Part 3

EMERGENCE OF EXCAVATION AND GRADING CODES 1952-75
Early hillside lots were constructed on “sliver fills,” or “wedge embankments,” without keying or benching, like that shown above.
Heavy rains of January 1952 caused $7.5 million in damage to hundreds of recently-built hillside homes in Los Angeles, like the one shown here, on a sliver fill.
The 1952 Los Angeles grading ordinance required keying and benching of fill embankments, as depicted here. Other agencies in southern California adopted similar statutes soon thereafter.
Agencies that adopted Grading Ordinances between 1952-64

- Los Angeles and Beverly Hills (1952)
- Pasadena (1953) and Glendale (1954)
- Burbank (1954) and San Francisco (1956)
- Los Angeles County (1957)
- San Diego (1960)
- Orange County (1962)
- Adoption of Appendix Chapter 70 - Excavation and Grading into the Uniform Building Code (1964)
Most state highway departments established uniform standards for highway cuts and fills beginning in 1955, with the introduction of the Interstate and Defense Highway Program.
1961 map illustrating the initial Interstate and Defense Highway Network, which revolutionized commercial truck transportation and introduced federal standards for excavation, grading, and pavement design.
1956 PORTUGUESE BEND LANDSLIDE
Portuguese Bend Landslide

- The Portuguese Bend Landslide developed on volcanic ash (tuff) beds that were altered to montmorillonite, dipping 6 to 13 degrees, towards the ocean.

- Note grading at upper right portion of photo, for extension of Crenshaw Boulevard.
A major problem in southern California were the countless dormant ancient landslides that mantled the region’s slopes, which were not properly identified or respected by many the engineers who drafted grading plans, who focused solely on balancing cut and fill quantities.
The Via de las Ojas Landslide in Pacific Palisades in 1958 shut down the coast highway, bringing the problem of landslippage into the consciousness of every Los Angeles resident.
In 1962 a series of destructive storms struck Los Angeles County causing widespread damage, triggering development of so-called “Modern Grading Codes;” subsequently adopted by the City of Los Angeles, as well as Los Angeles and Orange Counties.
City of Los Angeles took lead in developing a more restrictive grading code following poor performance of slopes during 1962 storms.

Much public attention was focused on the problem by the reactivation of the Portuguese Bend Landslide in 1956, which damaged or destroyed more than 130 homes.

Los Angeles County adopted a more restrictive grading ordinance after losing an inverse condemnation lawsuit in 1961, which alleged that the extension of Crenshaw Blvd triggered the 1956 Portuguese Bend Landslide. The County had to pay for 130 homes!
Numerous slope failures were triggered by near-record storms in early 1969 in southern California. Grading & Excavation standards were amended to limit cut and fill slopes to inclinations no more than 2:1 in the 1970 Uniform Building Code (UBC).
Storms in early 1978 came on the heels of the worst 2-year drought in over 100 years, triggering countless debris flows and slope failures in southern California.
Statistical data of storm-inflicted damage to hillside areas of Los Angeles in 1969 and 1978 confirmed the societal benefits of grading and excavation codes.

### Damage Associated with Destructive Storms of 1969 in Hillside Areas of Los Angeles

<table>
<thead>
<tr>
<th></th>
<th>Sites developed prior to 1952</th>
<th>Sites developed 1952-1962</th>
<th>Sites developed 1963-1969</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of sites</td>
<td>10,000</td>
<td>27,000</td>
<td>11,000</td>
</tr>
<tr>
<td>constructed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total damage</td>
<td>$3,300,000</td>
<td>$2,767,000</td>
<td>$184,400</td>
</tr>
<tr>
<td>Average damage per site</td>
<td>$300</td>
<td>$100</td>
<td>$17</td>
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<tr>
<td>Percentage of sites damaged</td>
<td>10.4%</td>
<td>1.3%</td>
<td>0.15%</td>
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</tbody>
</table>

**SOURCE:** Slosson, 1969

### Slope Failures in City of Los Angeles, 1978

<table>
<thead>
<tr>
<th></th>
<th>Sites developed prior to 1963</th>
<th>Sites developed after 1963</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of sites constructed</td>
<td>37,000</td>
<td>30,000</td>
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<tr>
<td>Number of failures</td>
<td>2,790</td>
<td>210</td>
</tr>
<tr>
<td>Percentage of sites damaged</td>
<td>7.5%</td>
<td>0.7%</td>
</tr>
</tbody>
</table>

**SOURCE:** Slosson and Krohn, 1979
Modern grading codes were successful in reducing 90% of hillside slope problems.