RETROFIT GRANTS PROGRAM
INFORMATION FOR OWNERS OF

CONCRETE OR REINFORCED MASONRY BUILDINGS

What types of concrete or reinforced masonry buildings are eligible for grants?

Based on observations from past earthquakes around the world, some types of concrete and reinforced masonry buildings are considered to be vulnerable to significant damage or collapse in a significant earthquake, depending on their structural characteristics. These buildings can be generally grouped in two categories:

» *"Tilt-up" and other Rigid Wall – Flexible Diaphragm (RWFD) buildings*:
- These are typically one or two story commercial buildings with reinforced concrete or reinforced masonry (brick or concrete block) walls. They have "flexible" roof diaphragms that consist of wood or steel beams, trusses, or rafters with wood sheathing or metal decking above. They may also have flexible diaphragms at intermediate floor levels.
- These buildings include many warehouses, manufacturing facilities, large retail stores, and other similar structures. Most heavily concentrated in West Berkeley, they are also frequently found along commercial corridors throughout the city.
- A diaphragm is a structural element that transmits lateral loads to the vertical resisting elements of a structure, such as shear walls or frames.
- The most common deficiency is an inadequate connection between the rigid walls and the roof (and floors) leading walls to pull away and collapse during ground shaking. Other structural deficiencies are also addressed in the program's technical guidelines.
- A "tilt-up" building is a specific type of building with precast concrete walls that is distinguished by its method of construction. A building does not need to be a true tilt-up building to participate in the program.
- Buildings designed under codes that predated the 1998 California Building Code are of primary concern.

» *Concrete buildings*:
- These buildings (or portions of buildings) may have concrete walls, concrete frames, or concrete columns, and frequently also have concrete roofs and/or intermediate floors.
- In older concrete buildings, the extent of reinforcement provided in the original design can be inadequate compared to today's standards. The most vulnerable buildings contain elements like columns, wall piers, and joints of beams and slabs that can fail in a sudden manner and are sometimes called "non-ductile" (i.e. brittle) concrete buildings.
- Retrofits of these buildings can vary widely in terms of scope, level of difficulty and expense.

Partial collapse of a tilt-up building with insufficient roof-wall connections during 2010 Chile earthquake

A tilt-up building is one type of rigid wall-flexible diaphragm building

Are there other grant eligibility requirements for concrete or reinforced masonry buildings?

Single family dwellings and duplexes are not eligible. Buildings used solely for storage and not for occupancy are not eligible. Eligible buildings are further defined in the program's technical guidelines.

Is my building seismically vulnerable?

Not necessarily. Your receipt of this fact sheet does not indicate that your building is seismically vulnerable. If you received this fact sheet, it is likely because you are the owner of a building whose structural system appears to consist (in whole or in part) of concrete or reinforced masonry. Not all buildings of this type require a retrofit and some may have already been retrofitted. A qualified engineer or architect would need to evaluate your building to determine the need for a seismic retrofit.

I already retrofitted my building. Why are you mailing me?

We want to make sure that building owners are aware of this new grant opportunity. In some cases, buildings that were retrofitted in the past could still benefit from additional seismic improvements. Previous seismic retrofits may have only included part of the building or addressed only the most hazardous elements of the structure. For example, a portion of the building may have been retrofitted as part of the City's Unreinforced Masonry Building program, but other parts of the building that weren't required to be retrofitted at the time might not have been touched.

I received notices many years ago about the Unreinforced Masonry Building program. I hired an engineer to remove my property from the inventory. Why are you mailing me again?

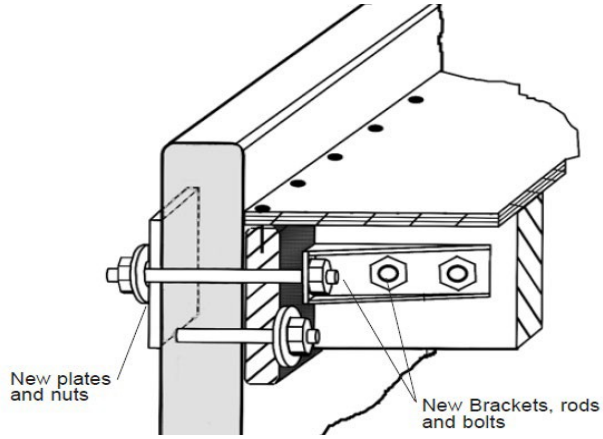
This is a voluntary grant program, funded by a grant the City recently received from FEMA. The City of Berkeley's Seismic Hazard Mitigation Program for Unreinforced Masonry Buildings was a mandatory retrofit program, established by ordinance in 1991. Many buildings were initially placed on an inventory of potentially hazardous Unreinforced Masonry Buildings and were later removed from the list, either because a building was constructed after 1955 (and was thus presumed to have adequate reinforcement in the walls) or because the owner's engineer documented that the building met the minimum structural requirements of Berkeley Municipal Code (BMC) Chapter 19.38. Other buildings were retrofitted and removed from the inventory, but those retrofits may not have addressed the entire structure. Each of these types of buildings could be eligible for funding for seismic retrofit work under the Retrofit Grants program.

The Pyne Gould Corporation Building in Christchurch, New Zealand was a concrete structure designed in 1963 that collapsed following a 6.3 magnitude earthquake in 2011.

What type of seismic retrofit is eligible for a grant?

A qualified engineer or architect would need to evaluate your building to determine the need for a seismic retrofit. To be eligible for a grant under this program, the retrofit must meet or exceed the requirements found in one of the following two sets of City of Berkeley guidelines available on the program website:

- Retrofit Grants Guidelines for Retrofit of Rigid Wall – Flexible Diaphragm (RWFD) Buildings.
- Retrofit Grants Guidelines for Retrofit of Concrete Buildings.



A typical retrofit of a rigid wall-flexible diaphragm building may include new Wall Anchors to strengthen the roof-to-wall and roof-to-floor connections.

What do I need to do to pass FEMA's historic preservation review?

As recipients of federal funds, all projects will also be required to undergo a historic preservation review conducted by the City and FEMA prior to the start of construction. Proposed retrofits will typically pass FEMA's historic preservation review if the seismic retrofit work is limited to the interior of the building or if work that impacts exterior walls is restored to its original condition so that it does not negatively affect the façade. In cases where portions of the completed seismic retrofit will be visible from the exterior, or where a building has local landmark status, or where FEMA determines the building may be eligible for listing in the National Register of Historic Places, the retrofit design may require additional review by the State Historic Preservation Officer (SHPO) to ensure that the project does not negatively impact the historic character of the building.

If I perform a seismic retrofit, will I need to do other additional work?

You might be required to install automatic gas shut-off valves and repair or replace your private sewer lateral. In cases where buildings have commercial space that will be impacted by the seismic work and that space is out of compliance with state and federal accessibility requirements, accessibility improvements may be required. For more information, see www.cityofberkeley.info/Triggers/.

How can I find more information about the Retrofit Grants program?

Review the program rules and application instructions at www.cityofberkeley.info/retrofitgrants/. Contact us at retrofitgrants@cityofberkeley.info or by phone at (510) 981-7475.

In a poorly reinforced concrete column, seemingly durable concrete may break during an earthquake and the column may no longer support the weight of the building above.