

HOSPITAL PREPAREDNESS FOR EARTHQUAKES IN THE BANGKOK METROPOLITAN AREA: A CASE STUDY FOLLOWING THE 28 MARCH 2025 EARTHQUAKE

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1. INTRODUCTION AND BACKGROUND

The Bangkok Metropolitan Area is generally considered a low-to-moderate seismic hazard zone with limited historical experience of damaging earthquakes. Consequently, hospital disaster preparedness has traditionally focused on floods, fires, and outbreaks of infectious diseases. However, the Mw 7.7 Mandalay Earthquake on March 28, 2025, which struck Myanmar, was widely felt in Bangkok due to local geological conditions. This rare occurrence served as a real-time stress test for the city's healthcare system, underscoring the urgent need for a targeted, specific approach to earthquake readiness. This study aims to evaluate the strengths and weaknesses of hospital preparedness following this event and to synthesize lessons learned to develop new guidelines and innovations for enhancing the resilience of the healthcare system.

2. OBJECTIVES

1. Assess the strengths and vulnerabilities in preparedness revealed by the March 2025 earthquake.
2. Identify and categorize structural, non-structural, and operational issues during the response.
3. Synthesize lessons from the shared perspectives of medical and engineering professionals.
4. Propose strategies and innovations to enhance hospital resilience to earthquakes.
5. Develop specific preparedness and response guidelines for hospitals in urban settings

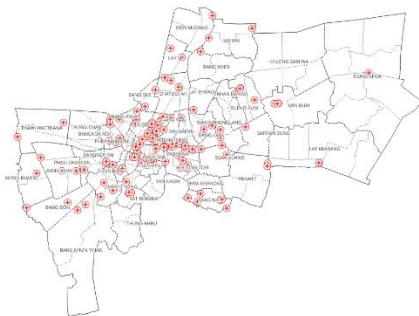


Figure 1. Hospital Map in Bangkok

3. METHODOLOGY

This research employed a descriptive qualitative case study approach. Data was collected from multiple sources, including post-event field observations to document actual impacts, analysis of incident reports and engineering assessments from affected healthcare facilities, and semi-structured interviews with administrators, medical staff, and building managers who were present during the event. The collected data was analyzed across three key dimensions: structural safety, operational continuity, and inter-agency coordination. Findings were also compared with case studies of urban hospital earthquake responses from other countries, with additional consideration given to emerging technologies like disaster simulation and digital tools.



Figure 2. Damaged hospital buildings

3. FINDING

The study found that Bangkok hospitals demonstrated certain strengths stemming from their existing emergency plans. These included pre-established emergency response plans and evacuation routes, staff familiarity with the Incident

Command System, and backup systems for power, water, and medical gases that maintained critical services.

However, the event exposed several significant vulnerabilities:

- Lack of Earthquake-Specific Training: Staff had limited knowledge and skills specifically for responding to an earthquake.
- Non-structural Hazards: Vulnerabilities were identified in non-structural elements such as ceilings, light fixtures, and unsecured medical equipment.
- Limited Structural Assessment Capability: Hospitals lacked the capacity to quickly and accurately assess building safety post-event, leading to delayed decisions on evacuation and re-entry.
- Absence of Real-time Systems: The lack of real-time monitoring and command tools hindered a timely and effective response.

3. CONCLUSION AND RECOMMENDATION

The March 2025 earthquake served as a critical reminder that a foundation in all-hazards preparedness is not enough for complex urban hospitals. Earthquake-specific preparedness is essential. The study recommends integrating Structural Health Monitoring (SHM) technology to enable rapid post-event safety assessments and improve decision-making. Furthermore, the use of disaster simulation and digital tools should be incorporated into training and planning. Finally, the creation of a comprehensive Hospital Earthquake Preparedness and Response Guideline for Urban Areas is crucial to provide a clear, systematic framework for staff, ensuring the continuity of healthcare services and rapid recovery in the face of future seismic events.

Keywords: Hospital Preparedness, Earthquake, Bangkok Metropolitan Area, Disaster Simulation, Hospital Guideline,

4. REFERENCE

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