Frie innlegg.

Lavfrekvent støy – skadelig selv om den ikke høres

Norsk Yrkeshygienisk Forenings Årskonferanse,

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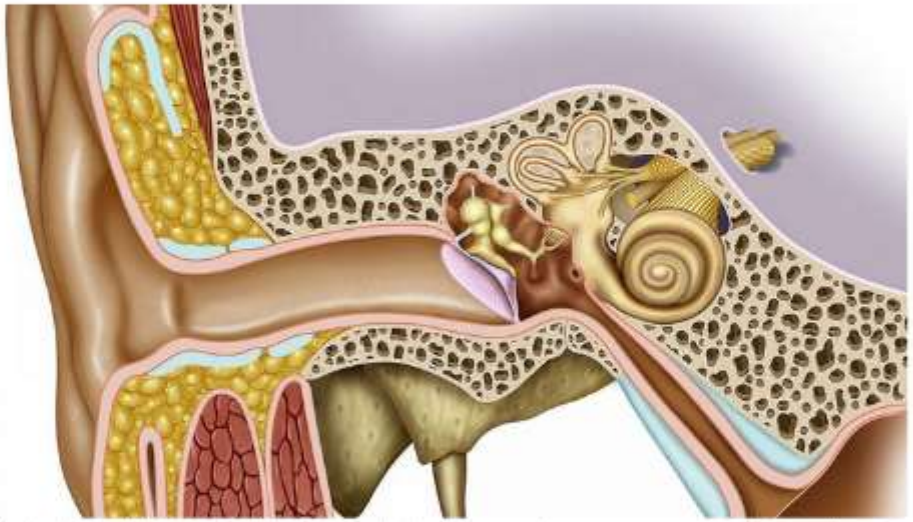

The functioning of the inner ear is at least temporarily altered by exposure to low-frequency sounds.

Sounds you can't hear can still hurt your ears

By Sarah C. P. Williams | Sep. 30, 2014 , 7:15 PM

A wind turbine, a roaring crowd at a football game, a jet engine running full throttle: Each of these things produces sound waves that are well below the frequencies humans can hear. But

http://www.sciencemag.org/news/2014/09/sounds-you-cant-hear-can-still-hurt-your-ears

Lyd du ikke hører kan allikevel skade hørselen

- **A wind turbine, a roaring crowd at a football game, a jet engine running full throttle: Each of these things produces sound waves that are well below the frequencies humans can hear.**
- **But just because you can't hear the low-frequency components of these sounds doesn't mean they have no effect on your ears. Listening to just 90 seconds of low-frequency sound can change the way your inner ear works for minutes after the noise ends, a new study shows.**
- "Low-frequency sound exposure has long been thought to be innocuous, and this study suggests that it's not," says audiology researcher Jeffery Lichtenhan of the Washington University School of Medicine in in St. Louis, who was not involved in the new work.
- Humans can generally sense sounds at frequencies between 20 and 20,000 cycles per second, or hertz (Hz)—although this range shrinks as a person ages. Prolonged exposure to loud noises within the audible range have long been known to cause hearing loss over time. But establishing the effect of sounds with frequencies under about 250 Hz has been harder. Even though they're above the lower limit of 20 Hz, these low-frequency sounds tend to be either inaudible or barely audible, and people don't always know when they're exposed to them.

SOAEs - Spontan Otoakustisk Emisjoner

- For the new study, neurobiologist Markus Drexl and colleagues at the Ludwig Maximilian University in Munich, Germany, asked **21 volunteers with normal hearing to sit inside soundproof booths and then played a 30-Hz sound for 90 seconds.**
- The deep, vibrating noise, Drexl says, is about what you might hear "if you open your car windows while you're driving fast down a highway."
- Then, they used probes to record the natural activity of the ear after the noise ended, taking advantage of a phenomenon dubbed **spontaneous otoacoustic emissions** (SOAEs) in which the healthy human ear itself emits faint whistling sounds. "Usually they're too faint to be heard, but with a microphone that's more sensitive than the human ear, we can detect them," Drexl says. Researchers know that SOAEs change when a person's hearing changes and disappear in conjunction with hearing loss.
- **People's SOAEs are normally stable over short time periods. But in the study, after 90 seconds of the low-frequency sound, participants' SOAEs started oscillating, becoming alternately stronger and weaker. The fluctuations lasted about 3 minutes, the team reports today in Royal Society Open Science.**
- **The changes aren't directly indicative of hearing loss, but they do mean that the ear may be temporarily more prone to damage after being exposed to low-frequency sounds, Drexl explains. "Even though we haven't shown it yet, there's a definite possibility that if you're exposed to low-frequency sounds for a longer time, it might have a permanent effect," Drexl adds.**

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Research

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Low-frequency sound affects active micromechanics in the human inner ear

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1. Summary

Noise-induced hearing loss is one of the most common auditory pathologies, resulting from overstimulation of the human cochlea, an exquisitely sensitive micromechanical device. At very low frequencies (less than 250 Hz), however, the sensitivity of human hearing, and therefore the perceived loudness is poor. The perceived loudness is mediated by the inner hair cells of the cochlea which are driven very inadequately at low frequencies. To assess the impact of low-frequency (LF) sound, we exploited a by-product of the active amplification of sound outer hair cells (OHCs) perform, so-called spontaneous otoacoustic emissions. These are faint sounds produced by the inner ear that can be used to detect changes of cochlear physiology. We show that a short exposure to perceptually unobtrusive, LF sounds significantly affects OHCs: a 90 s, 80 dB(A) LF sound induced slow, concordant and positively correlated frequency and level oscillations of spontaneous otoacoustic emissions that lasted for about 2 min after LF sound offset. LF sounds, contrary to their unobtrusive perception, strongly stimulate the human cochlea and affect amplification processes in the most sensitive and important frequency range of human hearing.

http://rsos.royalsocietypublishing.org/content/royopensci/1/2/140166.full.pdf

Sources and effects of low-frequency noise

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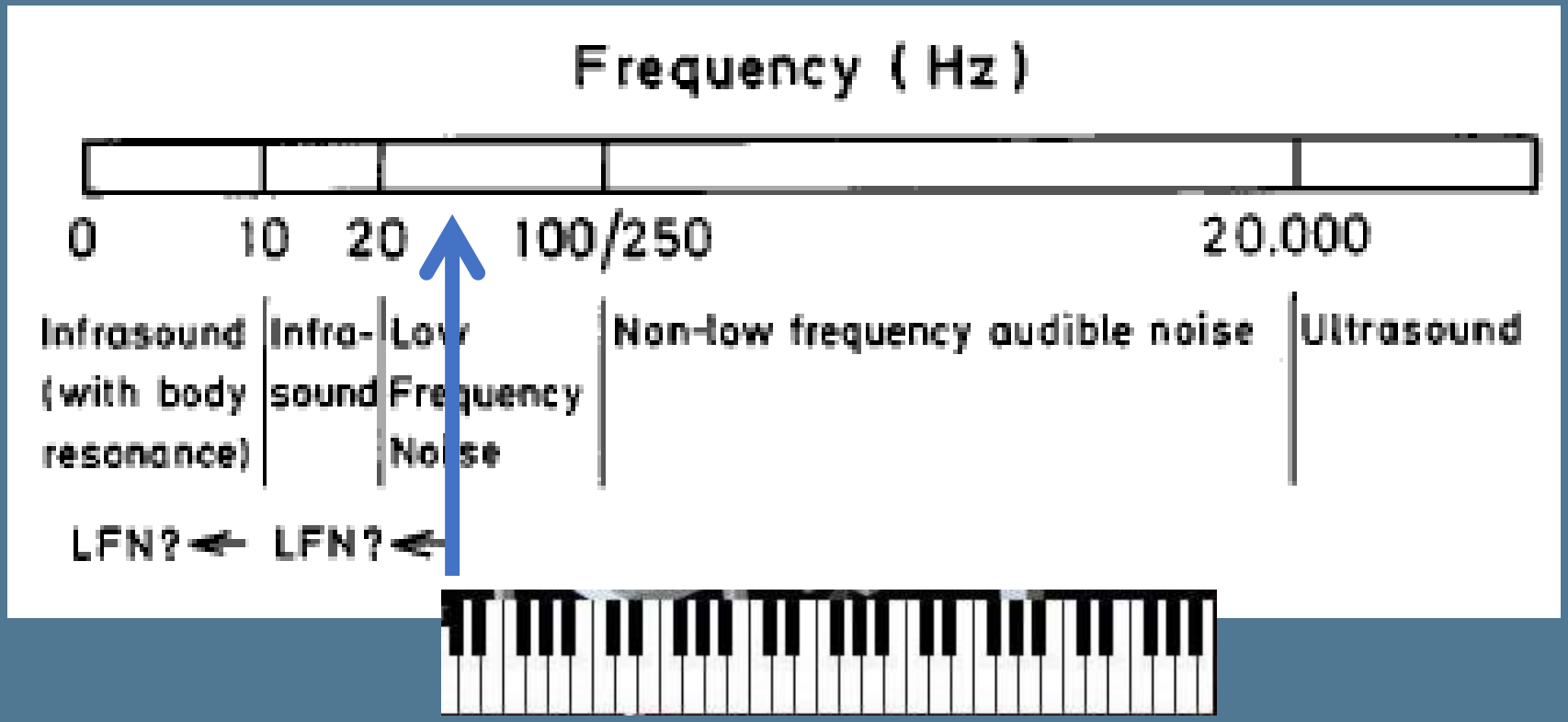
The sources of human exposure to low-frequency noise and its effects are reviewed. Low-frequency noise is common as background noise in urban environments, and as an emission from many artificial sources: road vehicles, aircraft, industrial machinery, artillery and mining explosions, and air movement machinery including wind turbines, compressors, and ventilation or air-conditioning units. The effects of low-frequency noise are of particular concern because of its pervasiveness due to numerous sources, efficient propagation, and reduced efficacy of many structures (dwellings, walls, and hearing protection) in attenuating low-frequency noise compared with other noise. Intense low-frequency noise appears to produce clear symptoms including respiratory impairment and aural pain. Although the effects of lower intensities of low-frequency noise are difficult to establish for methodological reasons, evidence suggests that a number of adverse effects of noise in general arise from exposure to low-frequency noise: Loudness judgments and annoyance reactions are sometimes reported to be greater for low-frequency noise than other noises for equal sound-pressure level; annoyance is exacerbated by rattle or vibration induced by low-frequency noise; speech intelligibility may be reduced more by low-frequency noise than other noises except those in the frequency range of speech itself, because of the upward spread of masking. On the other hand, it is also possible that low-frequency noise provides some protection against the effects of simultaneous higher frequency noise on hearing. Research needs and policy decisions, based on what is currently known, are considered.

PACS numbers: 43.50.Qp, 43.28.Dm

http://doc.wind-watch.org/sources-effects-lfn-1996.pdf

http://www.salbu.co.za/noise/lowfreqnoise.pdf#page=2&zoom=auto,0,2



Laveste C på et piano 32 Hz

J. Acoust. Soc. Am., Vol. 99, No. 5, May 1996

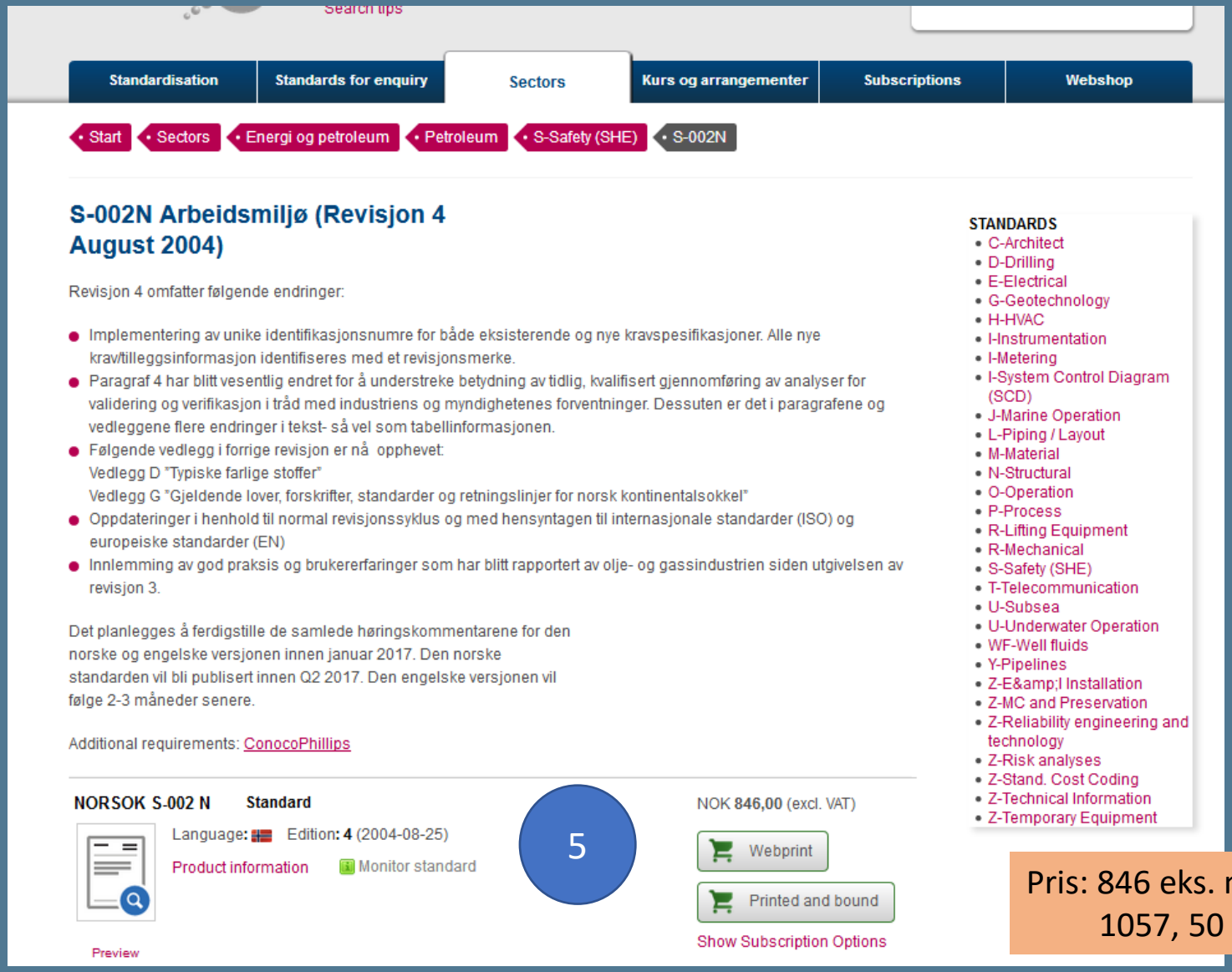
Lavfrekvent støy – krever fortsatt ikke data

Krav til støytest Ja O Nei O Valgfritt O

LEVERANDØRDATA		Senterfrekvens i oktavbånd, Hz								
Garantert støynivå (Merknad 1)	dB	31.5	63	125	250	500	1000	2000	4000	8000

Smalbåndskomponent: Ja O Nei O Frekvens/oktavbånd: Hz

Lyst til å se kravene? Da må du dra kortet



Pris: 846 eks. moms
1057, 50 med moms

https://www.standard.no/en/sectors/energi-og-klima/petroleum/norsok-standard-categories/s-safety-she/s-002n1/

Hva er konsekvensen av «ikke nye krav» i forhold til S-002 rev. 2004?

2004

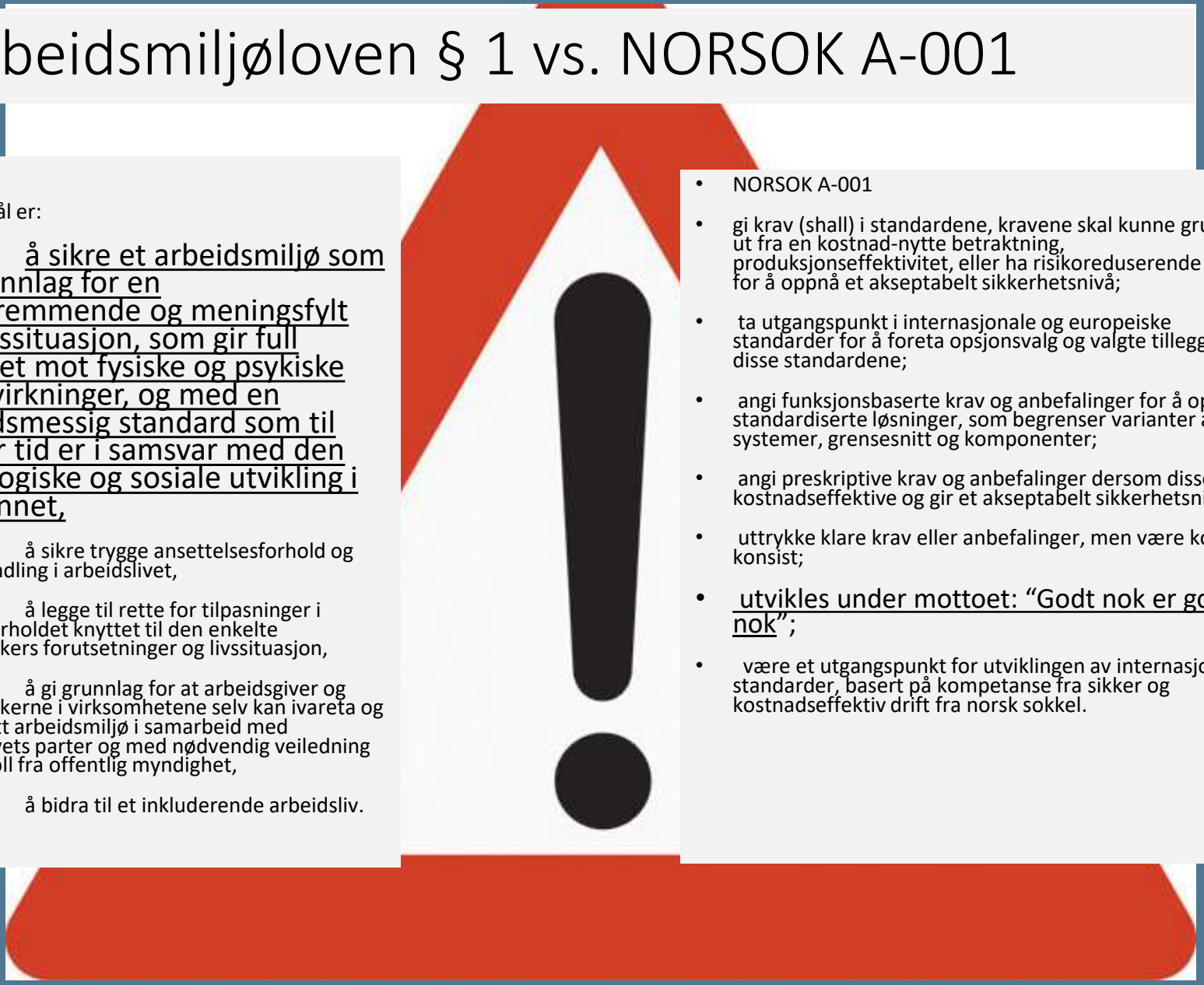
iPhone 2007

Arbeidsmiljøloven står over NORSOK!

Arbeidsmiljøloven § 1 vs. NORSOK A-001

Lovens formål er:

- a) å sikre et arbeidsmiljø som gir grunnlag for en helsefremmende og meningsfylt arbeidssituasjon, som gir full trygghet mot fysiske og psykiske skadevirkninger, og med en velferdsmessig standard som til enhver tid er i samsvar med den teknologiske og sosiale utvikling i samfunnet,
- b) å sikre trygge ansettelsesforhold og likebehandling i arbeidslivet,
- c) å legge til rette for tilpasninger i arbeidsforholdet knyttet til den enkelte arbeidstakers forutsetninger og livssituasjon,
- d) å gi grunnlag for at arbeidsgiver og arbeidstakerne i virksomhetene selv kan ivareta og utvikle sitt arbeidsmiljø i samarbeid med arbeidslivets parter og med nødvendig veiledning og kontroll fra offentlig myndighet,
- e) å bidra til et inkluderende arbeidsliv.



- NORSOK A-001
- gi krav (shall) i standardene, kravene skal kunne grunngis ut fra en kostnad-nytte betraktning, produksjonseffektivitet, eller ha risikoreduserende effekt for å oppnå et akseptabelt sikkerhetsnivå;
- ta utgangspunkt i internasjonale og europeiske standarder for å foreta opsjonsvalg og valgte tillegg til disse standardene;
- angi funksjonsbaserte krav og anbefalinger for å oppnå standardiserte løsninger, som begrenser varianter av systemer, grensesnitt og komponenter;
- angi preskriptive krav og anbefalinger dersom disse er kostnadseffektive og gir et akseptabelt sikkerhetsnivå;
- uttrykke klare krav eller anbefalinger, men være kort og konsist;
- utvikles under mottoet: “Godt nok er godt nok”;
- være et utgangspunkt for utviklingen av internasjonale standarder, basert på kompetanse fra sikker og kostnadseffektiv drift fra norsk sokkel.

Øredøvende taushet

Lavfrekvent støy kan ikke lenger bli møtt med stillhet!