Risk

2nd International Human Factors Conference by Lufthansa Flight Training
October 21st, 2016

Immanuel Barshi
NASA Ames Research Center
Immanuel.Barshi@nasa.gov
What is risk assessment?

It’s what we do all the time!

• Every decision is a choice.
• Every choice is a form of risk assessment.
• Every risk assessment is designed to inform a choice.
Risk Assessment

What are the chances of something bad happening?
What are the chances of something bad happening?

• Chances
• Something
• Bad
• Risk is relative

  – Risk assessment is used to compare options
  
    • Either to choose the least/acceptable risk option
      (what’s the risk of doing nothing?)
    
    • Or to choose the intervention that would lead to the
      greatest risk reduction (for the cost)
Which is riskier?
What are the chances of something bad happening?

- Chances – likelihood/probability
- Something - outcome
- Bad – consequences/severity/threat value
Risk

• Combination of probability (likelihood) and consequences (threat value)
  – Risk = f(p,c)
PRA

- Traditional “economic” definition
  - \( R_x = p_x \times c_x \)

- Example
  - Supplier A
    - \( P(\text{chip failure}) = 0.0001 \)
    - Cost (replace chip) = $0.30
  - Supplier B
    - \( P(\text{chip failure}) = 0.00001 \)
    - Cost (replace chip) = $0.60
  - Risk (Supplier A) = 0.00003
  - Risk (Supplier B) = 0.000006
Problem with PRA

– Doesn’t fit all conditions
  • Example: High probability-low threat & low probability-high consequence

– Example
  • Likelihood scale: 0 (guaranteed not to happen) – 1 (guaranteed to happen)
  • Consequence scale: 0 (nothing) - 100 (catastrophe)
  • Threat A: \( p(a) = 0.001, c(a) = 2 \)
  • Threat B: \( p(b) = 0.000001, c(b) = 90 \)
  • \( R(a) = 0.002; R(b) = 0.00009 \)
  • \( R(a) >> R(b) \)
PWA

- Low p
- High c
- Little d
The Risk of Multitasking
And the Risk of Speaking UP?

• Assumed High $p$
• Assumed High $c$
• Little to no $d$
Thank you for your attention.

Additional Information:

Or contact me at:  Immanuel.Barshi@nasa.gov