

From Resilient Infrastructure to Resilient Communities: how can emerging technologies support community efforts to become resilient?

Chris D. Poland P.E., S.E., NAE, M.ASCE, F.SEI

Consulting Engineer, Canyon Lake, California

NIST Disaster Resilience Fellow

The Role of Advanced Technologies in Structural Engineering for More Resilient Communities

ResilientAmerica
The National Academies of
SCIENCES • ENGINEERING • MEDICINE

Resilient Infrastructure

- Infrastructure
 - Buildings
 - Lifelines
- Resilience
 - Endure environmental conditions
 - Support routine daily use
 - Safety after disasters
- Tradition
 - Community regulated
 - Owner financed

The Role of Advanced Technologies in Structural Engineering for More Resilient Communities

Community Resilience

- Holistic view
 - Social Institutions
 - Economic drivers
 - Protecting the Natural Environment
 - Maintaining the Built Environment
- Addresses
 - Chronic Stresses
 - Expected Shocks

The Role of Advanced Technologies in Structural Engineering for More Resilient Communities

Engineering Resilient Infrastructure -- Before

- Built Environment
 - Capacity
 - Reliability
 - Durability
 - Quality
- Resilience Planning
 - Hazard Characterization
 - Codes and Standard
 - Recovery

The Role of Advanced Technologies in Structural Engineering for More Resilient Communities

Engineering Resilient Infrastructure -- After

- Safety Assessments
- Repair standards
- Hazard Characterization
- Codes and standards

The Role of Advanced Technologies in Structural Engineering for More Resilient Communities

Emerging Engineering Technologies

- Social and Economic dependences
- Community wide vulnerabilities
- Design and evaluation tools
- Construction Materials
- Structural Systems

The Role of Advanced Technologies in Structural Engineering for More Resilient Communities

Emerging Engineering Technologies

- Connected, autonomous and adaptive systems
- Performance Based Design codes and standards
- Health monitoring, before and after
- Balanced repair standards
- Social Media and crowd sourcing

The Role of Advanced Technologies in Structural Engineering for More Resilient Communities