

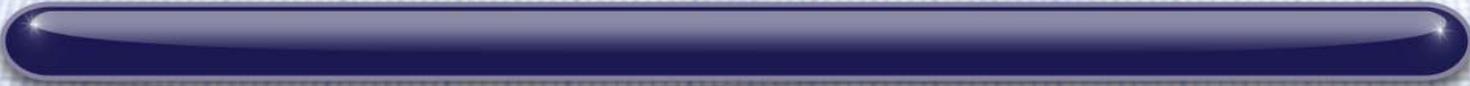
Risk Based Work Selection (RBWS)

How Good are you at Risk Management

Rank Order the following Risks - High to Low

- A. Dying in a car accident before you retire
- B. Bitten by shark on your next trip to the beach
- C. Plane trip to Atlanta
- D. Betting sports against your father-in-law
- E. Receiving a splinter at home during the summer
- F. Parking for 5 min in a handicapped spot

Let's work an example...



C. Plane trip to Atlanta

1/1,000,000 probability of Fatality

1/30 probability of sitting next to a person with BO

1/3 probability of sitting next to a “chatty” person

(and I'm an introvert)

Observations

- Answers must include both probability & consequence
- Time period is important
 - *Airplane risk is a single event*
 - *Car wreck risk was defined as decades*
- Worse case scenario not = worse risk
 - *I hate to fly not for fear of death, but for fear of my aunt Rosie*

Compare Notes with a Neighbor

Are there differences? WHY?

- Because your risk PERCEPTION is influenced by your experiences
- By definition, this is inadequate!!! (have you flown 1M times?)
- If you've experienced _____ once you will judge the risk higher (do you know someone who has died in airplane crash?)
- If you have NOT experienced, you may understate risk

... human nature, but WRONG for business

Dangerous Human Nature

- Single person risk assessments - NO GOOD
- Driving analogy

Drivers faster than you are... wreckless jerks

Drivers slower than you are... complete idiots

Are you really that good at judging proper speeds?

Companies need Risk tools & methods

just as society needs speed limit signs

Webster's Definition Risk

the possibility that something bad... will happen

Probability (of the Consequence)

- Certainty
- Possibility of occurring sometime
- Not likely to occur
- Less than lottery odds

Consequence

- Financial loss
- Someone hurt
- Environmental damage
- Reputation damage
- Other impact?

Wikipedia Risk Matrix

Consequence

	Negligible	Marginal	Critical	Catastrophic
Probability	Certain	High	High	Extreme
	Likely	Moderate	High	Extreme
	Possible	Low	Moderate	High
	Unlikely	Low	Low	Moderate
	Rare	Low	Low	Moderate

API RP581 Risk Matrix

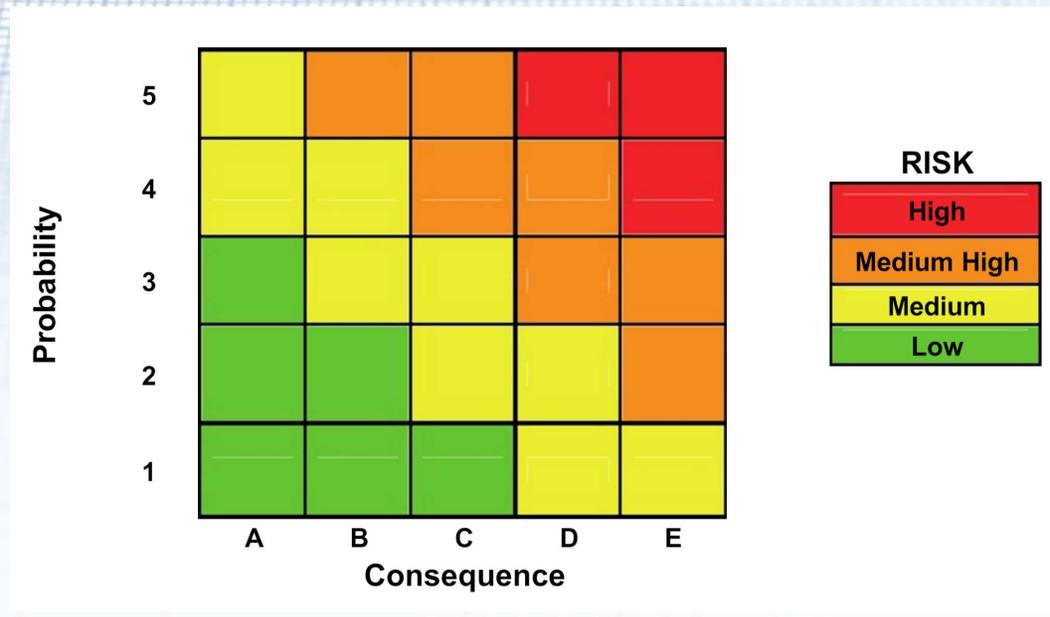
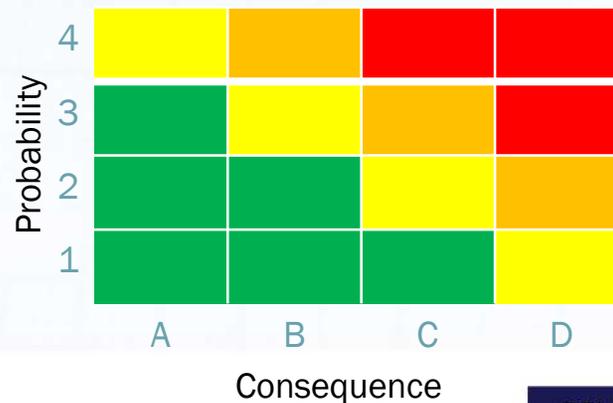


Figure 4.3 – Balanced Risk Matrix Example

Developing a Risk Matrix

- Many corporations will have their own version of a risk matrix
- Calibrating the matrix for extreme/high/medium/low levels of risk (risk categories) is a key responsibility of corporate leadership
 - *Acts as the corporation's speed limit sign for risk management*

For the purposes of this training let's use a simplified version:



Basic Information Requirements

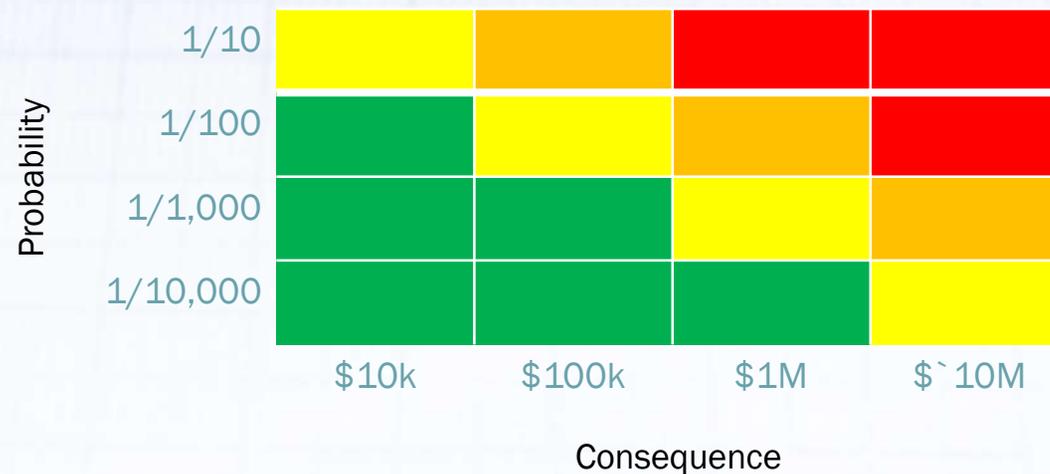
Risk assessments need “knowledgeable” personnel

- *Operations knowledge is key to this process*
 - ✓ Provides operational consequence of failure
 - ✓ Detectability from an operational perspective
 - ✓ Must have for successful implementation
- *Technical personnel*
 - ✓ Probability of failure mode
 - ✓ Effectiveness of mitigation steps
- *Mechanical personnel*
 - ✓ Duration and cost of repair

Financial Risk

- Financial Risk can be defined mathematically as
*“Probability * Consequence”*

Let's overlay numeric values onto our risk matrix



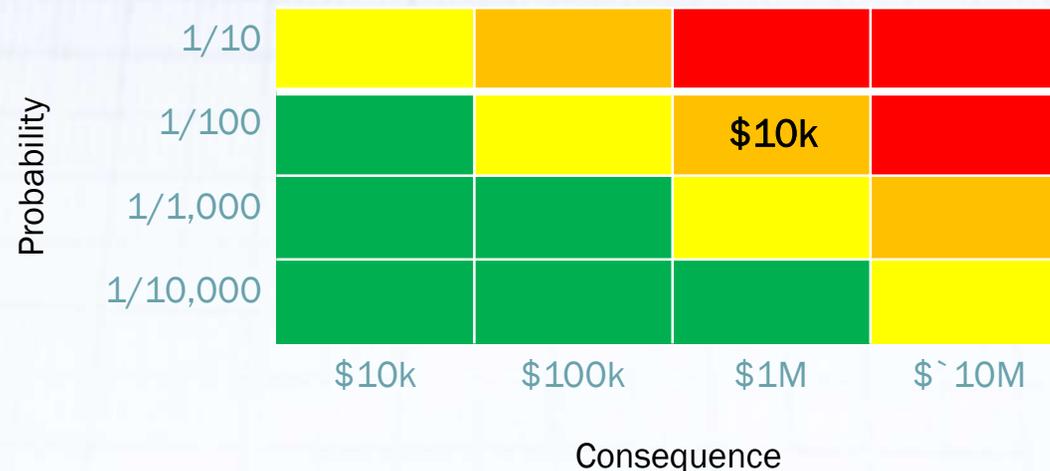
Financial Risk - calculated

- Let's say our example is the risk of random bearing failure of a critical machine lacking an on site spare bearing

*Risk = "Probability * Consequence"*

or

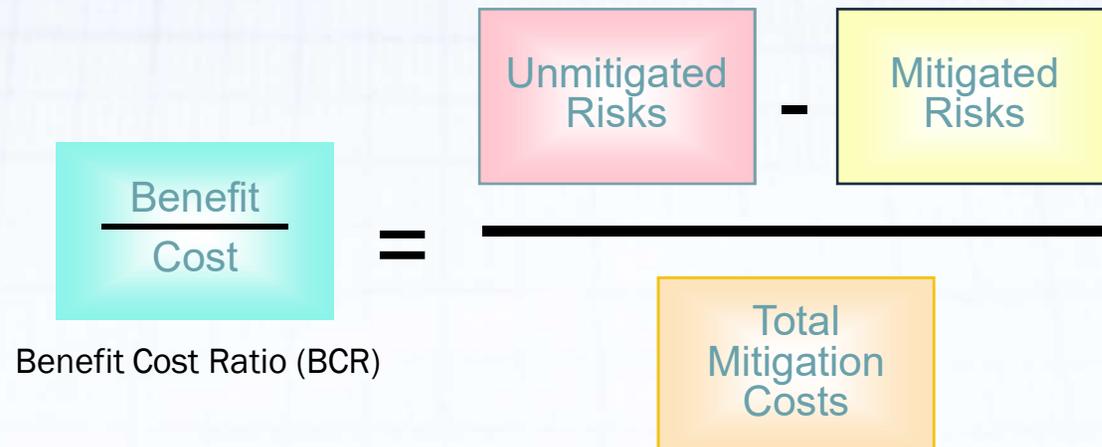
$$1/100 * \$1M = \$10k$$



So What?

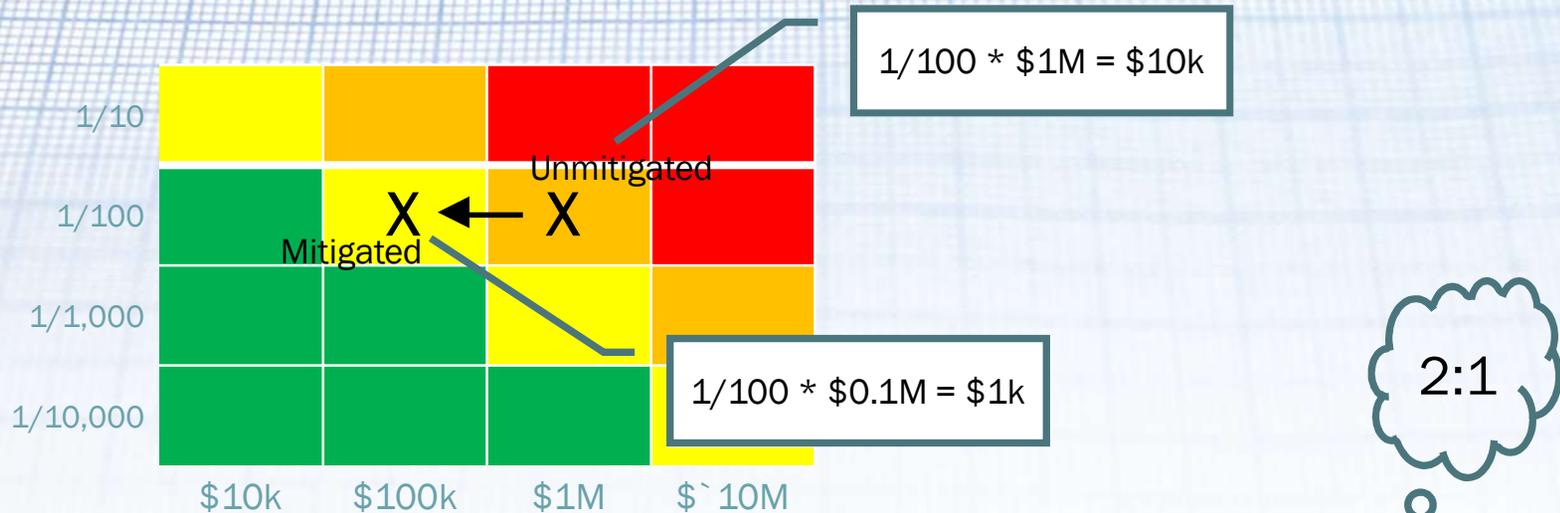
The significance of calculating Financial Risk as the product of Probability & Consequence is that we now have the ability to evaluate:

Benefit vs Cost as...



Back to our Example

(assume mitigation costs of \$5k)



$$\frac{\text{Benefit}}{\text{Cost}} = \frac{\$10k - \$1k}{\$5k} = 1.8$$

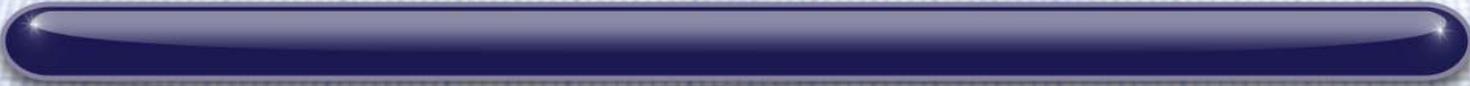
Benefit Cost Ratio (BCR)

A Word about BCRs & Hurdle Rates

PROPRIETARY

- A “hurdle rate” is a target BCR under which work is not selected
 - *Time dependent*
 - *Different for Margin benefits vs Operating Expense Benefits*
 - *Leadership responsibility to set the hurdle*

Closing Notes



- We manage risks everyday
- “Risk” is not a difficult concept for most people. But...
 - It’s common for different people to have different risk tolerances

However,

- Manufacturing organizations need consistent risk management systems to function consistently & efficiently
- Consistently managing “risk” at the corporate level takes considerably more effort that we typically exercise in our personal lives (where intuition rules)