Security, Energy, and Environment (SEE)

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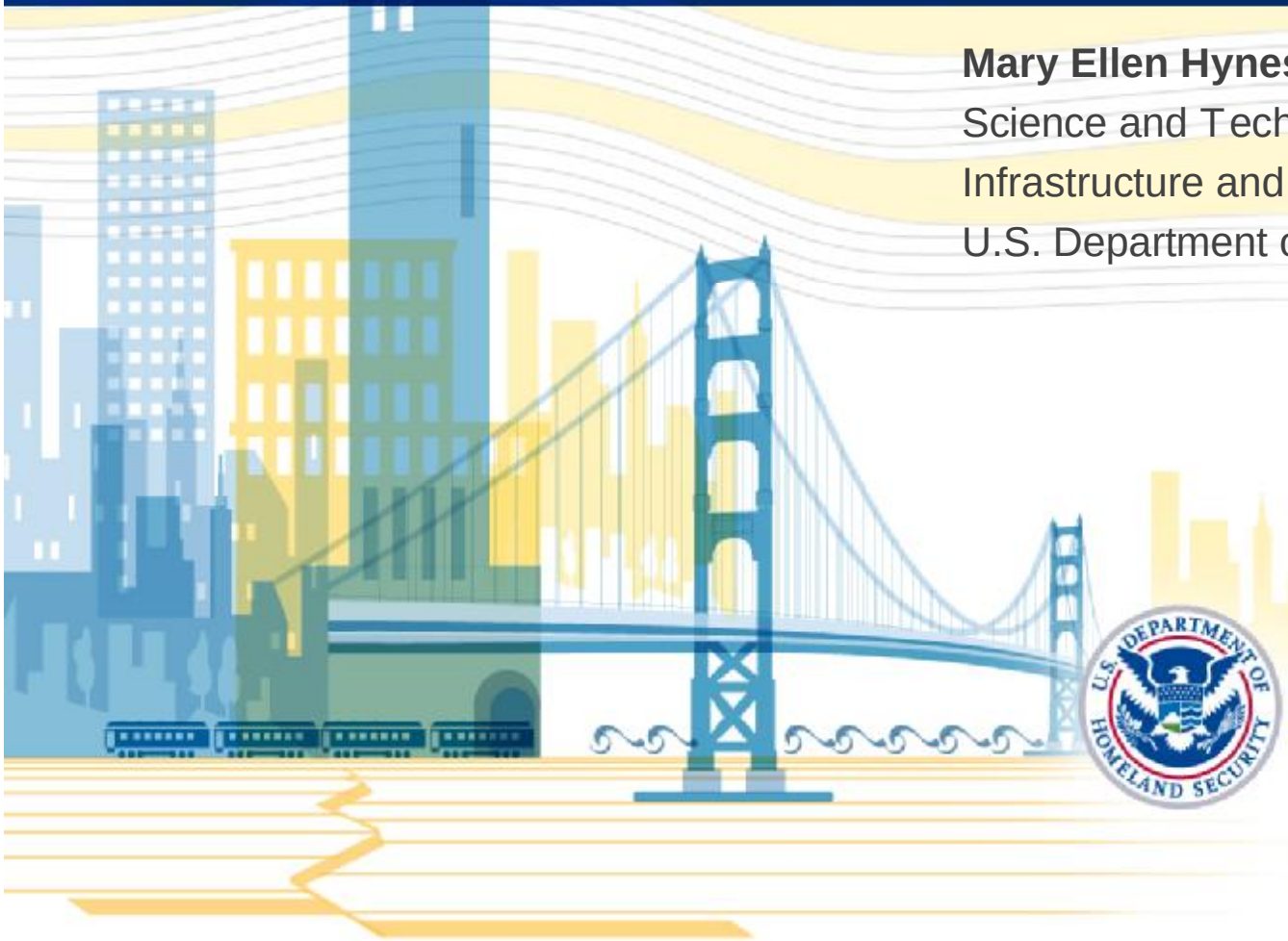

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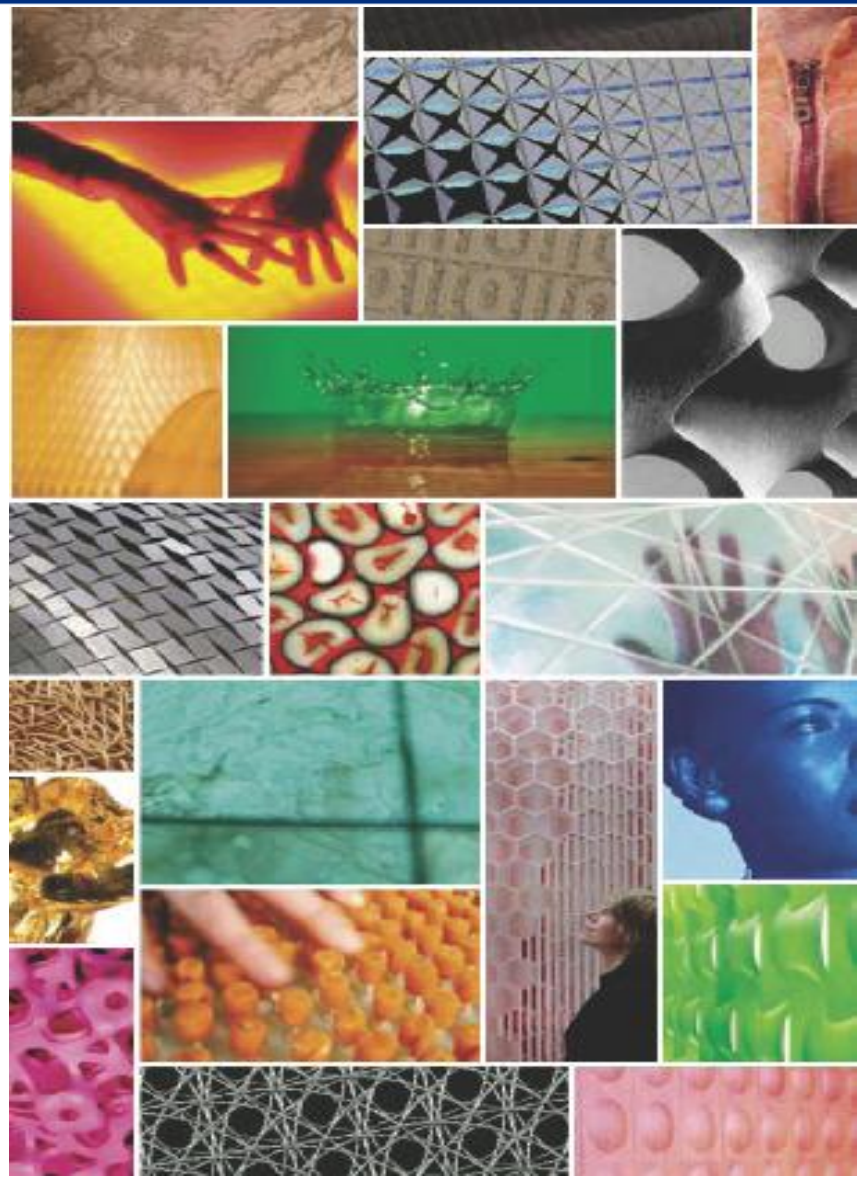
Advanced Materials Program

- **Increase** the performance of critical infrastructure and buildings by optimizing:
  - Blast protection
  - Energy efficiency
  - Environmental sustainability
  - Corrosion and fatigue
  - Stand the test of time and degradation
  - Multi-hazard/resiliency
  - Operational maximization and misuse



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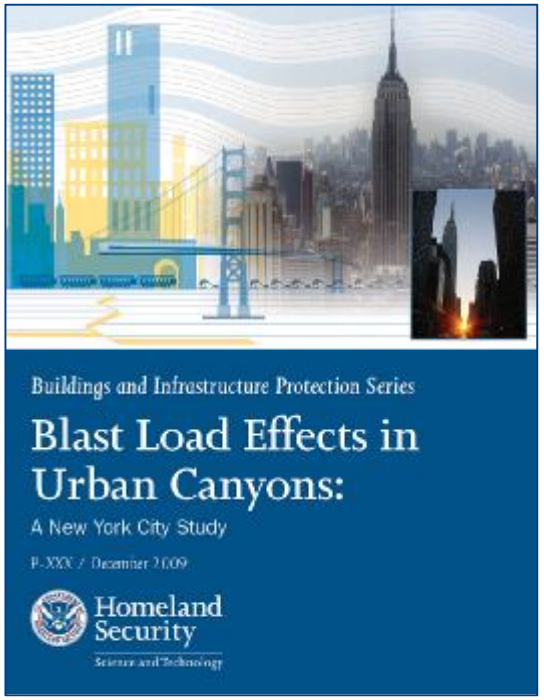
Blast and Urban Canyons

- **Evaluate** airblast pressures in the Financial District of NYC caused by an explosive/IED attack
- **Prevent** structures from collapsing and limiting the damage to targeted and adjacent structures
- **Develop** an emergency evaluation, rescue and recovery model
- **Develop** manual to help blast engineers calculate blast loads in dense urban environments
- **Develop** a computational tool to quickly calculate structural responses to a range of explosives



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Stabilization of Buildings

The Research Agenda includes the following:

- **Structural Evaluation –** performed by sensors installed pre-disaster or deployed in the aftermath of the event
- **Rapid Risk Assessment –** performed post-disaster in order to expand the understanding of the damage

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Stabilization of Buildings

- **Understand** innovative concepts, materials and deployable technology systems
  - Involvement with universities, labs, researchers, federal agencies, associations, industry, international partners, buildings owners, first responders and building designers

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SEE High Performance Solutions

- **Push** forward an agenda that includes blast-resistance and security issues as the Nation's building stock is transformed to comply with EISA 2007
- **Establish** a council that serves as an authoritative source of knowledge comprised of public sector members, researchers, designers, associations, and industry

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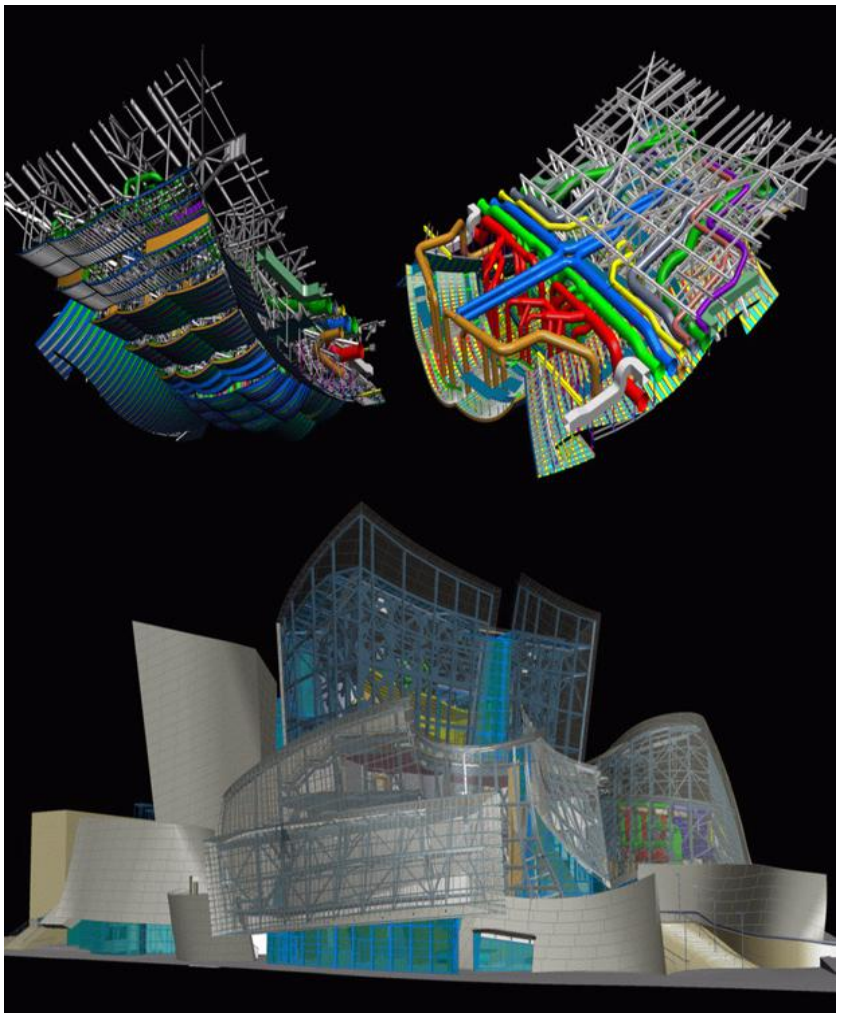
SEE High Performance Solutions

- **Promote** integrated design and reduce cost of operation and maintenance, increase asset protection, and increase community resilience
- **Conduct** testing in advanced performance materials with the collaboration of ERDC and other national laboratories and universities



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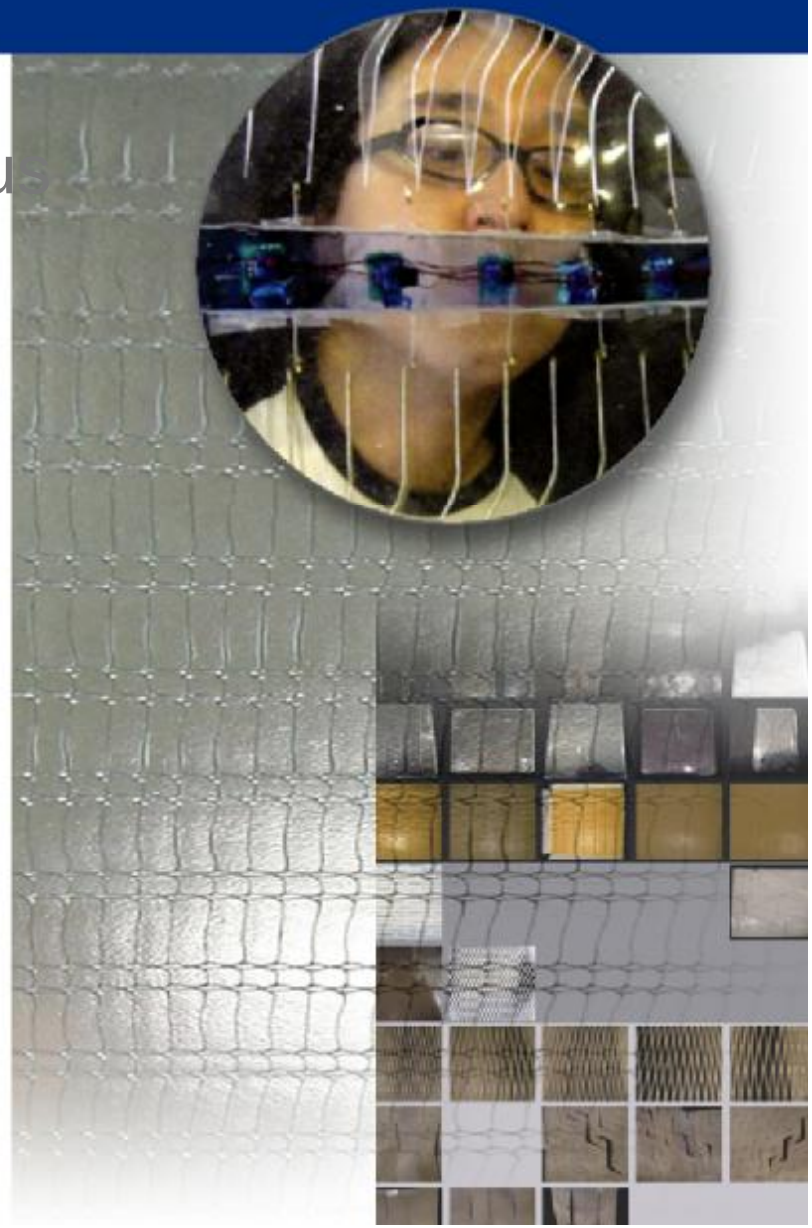
SEE High Performance Solutions

- **Create** a database that will focu on collecting innovative high performance building envelope materials
- **Provide** technology transfer of new advanced systems into the public and private sectors by disseminating integrated concepts that facilitate the adoption of security measures, as well as all EISA attributes



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Ultra-High Performance Concrete

- **Conduct** basic research and testing of materials such as ultra-high performance concretes, ceramics, foams, layered composites, woven and nano-enabled materials
- ERDC, Oak Ridge National Lab, and MIT (possible collaboration)

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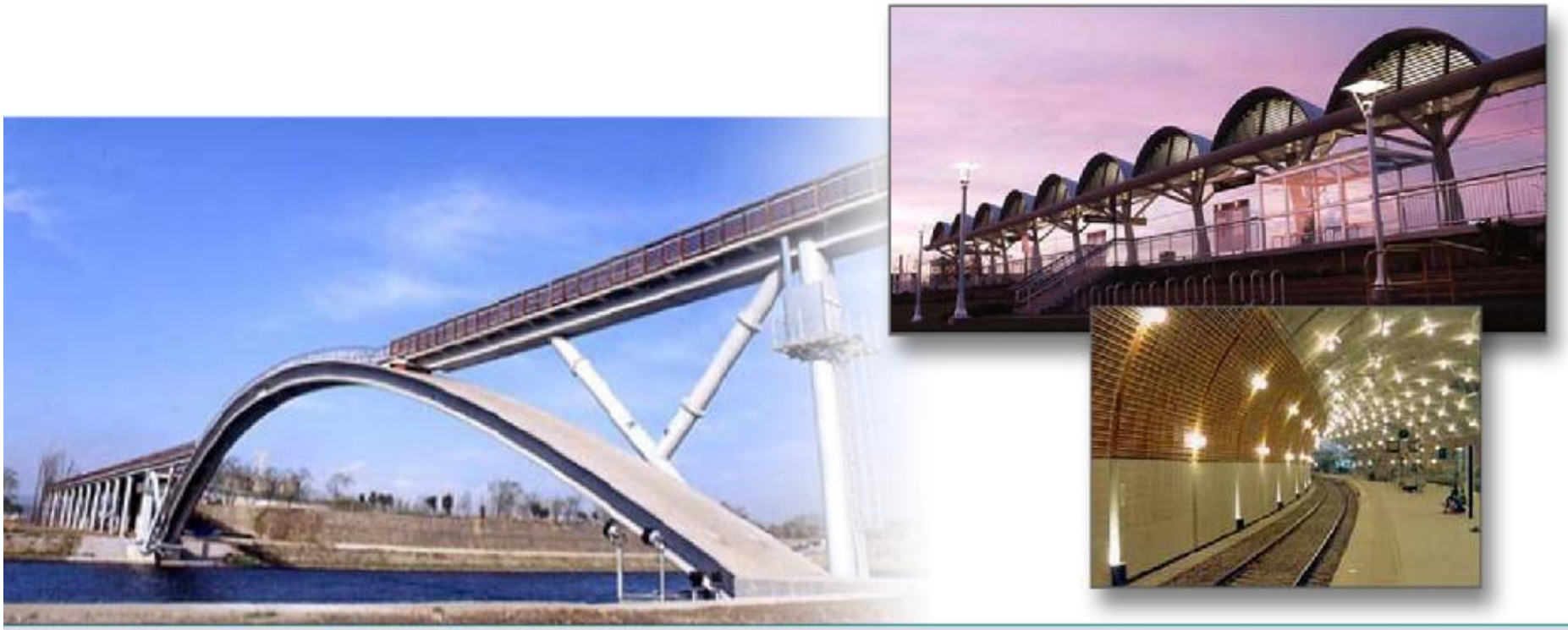
Ultra-High Performance Concrete

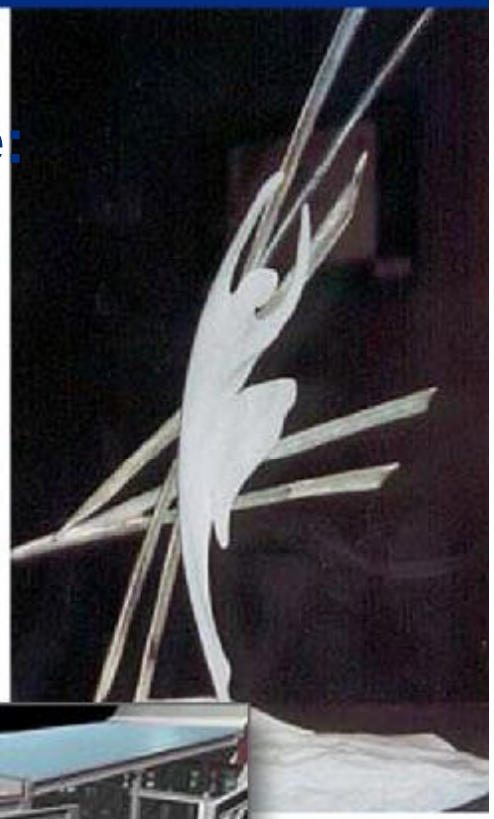
- **Prepare** report on the current state of the art for use of advanced material to counter IED effects

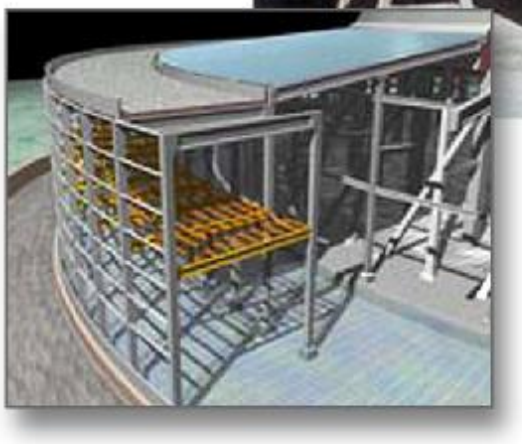


Ultra-High Performance Concrete

Conduct research in UHPC/RPC to advance:

- Ultra high strength
- Ductility, flexibility
- Toughness, Impact resistance
- Ability to built in thin and complex structures forms
- Durability
- Impermeability
- Freeze/thaw resistance
- Corrosion resistance
- Abrasion resistance
- Aggressive environment resistance
- Chemical resistance





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Ultra-High Performance Concrete

First ultra-thin-shelled canopy system (2003), Alberta Canada

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Special Projects

Workshops:

- US-UK Bridges, Tunnels, and Stadia/ URS
- Aging Infrastructure/Columbia University
- Protection of Infrastructure and First Responder Technology/ Sweden
- Advanced Materials/Singapore
- Stabilization of Buildings/ERDC
- DHS Risk Assessments Pilot Projects/Sweden
- Security, Energy, and Environment/ NIBS

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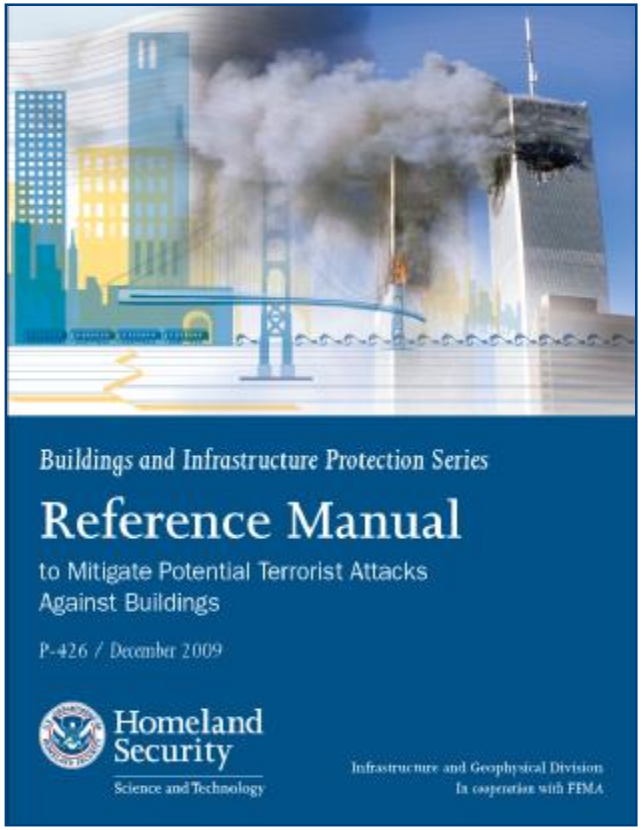
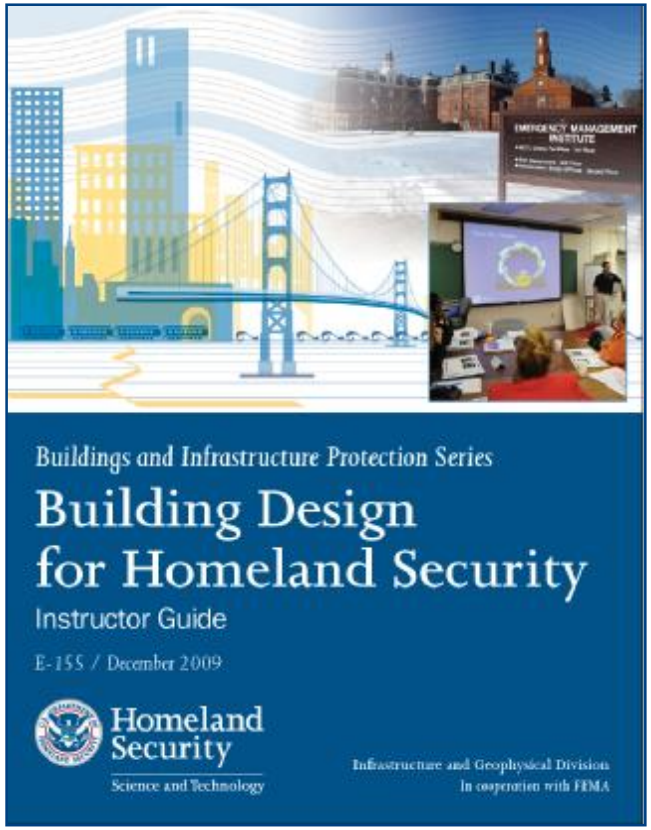
Publication Updates





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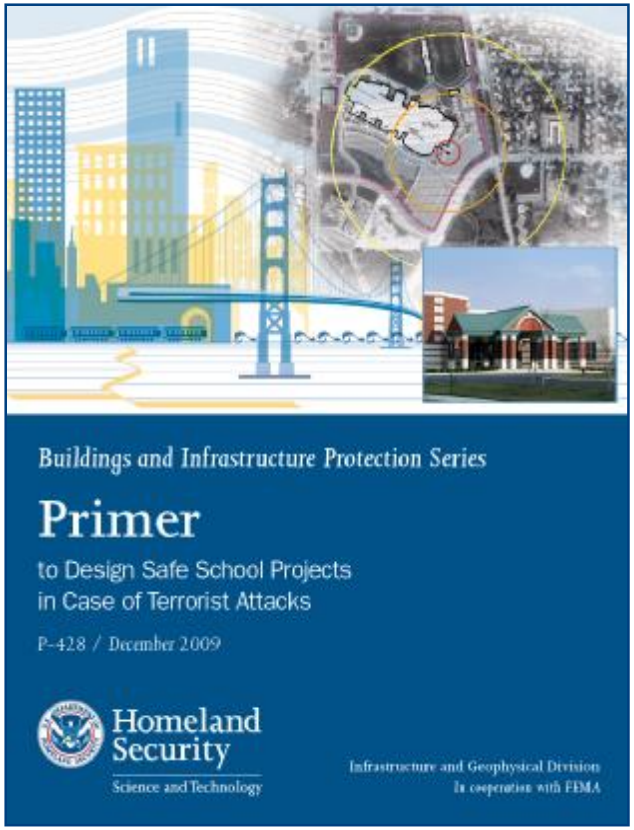
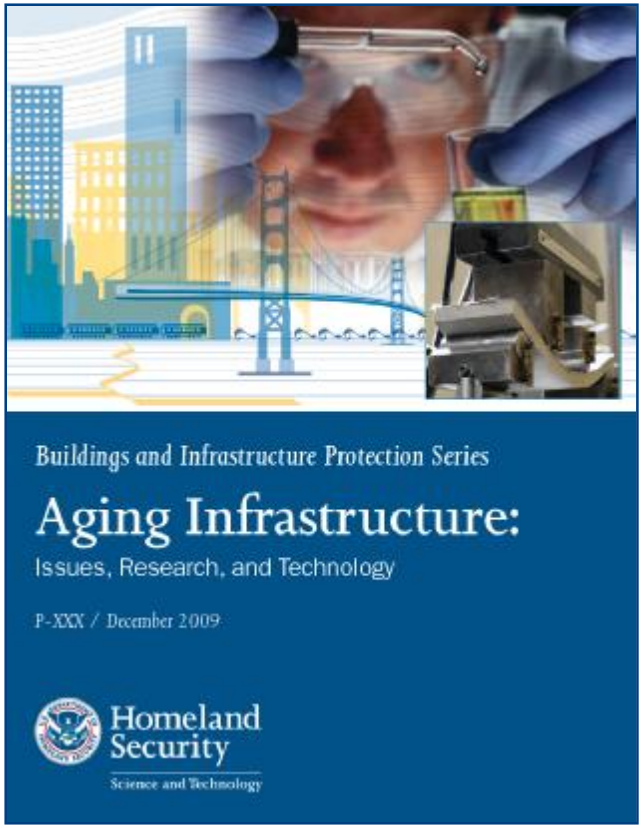
Publication Updates





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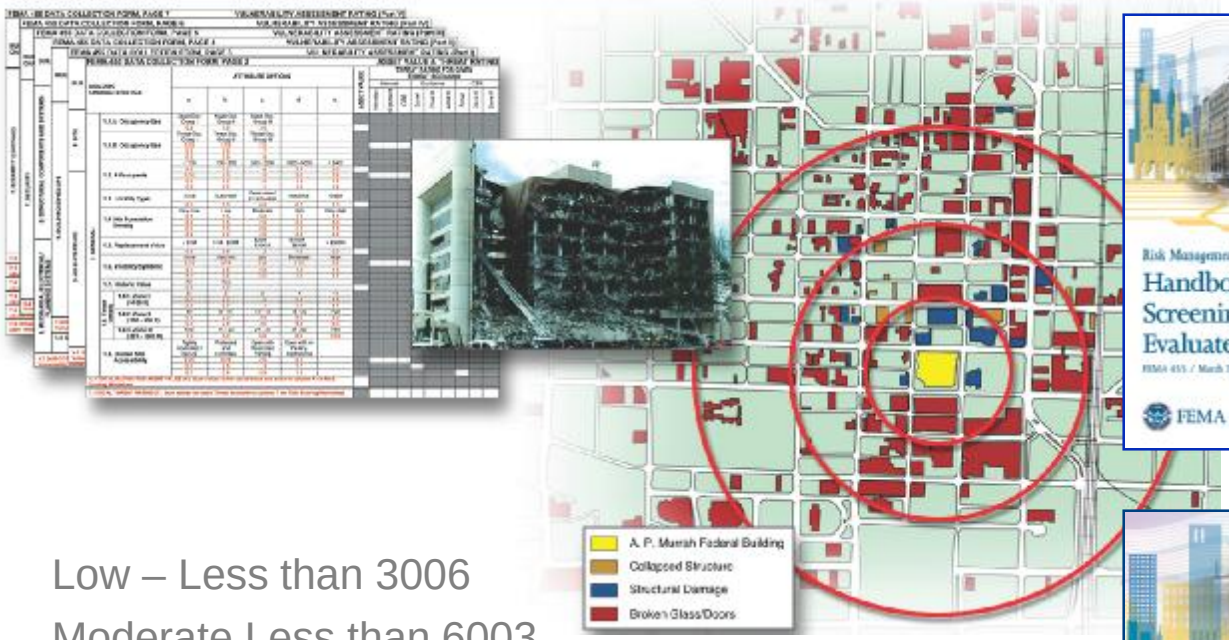
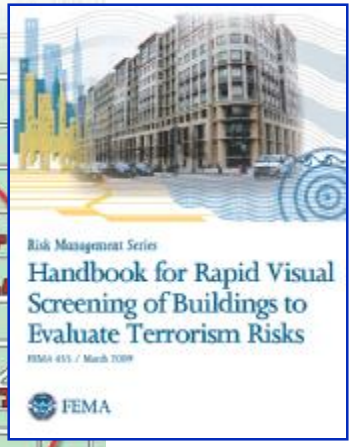
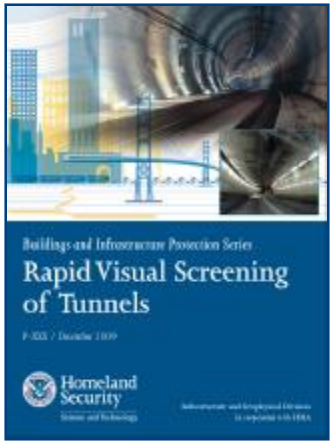
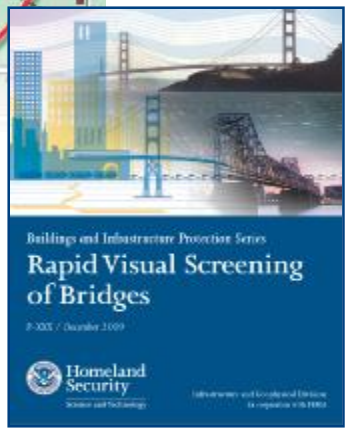
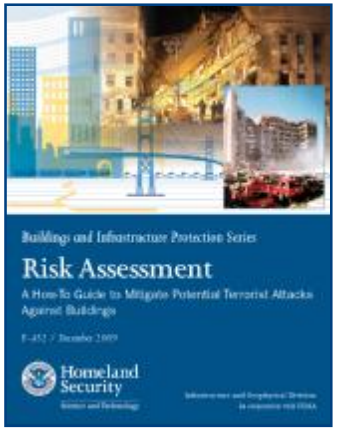
Rapid Visual Screening











Low – Less than 3006

Moderate Less than 6003

Height above 6003

Maximum number of points = 1000

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Rapid Visual Screening

RVS Catalogues:

- The RVS catalogues are critical elements in performing RVS assessments.They explain, in detail, all questions being asked in the forms/ database

RVS Database

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Rapid Visual Screening

- Assessments are based on features that can be observed during a visual inspection including:
  - Exterior
  - Selected interior areas
- Assessments can be completed in a few hours or as much as 2 days
- Designed to be conducted by one or two screeners
- Knowledge is embedded in the tool
- Assessors require limited expertise

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Rapid Visual Screening

Audience

- Engineers, architects, and other design professionals
- City, county, and state officials
- Emergency managers
- Law enforcement agencies
- Lenders
- Insurers
- Building owners/operators
- Facility managers
- Security consultants

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Conclusions

- IGD is carrying out a series of projects that will be beneficial for high performance buildings and systems
- These projects will increase the performance of private and public sector buildings
- The collaboration of both Sectors is essential for expanding security and advancing and integrating design

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