SEISMIC EVALUATION AND RETROFIT FOR REDUCING THE VULNERABILITY OF HOUSING IN COLOMBIA: DEVELOPMENT AND IMPLEMENTATION

16th World Conference on Earthquake Engineering
Santiago, Chile
Bad constructions plus a large seismic gap determine a big potential loss

- Every 5 new homes built in Colombia today, approximately 3 are of “informal origin”*
- In Bogotá about 79% of assets are in “informal origin” construction**
- Last major earthquake to hit Bogotá happened in 1917

*DANE, 2015  
**PhD. Omar D. Cardona, 2015
To create awareness in pre-disaster areas is a real challenge

- Last major earthquake to hit Bogotá happened in 1917
- People in Bogotá might be aware of earthquakes because of Popayán 1983 (M5.5) and Armenia 1999 (M6.2)

Source: El Espectador
There is no simplified methodology available in Colombia to approach buildings taller than 3 stories.

Colombia has an adequate tool to address low-rise masonry buildings’ seismic vulnerability:

- Simple method for evaluation and retrofit design
- Up to 3-story tall buildings
- Confined Masonry and Unreinforced Masonry
Keep the level of effort to produce a single Retrofit Package low

- Structural assessment 4h
- Retrofit design 4h
- Production of drawings and other documentation required by Curaduría Urbana 32h

1 Week

A single RF package has more than 50 pages in Bogotá!
The current financial schemes constrain Bogotá to address the seismic vulnerability.
Subsidies that rely on socioeconomic conditions do not contribute risk reduction programs to be efficient.
The used methodology allows the engineer use different options of retrofitting

- Plaster
- Reinforced Concrete Overlay
- Adding new confining elements (NCM -> CM)
- Demolish existent elements
Common structural issues can be retrofitted
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Thanks
QUESTIONS?

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