

Risk Assessment and Reduction-II

ENG101 Engineering Professionalism

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Risk-Benefit Analysis

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What is Risk-Benefit Analysis?



Quantification of risks, benefits and their ratio: advisability or desirability of a project



Is the product worth the risks associated with its use?



What are the benefits?



Do the benefits outweigh the risks?



Present value of risk (units)?



Same or different units (lives, rupees, etc.)



What is the future value of risks and benefits?



Aesthetic value – appearance, emotional effect?

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Valuation of Risks

Present value

Common set of units are convenient to use, e. g. the ratio of lives lost to the lives saved

Future value

Expected value of loss: magnitude of loss \times probability of loss

Expected value of gain: magnitude of gain \times probability of gain

Risk-benefit ratio: expected value of loss/expected value of gain

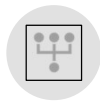
Discounting future value: Near-future benefits vs. far-off risks, interest/inflation rates?

Benefits to one party and risks to another party?

Risk in one set of units and benefits in another set of units

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Acceptability of Risky Projects



A commonly agreed-process or a process open to scrutiny and modification



Under what conditions, if any, is someone in society entitled to impose a risk on someone else on behalf of a supposed benefit to yet others?



Average risks and benefits



Worst case: maximum risk and minimal benefits



Acute statistics vs. statistical risk

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Personal Risk

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Voluntary vs Involuntary risks

Individual vs. public consent

Monetary value of human life?

Role of marketplace

Any examples to valueate personal risk?

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References

1. Zhu, Q., Martin, M. W., & Schinzinger, R. (2022). *Ethics in engineering*.

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