



Concrete Slabs and Foundations Damaged by Fire...

January 19, 2018

Existing footings, slabs, and foundation systems in fire-destroyed buildings are not typically permitted to be re-used.

The effects of intense heat and fire on a foundation system renders the foundation unusable, or impractical for re-use for the following reasons:

1. The ground beneath the foundation must be tested to ensure it is free of contaminants and hazardous materials that may have been released by the building contents during the fire, into the ground. This test must be conducted in accordance with EPA Lab Method 6020 and 7471A. The test is destructive to the floor slab as it involves coring of portions of the concrete foundation for access and exploratory drilling into the ground.
2. A serious house 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 excellent 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 re-using a foundation, is expensive, destructive, and generally not cost effective.
3. Foundation anchorage hardware (steel bolts and hold-down anchors) are typically lost or severely compromised during a serious fire and cannot be replaced or repaired without great 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.

4. 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 jack-hammering out those portions of concrete containing pipes and conduit, removing and replacing the damaged pipes and conduit, and pouring the replacement concrete.
5. 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 strong 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.
6. The foundation system usually does 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 Ventura County Building and Safety office 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.

There are a number of tests and standards for evaluating the compressive strength of the concrete or masonry, including ASTM C39 and ASTM C140, which involve taking core samples from the foundation and doing a compressive test in a certified lab. Homeowners interested in pursuing an exception and retaining their foundation are advised to discuss this issue in detail with the professional engineer who will be designing their replacement structure.