Frie innlegg

Kjemisk cocktail uten kontroll –

om behov for merking av diffuse utslipp fra smøresystem, tanker og prosessanlegg.

Norsk Yrkeshygienisk Forenings Årskonferanse,

Scandic Park Sandefjord 30. okt. – 1. nov 2017

Halvor Erikstein
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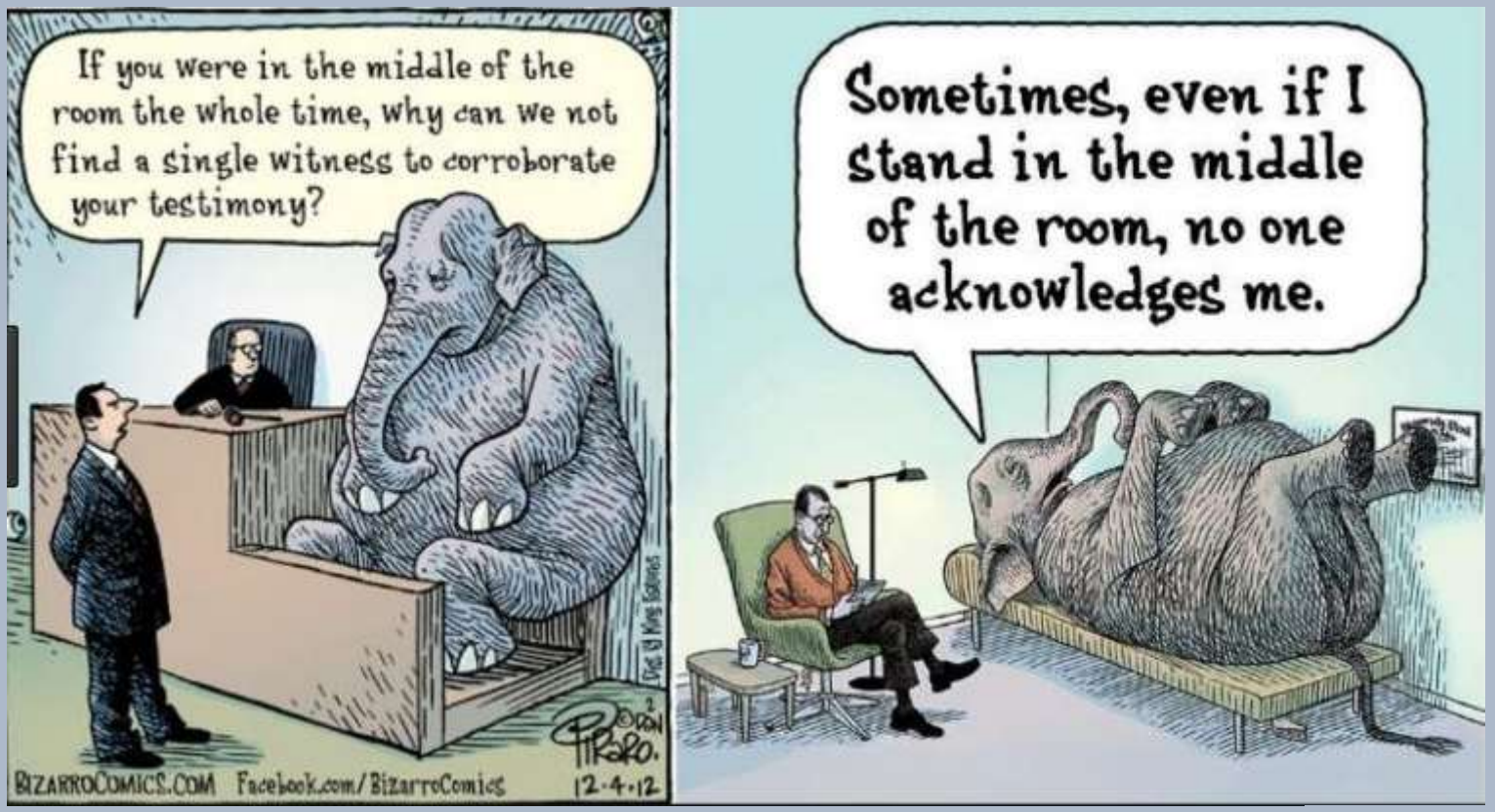

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Den hvite dampen og den vonde lukten

Kan karakteriseres som utslipp av en kjemisk cocktail.

- Smøroljer
  - Nedbrytningsprodukter fra slitasje
  - Termisk dekomponering
  - Omdanningsprodukter pga temperatur
  - Organofosfatforbindelser
    - Nye organofosfatforbindelser som oppstår pga høy temperatur og reaksjoner med baseoljen +++
- Tetningsoljer
  - cocktail av; benzen, n-heksan, BTEX, lette og tyngre hydrokarboner++++++
- Sloptanker
  - Cocktail fra mulige kjemiske reaksjoner, H_2S og andre sulfidforbindelser fra mikrobiologisk +++++

A3 plakat. Sendt ut på plattformer

Om merking av utslippspunkt: Den hvite dampen og den rare lukten. Det du ikke vet kan du bli syk av

Tekst og foto: Halvor Erikstein

Over alt på en plattform eller et landanlegg er det avlufting (venter) fra maskiner og prosessutstyr. Det er gjort lite for at det skal bli tatt hensyn til slike forurensningskilder selv om det som forurenser kan gi alvorlige helseskader. Kanskje er det avlufting fra tetningsoljene til gasskompressorene, smøresystemet til turbinene, avlufting fra tanker eller avsug fra en eller annen prosess hvor det benyttes kjemiske forbindelser. Ventene er gjerne plassert med utblåsing i «ubemannede områder» og det er alltid en vind som fjerner forurensningen. Det er lite tatt hensyn til at også slike områder trenger inspeksjon og vedlikehold, og det medfører et lengre opphold i forurenset område. Det kan også være at utblåsingene skjer på områder som en må passere til og fra arbeid.

Halvor Erikstein

Hva kan komme ut fra «ventene»? Der det benyttes gasskompressorer med tetningsoljesystem må det ventileres store mengder av eksempelvis den meget kreftfremkallende forbindelsen benzen. Det er i tillegg mange andre helsefarlige forbindelser som kan utsette omgivelsene for skadelig eksponering. Fra turbinene luftes det ut ulike nevrotoksiske organofosfater samt en cocktail av forbindelser fra den syntetiske smøreoljen og nedbrytningsprodukter.

Regelverket er helt klart når det gjelder kartlegging av kjemisk eksponering. I Aktivitetsforskriftens §38 «Kjemisk helsefare» vises det til arbeidsgivers pliktet: Arbeidsgiveren skal sikre at helseskadelig kjemisk eksponering ved lagring, bruk, håndtering og avhending av kjemikalier, og ved arbeidsoperasjoner og prosesser som avgir kjemiske komponenter, unngås, jf. innretningsforskriften § 15.

Vi mener mangelen på kartlegging av utslippsmengder og mangel på risikovurdering av kjemisk helserisiko hvor det også blir tatt hensyn til de reelle arbeidsoppgavene i et område, er uholdbar. Når en ikke kjenner sammensetningen og konsentrasjonen av arbeidsmiljøforurensningen betyr det at en heller kan vite hva slags vernetøy som gir rett beskyttelse. Vi mener at alle avluftningspunkter må merkes og volum av utslipp og konsentrasjon av forurensingen bli kartlagt.

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TOXICOLOGY BRAIN, POLLUTION, CELLS

Nano air pollutants strike a blow to the brain

Scientists track super-small pollutants that are inhaled into the brain

Air pollution soaks Mexico City in haze. Breathing in this pollution doesn't just harm the lungs; new studies show it also can damage the brain.

Cough. Wheeze. Gasp!

Those sounds echo through the streets of polluted cities. Brown clouds made up of noxious gases, dust, soot and even finer particles hang over buildings and hug the

Black soot spews from a truck. People can inhale these fine, black-carbon particles deeply into the lungs, where they can trigger inflammation.

CHMIEL/ISTOCKPHOTO

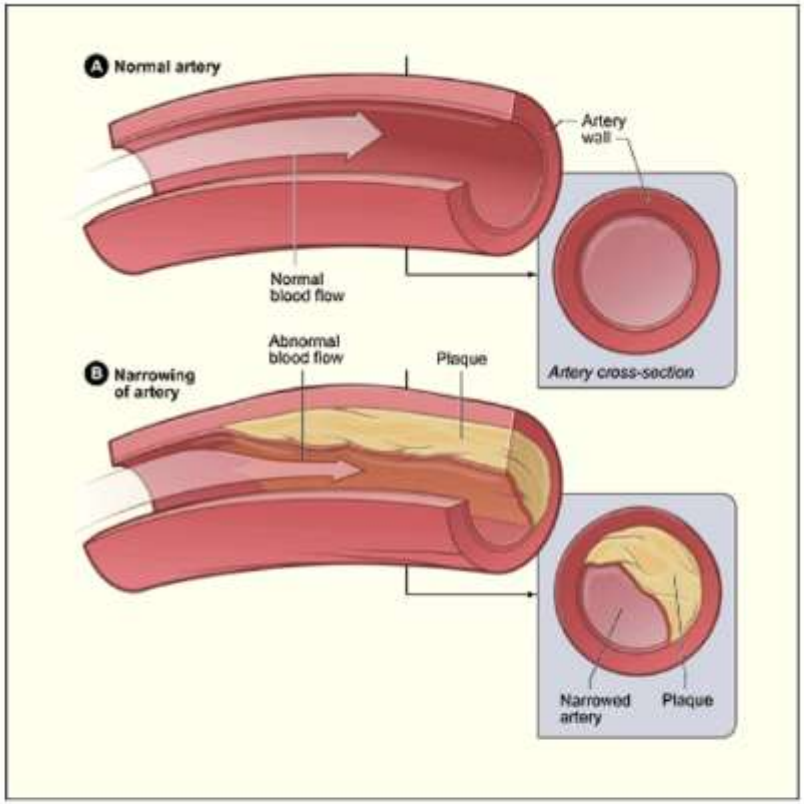
https://www.sciencenewsforstudents.org/article/nano-air-pollutants-strike-blow-brain

Ultrafine partikler kan gi betennelsesreaksjoner i blodårene

This makes them less sensitive to the chemicals — and messages — they need to detect.

Damage occurs because many nanoparticles contain what chemists call *free radicals*. That means some of their molecules contain an atom with an unpaired (missing) outer electron. This makes them unstable. In search of a mate for its lone outer electron, a free radical will swipe an electron from some other molecule. This theft transforms the radical into a stable molecule again. In the process, though, its victim now becomes a free radical. As each victim steals an electron from some neighboring molecule, new free radicals form.

The ongoing chain of electron-theft will damage molecules. It can even kill cells. This happens in the lungs and in the brain. The impact of nanoparticles



In a healthy artery (top), blood can flow freely. Inflammation triggered by nanoparticles can lead to hardening of blood vessels (bottom). Inflammation can slow — or eventually block — blood flow and foster the build up of fatty plaque.

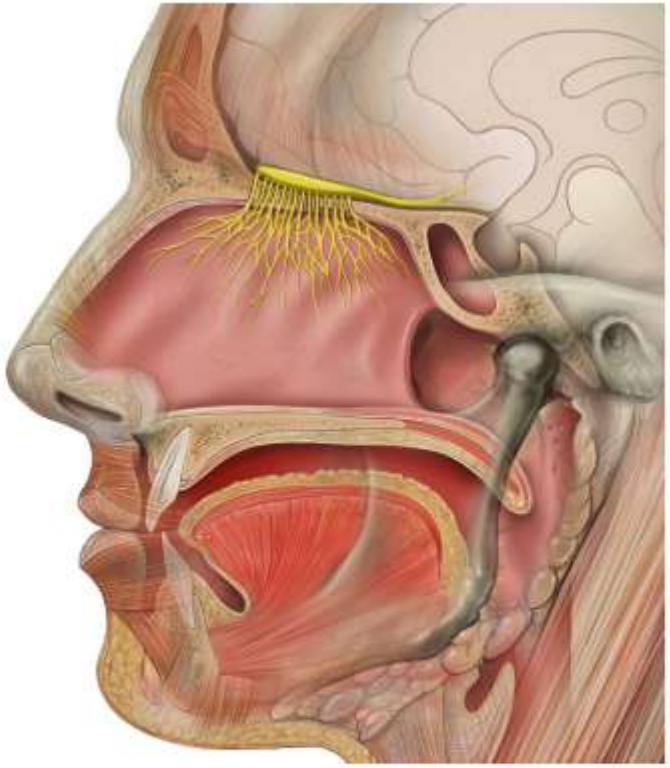
NHLBI/WIKIMEDIA COMMONS

https://www.sciencenewsforstudents.org/article/nano-air-pollutants-strike-blow-brain

Ultrafine partikler kan entre hjernen gjennom olfaktoriske nevroner

But owing to their super-tiny size, nanoparticles can hijack that connection. Scientists had known about this route into the brain since the 1930s (when they realized the polio virus could exploit it). Nanoparticles, at less than one-thousandth the diameter of a human hair, are about the same size as a virus, Elder explains. And just as that small size allows viruses to slip across the blood-brain barrier, it also allows nanoparticles to enter olfactory neurons.

Moving along these sensory neurons, nanoparticles travel straight into the brain by way of mitral cells. Scientists don't know yet what happens in the nerve cells that allows nanoparticles to travel along them, as if along a highway. Scientists do know, however,



Nanopollutants can hijack olfactory nerve cells and enter the brain by way of the olfactory bulb. That bulb is highlighted here as a yellow netlike structure coming through the ceiling of the nasal cavity. Earlier work showed the polio virus can use the same pathway.

PATRICK J. LYNCH, MEDICAL ILLUSTRATOR/WIKIMEDIA COMMONS (CC BY 2.5)

https://www.sciencenewsforstudents.org/article/nano-air-pollutants-strike-blow-brain

«Ultra-fine particles»

Up next

An unde
quality

An undercover investigation reveals air quality on a cruise ship deck could be worse than the world's most polluted cities

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http://nordic.businessinsider.com/cruise-ship-decks-air-quality-worse-than-most-polluted-cities-2017-10?r=UK&IR=T

FEATURE POLLUTION, CLIMATE, HEALTH

The list of diseases linked to air pollution is growing

As governments decide what to do about air quality, studies connect an array of health problems to dirty air

BY LAURA BEIL 7:00AM, SEPTEMBER 19, 2017

BAD AIR U.S. pollution levels have come way down since the 1970s, but there's still enough smog to raise the risk for cardiovascular deaths. Researchers are also drawing new connections between dirty air and metabolic and brain disorders.

https://www.sciencenews.org/article/list-diseases-linked-air-pollution-growing?mode=magazine&context=193434

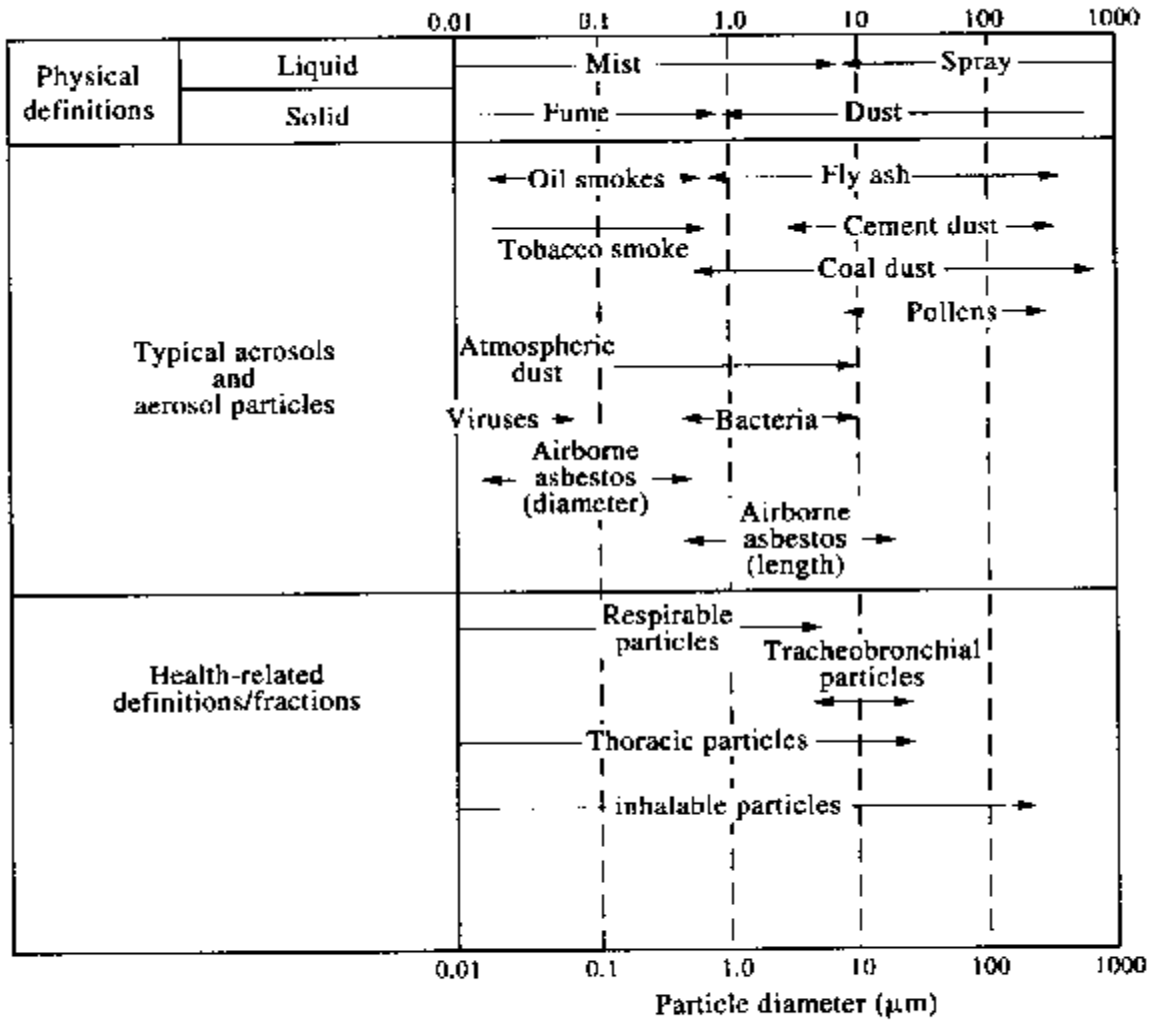


Figure 1.1. Summary classification of aerosols (from Vincent, J.H., *Aerosol Sampling: Science and Practice*, Copyright 1989, adapted by permission of John Wiley and Sons Limited).

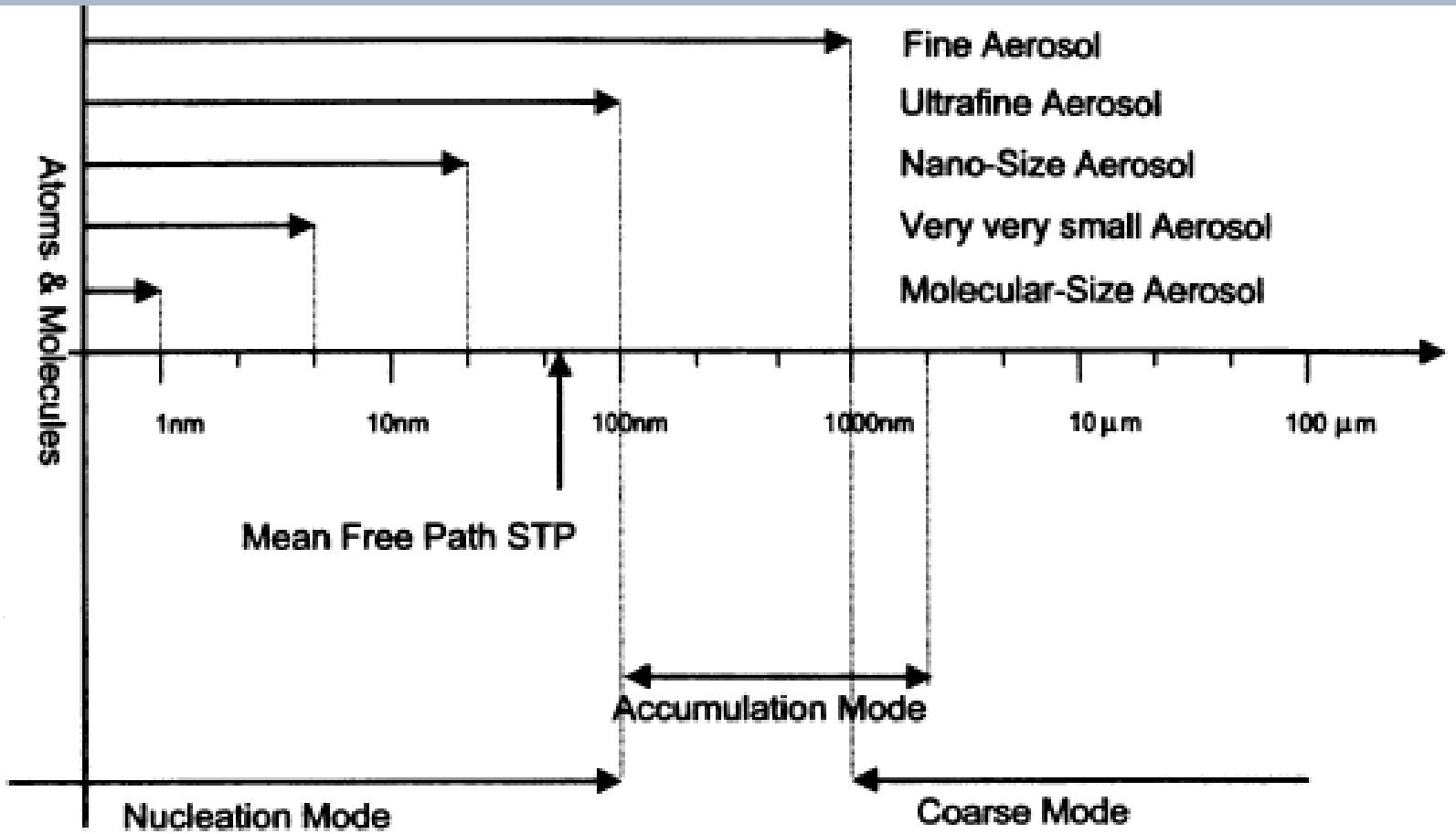


Figure 3.

The particle size classes: **coarse mode**, particles larger than about 1 µm mainly produced by diminution processes; **fine aerosol**, particles smaller than about 1 µm mainly built up by nucleation, condensation and coagulation; **nucleation mode** and **ultrafine aerosol**, particles smaller than about 100 nm; **nanosized aerosol**, particles smaller than about 20 nm; **very very small aerosol**, particles smaller than about 5 nm, particle behaviour dominated by surface effects, total number of molecules less than 500, **molecular size aerosol**, particles smaller than about 1 nm, less than 10 molecules in the particle. Reproduced from Preining (1998).

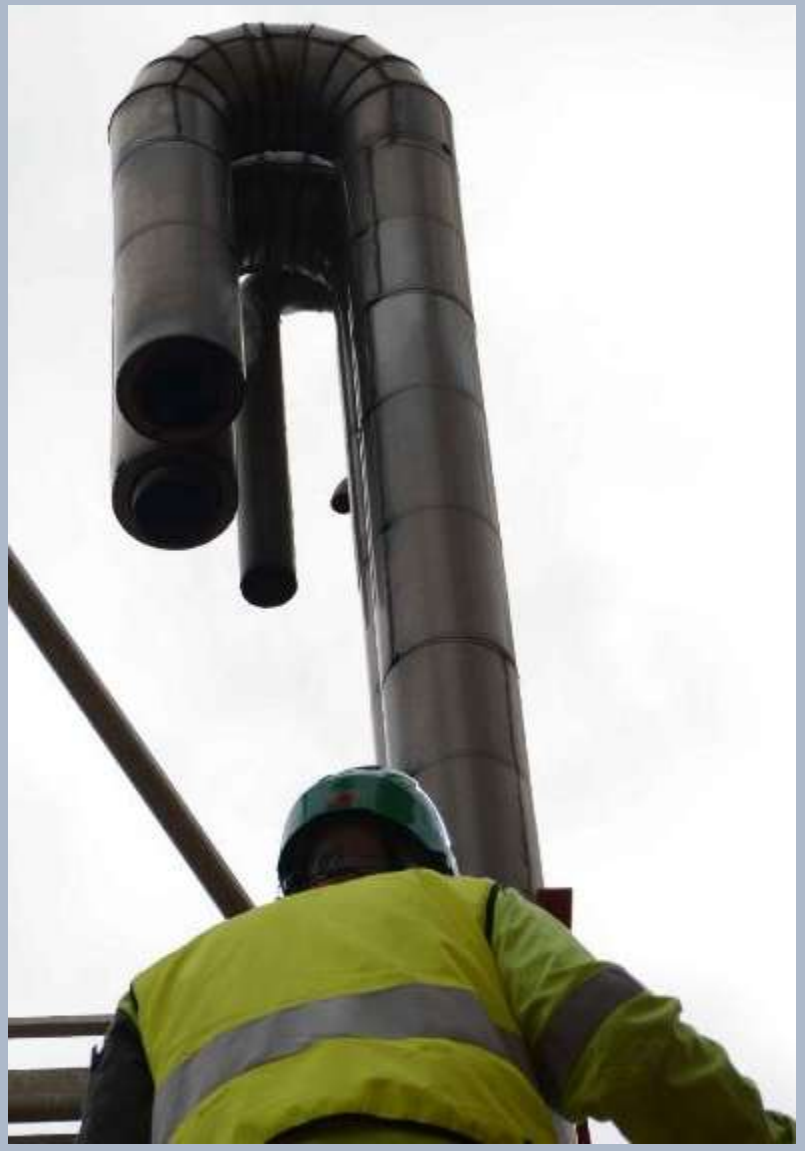

Eksos

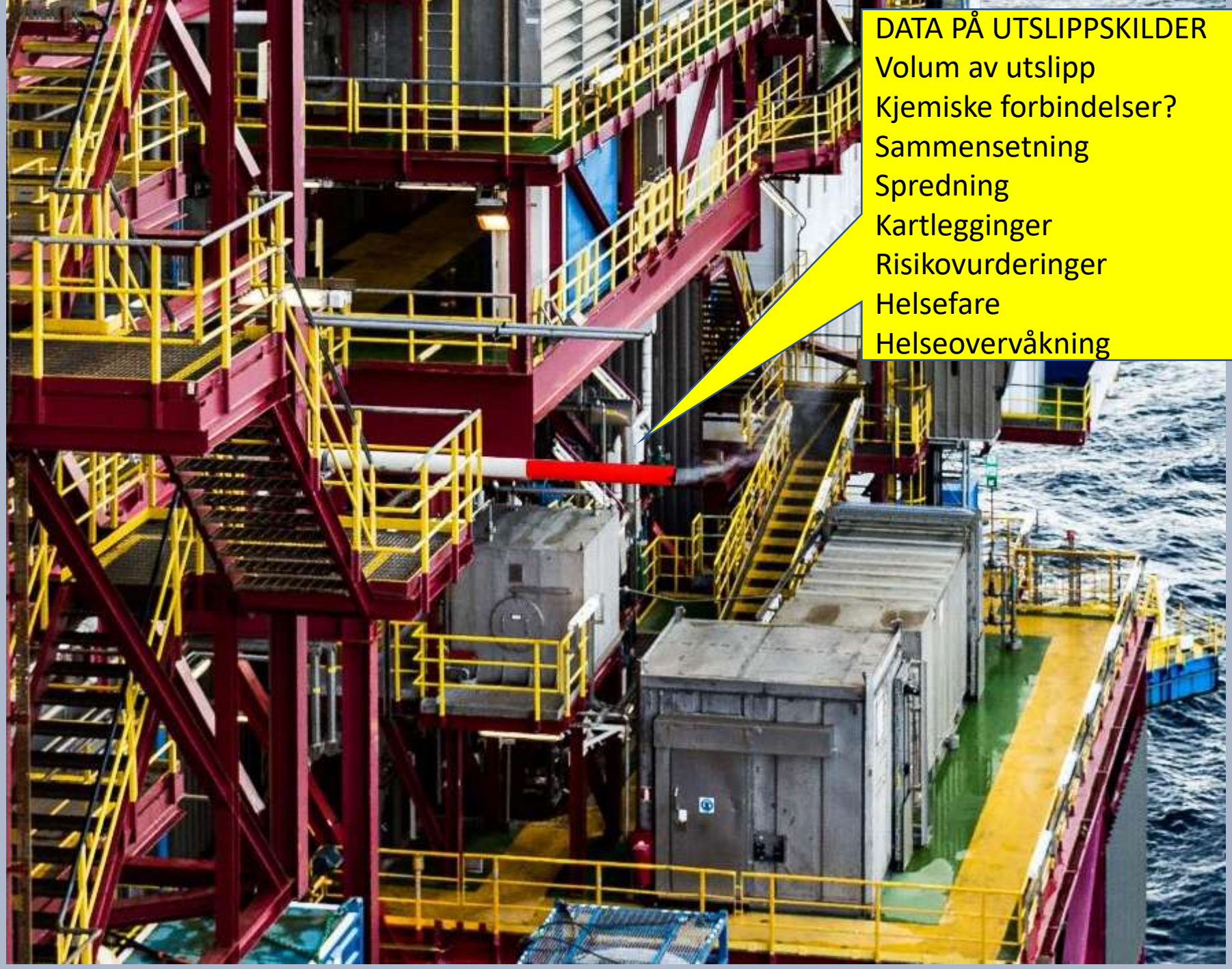

eksos
2

Hva må en vite om utslippspunktet?

- Utslippsvolum kubikkmeter/time (m^3/h)
- Sammensetning
  - Benzen
  - N-heksan
  - oljedamp
  - Oljetåke
  - Additiver
  - Organofosfater
  - **PARTIKLER (AEROSOLER) AV ALLE STØRRELSER**
  - +++++++
  - ++++++

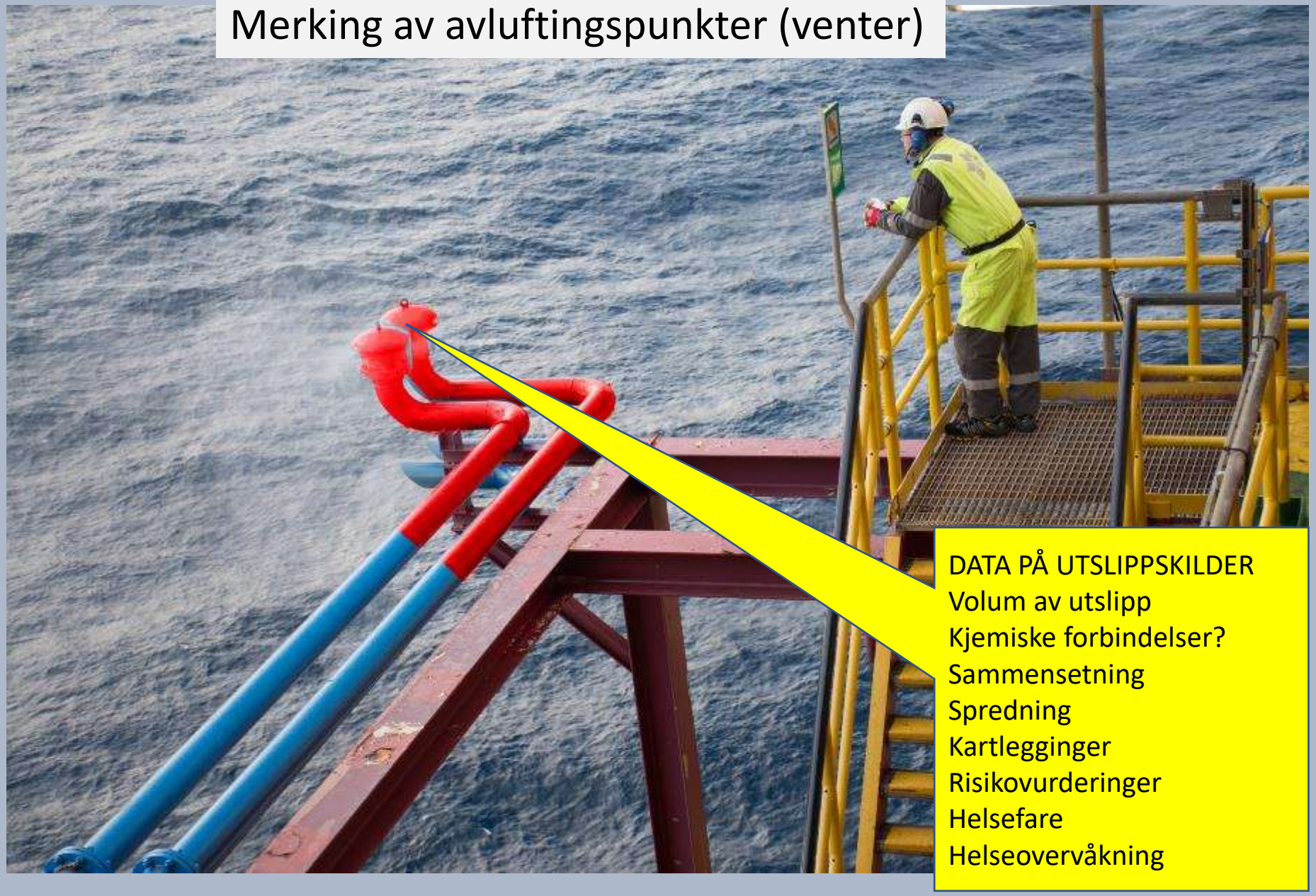
Spredningsanalyser – risikovurderinger – spredningskart (tilsvarende støykart?)




DATA PÅ UTSLIPPSKILDER
Volum av utslipp
Kjemiske forbindelser?
Sammensetning
Spredning
Kartlegginger
Risikovurderinger
Helsefare
Helseovervåkning

Ukjent og umerket

Merking av avluftingspunkter (venter)



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ATMOS VENT
6"-VA-26-508-AS01

Merking av avluftingspunkter (venter)

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Helseovervåkning

De mange ukjente og diffuse utslipp som ikke blir tatt hensyn til.

Merking av avluftingspunkter (venter)

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What is an Intelligent Electronic Nose ?

A combination of

1> non specific miniaturized gas sensors in real or virtual arrays

2> sensors eletronic triggering algorithms

3> Multivariate data processing for pattern recognition for qualitative and quantitative analysis of VOC

4> a strong knowledge of chemical or biomarkers involved in the various detections

What is RUBIX S&I expertise in E Nose ?

1> we make third parties gas sensors Intelligent and we have started to develop our own gas sensors

2> we have a strong expertise in sensors electronic triggering

3> We have a strong foothold in fuzzy logic, neural network and Multivariate processing for pattern recognition for qualitative and quantitative analysis of data.

4> We have a very strong knowledge of chemical and biomarkers involved in the various applications (particularly IAQ, Household appliances, health ..)

5> We participate to various norms and standards development

RUBIX S&I DATA PROCESSING – MINING

- Pattern recognition knowledge :
  - Multivariate statistics (PCA, DFA, PLS, SIMCA, ANNOVA, SQC , MLR …)
  - Neural Network
  - Fuzzy Logic
  - Base line Drift compensation
  - Humidity Drift compensation

https://www.rubixsi.com/

Intelligent elektronisk nese – noen som kan finne ut mer om dette utstyret?

https://www.rubixsi.com/indoor-air-monitoring/

RubiX PoD

Shaped as an elegant object, it can be attached to a wall , or used on a desk, or in any working environment. It measures continuously 8 parameters pertaining to comfort and health but also to allergens, VOC (Volatiles Organic Compounds) and toxics. Anybody can also express oneself and give opinions about the perceived situation. The PoD carries a QR Code and you can report your feelings and perception wherever you are. RubiX PoD allows to collect real-time, analytics data on nuisances and building performances along with people's well-being perception .

Who use the RubiX PoD ?

- Working environment, Open space
- Production floor monitoring
- Hotel atrium, Hotel room
- Shopping mall, Department store
- Subways, Airport, Restaurant ...

Benefits

Accurate, relevant data collection allows fast response and relevant action for improving indoor environmental quality, building performance and global well-being.

More well-being	More efficiency at the work-place	Less global warming
+ 40 %	+ 19 %	- 55 %
Of productivity with more natural light	Of creativity with a suitable temperature	Less sick days with better ventilation

Use of data

24/7 WORKING ENVIRONMENT WELLNESS MONITORING NUISANCES & COMFORT MAPPING

- Dynamic mapping of the various parameters via a centralized wireless (LoRa) network (more than 1 km) and cloud based software
- Simple information and globalized control
- Automated alarm and generation of customized reports with individual monitoring of level of nuisances
- Simple feedback information via questionnaire by QR Code connection particularly useful in large Environments (cafeteria, shopping mall...)

REAL-TIME ALERTS

- Standardized and Customizable alert threshold for each data
- Notification by warning message (SMS or E mail)
- Simple installation and identification of odors and particles origins
- Help to qualify analytically the level of physical and chemical stress of the workforce

EASY TO USE SOFTWARE AND FULL DATA SUPPORT to Human Resources Department

- Full access to all data (analytics & subjective) by PoD, by Department, by Building

Workplace environmental quality has a direct impact on human performance. It is proven that noise, lighting quality, natural light, temperature or air quality have a huge influence on well-being and productivity

Measured quality of wellness and analytical parameters

Technical features

- **Temperature** (-30°C, 120°C)
- **Humidity** (1% - 100%)
- **Light** (light intensity, flicker)
- **Noise** (sensitivity of the human ear, stress)
- **Air Quality** (6 Gas sensors: CO, H2S and 4 Odor sensors)
- **Particles** (PM 1um to PM 10 or 40um)
- **Vibration**


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"I think it's time we acknowledged the elephant in the room."

To innlegg i Sikkerhetsforum med underlag

http://www.ptil.no/getfile.php/1338775/Sikkerhetsforum/2016/Halvor%20Erikstein%20a%20Sikkerhetsforum%20L06042016%20%20Kjemisk%20arbeidsmilj%C3%B8_final.pdf

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https://thefutureleadershipinitiative.wordpress.com/2011/10/13/leadership-thought-5-leadership-is-acknowledging-the-elephant-in-the-room/