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Modern Problems: Occupational Safety and Health in the 21st Century

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Workplace Safety and Health

Outline

- Current problems
- Emerging issues
- New control approaches
- Opportunities for impact



Current exposures

- Lead
- Asbestos
- Silica
- Formaldehyde
- Noise
- Mold

Emerging exposures

- Infectious agents
 - ◆ SARS
 - ◆ Avian Flu
- Nano-materials



Gauley River



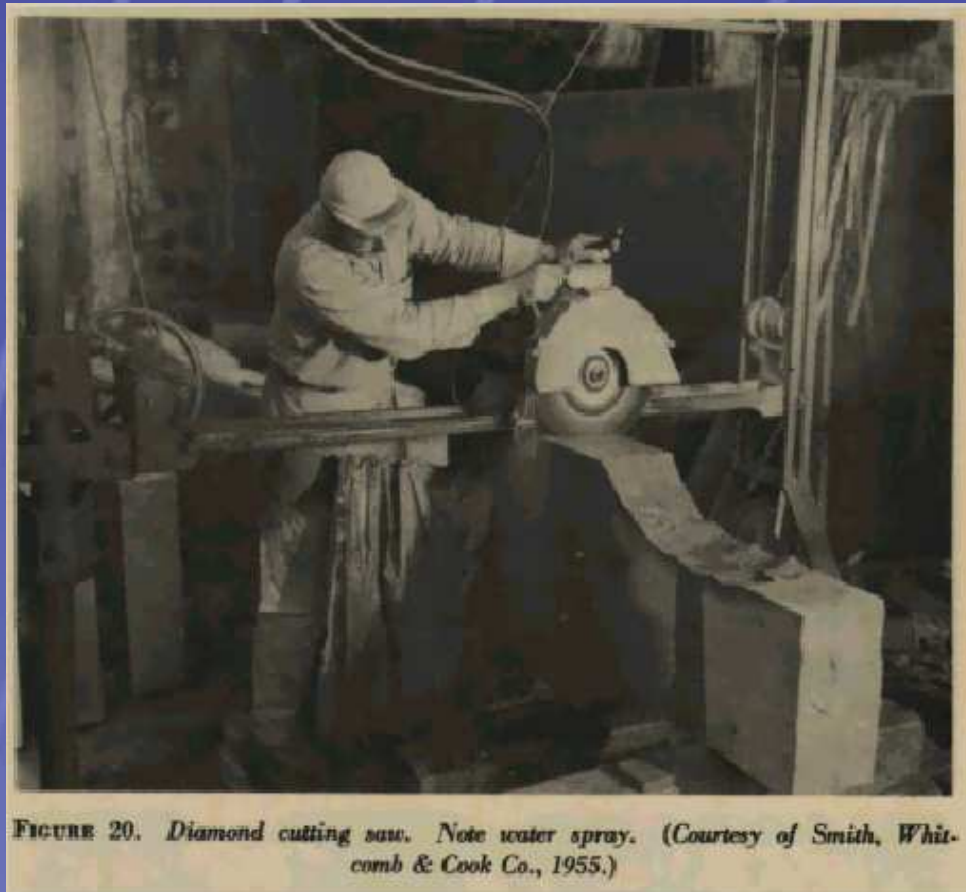
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Stone Cutting - 1955

(with water spray dust control)



Jackhammer Drilling - 1936



FIGURE 12. *Jackhammer drilling without dust control. (About 1936.)*

Stone Cutting ~1996 (no dust control)



Photo Credits: Ken Linch



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Drilling in 1990's – 2000's

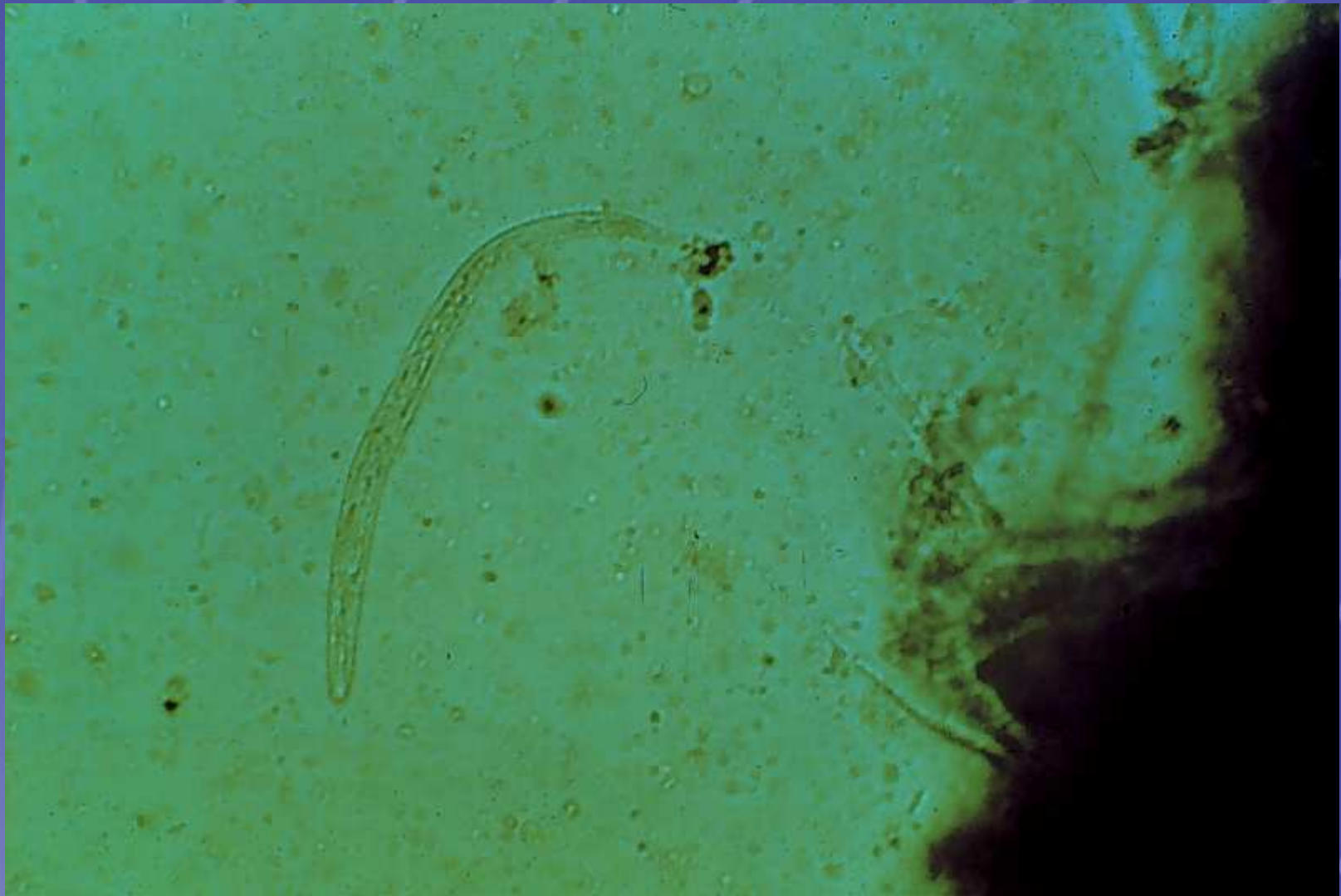


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Mold in hurricane-damaged home



Photo Credits: Carol Rao

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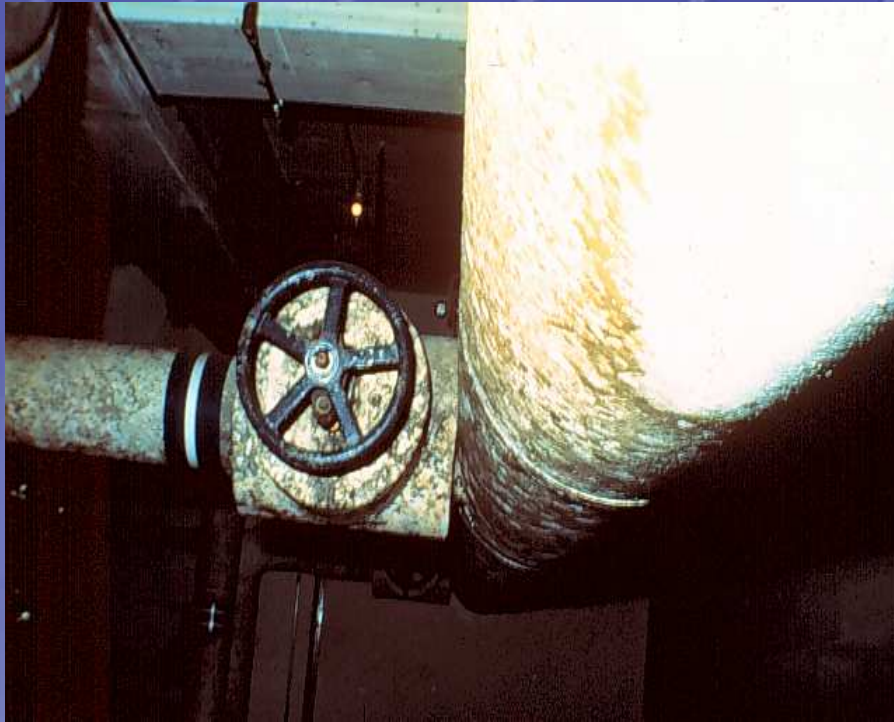
Leviticus 14:35

“He shall examine the disease; if the disease is in the walls of the house with greenish or reddish spots, and if it appears to be deeper than the surface, the priest shall go outside to the door of the house and shut up the house seven days. The priest shall come again on the seventh day and make an inspection; if the disease has spread in the walls of the house, the priest shall command that the stones in which the disease appears be taken out and thrown into an unclean place outside the city.”

Circa 650 B.C.E.



Mold in office building



Anthrax at Hart Senate Office Building





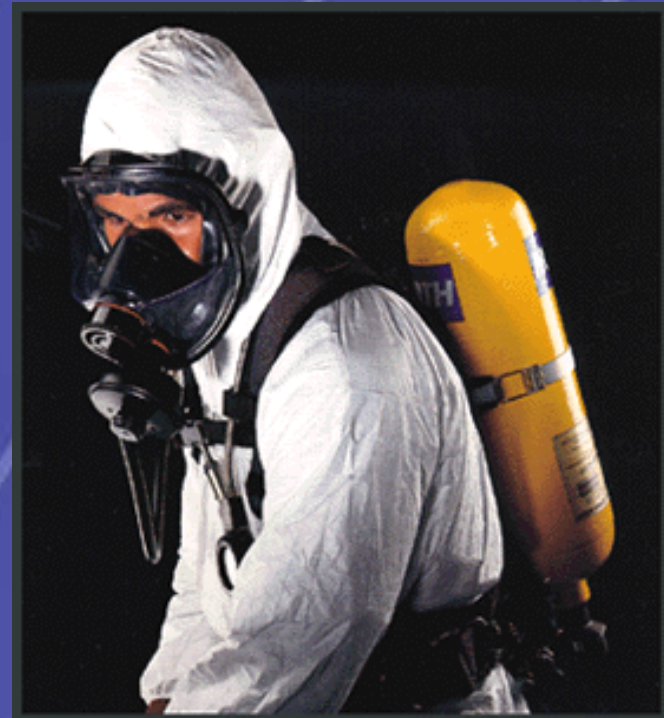
Kenneth Lambert / AP



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Nanotechnology in today's products

Nano clay composite



Easton CNT is Real Nanotechnology

The Buckey Ball
Discovered in the eighties, the Buckey Ball derives its name from noted architect Buckminster Fuller. Sixty carbon atoms, each sharing covalent bonds with three other carbon atoms, is similar to the structure of the carbon nanotube.

The Carbon Nanotube (CNT)
A carbon nanotube is a structure one billionth of a meter.

Easton's Tiny Innovation Is Huge
Easton has an eighty-three year history of leading the market by developing new materials and innovative products. Easton has been manufacturing sporting goods using carbon-fiber composites since 1989 and has been the leading brand of composite bicycle handlebars since their introduction in 1995.

Now Easton's research and development team is proud to present a breakthrough in composite materials and manufacturing.

The Next Frontier
Nanotechnology is the next frontier in scientific research and manufacturing. Nanotechnology deals with the manipulation of matter on the atomic or molecular scale measured in billionths of a meter (nanometers). Worldwide are spending countless man-hours and billions of dollars on research and development for nanotechnology in the areas of electronics, medicine, and structural reinforcement.

Enhanced Resin System™

Carbon nano-tube composite

Filtek™ Supreme Universal Restorative

Say goodbye to microfills and hybrids with our revolutionary new nanocomposite based restorative.

It's good to be king!



3M ESPE

Nano silica composite

NANOTEX™ Fabric

resists SPILLS

Spilled an iced latte in your lap, but you don't mind. The fabric is made with NANO-TEX™ spill-resistant fabric, so the liquid beads up and rolls right off.

Unlike conventional fabric, NANO-TEX™ has been seen before. NANO-TEX™ builds on the very fibers of the fabric, so the fabric keeps the liquid soft, and the liquid should be.

With NANO-TEX™ fabric, you're looking good. The complications roll away like water. You'll experience the breakthrough and the next.

Nano fibers



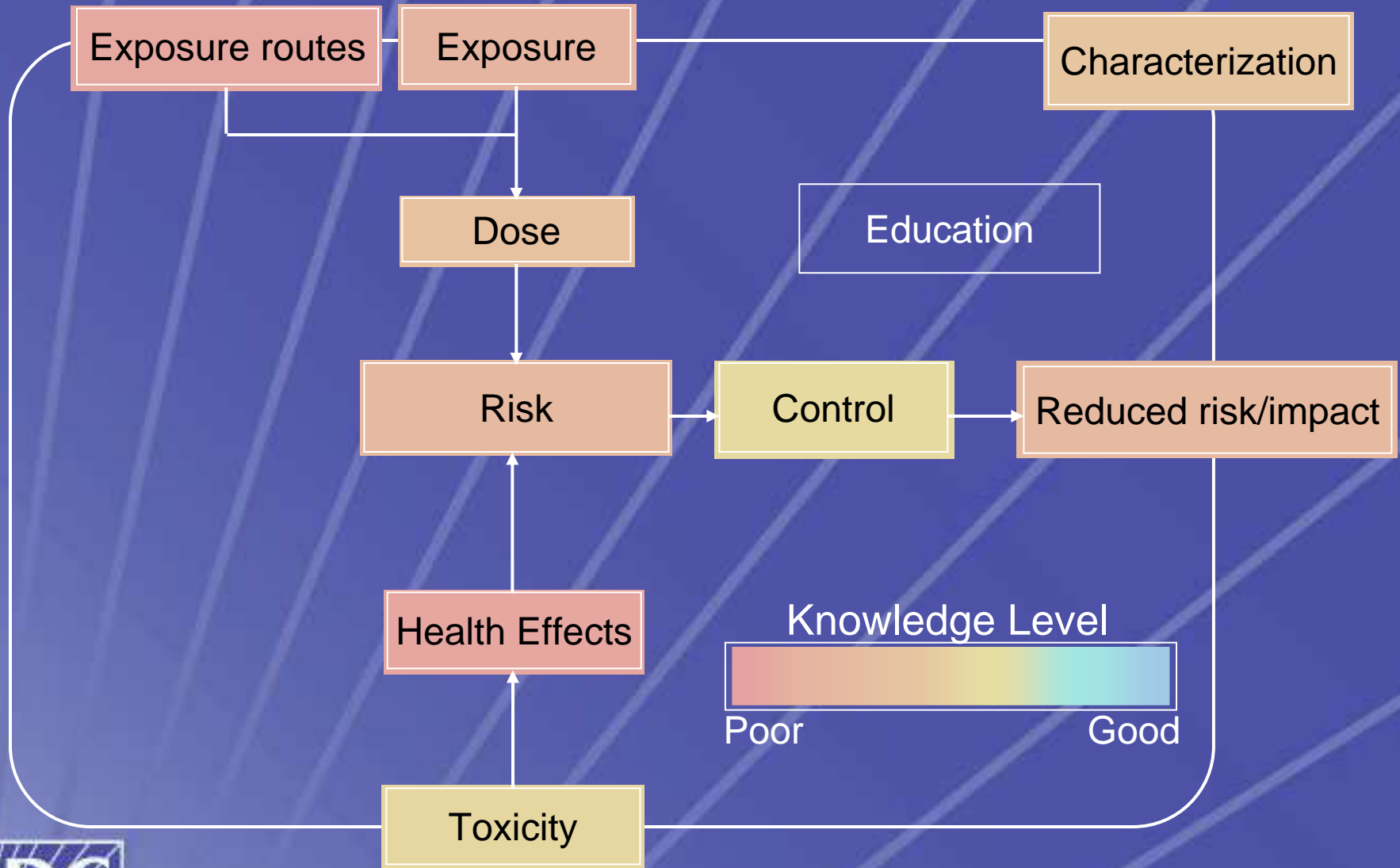
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Nanotechnology

- Are workers exposed?
- At what concentrations?
- Are there potential adverse health effects?
- What controls are available?
- How effective are they?



Addressing Occupational Impact





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Personal Dust Monitor



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Control Banding

Table 1. Control bands for exposures to chemicals by inhalation

Band No.	Target Range of Exposure Concentration	Hazard group	Control
1	>1 to 10 mg/m ³ dust >50 to 500 ppm vapor	Skin and eye irritants	Use good industrial hygiene practice and general ventilation.
2	>0.1 to 1 mg/m ³ dust >5 to 50 ppm vapor	Harmful on single exposure	Use local exhaust ventilation.
3	>0.01 to 0.1 mg/m ³ dust >0.5 to 5 ppm vapor	Severely irritating and corrosive	Enclose the process.
4	<0.01 mg/m ³ dust <0.5 ppm vapor	Very toxic on single exposure, reproductive hazard, sensitizer*	Seek expert advice.



Summary

- Monitoring technology
- Analysis methods
- Exposure limits and guidelines
- Risk management tools
- Translate research to practice





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www.cdc.gov/niosh

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