

# Hazard Banding and Control Banding – Shortfalls and Pitfalls

Brent Altemose, CIH, CSP

Principal Consultant

SABRE Health & Safety, Easton, PA

Phone: 908.500.4784

Email: [baltemose@sabresafety.net](mailto:baltemose@sabresafety.net)

AIHce

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**What if we don't have an OEL or exposure data?**

**“God help us; we're in  
the hands of engineers.”**

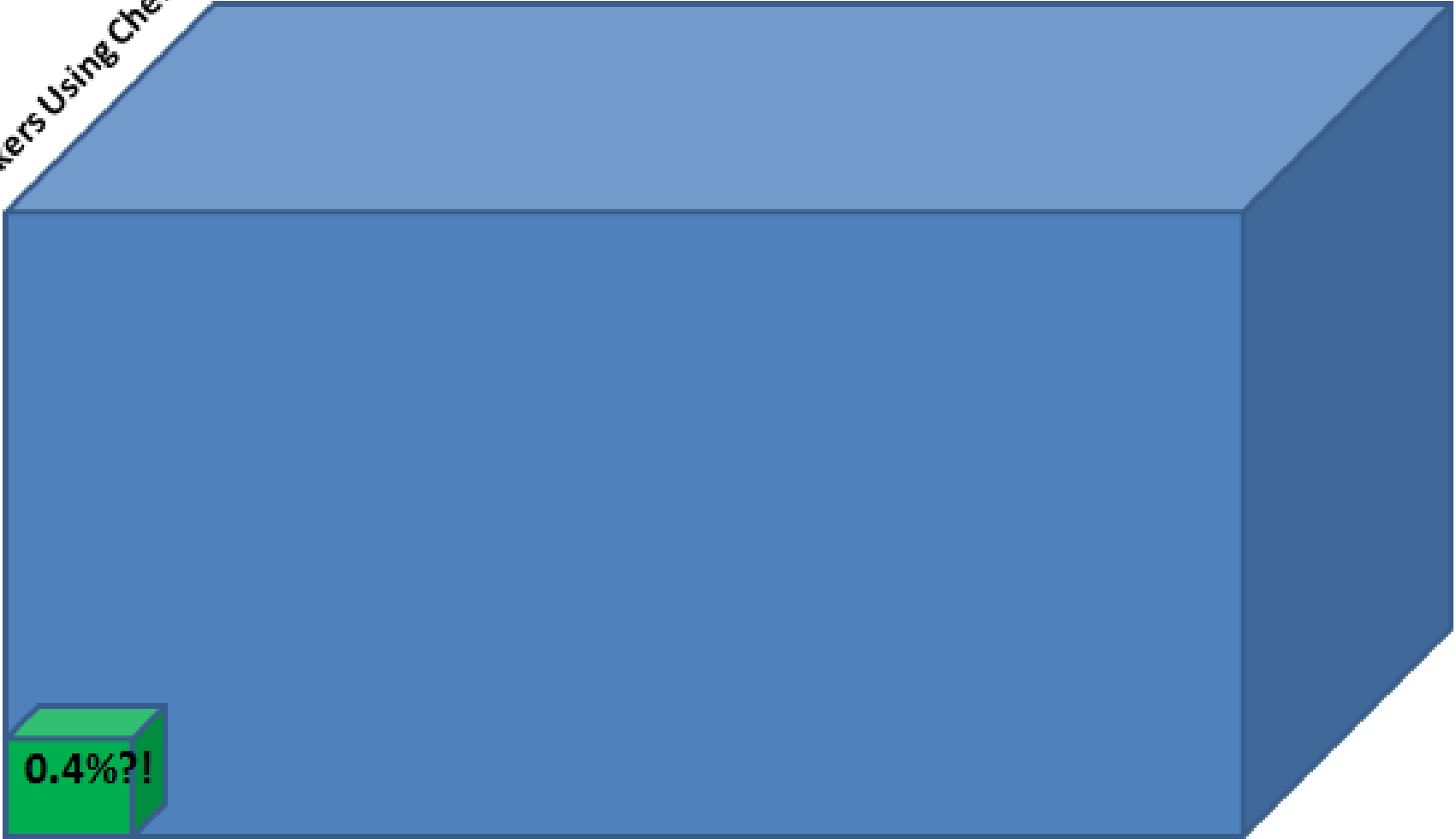
**Dr. Ian Malcolm**

## **Very generous estimates for argument's sake:**

- 10% of chemicals in the workplace have had some form of hazard assessment (OEL, tox testing, etc)
- 20% of locations using those chemicals have had some form of risk assessment (exposure monitoring, modeling, etc.)
- 20% of workers in those locations have had their exposure risk adequately characterized

*Workers Using Chemicals*

**Locations Using Chemicals**



**0.4%?!**

**Chemicals Used in U. S. Workplaces**

# Modern Industrial Hygiene Shortfalls and Pitfalls

- Decisions with limited data
- Poor understanding of statistical principles
- Outdated exposure limits
- “Bright line in the sand”
- Disparate end points
- No exposure limits for most chemicals
- Lack of controls verification

# Hazard and Control Banding Shortfalls and Pitfalls

- Decisions with limited data (no data?)
- Poor understanding of statistical principles (no statistics?)
- Outdated exposure limits (no OEL?)
- ~~“Bright line in the sand”~~
- Disparate end points (helps here)
- No exposure limits for most chemicals (helps here)
- Lack of controls verification (true enough)

# Hazard and Control Banding Shortfalls and Pitfalls

- Expert judgment and therefore expert systems, such as control and hazard bands, are not good at precise estimates.
- However, they are good within an order of magnitude – and depending on the context, that is often sufficient

# Example Chemical Risk Assessment

- Consumer products manufacturer
- Use of 61 chemicals reviewed
- 8 PELs (13%) , 11 OELs (18%)
- Many of the highest exposure potential chemicals had no exposure limits

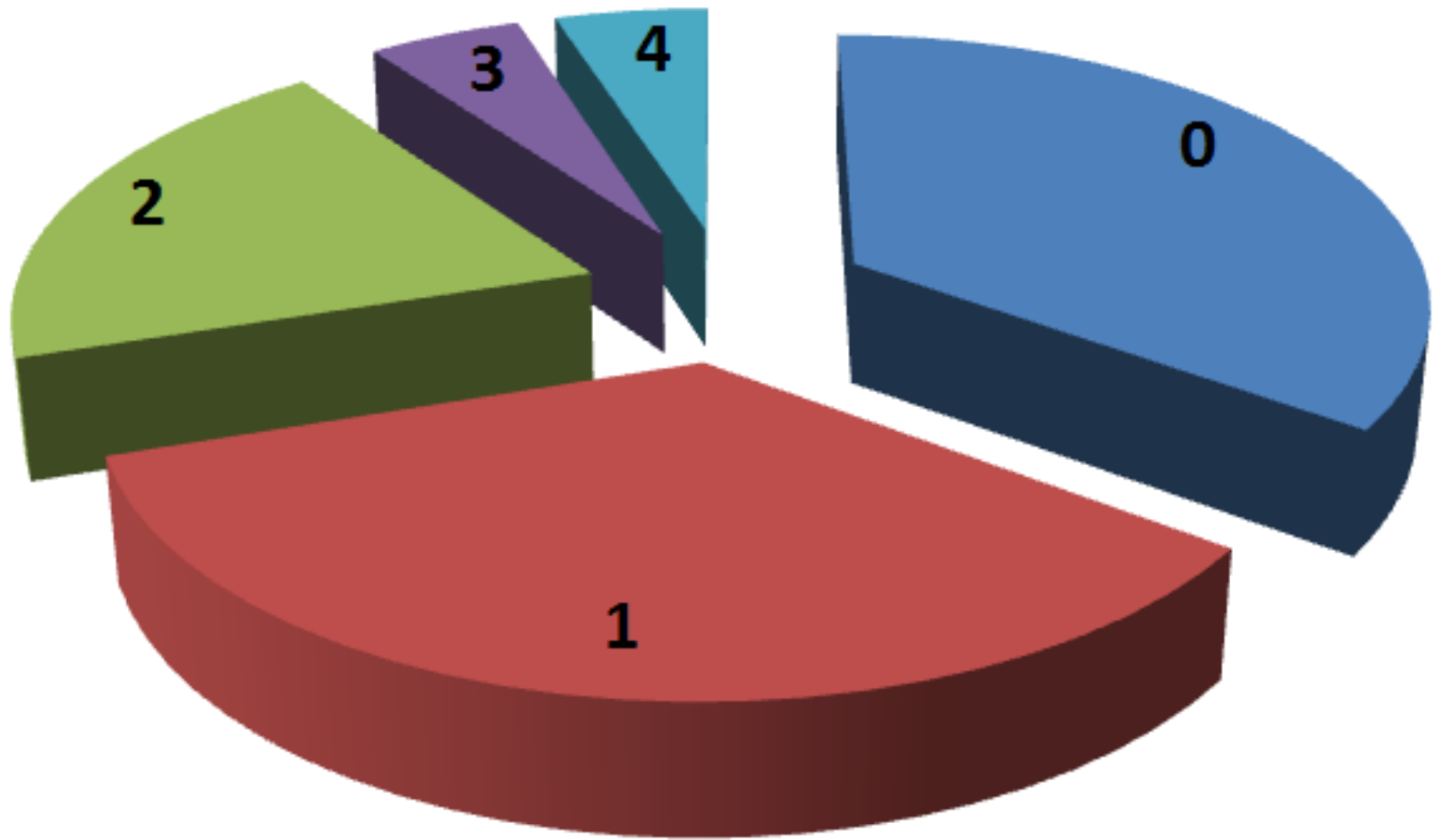
## AIHA Exposure Ratings

Rating*	Description	Values
0	Trivial	< 0.01 x OEL
1	Highly controlled	0.01 to 0.1 x OEL
2	Well controlled	0.1 to 0.5 x OEL
3	Controlled	0.5 to 1 x OEL
4	Poorly controlled	>1 x OEL

OEL = Occupational Exposure Limit

\*Ratings based on “A Strategy for Assessing and Managing Occupational Exposures”, 2006, 3<sup>rd</sup> edition. American Industrial Hygiene Association, Fairfax, VA. (trivial category added)

## Typical Breakdown of Workplace Chemical Exposure Risks within a Facility



		HAZARD BAND			
		1	2	3	4
CONTROL BAND	1				
	2				
	3				
	4				

		HAZARD BAND			
		1	2	3	4
CONTROL BAND	1			!!	!!!
	2				!!
	3				
	4				

		HAZARD BAND			
		1	2	3	4
CONTROL BAND	1			!!	!!!
	2				!!
	3	\$\$			
	4	\$\$\$	\$\$		

		HAZARD BAND			
		1	2	3	4
CONTROL BAND	1	?	!	!!	!!!
	2	\$	?	!	!!
	3	\$\$	\$	?	!
	4	\$\$\$	\$\$	\$	?



Source: Hoover et al., The Synergist, January 2011

Benefit/cost and value of info analyses

## How does banding fit in?

- Step 1. Qualitative risk assessment (banding, professional judgment); implement essential controls
- Step 2. Toxicological reviews; exposure modeling and risk assessment; refine controls.
- Step 3. Tox testing/modeling; OELs; methods; exposure assessment; dose-response; refine controls.
- Step 4. Ongoing exposure assessment and medical monitoring; dose-response including complex scenarios; test controls.

# Thank you!

Brent Altemose, CIH, CSP

Principal Consultant

SABRE Health & Safety

Phone: 908.393.1517

Email: [baltemose@sabresafety.net](mailto:baltemose@sabresafety.net)

