

# Communicating Risks in Workplaces

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# Early Chemical Safety at Work Communication

1872

Finland's  
Grand-Dukedom's  
Collection of Ordinances

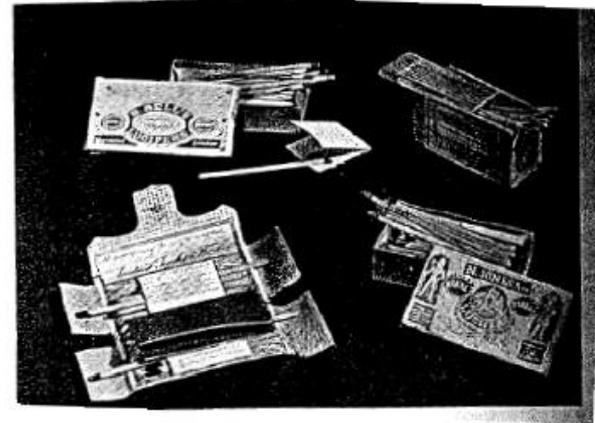
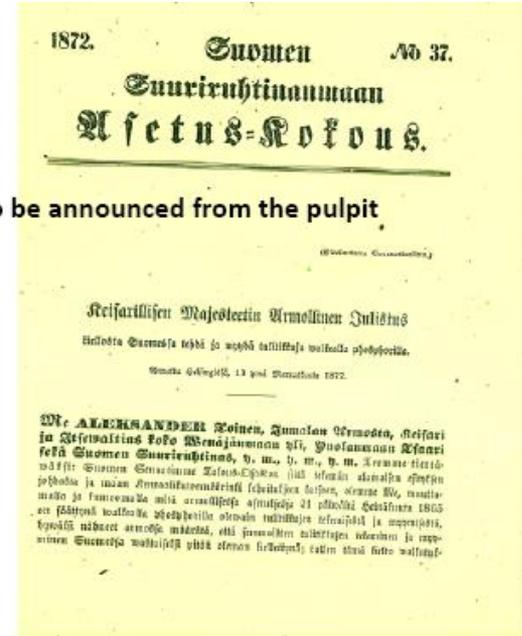
No 37

**Graceful Proclamation of the Imperial Majesty**  
On prohibition to manufacture and sell matches with white phosphorus

Given in Helsinki, 13<sup>th</sup> November 1872

We Alexander the Second, from Grace of God, Emperor and Sovereign over the whole Russia, Tsar of Poland and Grand Duke of Finland, etc, etc, etc, Make it known: Due to the proposal of The Commerce Department of Our Finland's Senate and the request of the General Governor, have We, by changing and abolishing what in the graceful ordinance 21<sup>st</sup> July 1865 has been prescribed on manufacturing and selling of matches with white phosphorus seen fit gracefully to order that the manufacture and selling of such matches in Finland shall be prohibited; this prohibition will be enforced from 1 January 1874. Which shall be obeyed by all concerned in subordination.

According to the Own Decision of the Imperial Majesty  
and in His High Name,  
His Senate set in Finland



Traditional *ex cathedra* unidirectional risk communication

# The Fate of Dr Stockmann in Ibsen's (1828-1906) Social Drama 'An Enemy of the People'

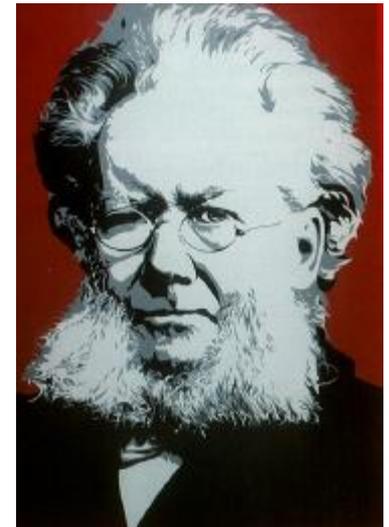
**DR STOCKMANN:** I tell you, the whole Baths are a poisonous whited sepulchre - the greatest possible danger to health! All that filth up at Mølleedal - all that foulsmelling stuff - is polluting the water in the mains that lead to the Pump Room. What's more, the filthy infected muck seeps down to the beach -

**HORSTER:** Where the sea-bathing is?

**DR STOCKMANN:** Exactly.

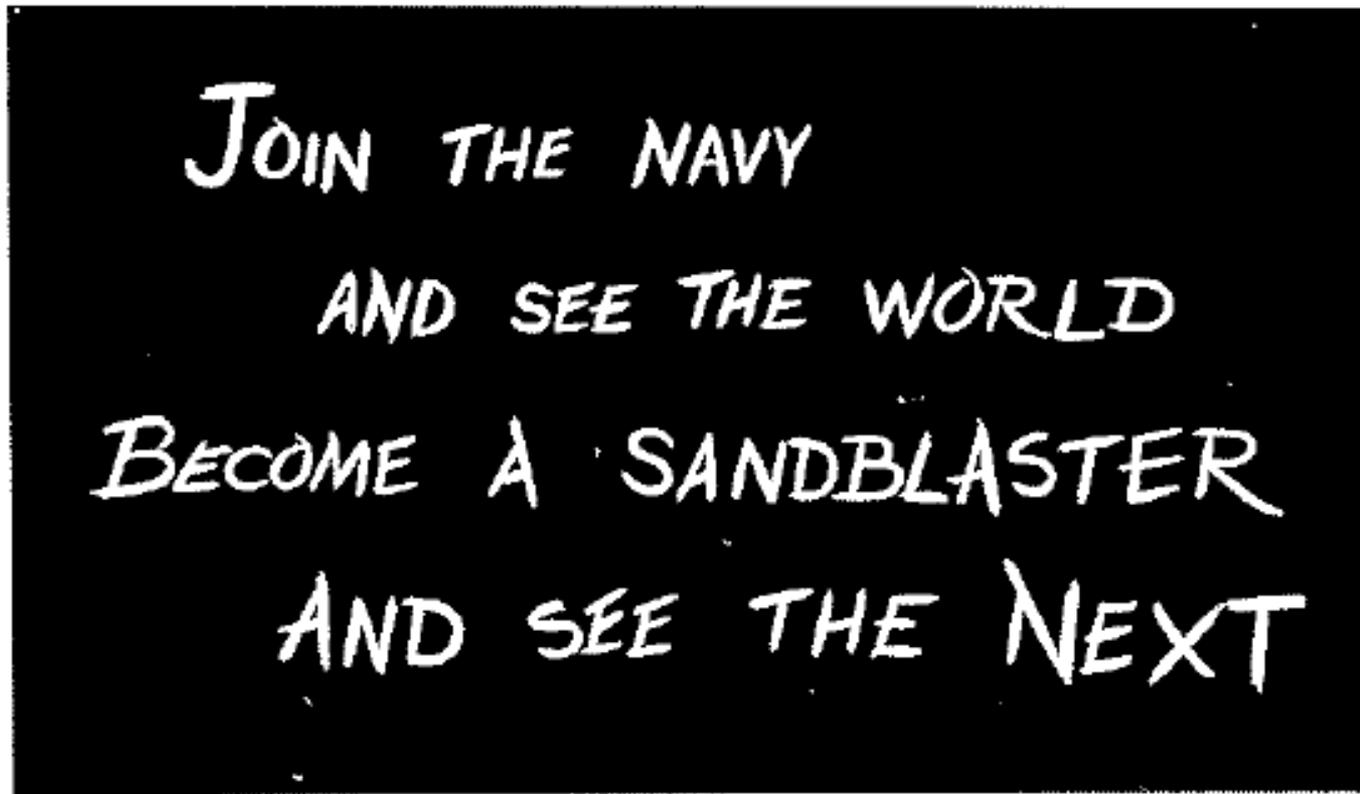
**HOVSTAD:** But Doctor, how can you be so sure of all this?

**DR STOCKMANN:** I've made the most careful investigations I possibly could. Oh, I've had my suspicions of something of the sort for a long time. Last year there were some very strange cases of illness among the visitors - there were stomach upsets, and even typhoid...



- 'Truth-tellers don't have a bed in the inn'

# Traditional unidirectional risk communication in a foundry



Hunter's The Diseases of Occupations, 1978

# Occupational chemical risks - the WHO estimate

## Overview of disease burden estimates attributable to chemicals

Chemicals/Groups of chemicals	Disease outcomes considered (attributable fraction)	Deaths	DALYs
<i>Chemicals in occupational exposures (longer term effects)</i>		<i>581,000 (sub-total)</i>	<i>6,763,000 (sub-total)</i>
Asbestos	Malignant mesothelioma (NA); trachea, bronchus, lung cancer (0,3 %); asbestosis (NA)	107,000	1,523,000
Occupational lung carcinogens (arsenic, asbestos, beryllium, cadmium, chromium, diesel exhaust, nickel, silica)	Trachea, bronchus, lung cancer (8,6 %)	111,000	1,011,000
Occupational leukaemogens (benzene, ethylene oxide, ionizing radiation)	Leukaemia (2,3 %)	7,400	113,000
Occupational particulates - causing COPD (dusts, fumes/gas)	COPD (13 %)	375,000	3,804,000
Occupational particulates - other respiratory diseases than COPD (silica, asbestos and coal mine dust)	Asbestosis (NA); silicosis (NA); pneumoconiosis (NA)	29,000	1,062,000

Prüss-Ustün et al, 2011

# A definition

***Risk communication*** is the conveying or transmitting of information among interested parties about levels of health risks and about decisions, actions or policies aimed at managing or controlling health risks

Communication takes place through a variety of channels, and ranges from warning labels on chemical bottles through information sheets and the news and television to public meetings, focus groups and polling

P. Illing, Toxicology and Risks, 2001

# Regulatory Framework

- CLP Regulation (1272/2008/EU)
- Chemical Agents Directive and Others Based on the Framework Directive of OSH

# Pre - MSDS Era

HYDRATSIINI	
 Myrkyllinen yli 64 %	 Syövyttävä 15...64 %
<b>KÄYTÖSSÄ</b>	
<b>VAIKUTUS IHOON</b>	Syövyttää ihoa ja limakalvoja. Voi aiheuttaa ihon herkistymistä, allergiaa tai ihottumia. Saattaa imeytyä ehjän ihon lävitse.
<b>Ensiapu</b>	Poistettava heti iholta suurella määrällä vettä. Jos ainetta on joutunut silmiin, on niitä huuhdottava runsaalla vedellä vähintään 15 min. ajan. Lääkärin hoitoon.
<b>Torjunta</b>	Estettävä ihokosketus. Suojakäsineet ja -vaatteet. Silmänsuojaimet.
<b>HENGITTÄMINEN</b>	Höyryjen hengittäminen vaarallista. Suuret määrät saattavat aiheuttaa myrkytysoireita: hengenahdistus, oksennutus, sydämen harvalyöntisyys.
<b>Ensiapu</b>	Raitis ilma — lääkäriin! Myös tunnettaessa pahoinvointia on mentävä lääkäriin.
<b>Torjunta</b>	Tehokas ilmanvaihto. Hengityssuojain.
<b>NAUTTIMINEN</b>	Ärsyttää voimakkaasti ruoansulatuselimiä, aiheuttaa jo suhteellisen pieninä määrinä myrkytysoireita, oksennusta, pahoinvointia jne.
<b>Ensiapu</b>	Juo runsaasti vettä tai maitoa. Oksenna. Toista muutamia kertoja. Lääkärin hoitoon.
<b>Torjunta</b>	Hyvä järjestys ja puhtaus. Peseytyminen ja vaatteiden vaihto ruokatauolla ja työn päätyttyä.
<b>PALOVAARA</b>	Saattaa räjähtää liekin ja kuumuuden vaikutuksesta. Liaksi kuumennettaessa saattaa syntyä myrkyllisiä typpipitoisia kaasuja. Ei saa säilyttää suoranalaisessa auringonvalossa eikä lämpölähteiden välittömässä läheisyydessä.
<b>Sammutus</b>	Jauhesammutin, runsaasti vettä sammutukseen ja jäähdytykseen.
<b>ERITYISESTI HUOM. OTETTAVAA</b>	Säilytettävä viileässä, muista aineista erillään. Eivät saa päästä kosketuksiin happojen kanssa.

Health effects, safety measures, fire risks, special considerations...

# MSDS Era from the 80's

- Mandatory in Finland since 1979, i.e. before the respective EU legislation
- The quality check by the authorities was done from the very beginning
- All employees at workplaces had - in principle - an access to these data sheets
- *A hazard* communication tool
- Reading difficulties experienced similarly as with some label risk phrases
- Common complaints by researchers: often lack information on allergens or male reprotoxicants

# Readability of Risk Phrases in MSDS

## - The Study of Frazier et al, 2005

### Example of male reproductive hazards

- 'Causes toxicity to human reproduction or development'  
(college level)
- '...is a specific male gonadotoxicant in humans and laboratory animals, leading at high doses to azoospermia which may not be reversible'  
(PhD level)

# Extended MSDS Era

- A step towards *risk* communication

# Hazard vs. risk

- Hazard refers to intrinsic toxic properties (at least in North America)
- Risk is the probability of an adverse outcome
- Perception of risk?
- E.g. pandemic vaccinations in 2009 in Finland



# Acceptable risk

- No EU wide consensus so far
- The 'Dutch' system in setting OELs for carcinogens
- The proposal for a life time cancer risk of 4 cases per 100 000 workers as a quasi-European standard to separate small risk from more urgent (discussed in Dortmund Workshop on DMEL; May 17th 2011)
- Comparison to radiation risks

## Risk of Occupational Cancer in Finland

- Continuous Exposure to OEL Level during the Entire Working Life

Exposure	%
Chromium (VI)	13,5
Benzo(a)pyrene	7,9
Smoking	7,0
Radiation work	3,6
Cobalt	2,5
Cadmium	1,6
Ethylene Oxide	0,9
Nickel (soluble salts)	0,7
ETS	0,5
Propylene Oxide	0,44

Aalto, 2003; Schuhmacher -Wolz et al, 2002; Stråby, 1994

# The Role of Occupational Health Care

- Mandatory to provide in Finland for all workplaces
- Obligatory measures include among others:
  - Risk assessment carried out by occupational health care
  - Risk communication to employees (information of risks and safety measures)



# Some challenges

- Risk communication on e.g.
  - endocrine disruptors, like bisphenol A
  - nanomaterials
- Role of the precautionary principle
- Readability of eMSDS
- Understanding new GHS/CLP symbols

# Understanding New GHS/CLP symbols

- ECHA study to be completed by February 2012



## Skyltar tydda!

På sid 7 i söndagens DN ekonomi finns de nya varningsskyltar som jag förmodar är ett EU-påfund. För dem som inte genast inser vad skyltarna betyder kommer här en förklaring enligt min egen Förordning Angående Skyltars Uttydning:

- 1) Läckande ledning!
- 2) Halvtom flaska!
- 3) Risk för hårresning!
- 4) Stenskott på väg!
- 5) Snabbväxande julgran!
- 6) Svag is!
- 7) Begravningsplats!
- 8) Allvarlig skottskada!
- 9) De vet fan!

JENS BUSCH, Lidingö

# A Finnish Study on Effectiveness of Risk Assessment Regulations in the Chemical Industry

- A questionnaire for chemical industry employers and employees
- Employer representatives (n =108) were selected from Responsible Care enterprises
- Response rate for employers was 45% and for employees 48%
- Risk assessment in cooperation with employers and employees is carried out well according to employers. One tenth of employees considered that it is carried out poorly
- The access of workers to risk assessment documents is poor according to one third of employers and one fourth of employees
- One fourth of employees consider that their know-how is poorly made use of
- Risk assessment carried out by subcontractors at the workplace comes true poorly
- One fifth considers that (safety) training and familiarization of subcontractors comes true poorly

(Niskanen et al, 2009)

Thanks to my colleagues at the ministry who contributed.

Thanks to the audience for attention.