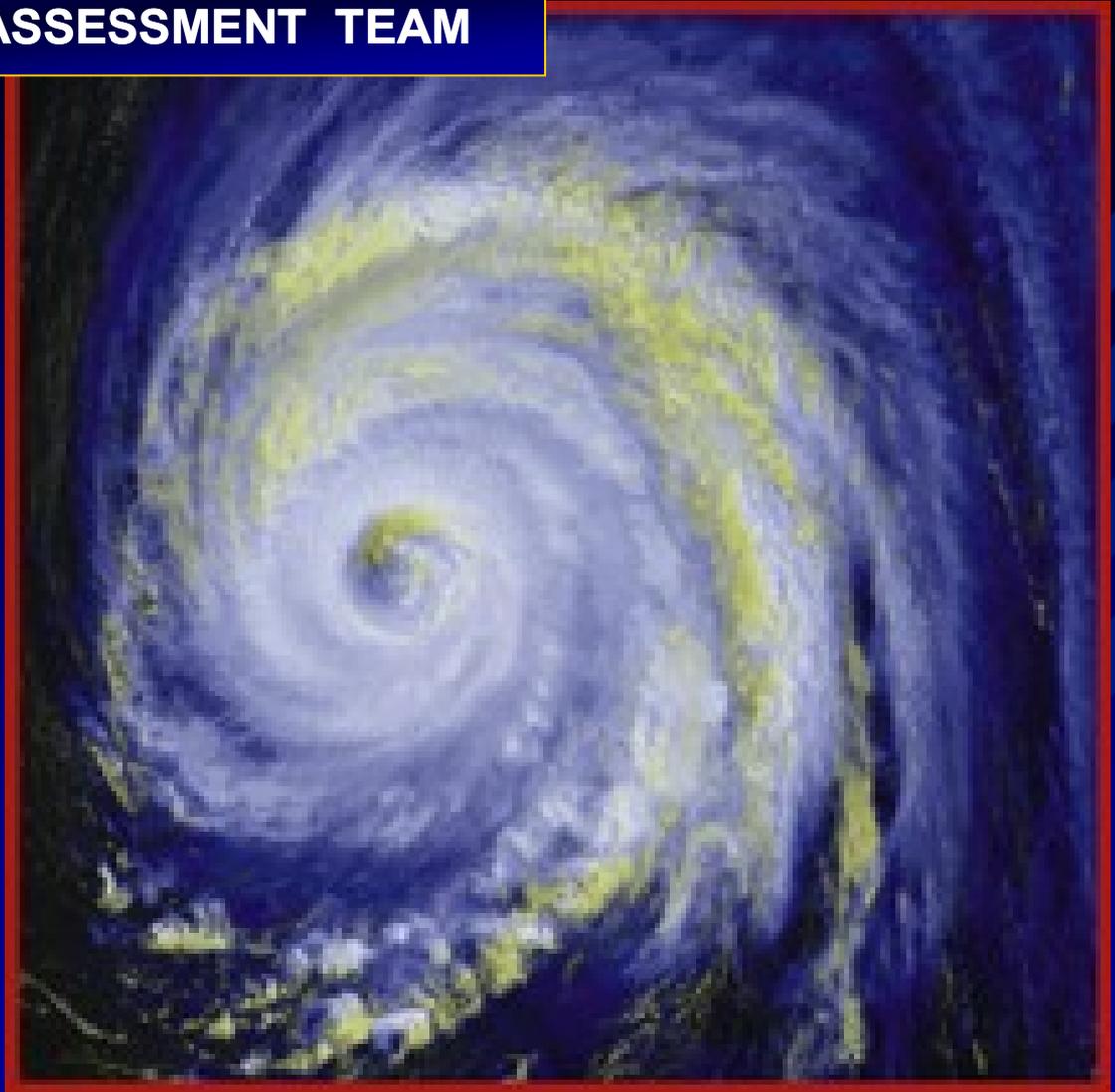


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Hurricane Iniki in Hawaii

**OBSERVATIONS,
RECOMMENDATIONS, AND
TECHNICAL GUIDANCE**



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MITIGATION DIRECTORATE



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BUILDING PERFORMANCE: HURRICANE INIKI IN HAWAII

OBSERVATIONS, RECOMMENDATIONS,
AND TECHNICAL GUIDANCE

Learning from failure...



...building on success

Teaming To Reduce Future Damages



FEDERAL EMERGENCY MANAGEMENT AGENCY
FEDERAL INSURANCE ADMINISTRATION

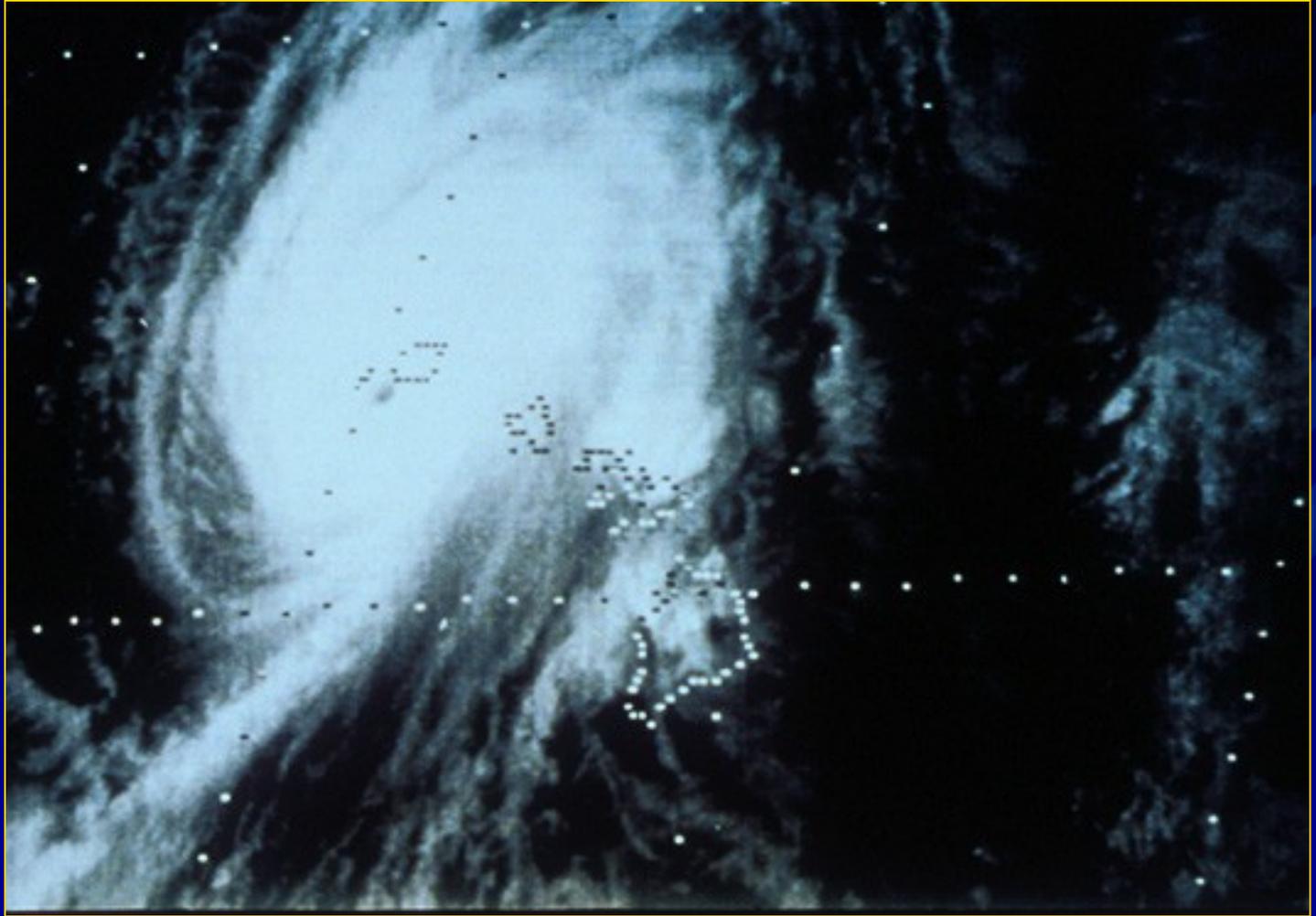
IN COOPERATION WITH
THE STATE OF HAWAII OFFICE OF CIVIL DEFENSE
AND KAUAI COUNTY

FIA-23
(3/93)

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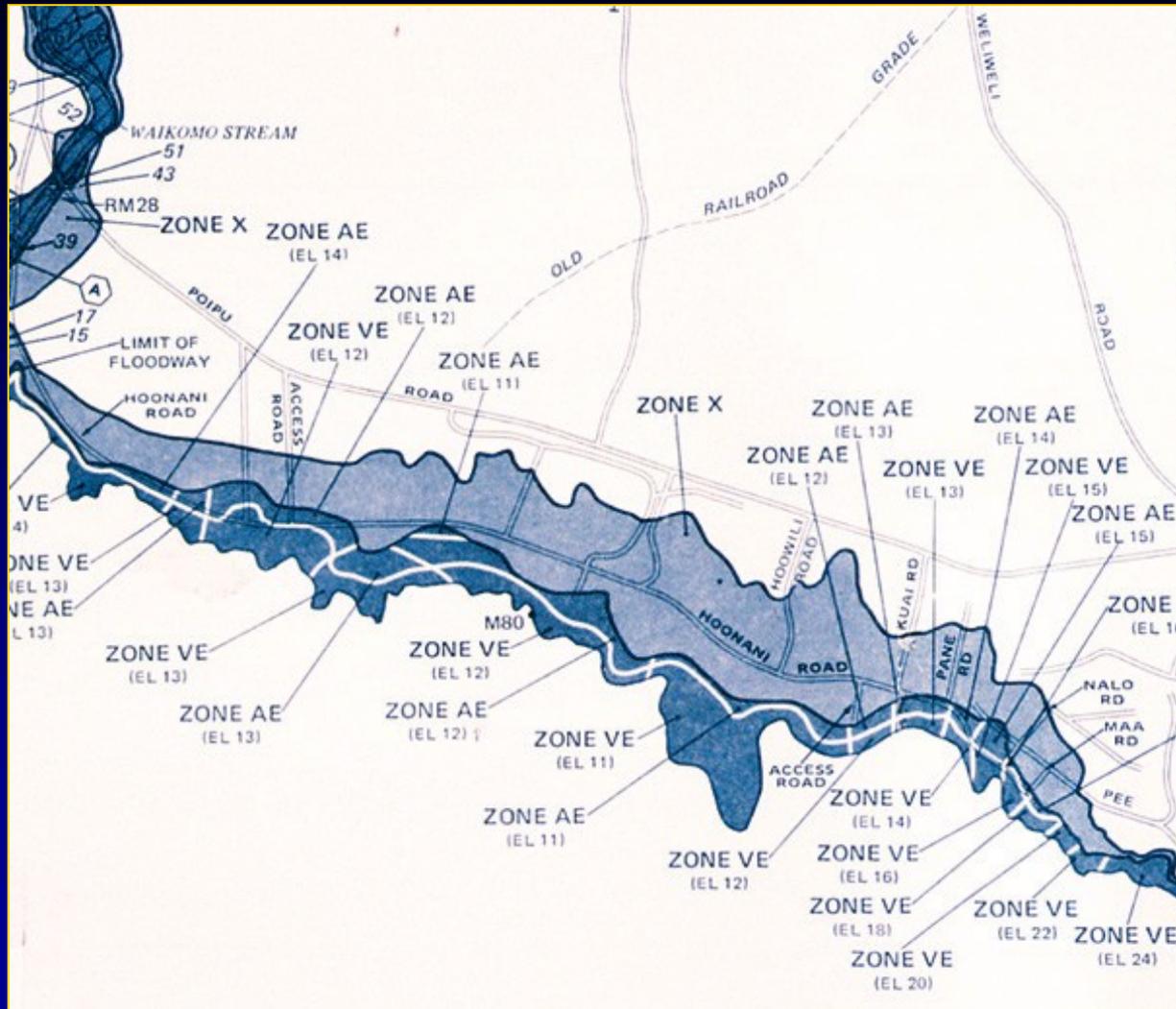
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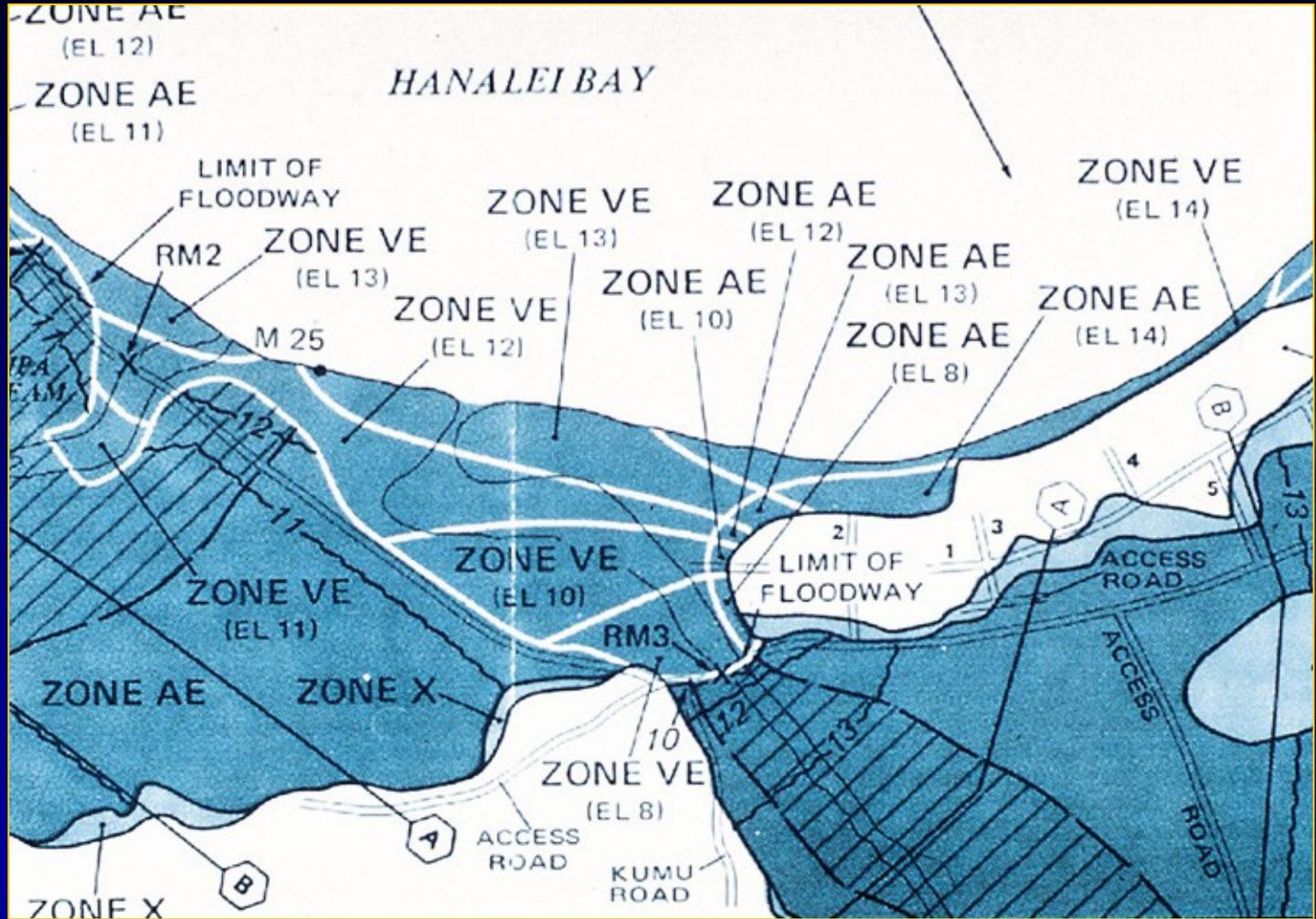
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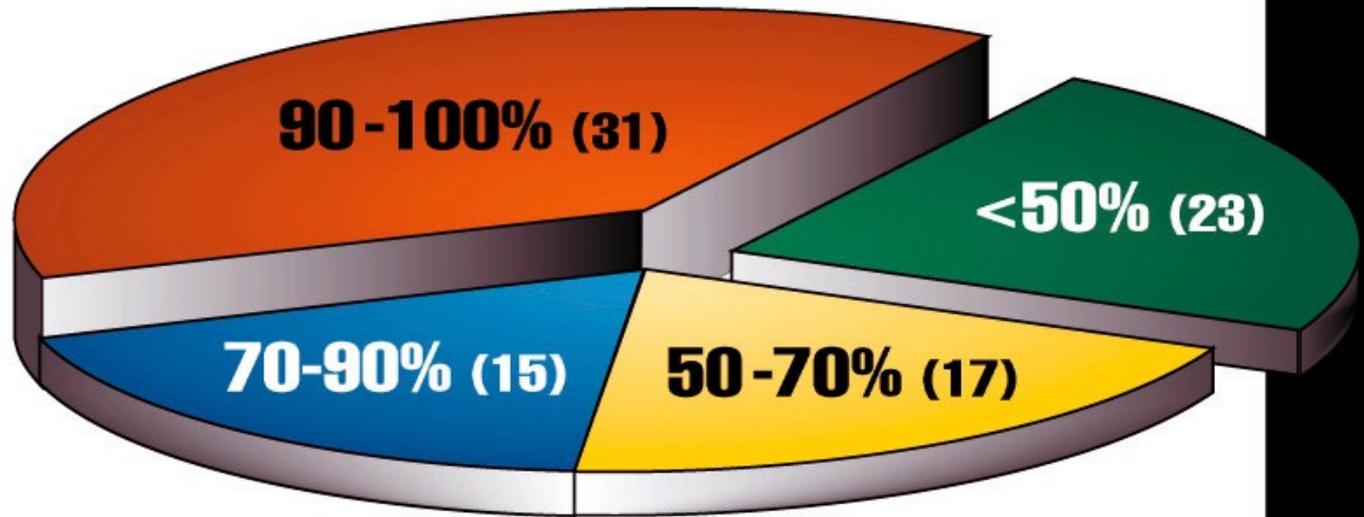
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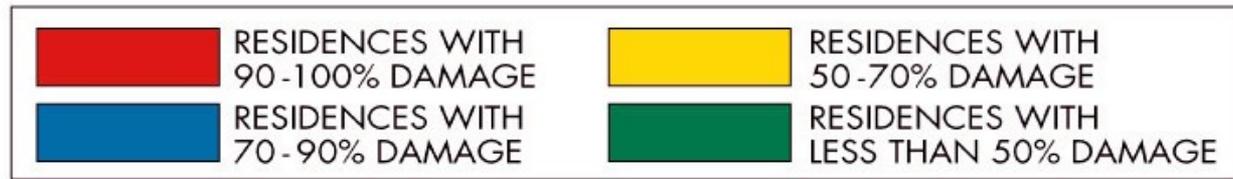
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ESTIMATED PERCENTAGE OF DAMAGE





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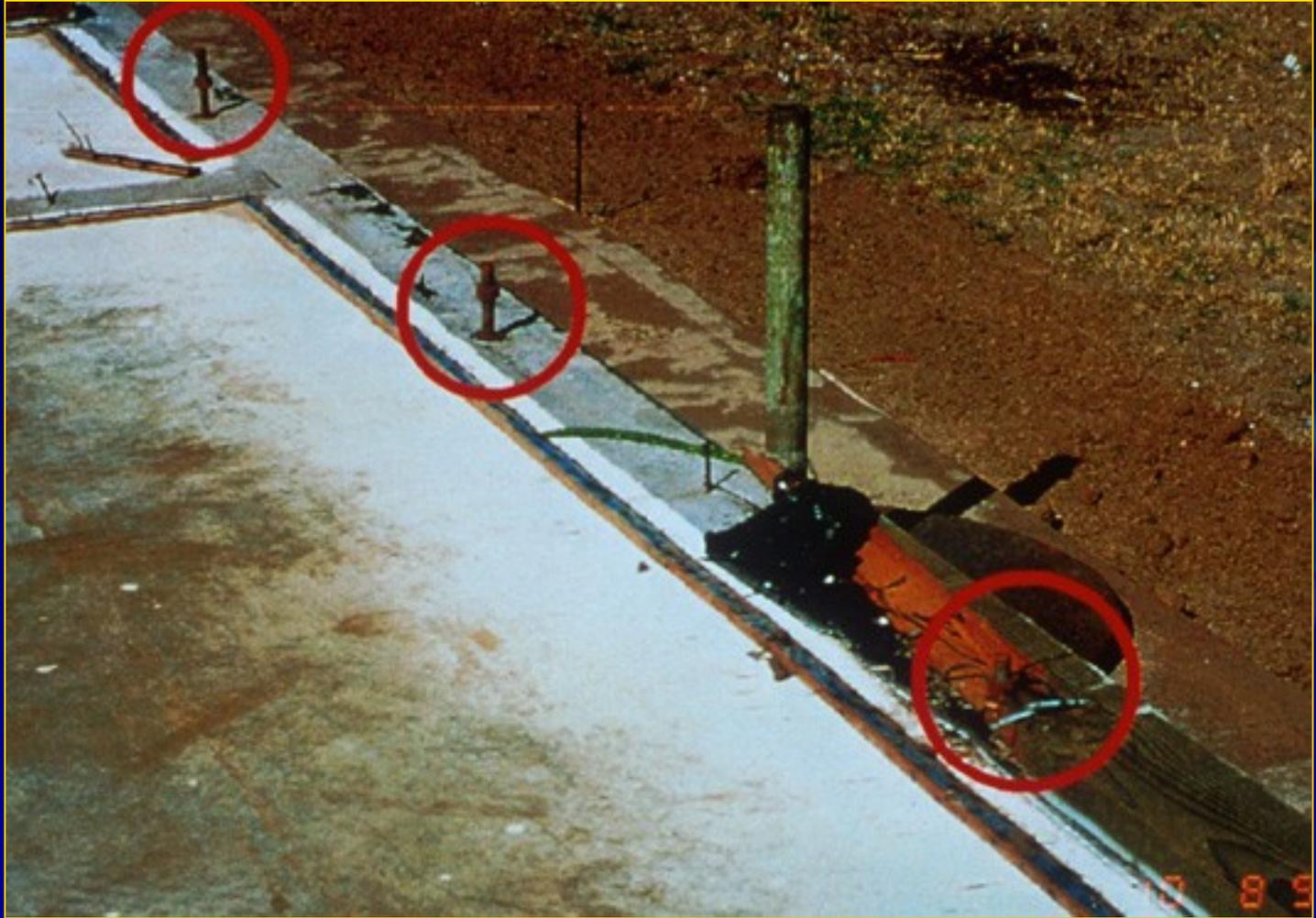
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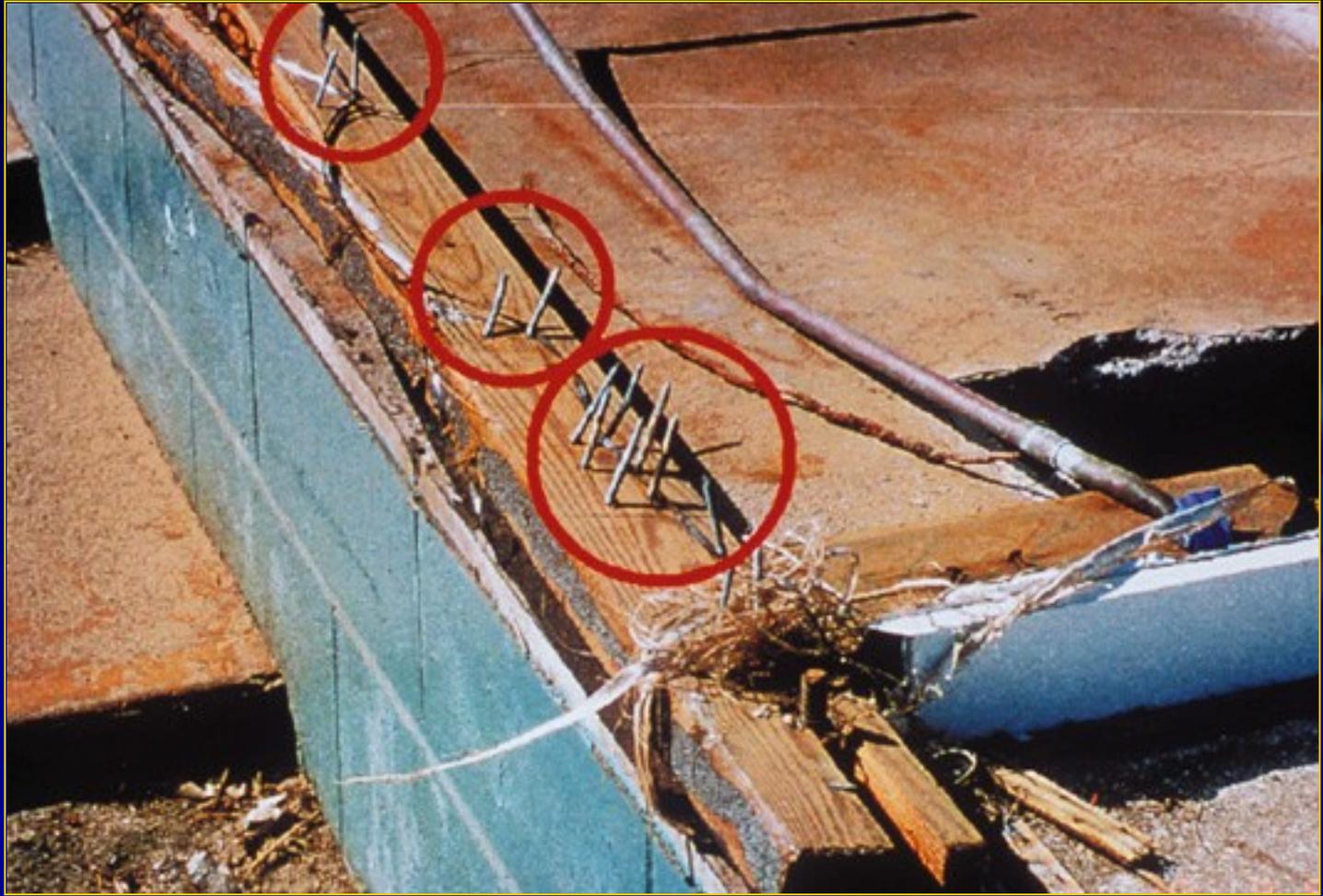
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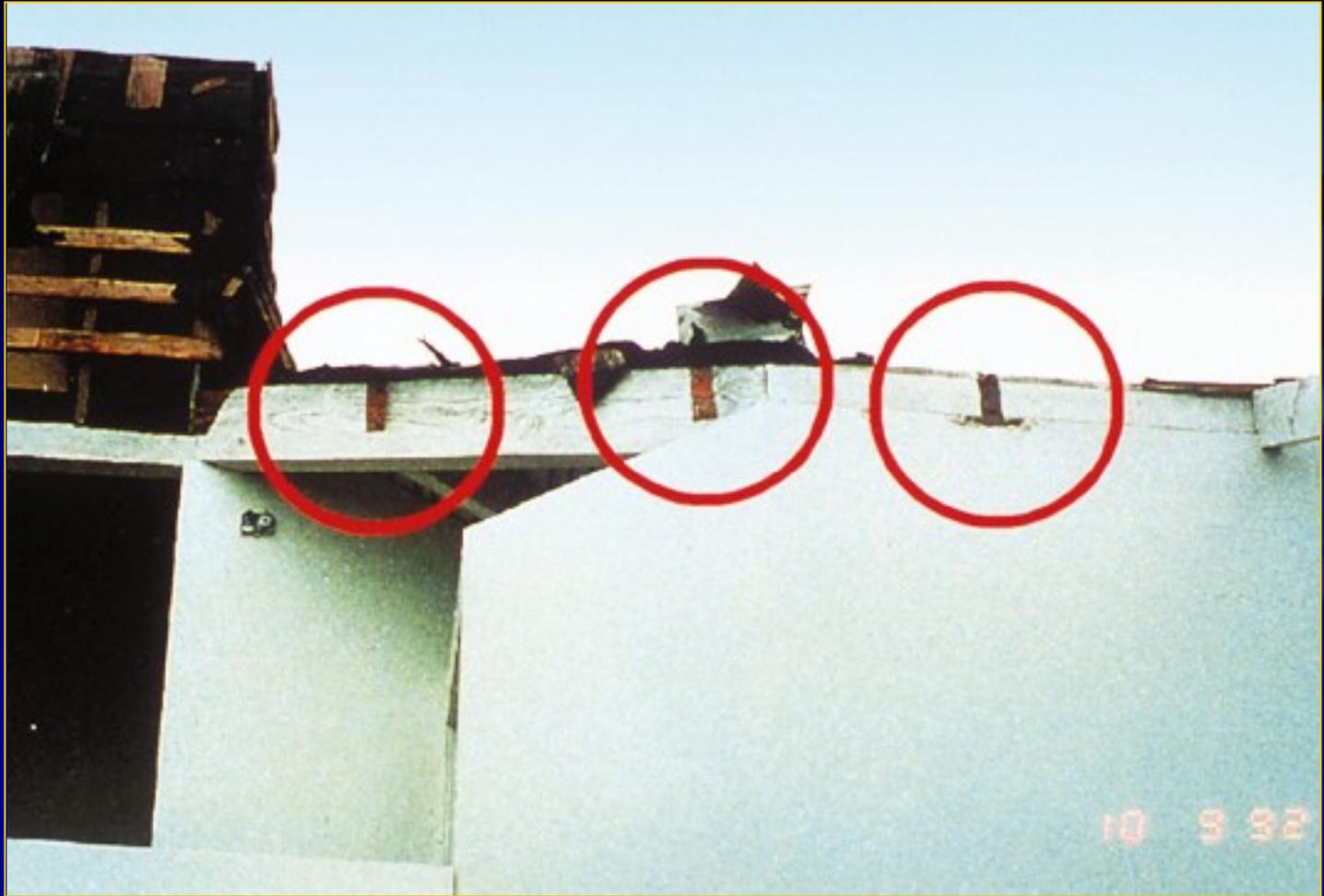
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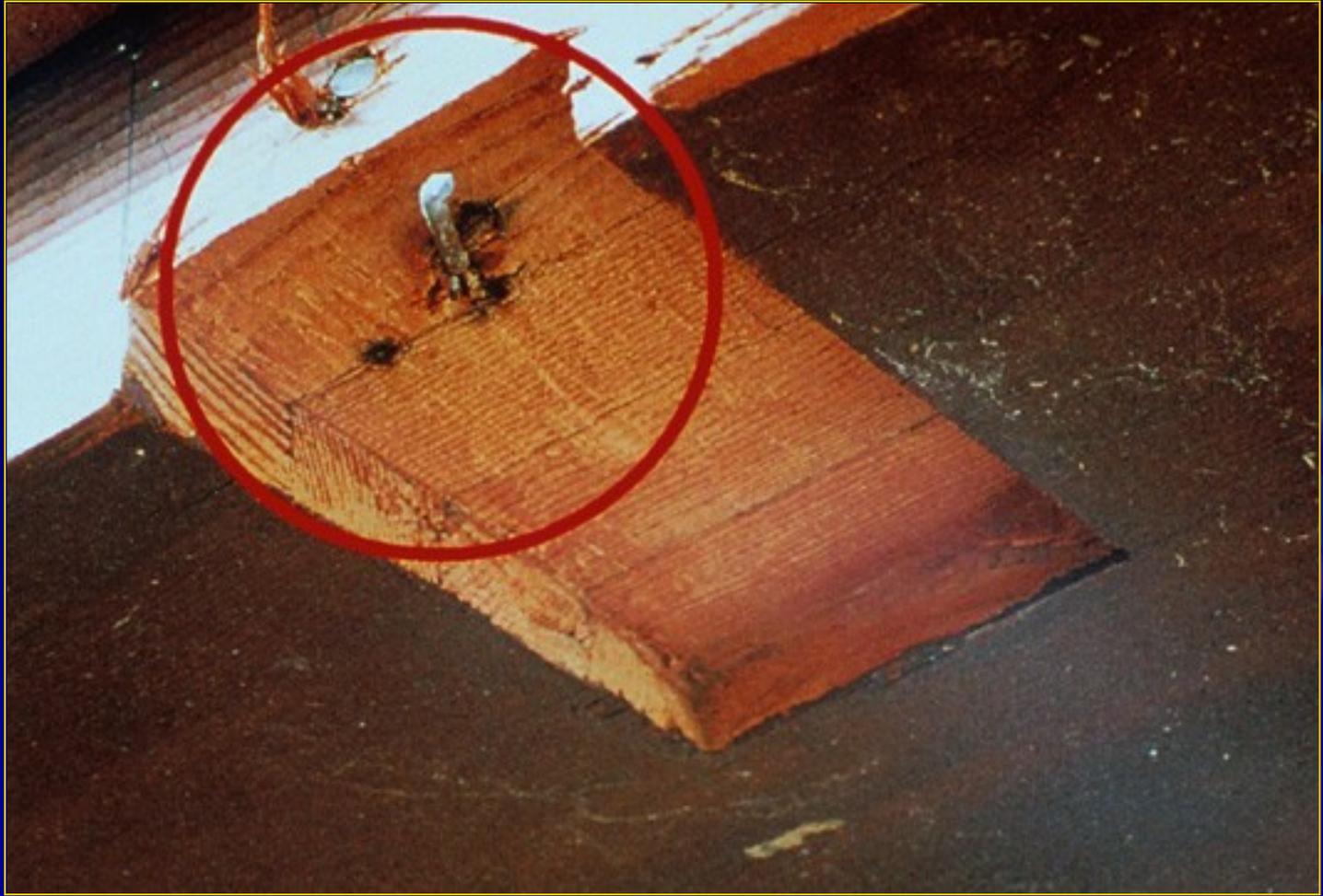
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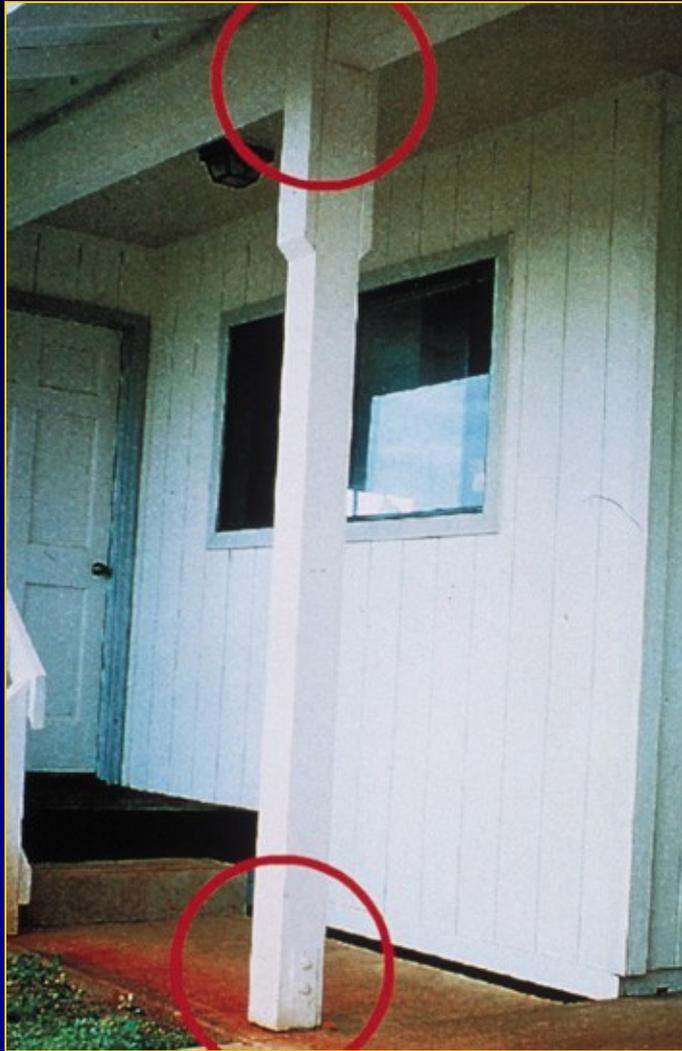
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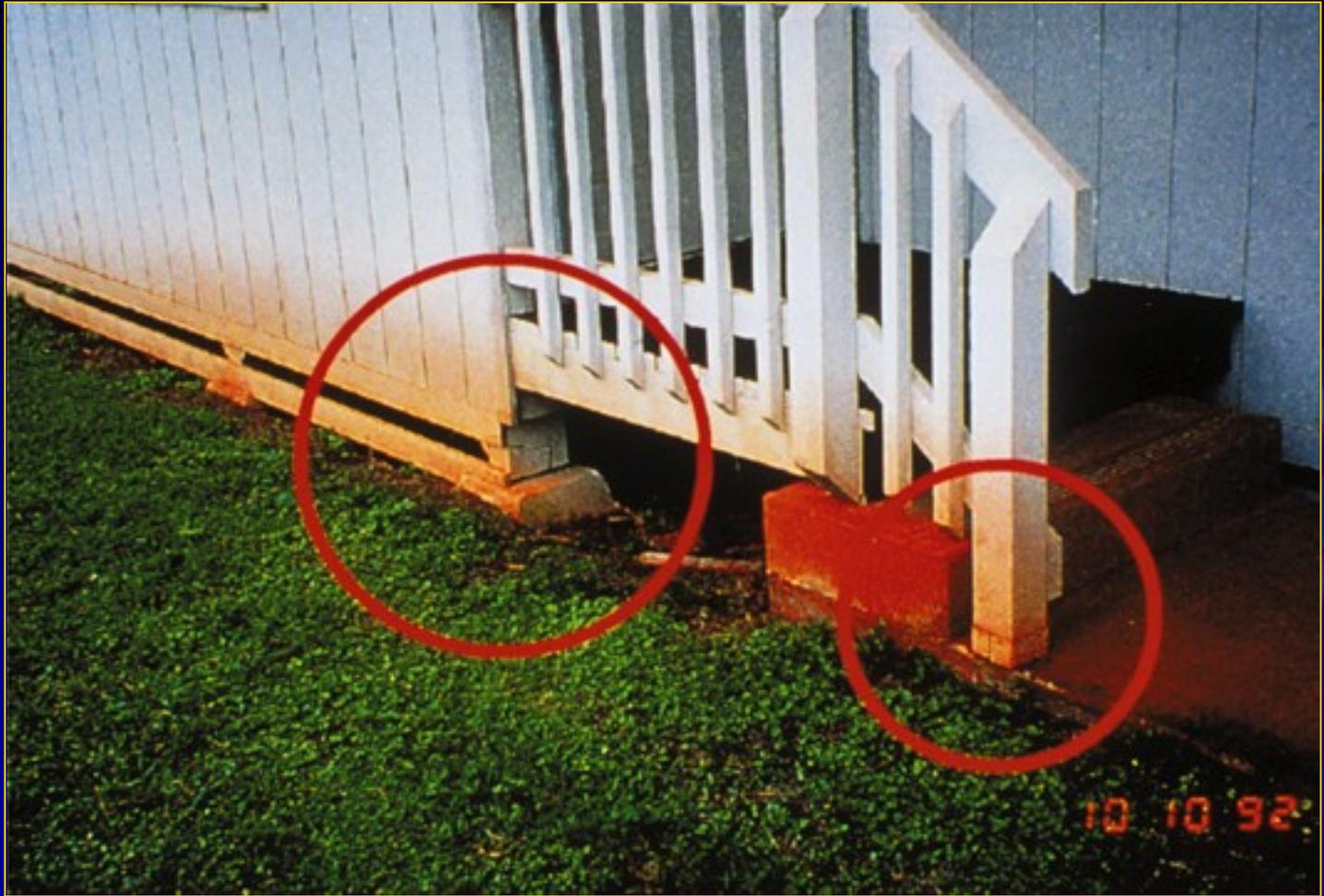
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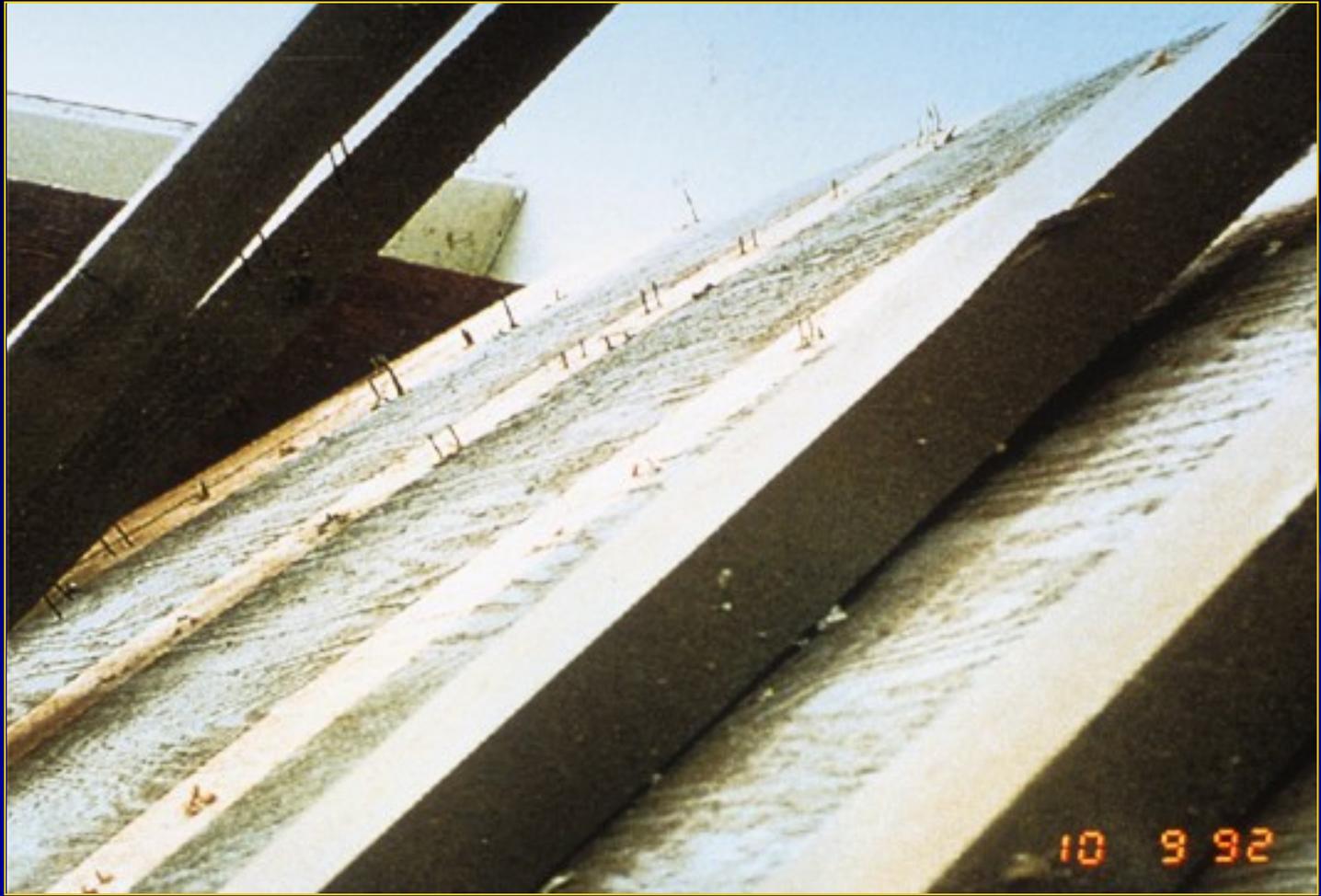
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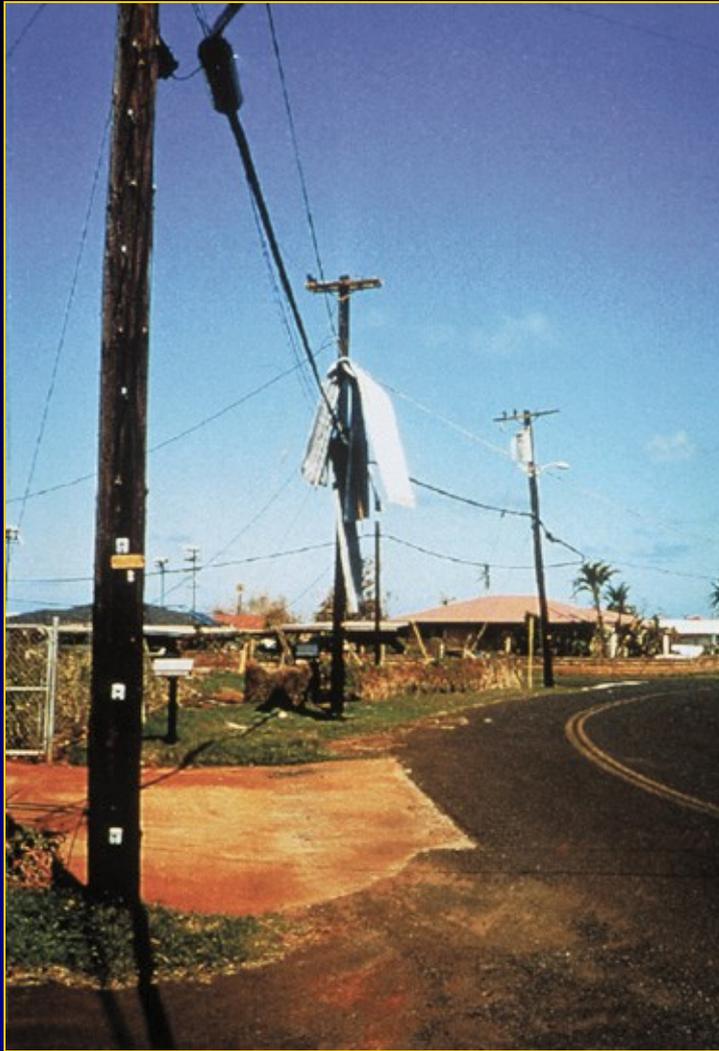
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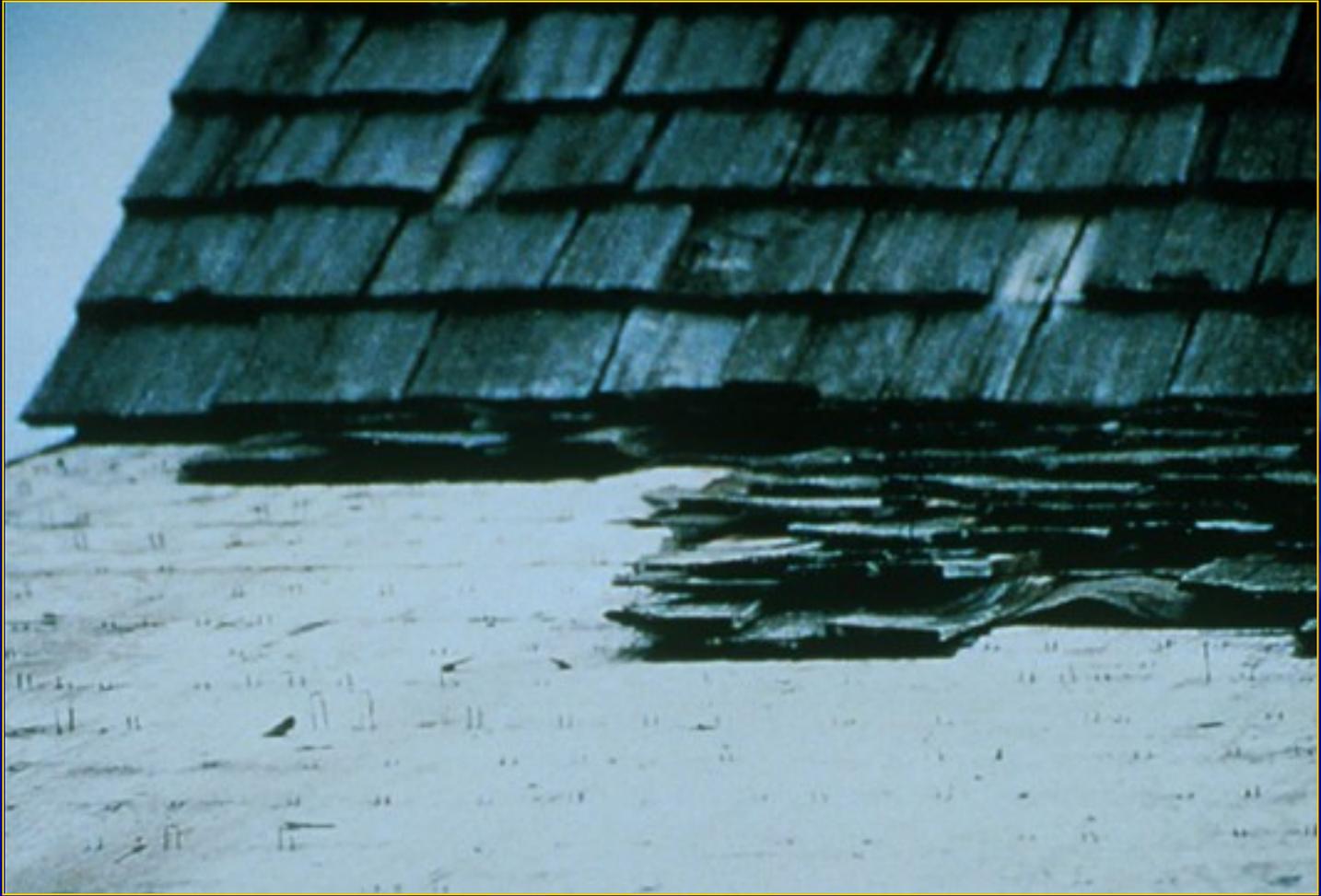
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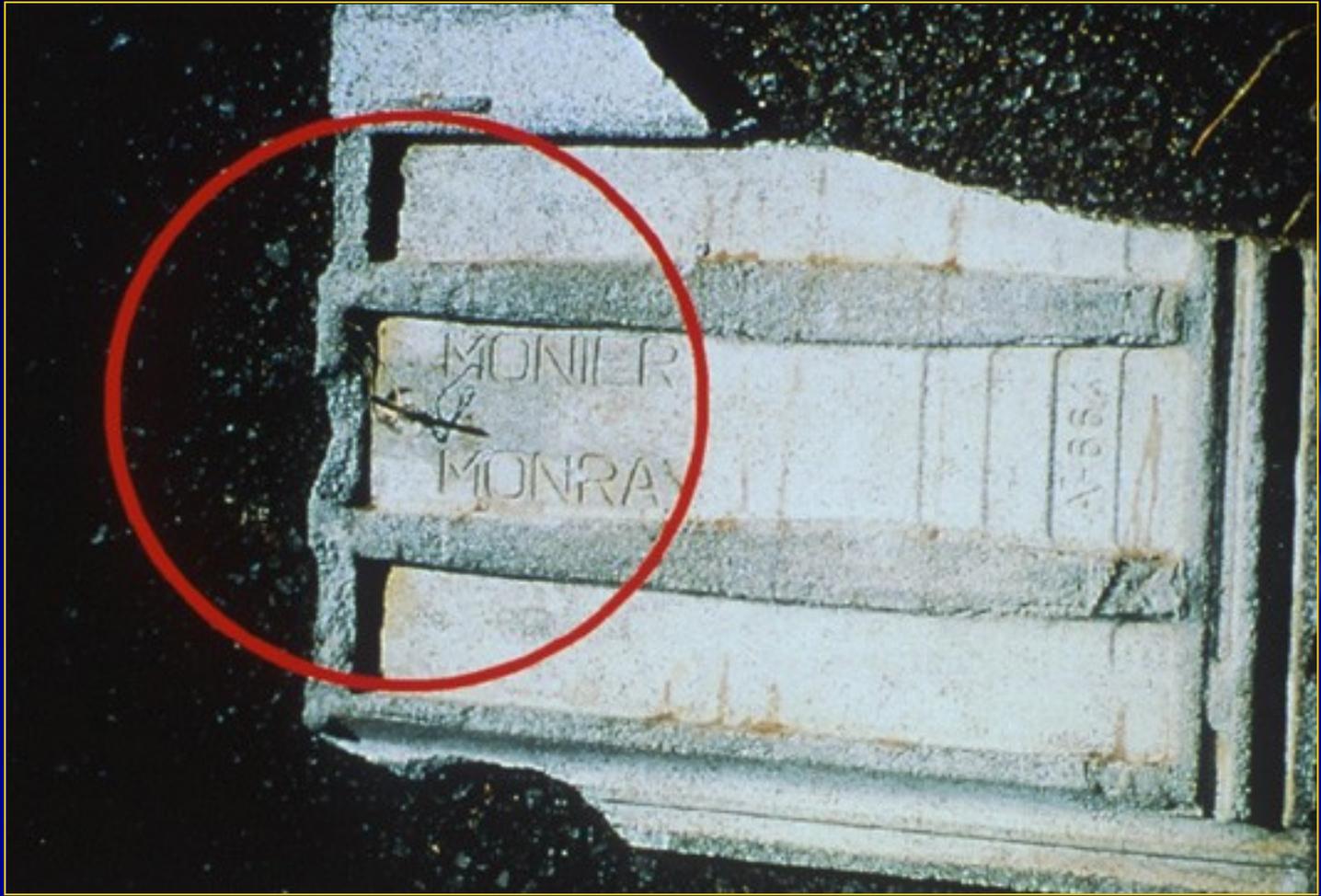
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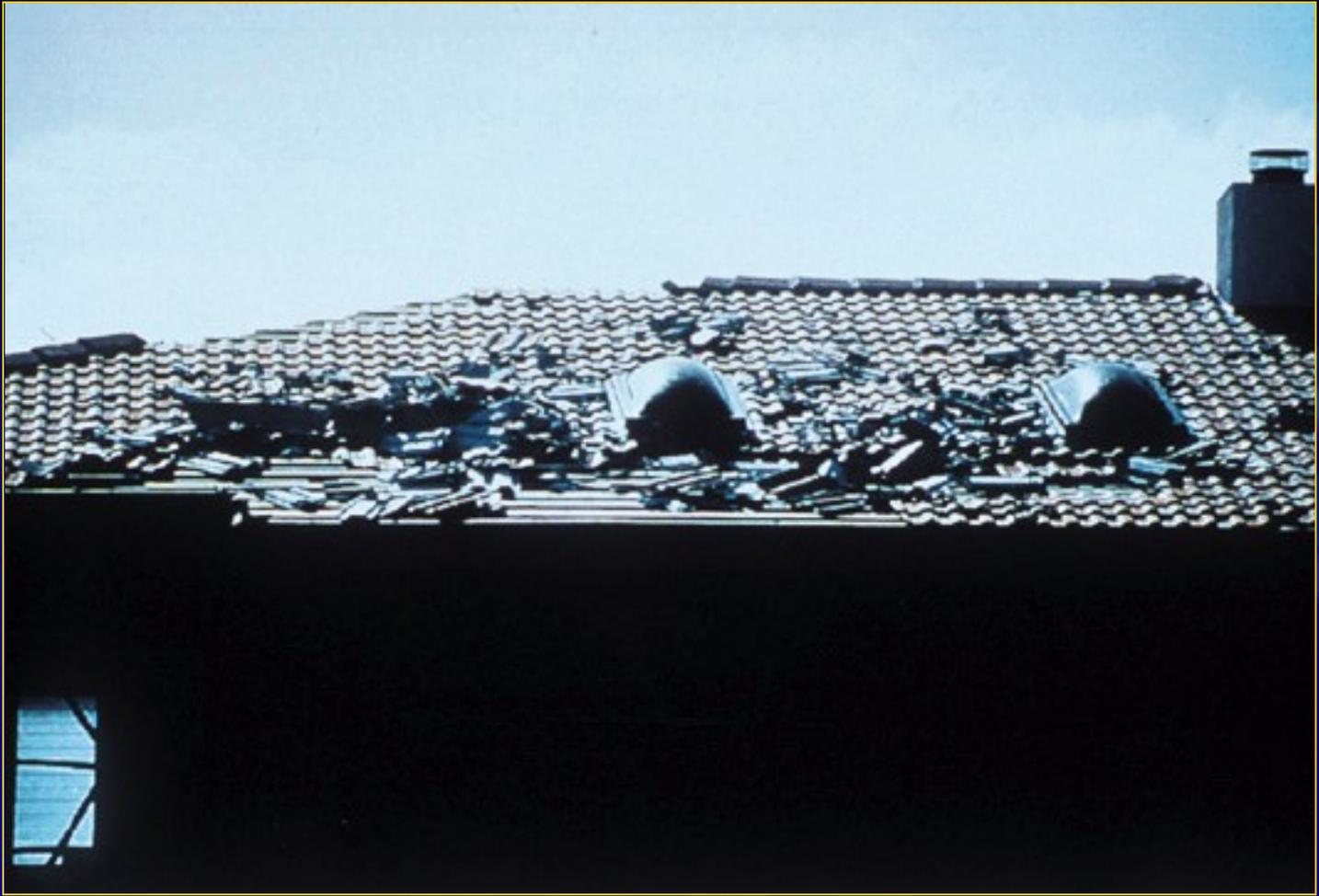
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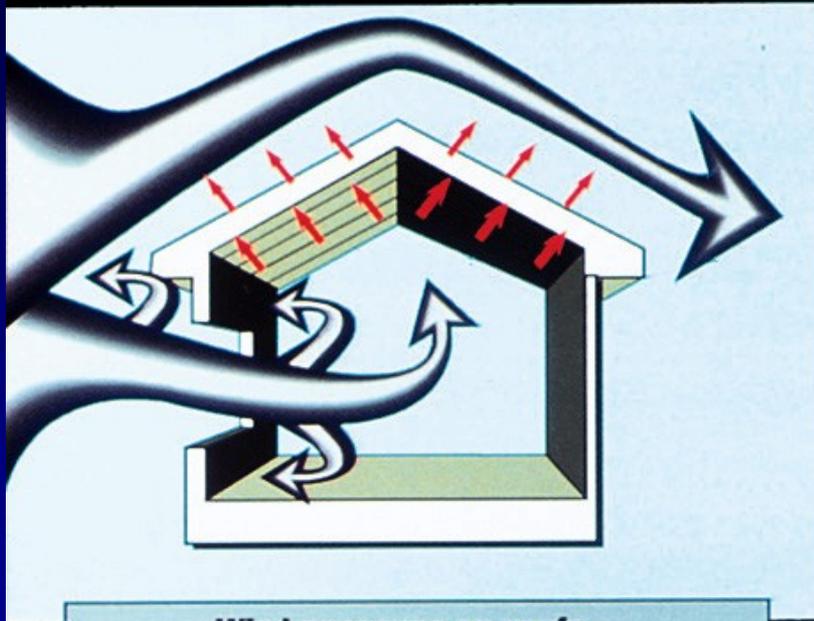
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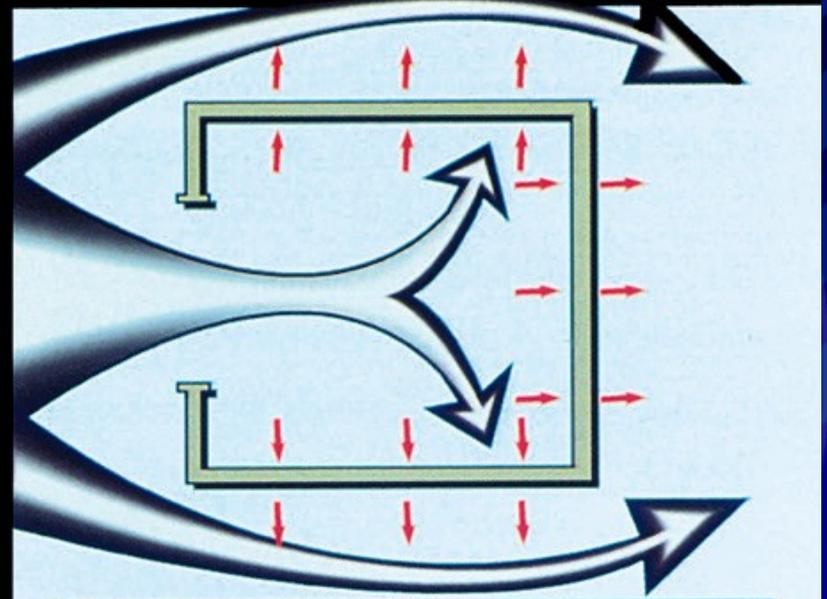
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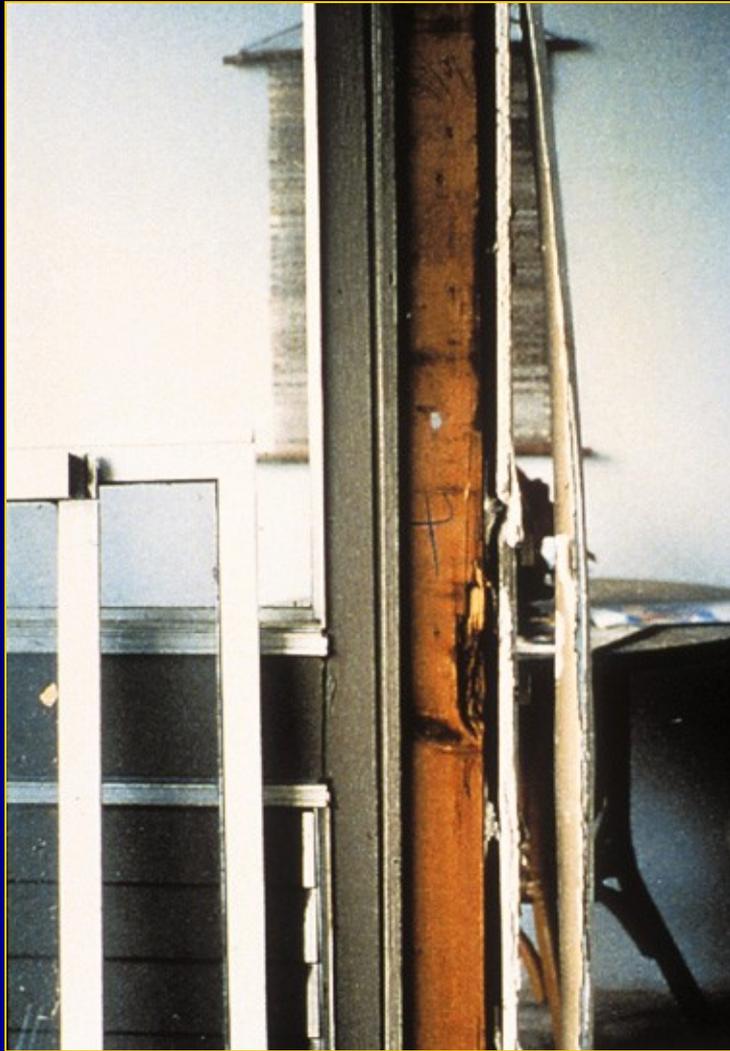
**Wind pressure on roofs.
Internal pressure adds to roof uplift.**



**Wind pressure on walls.
Internal pressure adds to wall suction.**



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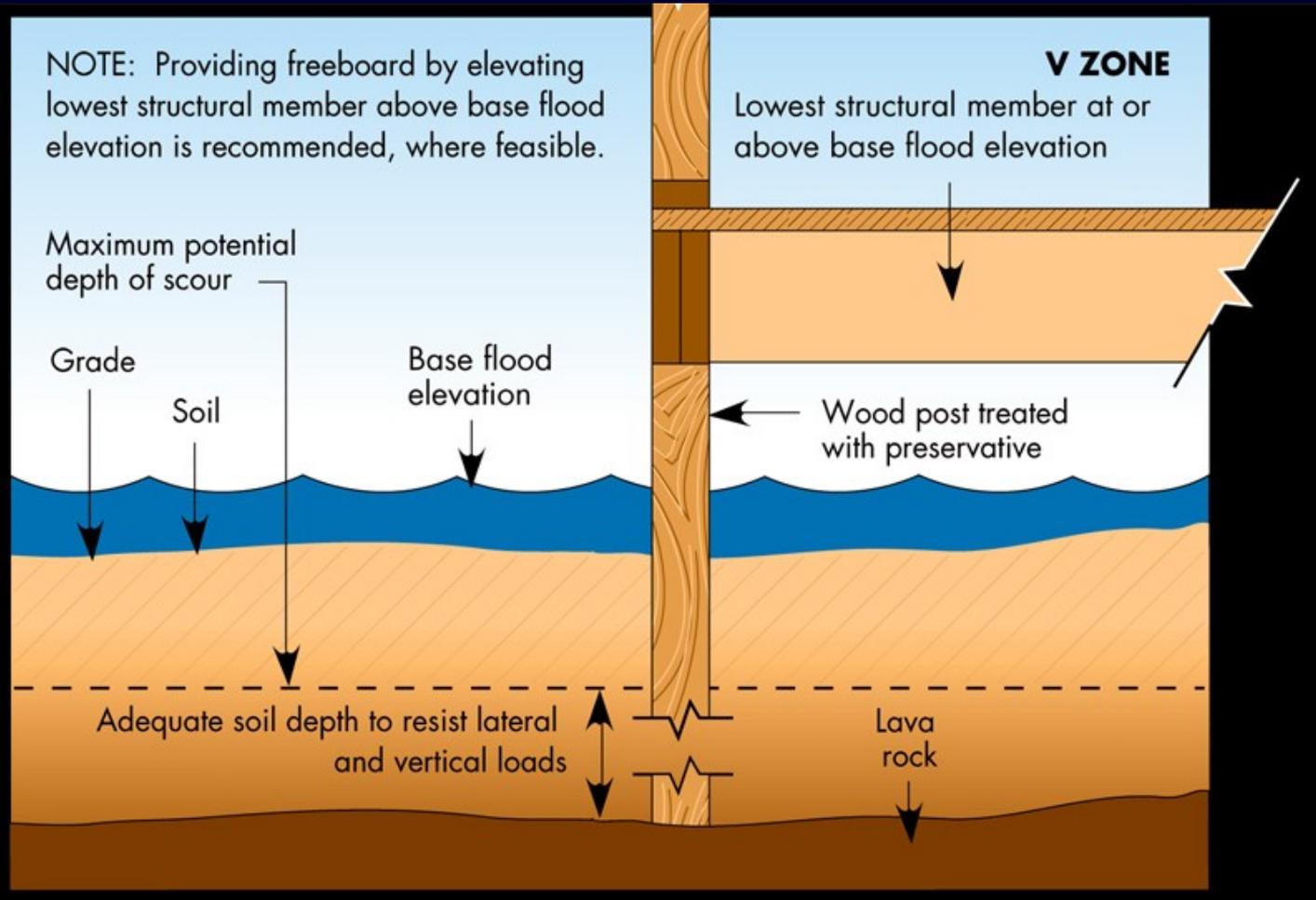


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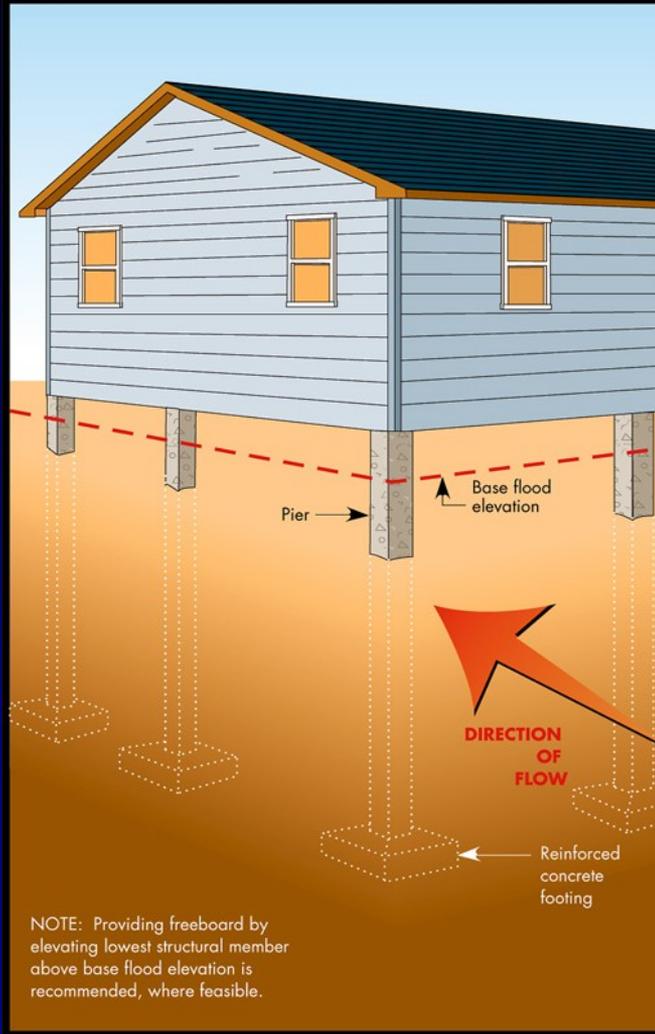
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NOTE: Providing freeboard by elevating lowest structural member above base flood elevation is recommended, where feasible.



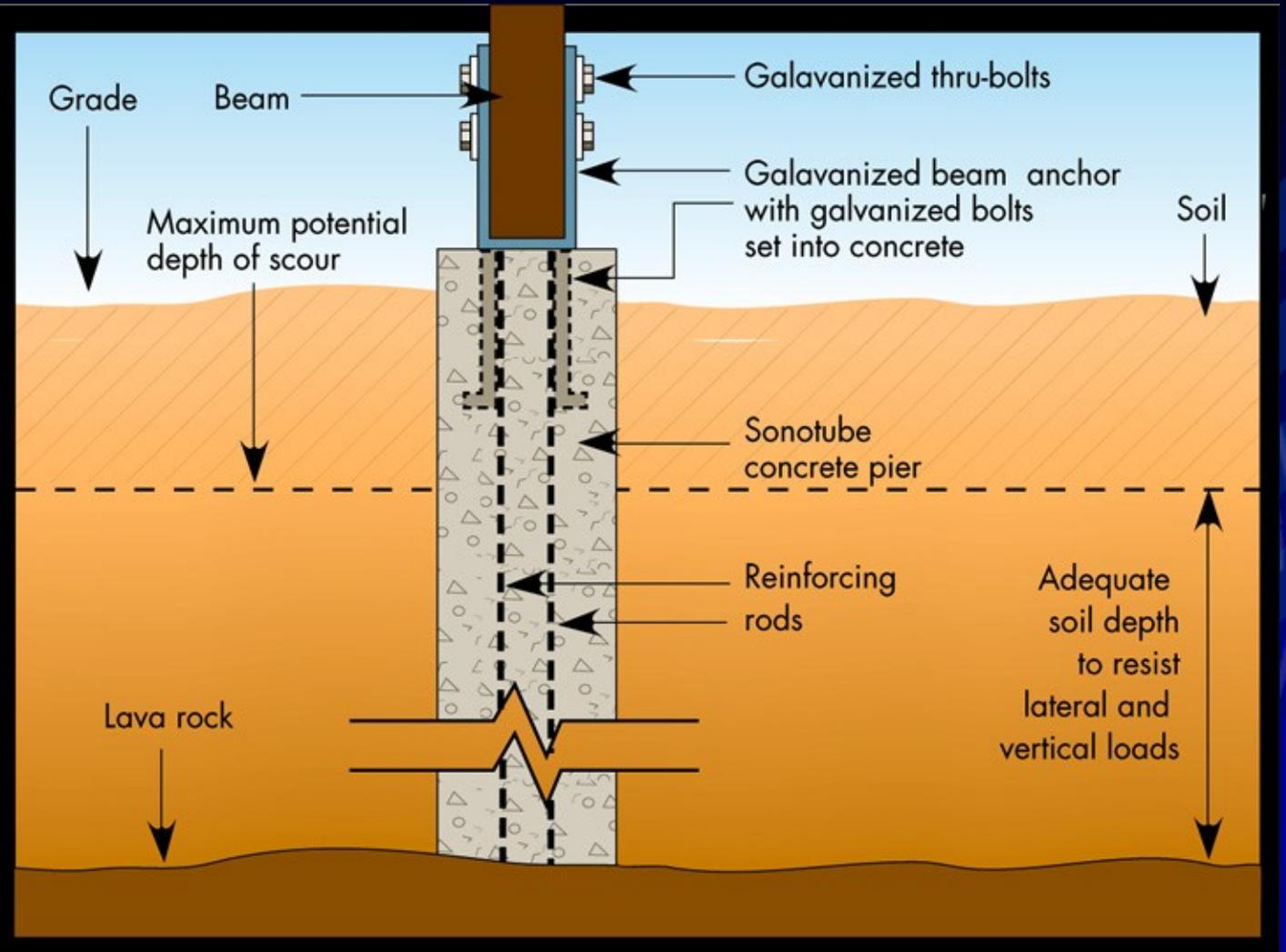


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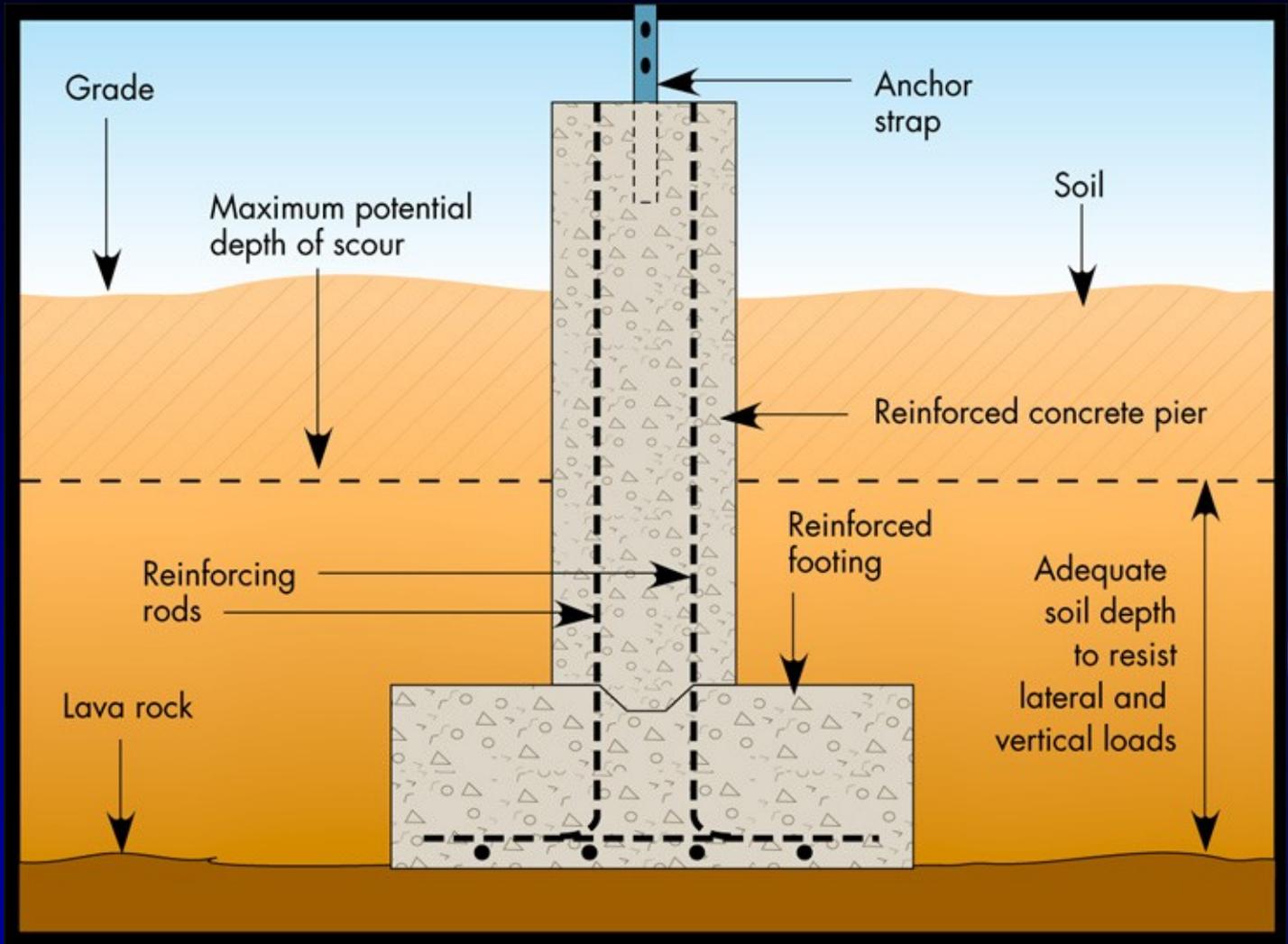


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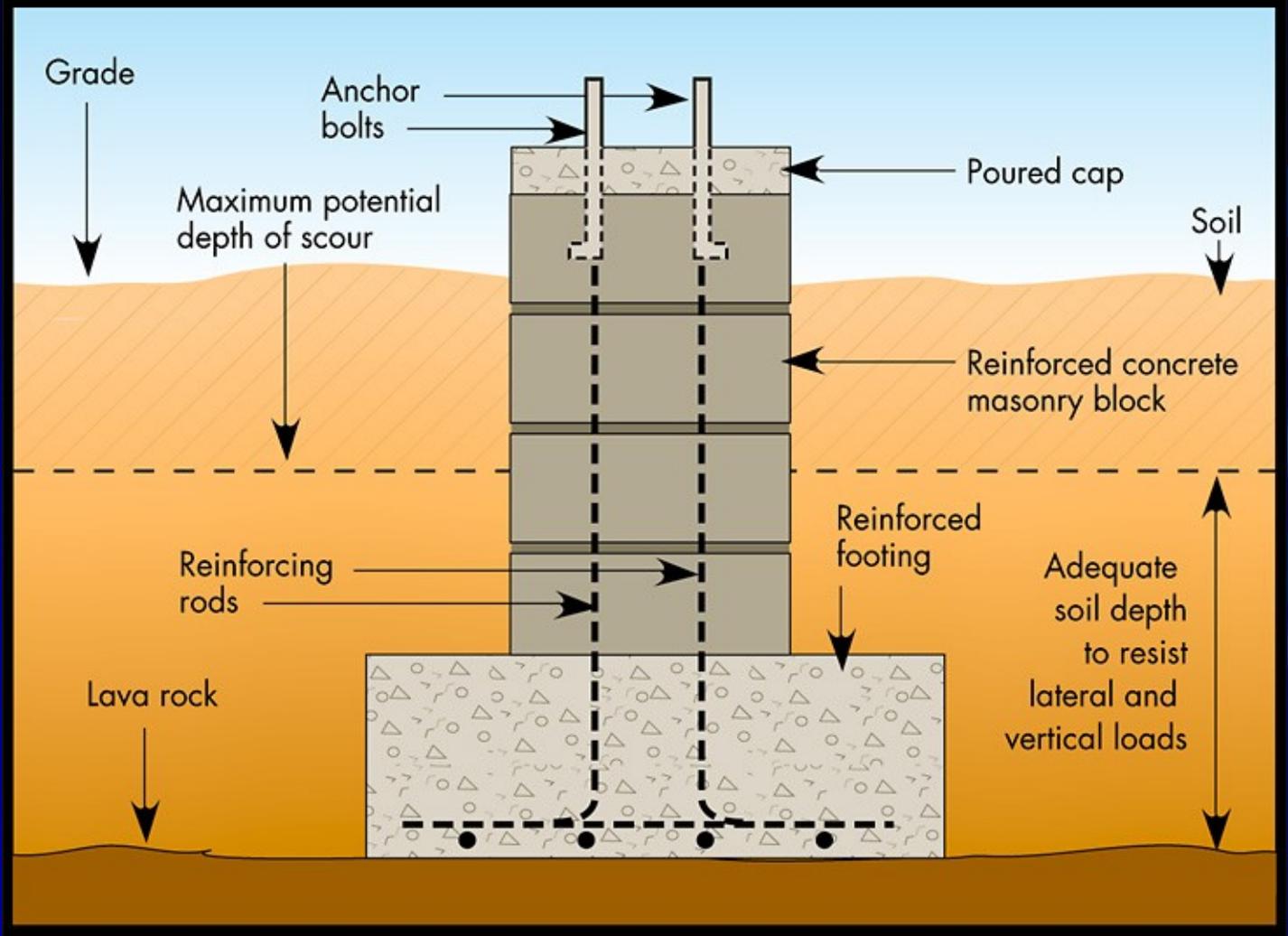
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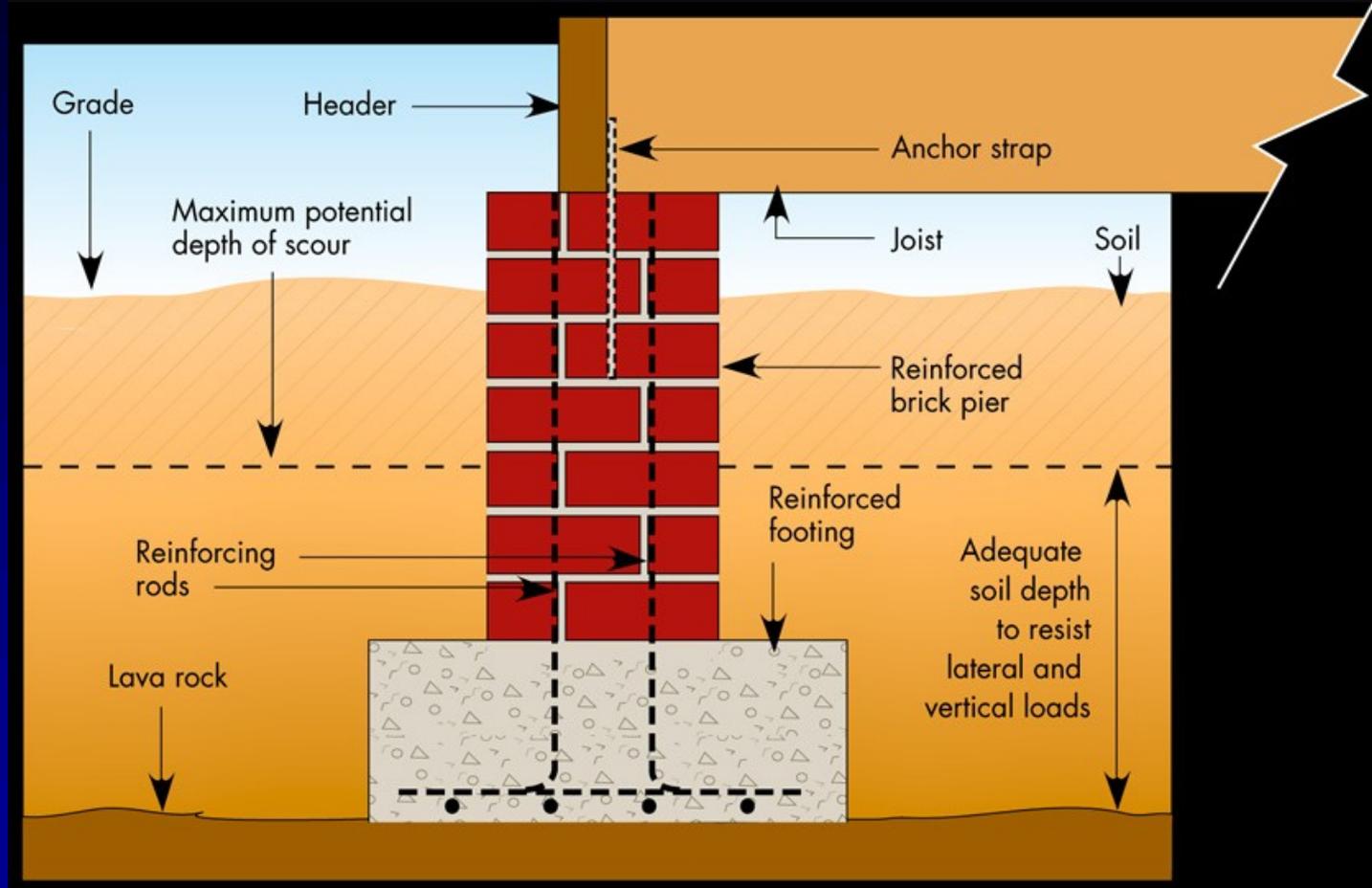


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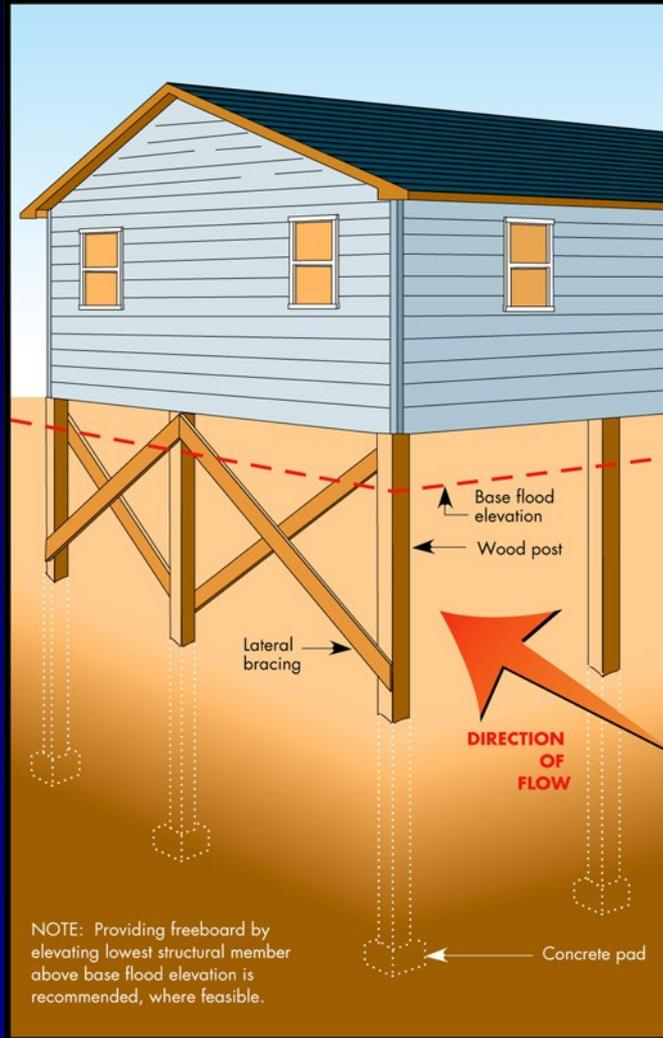


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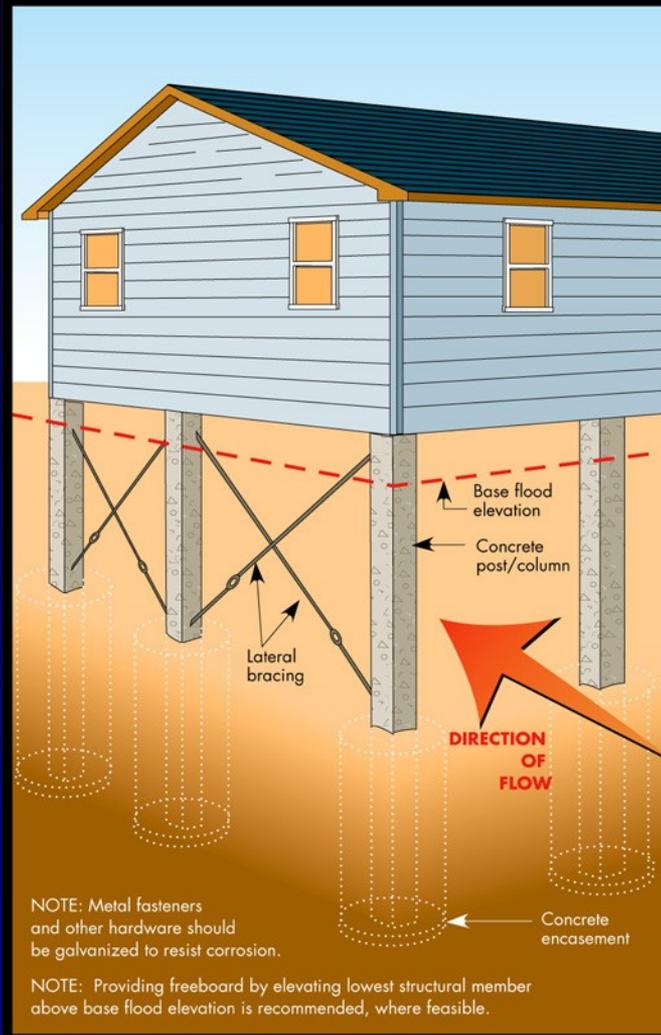


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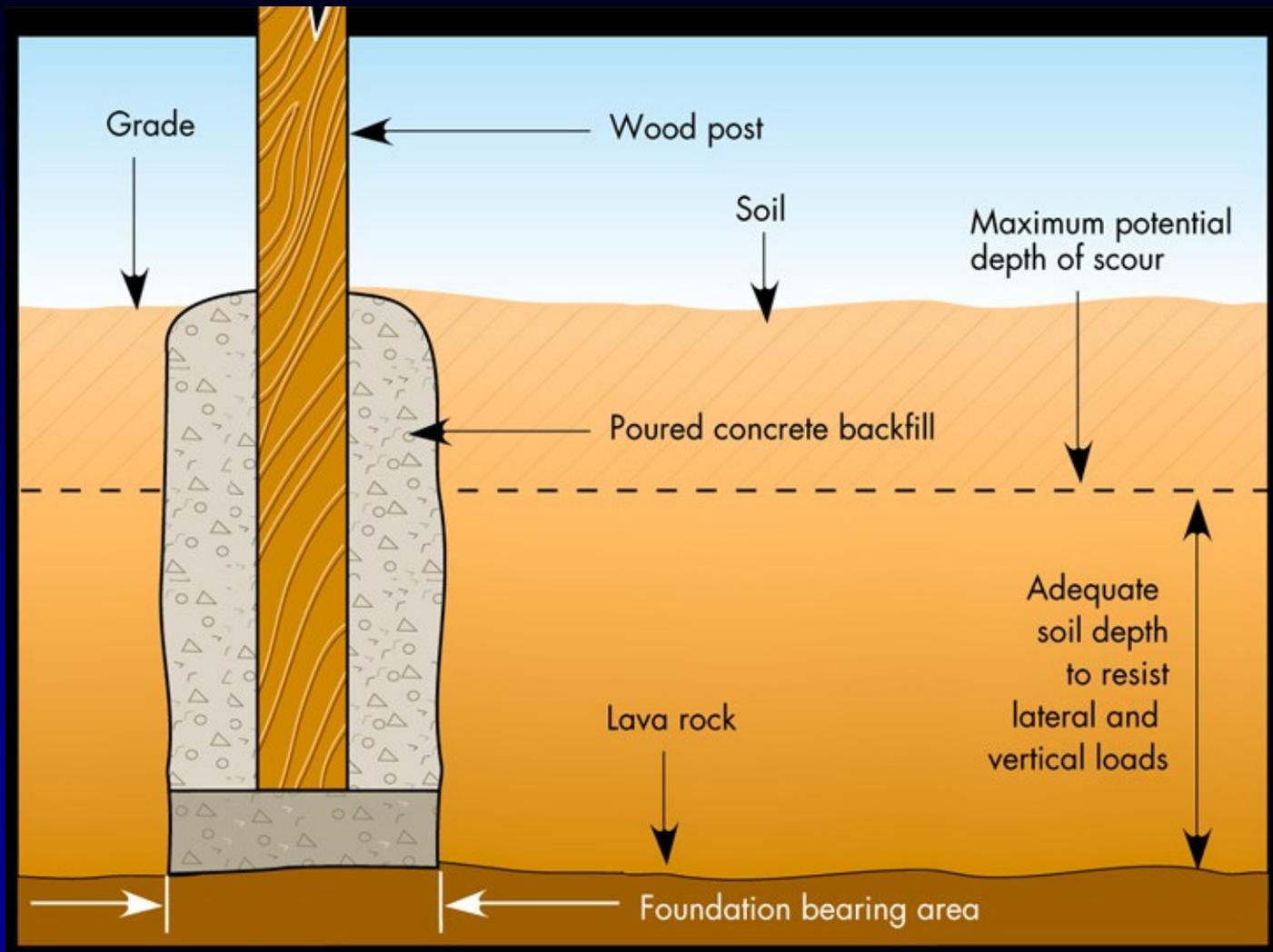


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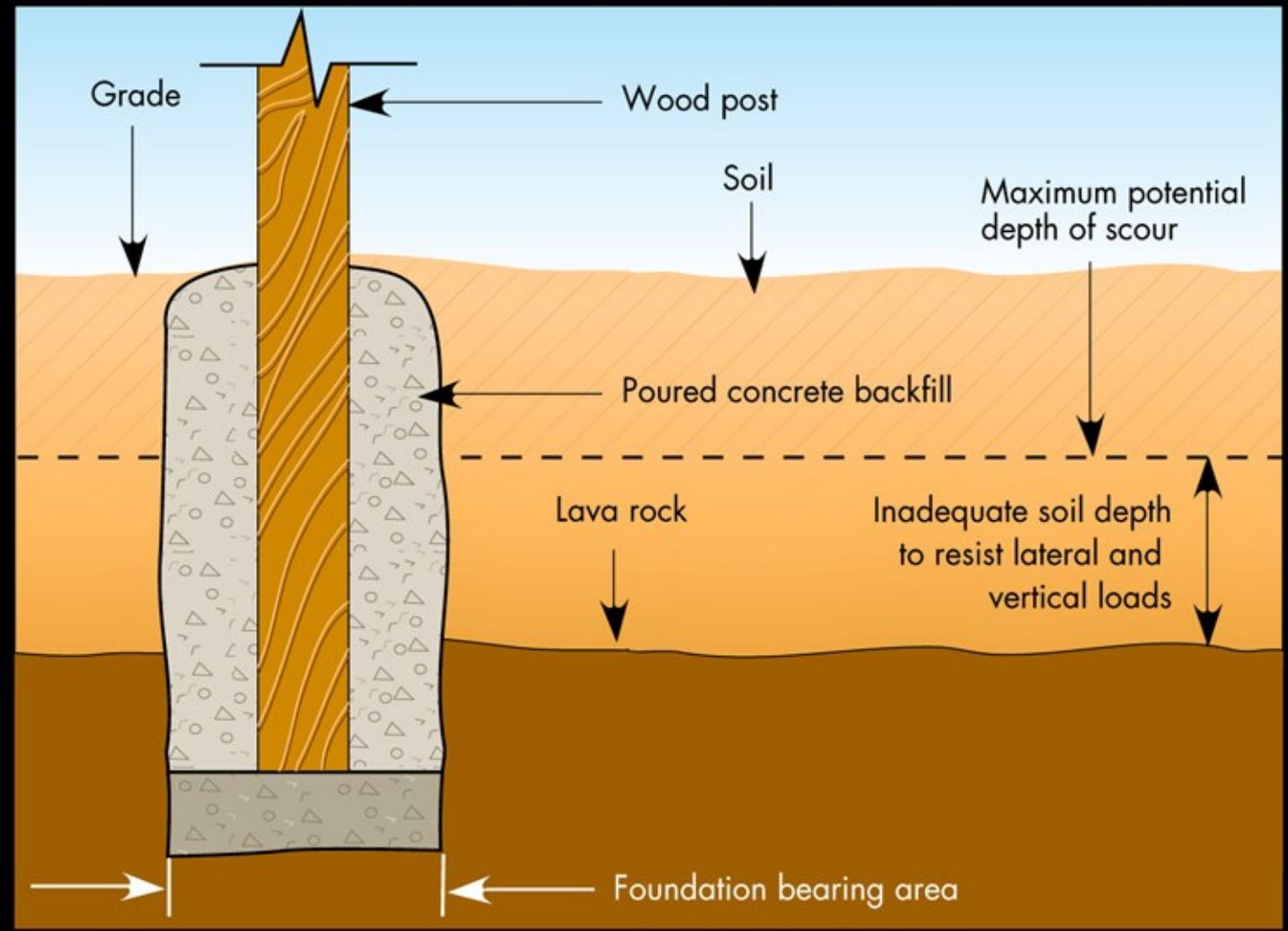
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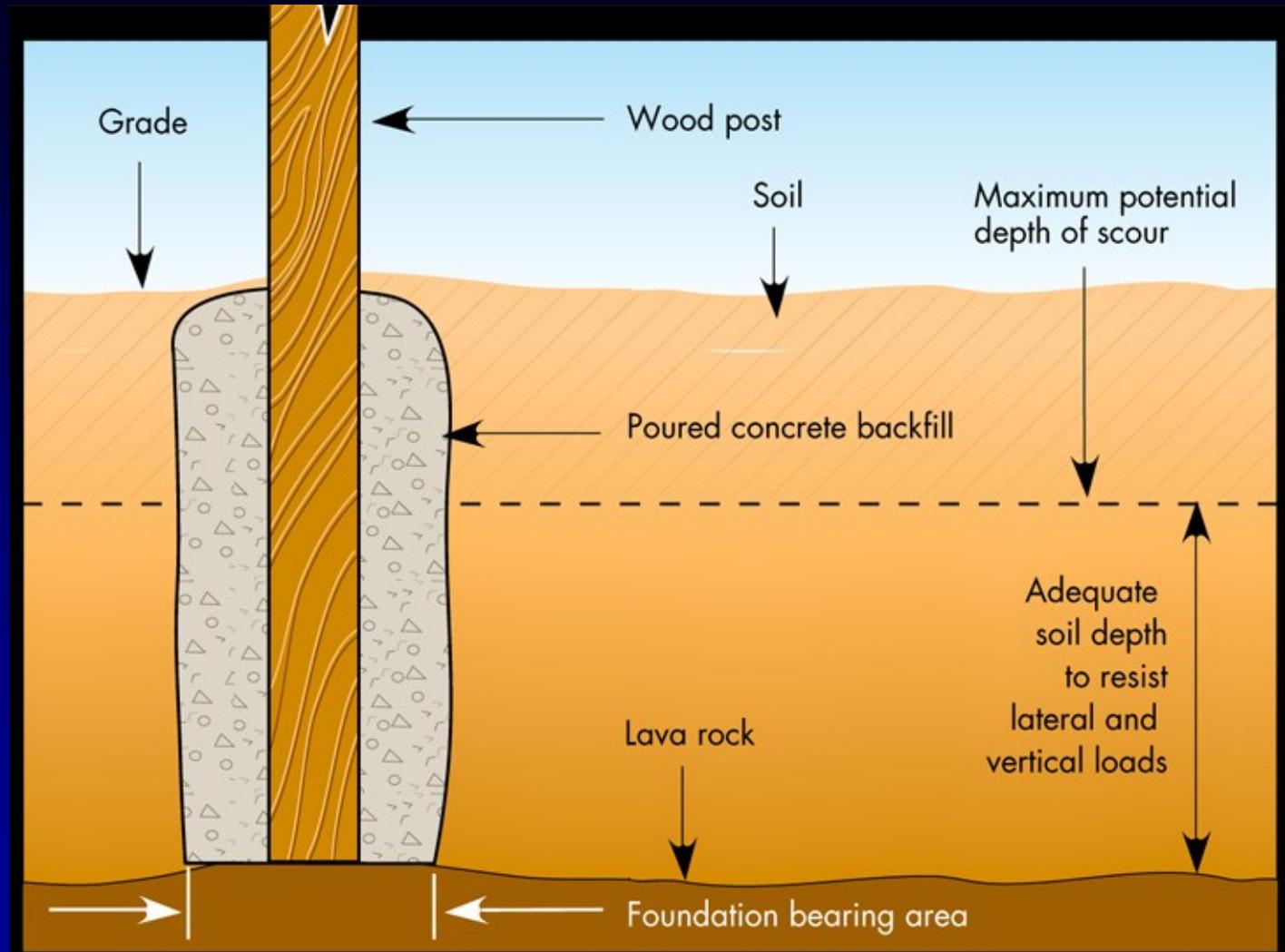


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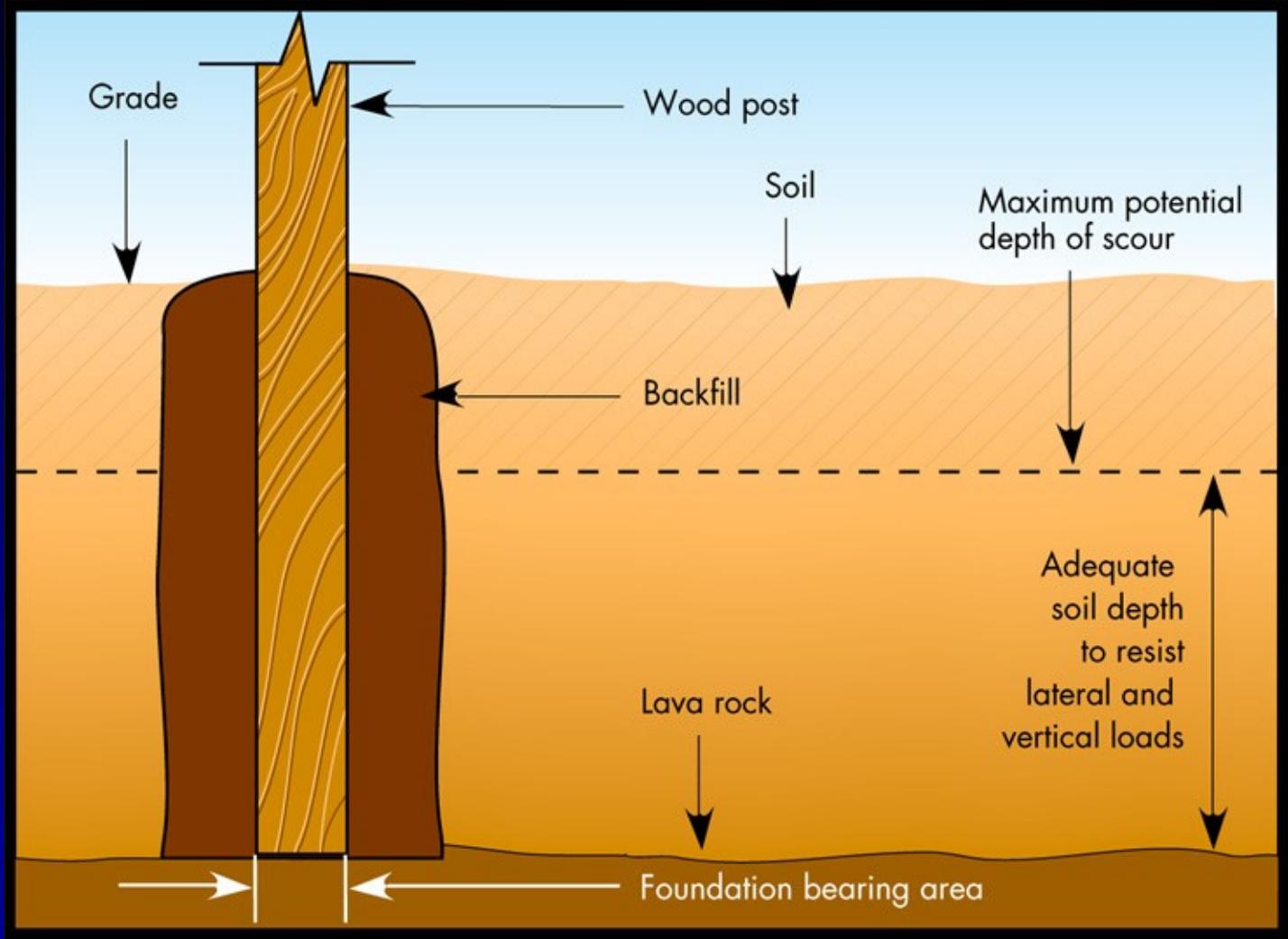


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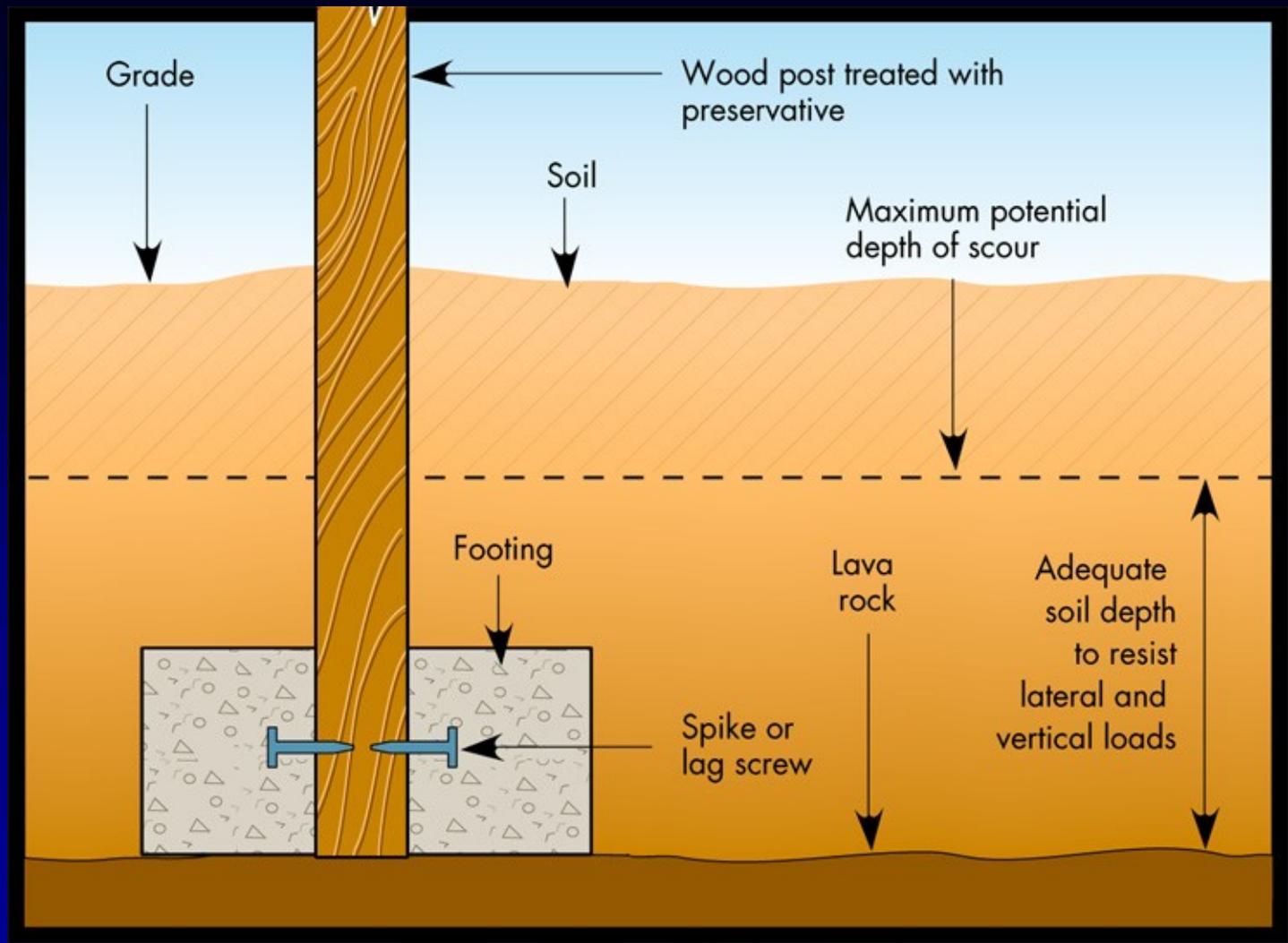


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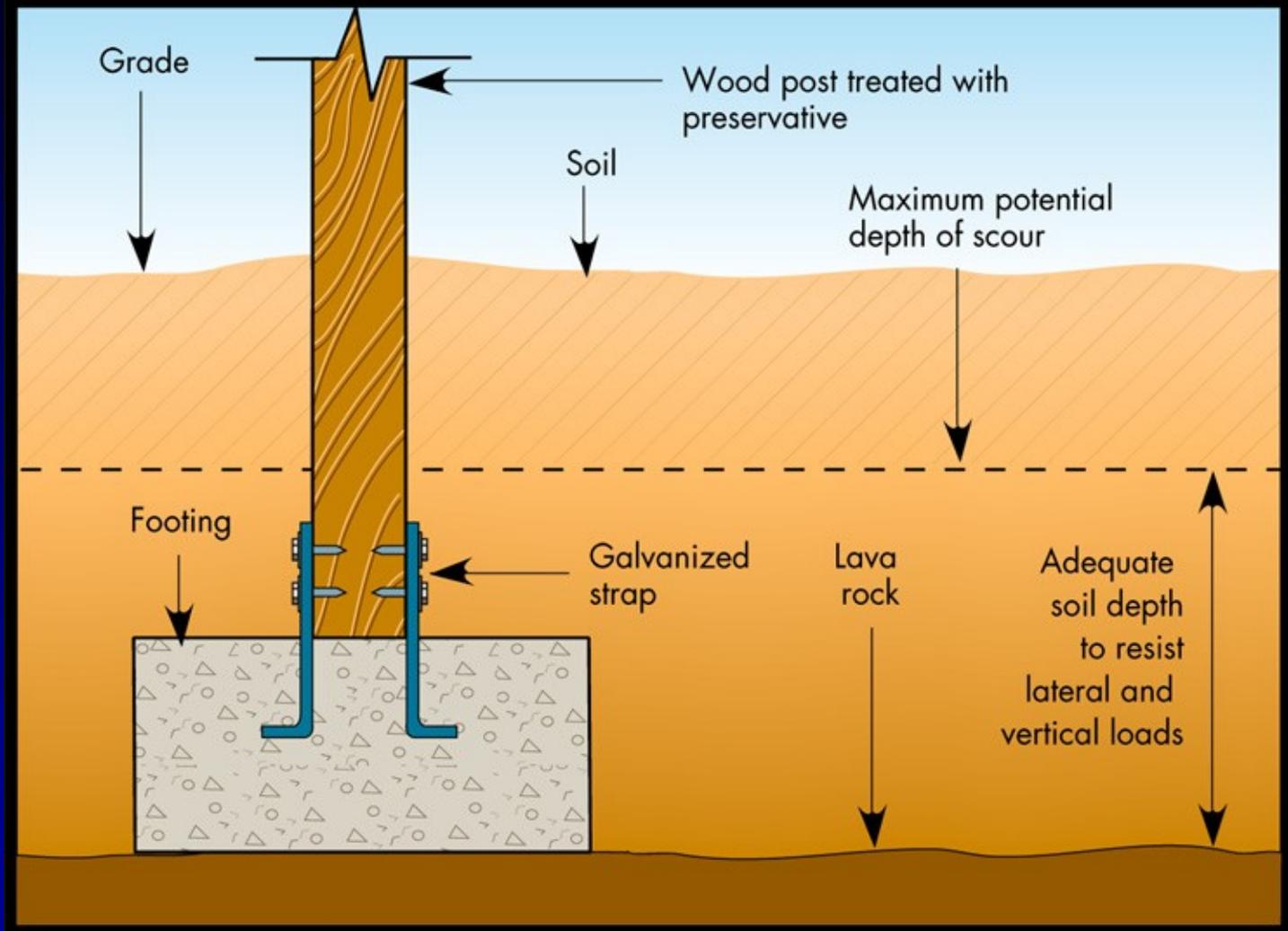


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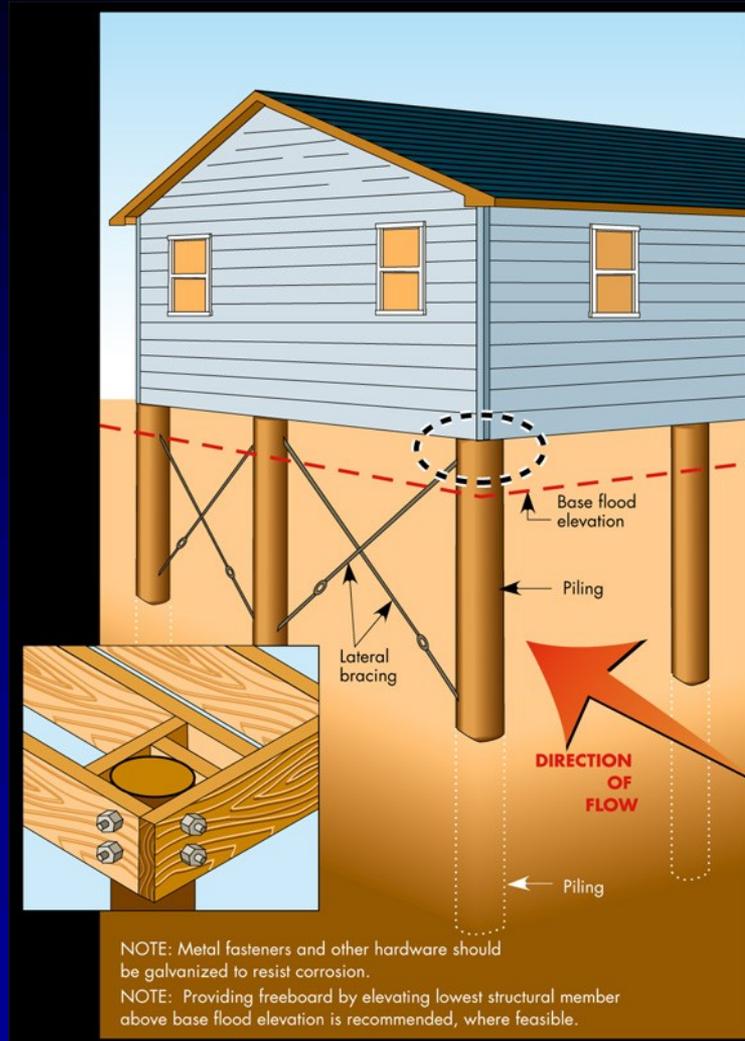


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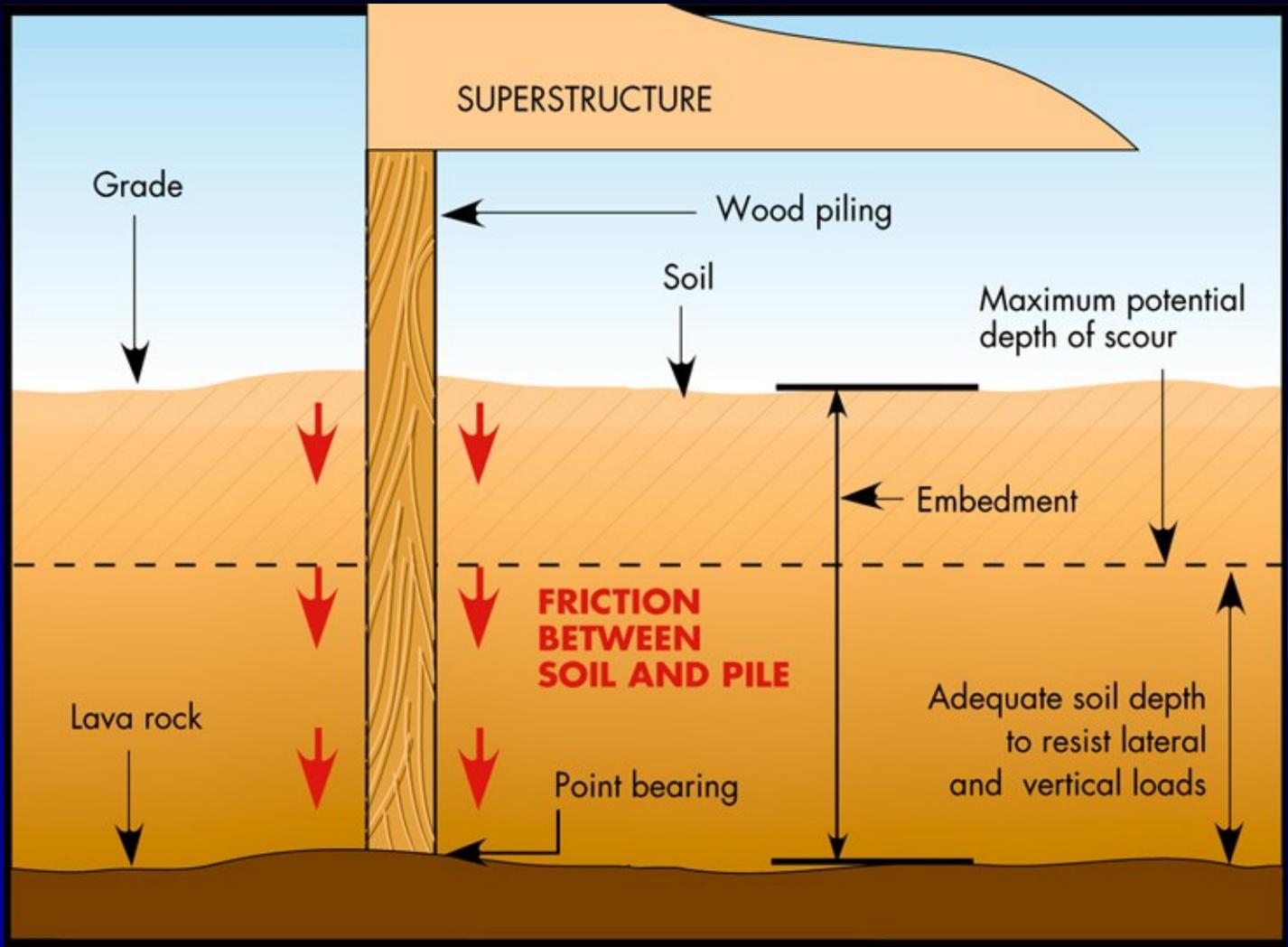


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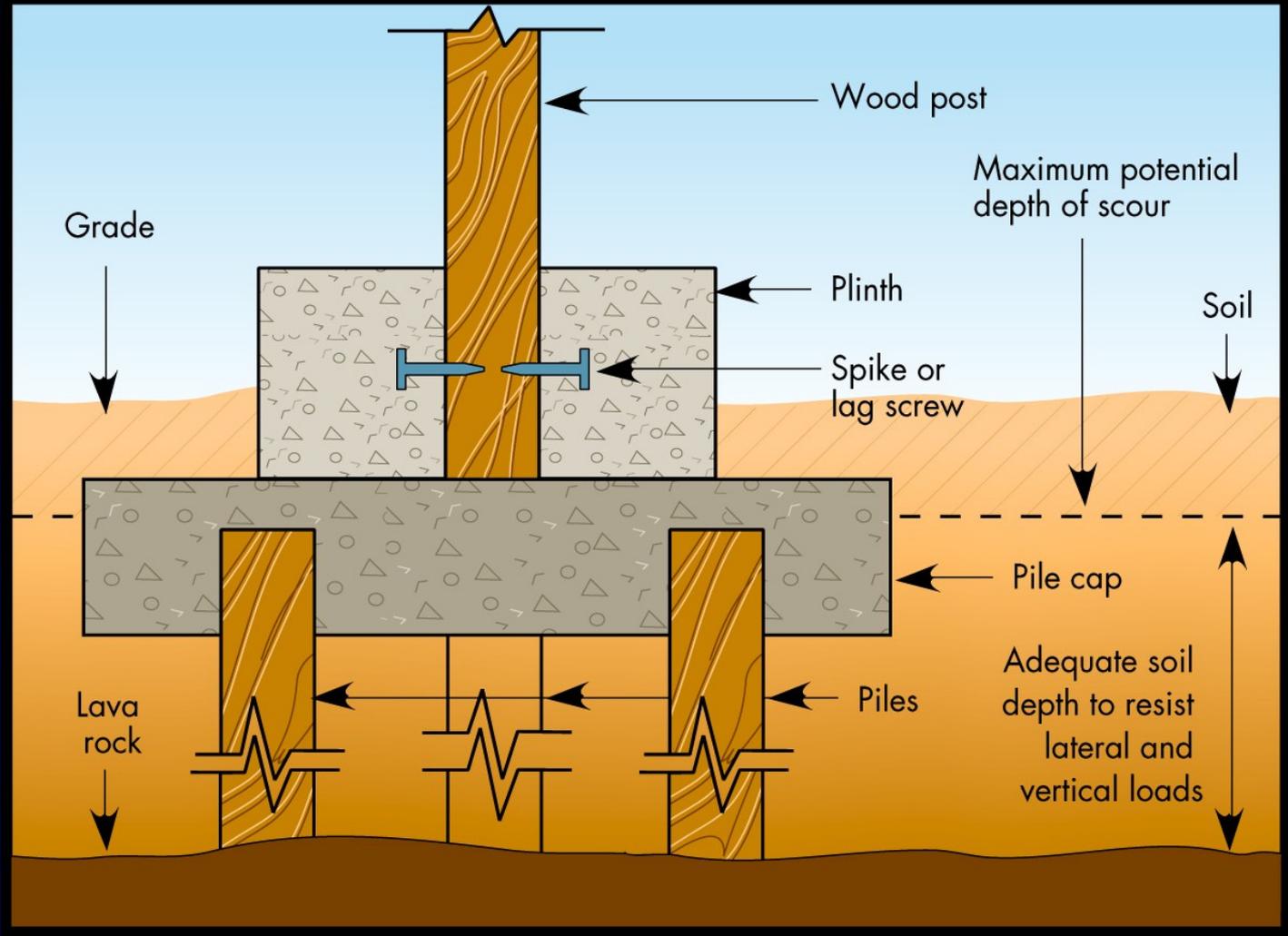


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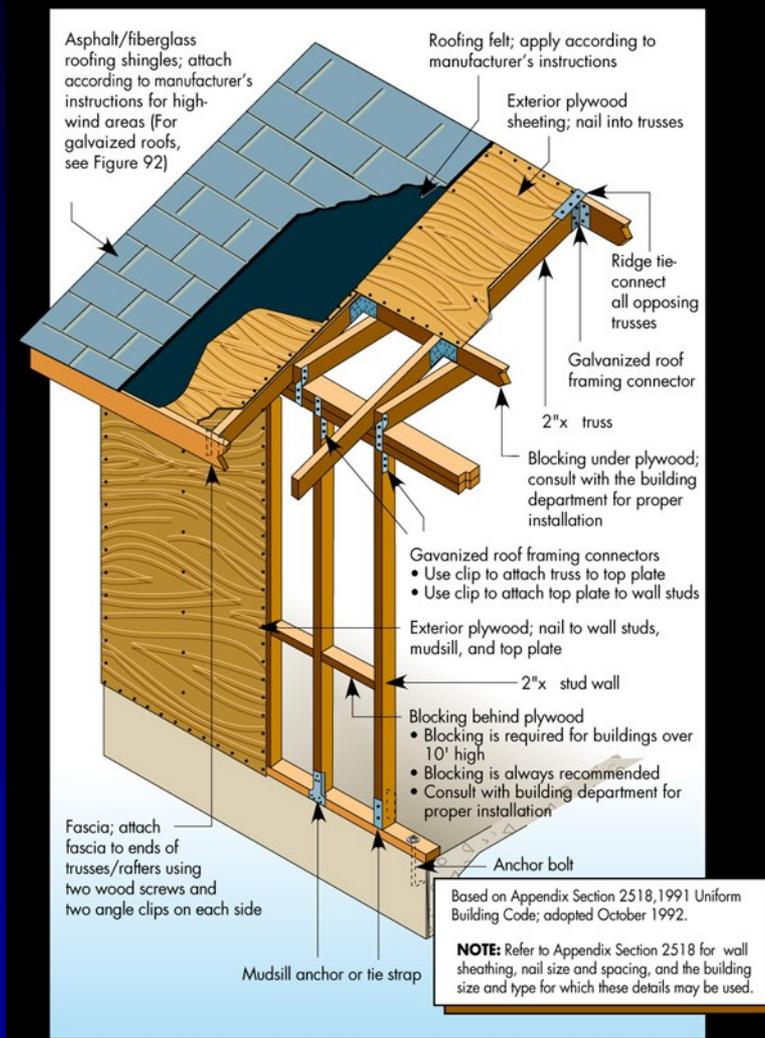


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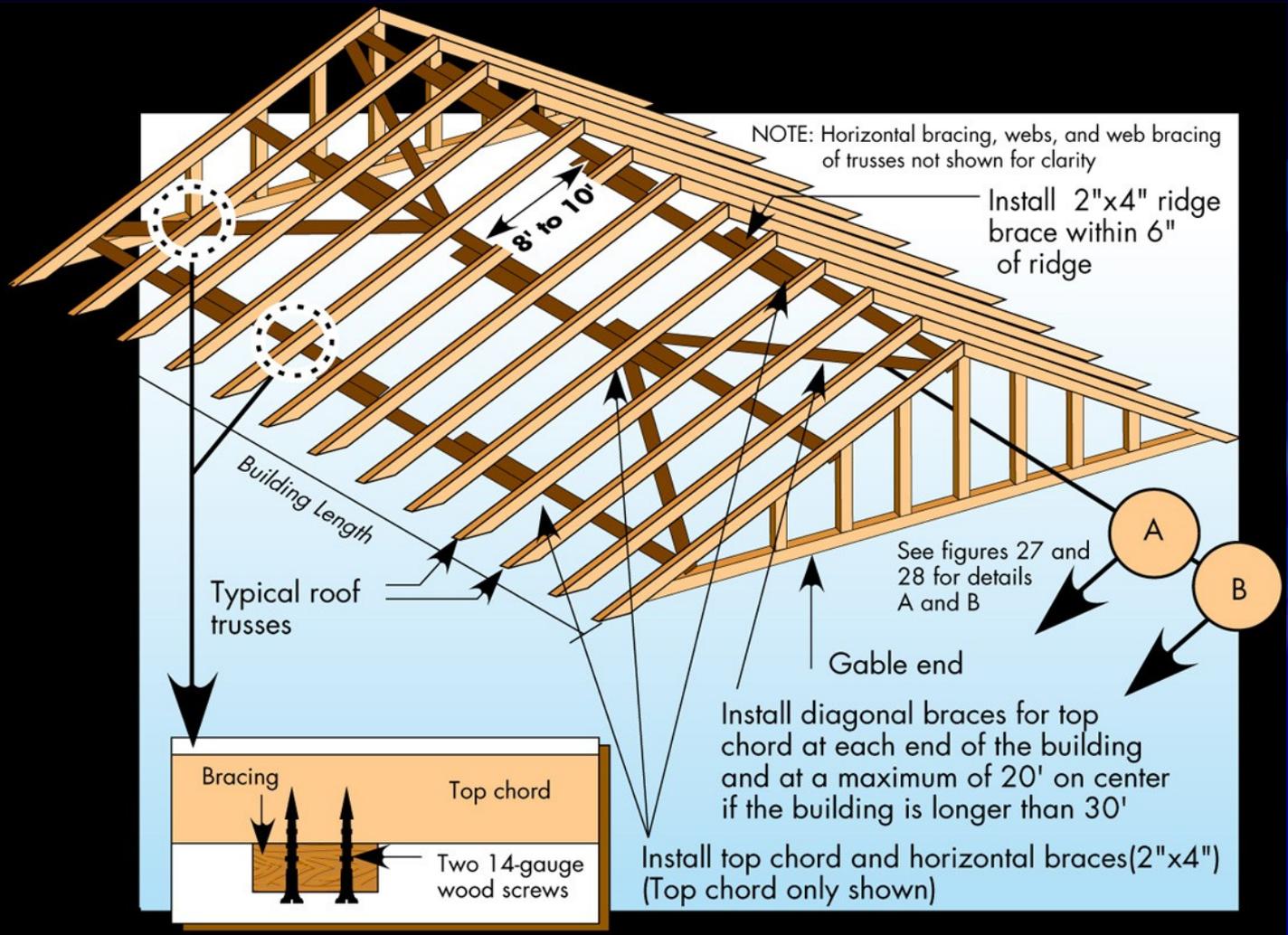


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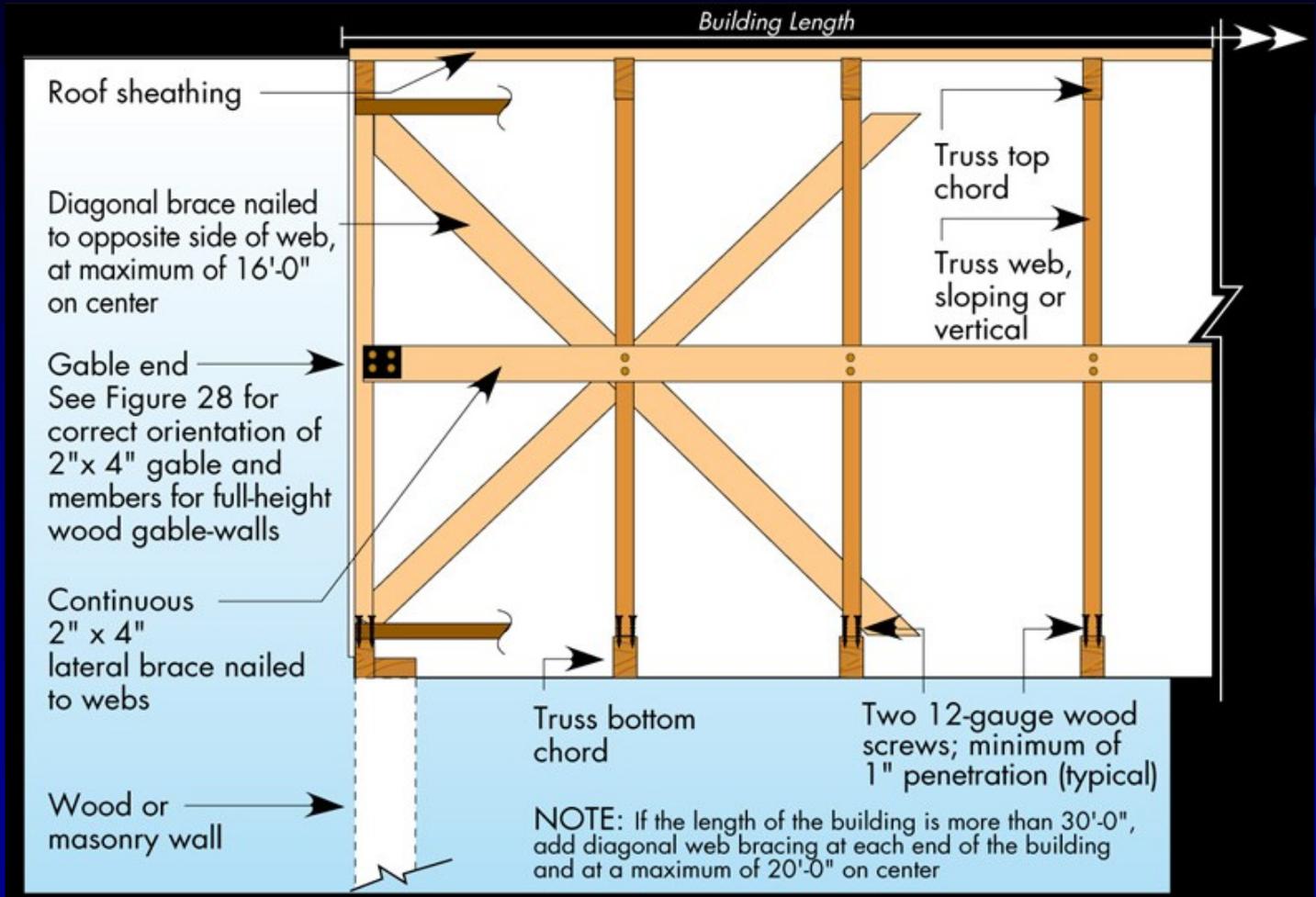


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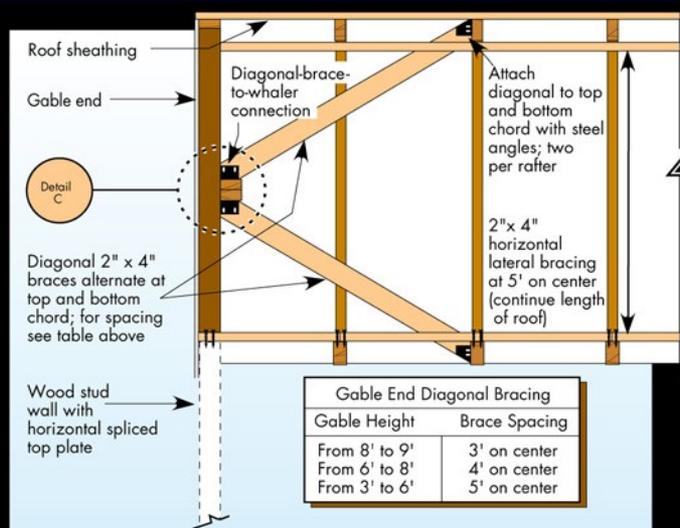


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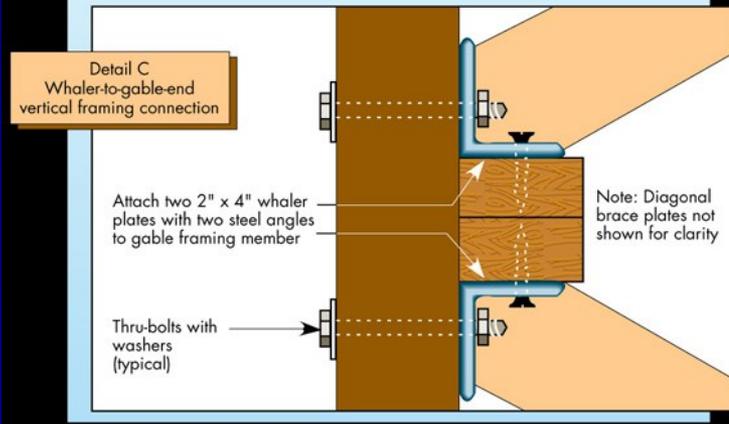




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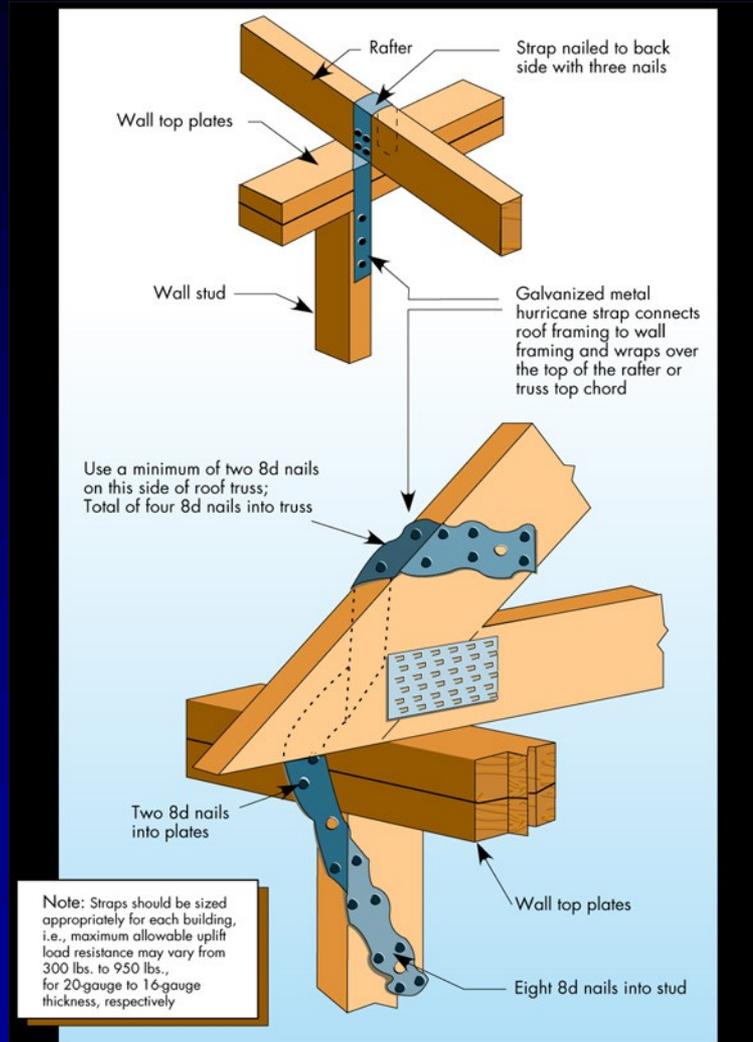


NOTES: Additional bracing not shown for clarity
 All wood screws shall have a minimum of 7D embedment into connecting members
 Recommendations for bracing of gable ends on masonry walls same, except orientation of 2" x 4" gable-end members may be same as shown in Figure 27



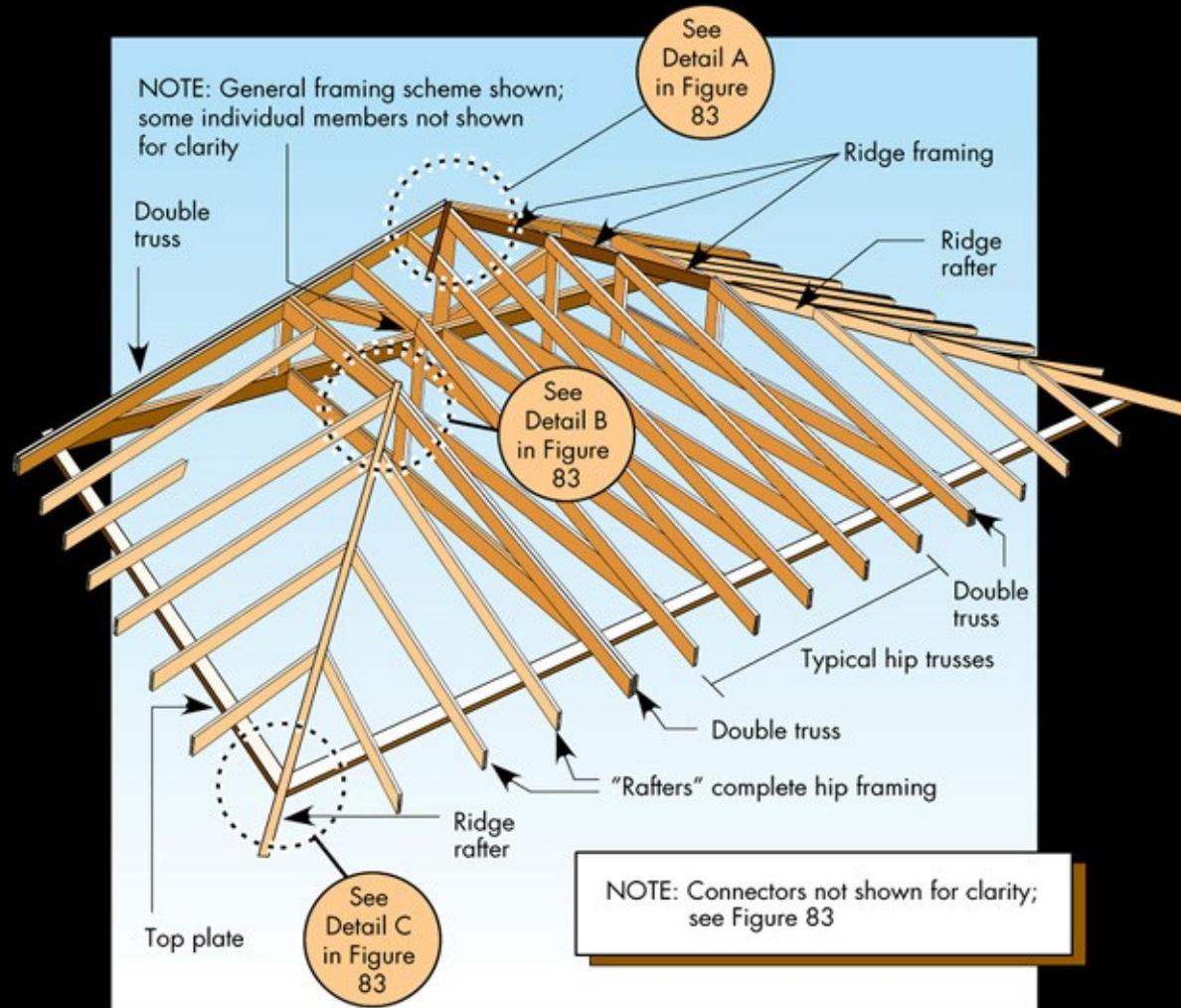


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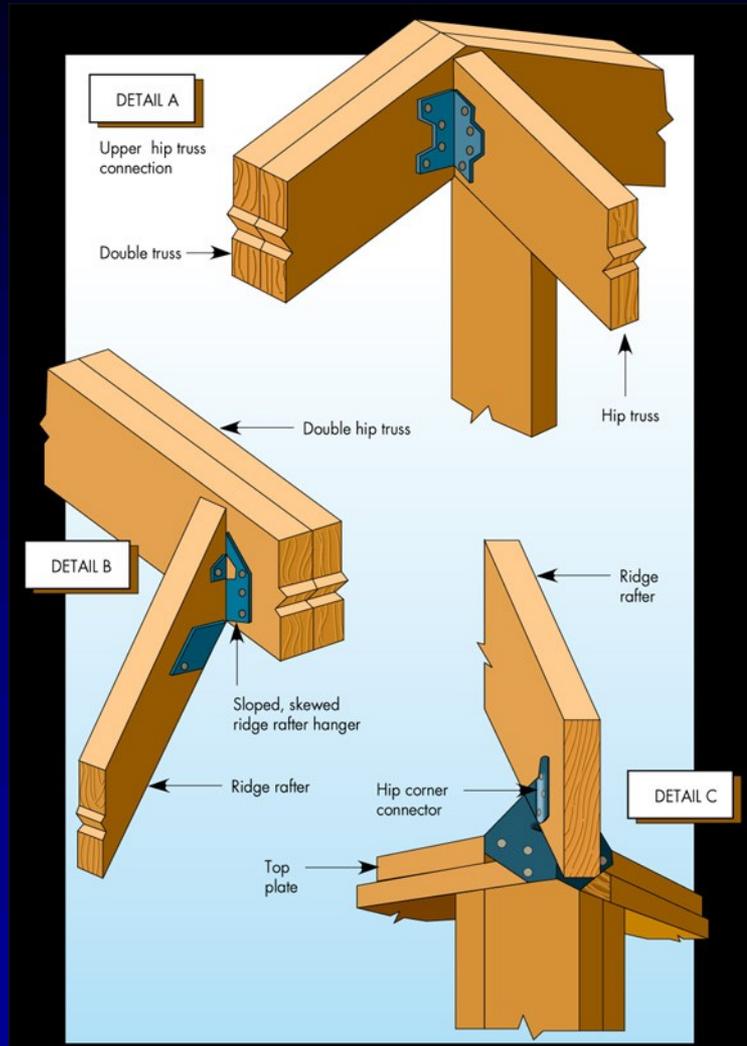


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FEDERAL EMERGENCY MANAGEMENT AGENCY





SOURCE: Structural Engineers Association of Hawaii, *Tips on Improving Wind Resistance for One Story Single Family Dwelling Repairs on Kauai*, October, 1992.

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GENERAL:

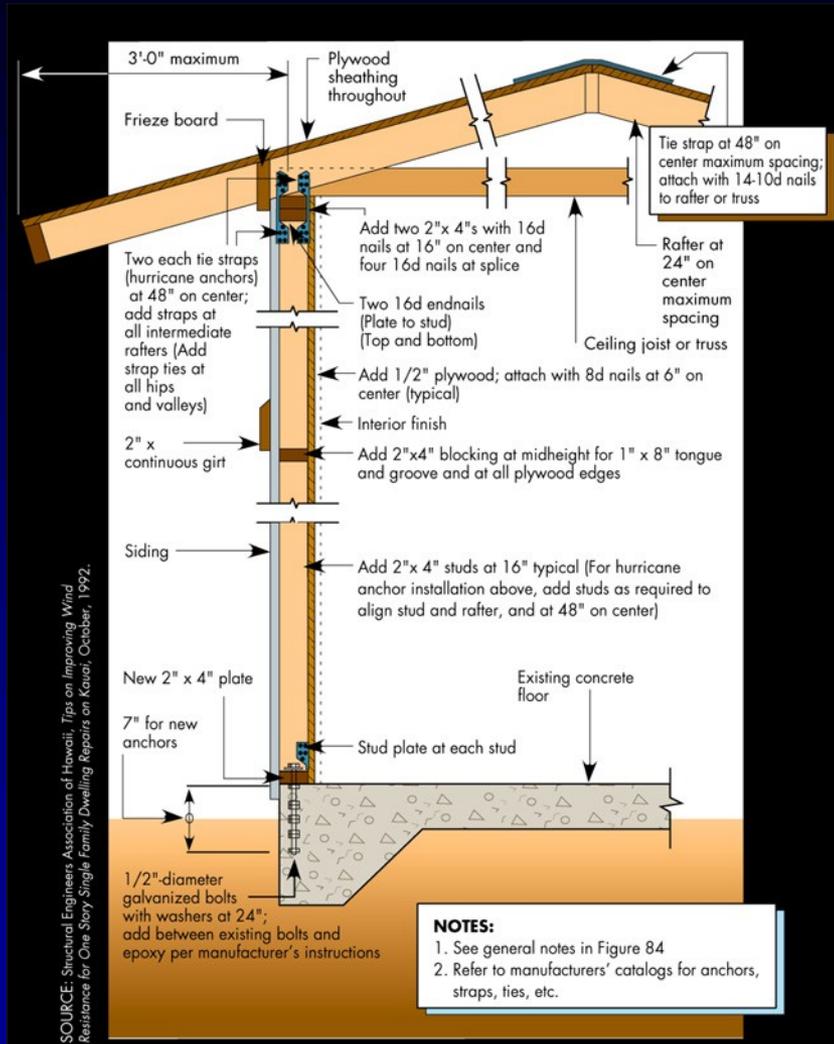
1. All work shall conform to the building code of the County of Kauai.
2. There are many different types of construction and details for existing single-family dwellings. The information and drawings presented are for general informational purposes only to illustrate the concept of the complete load path to resist high winds. The drawings are not complete design details or drawings and shall not be used as such. The information and details provided shall not be used or relied upon for any specific application without independent professional examination and verification of their accuracy, suitability, and applicability.
3. The details are based on the following types of construction:
 - A. Repair work only (not new construction)
 - B. Single-story, single-family dwelling, with floor-to-ceiling height of approximately 8 feet
 - C. Regular-shaped buildings with floor area of approximately 1,200 square feet, constructed on stable ground

MATERIALS:

1. Lumber: Douglas Fir/Larch, preservative treated, S4S, No. 2 Grade or better.
2. Unless noted otherwise, all nailing shall be galvanized common nails and shall conform to Table 25-Q of the 1985 Uniform Building Code.
3. Framing hardware: Galvanized and of adequate strength.
4. Framing, finish, and trim shall be notched for hardware as required to provide snug fit at all joints.
5. Trim and finish details are not shown on framing details and sections.



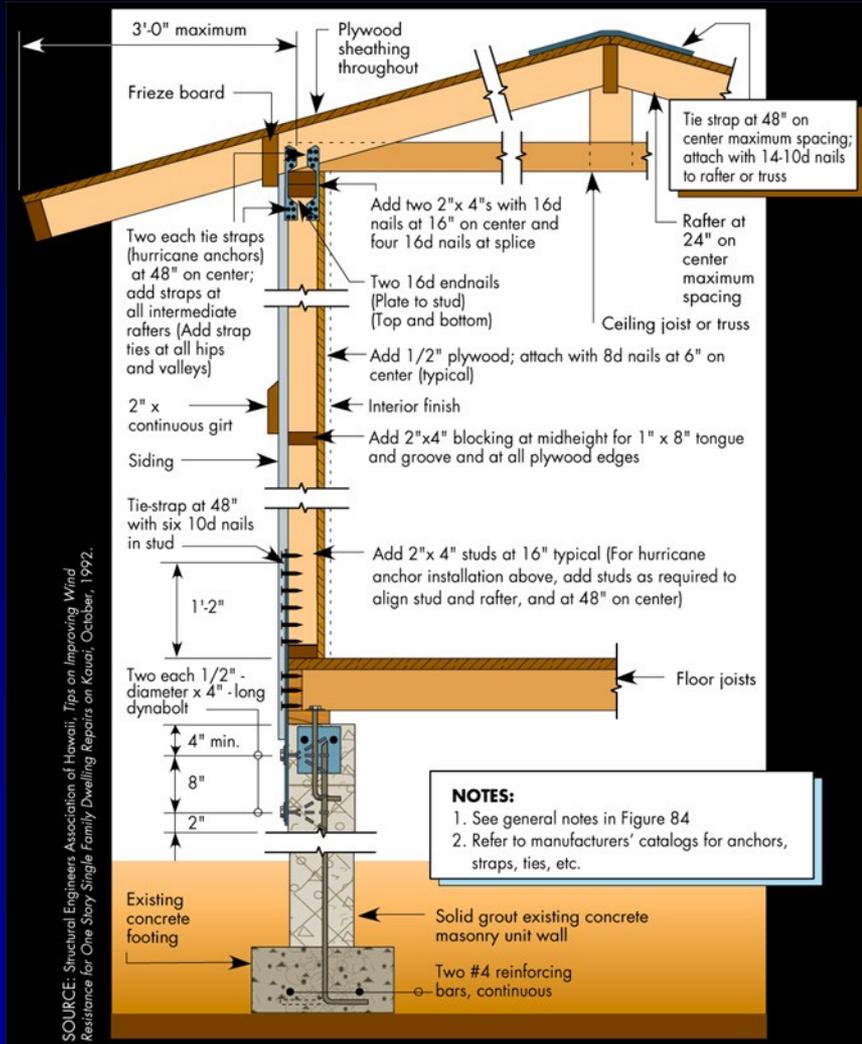
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SOURCE: Structural Engineers Association of Hawaii, *Tips on Improving Wind Resistance for One Story Single Family Dwelling Repairs on Kauai*, October, 1992.



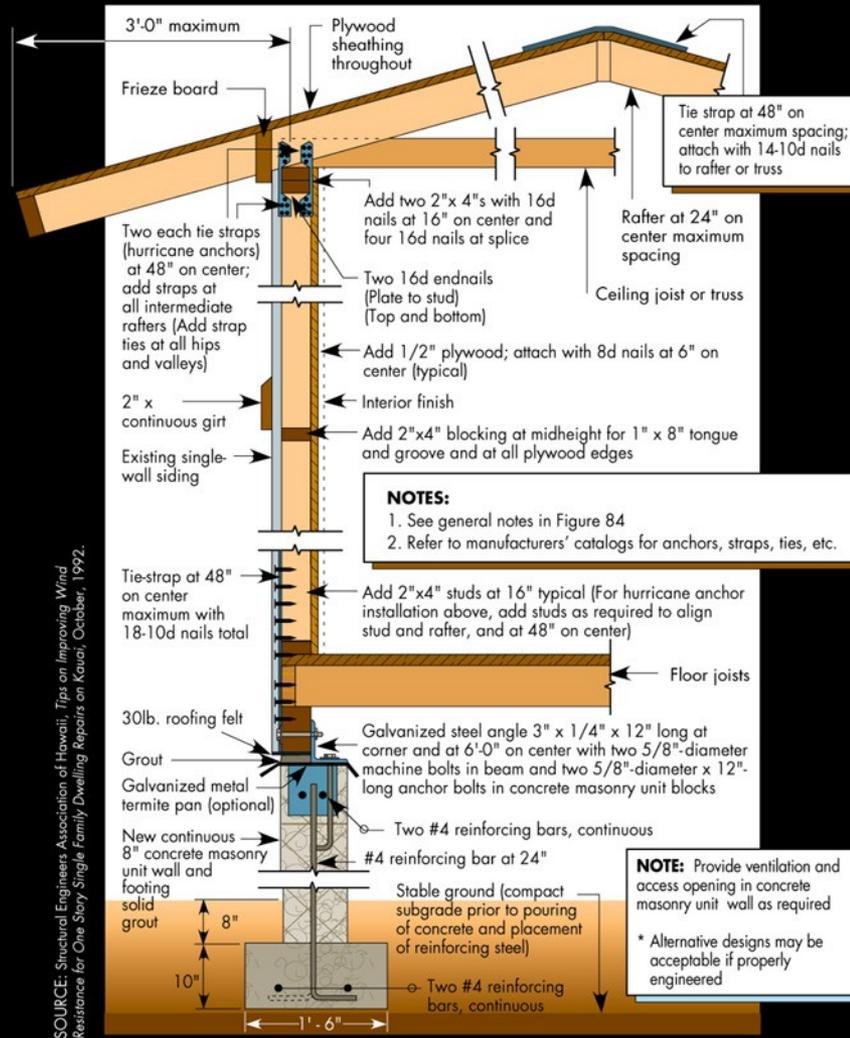
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SOURCE: Structural Engineers Association of Hawaii, *Tips on Improving Wind Resistance for One Story Family Dwelling Repairs on Kauai*, October, 1992.



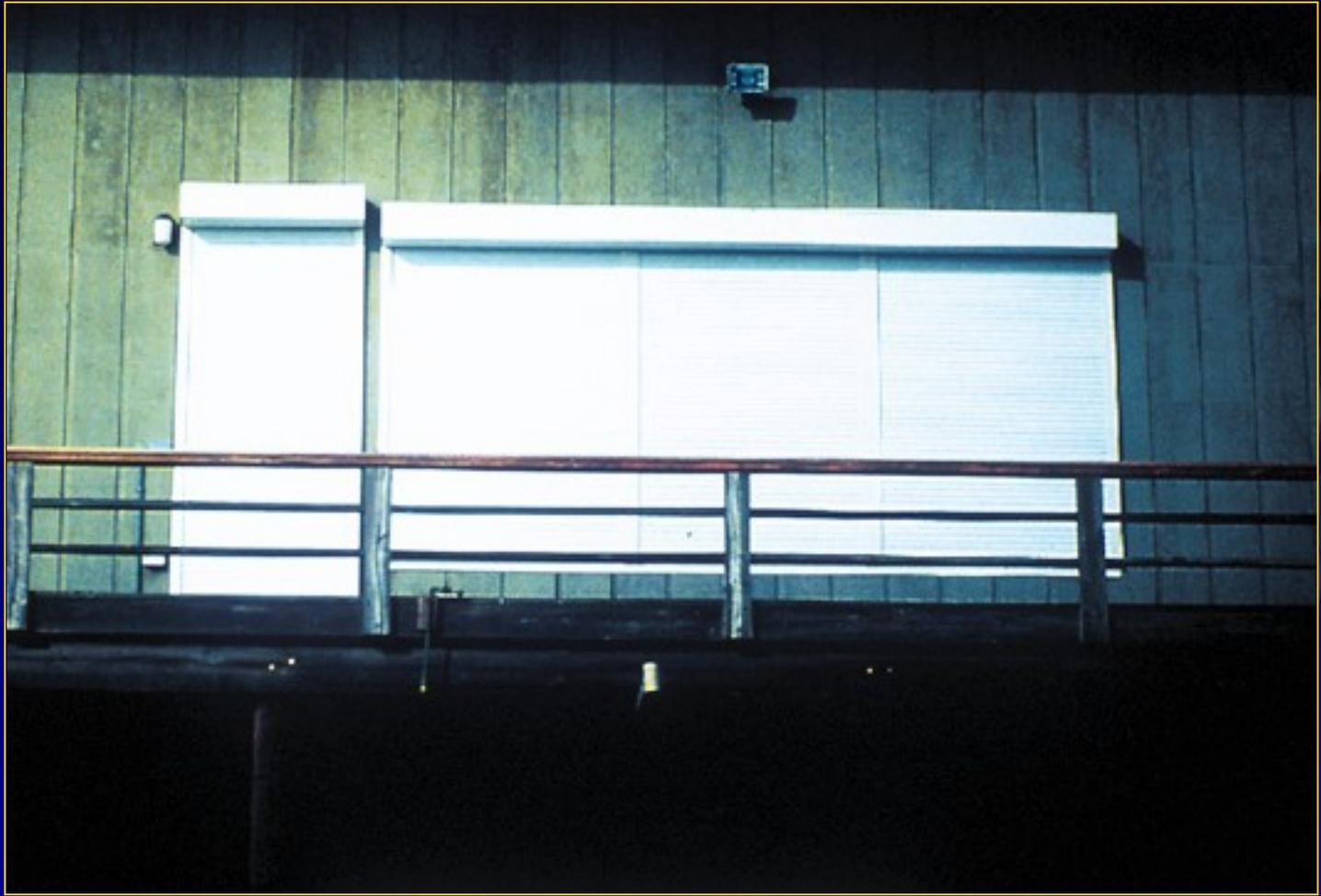
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SOURCE: Structural Engineers Association of Hawaii, *Tips on Improving Wind Resistance for One Story Single Family Dwelling Repairs on Kauai*, October, 1992.



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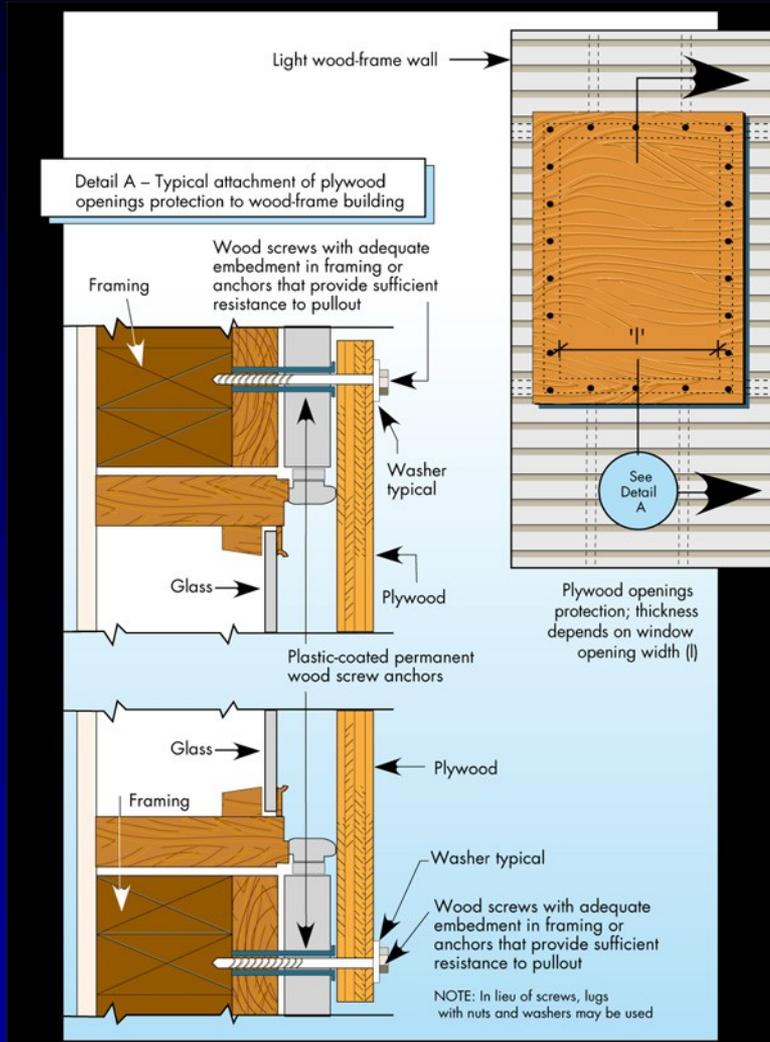
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