Universal Building Code Soils

Susceptibility to Damage from Earthquakes

Hard Rock
Rock
Urban Growth Boundary
Very Dense Soil and Soft Rock
Stiff Soil Profile
Soft Soil Profile
Special Studies: Soil Requiring Site-Specific Evaluation

Astoria
St Helens
Tillamook
Hillsboro
Portland
Oregon City
McMinnville
Dallas
Salem
Newport
Albany
Corvallis
Eugene
Coquille
Roseburg
Gold Beach
Grants Pass
Medford
Klamath Falls
Lakeview
Bend
Prineville
Madras
Hood River
The Dalles
Moro
Condon
Fossil
Heppner
Pendleton
Enterprise
La Grande
Baker City
Canyon City
Vale
Burns

called swarms or clusters, shown on the Historic Earthquakes map. In the short interval of time represented by the instrumented record, only a few of these faults have produced such clusters. Recent activity has been concentrated in zones near Klamath Falls and in the Warner Valley. Adding the historic earthquakes to the instrumented record fills in the picture to some degree. Over a much longer, geologic period of time, all the active faults can be expected to experience earthquakes.

Earthquakes cause shaking, ground rupture, liquefaction, landslides and other forms of ground failure that can lead to loss of life and property. The large map above locates various types of soils which respond differently during earthquakes. Soft, porous, unconsolidated soils amplify shaking and are more susceptible to ground failure during earthquakes. The particularly unstable "Special Study" soils indicated on the map are mostly wetlands or old landslides. The Seismic Hazard map shows the maximum level of shaking likely to occur during a fixed interval of time (here, 1,000 years) from all possible earthquakes. Damage becomes significant at shaking levels of about 20 percent of the pull of gravity and becomes almost total above 60 percent. The third map shows the projected economic value of damage expected from all possible earthquakes during a 500 year period. The loss ratio is the expected loss divided by the economic base. Settlement in Oregon is heavily concentrated along rivers, where there are abundant unconsolidated soils and wetlands (often covered with loose fill for development purposes), and projected losses are accordingly very high.