

VULNERABILITY REDUCTION SOLUTIONS

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Sheet:	1 OF 1

REINFORCED CONCRETE BUILDINGS

GENERAL INFORMATION

Strengthening Intervention:

Steel Braced Frames

Applicable Building Types:

- | | | | | | |
|---------------------------------|---|--|---|------------------------------------|------------------------------|
| 1. Main structural system:..... | RC1 <input checked="" type="checkbox"/> | RC2 <input type="checkbox"/> | RC3 <input checked="" type="checkbox"/> | RC4 <input type="checkbox"/> | RC5 <input type="checkbox"/> |
| 2. Height range:..... | | Low (LR) <input checked="" type="checkbox"/> | Medium (MR) <input checked="" type="checkbox"/> | High (HR) <input type="checkbox"/> | |
| 3. Seismic design level:..... | Poor (PD) <input checked="" type="checkbox"/> | Low (LD) <input checked="" type="checkbox"/> | Medium (MD) <input type="checkbox"/> | High (HD) <input type="checkbox"/> | |

EXISTING STRUCTURAL DEFICIENCIES

-Excessive building flexibility; -Soft story; -Captive column; -Low horizontal capacity and resistance.

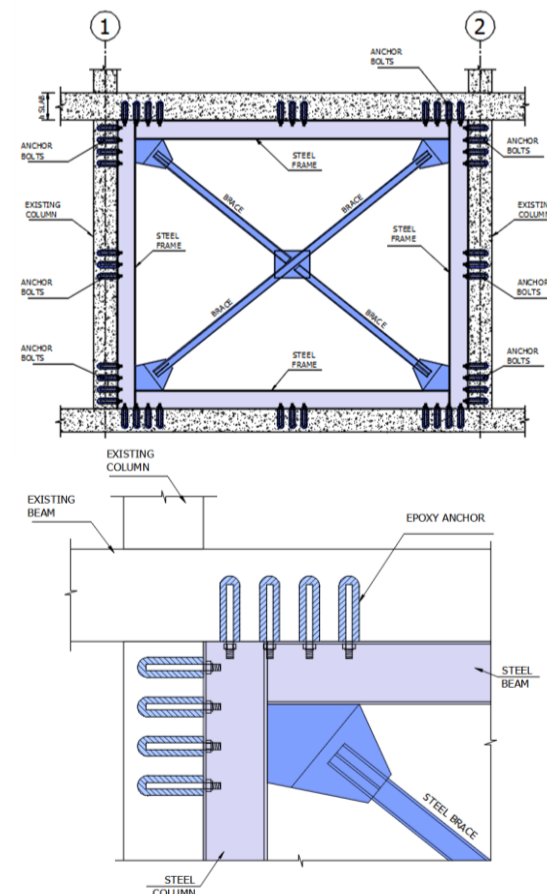
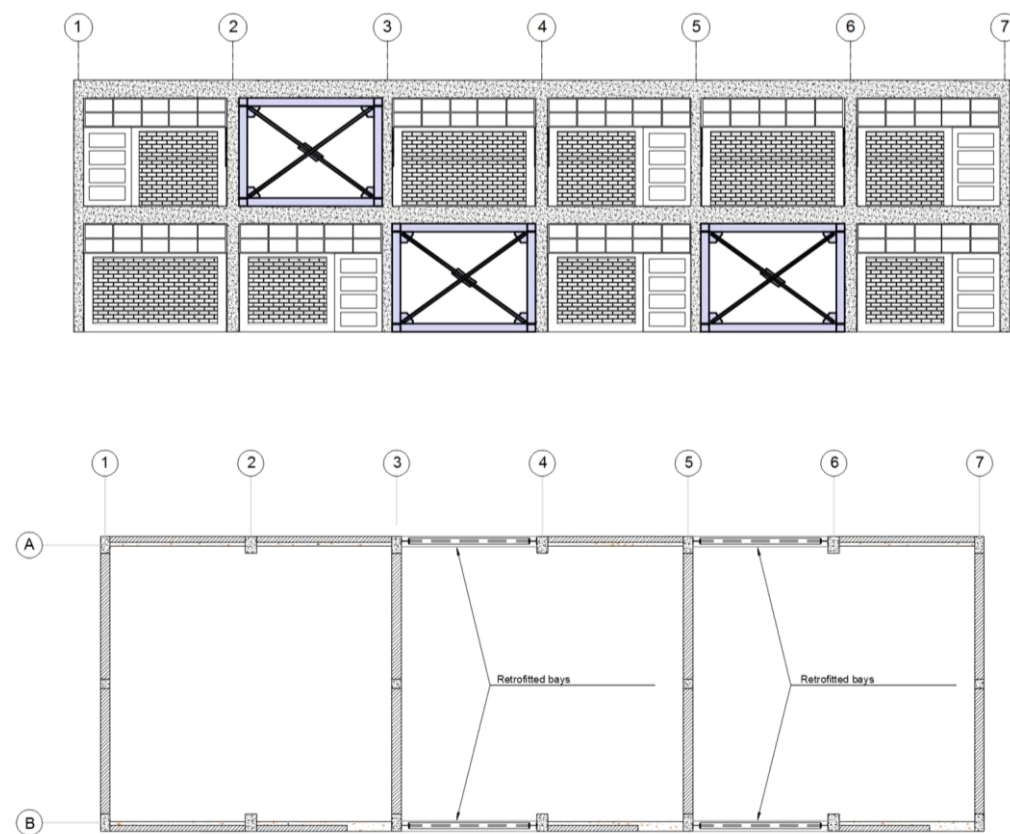
STRUCTURAL IMPROVEMENTS AFTER STRENGTHENING

- Stiffness increase.
- Ductility increase.
- Fragile collapse mechanism avoided.

STRENGTHENING INTERVENTION DESCRIPTION

The proposed strengthening intervention provides stiffness to the building and eliminate the short column (or weak story) collapse mechanism. In first place it is necessary to select at least two bays in the longitudinal direction, one in each principal axis, to reinforce the building. In these bays, remove non-structural elements and prepare RC beams and columns for connections. Construct and install modular steel braced frames between columns and beams. After this, reconstruct non-structural components in selected bays. Final step is to isolate and retrofit non-structural masonry walls in the remaining bays. Verify the need to rebuild or reinforce the foundation of the building.

ILLUSTRATIVE FIGURES



FURTHER REFERENCES

- ASCE (2017). Seismic Evaluation and Retrofit of Existing Buildings ASCE 41-17. American Society of Civil Engineers, Washington DC, USA.
- FEMA (2012). Reducing the Risk of Nonstructural Earthquake Damage - A Practical Guide FEMA E-74. Federal Emergency Management Agency, Reston, Virginia, USA.

Notes:

- The proposed intervention options are for illustration purposes only.
- All dimensions, details and material specification has to be specifically designed for each application case.
- Any actual reinforcement solution requires the participation of a structural engineer.
- The authors do not assume any responsibility for the use of the proposed reinforcement options.