

# Energy Theory of Accident Prevention

Rex Kitchen, Risk Manager

# Why We're Here?

- \* Who's Accountable for Accident Prevention
- \* Review the Energy Theory of Accidents
- \* Real World Examples of the Energy Theory In Action

# Powerball – Got Yours!



# Powerball Facts

- \* Current Prize - \$1.5 Billion
  - \* Cash Value Estimate
    - \* \$850,000,000
  - \* After Taxes
    - \* \$550,000,000 +/-
  - \* Odds of Winning?
    - \* 1/292,000,000

**\* Good Luck With That!**

# Lucky Numbers

- \* What's yours?
- \* My Lucky Number is 13
  - \* Isn't 13 suppose to be unlucky?
    - \* Templars
      - \* First World Banking Network
    - \* King of France Deeply in Debt in 1307
    - \* Friday the 13<sup>th</sup> of October 1307
      - \* King orders all Templars rounded up and killed
  - \* The first Dave Ramsey "We're Debt Free" Scream

# Thirteen is Bad For Another Reason

- \* Did You Know

- \* 13 Work Related Deaths per Day on Average
- \* Top Three Industries for Deaths
  - \* Construction
  - \* Mining

\* Agriculture

# What's the Chances?

- \* Winning Powerball Lottery
  - \* 1/292,000,000
- \* Becoming President of the United States
  - \* 1/10,000,000
- \* Struck by Lightening
  - \* 1/300,000
- \* Being Killed in a Workplace Accident
  - \* 1/63,000

# So Who's Accountable?

- \* Behavior Based Safety
  - \* Very Popular Accident Prevention Program
  - \* Big Companies
    - \* DuPont “Stop Program”
    - \* BST
    - \* Others
  - \* Process
    - \* Observe Safe Versus Unsafe Behavior
    - \* Chart Safe Versus Unsafe Behavior
    - \* Feed Back Statistics To The Target Group



# So Who's Accountable?

- \* New Thinking on Accident Prevention
- \* Robert Veazie – Commitment Based Safety
- \* So Who's Accountable?
  - \* You Are!
    - \* Not your boss
    - \* Not your HR Department
    - \* Not your Safety Department
    - \* You Are!

# Commitment Based Safety

- \* Keys To Commitment Based Safety
  - \* First Manage Your Risks
    - \* Identify/Correct Problems You See
    - \* Be Accountable To Yourself For Safety
      - \* Don't Text and Drive ( Your Commitment)
  - \* Then Look To Help Manage Others Risk
    - \* Coach When You See Something Wrong
      - \* Discuss With Your Child Why Not To Text and Drive
    - \* Help Others Be Safe

# Energy

- \* What is Energy?
  - \* In physics, **energy** is a property of objects which can be transferred to other objects or converted into different forms, but cannot be created or destroyed.
- \* Keys
  - \* Can Be Transferred To Other Objects
  - \* Converted Into Other Forms
  - \* Cannot Be Created or Destroyed
    - \* Law of Conservation of Energy

# Energy Measurement

- \* How Do We Measure Energy?
  - \* Calorie
    - \* Energy Required to Raise One Kilo of Water One Degree Centigrade.
    - \* Kilo Calories (1/1000 of Calorie)
      - \* Food Labels
  - \* Organic Caloric Content
    - \* Wood
    - \* Oil
    - \* Food

# Work

- \* What Is Work?
  - \*  $\text{Work} = \text{Force} \times \text{Distance}$
- \* Example
  - \* Push A Ten Pound Box Five Feet
    - \*  $\text{Work} = 10 \times 5 = 50 \text{ foot-lbs}$
- \* What Happens?
  - \* Energy Transferred To Another Object
  - \* Chemical Energy (Snickers Bar) Converted To Mechanical Energy to Perform Work
  - \* Energy Conservation ( $\text{Work} + \text{Heat Loss} = 50 \text{ ft-lbs}$ )

# Entropy

- \* Definition
  - \* the degradation of the matter and energy in the universe to an ultimate state of inert uniformity
- \* WTF?
  - \* Every Thing Moves To A Zero Energy State Given Enough Time
  - \* Absolute Zero
    - \* - 454 degrees below zero
  - \* Zero Energy State

# Energy Theory of Accident Prevention

- \* Old Saying in Insurance
  - \* The only thing they want to underwrite is “Pig Iron at the Bottom of a Lake”
  - \* Why would they say that?



# Energy Theory of Accident Prevention

## \*Zero Energy State

- \*Nothing Can Happen – They'll Be Happy To Take Your Money To Insure Pig Iron Under Water!



# Energy Theory of Accident Prevention

- \* **The Energy Theory:**

- \* **Accidents Are The Result of Unintended Release of Energy in the System That Cause Damage or Injury.**

- \* If There's No Energy– No Problems (Pig Iron Under Water)
    - \* Zero Energy State

# How Do We Do It?

- \* Prevent Accidents by:
  - \* (I) Identifying The Energy In The System
  - \* (R) Respecting The Energy In The System
  - \* (C) Control The Energy In The System

\* **IR C**

# Identify The Energy

- \* Types of Energy
  - \* Kinetic
    - \* Truck Moving Down The Road
    - \* Bullet Moving Down Range
    - \* Flywheel Spinning
  - \* Stored Potential Energy
    - \* Water Behind A Dam
    - \* Truck Part On A Shelf
    - \* Erected Grain Bin/Leg

# Identify The Energy

- \* Thermal Energy
  - \* Open Flame
  - \* Radiant Heater
- \* Electrical Energy
  - \* Motors
  - \* Extension Cords
- \* Chemical Energy
  - \* Gasoline
  - \* Paint Thinner
  - \* Propane

# Identify The Energy

- \* Radiant Energy
  - \* X Ray Machine
- \* Sonic Energy
  - \* Loud Noises

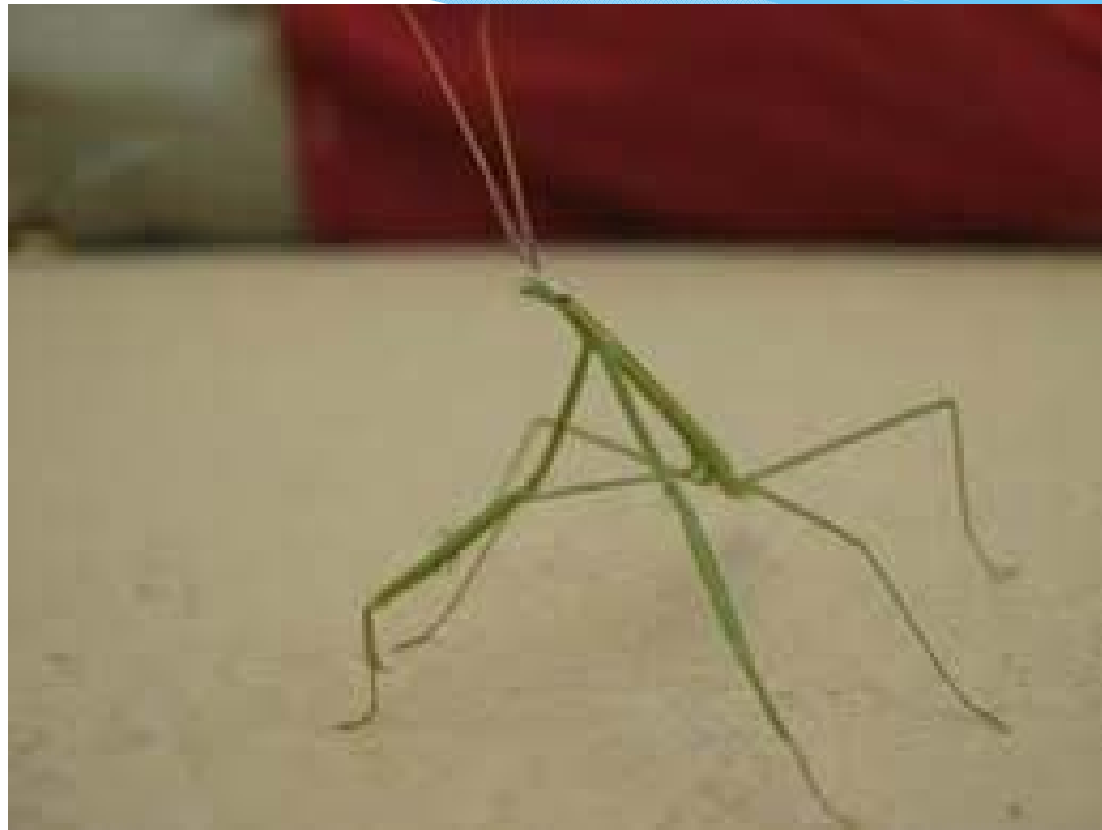
# Dark Energy

- \* Not Energy in A Physical Sense
- \* Negative Energy
  - \* Will Suck Energy Out You and Kill You!
- \* Examples
  - \* Harmful Gases
    - \* Grain Bin/Confined Spaces
  - \* Engulfment
    - \* Grain
  - \* Water
    - \* Drowning
    - \* Hypothermia

# Energy Systems

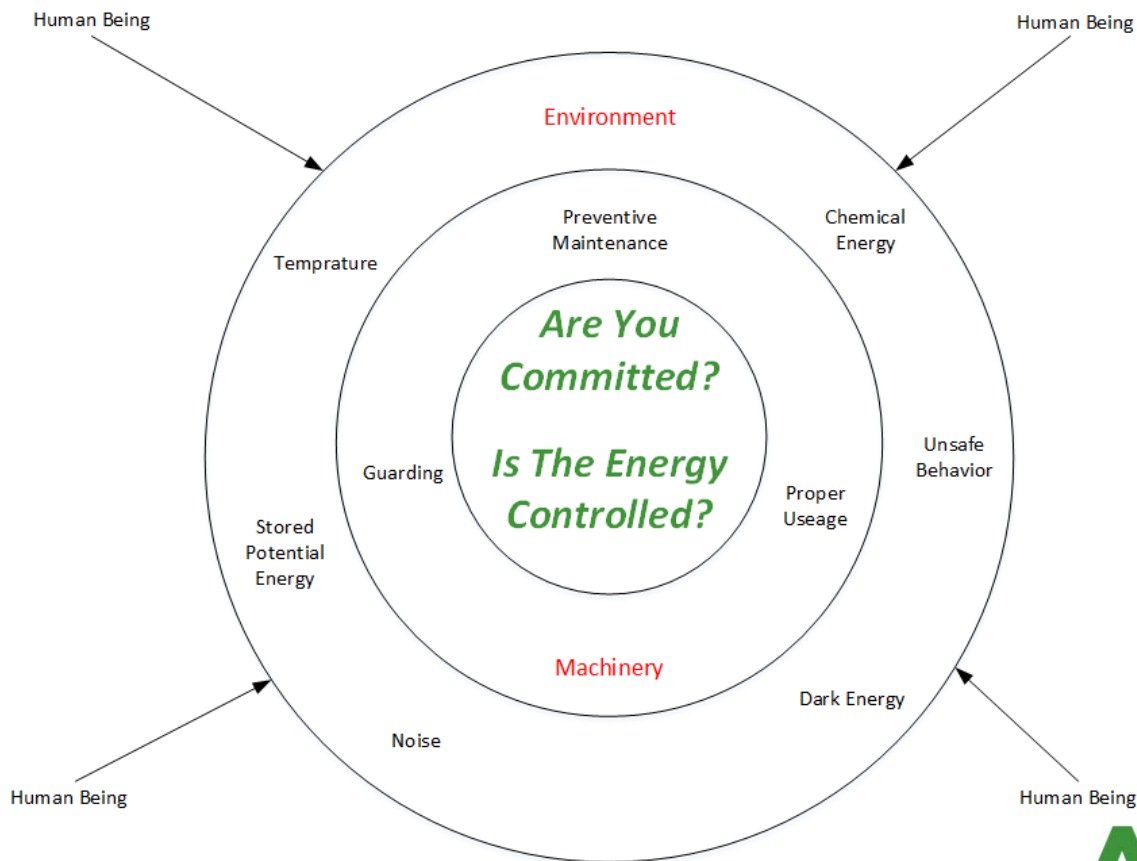
- \* Rarely Just One Type Of Energy In System
  - \* Example
    - \* Gasoline Tanker Truck
      - \* Kinetic Energy
      - \* Chemical Energy
      - \* Thermal Energy
    - \* Feed Grinder
      - \* Electrical
      - \* Kinetic
      - \* Chemical
      - \* Sonic (Noise)

# Antenna Up At All Times





# Be An Energy Ninja



# Respect The Energy

- \* Gun Owners?
  - \* Do You Respect The Energy?
    - \* Lock Up Your Guns
    - \* Handle Them Properly
    - \* Secure The Ammunition
- \* Truck Drivers
  - \* Do You Respect The Energy?
    - \* Go 60 MPH – Same Energy Content as Two Sticks of Dynamite
    - \* Got Respect Now!

# Respect The Energy

- \* Grain Elevator Operators
  - \* Do You Respect The Energy?
    - \* Grain Dust Has More Explosive Power Than Dynamite
      - \* Housekeeping
      - \* Electrical
      - \* Hot Work Programs
      - \* Smoking
  - \* Got Respect?

# Control The Energy

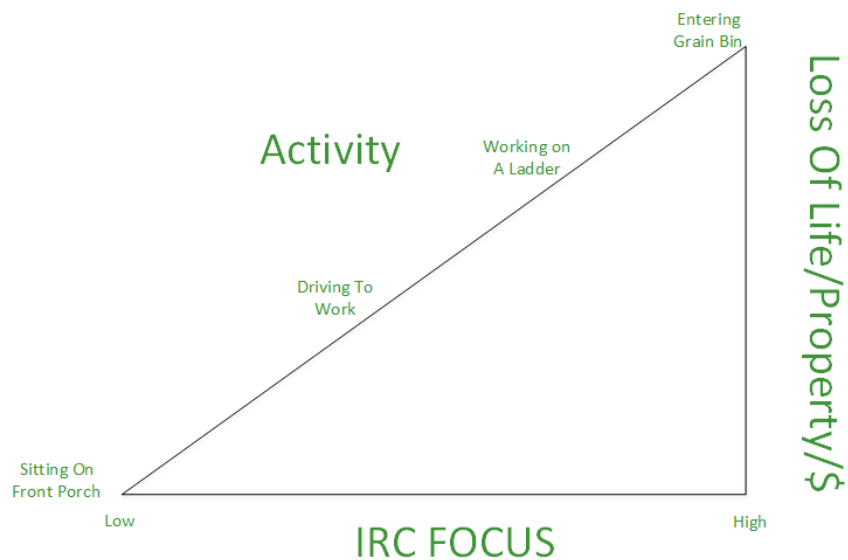
- \* How Do We Control The Energy?
  - \* Avoidance
    - \* Do we have to do it?
    - \* Can We Substitute Something Less Hazardous?
  - \* Procedures
    - \* Follow All Safety Rules
    - \* Lock Out Equipment
    - \* Confined Space Entry
  - \* Equipment
    - \* Maintenance
    - \* Right Tools For The Job
    - \* Guards

# Control The Energy

- \* Use Caution At All Times
  - \* Slow Down
  - \* Always Expect The Unexpected
  - \* Always Plan The Move

# Control The Energy

## Identify/Respect/Control Risk Triangle



# Ninja Workshop

- \* Putting Up Your Christmas Lights At Home
  - \* Environmental Issues
  - \* Energy Types
  - \* Controls
- \* Cleaning Elevator Head House Following Harvest
  - \* Environmental Issues
  - \* Energy Types
  - \* Controls

# The Keys To Accident Prevention

- \* **Be Committed**

- \* Manage Your Own Risks First
- \* Seeks To Help Others Manage Theirs

- \* **Always Remember The Energy Theory**

- \* Are You Dealing With Pig Iron Under Water?

- \* **IRC**

- \* Identify
- \* Respect
- \* Control



# Additional Resources

- \* For More Safety Information Visit:
- \* <http://www.abisonline.com/risk-management>

Thank You



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Insurance Services