

# Delhi Earthquake Safety Initiative for Life Line Buildings

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## Project Brief

**Introduction :** This is a project for developing and piloting a “Model Program for Seismic Evaluation and Retrofitting in Life-line buildings in Delhi”. This initiative is supported by the United States Agency for International Development (USAID), within the National Disaster Management Framework of the Government of India. In Delhi, the project is led by the Office of Divisional Commissioner, Government of N. C. T. of Delhi (GNCTD) the Delhi Disaster Management Authority (DDMA), and is being assisted by US based non-profit organization – GeoHazards International (GHI), along with Delhi based non-governmental organization – SEEDS.

**Aim :** The project aims at developing an approach towards identifying and reducing the earthquake risk of lifeline buildings by building capacity on earthquake evaluation and retrofitting. GHI will provide assistance, as needed, based on similar efforts in other countries

It is expected that this initiative, would form the precursor to a larger nation-wide movement to reduce earthquake risk in India. More than 60% of the country is prone to shaking of intensity VII (MMI) and above. The country has more than 5000 urban areas and a burgeoning building stock. While recent initiatives would guide and facilitate incorporation of seismic safety in new structures, the real challenge would be to address the risk of existing ones. Seismic retrofitting is one strategy that can help mitigate earthquake risk in existing buildings. Seismic retrofitting, means upgrade of the lateral force (earthquake force) resisting system of a building so that the building can resist higher level of forces not considered in the original design.

**Contents :** In Delhi, the project would be piloted in five “life-line” buildings. These are buildings that would be needed after a major earthquake. The following buildings have been identified for the project :

- Delhi Police Headquarters Building
- Guru Tegh Bahadur Hospital
- Government School, Ludlow Castle
- Office of Divisional Commissioner
- Delhi Secretariat/ Players Building

The project will prepare designs for retrofit of these life-line buildings, develop decision-making procedures, build capacity for similar work elsewhere, and foster relationships among Indian and US engineers. Experiences from US will be shared and adapted for implementation in India.

A Peer Review Panel will be constituted comprising Indian and US experts. This panel would meet on three occasions for each life line building. The panel members would visit each building, and discuss their observations with engineers in charge of the building.

**Highlights :**

- A Roll-Out workshop, involving decision makers, engineers and representatives of important stakeholder organizations working towards earthquake risk reduction in Delhi.
- A Refresher course for engineers and decision makers where analytical methods and technical background will be discussed with experienced American engineers.
- Peer Review Sessions where Indian and American experts will review and discuss objectives, concepts, assumptions, criteria, analytical and design methods and work products with the leaders of Indian engineering teams.
- A telephone hotline for engineers to use to ask questions regarding retrofitting work in the five lifeline buildings.
- A website for posting relevant information. [www.quakesafedelhi.net](http://www.quakesafedelhi.net) (under construction)
- “Non-Structural” earthquake safety in the selected school and hospital. Non-structural measures would include anchoring and bracing on building contents, furniture and equipment.
- Preparation of special educational, training and Non-structural mitigation material.

**Time Line:**

This is a pilot initiative, divided into three phases :

In the first phase, the important lifeline buildings and the respective engineering teams were identified. Experts from India and US were identified to form part of the Peer Review Panel. Necessary groundwork was done to carry out non-structural mitigation work in the selected school and hospital building. This phase is complete.

In the second phase, a roll-out workshop and a refresher course will help guide the engineering teams to develop retrofit designs for the selected buildings. The Review Panel would meet twice to advise on the process. The non-structural mitigation work would be carried out in the school and hospital building. This phase begins on April 28, 2005.

In the third phase, the final construction documents will be produced. The Peer Review Panel would meet to review documents and advise on the quality control process.

**Participating Organizations:**

- The Ministry of Home Affairs, Govt of India –The Nodal Ministry for Disaster Management in the country is working in partnership with State Governments for sustainable disaster risk reduction in the country. This project is seen as a pilot initiative to the upcoming ‘National earthquake Risk Mitigation Project’ wherein districts in the country falling in Seismic Zones IV and V will be assisted in reducing damage in future earthquakes. Retrofitting of lifeline structures is a major component of this programme.
- The Delhi Disaster Management Authority, Office of the Divisional Commissioner, Government of NCT Delhi has been formed to create a unified command, control and coordination of disaster management activities in Delhi. It is currently governed by an apex committee chaired by the Lieutenant Governor of Delhi. The Secretariat of the Authority is located in the Office of

Divisional Commissioner of Delhi. (<http://ddma.delhigovt.nic.in>).

- The United States Agency for International Development is the aid agency of the Government of United States. The USAID mission, Delhi and the Office of Foreign Disaster Assistance also provide support. This project forms part of USAID's India Disaster Management Support Project. ([www.usaid.gov/in/](http://www.usaid.gov/in/))
- GeoHazards International is a non-profit organization based in California, USA with a mission to reduce death and suffering due to earthquakes in the world's most vulnerable communities through advocacy, preparedness, prevention and mitigation. ([www.geohaz.org](http://www.geohaz.org))
- SEEDS is a Delhi based NGO working on Community based Disaster Management in various parts of India. SEEDS mission is to equip the most vulnerable with appropriate tools and technologies, knowledge and skills and promote linkages among stakeholders to prevent life loss and suffering. ([www.seedsindia.org](http://www.seedsindia.org))

**Members of  
Review Panel:**

- Prof. Anand S. Arya, National Seismic Advisor (MHA)
- Prof. D.K. Paul, Head, Earthquake Engineering Department, IIT Roorkee (Member-Core Group for Earthquake Risk Mitigation, MHA)
- Sri. Jose Kurien, Chief Engineer, DTTDC
- Sri. Mahesh Tandon, Tandon Consultants, New Delhi
- Prof. Ravi Sinha, Civil Engineering Department, IIT Bombay (Member-Core Group for Earthquake Risk Mitigation, MHA)
- William T. Holmes, Rutherford and Chekene, Oakland, California
- Melvyn Green, Melvyn Green and Associates, Torrance, California
- I. M. Idriss, University of California at Davis
- L. Thomas Tobin, GeoHazards International, Palo Alto, California
- Kip Edwards, Sutter Health, San Francisco, California

**Participating  
Teams:**

1. Delhi Secretariat (Team leader-Sh. Mukund Joshi-Project Manager)
  1. Sh. C.M. Tiwari, EE(Civil)
  2. Sh. S.K. Garg, AE (Civil)
  3. Sh. T.B. Singh, AE (Civil)
  4. Sh. Premchand, AE (Civil)
  5. Sh. Ashutosh Singh, JE (Civil)
  6. T.K. Biswas, E (Civil)
  7. Sh. Amar Balwani, EE (Elect)
  8. Sh. Santosh Kumar Pandey

2. GTB Hospital (Team Leader-Sh. Mukund Joshi)
  1. Sh. C.M. Tiwari, EE (Civil)
  2. Sh. V.K Gupta, EE (Elect)
  3. Sh. Iswari Prasad, AE (Civil)
  4. Sh. Rajbir Singh, AE (Civil)
  5. Sh. Siddiqui, AE (Civil)
  6. Sh. Dheer Singh, JE (Civil)
  7. Sh. Sandeep Kumar, JE (Civil)
  8. Sh. R.C Bansal, AE (Elect)
3. Police Headquarters (Team Leader-Sh. Anil Kumar Pandit, SE, (Civil))
  1. Mr. Amar Singh
  2. Sh. K.N.C Prasad, AE(Civil)
  3. Sh. Karnal Singh, AE(Civil)
  4. Sh. A.K Yadav, AE – Planning (Civil)
  5. Sh. S.S Jaiswal, AE - Planning(Civil)
  6. Sh. Ramprakash, JE (Civil)
  7. Sh. S.K Jain, JE (Civil)
4. Divisional Commissioners Office, 5, Shamnath Marg (Team Leader-Sh. Vineet Jaiswal, SE (Civil))
  1. Sh. Raj Kumar Thakur, EE (Civil)
  2. Sh. Devi Shankar, AE, (Civil)
  3. Sh. Ram Kanwar, AE, (Civil)
  4. Sh. Jamil Ahmed, AE (Civil)
  5. Sh. M.P. Singh, JE (Civil)
5. Ludlow Castle School 1 (Team Leader-Sh. Vineet Jaiswal, SE (Civil))
  1. Sh. Gajendra Kumar, EE (Civil)
  2. Sh. Amar Singh, AE (Civil)
  3. Sh. SPS Saini, AE (Civil)
  4. Sh. Yash Pal, AE (Civil)
  5. Sh. Harish Kumar, JE (Civil)