Intersection of Earthquake Engineering with the Digital Age: Applications to Resilience

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Motivation

• Risk and resilience assessment of university campus

• 50,000 students

• Buildings, utilities, and operations
Challenges

• Large amounts of data
• Accuracy and sensitivity
• Computational efficiency
Leveraging Digital Technology
Understanding Portfolio Risks
Web Application Architecture

Front-end

Administrator

Client

Back-end

Server

Risk Engine

Database

FEMA P-58 + REDi

ARUP
Integrating Automation in Workflow

Prepare  Field Evaluations  Upload and Analyze
Why Digital?

• Run asynchronously
• Manage data
• Visualize results
• Data interaction
• Easy Q/A process
User Experience

- External users
- Users can edit the buildings in the front end

See my email just sent - its done. Great app BTW C.
Computational Efficiency

Computation time

Increasing automation
Ecosystem of Digital Tools

- Portfolio risk web app
- Resilience payback calculator
- REDi Online
- Disaster reconnaissance
Lessons Learned

- Requires significant expertise - full-stack knowledge and scripting skills
- Set up the architecture with synthetic data, don’t wait
- Significant investment – long term payback
- Develop so that modules can be added later
Conclusions

• Digital technology enables more robust portfolio risk assessments

• Digital skills once the domain of software developers now beginning to penetrate our industry

• Next problem – how do we recruit and retain engineers with digital skills?