Disaster Resilient Housing Construction

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What RESILIENCE Means?

Disaster Strikes

Direct Loss

Downtime

Reconstruction

Recovery

Direct loss x Recovery
% OF BUILDINGS IN AFFECTED AREAS

TIME

Year 0

Year 5

Year 8

Haiti Earthquake

Christchurch Earthquake

6 mo.

1.5 years
What is meeting code?
Reinforcement bars

a) Deformed bars with 135-degree hooks

b) Smooth ties with 90-degree hook
What Code performance means?
Construction Cost Differences

- Semi code
- Code
- Enhanced
- Isolation

Construction Cost

- 100
- 101
- 105
- 120
Earthquake Retrofit makes sense?

- Strengthen (E) Ceiling Sheathing Nailing
  - (N) 1mm x 25mm x 25mm x 50mm wide x 300mm Long Diagonal Bands at each corner

- Anchor (E) Each Truss to the existing bond beam where anchorage is not present. See figure
  - (E) Conc Beam (where occurs at porch)

- Infill Opening w/ (N) Brick
  - (N) 1mm x 25mm x 25mm x 50mm wide bands at all openings to extend 300mm beyond opening. Both face of wall

- Door (E)
- Window (E)
- Masonry Wall (E)
- Metal/Wood Truss w/ Bare Metal Deck
Timber bands
Timber bands
The building has been approved to have 35% of additional construction area.
The sale of this +35% should be used to pay for the construction of the building.
Innovation in Quality Control

• **What?** FAST REMOTE CONSTRUCTION MONITOR (FRCM)

• **Why?** Ensure inspection quality by empowering engineers

• **How?** Document quantity, quality in Cloud
Preset inspection schedule and locations

- Foundations, Floors at critical locations and time
Data collected and photos taken will be uploaded to the ECP via App.
Public Recognition of Good Construction

- When the building is done per FRCM, then “Gold Star”
- Gold Star buildings will be shown on a map that is open to the public.
Capacity Building is a Critical Part of it.

• Massive reconstruction effort affected today’s construction quality

• Extensive mason training programs and public outreach programs