



# Evaluating Risk

UNDERSTANDING MULTIPLE PERSPECTIVES

YouTube  
Chemistry

### Chemistry Lab Pt. 1



### V 22 Sodium on water - Natrium auf Wasser

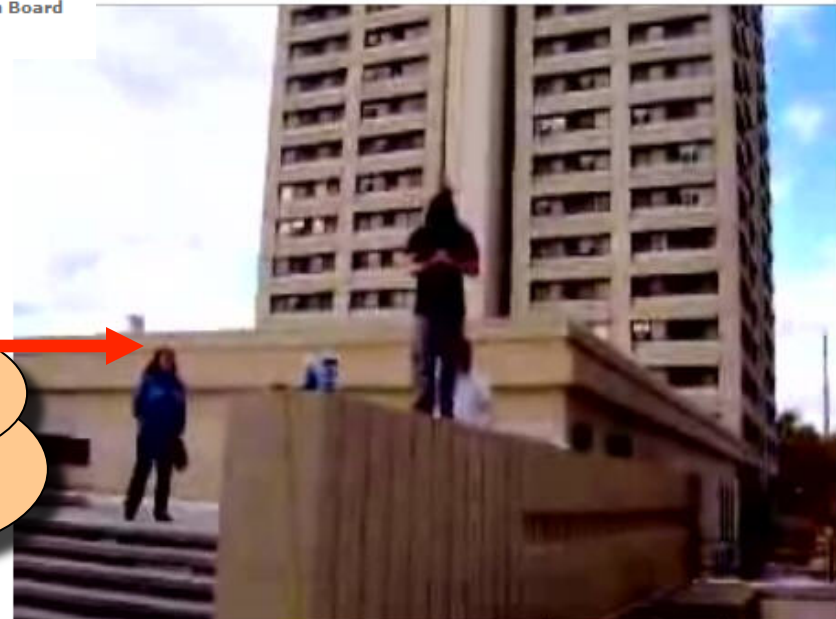




U.S. Chemical Safety and Hazard Investigation Board

The aftermath of the fatal explosion at BP's Texas City refinery two years ago

## Comptu Chemistry Experiment



The Mentos Experiment  
can be fun, ...



# Where you when....

- ▶ John F. Kennedy was assassinated?
- ▶ You heard about the Bhopal, India chemical accident?
- ▶ You heard about the crash of TWA Flight 800?
- ▶ You heard about the OKC Bombing?
- ▶ On September 11, 2001?
- ▶ Texas City Plant Explosion?
- ▶ Hurricane Kat-Rita?
- ▶ Paris Bombings?

# Ask your self....



- ▶ Did these events change my behavior?
- ▶ How safe do I feel?
- ▶ What concerns do I have about ..
  - ▶ Business Travel
  - ▶ Driving to Work
  - ▶ My Personal Activities
  - ▶ Where I Live
  - ▶ Where I Work
- ▶ What changes am I willing to make to feel safe?
  - ▶ Behavioral
  - ▶ Liberties


# Ask your self....



- ▶ Has my behavior changed over the past..
  - ▶ Year
  - ▶ 2 Years
  - ▶ 5 Years
  - ▶ 10 Years



# Now ask your self ..



- ▶ Did these events change my perception of risk?
- ▶ Did these events change my day-to-day behavior?
- ▶ Am I more likely to die than I was yesterday?
- ▶ What choices do I make because of my view of risk?
- ▶ Am I trying to eliminate risk at the cost of desired benefits?
- ▶ *How is my view of risk different than my neighbors? If so, why?*

# Definition of Risk



Kloman:

-The possibility of deviation from the expected.

-<http://www.riskreports.com/htdocs/riskmatter.html>

## Multiple Definitions of Risk

- Risk as hazard
- Risk as probability
- Risk as consequence
- Risk as potential adversity or threat

Paul Slovic

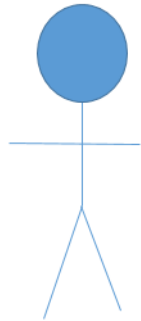


# So, why are so many people ...

- ▶ Willing to drive to their destination rather than fly?  
Or, willing to allow a car to drive for them, but not take a bus?
- ▶ Worried about a transportation pipeline through their neighborhood but not the trucks?
- ▶ Worried eating GMO corn, but will eat a processed food?
- ▶ Worried about industrial activity, but willing to use a pesticide or herbicide on their lawns in bare feet and shorts?

# Perception

6



9

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# It is the perception of risk!

- ▶ It is very subjective
- ▶ Based on characteristics and severity.
- ▶ Personal history
- ▶ Sense of control
- ▶ Perceived benefits

*And, the knowledge or  
perceived knowledge base.*



# Risk versus Benefit

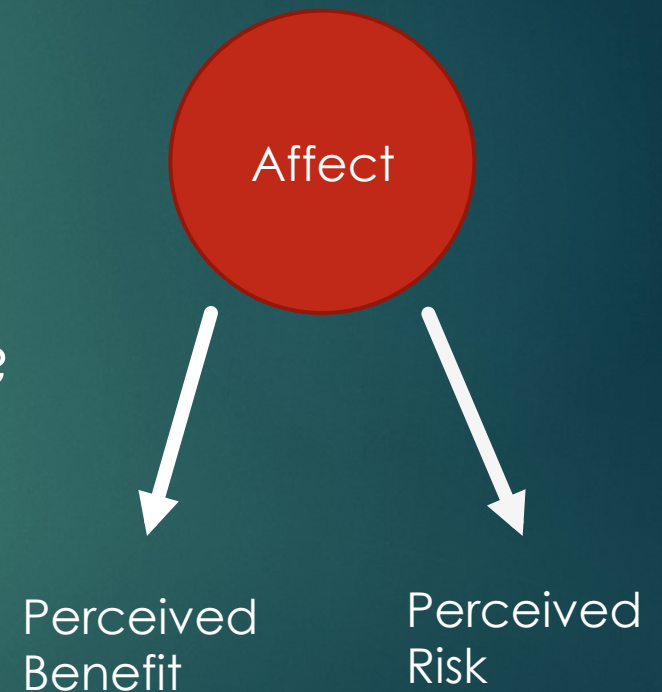
What really is the question??

Is this product acceptably safe?

Is this activity acceptably safe?

Is this technology acceptably safe?

Is this process acceptably safe?



# Acceptable Risk for New Technology

Measured by:

That level of safety associated with ongoing activities having similar benefit.

# Laws of Acceptable Risk

- ▶ Roughly proportional to the cube of the benefits.
- ▶ Voluntary risks are 1000 times more likely to be accepted than involuntary ones.
- ▶ Inversely related to the number of persons exposed to that risk.
- ▶ The level of risk for voluntarily accepted hazards is similar to the level of risk from disease.

*The Perception of Risk*, Paul Slovic, credited to Starr 1969



# What Determines Risk Perception?

- ▶ Comparison to Frequency of Death
- ▶ Imaginability and Memorability of the Hazard
- ▶ Dread
- ▶ Likelihood of Mishap of Being Fatal
- ▶ Catastrophic Potential
- ▶ Availability of Information

“Rating the Risks”, *The Perception of Risk*, Paul Slovic

# Risk Management



Kloman:

“A discipline for living with uncertainty”

-<http://www.riskreports.com/htdocs/riskmatter.html>

# The Media, Risk Assessment and The Numbers



- ▶ Complex Issue & Short Timeframes
- ▶ Improper Links
- ▶ Bare Risk versus Qualifying Risk
- ▶ Expert Disagreement



# Reducing Risk



- ▶ Stay Current with Best Practices
- ▶ Monitor Regulatory Climate
- ▶ Monitor Public Concerns
- ▶ Audit, Audit, Audit
- ▶ Educate, Educate, Educate