

## FOUNDATION REUSE AFTER THE WOOLSEY FIRE

The standard procedure for removal of debris at a property with a severely damaged or destroyed structure is to completely remove and dispose of the foundation. Property owners who opt-in to the State led Office of Emergency Services (OES)/CalRecycle debris removal program will automatically have aboveground portions of their foundations removed. Existing footings, slabs, and foundation systems in fire-destroyed buildings are typically compromised and are not permitted to be re-used. For property owners who enroll in the Local Program for self-directed debris removal, exceptions may be considered on a case-by-case basis.

Intense heat and fire can render a foundation unusable, or impractical for re-use for the following reasons:

1. A fire can generate enough heat to damage and weaken the concrete and steel reinforcement bars in footings, slabs, and footing stem walls. Even though concrete is non-flammable and offers fire protective qualities for preventing the spread of fire, it loses most, if not all of its structural strength characteristics when exposed to extreme heat. Performing compressive tests to confirm that the concrete has retained sufficient strength for reusing can be destructive and is not cost effective.
2. Foundation anchorage hardware (steel bolts and hold-down anchors) are lost or compromised during a fire and cannot be replaced or repaired without expense. Installing replacement anchors in an existing footing is labor intensive and requires special inspection during installation, which can add significant cost. Replacement anchors for hold down hardware must be re-engineered and are difficult and expensive to install in existing concrete footings. It requires special hardware and installation techniques involving high-strength epoxies, careful drilling and inspection of the installation locations, and continuous inspection of the new anchor placement. Continuous inspection is required throughout the entire installation process, and is required to be conducted by inspectors certified by the International Code Council (ICC) or LA City.
3. Plumbing pipes and electrical conduit embedded in the concrete is usually destroyed or heavily damaged during a fire. Repairs and replacement of pipes and conduit in existing foundations involves the removal and replacement of portions of the concrete that encapsulates them, which further compromises the concrete. This process usually involves the saw cutting or jackhammering out those portions of concrete containing pipes and conduit, removing and replacing the damaged pipes and conduit, and pouring the replacement concrete.

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4. Moisture barriers under concrete slabs. The moisture barrier is a thin layer of plastic commonly referred to as “visqueen,” which is typically located under concrete slabs. Moisture barriers are important because they prevent moisture intrusion, which can damage flooring materials, drywall, and other finish materials inside the home. A fire can destroy or damage the moisture barrier beneath the slab. Replacement of the moisture barrier will require that the entire floor slab be removed and replaced.
5. The foundation systems generally do not meet today’s structural design requirements for earthquake safety, and stability of the home during strong winds. This is especially true in cases where the original building was constructed prior to 1974. Current State Codes require that new buildings meet or exceed certain minimum design and construction standards of safety. In most cases, compliance with these standards is difficult or impossible to verify in an existing foundation system because the foundation is below ground and the size, spacing, and location of steel reinforcement steel embedded in the concrete is difficult to determine. In the absence of the original building plans used to construct the original building, the Building Safety plan reviewer typically will not accept an existing fire-damaged foundation for consideration as a viable code-complying alternative to a newly-designed and constructed foundation for supporting a new building.
6. During debris removal operations the ground beneath the foundation is tested to ensure it is free of contaminants and hazardous materials that may have been released into the ground by the building contents during the fire. The sample collection procedure may be destructive when it involves coring of portions of the concrete foundation for access and exploratory drilling into the ground.

Owners of fire affected properties interested in pursuing an exception and retaining their foundation are advised to discuss this issue in detail with the California licensed civil/structural engineer who will be designing their replacement structure. The engineer will need to document field testing, observations, and lab tests used to support their conclusions and recommendations for reuse. The foundation for a replacement structure will need to meet current building code requirements for materials and load capacities. A report of the findings stamped by the licensed professional will be reviewed for approval by the City of Malibu Environmental Sustainability Department, Building and Safety Division.

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