

# *Quakesmart Testimonial*



**Allen&Hoshall**  
since 1915



# Marvin Windows & Doors

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- ❑ Ripley, TN
- ❑ Manufacturing Facility
- ❑ 660 Associates
- ❑ 3-shifts
  
- ❑ 4 Main Buildings
- ❑ 480,000 sq ft
- ❑ 1980 – 1991 vintage
  
- ❑ New Madrid Seismic Zone



# Why Mitigate Earthquake Risk?

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- ❑ Marvin Family concerned about Associate and plant safety
- ❑ Corporate Risk Management legal review of obligations & responsibilities
- ❑ Corporate & local plant management involvement
- ❑ 1<sup>st</sup> Question - What is the earthquake risk or exposure at the plant?

# Next Step

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- Mitigation Plan -
  - Perform an earthquake risk assessment
  - Interview *Experienced* firms
  - Desire regional presence
  - Select most qualified firm
  - Quantify earthquake risk
  - Begin implementing risk reduction measures

# Earthquake Risk Assessment

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- 2005 – Selected the team of CCS Group and Allen & Hoshall to perform Earthquake Risk Assessment study.

Three Tasks:

1. Assess building structure risk
2. Assess potential life-threatening hazards to plant associates – nonstructural risks
3. Perform a financial risk analysis

# Earthquake Risk Assessment Results

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- ❑ Region of *high* seismicity
- ❑ High risk identified for all buildings
- ❑ Building egress/evacuation routes, exits, and signage require improvement
- ❑ Life-safety concerns from nonstructural components & contents
- ❑ Financial loss exceeds 50% of total insured value (bldgs & contents)

# Mitigation Implementation

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- 2006-2007:
  - Building egress routes improved, fire extinguisher and fire walls addressed, added additional building exits, & updated exit signage to current code requirements
  - Nonstructural component restraint/anchorage designed and constructed

# Building Evacuation

- ❑ Exit markers difficult to see. Installed new signs.
- ❑ Evaluated egress routes and labeling.



# Building Exits

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- Installed:
  - 5 new exterior emergency exit doors
  - 2 new interior horizontal exit doors between bldg sections
  - 3 new fire rated doors in office area



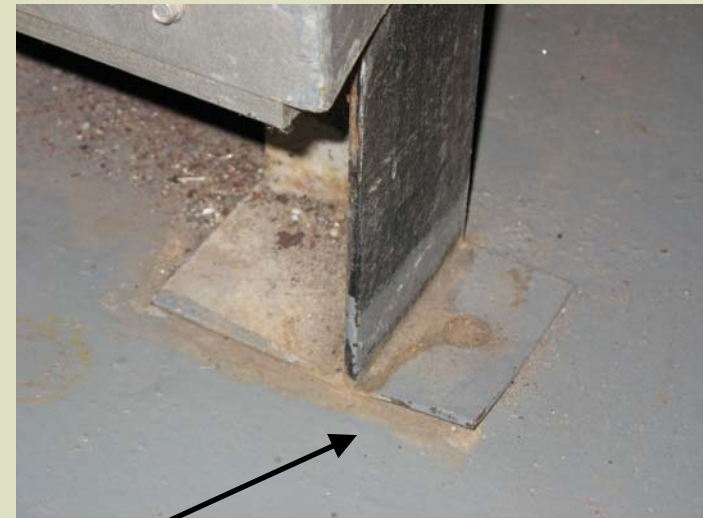
# Nonstructural Life-Safety Risks

- Addressed life-safety risks throughout the plant.



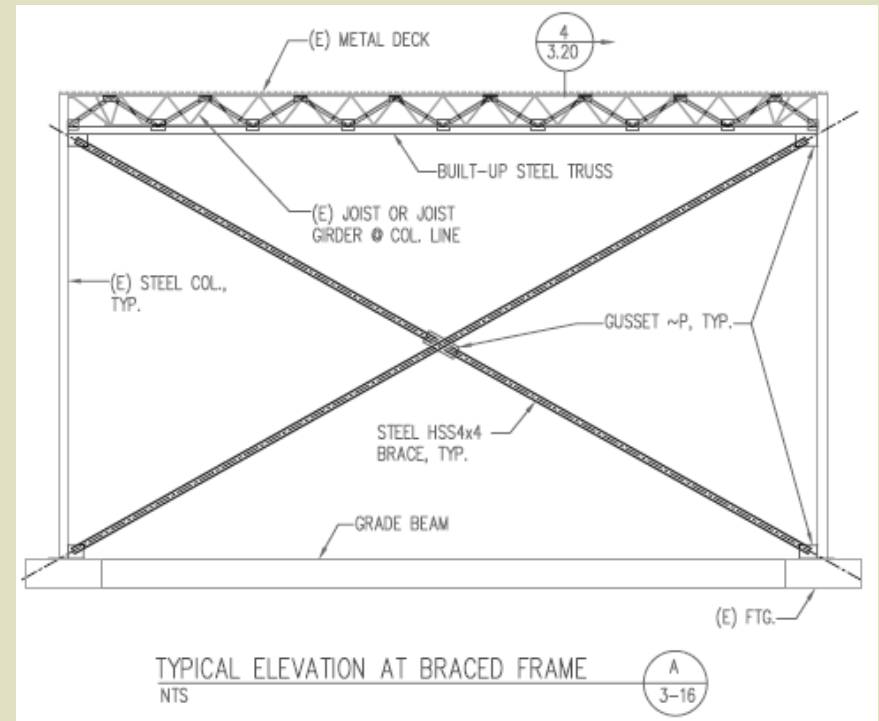
# Nonstructural Life-Safety Risks

## ❑ Natural Gas Boiler



# Mitigation Implementation (Cont.)

- 2008-2011: Building Strengthening
  - Building 1 & removal of Bldg. 3 roof ballast/re-roof
  - Building 2 & 3 strengthening
  - Building 6 strengthening, ballast removal & re-roof



# Integration Opportunities

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- ❑ Nonstructural Mitigation Project:
  - Install energy efficient high-bay lighting ballasts as lights were strengthened
  - Remove unused hanging piping & equipment in ceiling spaces reducing hazards
- ❑ Building Strengthening Project:
  - Remove heavy roof ballast & roof:
    - ❑ Reduced the seismic load to the building
    - ❑ Reduced disruption to operations
    - ❑ Reduced cost of overall strengthening
  - Install new energy star roofing system
    - ❑ Reduced heating & cooling costs
  - Used roof ballast for employee exercise track
    - ❑ Improved associate working environment & health

# Questions?

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