

### **Building-Related Economic Losses**

Total building-related losses were \$5.5 billion dollars, and 22% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies, which made up over 68% of the total loss. Table 1-24, below, provides a summary of the losses associated with building damage.

**Table 1-24: Building-Related Economic Loss Estimates (millions of dollars) as a Result of a  $M_w$  6.9 Earthquake on the San Jacinto Fault**

Category	Area	Residential	Commercial	Industrial	Others	Total
<b>Building Loss</b>	<b>Structural</b>	615.3	158.3	48.1	31.0	<b>852.7</b>
	<b>Non-Structural</b>	2,061.2	368.2	107.2	81.1	<b>2,617.7</b>
	<b>Content</b>	519.1	167.0	73.8	35.1	<b>794.9</b>
	<b>Inventory</b>	N/A	3.6	11.7	0.9	<b>16.2</b>
	<b>Subtotal</b>	3,195.6	697.1	240.8	148.1	<b>4,281.6</b>
<b>Business Interruption Loss</b>	<b>Wage</b>	16.6	190.3	10.4	8.8	<b>226.0</b>
	<b>Income</b>	7.1	208.6	6.2	2.4	<b>224.4</b>
	<b>Rental</b>	160.2	67.2	4.9	4.6	<b>236.9</b>
	<b>Relocation</b>	378.7	105.1	12.8	39.3	<b>535.9</b>
	<b>Subtotal</b>	562.7	571.2	34.4	55.1	<b>1,223.3</b>
<b>Total</b>		3,758.3	1,268.3	275.1	203.2	<b>5,504.9</b>

### **1.8.6 Estimated Losses Associated with a $M_w$ 7.9 Southern San Andreas Earthquake**

This event represents the Maximum Credible Earthquake (MCE) for Riverside County. The earthquake would rupture the San Andreas fault from Cajon Pass, north of the County, to the Salton Sea. It is an event that likely occurs only once every several hundred years, but should it occur tomorrow, HAZUS estimates that Riverside County would suffer about 120 deaths, nearly 9,800 injuries, and economic losses of \$13.6 billion, about 22% of the total replacement value of the region's buildings.

**Building Damage:**

HAZUS estimates that over 181,000 buildings will be at least moderately damaged. This is over 45% of the buildings in the County. An estimated 37,013 buildings will be destroyed. Table 1-25 below summarizes the expected damage by building occupancy, while Table 1-26 summarizes expected damage by building type.

**Table 1-25: Expected Building Damage by Occupancy  
M<sub>w</sub> 7.9 San Andreas Fault Earthquake**

Occupancy Type	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Residential	107,383	98.18	110,856	98.89	90,754	97.89	49,686	97.66	35,937	97.1
Commercial	1,259	1.15	817	0.73	1,331	1.44	856	1.68	799	2.16
Industrial	399	0.36	233	0.21	375	0.40	224	0.44	179	0.48
Agriculture	128	0.12	80	0.00	94	0.10	43	0.08	41	0.11
Religion	104	0.10	73	0.00	97	0.10	41	0.08	36	0.10
Government	25	0.02	4	0.00	11	0.01	5	0.01	3	0.01
Education	78	0.07	32	0.03	49	0.05	20	0.04	18	0.05
<b>Total</b>	<b>109,376</b>		<b>112,095</b>		<b>92,711</b>		<b>50,875</b>		<b>37,013</b>	

**Table 1-26: Expected Building Damage by Building Type (all design levels)  
M<sub>w</sub> 7.9 San Andreas Fault Earthquake**

Occupancy Type	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	420	0.4	321	0.3	430	0.5	309	0.8	281	0.6
Mobile Hms.	2,123	1.9	6,125	5.5	18,971	20.5	25,484	59.3	21,949	50.1
Precast Concrete	415	0.4	204	0.2	370	0.4	276	0.7	267	0.5
Reinforced Masonry	7,546	6.9	4,360	3.9	6,240	6.7	4,932	10.8	3,992	9.7
Steel	3,387	3.1	3,485	3.1	7,807	8.4	7,310	13.7	5,077	14.4
URM	140	0.1	233	0.2	568	0.6	834	5.4	1,985	1.6
Wood	95,345	87.2	97,367	86.9	58,325	62.9	11,730	9.4	3,462	23.1

**Essential Facility Damage:**

Before the earthquake, the region had 2,682 hospital beds available for use. HAZUS estimates that only 20% of these beds are available on the day of the earthquake, as well as by patients already in the hospital. After one week, 34% of the beds will be back in service. Even after 30 days, only 57% will be operational.

**Table 1-27: Expected Damage to Essential Facilities  
as a Result of a  $M_w$  7.9 Earthquake on the San Andreas Fault**

Classification	Total	Number of Facilities With		
		At Least Moderate Damage	Complete Damage	Functionality > 50% at day 1
Hospitals	18	18	0	2
Schools	380	380	0	3
EOCs	12	12	0	1
Police Stations	45	45	0	8
Fire Stations	52	52	0	4

**Transportation and Utility Lifeline Damage:**

Table 1-28, below, provides damage estimates based on available inventory.

**Table 1-28: Expected Damage to the Transportation Systems  
as a Result of a  $M_w$  7.9 Earthquake on the San Andreas Fault**

System	Component	Number of Locations				
		Locations/ Segments	With at Least Mod. Damage	With Complete Damage	With Functionality > 50 %	
					After Day 1	After Day 7
Highway	Bridges	1,306	392	124	936	1,096
Railways	Bridges	4	1	0	4	4
	Facilities	2	0	0	2	2
Bus	Facilities	6	3	0	5	6
Airport	Facilities	39	14	1	36	39
	Runways	34	1	1	34	34

HAZUS performs a simplified system performance analysis for electric power (Table 1-29).

**Table 1-29: Expected Electric Power System Performance as a Result of a  $M_w$  7.9 Earthquake on the San Andreas Fault**

System	Total # of Households	Number of Households without Service				
		At Day 1	At Day 3	At Day 7	At Day 30	At Day 90
Electric Power	402,426	210,867	121,080	50,577	4,470	0

### ***Fire Following Earthquake***

HAZUS uses a Monte Carlo simulation model to estimate the number of ignitions and the amount of burnt area. For this MCE scenario, HAZUS estimates 124 ignitions that will burn about 0.06% of the region's total area, displace about 830 people, and burn about \$51.0 million dollars of building value.

### ***Debris Generation***

HAZUS estimates 11.9 million tons of debris will be generated. Brick/Wood comprises 36%, with the remainder being Reinforced Concrete/Steel. If the debris tonnage is converted to an estimated number of truckloads, it will require 474,338 truckloads (@25 tons/truck) to remove the debris generated by the MCE for Riverside County.

### ***Shelter Requirement***

HAZUS estimates 27,027 households will be displaced. Of these, 20,079 people will seek temporary shelter in public shelters.

### **Casualties**

Table 1-30 provides a summary of the casualties estimated for this earthquake

**Table 1-30: Casualty Estimates as a Result of a  $M_w$  7.9 Earthquake on the San Andreas Fault**

		Level 1	Level 2	Level 3	Level 4
<b>2 AM</b> (maximum residential occupancy)	<b>Residential</b>	8,102	1,479	122	122
	<b>Non-Residential</b>	51	10	1	1
	<b>Comm ute</b>	7	11	17	3
	<b>Total</b>	8,159	1,499	141	127
<b>2 PM</b> (maximum educational, industrial and commercial)	<b>Residential</b>	2,960	540	43	43
	<b>Non-Residential</b>	2,676	508	67	67
	<b>Comm ute</b>	36	56	85	17
	<b>Total</b>	5,672	1,104	195	127
<b>5 PM</b> (peak commute time)	<b>Residential</b>	3,515	642	52	52
	<b>Non-Residential</b>	841	160	21	21
	<b>Comm ute</b>	98	149	229	46
	<b>Total</b>	4,454	950	302	118

### **Building-Related Economic Losses**

Total building-related losses were \$13.2 billion dollars, and 25% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies, which made up over 67% of the total loss. Table 1-31, below, provides a summary of the losses associated with building damage.

**Table 1-31: Building-Related Economic Loss Estimates (millions of dollars)  
as a Result of a Mw 7.9 Earthquake on the San Andreas Fault**

Category	Area	Residential	Commercial	Industrial	Others	Total
<b>Building Loss</b>	<b>Structural</b>	1,532.3	433.1	104.0	71.3	2,140.7
	<b>Non-Structural</b>	5,085.1	975.7	195.6	180.6	6,436.9
	<b>Content</b>	1,032.4	335.8	116.0	60.6	1,544.7
	<b>Inventory</b>	N/A	6.9	18.3	1.7	26.9
	<b>Subtotal</b>	7,649.8	1,751.5	433.9	314.2	10,149.3
<b>Business Interruption Loss</b>	<b>Wage</b>	69.6	566.5	21.4	18.5	676.0
	<b>Income</b>	29.5	742.3	12.8	5.6	790.3
	<b>Rental</b>	459.9	171.5	9.5	10.3	651.1
	<b>Relocation</b>	934.1	253.2	23.3	86.7	1,297.4
	<b>Subtotal</b>	1,493.1	1,733.5	67	121.1	3,021
	<b>Total</b>	<b>9,142.9</b>	<b>3,485.0</b>	<b>500.9</b>	<b>435.3</b>	<b>13,170</b>