

Modified Mercalli Scale

Intensity	Effects	PGA*(gals)
I	Not felt. Marginal and long-period effects of large earthquakes.	less than 1
II	Felt by persons at rest, on upper floors or favourably placed.	1 - 2
III	Felt Indoors. Hanging objects swing. Vibration like passing of a light truck. Duration estimated. May not be recognized as an earthquake.	2 - 5
IV	Hanging objects swing. Vibration like passing of heavy trucks: or sensation of a jolt like a heavy ball striking the walls. Standing motor cars rock. Car alarms activated. Windows, dishes, doors rattle. Glasses clink, crockery clashes. In the upper range of IV wooden walls and frames creak.	5 - 10
V	Felt Outdoors. Direction estimated. Sleepers wakened. Liquids disturbed, some spilled. Small unstable objects displaced or upset. Doors swing, close open. Shutters, pictures move, pendulum clocks stop, start, change rate.	10-25
VIa	Felt by all: many frightened and run outdoors. Persons walk unsteadily. Windows, dishes, glassware broken. Knickknacks, books etc. off shelves. Pictures off walls. Furniture moved or overturned. Weak plaster and masonry D cracked. Small church and school bells ring. Trees, bushes shaken (visibly or heard to rustle).	25-50
VII	Difficult to stand. Noticed by car drivers. Hanging objects quiver. Furniture broken. Damage to masonry D including cracks. Weak chimneys broken at roof line. Fall of plaster, loose bricks, stones tiles cornices unbraced parapets, and architectural ornaments. Some cracks in masonry C. Waves on ponds; water turned turbid with mud. Small slides and caving in along sand or gravel banks. Large bells ring. Concrete culverts damaged.	50-100
VIII	Steering of motor cars affected. Damage to masonry C: partial collapse. Some damage to masonry B, none to masonry A. Fall of stucco and some masonry walls. Twisting, fall of chimneys, factory stacks, monuments, towers, elevated tanks. Frame houses moved on foundations if not bolted down; loose panel walls thrown out. Decayed piling broken off. Branches broken from trees. Changes in flow or temperature of springs and wells. Cracks in wet ground and steep slopes.	100-250
IX	General panic. Masonry D destroyed; masonry C heavily damaged, sometimes with complete collapse; masonry B seriously damaged. General damage to foundations. Frame structures shifted off foundations if not bolted down. Serious damage to reservoirs. Underground pipes broken. Conspicuous cracks on ground. Sand boils, earthquake fountains, and sand craters.	250-500
X	Most masonry and frame structures destroyed with their foundations. Some well-built wooden structures and bridges destroyed. Serious damage to dams, dikes, embankments. Large landslides. Water thrown on banks of canals, rivers, lakes etc. Sand shifted horizontally on beaches and flat land. Rails	500- 1000

	bent slightly.	
XI	Rails bent greatly. Underground pipelines completely out of service.	**
XII	Damage nearly total. Large rock masses displaced. Lines of sight and level distorted. Objects thrown into the air.	**

Notes:

* PGA is the effective Peak Ground Acceleration during the earthquake. That is the maximum horizontal ground acceleration excluding high frequency spikes. 1 gal = 1 cm/sec/sec. Since the intensity of gravity (g) is about 10 meters/sec/sec 10 gals is about 1% of gravity

** At the highest intensity levels damage potential is determined increasingly by the effects of ground failure. Most types of ground are unable to sustain prolonged accelerations much greater than 500 gals.

Masonry A. Good workmanship, mortar and design: reinforced especially laterally and bound together using steel, concrete etc. Designed to resist lateral forces.

Masonry B. Good workmanship and mortar. Reinforced but not designed in detail; to resist horizontal forces.

Masonry C. Ordinary workmanship and mortar. No extreme weaknesses like failing to tie in at corners but neither reinforced nor designed to resist horizontal forces.

Masonry D. Weak materials such as adobe; poor mortar; low standards of workmanship; weak horizontally.

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