Building Issues for Lifeline Utilities Following Major Earthquakes

National Lifelines Forum

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Presentation Overview

- **Assessing and understanding the seismic performance of an operational facility**
- **Building Importance Levels**
- **The interface between the Building Act and the CDEM Act**

What is the Likely Seismic Performance of Your Premises?

- **What level of post-earthquake operability do you need as a lifeline utility/ CDEM/ govt agency?**
  - %NBS is only part of the story
  - Especially if only determined from an IEP assessment
  - Especially if it is an IL4 building….

Structural Requirements for Importance Level 4

- **ULS: Building designed for 1/2500 year return period shaking**
  - Earthquake design forces 80% greater than for 'ordinary' IL2 building
- **SLS: Essential components to remain *operational* under 1/500 year return period shaking**
  - Only nominal damage to structure, non-struct. elements and contents; all services within the building functioning

What is the Likely Seismic Performance of Your Premises (2)?

- **Engineers need to be carefully briefed**
  - Must focus on specific vulnerabilities as well as strength and ductility
  - Must consider adjacent buildings, and should consider the surrounding area

- **For post-disaster operational facilities, an assessment should include geotechnical consideration**

Building Importance Levels

Clause A3 of the NZ Building Code (April 2012) for Fire Purposes

1	**Buildings posing a low risk to human life or the environment**	**Ancillary buildings not for human habitation**
2	**Buildings posing a normal risk to human life, the environment or a normal economic cost should the bldg fail**	**Houses, office buildings, car parking buildings**
3	**Buildings of a higher level of societal benefit, or with higher levels of risk-significant factors to occupants (large numbers of people; vulnerable populations)**	**Areas of assembly or congregation; health care facilities (not surgery or emergency treatment)**
4	**Buildings essential to post-disaster recovery or associated with hazardous facilities**	***Essential facilities with post-disaster functions***

Buildings Importance Levels: Current Status

- **The wordings describing ‘specific structures’ corresponding to each IL have typically changed**
- **But they supposedly only relate to fire design**
- **There is continued uncertainty as to how they apply to some utility building types**

Recommendations From NZSEE Conference Paper March '06

- A specific guidance note for practitioners is required to achieve a uniform interpretation of legislative and regulatory requirements for Importance Level 4 and 5 structures across the provisions of the CDEM Act and structural loadings standards

Building Act and CDEM Act Interface

- **Building Act: Importance Levels via Building Code and design standards**
- **CDEM Act: s60(a)** ***ensuring that it is able to function to the fullest possible extent, even though this may be at a reduced level, during and after an emergency***
  - plan for, and be able to ensure continuity of service, particularly in support of critical CDEM activities
  - be capable of managing its own response to emergencies

Perhaps the Real Question….

- **How do the Lifeline Utility obligations in the CDEM Act inform or guide the resilience criteria/ decisions for the design of new infrastructure facilities?**

Or

- **How do the Lifeline Utility obligations in the CDEM Act inform or guide risk reduction?**

In Practical Terms…

- **Expectation is that lifeline utilities should have a clear view of the required post-disaster functionality of specific buildings or facilities**
- **This would come from a strategic response plan for the site or facilities**
  - In overview, not necessarily a detailed business continuity plan
  - Identifying the more critical and less critical buildings or facilities
  - Taking into account the support of CDEM-critical activities