

**DEATH LOSS & INJURIES**

Veterans' Administration Medical Center 1030 Jefferson Ave. Memphis, TN 38104

Facility Class: Concrete Frame with Concrete Shear Wall

Project Description: Add shear walls and moment frame

MMI	VI	VII	VIII	IX	X	XI	XII
PGA (percent of g)	4-8	8-16	16-32	32-55	55-80	80-100	>100
Mean Damage Function	1	25	75	100	100	100	100

**SCENARIO INJURIES & DEATHS WITHOUT REHABILITATION:**

Number of Minor Injuries	8.85E-02	2.48E+01	2.95E+02	1.48E+02	1.48E+02	1.48E+02	1.48E+02
Number of Serious Injuries	1.18E-02	3.30E+00	8.85E+02	7.38E+02	5.90E+02	4.43E+02	4.43E+02
Number of Deaths	2.95E-03	8.26E-01	1.48E+02	1.48E+03	2.07E+03	2.36E+03	2.36E+03

**EXPECTED INJURIES & DEATHS WITHOUT REHABILITATION:**

Number of Minor Injuries	4.52E-03	3.33E-01	1.04E+00	1.21E-01	3.38E-02	1.12E-02	2.08E-02
Number of Serious Injuries	6.03E-04	4.44E-02	3.13E+00	6.04E-01	1.35E-01	3.35E-02	6.25E-02
Number of Deaths	1.51E-04	1.11E-02	5.22E-01	1.21E+00	4.74E-01	1.79E-01	3.33E-01

**SCENARIO INJURIES & DEATHS WITH REHABILITATION:**

Number of Minor Injuries	8.85E-03	2.48E+00	2.95E+01	1.48E+01	1.48E+01	1.48E+01	1.48E+01
Number of Serious Injuries	1.18E-04	3.30E-02	8.85E+00	7.38E+00	5.90E+00	4.43E+00	4.43E+00
Number of Deaths	2.95E-06	8.26E-04	1.48E-01	1.48E+00	2.07E+00	2.36E+00	2.36E+00

**EXPECTED INJURIES & DEATHS WITH REHABILITATION:**

Number of Minor Injuries	4.52E-04	3.33E-02	1.04E-01	1.21E-02	3.38E-03	1.12E-03	2.08E-03
Number of Serious Injuries	6.03E-06	4.44E-04	3.13E-02	6.04E-03	1.35E-03	3.35E-04	6.25E-04
Number of Deaths	1.51E-07	1.11E-05	5.22E-04	1.21E-03	4.74E-04	1.79E-04	3.33E-04

**AVOIDED INJURIES & DEATHS DUE TO REHABILITATION:**

Number of Minor Injuries	4.07E-03	3.00E-01	9.40E-01	1.09E-01	3.04E-02	1.01E-02	1.87E-02
Number of Serious Injuries	5.97E-04	4.40E-02	3.10E+00	5.98E-01	1.34E-01	3.32E-02	6.18E-02
Number of Deaths	1.51E-04	1.11E-02	5.22E-01	1.21E+00	4.73E-01	1.79E-01	3.33E-01

Analyst: Goettel &amp; Homer Inc.

SUMMARY		Run Identification: Final					
Veterans' Administration Medical	1030 Jefferson Ave.	Memphis, TN 38104					
Rehab Project Description:	Add shear walls and moment frame						
Facility Class.	Concrete Frame with Concrete Shear Wall						
Data used for this analysis:							
Building Replacement Value per square foot			\$115.00				
Total Floor Area (square feet):			805,700				
Total Building Replacement Value			\$92,655,500				
Demolition Threshold Damage Percentage:			50%				
Total Contents Value			\$96,000,000				
Cost of Providing Services per day			\$302,701				
Continuity Premium			\$1,500,000				
Value of lost services per day			\$1,802,701				
Total Private Monthly Rental Revenue			\$0				
Total Relocation Costs (\$/sq.ft./month):			\$2.50				
Total Seismic Rehabilitation Costs			\$40,457,800				
Average Day Occupancy			3,000				
Average Night Occupancy			2,900				
Soil Type			S2				
Data used in this analysis that varies by MMI:							
MMI	VI	VII	VIII	IX	X	XI	XII
PGA (%g)	4-8	8-16	16-32	32-55	55-80	80-100	>100
Mean Damage Function (%)	1	25	75	100	100	100	100
Modified MDF (%)	1	25	100	100	100	100	100
Minor Injury Rate/1000	3.000E-02	8.400E+00	1.000E+02	5.000E+01	5.000E+01	5.000E+01	5.000E+01
Major Injury Rate/1000	4.000E-03	1.120E+00	3.000E+02	2.500E+02	2.000E+02	1.500E+02	1.500E+02
Death Rate/1000	1.000E-03	2.800E-01	5.000E+01	5.000E+02	7.000E+02	8.000E+02	8.000E+02
Content MDF (%)	1	25	75	100	100	100	100
Functional Downtime (days)	1	25	30	30	30	30	30
Days of Relocation Necessary:	0	150	365	365	365	365	365
Building Rehab Effectiveness (%)	100	83	94	88	81	73	67
Contents Rehab Effectiveness (%)	100	83	94	88	81	73	67
Rehab Minor Injury Rate/1000	3.000E-03	8.400E-01	1.000E+01	5.000E+00	5.000E+00	5.000E+00	5.000E+00
Rehab Major Injury Rate/1000	4.000E-05	1.120E-02	3.000E+00	2.500E+00	2.000E+00	1.500E+00	1.500E+00
Rehab Death Rate/1000	1.000E-06	2.800E-04	5.000E-02	5.000E-01	7.000E-01	8.000E-01	8.000E-01
Annual Number of Earthquakes	5.108E-02	1.345E-02	3.541E-03	8.196E-04	2.293E-04	7.575E-05	1.412E-04
SUMMARY OF DAMAGES AND ECONOMIC LOSSES:						Without Value of Life	With Value of Life
PRESENT VALUE OF TOTAL DAMAGES AND ECONOMIC LOSSES AVOIDED:						\$33,385,616	\$97,892,529
TOTAL BENEFITS MINUS TOTAL COSTS :						(\$7,072,184)	\$57,434,729
Benefit cost ratio :						0.83	2.42

Analysis - Soetzel &amp; Porter Inc.