APPENDIX 1

DATABASE ON THE NORTHRIDGE EARTHQUAKE

6685 Hollywood Blvd and Las Palmas Av , NE corner	Hollywood	Two-story commercial building with a penthouse Built around 1930's URM structure Shear cracking on walls and piers on second floor (URM / Low-Rise Commercial)
Hollywood Blvd and Las Palmas Av , NW corner	Hollywood	Two-story URM commercial building Diagonal cracking at opening corners
N side of Hollywood Blvd between Cherokee Av and Whitley Av	Hollywood	Pounding of one- and two-story URM commercial buildings
N side of Hollywood Blvd between Whitley Av and Hudson Av	Hollywood	Three-story retrofitted URM commercial building from the 1940's Crushing of exterior piers perhaps due to upper stories shaking (Appendix behavior)
6537, 6535 and 6531 1/2 Holloywood Blvd, N side	Hollywood	Eighty year old historical landmark Retrofitted URM with four floors plus basement Commercial use at ground floor, others, apartments Foundation has 1 m thick R/C walls Diagonal cracking on facade walls Maximum crack widths were 1cm No visual structure damage, only plaster cracks "Limited entry" sign of Jan-22-94
6381 Hollywood Blvd and Cahuenga St, NE corner	Hollywood	Six-story retrofitted URM commercial building Historical trust Cracking on top of wall piers
Hollywood Blvd and Ivar St, NE corner	Hollywood	Eleven-story retrofitted URM commercial building Cracking in wall openings
Vine Street, E side, between Hollywood Blvd and Selma St	Hollywood	Two-story URM structure built around 1940's-1950's Fire damage
Sunset Blvd and Ivar St, NW corner	Hollywood	One-story commercial Modern steel structures with wood floor trusses Collapse of false ceiling No pictures allowed
Warwick Building 6505 Sunset Blvd and Wilcox, NW corner	Hollywood	Three-story commercial (ground floor) and apartment structure built around 1940's Retrofitted URM Corner building with regular plan Wall shear cracking on E-W facade (Sunset Blvd), almost no cracking on N-S side Pounding with 6507 Sunset Blvd
6525 Sunset Blvd, N side	Hollywood	Eight-story URM apartment building Diagonal cracks on wall piers
6515 Sunset Blvd, N side	Hollywood	Four-story modern masonry commercial structure Only two window glasses broken
6600 and 6606 Sunset Blvd with Seward, SW corner	Hollywood	Two-story URM commercial (ground level) and apartment building Wall diagonal cracking

St. Andrew's Liquor Hollywood Blvd	Hollywood	Two-story building. More than 20 years old R/C structure in the first story. R/C and masonry structure in the second story. Nonstructural damage in the first floor but severe damage in the corner of the second floor because of no continuity of column and no continuity of tie beams in the joint
St. Andrew's Liquor Hollywood Blvd	Hollywood	Corner view and damage in masonry cover of the second story
St Andrew's Liquor Hollywood Blvd	Hollywood	General view of a commercial building
Hollywood Blvd	Hollywood	3-story apartment building Shear cracks in the first story panel walls up to window openings Maybe 10 years old Structural panel system
Hollywood Blvd	Hollywood	Flexural crack at the bottom of the wall fence and shear cracks in the corner of the window opening of an apartment building
Hollywood Blvd	Hollywood	1-story URM structure Shear cracks and a stiff facade This structure will be demolished soon High risk and instability in the floor system
Hollywood Blvd	Hollywood	Severe damage in URM one story building with shear cracks
Hollywood Blvd	Hollywood	Official document about an structural safety evaluation in this building
Hollywood Blvd	Hollywood	Stiff and heavy masonry facade
Janitorial Hollywood Blvd	Hollywood	1-story URM commercial building built more than 30 years ago Double wythe wall Shear cracks and spall of corner masonry in the facade
Janitorial Hollywood Blvd	Hollywood	Corner view of double wythe URM wall with shear cracks
Vacancy Hotel Hollywood Blvd	Hollywood	4-story URM building with timber floor and roof system anchored to exterior walls with post-tensioned steel round bars Shear cracks in walls up to opening edges Shear damage in transverse wall This structure damaged another small neighbor (pounding)
Vacancy Hotel Hollywood Blvd	Hollywood	Damage due to pounding between neighbor buildings without enough separation
Vacancy Hotel Hollywood Blvd	Hollywood	Shear cracks in URM walls in the facade of the Hotel

Vacancy Hotel Hollywood Blvd	Hollywood	Transverse URM walls and details of anchorages to fix the timber floor system to masonry walls Shear cracks in wall along mortar joints
Hollywood Blvd	Hollywood	4-story apartment URM building Partial collapse of the north corner Spectacular collapse No separation from neighbor construction Double wythe masonry walls and heavy loads in each story
Hollywood Blvd	Hollywood	Partial collapse of the corner in a URM 4-story building
Hollywood Blvd	Hollywood	Severe partial collapse of roof system and out-of-plane failure in URM one-story commercial building
Bledsoe St between Bradley Av and Woodcock Av	Sylmar	Six-story R/C office structure Cracking at construction joints Crushing on ground floor columns
Olive View Medical Center - Main building	Sylmar	Five-story county hospital which replaces the 1971collapsed building Located on alluvium Underground with R/C walls, elevator (7 units) and machinery pent-house Built in 1975 although occupied until 1985 due to safety and health requirements Surgical hospital with 350 beds (the original had 850 beds) Structure is made of welded steel shapes Slab system consists of metal decking with concrete topping Columns are spaced at 20 ft R/C walls in the basement (box-type foundation) and in elevator core Story height is 18 ft No structural damage reported in the steel structure Diagonal cracking in basement walls at 20 cm spacing and 0 010 inch wide Flexural cracking in edges Column size in the basement is 50 cm Water damage in fifth floor and fourth floor due to fracture of a 1 inch diameter cooper pipes (bad solder fracture) Seven sprinkler black iron pipes broke in same floors Machinery sliding due to ripping of anchor bolts due to reduced length over the nut USGS has two instruments 2 3g in the sixth floor and 0 9g at the base The sixth story apparatus is located at most in the center of the cross-shaped building (which goes from 4th to 6th floors)
Olive View Medical Center Olive View Dr	Sylmar	Nonstructural elements in floor systems and nonstructural damage in small diameter pipes for water supply located at the bottom face of the floor system
Olive View Medical Center Olive View Dr	Sylmar	Damage in nonstructural gypsum board in roof due to lateral movements of the structure
Olive View Medical Center Olive View Dr	Sylmar	No damage in office room located in the 6th story of the building
Olive View Medical Center Olive View Dr	Sylmar	Beam-column joint and pipes in machinery room at the top of the building
Olive View Medical Center Olive View Dr	Sylmar	Screws in the base of the electric transformer in the roof level

Olive View Medical Center Olive View Dr	Sylmar	General view of roof level and machinery room
Olive View Medical Center Olive View Dr	Sylmar	Base plate which supports a steel structure where relative movement between slab and steel structure occurred
Olive View Medical Center Olive View Dr	Sylmar	Exterior view of windows facade
Olive View Medical Center Olive View Dr	Sylmar	General view of the parking lot
Olive View Medical Center Olive View Dr	Sylmar	Lamp in machinery room at roof level
Olive View Medical Center Olive View Dr	Sylmar	Interior view of machinery room (transformer), tie bar (tensor) which fixes the equipment to the slab to preclude displacements
Olive View Medical Center Olive View Dr	Sylmar	Base plate and screws of a steel structure, no damage
Olive View Medical Center Olive View Dr	Sylmar	Checking the lower part of the roof system without nonstructural elements
Olive View Medical Center Olive View Dr	Sylmar	Overturning of files at the basement
Olive View Medical Center Olive View Dr	Sylmar	Main entrance of the Hospital No damage
Olive View Medical Center Olive View Dr	Sylmar	General view of the Olive View Medical Center
Olive View Medical Center Olive View Dr	Sylmar	General view of the Olive View Medical Center
Olive View Medical Center - Warehouse Olive View Dr	Sylmar	Tilt-up structure with R/C concrete walls and a steel and wood roof Diagonal cracking in some panels near the base Joint opening between panels Damage near the connection with roof Panel horizontal deflection at mid-height at rear of building Several interior lamps were sheared off and fell Separation of roof panels
Olive View Medical Center Olive View Dr	Sylmar	Precast building for warehouse with R/C walls Detail of the separation between precast walls

Olive View Medical Center Olive View Dr	Sylmar	Roof system of the warehouse No damage
Olive View Medical Center Olive View Dr	Sylmar	Base plate and screws of the steel shelf in the warehouse Possible relative movement in the base plate respect to the floor slab
Olive View Medical Center Olive View Dr	Sylmar	Column support of transverse beam in roof Warehouse of the Olive View Medical Center
Sylmar Electric Power Substation	Sylmar	Damaged ceramic elements
Varsity Club Apartments 10020 Zelzah Ave	Northridge	Four-story apartment building (upper three floors) Corner building Basement N and E walls are fully grouted CMU W and S columns made of stack bonded CMU Shear cracks on walls and columns No damage noted in interior 30 cm round R/C columns in the basement No distress in the 25x70 cm slab drop panel Upper floors have wood framing covered with stucco reinforced with a mesh Damage along panel joints
Varsity Club Apartments 10020 Zelzah Ave	Northridge	Front view of apartments and street
Varsity Club Apartments 10021 Zelzah Ave	Northridge	Shear cracks in column and beam from upper right corner of window opening
Varsity Club Apartments 10022 Zelzah Ave	Northridge	Front view of the apartment complex
Varsity Club Apartments 10023 Zelzah Ave	Northridge	Shear crack in column of the first level which is used as parking lot Possible first soft floor
Varsity Club Apartments 10024 Zelzah Ave	Northridge	Exterior view without damage to balconies
Varsity Club Apartments 10025 Zelzah Ave	Northridge	Severe column damage Columns built with stucco reinforced with a mesh along joints
RM Garden Walls or Fences Zelzah Ave	Northridge	Damage in RM garden wall, partially collapsed
RM Garden Walls or Fences Zelzah Ave	Northridge	Detail of spliced rebars inside the hollow blocks Partial collapse

RM Garden Walls or Fences Zelzah Ave	Northridge	General view of continuous RM garden wall along the street.
RM Garden walls Around CSU campus near Zelzah and Nordhoff Streets	Northridge	Out-of-plane damage (collapse) in garden walls
RM Garden walls Around CSU campus near Zelzah and Nordhoff Streets	Northridge	Concrete hollow bricks of a collapsed garden wall. Partial grouting of cells.
Nordhoff St.	Northridge	Indirect grouted masonry garden fence
Mountain View Apartments 9950 Zelzah Ave.	Northridge	Three-story building Wood frame structure with steel poles in the garage Twisted and leaning to W side Declared unsafe.
CSU Northridge Campus Zelzah Ave near Nordhoff St; W side	Northridge	Buildings inside of the CSU campus
Parking Building - CSU Northridge Campus Zelzah Ave near Nordhoff St; W side	Northridge	Four-story precast concrete structure Unbonded post-tensioned two-way slabs. Precast columns with vertical post-tensioning Precast beams on column corbels. In both directions, columns every two other beams. N-S span was about 5 m Collapse of E and W sides of the building Diagonal cracking of beam-column joints in the N-S direction. Column ductile failure (bending) except in a couple of columns Possibly interior columns failed thus causing inward collapse. Catenary action of slabs was noticed Few unbonded tendon anchorage failure due to collapse
Parking building inside CSU Northridge Campus Zelzah Ave near Nordhoff St, W side	Northridge	Front view of the most damage area
Parking building inside CSU Northridge Campus Zelzah Ave near Nordhoff St, W side	Northridge	Collapse of the last bay and severe flexural damage in a column of the first story
Parking building inside CSU Northridge Campus Zelzah Ave near Nordhoff St, W side	Northridge	General view of the collapsed structure
Parking building inside CSU Northridge Campus Zelzah Ave near Nordhoff St, W side	Northridge	Partial collapse of the parking building and standing of three columns
Parking building inside CSU Northridge Campus Zelzah Ave near Nordhoff St, W side	Northridge	Flexural cracks in column and partial collapse of the parking building
Parking building inside CSU Northridge Campus Zelzah Ave near Nordhoff St, W side	Northridge	Partial collapse of the last two bays

Parking building inside CSU Northridge Campus Zelzah Ave near Nordhoff St; W side	Northridge	Collapse of the last two bays and details of flexural cracks in R/C column.
Parking building inside CSU Northridge Campus Zelzah Ave near Nordhoff St; W side	Northridge	Collapse and details of post-tensioned slab cables.
Parking building inside CSU Northridge Campus Zelzah Ave near Nordhoff St; W side	Northridge	Column and slab failure. Lack of continuity among precast elements. Flexural cracks along the height of the column.
Parking building inside CSU Northridge Campus Zelzah Ave near Nordhoff St; W side	Northridge	Stairs failure as an independent body due to the collapse of the parking.
Parking building inside CSU Northridge Campus Zelzah Ave near Nordhoff St; W side	Northridge	Plastic hinge in a beam end near the beam-column joint
Parking building inside CSU Northridge Campus Zelzah Ave near Nordhoff St; W side	Northridge	Collapsed area and standing of three columns showing the precast connections.
Parking building inside CSU Northridge Campus Zelzah Ave near Nordhoff St; W side	Northridge	Exterior frame showing the damage to unbonded post-tensioned slabs.
Parking building inside CSU Northridge Campus Zelzah Ave near Nordhoff St; W side	Northridge	Detail of secondary beams joint and slab collapse.
Parking building inside CSU Northridge Campus Zelzah Ave near Nordhoff St; W side	Northridge	Collapse of stair area. The platform was overturned to a vertical position.
Parking building inside CSU Northridge Campus Zelzah Ave near Nordhoff St; W side	Northridge	Slab damage.
Parking building inside CSU Northridge Campus Zelzah Ave near Nordhoff St; W side	Northridge	Detail of joint between main and secondary beam under the collapsed slab.
Parking building inside CSU Northridge Campus Zelzah Ave near Nordhoff St; W side	Northridge	Flexural and shear cracks in a column
Parking building inside CSU Northridge Campus Zelzah Ave near Nordhoff St; W side	Northridge	Collapse of floor slabs and flexural cracks at the ends of a first story column.
Parking building inside CSU Northridge Campus Zelzah Ave near Nordhoff St; W side	Northridge	General view of the parking collapse. Column ductile failure

CSU Northridge Campus Zelzah Ave near Nordhoff St, W side	Northridge	New apartment, 4-story buildings inside CSU campus
CSU Northridge Campus Zelzah Ave near Nordhoff St, W side	Northridge	Two-story apartment buildings inside CSU campus
CSU Northridge Campus Zelzah Ave near Nordhoff St, W side	Northridge	Two-story apartments inside CSU campus Severe damage at the base of these wooden structures
The Superior Apartment Building Zelzah Ave, E side	Northridge	Three-story 18-apartment units Upper wood frame with stucco over E-W soft-garage level with steel poles First soft story collapse.
University Residency Town - CSU Campus Lassen St and Zelzah Ave, NW corner	Northridge	Seven-story R/C building Damage at construction joints between building and stair core though they are continuous at the top (parapet) Wall diagonal cracking in the second floor, crushing No damage in the ground floor, no distress in the R/C structure
University Residency Town - CSU Campus Lassen St and Zelzah Ave NW corner	Northridge	Seven-story R/C building
University Residency Town - CSU Campus Lassen St and Zelzah Ave NW corner	Northridge	Seven-story building
University Residency Town - CSU Campus Lassen St and Zelzah Ave NW corner	Northridge	Damage in the second story corner only in the brick finish cover
University Residency Town - CSU Campus Lassen St and Zelzah Ave NW corner	Northridge	Diagonal shear cracks in a wall of the second story showing the rebars
University Residency Town - CSU Campus Lassen St and Zelzah Ave NW corner	Northridge	Damage at the top parapet in the joint between the building and the stair core
University Residency Town - CSU Campus Lassen St and Zelzah Ave NW corner	Northridge	Shear cracks in the second story exterior walls
University Residency Town - CSU Campus Lassen St and Zelzah Ave NW corner	Northridge	New 4-story office building without any damage in the Northridge zone
University Residency Town CSU Campus Lassen St and Zelzah Ave NW corner	Northridge	Damage in one-story wooden houses URM chimney fell down

Apartment building Dearborn and Yolanda St	Northridge	Three stories, 24 apartments. Open ground floor in the E-W direction there are sheat-rock walls covered with stucco For the N-S direction, steel pole columns (6-in diameter) covered with mesh and stucco Steel pole typical spacing was 5 m, however, column size and spacing vary widely Red-tagged Significant story drift in first story
Apartment Building Dearborn and Yolanda Streets	Northridge	General view in Yolanda Ave Three-story buildings with open ground floor
Apartment Building Dearborn and Yolanda Streets	Northridge	Severe damage in the first floor walls mainly on its stucco cover
Apartment Building Dearborn and Yolanda Streets	Northridge	Steel pole column (6 in-diameter) covered with mesh and stucco
Apartment Building Dearborn and Yolanda Streets	Northridge	Damage at the top of the column only in cover of beam ends
Apartment Building Dearborn and Yolanda Streets	Northridge	Crushing of stucco cover and vertical crack at the base of the column
Apartment Building Dearborn and Yolanda Streets	Northridge	Vertical crack in a wall and flexural cracks at the base near the foundation beam Possible slip failure in the wall
Apartment Building Dearborn and Yolanda Streets	Northridge	Severe damage at the top and bottom of the 6-in diameter column Permanent deformation out of the original vertical line is noted
Apartment building 19039 Nordhoff St, between Vanalden Ave and Wilbur Ave, N side	Northridge	Three stories Groundf floor (parking) made of fully grouted CMU along E side all wall, on W side CMU columns Interior 12-in diameter R/C columns with a 70 x 70 x 25 cm slab drop panel Diagonal cracks in N-S and E-W walls Crushing in top of columns for E-W movement (parallel to Nordhoff St)
Apartment Building 19039 Nordhoff St , between Vanalden Ave and Wilbur Ave , North side	Northridge	Damage at the bottom of a circular R/C column in the ground floor
Apartment Building 19040 Nordhoff St , between Vanalden Ave and Wilbur Ave , North side	Northridge	The concrete cover at the top of the column was crushed
Apartment Building 19041 Nordhoff St , between Vanalden Ave and Wilbur Ave , North side	Northridge	Shear crack and damage at the top of the column in the boundary with the column head

Apartment Building 19042 Nordhoff St , between Vanalden Ave and Wilbur Ave , North side	Northridge	Spalling of concrete cover at the bottom of the concrete (crushing)
Apartment Building 19043 Nordhoff St , between Vanalden Ave and Wilbur Ave , North side	Northridge	Shear and vertical cracks along the height of the column
Apartment Building 19044 Nordhoff St , between Vanalden Ave and Wilbur Ave , North side	Northridge	Shear crack in a R/C masonry wall
Apartment Building 19045 Nordhoff St , between Vanalden Ave and Wilbur Ave., North side	Northridge	Spalling of concrete at the floor level
Apartment Building 19046 Nordhoff St , between Vanalden Ave and Wilbur Ave , North side	Northridge	Notice of limited entry to a high risk damaged structure
Apartment building 19053 Nordhoff St, between Vanalden Ave and Wilbur Ave, N side	Northridge	Similar damage to 19039 Nordhoff St.
Apartment building 19201 Nordhoff St, between Vanalden Ave and Tampa Ave, N side	Northridge	Three stories wood structure Damage in wood framing covered with stucco (concrete block wall)
Apartment Building 19201 Nordhoff St , between Vanalden Ave and Tampa Ave , North side	Northridge	Collapse of URM facade of a wood structure Damage in wood framing covered with stucco
GW Parking Building 19808 Praire St between Oakdales Ave and Penfield Ave , N side	Northridge	General view of precast beams in EW direction (span was almost 20m)
19500 Nordhoff St (and Shirley Ave)	Northridge	Damage on 37
GW parking building 19808 Prairie St between Oakdale Av and Penfield Av S side	Northridge	Three stories R/C frames in the N-S direction EW precast beams Square columns 60 cm sides Four walls on each side 30 cm thick and 5 m long EW beam span was 19 3 m (58 ft) Slab thickness was 17 5 cm (unbonded post-tensioned slabs) Minor column shear cracking next to ramps Wall diagonal cracking
GW Parking Building 19809 Praire St between Oakdales Ave and Penfield Ave , N side	Northridge	Interior view of the parking structure and precast beam in EW direction
GW Parking Building 19811 Praire St between Oakdales Ave and Penfield Ave , N side	Northridge	Exterior view of R/C frames in N-S direction 3-story building

GW Parking Building 19812 Praire St between Oakdales Ave and Penfield Ave , N side	Northridge	Intersection of beams in N-S and E-W directions
GW Parking Building 19813 Praire St between Oakdales Ave and Penfield Ave , N side	Northridge	Beam-column joint with small size flexural cracks at the bottom of the beam
GW Parking Building 19814 Praire St between Oakdales Ave and Penfield Ave , N side	Northridge	Hair-line flexural cracks at the base of square columns 60 cm sides
GW Parking Building 19815 Praire St between Oakdales Ave and Penfield Ave , N side	Northridge	Detail of ramp connection with a column and perpendicular like R/C wall and beam
GW Parking Building 19816 Praire St between Oakdales Ave and Penfield Ave , N side	Northridge	Small width shear diagonal cracks in column due to possible short-column effect because of ramp and beam connections to the column
GW Parking Building 19817 Praire St between Oakdales Ave and Penfield Ave , N side	Northridge	Exterior back view of the GW parking building
Northridge Fontana Apartment Building 18547 Plummer St with Reseda Blvd	Northridge	First soft floor collapse in a three stories wood structure
Northridge Meadows Apartment Building 9565 Reseda Blvd between Plummer St and Citronia St	Northridge	Two stories and 22 apartments wood structure Garage in ground floor with steel poles (EW direction) Collapsed first story, almost no damage in second floor Sixteen people killed
Northridge Fontana Apartment Building 18547 Plummer St with Reseda Blvd	Northridge	Three stories wood structure First soft floor collapse
Northridge Meadows Apartment Building 9565 Reseda Blvd between Plummer St and Citronia	Northridge	External view of the two stories series apartments with garage in ground floor
Northridge Meadows Apartment Building 9566 Reseda Blvd between plummer St and Citronia	Northridge	Collapse of the last apartment with first soft floor
Northridge Meadows Apartment Building 9567 Reseda Blvd between Plummer St and Citronia	Northridge	General view of damage between two adjacent neighbor structures due to pounding
WoodridgeApartment Building 18540 Plummer St with Reseda Blvd	Northridge	Two stories wood structure Collapse of open garage story (NS direction) Three cars crushed

Woodridge Apartment building 18540 Plummer St with Reseda Blvd	Northridge	Collapse of open garage story (NS direction) One crushed car.
Robinson's - May Parking Structure in Northridge Shopping Center Nordhoff St	Northridge	R/C shear walled parking building Demolished
118 Simi Valley - San Fernando Valley Freeway San Fernando Mission Blvd and Debra Av	Granada Hills	Shear compression failure in bridge columns Longitudinal steel (#11 bars) buckled and fractured #5 spiral reinforcement Failure at section damage along the column Flexural cracking in box girder due to column failure Crushing in the W support at the abutment Next to Valjean Av, columns are crushed at different heights The columns had a uniform section
118 Simi Valley - San Fernando Valley Freeway San Fernando Mission Blvd and Debra Av	Granada Hills	Shoring under Freeway #118
118 Simi Valley - San Fernando Valley Freeway San Fernando Mission Blvd and Debra Av	Granada Hills	Steel support structure located al the end of the bridge
118 Simi Valley - San Fernando Valley Freeway San Fernando Mission Blvd and Debra Av	Granada Hills	Spalling of concrete cover in the parapet joint between two precast bridges
118 Simi Valley - San Fernando Valley Freeway San Fernando Mission Blvd and Debra Av	Granada Hills	Lateral view of shoring and parapet of the freeway
118 Simi Valley - San Fernando Valley Freeway San Fernando Mission Blvd and Debra Av	Granada Hills	Detail of the bottom part of the shore
118 Simi Valley - San Fernando Valley Freeway San Fernando Mission Blvd and Debra Av	Granada Hills	Spalling of concrete cover at the top of a bridge column compression failure
118 Simi Valley - San Fernando Valley Freeway San Fernando Mission Blvd and Debra Av	Granada Hills	Shear compression failure and rebar buckling in a bridge R/C column
118 Simi Valley - San Fernando Valley Freeway San Fernando Mission Blvd and Debra Av	Granada Hills	General view of shoring work around the bridge column with a large compression failure
118 Simi Valley - San Fernando Valley Freeway San Fernando Mission Blvd and Debra Av	Granada Hills	Longitudinal view through the freeway showing the shoring work

118 Simi Valley - San Fernando Valley Freeway San Fernando Mission Blvd and Debra Av	Granada Hills	Compression failure at the bottom of the bridge column Crushing of concrete and rebar buckling in Freeway 118
118 Simi Valley - San Fernando Valley Freeway San Fernando Mission Blvd and Debra Av	Granada Hills	Longitudinal view of Freeway 118
118 Simi Valley - San Fernando Valley Freeway San Fernando Mission Blvd and Debra Av	Granada Hills	Shear compression failure in a series of trasverse bridge columns Column concrete is crushed at different heights
118 Simi Valley - San Fernando Valley Freeway San Fernando Mission Blvd and Debra Av	Granada Hills	General view of the end part of the bridge in Freeway 118
Roscoe Blvd	Sepulveda	Collapsed grouted masonry fences
Holiday Inn Express Hotel Roscoe Blvd between Orion Ave and Langdon Ave	Sepulveda	Seven-story R/C frame Mostly damaged in the EW direction Shear cracking in fourth floor N and S face columns ("captive" column) Diagonal cracking in beam-column joints from second to fourth stories Parapet crushing at first floor CSMIP records
Holiday Inn Express Hotel Roscoe Blvd Orion Ave and Langdon Ave	Sepulveda	Diagonal cracking in beam-column joints from second to fourth stories
Holiday Inn Express Hotel Roscoe Blvd Orion Ave and Langdon Ave	Sepulveda	Detail of flexural cracking at the end of beam in the second story
Holiday Inn Express Hotel Roscoe Blvd Orion Ave and Langdon Ave	Sepulveda	Small damage at the end of the column above the parapet due to short-column effect
Holiday Inn Express Hotel Roscoe Blvd Orion Ave and Langdon Ave	Sepulveda	Damage in a series of columns in the fourth story back view
Holiday Inn Express Hotel Roscoe Blvd Orion Ave and Langdon Ave	Sepulveda	Shear cracks in the external face of a beam-column joint (second story)
Holiday Inn Express Hotel Roscoe Blvd Orion Ave and Langdon Ave	Sepulveda	Front view of the building showing the frame structure
Robinson - May Parking Building - Westside Pavilion Across from 2472 Overland between Pico Bl and Pico Av	Rancho Park	Three stories including a basement Cast-in-place R/C frame structure Short column type failure Column section 35 x 40 cm Column ties #3 @ 15 cm with 90-deg hooks The effective length of column was 65 cm Columns damaged in the basement It is being demolished

Robinson -May parking building-West Side Pavilion Across 2472 Overland between Pico Blvd. and Pico Av	Rancho Park	General view of the West-Side Pavilion Commercial Center.
Robinson -May parking building-West Side Pavilion Across 2472 Overland between Pico Blvd and Pico Av	Rancho Park	Short-column type failure with spalling of concrete
Robinson -May parking building-West Side Pavilion Across 2472 Overland between Pico Blvd and Pico Av	Rancho Park	Shear cracks along the height of the column next to the ramp
Robinson -May parking building-West Side Pavilion Across 2472 Overland between Pico Blvd and Pico Av	Rancho Park	Spalling of concrete cover in a construction joint of a R/C parapet beside the ramp
Robinson -May parking building-West Side Pavilion Across 2472 Overland between Pico Blvd and Pico Av	Rancho Park	Typical short-column failure in a column with an effective length of 65 cm buckling of transverse steel
Santa Monica Freeway Santa Monica Freeway and La Cienega Bl	Rancho Park	Column failure showing #12 longitudinal bars buckled and #4 spiral reinforcement at 30 cm spacing fractured Column diameter was 1 2 m Box girder of the superstructure had a 40 cm thick web (approximately) and 20 cm thick flanges Across the street several apartment units did not exhibit damage
Santa Monica Freeway Santa Monica Freeway and La Cienega Blvd	Rancho Park	General view of Santa Monica Freeway demolition
Santa Monica Freeway Santa Monica Freeway and La Cienega Blvd	Rancho Park	Column failure with rebar buckling and crushing of concrete Longitudinal beams were box-type
Santa Monica Freeway Santa Monica Freeway and La Cienega Blvd	Rancho Park	Cleaning work in the stores which were located under the freeway
Santa Monica Freeway Santa Monica Freeway and La Cienega Blvd	Rancho Park	Detail of failure at the top of the column and joint with the box-type girder actually under demolition
Santa Monica Freeway Santa Monica Freeway and La Cienega Blvd	Rancho Park	Demolition work with a drag shovel machine
Santa Monica Freeway Santa Monica Freeway and La Cienega Blvd	Rancho Park	Several apartment units across the street without any damage

Santa Monica Freeway Santa Monica Freeway and La Cienega Blvd	Rancho Park	Santa Monica freeway under demolition work.
Santa Monica Freeway Santa Monica Freeway and La Cienega Blvd	Rancho Park	Front view of box-type girders and failure at upper part of a column with rebar buckling
Santa Monica Freeway Santa Monica Freeway and La Cienega Blvd	Rancho Park	Detail of failure at the top of a column with buckling of longitudinal bars and concrete crushing
Santa Monica Freeway Santa Monica Freeway and La Cienega Blvd	Rancho Park	Front view of box type girders showing a difference of elevation due to more damage in the right side columns
Santa Monica Freeway Santa Monica Freeway and La Cienega Blvd	Rancho Park	Column failure with an impressive buckling of steel bars and concrete crushing along the height The freeway was supported after the column failure by the commercial rooms located under the bridge
Kaiser Permanente Regional Hospital Venice Blvd near La Cienega Blvd	Rancho Park	The hospital includes a main building (built in 1972) and two adjacent towers built in 1982 and 1987 One steel frame parking building collapsed A R/C parking structure showed cracks along the construction joints No damage was visible in the EW precast beams wich were simply supported on columns Shear cracking was observed in columns next to the corbel Slight parapet crushing was also noted No damage was observed in the CMU stairs at corners
Kaiser Permanente Medical Center Venice Blvd near La Cienega Blvd	Rancho Park	General view of main entrance on Venice Blvd
Kaiser Permanente Medical Center Venice Blvd near La Cienega Blvd	Rancho Park	Hospital name Legend
Kaiser Permanente Medical Center Venice Blvd near La Cienega Blvd	Rancho Park	Interior room view (dark slide)
Kaiser Permanente Medical Center Venice Blvd near La Cienega Blvd	Rancho Park	Back view of Kaiser Hospital
Kaiser Permanente Medical Center Venice Blvd near La Cienega Blvd	Rancho Park	Facade on the ambulance entrance
Kaiser Permanente Medical Center Venice Blvd near La Cienega Blvd	Rancho Park	R/C parking structure, beam column joint detail

Kaiser Permanente Medical Center Venice Blvd near La Cienega Blvd	Rancho Park	Corner view of the parking R/C structure
Kaiser Permanente Medical Center Venice Blvd near La Cienega Blvd	Rancho Park	Damage below the column supports for the precast beams in transversal direction
Kaiser Permanente Medical Center Venice Blvd near La Cienega Blvd	Rancho Park	R/C beams-parapets in the longitudinal direction of the parking structure
Kaiser Permanente Medical Center Venice Blvd near La Cienega Blvd	Rancho Park	Parking structure back view (not so clear)
Kaiser Permanente Regional Hospital Venice Blvd near La Cienega Blvd	Rancho Park	Damage at the end of the R/C parapet beam next to the column Longitudinal direction of the parking building
Kaiser Permanente Regional Hospital Venice Blvd near La Cienega Blvd	Rancho Park	Back view of the parking building Damage at the top a column with crushing of cover concrete
Kaiser Permanente Regional Hospital Venice Blvd near La Cienega Blvd	Rancho Park	Typical damage of a strong parapet beam and weak column Back side of the parking building
Kaiser Permanente Regional Hospital Venice Blvd near La Cienega Blvd	Rancho Park	Shear crack in a R/C wall opened in a small angle in two directions
Landslide failure on Beach road Beach road near Sta Monica freeway	Santa Monica	General view of landslide
Sta Monica Blvd	Santa Monica	Two-story house roof collapse
Public office 1231 Lincoln Street	Santa Monica	One-story URM structure with partial collapse of its facade (mainly the parapet) The roof system is composed by wood members There are many window openings in the main facade Shear cracks were identified on transversal boundary wall Possible pounding between this structure and neighbor building because there was not enough separation
Public office 1232 Lincoln Street	Santa Monica	Front view of the public office in Lincoln #1231 Partial collapse of the facade
Public office 1233 Lincoln Street	Santa Monica	Lincoln Avenue R/C buildings without any damage

Public office 1234 Lincoln Street	Santa Monica	Detail of URM damage and roof system with timber members (Office in Lincoln #1231)
Public office 1235 Lincoln Street	Santa Monica	Detail of insufficient clear space between office and neighbor bldg
Harman Industries Wilshire and 9th Street South East corner	Santa Monica	URM structures with shear cracks from the arc opening to the upper left corner Double height one-story building
Memory Flowers Wilshire and 11th Street SE corner	Santa Monica	One-story commercial building with R/C structural system Damage was observed in URM parapet which supports the old roof system
Memory Flowers Wilshire and 11th Street SE corner	Santa Monica	Corner view of the commercial store Out of plane failure in URM parapet
Memory Flowers Wilshire and 11th Street SE corner	Santa Monica	Damage in URM parapet of the commercial store
Santa Monica Imaging Center Wilshire 1131 and 12th Street NW corner	Santa Monica	Three-story R/C structure private building Local damage in left end of beam
Santa Monica Imaging Center Wilshire 1131 and 12th Street NW corner	Santa Monica	General view of the building
Santa Monica Imaging Center Wilshire 1131 and 12th Street NW corner	Santa Monica	Flexural and shear cracks in left end of the beam At the bottom of the column only the finish cover spalled off
Commercial building Wilshire and 14th Street SE corner	Santa Monica	Two-story commercial URM structure Shear cracks in transverse walls of the second story which have openings Also slip failure in walls was observed
Commercial building Wilshire and 14th Street SE corner	Santa Monica	General view of the commercial building along Wilshire Street
Commercial building Wilshire and 14th Street SE corner	Santa Monica	Transverse walls and window openings in the second story
Commercial building Wilshire and 14th Street SE corner	Santa Monica	Shear cracks in the second story of the transverse walls from opening to upper right corner
Santa Monica Hospital 15th Street near Wilshire	Santa Monica	R/C building with coupled shear walls eight stories maybe 20 years old Shear failure of coupling beams on N side Uplift of SW corner wall significant cracking, coupling beam shear failure torsional damage

Santa Monica Hospital 15th Street near Wilshire	Santa Monica	General view of the hospital and shear failure in coupling beams is observed
Santa Monica Hospital 15th Street near Wilshire	Santa Monica	Details of shear damage in coupling beams
Santa Monica Hospital 15th Street near Wilshire	Santa Monica	Damage in the lower part of the neighbor building URM wall severe damage in finish and wall
Santa Monica Hospital 15th Street near Wilshire	Santa Monica	Detail of damage due to no separation between the hospital (8 stories) and the neighbor building (3 stories) Pounding between two structures
Santa Monica Hospital 15th Street near Wilshire	Santa Monica	Back side of Santa Monica Hospital Shear cracks in concrete walls near windows openings
Barkley East Convalescent Hospital	Santa Monica	5-story RM building Shear cracks on the 3rd story crossing from the upper left corner of window openings throughout slab or collar beam
Barkley East Convalescent Hospital	Santa Monica	Front view of the hospital and shear cracks of masonry walls located at the top of the openings on the 3rd floor
Medical Center of Santa Monica 2021 Santa Monica Bl and 20th St (N corner)	Santa Monica	Two main towers are a 7-story and a 12-story R/C buildings No structural damage noted
Parking Building of the Medical Center of Santa Monica Arizona Av between 20th and 21st Streets	Santa Monica	Three-story R/C frame structure with post-tensioned girders One-way slab and R/C walls Columns had a square section with a circular core with spiral reinforcement The building shows more damage in the NE-SW direction At ground level severe concrete spalling and shear cracking was observed Column height and width were 2 0 m and 55 cm, respectively
Parking building of the Medical Center of Santa Monica Arizona Av between 20th and 21 Streets	Santa Monica	General view of the frame structure and RC masonry parapets
Parking Building of the Medical Center of Santa Monica Arizona Av between 20th and 21st Streets	Santa Monica	Shear cracks at the top of the column in the 1st story
Parking Building of the Medical Center of Santa Monica Arizona Av between 20th and 21st Streets	Santa Monica	Spalling of concrete cover near the slab-column connection
Parking Building of the Medical Center of Santa Monica Arizona Av between 20th and 21st Streets	Santa Monica	Spalling and shear cracking of column because of short-column effect due to a R/C spandrel wall The spiral reinforcement seems to be adequate

Parking Building of the Medical Center of Santa Monica Arizona Av between 20th and 21st Streets	Santa Monica	Square R/C column with small damage in the beam-column joint (flexural cracks)
Parking Building of the Medical Center of Santa Monica Arizona Av between 20th - and 21st Streets	Santa Monica	Flexural cracks at the external face of a beam-column connection
Apartment building	Santa Monica	Medium rise RM building (maybe 5-story building), shear cracks above the window opening in the collar RM beam
Apartment building	Santa Monica	Facade of the building without any kind of damage
Apartment building	Santa Monica	Big shear cracks at the corner column in the first story
Office Building 2020 Santa Monica Bl and 20th Street	Santa Monica	Six-story steel frame structure with R/C jacketing and R/C walls Walls are located in all four facades Shear cracking columns was observed Column effective height was reduced by a parapet for spandrel wall Wall cracking and crushing were visible The building was in normal operation since a structure engineering firm had checked the structural safety A letter from this office was posted at the building entrance
Office Building 2021 Santa Monica Bl and 20th Street	Santa Monica	General view of an office building composite structure
Office Building 2022 Santa Monica Bl and 20th Street	Santa Monica	Front view of the office bldg No damage in this side
Office Building 2023 Santa Monica Bl and 20th Street	Santa Monica	Flexural and shear damage in R/C wall, buckling of rebars at the right end of the wall
St John's Hospital Santa Monica Bl and 21st Street	Santa Monica	Six-floor plus pent-house R/C structure Shear cracking only in the N facade in columns and wall piers at the second floor (above ground level) Stiffness and strength were irregular in this story compared with other floors Tie spacing was 20 cm
St John's Hospital Santa Monica Bl and 21st Street	Santa Monica	Severe shear cracks in the N facade in columns and wall piers at the second story