Identifying Knowledge and Perceptions among Designers about Climate Resilient Buildings

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Overview

- Research Purpose
- Background
- Research Methodology
- Data Collection & Analysis
- Results
- Conclusion & Future Research
Purpose of Research

• For Building Resiliency
  • Identify knowledge level among Design Firms
  • Ascertain perceptions of the Design Firms
  • Understanding the current challenges and barriers
Background

• IPCC indicates that in global climate is resulting in elevated temperatures:
  • Rising sea level
  • Heavier precipitation & storms
  • Tornadoes
  • Hurricanes
  • Cyclones
  • Additional heatwaves

(Younger et al., 2008)
Background

Severe Storms and Flooding Instances in the US (1956-2016)

(Source: FEMA https://www.fema.gov/disasters/grid/year)
Background

• NOAA’S National Climatic Data Center indicates climate events resulted in a loss of at least $1 billion in overall damages (Lott & Ross, 2015)

• Between 1995 and 2014:
  • 15,000 extreme weather events
  • 525,000 Causalities
  • 3.0 Trillion USD losses

(Kreft, Eckstein, Dorsch, & Fischer, 2015)
(Source: CNN 2016; NOAA 2016)
Definition - Resilience

The ability to absorb, adapt, recover quickly from the natural stresses, and be operational and functional

(Richardson et al., 1990).

(Source: http://www.archdaily.com/259629/make-it-right-house-morphosis-architects)
Research Methodology

Population Selection
- Design firms
- Provided diversity in terms of geographic location & firm size

Survey Design
- Question types-ordered & Likert type
- Sections – background of firm, level of familiarity, and perceptions

Data Collection
- Electronic surveys distributed via email

Data Analyses
- Mostly descriptive statistics
Responsive building design to natural disasters can alleviate challenges.

Definitely not
Probably not
Might or might not
Probably yes
Definitely yes

Very Important
Important
Fairly Important
Slightly Important
Not important

Importance to design a resilient building
Results

Firm designed any resilient buildings

No
Yes

Projects designed by respondent, in the last ten years, were resilient to natural disasters

No
Yes
Results

Confidence possessed to design a resilient building

- Extremely uncomfortable
- Moderately uncomfortable
- Slightly uncomfortable
- Neither comfortable nor uncomfortable
- Slightly comfortable
- Moderately comfortable
- Extremely comfortable

0.0% 10.0% 20.0% 30.0% 40.0% 50.0% 60.0% 70.0% 80.0% 90.0% 100.0%
Results

Training regarding the design of resilient buildings

- No
- Yes

Training for "design of resilient buildings" offered by employer

- No
- Yes
Requirement of standard guideline for utilization of technologies and strategies that make a building resilient

- Yes: 50.0%
- Maybe: 30.0%
- No: 20.0%
Results

Motivators towards adopting technologies and strategies that enhance the building resiliency (Top 5)

1. Return on investment for the owner
2. Potential reduction in insurance of the building
3. Improved building life
4. Owner requirement
5. Obligation towards occupants
Results

Barriers towards adopting technologies and strategies that enhance the building resiliency (Top 5)

1. Resistance to change
2. Cost of the project
3. Increased responsibilities for Designers
4. Lack of trained stakeholders
5. Lack of availability of guidelines
Knowledge among stakeholders about the technologies and strategies that can enhance the building resilience (Top 5)

1. Engineer
2. Consultants
3. Designer
4. Insurance Companies
5. Contractor
Results

*Level of training among stakeholders about the technologies and strategies that can enhance the building resilience (Top 5)*

1. Consultants
2. Engineer
3. Insurance Companies
4. Designer
5. Municipal Authorities
Results

Stakeholders resistant towards adopting technologies and strategies that can enhance project resiliency (Top 5)

1. Owner
2. Contractor
3. Subcontractors
4. Designer
5. Municipal Authorities
Conclusion

1. Even though owners and occupants are benefitted by a resilient facility, they are resistant to the concept.

2. Even though respondents claim to design resilient projects, nearly 35% of the projects were not resilient.

3. Need for standard guidelines, education, and training of design firms to generate facilities that are resilient.
Comments/ Questions

Thank You

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