

# Concrete Coalition Phase II: Concrete Building Performance Record

**Instructions:** This form is for use in collecting data for phase two of the Concrete Coalition project: Developing a Global Database of Concrete Buildings Damaged in Earthquakes. For more information about how to use this form, see the sample form or view the demo at: <http://concretecoalition.org>.

Record ID:

Building Name:

Prepared By:

## Section 1: Basic Building Information



Elevation view of the south corner of the Champagne Tower. (Curry Price Court Engineering)

|                                 |  |          |
|---------------------------------|--|----------|
| Country:                        |  |          |
| State/Province:                 |  |          |
| City:                           |  |          |
| Latitude:                       |  |          |
| Longitude:                      |  |          |
| Street Address:                 |  |          |
| Occupancy:                      |  |          |
| Height:                         |  | Ft, m    |
| Number of Stories:              |  |          |
| Number of Stories below ground: |  |          |
| Size:                           |  | gsf, sqm |
| Year Built:                     |  |          |
| Original Code:                  |  |          |
| Modification:                   |  |          |
| Year Modified:                  |  |          |
| Code of Modification:           |  |          |

## Concrete Coalition Phase II: Concrete Building Performance Record

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### **Section 1: Basic Building Information**-(Continued)

|                             |  |
|-----------------------------|--|
| Lateral Load System:        |  |
| Other Lateral Load System:  |  |
| Vertical Load System:       |  |
| Other Vertical Load System: |  |
| Foundation:                 |  |
| Building Description:       |  |

**Supplemental Basic Information:**

Paste in building plans, engineering drawings or sketches

|                          |                          |
|--------------------------|--------------------------|
| Insert image here        | Insert image here        |
| Type image caption here: | Type image caption here: |
| Insert image here        | Insert image here        |
| Type image caption here: | Type image caption here: |

## Concrete Coalition Phase II: Concrete Building Performance Record

Record ID:

Building Name:

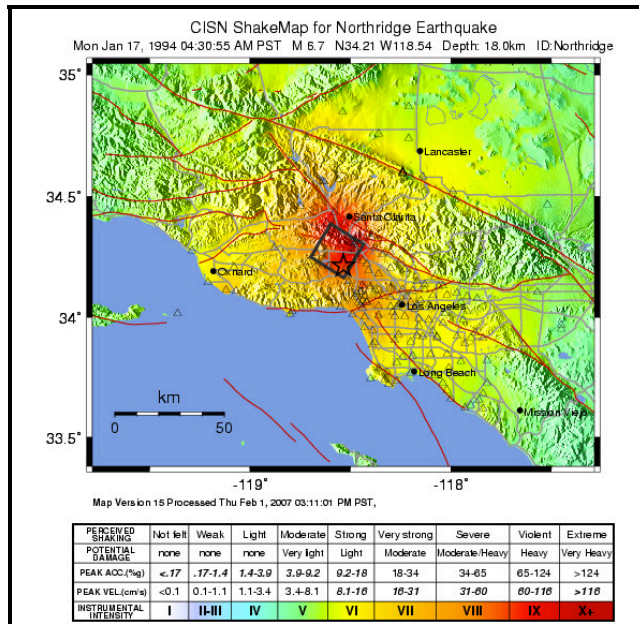
Prepared By:

### Section 2: Earthquake Information

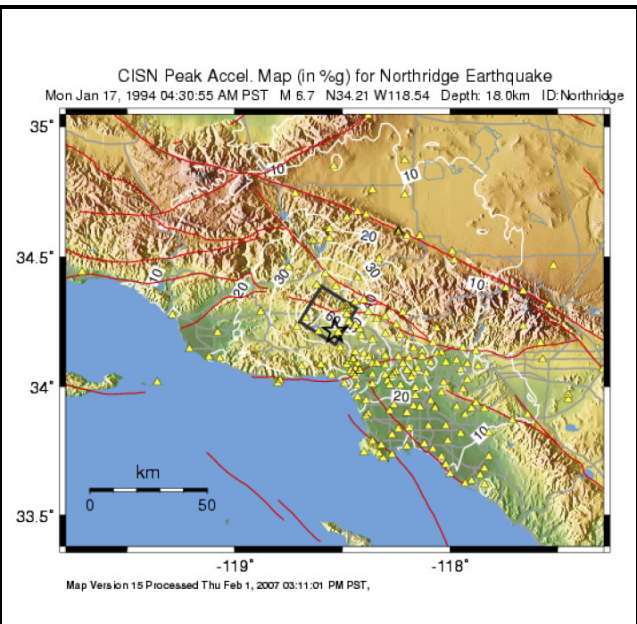
|                                   |  |                  |  |
|-----------------------------------|--|------------------|--|
| Earthquake Date:                  |  |                  |  |
| Moment Magnitude:                 |  |                  |  |
| Epicentral Distance (km):         |  |                  |  |
| Local Intensity:                  |  | Intensity Scale: |  |
| Site Description:                 |  |                  |  |
| PGA (max horizontal):             |  |                  |  |
| PGA (vertical):                   |  |                  |  |
| SaT:                              |  |                  |  |
| Ground Motion Recording Stations: |  |                  |  |
| Distance to Station (km):         |  |                  |  |
| Station Latitude:                 |  |                  |  |
| Station Longitude:                |  |                  |  |
| Ground Motion Summary:            |  |                  |  |

## Additional Ground Motion Information:

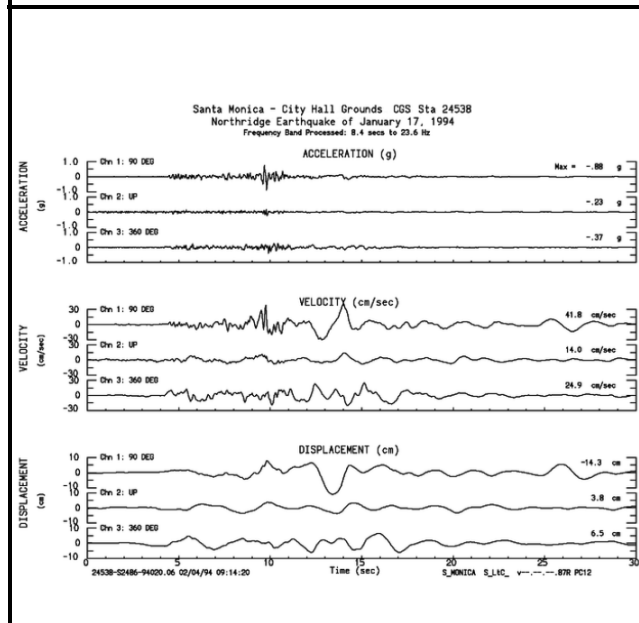
Paste in earthquake maps, spectra, or figures involving the ground motion at the building site



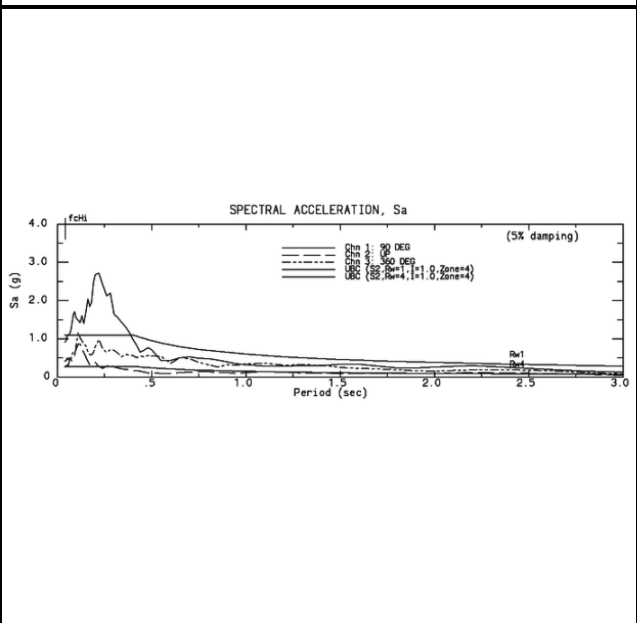
Shaking intensity of Northridge earthquake. (USGS, 2009)



Peak ground acceleration for Northridge earthquake (in %g). (USGS, 2009)



Ground acceleration, velocity and displacement at CSMIP Station No. 24538. (CESMD, 1994)



Spectral acceleration at CSMIP Station No. 24538. (CESMD, 1994)

## Concrete Coalition Phase II: Concrete Building Performance Record

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Record ID:

Building Name:

Prepared By:

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### **Section 3: Damage Information**

|                              |  |
|------------------------------|--|
| Performance Summary:         |  |
| Damage State Description:    |  |
| Summary of Causes of Damage: |  |

## Concrete Coalition Phase II: Concrete Building Performance Record

Record ID:

Building Name:

Prepared By:

### **Section 4: Observed Design and Construction Characteristics**-Construction Quality

| Notes                                   | Contribution to Observed Damage |                 |               |                |            |
|---|---------------------------------|-----------------|---------------|----------------|------------|
|   | <u>Unlikely</u>                 | <u>Possible</u> | <u>Likely</u> | <u>Unknown</u> | <u>N/A</u> |
| <b>Materials</b>                        |                                 |                 |               |                |            |
| Concrete                                |                                 |                 |               |                |            |
| Reinforcing steel                       |                                 |                 |               |                |            |
| <b>Execution</b>                        |                                 |                 |               |                |            |
| Conveyance/<br>placement of concrete    |                                 |                 |               |                |            |
| Rebar                                   |                                 |                 |               |                |            |
| Field variance with<br>design documents |                                 |                 |               |                |            |
| <b>Other Factors</b>                    |                                 |                 |               |                |            |
| Please Specify:                         |                                 |                 |               |                |            |

## Concrete Coalition Phase II: Concrete Building Performance Record

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### **Section 4: Observed Design and Construction Characteristics**-Configuration

|  | Notes | Contribution to Observed Damage |                 |               |                |            |
|--|-------|---------------------------------|-----------------|---------------|----------------|------------|
|  |       | <u>Unlikely</u>                 | <u>Possible</u> | <u>Likely</u> | <u>Unknown</u> | <u>N/A</u> |
| <b>Plan Irregularities</b>                       |       |                                 |                 |               |                |            |
| Torsion  |       |                                 |                 |               |                |            |
| Perimeter boundary                               |       |                                 |                 |               |                |            |
| Diaphragm  |       |                                 |                 |               |                |            |
| Out-of-plane offsets in lateral resisting system |       |                                 |                 |               |                |            |
| Non-orthogonal systems                           |       |                                 |                 |               |                |            |



## Concrete Coalition Phase II: Concrete Building Performance Record

Record ID:

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Prepared By:

### **Section 4: Observed Design and Construction Characteristics**-Configuration-(Continued)

|  | Notes | Contribution to Observed Damage |                 |               |                |            |
|--|-------|---------------------------------|-----------------|---------------|----------------|------------|
|  |       | <u>Unlikely</u>                 | <u>Possible</u> | <u>Likely</u> | <u>Unknown</u> | <u>N/A</u> |
| <b>Vertical Irregularities</b>                     |       |                                 |                 |               |                |            |
| Soft Story   |       |                                 |                 |               |                |            |
| Weak story   |       |                                 |                 |               |                |            |
| Mass distribution                                  |       |                                 |                 |               |                |            |
| Geometric variability of lateral resisting system  |       |                                 |                 |               |                |            |
| In-plane discontinuity of lateral resisting system |       |                                 |                 |               |                |            |
| Setbacks   |       |                                 |                 |               |                |            |
| Change in stiffness                                |       |                                 |                 |               |                |            |
| <b>Other Factors</b>                               |       |                                 |                 |               |                |            |
| Please Specify:                                    |       |                                 |                 |               |                |            |

## Concrete Coalition Phase II: Concrete Building Performance Record

Record ID:

Building Name:

Prepared By:

### **Section 4: Observed Design and Construction Characteristics**-Lateral Load Resisting System-General

|                                     | Notes | Contribution to Observed Damage |                 |               |                |            |
|-------------------------------------|-------|---------------------------------|-----------------|---------------|----------------|------------|
|                                     |       | <u>Unlikely</u>                 | <u>Possible</u> | <u>Likely</u> | <u>Unknown</u> | <u>N/A</u> |
| <b>Strength</b>                     |       |                                 |                 |               |                |            |
| Overall lack of strength            |       |                                 |                 |               |                |            |
| <b>Stiffness</b>                    |       |                                 |                 |               |                |            |
| Extreme Flexibility                 |       |                                 |                 |               |                |            |
| <b>Load Path</b>                    |       |                                 |                 |               |                |            |
| Collectors/Struts                   |       |                                 |                 |               |                |            |
| Anchorage of nonstructural elements |       |                                 |                 |               |                |            |
| Out-of-plane capacity of walls      |       |                                 |                 |               |                |            |
| Diaphragm chords                    |       |                                 |                 |               |                |            |
| Diaphragm openings                  |       |                                 |                 |               |                |            |
| <b>Other Factors</b>                |       |                                 |                 |               |                |            |
| Please Specify:                     |       |                                 |                 |               |                |            |

## Concrete Coalition Phase II: Concrete Building Performance Record

Record ID:

Building Name:

Prepared By:

### **Section 4: Observed Design and Construction Characteristics**-Lateral Load Resisting System-Frames

|   | Notes | Contribution to Observed Damage |                 |               |                |            |
|---|-------|---------------------------------|-----------------|---------------|----------------|------------|
|   |       | <u>Unlikely</u>                 | <u>Possible</u> | <u>Likely</u> | <u>Unknown</u> | <u>N/A</u> |
| <b>Columns</b>                            |       |                                 |                 |               |                |            |
| Shear strength                            |       |                                 |                 |               |                |            |
| Flexural strength                         |       |                                 |                 |               |                |            |
| Axial load ratio<br>( $P/A_c/f_c'$ )      |       |                                 |                 |               |                |            |
| “Vertical” load columns<br>drift capacity |       |                                 |                 |               |                |            |
| Interference of frame<br>action by infill |       |                                 |                 |               |                |            |
| <b>Beams</b>                              |       |                                 |                 |               |                |            |
| Strength relative to<br>columns           |       |                                 |                 |               |                |            |
| Shear controlled<br>behavior              |       |                                 |                 |               |                |            |
| Continuity of<br>longitudinal reinforcing |       |                                 |                 |               |                |            |
| Loss of vertical capacity                 |       |                                 |                 |               |                |            |

## Concrete Coalition Phase II: Concrete Building Performance Record

Record ID:

Building Name:

Prepared By:

### **Section 4: Observed Design and Construction Characteristics**-Lateral Load Resisting System-Frames-Continued

|  | Notes | Contribution to Observed Damage |                 |               |                |            |
|--|-------|---------------------------------|-----------------|---------------|----------------|------------|
|  |       | <u>Unlikely</u>                 | <u>Possible</u> | <u>Likely</u> | <u>Unknown</u> | <u>N/A</u> |
| <b>Beams</b> –(continued)              |       |                                 |                 |               |                |            |
| Interference of frame action by infill |       |                                 |                 |               |                |            |
| <b>Joints</b>                          |       |                                 |                 |               |                |            |
| Interior                               |       |                                 |                 |               |                |            |
| Exterior                               |       |                                 |                 |               |                |            |
| Corner                                 |       |                                 |                 |               |                |            |
| <b>Other Factors</b>                   |       |                                 |                 |               |                |            |
| Please Specify:                        |       |                                 |                 |               |                |            |

## Concrete Coalition Phase II: Concrete Building Performance Record

Record ID:

Building Name:

Prepared By:

### **Section 4: Observed Design and Construction Characteristics**-Lateral Load Resisting System-Shear Walls

| Notes                                  | Contribution to Observed Damage |                 |               |                |            |
|--|---------------------------------|-----------------|---------------|----------------|------------|
|  | <u>Unlikely</u>                 | <u>Possible</u> | <u>Likely</u> | <u>Unknown</u> | <u>N/A</u> |
| <b>Shear</b>                           |                                 |                 |               |                |            |
| Diagonal tension/compression           |                                 |                 |               |                |            |
| Sliding shear                          |                                 |                 |               |                |            |
| Flexure/shear                          |                                 |                 |               |                |            |
| <b>Flexure</b>                         |                                 |                 |               |                |            |
| Compression zone buckling capacity     |                                 |                 |               |                |            |
| Boundary reinforcing fracture/buckling |                                 |                 |               |                |            |
| Discontinuity of wall                  |                                 |                 |               |                |            |
| Boundary Reinforcing at openings       |                                 |                 |               |                |            |
| <b>Other Factors</b>                   |                                 |                 |               |                |            |
| Please Specify:                        |                                 |                 |               |                |            |

## Concrete Coalition Phase II: Concrete Building Performance Record

Record ID:

Building Name:

Prepared By:

### **Section 4: Observed Design and Construction Characteristics**-Lateral Load Resisting System-Infills

|                                | Notes | Contribution to Observed Damage |                 |               |                |            |
|--------------------------------|-------|---------------------------------|-----------------|---------------|----------------|------------|
|                                |       | <u>Unlikely</u>                 | <u>Possible</u> | <u>Likely</u> | <u>Unknown</u> | <u>N/A</u> |
| Unreinforced                   |       |                                 |                 |               |                |            |
| Interference with frame action |       |                                 |                 |               |                |            |
| Out-of-plane                   |       |                                 |                 |               |                |            |
| Attachment to framing          |       |                                 |                 |               |                |            |
| <b>Other Factors</b>           |       |                                 |                 |               |                |            |
| Please Specify:                |       |                                 |                 |               |                |            |

## Concrete Coalition Phase II: Concrete Building Performance Record

Record ID:

Building Name:

Prepared By:

### **Section 4: Observed Design and Construction Characteristics**-Lateral Load Resisting System-Other

| Notes                      | Contribution to Observed Damage |                 |               |                |            |
|----------------------------|---------------------------------|-----------------|---------------|----------------|------------|
|                            | <u>Unlikely</u>                 | <u>Possible</u> | <u>Likely</u> | <u>Unknown</u> | <u>N/A</u> |
| <b>Foundations</b>         |                                 |                 |               |                |            |
| Liquefaction               |                                 |                 |               |                |            |
| Pile/pier tension capacity |                                 |                 |               |                |            |
| Spread footing capacity    |                                 |                 |               |                |            |
| <b>Other:</b>              |                                 |                 |               |                |            |
| Please Specify:            |                                 |                 |               |                |            |
| <b>Miscellaneous</b>       |                                 |                 |               |                |            |
| Pounding                   |                                 |                 |               |                |            |
| Surface Rupture            |                                 |                 |               |                |            |
| <b>Other:</b>              |                                 |                 |               |                |            |
| Please Specify:            |                                 |                 |               |                |            |

**Illustrations of damage:**

Paste in drawings, sketches or photos of building damage



Damage to the perimeter moment frames of the Champagne Tower. (Comartin et al., 2004)



Typical X-shaped shear cracking, a result of induced short-column effects from the presence of balcony parapets. (Comartin et al., 2004)



Classic shear failure of the coupling beams between linked shear walls at the south end of the building. (EEFIT, 1994)



Classic shear failure of the coupling beams between linked shear walls at the south end of the building. (Hew et al., 1994)



## Concrete Coalition Phase II: Concrete Building Performance Record

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Record ID:

Building Name:

Prepared By:


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### **Section 4: Repair and Retrofit Information**

|                             |  |
|-----------------------------|--|
| Type of retrofit or repair: |  |
| Other:                      |  |
| Performance Level:          |  |
| Hazard Level:               |  |
| Code:                       |  |
| Other:                      |  |
| Lateral Analysis:           |  |
| Other:                      |  |
| Design Strategy:            |  |
| Retrofit Summary:           |  |

**Illustrations of Repair or Retrofit:**

Paste in drawings, sketches or photos of building repair or retrofit

|   |                                 |
|---|---------------------------------|
|  | <p>Insert image here</p>        |
| <p>Temporary stabilization of severely damaged columns. (Erdey, 2007)</p>         | <p>Type image caption here:</p> |
| <p>Insert image here</p>  | <p>Insert image here</p>        |
| <p>Type image caption here:</p>   | <p>Type image caption here:</p> |

## Concrete Coalition Phase II: Concrete Building Performance Record

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Record ID:

Building Name:

Prepared By:

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| <b>Additional Notes:</b> |  |
|--------------------------|--|
| <b>Section 1</b>         |  |
| <b>Section 2</b>         |  |
| <b>Section 3</b>         |  |
| <b>Section 4</b>         |  |

## Concrete Coalition Phase II: Concrete Building Performance Record

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Record ID:

Building Name:

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### **Appendix 1: Supplemental Basic Information**

|               |  |
|---------------|--|
| File Location |  |
| File Caption  |  |
| File Location |  |
| File Caption  |  |
| File Location |  |
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| File Location |  |
| File Caption  |  |

## Concrete Coalition Phase II: Concrete Building Performance Record

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Record ID:

Building Name:

Prepared By:

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### **Appendix 2: Additional Ground Motion Location**

|               |  |
|---------------|--|
| File Location |  |
| File Caption  |  |
| File Location |  |
| File Caption  |  |
| File Location |  |
| File Caption  |  |
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## Concrete Coalition Phase II: Concrete Building Performance Record

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Record ID:

Building Name:

Prepared By:

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### **Appendix 3: Illustrations of Damage**

|               |  |
|---------------|--|
| File Location |  |
| File Caption  |  |
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| File Caption  |  |



## Concrete Coalition Phase II: Concrete Building Performance Record

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Record ID:

Building Name:

Prepared By:

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### **Appendix 5: References**

|                  |  |
|------------------|--|
| <b>Citation</b>  |  |
| Link to Purchase |  |
| File Location    |  |
| <b>Citation</b>  |  |
| Link to Purchase |  |
| File Location    |  |
| <b>Citation</b>  |  |
| Link to Purchase |  |
| File Location    |  |
| <b>Citation</b>  |  |
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| File Location    |  |
| <b>Citation</b>  |  |
| Link to Purchase |  |
| File Location    |  |



## Concrete Coalition Phase II: Concrete Building Performance Record

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Record ID:

Building Name:

Prepared By:

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### **Appendix 5: References**-(Continued)

|                  |  |
|------------------|--|
| <b>Citation</b>  |  |
| Link to Purchase |  |
| File Location    |  |
| <b>Citation</b>  |  |
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