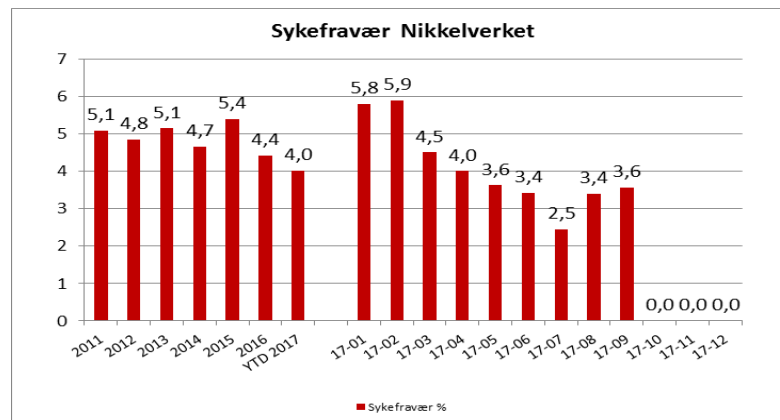
SOME ACHIEVEMENTS



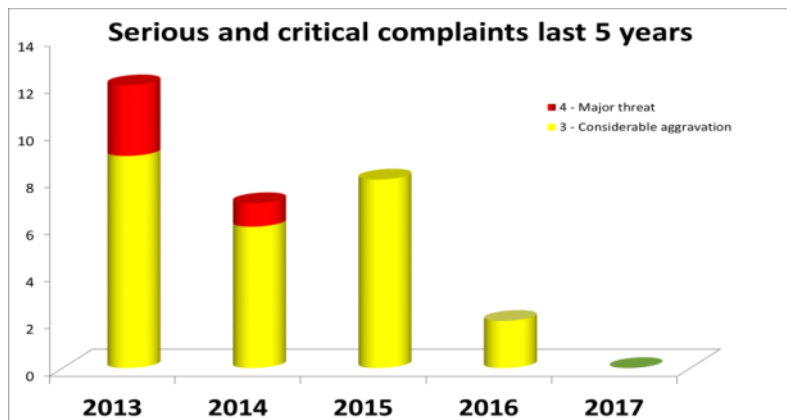
NBS is giving tangible results



NBS and safety go hand in hand



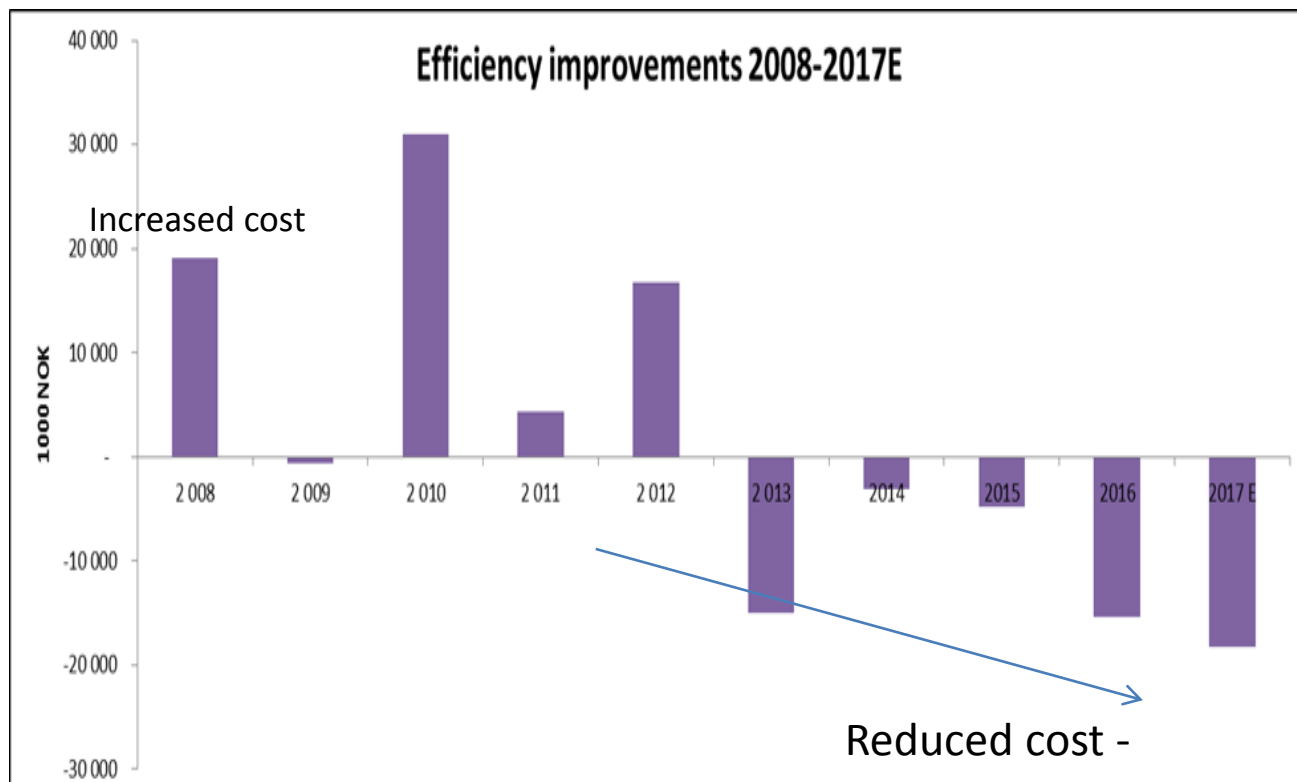
Improved working environment and well-being



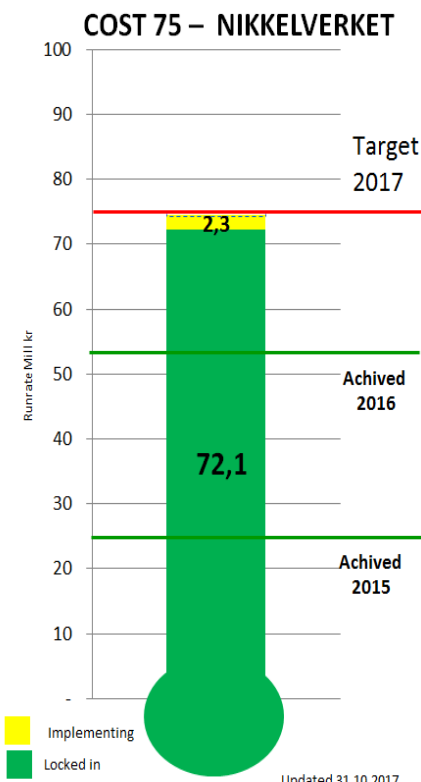
Large quality improvement



Improving EHS and quality have a big impact on cost



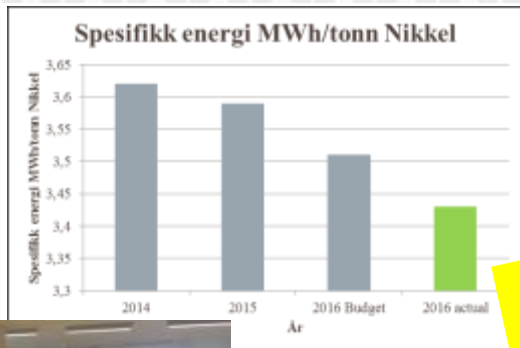
Note: Actual saving adjusted for production and price adjustments



Reported improvements



Other results...



Energy saving in Nickel tankhouse: 18 GWh/y



600-1400-2500
2015-2016-2017
Registered improvements
Run-rate value: 10 MUSD



30 kaizen boards

ENOVA

Total of 50 MUSD in committed funding



NBS Academy

Production record ! 92,7 kton Ni
Zero harm in Nikkel tankhouse
2015/2016



Agder competence Award



New SOPs

Årets forbedring



(Fra venstre) Frode Solheim, Werner Abrahamsen, Anne May Hagen og Tone Josefsen

Improvement of the month
Improvement of the year



Quality Director Harald Eik
Designated as the year's quality leader 2016



NBS – People development!

- Only **people** can identify and **solve problems**
- Continuous improvement and problem solving – great way to develop people
- More problem solvers = more problems solved 😊!
- Learning organization – competent and motivated people





NBS School, foundation for training



5th class now being trained

Participants from all
organization levels

5 days (3+2) School sessions



HIGHLIGHTS AND KEY LEARNINGS



Key learnings - Highlights

- Securing **commitment** from union and **management** was time well spent
- **Pilots** for demonstrating NBS extremely useful
- Investing time in **sustaining new structures** was a key success factor for building improvement culture
- **NBS training** was important to build momentum
- **People-involvement, visibility** and **ownership** are key



What would we have done differently?

- Comment from Nickel tankhouse Superintendent:
 - «**We should have started earlier!**»
- Could have invested more time with **middle management**
 - Leadership training – leader as coach
 - NBS understanding in practice
- More **coaching** in the implementation phase
- Stronger effort earlier on cascaded **targets**
 - Increase understanding for the **need to change**
 - **Management by objective**, with a regular «*target resetting process*»



NBS = Cultur Change

Understanding , motivation, mastering

Culture and behaviour



Competence and involvement

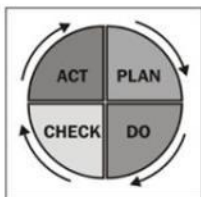


Culture :
Continuous Improvement
Involvement
Precision
Discipline



- *Do the Job*
- *Improve the job*
- *Communicate the improvements*

Principles , methods and tools





There will be many challenges on our way to operational excellence

to succeed we must make an effort!





What does it mean to “change a culture”?



It's like making a new path
in the woods:

We have to walk it many
times...

...and let the old one grow over!

(Quote from Bjarne Berg Wiik)

Thank you very much for your attention!