August 11, 2008
8th Annual Technical Forum
Geohazards in Transportation in the Appalachian Region

Risk Management in Geotechnical Decision Making

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Federal Highway Administration
Competing Demands...
Asset Management Perspective

- National Highway System Practically Complete
- Maintain, Improve, Manage
  - System Management and Monitoring
  - Construction and System Preservation
  - Evaluation and Economic Investment

- Managing Decisions…
Risk Management …a decision making tool.

Systematic Process Involving…

• Identification
• Analysis
• Planning
• Management
Risk

- Future Phenomenon
- May or May Not Occur
- Direct Impact to Project/Program
- Benefit or Detriment
Risk Management – Why?

• Limit Surprises
• Minimize Management by Crisis
• Operate Proactively instead of Reactively
• Reduce Long-term Costs and/or Variances
• Increase Likelihood of Success
• “Do It Right” the First Time
• Prevent or Minimize Bad Things from Happening
• Gain Competitive Advantage

Minimize Threats       Maximize Opportunities
Construction Claims

• Changed Conditions
  • Legitimate
    ➢ Inadequate site characterization
    ➢ Bust in process...
  • Fraudulent
    ➢ Loopholes in contracting method(s)
    ➢ Problems/Conflicts within specifications, special provisions, documentation...
Failures...due to...

- Geohazards
  - Complex Geologic Conditions
  - Man-Made Conditions
- Inadequate Design
- Inadequate Characterization
- Inadequate Construction
- Inadequate QA...
Inherent to Geotechnical Engineering…

- Geological and subsurface conditions are quite variable and dynamic
- Subsurface conditions are typically not readily apparent
- Generalize conditions on limited physical data
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**PROJECT:** Drilled Shaft Load Tests  
**LOCATION:**  
**JOB NO.:**  
**DATE:** 6-23-08

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**PROJECT:** Drilled Shaft Load Tests  
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Types of Risks...

- Pure Risks
- Business Risks

- Identified Risks - “Known Unknowns”
- Unidentified Risks – “Unknown Unknowns”
Maximum Value Approach

Greatest Reduction in Risk for the Cost

Compare Benefits of Response Strategies to Overall Cost

Expected Value = Probability of Risk Event $\times$ Impact of Risk Event

Quantitative or Qualitative
Effective Responses to Risks

• Appropriate to the Severity of the Risk
• Cost-Effective
• Timely
• Realistic and within Context
• Mutual buy-in from all involved
• Ownership/Responsibility
• Primary and Backup Strategies
Threat Responses

- Avoid
- Transfer
- Mitigate
- Accept
Opportunity Responses

- Exploit
- Share
- Enhance
- Accept
Risk Management: An Opportunity for the Engineering Geology and Geotechnical Engineering Professions

- A Rational Method for Showing Value
Risk Management Resources

NHI Course No. 134065: Risk Management

Other Sources:


Questions?