

# The alignment of parallel OH tools

An IOHA project?

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**IOHA** 2018



 **AIHA**  
Protecting Worker Health

 **IOHA**



# Agenda

- The Occupational Hygiene Toolbox
- Parallel tools
- Alignment initiative
- Roles of NVvA and IOHA

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## On the Strength and Validity of Hazard Banding

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# OH toolbox exposure assessment in the 70-s



THE NORDIC  
EXPERT GROUP

ED 984

TRGS 900

EH40/2005

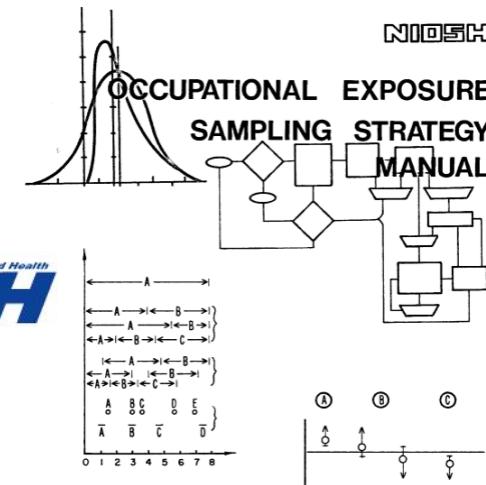


DFG

ACGIH®



- OELV
- Health hazard classification
- Hazard Banding
- CB based Models
- Exposure assessment strategies
- Measurement methods
- Compliance testing
- Handling Mixtures



U. S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE  
Public Health Service  
Center for Disease Control  
National Institute for Occupational Safety and Health

# DOHSBase OELV hierarchy

**Legal compliance**  
limits with technical  
and/or economical  
feasibility:  

- EU BLV,
- UK WEL
- Ge TRGS900
- Fr VLEP
- OSHA PEL

Health based only  
SCOEL, DECOS, DFG, ACGIH-  
TLV (>1996), NIOSH-REL ( $\geq 2013$ )

Health based, with stakeholder influence  
AGS, NIOSH-REL(<2013), EU-IOLV, Corporate,  
ECETOC, ORAS/WEEL, ACGIH-TLV(<1996)  
WGD/DECOS

Default factor. Prescriptive, process based  
DNEL, Dutch Health Council Gr2000-15/OSH

Hazard Banding  
Kick-off levels, Control Banding concentration ranges, Generic Exposure Values

Generic  
single endpoint MTD & RD50, QSAR, structural activity TTC, read across, expert judgment (Nano)

Epidemiology ->

Data rich ->

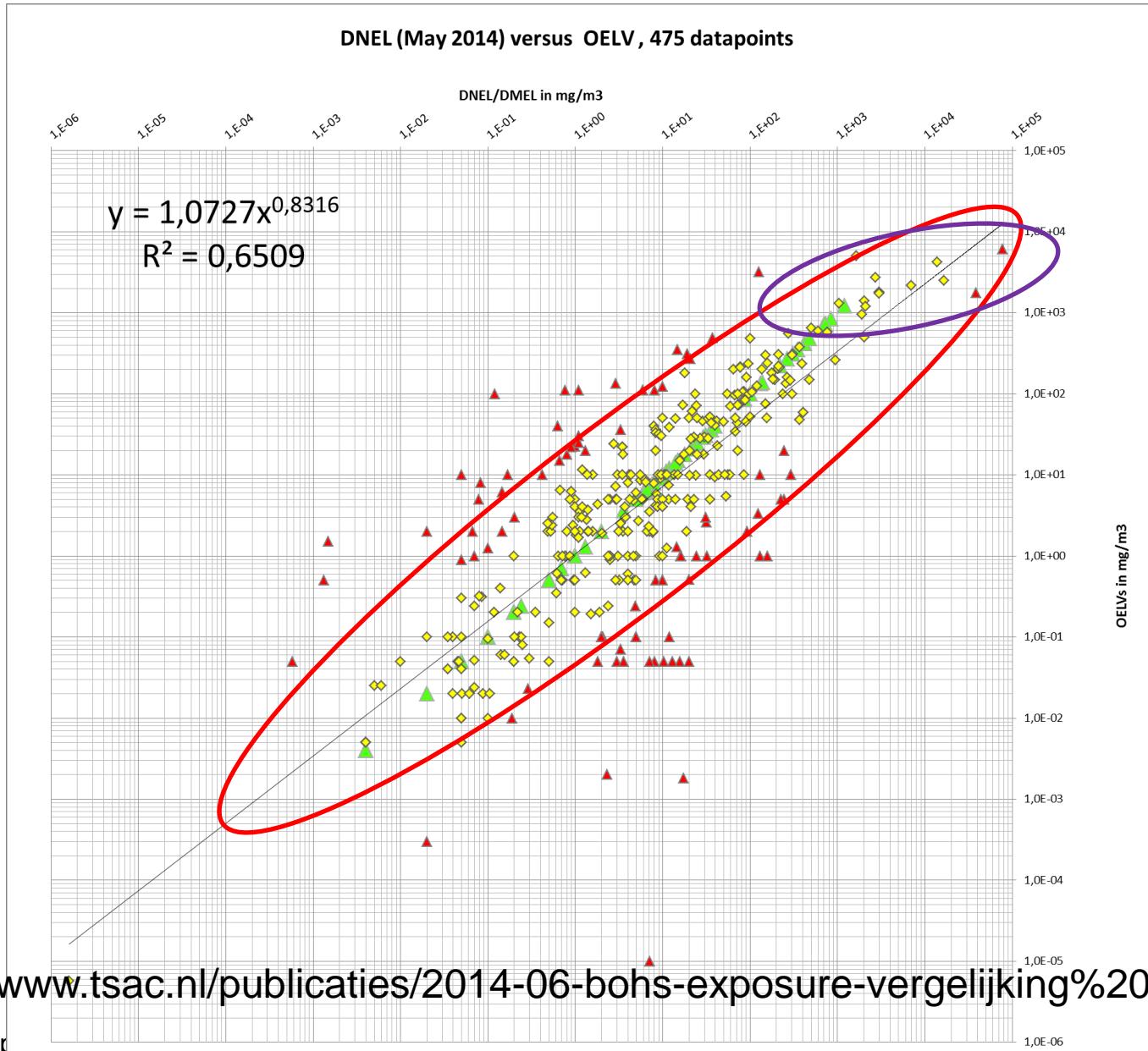
<-Data poor

# OELV variability (mg/m<sup>3</sup>)

substance	UK-WEL	ACGIH TLV	SCOE L	DFG	DNEL	OARS WEEL
Maleic anhydride 108-31-6	3	0,01	-	0,41	0,4	-
Diisobutylene (DIB) 25167-70-8	-	-	-	-	14.7	344
Cumene 98-82-8	-	246	No data	200	100	-
Ethanol	-	1884	-	960	950	-

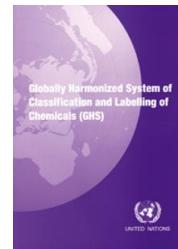
OELV 90%-range: 0.001 through 1000 mg/m<sup>3</sup>  
**Red: based on socio-economic feasibility**

# DNEL vs OELV



# Health Hazard classifications

- OELV
- Health hazard
- Hazard Banding
- CB based Models
- Compliance testing
- Handling Mixtures



GHS

ACGIH®



NIOSH

EU/C&L

International Agency for Research on Cancer

EU/CLP



Enterprises SDS



# *Fancy toys for IH girls & boys*

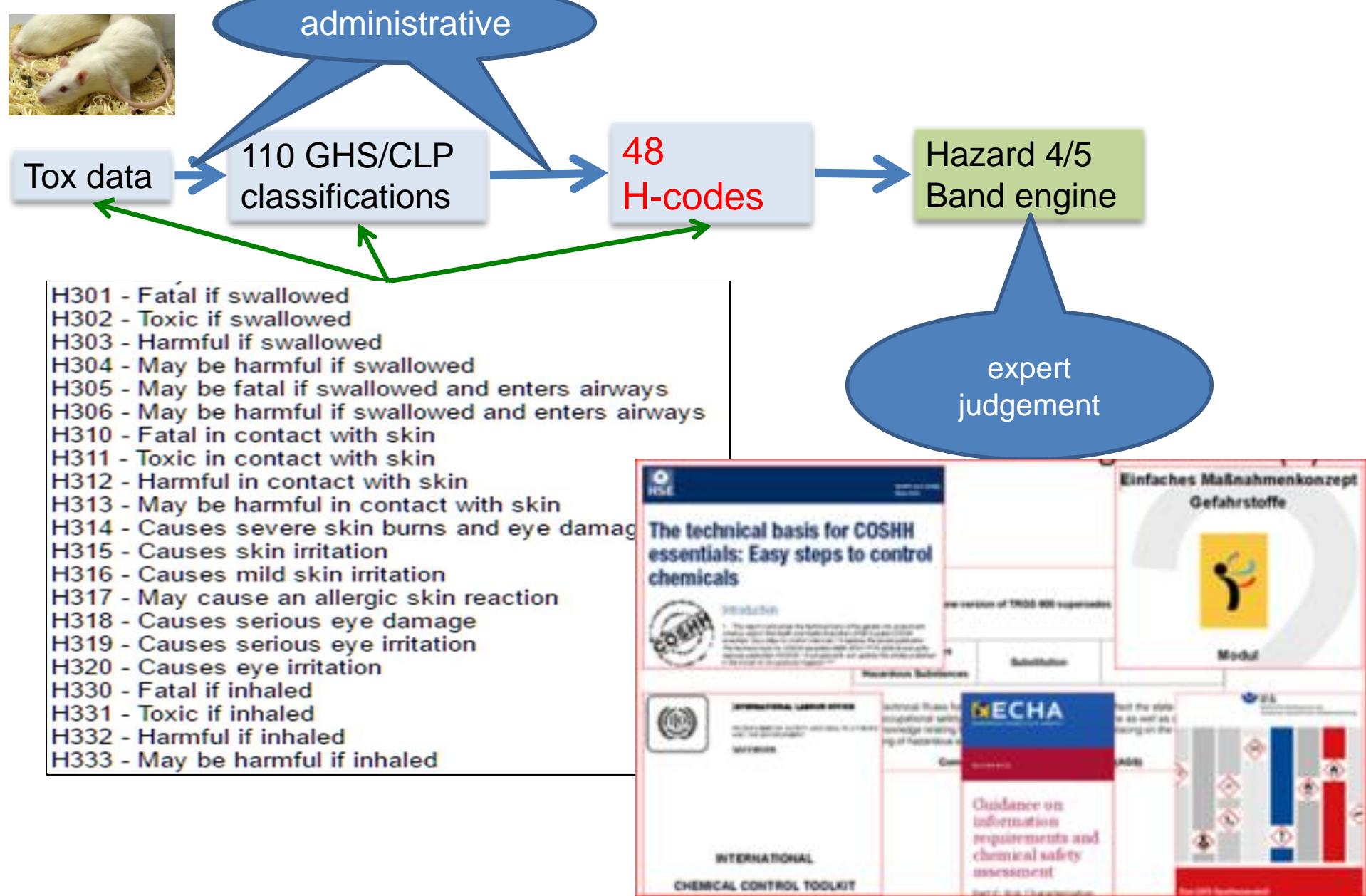
- OELV
- Health hazard
- Hazard Banding
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EMKG



MEASE v.1.02.01, EMKG-EXPO-TOOL and EASE v.2.0.

# The development of a Hazard Band engine



# 5 bands HB-engine

hazard band #	GHS/CLP health hazard H/EUH-codes, REACH Annex IV
 E/5	EU070 (Tox) 340, 341, 350(i) (Carc1, Mut1) 334 (S)
D/4	300, 310, 330, 372 (Tox1/2) 351, 360 <sub>xy</sub> , 361, 362 (Carc2, Repro1) EUH070 (Irritant, Corrosive)
C/3	301, 311, 331, 314, 370, 373 (Tox3) 317, 318, 335, EUH071 (Irritant, Corrosive)
B/2	302, 312, 332, 371 (Tox4)
 A/1	303, 313, 333(Tox5) 315, 319, 316, 320 (Irritant) 304, 305 (Aspiration hazard) 336 (Tox), EUH066 (solvent effect) REACH Annex IV non-hazardous

# Allocation of H-codes in 4 HB-engines

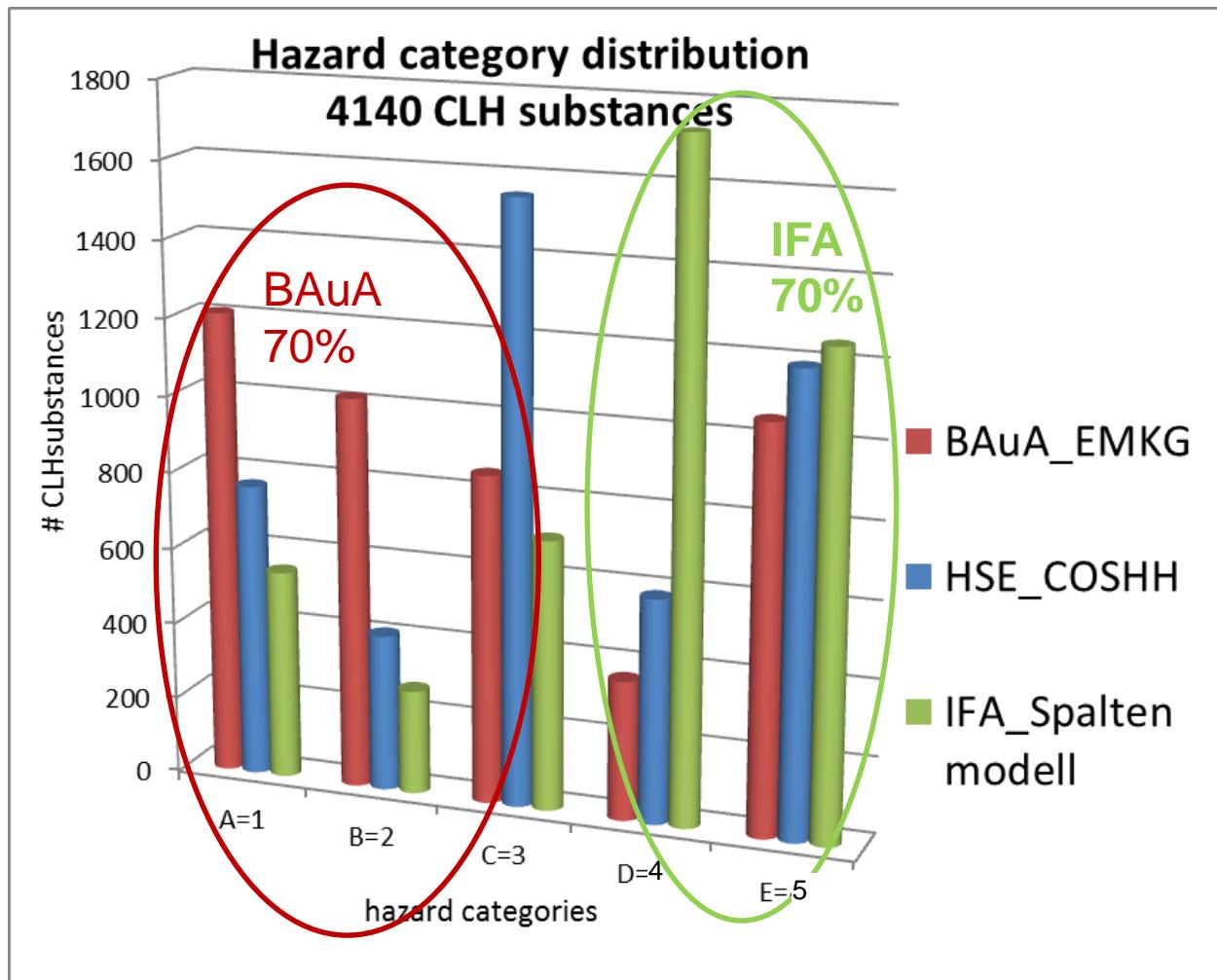
Hazard band	DGUV IFA Spaltenmodell	HSE COSHH	BAUA EMKG (inhalation)*	Solvay OEB
E/5	300, 310, 330 (Tox) 340, 350, 350i (CM) EU032 (Tox gas release)	340, 341, 350(i) (CM) 334 (S) EU070 (Tox)	340, 350, 350i (CM) <b>360<sub>F</sub></b> (R)	372 (Tox) 340, 350 (CM) 334 (ICS)
D/4	301, 311, 331, 370, 372 (Tox) 341, 351, <b>360<sub>xy</sub></b> (CMR) EUH029, EUH031 (Tox gas release) 317, 334, 318, EUH070 (ICS)	300, 310, 330, 372 (Tox) 351, <b>360<sub>xy</sub></b> , 361, 362 (CR)	<b>300, 330, 372</b> (Tox) <b>360<sub>D</sub></b> (R) EUH032 (Tox gas release)	<b>300, 310, 330</b> ; 370, 373 (Tox) 314 (+ cat A), EUH071 (ICS), 341, 351, <b>360<sub>xy</sub></b> (CMR)
C/3	302, 312, 332 (Tox) 314 (pH ≥ 11,5, pH ≤ 2), 371, EUH071 361 <sub>f/d</sub> , 373, 362 non-toxic gases which may cause asphyxiation	301, 311, 331, 314, 370, 373 (Tox) 317, 318, <b>335</b> , EUH071 (IC)	301, 331, 314, 370, 371, 373 (Tox) 334 (S) 341, 351, 361f/d (CMR) EUH031 (Tox gas release)	301, 311, 331; 371 (Tox) 304, EUH070 (lung, eye damage) 314 cat B and C, 317, 318, <b>335</b> (ICS) 361, 362 (R & Lact)
B/2	315, 319, <b>335</b> , ** (I) 304, EUH066, 336 (solvents) ***	302, 312, 332, 371 (Tox)	302, 332 (Tox) 318 (C)	302, 312, 332, 336 (Tox) 315, 319, EUH066 (I)
A/1	substances which experience shows to be harmless (e.g. water, sugar, paraffin etc.)	303, 313, 333 (GHS Tox 4) 315, 316, (GHS) 319, 320 (I) 304, 305 (Aspiration) 336, EUH066 (solvents) and all H-numbers not otherwise listed	319, <b>335</b> (I) 336 (solvent) 304 (Aspiration) Non health hazard H-statement codes	303, 313, 333 (GHS Tox 4) 305 (ICS) 316 (GHS-> noCLP), 320 (GHS eye irr 2b->CLP 319)

# HB-engines variability

Substance	CLH H-codes	Band# per HB-engine		
		IFA	COSHH	EMKG
Maleic anhydride 108-31-6	H302 H314 <b>H334</b> H317	4	5	3
Diisobutylene (DIB) 25167-70-8	<b>H304</b> H336	2	1	1
Cumene 98-82-8	H304 <b>H335</b>	2	3	1
Ethanol 64-17-5	(CLH H225) (IARC 1)	-	-	-

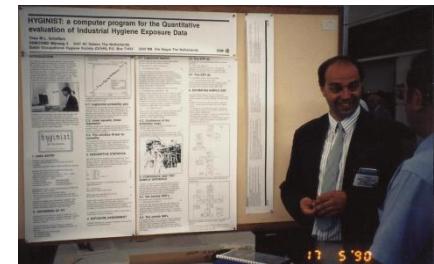
In red: the H-code determining the band #  
 Band# determines control regime

# Comparing 3 Hazard Banding Engines



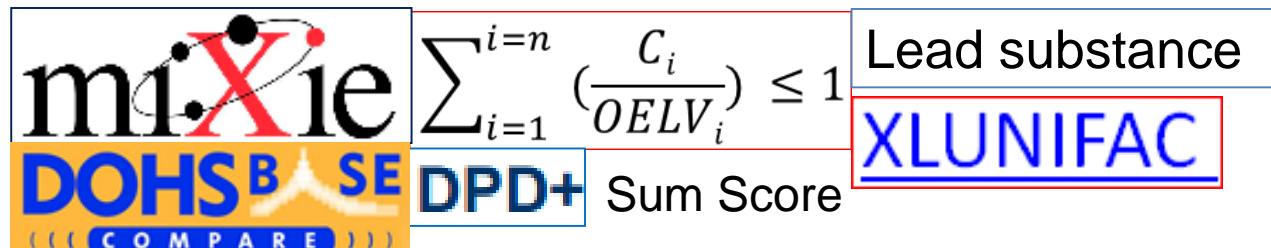
# *Compliance testing tools*

- OELV
- Health hazard
- Control Banding
- CB based Models
- Compliance testing
- Handling Mixtures



# *Mixture tools*

- OELV
- Health hazard
- Hazard Banding
- CB based Models
- Compliance testing
- Mixtures



# Summary and conclusions

- From poverty (70-s) to wealth
- Parallel tools with different outcome:
  - OELV's of the same hierarchy
  - Hazard banding
  - CB based models
- Confusing and shopping
- Damaging IH effectiveness & reputation
- International alignment approach

# Alignment recommendations

- Communicate and find support within WHO/OECD/ILO/EU/ECHA...
- Motivate key players/stakeholders to take action
- Bring key players/stakeholders together (IOHA 2018)
- Alignment Award
- Alignment ambassador
- Combine existing inventories of tools

# KAHOOT questions

1. Inherent principles of occupational hygiene, or more specific 'intrinsic chemical hazard properties', do differ between countries/cultures
  - Yes/no
  
2. Safe working with chemicals worldwide is hampered by the large number of tools developed by (inter)national bodies without mutual alignment.
  - Yes/no

# KAHOOT questions

3. Victims of the lack of alignment are (>1 tick is possible)
  - SME's
  - Workers world wide
  - International operating Industrial hygienist & enterprises
  - All of the above

# KAHOOT questions

4. Which organisation(s) should take the initiative to promote the alignment of IH tools?
  - Bilbao Institute (for EU)
  - WHO ILO
  - ISSA
  - IOHA

*Thanks!  
Questions & suggestions?*

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