

# AN ARGUMENT FOR PROJECT RISK EVALUATION PROGRAMS

PURDUE GEOTECHNICAL SOCIETY WORKSHOP  
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# OVERVIEW

- Purpose Of Talk
- What is it?
- Simplistic Example
- PREP
- Advantages
- Barriers
- Limitations



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# WHAT IS MEANT BY RISK AND UNCERTAINTY ANALYSIS?

- Methodology for making decisions and developing solutions
- Uncertainties quantified and made explicit
- Additional evaluations considered
- Considers a range of options and possible outcomes
- Emphasizes communication and “assignment” of responsibilities
- Used on small elements of a project or the entire project

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# SIMPLISTIC EXAMPLE

- Land development project
- Start construction in the fall or spring next year?
- Upside of starting the project in the fall
- Downside of starting the project in the fall
- Lots of Unknowns

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# SIMPLISTIC EXAMPLE (CONTINUED)

## NORMAL APPROACH TO DECISION

- Consultants recommend waiting (liability reasons)
- Project manager concerned (doesn't want to fail)
- Home office pushes to start early (time is money)
- No one actually does a risk benefit analysis
- They wait

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# SIMPLISTIC EXAMPLE (CONTINUED)

## RISK AND UNCERTAINTY APPROACH TO DECISION

- Develop model
- Identify major risks, options and scenarios
- Use probability distributions
- Results expressed as cost, schedule uncertainty, and assignment of risks
- Owner, design team and contractor can make an informed decision

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# SIMPLISTIC EXAMPLE (CONTINUED)

## PORTION OF MODEL

- Weather statistics
- Estimate rain limits related to problems
- Assess cost and schedule impacts
- Result is probability distribution for additional earthwork costs related to early start
- Spreadsheet model

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# THE PREP PROCESS

- Project Risk Evaluation Process --- PREP
  - Define
  - Focus
  - Identify
  - Structure
  - Ownership
  - Estimate
  - Evaluate
  - Plan
  - Manage

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# DEFINE



- Consolidate Existing Information
- State project objectives
- Timing & Recourses
- Identify Stakeholders Interests

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# IDENTIFY

- Sources of Risks and Potential Responses
- Classify Risks



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# OWNERSHIP

- Distinguish Risks Owner is Prepared to Manage
- Identify Risks being Transferred to the Design Team
- Identify Risks Being Assigned by Contract to the Contractors
- Purchase Insurance for some Risks

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# LIQUEFACTION DESIGN EXAMPLE

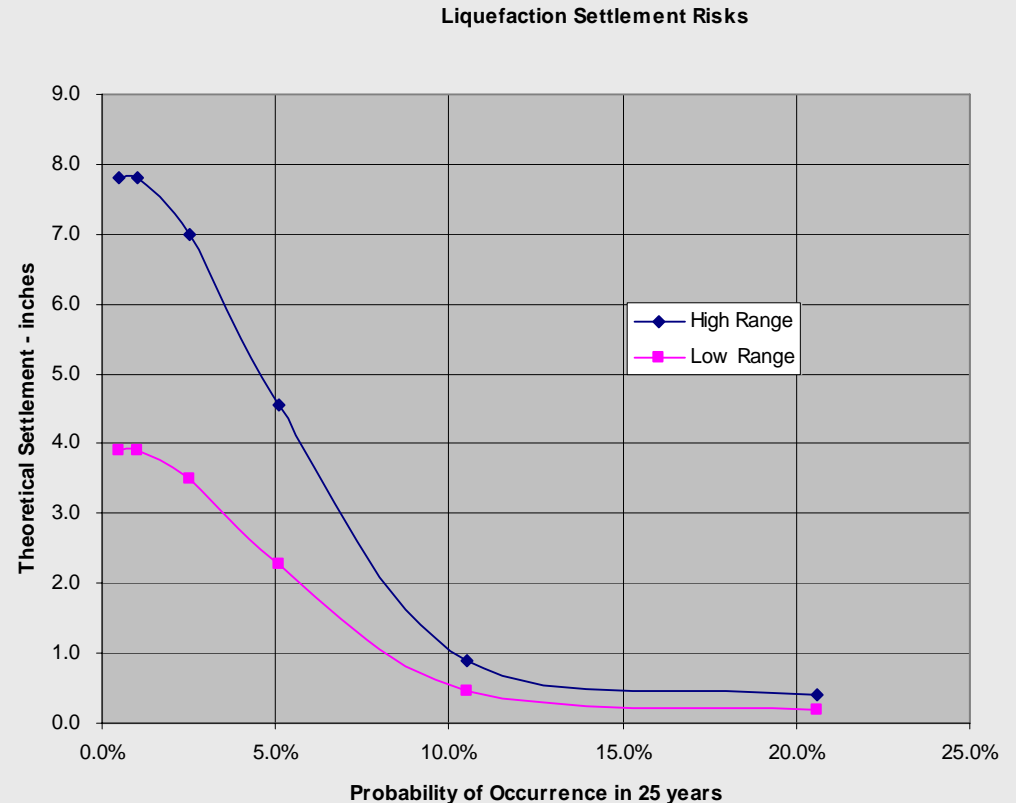
- Big box project
- Preload to allow spread foundations
- Risk of Liquefaction Causing Settlement
- IBC criteria indicates estimated settlement of 4 to 8 inches
- Pile foundation with structural slab adds significant costs
- No concern of structural collapse
- Owner wants to better understand risks

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# LIQUEFACTION DESIGN EXAMPLE

- Use USGS Seismic Hazards web site
- Convert to probability of occurrence over 25 years
- Use standard methods to predict liquefaction settlement



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# WHY GEOTECHNICAL?

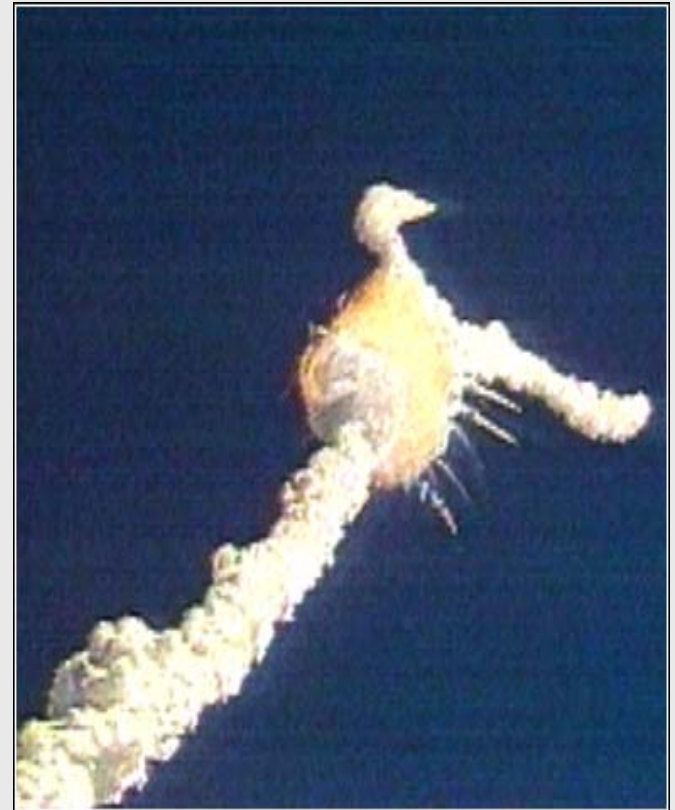
- It is in our culture to evaluate risks --- it is what we are trained to do!
- Riskier Projects --- Dams, Levees, Settlement, .....
- Experience

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# WHY NOW?



Feynman was a key player in finding the cause of the Challenger explosion 10 years ago

(CNN)

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# ADVANTAGES OF PREP

- Involves owner/stakeholders in major risk decisions
- Properly incorporates risk and uncertainty into contracts
- Improves communication and understanding of important issues
- Should result in more cost effective solutions
- Allows stakeholders to make better decisions

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# BARRIERS TO USE OF A RISK APPROACH

- Requires a sophisticated client
- Inertia for old ways
- Requires uncertainties to be quantified
- Loss of Control – Discovery of Hidden Agendas
- Hidden Costs (Owner was planning to transfer)
- Decision makers must be involved and understand process

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A meteor streaks across a dark blue night sky, leaving a long, glowing orange and yellow trail. A bright sun or moon is visible in the upper right quadrant, casting a soft glow. The background is a deep, dark blue with some lighter blue wisps, possibly representing clouds or a nebula.

Oh By the Way,  
One Lingering Risk  
We Haven't Discussed

Thank you