



## WHAT EVERY SEISMIC RETROFIT CONTRACTOR SHOULD KNOW (AND WHY IT MATTERS FOR YOUR BUILDING)

Strengthening a building to withstand earthquakes requires specialized knowledge and experience. It's about understanding how buildings behave during earthquakes and making informed choices that enhance safety, reduce costs, and avoid unnecessary construction.

Not every general contractor has this expertise. Many can follow a set of engineering plans but may not recognize why specific reinforcements are necessary—or when there are better, more cost-effective solutions. Without that understanding, building owners face increased costs, construction delays, and, most importantly, greater risk during a future earthquake.

This guide explains what every seismic retrofit contractor should know—and why it matters for your building's safety, compliance, and long-term value.

### WHY CONTRACTOR EXPERIENCE MATTERS

A seismic retrofit is only as effective as the contractor performing the work. It takes more than construction skills to strengthen a building properly—it requires an understanding of how to apply engineering details in real-world conditions and anticipate the challenges unique to seismic retrofitting.

That's where Saunders Seismic stands apart. Since 1979, we've been dedicated to performing [seismic retrofits](#) and [structural upgrades](#) across commercial, industrial, and multi-family sectors. We deliver value by aligning engineering intent with constructability and code compliance.

While many contractors may handle a range of general construction projects, we bring over four decades of focused, field-tested seismic retrofit experience to every job. That experience matters. With more than 46 years in this highly specialized field, we've seen it all—and we know how to avoid the most common missteps that cost owners time, money, and safety.

At Saunders Seismic, we collaborate closely with engineers and clients to review retrofit plans where appropriate, improving both cost efficiency and safety through practical, field-informed recommendations.



## FIVE COSTLY RETROFIT MISTAKES (AND HOW TO AVOID THEM)

Over the years, we've seen common mistakes that increase costs, delay projects, or leave buildings vulnerable despite the investment. These examples highlight some of the most frequent missteps—and how attention to detail and field expertise can make all the difference.

### 1. OVERDESIGNED PLANS

Engineers sometimes include conservative details to ensure code compliance. These can often be revised safely with field-proven alternatives. We've helped clients save thousands by removing unnecessary reinforcements—without compromising safety or approvals.

### 2. MISINTERPRETING THE CODE

One client brought us a permitted plan that required parapet bracing. We noticed the parapet was wood and didn't require reinforcement under code. We worked with the city to remove it, saving the client \$140,000 (*even the engineer did not catch this*).

### 3. IGNORING STRUCTURAL GEOMETRY

Long narrow buildings (length > 2x width) may need additional lateral resistance. Spotting this early helps prevent last-minute additions like moment frames or shear walls.

### 4. UNNECESSARY ROOF REPLACEMENT

When roof diaphragm upgrades are called for, a full re-roof isn't always required. We often use framing hardware beneath the roof to meet requirements while preserving the existing roofing.

### 5. POOR FRAME PLACEMENT

Moment frames should never block operations. We've seen plans that placed frames in front of loading docks. We worked with the engineer to relocate them, preserving function and code compliance.



## UNDERSTANDING LOAD PATHS

Seismic forces flow through a structure from roof to foundation. A continuous load path ensures those forces move safely through the building. If the path is interrupted, localized failures can cause partial or total collapse.

### **A strong retrofit:**

- Creates a continuous connection from the roof to the foundation
- Connects diaphragms, shear walls, and structural components
- Reinforces weak points and transfers forces effectively

### **Alternative load path solutions:**

- Exterior plates with through bolts (when epoxy bolts are impractical)
- Fiber-reinforced polymer (FRP) to add strength to walls and columns without bulk

### **Common mistakes:**

- Retrofitting only one section of a building, such as a tenant space, without addressing the entire structure. This can worsen seismic performance by causing separate movement between retrofitted and non-retrofitted areas.
- Failing to account for how floors, walls, and roofs share forces

**Always ask:** *How does this plan maintain a continuous load path?*

## ROOF DIAPHRAGM REINFORCEMENT

The roof diaphragm distributes earthquake forces across the structure. If it's weak or disconnected, the building is at serious risk of failure.

### **Effective reinforcement methods include:**

- Installing roof-to-wall anchors
- Adding continuity ties
- Strengthening re-entrant corners where wall offsets exceed 15%, creating vulnerable areas outside the main structural lines



**Advanced reinforcements may include:**

- Additional plywood nailing or overlay
- New shear walls or footings
- Steel frame systems where needed

**Alternate Techniques:**

- Metal strap reinforcement to supplement retrofitting from below
- High-load nailing patterns

**Common Mistakes:**

- Insufficient fasteners at panel edges
- Incorrect nail size or spacing
- Missing continuity ties to strengthen the diaphragm

## LATERAL FORCE-RESISTING SYSTEMS

These systems prevent the building from swaying or collapsing sideways during a quake.

**Best practices include:**

- Installing shear walls tied to strong foundations
- Using moment-resisting frames with proper bolted or welded connections
- Avoiding placement in operational zones

**Alternative Solutions:**

- Buckling-restrained braces (BRBs) for energy dissipation
- Using external dampers for force reduction without major modifications to the existing structure

**Common Mistakes:**

- Adding shear walls without floor/roof connection
- Performing poor-quality welding or bolt installation
- Using braced frames in high-traffic areas



## COST VS. EFFECTIVENESS OF DIFFERENT SEISMIC RETROFITS

Not all retrofits provide the same level of protection per dollar spent. The effectiveness of a retrofit depends on building type, existing weaknesses, and seismic vulnerabilities.

Property owners should focus on solutions that offer the most structural resilience relative to their investment.

### BEST-VALUE SEISMIC RETROFITS

Certain retrofit projects provide a high return on investment by addressing the most critical structural weaknesses while keeping costs manageable. These include:

- Strengthening **soft-story apartment buildings** to reduce collapse risk and ensure code compliance
- Reinforcing **tilt-up industrial and commercial structures** to prevent concrete panel detachment and improve lateral stability

### MOST CHALLENGING RETROFITTING PROJECTS

Some structures require more extensive and expensive reinforcement but still pose a higher seismic risk due to their materials and construction methods. These include:

- Retrofitting **unreinforced masonry buildings (URM)**, which need significant strengthening but may still perform poorly in large earthquakes
- Strengthening **non-ductile concrete buildings**, which involve high-cost retrofits but offer limited performance improvements due to brittle materials
- Reinforcing **hollow clay tile structures**, which are weak under lateral loads and complex to retrofit effectively. *This is one of the worst materials found in buildings, as they are brittle and don't possess much strength.*

Regardless of difficulty, high-risk buildings should be prioritized for seismic strengthening to prevent business interruption, financial loss, and life safety risks.

Owners should consult an experienced seismic retrofit contractor to determine the best strategy for their specific property.



## **INSURANCE, LENDER REQUIREMENTS, AND RISK MANAGEMENT**

A seismic retrofit can significantly impact a building's insurance costs, financing eligibility, and overall risk exposure.

To maximize financial and safety benefits, contractors must ensure retrofits align with industry requirements and expectations.

### **A well-documented seismic upgrade:**

- Meets engineering standards at the SUL/SEL engineering level and requires city and state seismic codes to ensure compliance
- Provides detailed records of reinforcements (approved plans and sign-offs), including load path continuity and lateral force resistance, for insurance and financing approvals
- Improves Scenario Expected Loss (SEL) and Scenario Upper Loss (SUL – what most lenders use) scores to meet lender risk thresholds
- Supports seismic evaluation reports that confirm the retrofit meets engineer recommendations, code and lender requirements
- Helps owners secure lower interest rates and better financing terms for their building
- May lower earthquake insurance premiums by reducing structural risk

### **Common mistakes include:**

- Failing to provide complete documentation, causing delays in insurance approvals or financing
- Neglecting lender risk thresholds, making it harder to secure loans
- Overlooking long-term financial benefits such as reduced insurance premiums and increased property value

Property owners should confirm that their contractor provides proper documentation to meet all compliance and financing needs.

## **WHAT TO LOOK FOR IN A SEISMIC RETROFIT CONTRACTOR**

The success of a seismic retrofit depends on the expertise of the contractor performing the work. A poorly executed retrofit can leave a building vulnerable to earthquake damage, code violations, and financial risk.



**To ensure the job is done correctly, a qualified seismic retrofit contractor should:**

- Have extensive experience in seismic retrofitting, not just general construction (GCs)
- Understand key principles such as load path continuity, lateral force resistance, and diaphragm strengthening
- Provide engineered retrofit plans that improve SEL and SUL ratings
- Ensure compliance with lender and insurance requirements to avoid financing issues
- Maintain accurate documentation of all reinforcements and structural modifications

**Common mistakes include:**

- Hiring a contractor without verifying their experience in seismic retrofits
- Assuming that general contractors have the necessary expertise in earthquake-resistant design
- Overlooking engineering review, leading to potential compliance failures and cost overruns that should have been avoided before project completion.

Property owners should thoroughly vet their contractor before starting a seismic retrofit project. If a contractor cannot clearly explain how their retrofit improves building resilience at the most effective cost, they may not be qualified for the job.

## **CHOOSING A TRUSTED SEISMIC RETROFIT EXPERT**

Seismic retrofitting requires specialized expertise in knowing the principles of structural engineering, compliance with insurance and lender requirements, and advanced construction techniques. Hiring the wrong contractor can lead to unsafe conditions, financial loss, and failed inspections.

**Saunders Seismic** specializes in seismic retrofits, structural repairs, and reinforcements for commercial, industrial, and multi-family buildings. Our team ensures every retrofit meets engineering, lender, and insurance standards for maximum safety and value.

[Contact us today](#) to learn more about how we support businesses in making the right seismic retrofit decisions.