Defining Resilience: A matter of perspective

SAME Fort Worth District
June 19, 2017

Presented by:

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Resilience Impressions:

What do you think about resilience?

- 3 x 5 cards have been provided to you upon arrival
- Please complete the color-coded cards prior to the start of the first presentation

List three words that come to mind when you think of resilience.

•
•
•

List two types of facilities that you feel "must" be resilient, and why.

•
•

List two things that are resilient, and a brief description of what makes them resilient.

•
•

List two specific facilities that you "believe to be" resilient, and what makes them so.

•
•

Icebreaker Table Discussions

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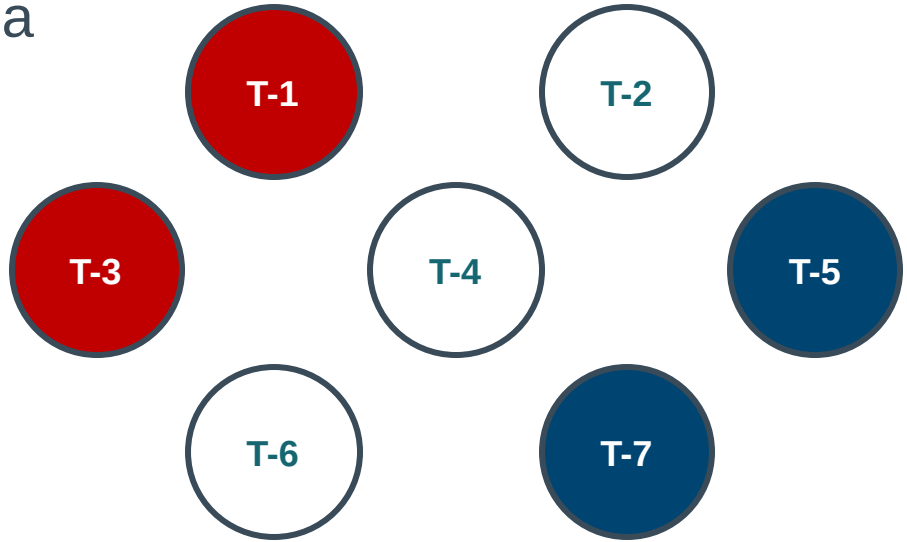
- Please work together with others at your table to develop a consolidated response to the questions on each of the cards
- Please selected a representative from each table to present your consolidated response to the Workshop
- You have 10 minutes



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Resilience definitions

Merriam-Webster:

1. The capability of a strained body to recover its size and shape after deformation caused especially by compressive stress

2. An ability to recover from or adjust easily to misfortune or change

- Toughness
- Pliability
- Flexibility
- Elasticity
- Springiness

Presidential Policy Directives (PPD):

PPD-8 (2011): "the ability to adapt to changing conditions and withstand and rapidly recover from disruption due to emergencies."

PPD-21 (2013): "the ability to prepare for and adapt to changing conditions and to withstand and recover rapidly from disruptions. Resilience includes the ability to withstand and recover from deliberate attacks, accidents, or naturally occurring threats or incidents."

100 Resilient Cities:

".....the capacity of individuals, communities, institutions, businesses, and systems within a city to survive, adapt, and grow, no matter what kinds of chronic stresses and acute shocks they experience. (Shocks considered single event disasters; Stresses considered factors that pressure on a recurring basis)."

NIST Community Resilience Planning Guide:

Resilience can be expressed simply, in terms of system functionality and the time to recover functionality following a disruptive hazard event.

"Community resilience is the ability of a community to:

- Prepare for anticipated hazards
- Adapt to changing conditions
- Withstand and recover rapidly from disruptions"

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What is Resilience? / What can be Resilient?

- People
- Communities
- Things
  - Buildings
  - Infrastructure
  - Lifeline Systems
- Ideas

UNIFIED FACILITIES CRITERIA (UFC): RESILIENCY PLANNING
(under development)

- "…..resilience translates into the ability of an installation to anticipate, absorb, accommodate, and recover from the effects of an acute natural or manmade shock to infrastructure systems in a timely and efficient manner."
- "Resiliency directly supports mission readiness."

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100 Resilient Cities

(Pioneered by The Rockefeller Foundation)

Four techniques to help cities respond to and address “Shocks and Stresses”:

1. Establish a fully funded Chief Resilience Officer in city government to lead the city‘s resilience efforts.
2. Solicit expert support for development of a robust resilience strategy.
3. Develop and implement resilience strategies with the help from public and private service providers, partners, and non-governmental organization (NGO) sectors.
4. Network with other member cities and learn from each other.

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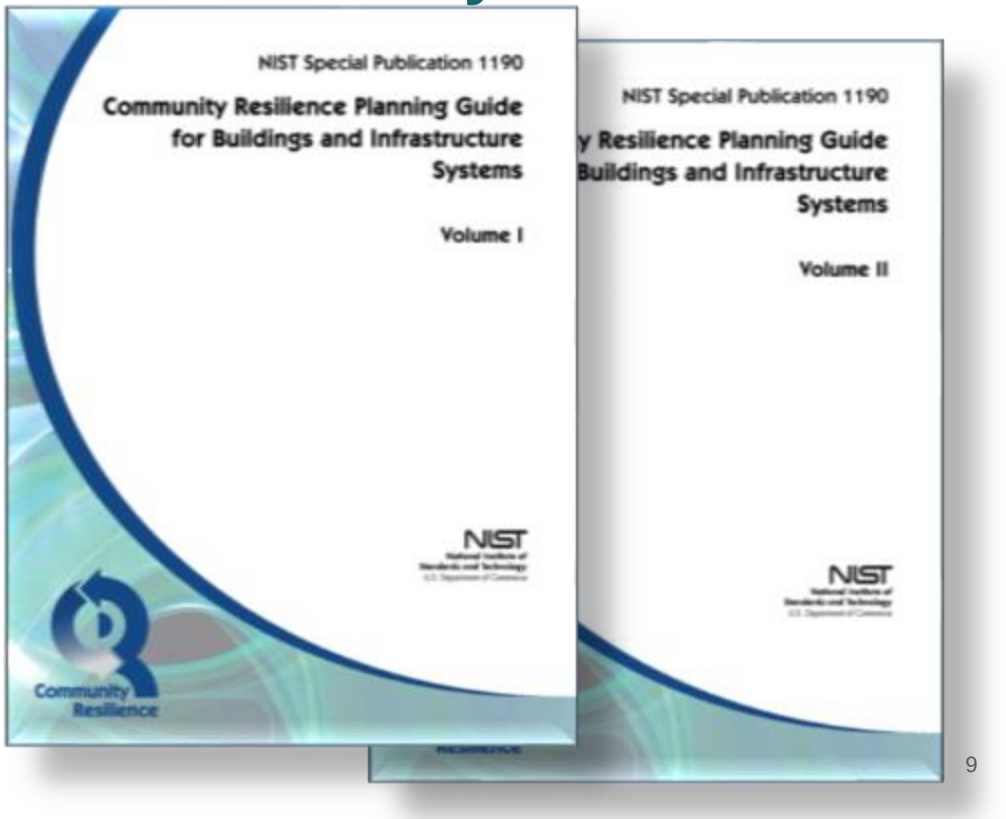
ASCE Infrastructure Resilience Division

Established in 2014 to develop a unified approach in advancing the concepts of resiliency within lifeline and infrastructure systems. The Infrastructure Resilience Division develops resources for improving the resilience of civil infrastructure and lifeline systems to all hazards.

- Community Resilience
- Disaster Assessments
- Emerging Technologies
- Civil Infrastructure and Lifeline Systems
- Multi-Hazard Characterization
- Risk and Resilience Measurements
- Social and Economic Impacts

NIST Community Resilience Planning Guide for Buildings and Infrastructure Systems

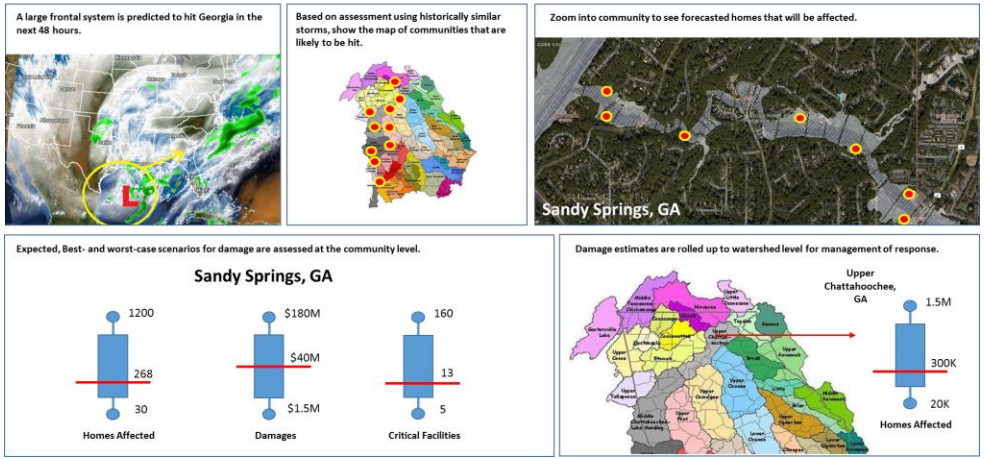
- Leading reference for understanding resilience
- Released May 2016
- The **Six-Step Process to Planning for Community Resilience** directly applies to military facilities
- Establishes a process by which stakeholders will understand and map their dependencies on the built environment (buildings and infrastructure systems)



Working Towards Resilience

- Identify leadership
- Establish long term resilience goals
- Determine when do services (and facilities supporting them) need to be restored
- Understand most likely hazards
- Evaluate hazard impacts
  - Routine
  - Design-level
  - Extreme
- Compare anticipated vs. desired performance (aspect of time)
- Identify solutions and compile them into resilience plan

One-Page Storyboard: Likely Impact of an Oncoming Storm



Six Step Process

Embrace the Infrastructure
(or lack thereof)

Examples of how community members depend on the built environment (from NIST CRPG):

- The need for housing and healthcare is universal
- Children need school buildings
- Neighborhoods need retail districts
- Businesses need suitable facilities, functioning supply chains, delivery networks, and a workforce that is readily available
- Everyone needs a transportation network, electricity, fuel, water, wastewater systems, and communication/information access

From the NIST *Community Resilience Planning Guide*:

In the context of community resilience, the emphasis is not solely on mitigating risk, but implementing measures to ensure that the community recovers to normal, or near normal function, in a reasonable timeframe.

Understand the Situation / Determine Goals and Objectives

Step 2 – Situation Awareness

- Identify/characterize built environment
- Identify plans
- Define clusters

Step 3 – Goals and Objectives

- Establish long-term goals
- Establish performance goals
- Define hazards
- Determine anticipated performance

Routine hazard events *are more frequent, less consequential events that should not cause significant damage.*

Design hazard events *are used to design structures; design loads are specified in building codes for many natural hazards.*

Extreme hazard events *may also be defined in building codes for some hazards; they are the most likely to cause extensive damage.*

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Clusters and Performance Goals

Disturbance [1]	
Hazard Type	Any
Hazard Level	Routine, Design, Extreme
Affected Area	Localized, Community, Regional
Disruption Level	Usual, Moderate, Severe

Restoration Levels [2,3]	
30%	Function Restored
60%	Function Restored
90%	Function Restored
X	Anticipated Performance

Footnotes:

1 Specify hazard type being considered
Specify hazard level – Routine, Design, Extreme
Specify the anticipated size of the area affected – Local, Community, Regional
Specify anticipated severity of disruption – Minor, Moderate, Severe

2 | 30% | 60% | 90% | Desired restoration times for percentage of elements within the cluster

3 | X | Anticipated performance for 90 % restoration of cluster for existing buildings and infrastructure systems
Cluster recovery times will be shown on the Summary Matrix

4 Indicate levels of support anticipated by plan
R = Regional; S= State; MS=Multi-State; C = Civil (Corporate/Local)

Building Clusters	Support Needed[4]	Design Hazard Performance								
		Phase 1 Short-Term			Phase 2 Intermediate			Phase 3 Long-Term		
		Days			Weeks			Months		
		0	1	1-3	1-4	4-8	8-12	4	4-24	24+
		Building Performance Category								
		A			B			C		D
Critical Facilities										
Emergency Operation Centers										
First Responder Facilities										
Acute Care Hospitals										
Non-ambulatory Occupants (prisons, nursing homes, etc.)										
Emergency Housing										
Temporary Emergency Shelters										
Single and Multi-family Housing (Shelter in place)										
Housing/Neighborhoods										
Critical Retail										
Religious and Spiritual Centers										
Single and Multi-family Housing (Functional)										
Schools										
Hotels & Motels										
Community Recovery										
Businesses - Manufacturing										
Businesses - Commodity Services										
Businesses - Service Professions										
Conference & Event Venues										

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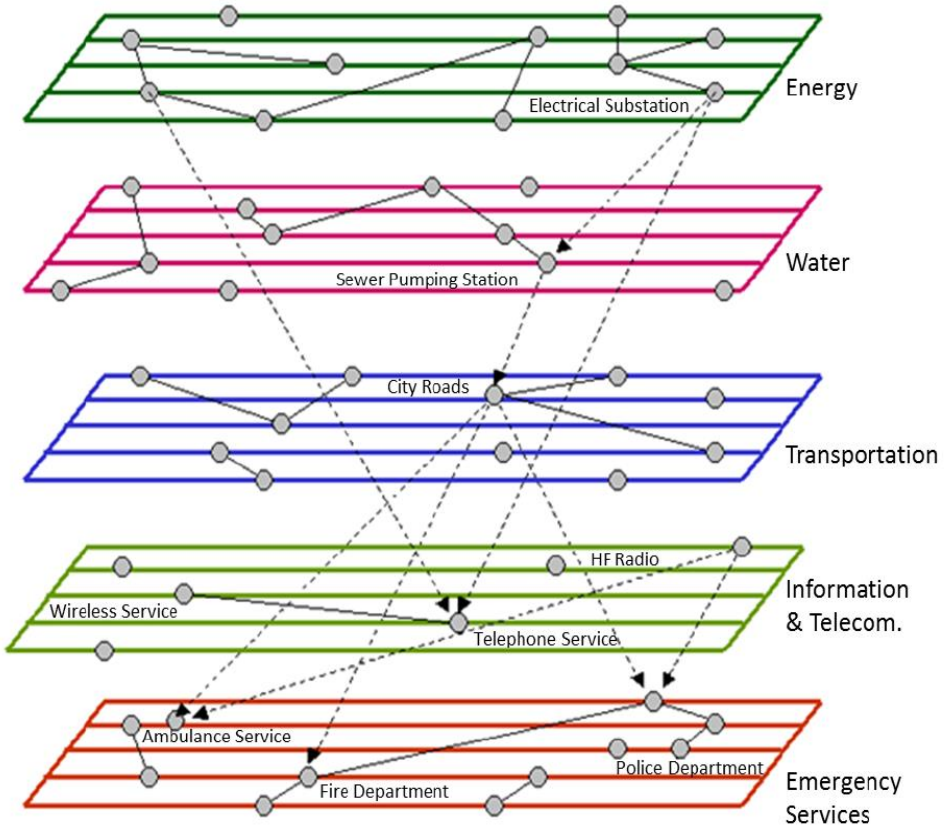
Dependencies

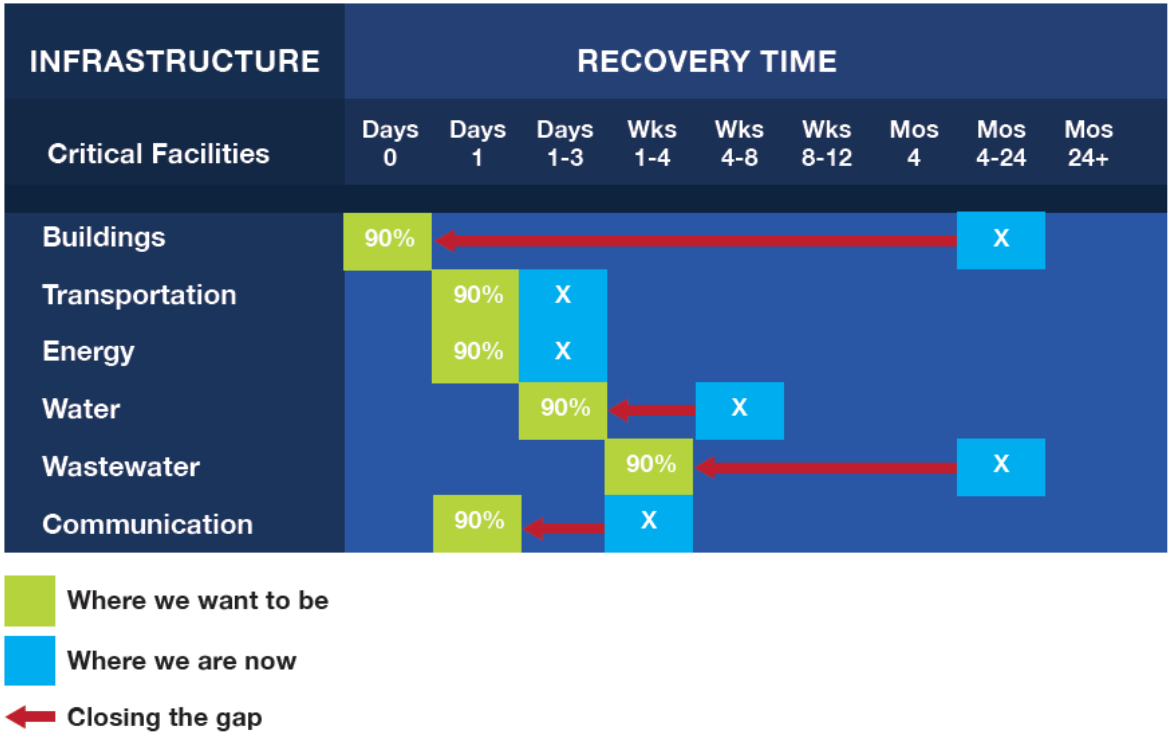
(Peterson et al. 2006)

- Identify and understand your “community”
- Map community to the infrastructure that supports
- Infrastructure performance goals for
  - Buildings
  - Transportation Systems
  - Energy Systems
  - Communication Systems
  - Water / Wastewater Systems
  - Emergency Services



Solid lines that connect nodes within each service, as indicated by the lined boxes, represent internal dependencies. Dashed lines represent external dependencies between emergency services and supporting infrastructure systems. For instance, delivery of ambulance, fire, and police services all depend on telecommunications and roads.

Map Dependencies and Evaluate Gaps



Resilience Progression:
City or Community Perspective

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….the capacity to recover quickly from difficulties (anticipated hazards; the ability of residential and commercial communities to spring back into shape, to withstand and recovery rapidly from disruption in order to meet...

- Public health and safety needs
- Water, food, and shelter needs
- Economic needs

at an understood and pre-identified level of performance

Resilience Progression:
DoD Organization Perspective

…. the capacity to recover quickly from difficulties; the ability of organizations to spring back into shape, in order to accomplish...

- Assigned mission(s)
- Critical mission(s)
- A level of readiness

at an understood and pre-identified level of performance

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Resilience Progression:
DoD Installation Perspective

…. the capacity to recover quickly from difficulties; the ability of installation to spring back into shape, in order to support...

- Unit training
- Unit deployments
- Mission operations

at an understood and pre-identified level of performance

Bringing Resilience Programs Together

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Community, Installation, and Organizational Resiliency address three common elements

- Natural Environment
- Built Environment
- Lines of Communication
- Various approaches to social/societal aspects

Resilience and Resiliency

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The challenge is one of priorities, which vary from:

- Person to person;
- Organization to organization; and
- Government to government

And is based on what each deems as their most treasured or important asset.

Resiliency Solutions

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Requires cooperation and collaboration between people, organizations and governments to establish group priorities based on:

- Benefit-cost analysis;
- Legal requirements; and
- Shared moral and ethical principles

Contact Information

For additional information:

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