Room Two: The Day Our City Trembled

Buildings Sank Like Quicksand

Much of San Francisco is built upon three precarious surfaces: steep hillsides, rolling sand dunes, and former marshes. Of these surfaces, marshes are probably the most treacherous. To build anything on marshes, huge amounts of fill—sand and other debris—must be trucked in and dumped until a firm dry surface is achieved. This new surface is called "made land." During the 1906 earthquake, structures on made land suffered the most damage because made land was so unstable and unsettled. This process, called Liquefaction, takes place when loosely packed, waterlogged sediments at or near the ground surface lose their strength in response to strong ground shaking. Liquefaction occurring beneath buildings and other structures can cause major damage during earthquakes.

Lateral spreads involve the lateral movement of large blocks of soil as a result of liquefaction in a subsurface layer. Movement takes place in response to the ground shaking generated by an earthquake. Lateral spreads are destructive particularly to pipelines. In 1906, a number of major pipeline breaks occurred in the city of San Francisco during the earthquake because of lateral spreading. Breaks of water mains hampered efforts to fight the fire that ignited during the earthquake. Thus, rather inconspicuous ground-failure displacements of less than 7 feet were largely responsible for the devastation to San Francisco in 1906.

Before the earthquake, the Valencia Street Hotel, between Eighteenth and Nineteenth Streets on Valencia Street, was an extreme example of the danger of liquefaction on inhabitants living on made land. When the quake struck, patrons in an all night coffee shop on the bottom floor of the four-story hotel ran from the building just in time to watch the building simultaneously lurch forward and sink, making the hotel's fourth floor the hotel's only floor above ground. It is believed that the Valencia Hotel tragedy was the source of nearly 100 deaths.