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STRUCTURAL REPAIRS FOR COMMERCIAL AND INDUSTRIAL BUILDINGS

Structural repairs are essential for maintaining the integrity, safety, and longevity of commercial and industrial buildings. Over time, factors such as earthquakes, roof condensation, overloaded beams, poor original design, and internal environmental conditions can compromise critical structural components. Repairs may involve reinforcing, replacing, or reconfiguring damaged elements to restore structural stability.

All types of buildings—including concrete tilt-up, unreinforced masonry (URM), and wood-framed structures—may require repairs to address roof diaphragms, glulam beams (GLBs), purlins, sub-purlins, columns, and walls**.** Proper structural repairs prevent further damage, reduce liability, and improve building performance under load conditions. Steel buildings may require modifications when seismic upgrades are necessary or when structural loads are altered.

COMMON STRUCTURAL REPAIRS

GLUE LAMINATED BEAM (GLB) REPAIRS

Glulam beams (GLBs) are frequently used in commercial construction but can weaken due to moisture exposure, excessive loads, temperature, age, or improper installation**.** Repair methods include:

- **Epoxy Injection:** Filling cracks with high-strength epoxy to restore structural integrity. In some cases, steel rods are inserted through the beam and secured with epoxy after shoring the beam for stabilization.
- **High-Tension Cables or Steel Rods:** Installing high-tension cables to reinforce weakened beams. Steel rods are sometimes used but may be less effective in certain applications.
- **Load Redistribution:** Adjusting support systems to redistribute loads, reducing stress on the beam and extending its lifespan.

PURLIN AND SUB-PURLIN REPAIRS

Purlins and sub-purlins support the roof deck and distribute loads**.** Damage often results from roof overload due to heavy equipment or moisture accumulation**.** Repairs may involve:

- **Reinforcing or Replacing Damaged Sections:** Using wood or steel materials that match the existing structure to restore strength and integrity.
- **Adding Lumber:** Adding lumber to the sides of purlins or sub-purlins to increase load capacity.

TRUSS REPAIRS

Trusses distribute roof weight across a building, but excessive load or impact can weaken the bottom chord. Trusses built before 1996 are under-designed compared to today's standards and fail often. Repair methods include:

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- **Installing high-tension cables** to reinforce bottom chords.
- **Replacing Vertical Members** to strengthen the truss system where critical elements have failed.
- **Reinforcing top and bottom chords** to maintain even load distribution and structural performance.

COLUMN REPAIRS (CONCRETE, STEEL, OR WOOD)

Columns provide vertical support and are vulnerable to impact damage (e.g., forklift collisions), deterioration, and seismic forces. Repairs may involve:

- **Installing temporary shoring** to relieve stress before repairs begin.
- **Adding concrete encasement** at the base of columns in high-traffic areas to protect against future impact damage.
- **Replacing damaged columns entirely or reinforcing them** using steel or fiber wrapping.

ROOF CONDENSATION REPAIRS

Roof condensation traps moisture between the roof and ceiling, leading to wood rot, mold, and structural deterioration. Repairs focus on:

- **Improving ventilation and insulation** by venting the foil to prevent condensation buildup.
- **Adding a wood ledger** under the existing sub-purlins.
- **Upgrading or replacing connection hardware** to enhance structural integrity. This can be done in conjunction with ledgering or as a separate process
- **Replacing or reinforcing damaged roof purlins, sub-purlins, roof plywood, and framing members** to restore strength.

DOOR OPENING REPAIRS WITH H-FRAMES

Door openings in industrial buildings can weaken due to repeated use, building movement, or insufficient reinforcement**.**

- **H-Frame Reinforcement** – Stabilizing the surrounding structure prevents cracking, sagging, or door misalignment, usually with tube steel bolted to the existing structure.

CONCRETE CRACK REPAIRS (EPOXY INJECTION & REINFORCEMENT)

Concrete walls, floors, and structural elements can develop cracks from thermal, seismic activity, water intrusion, or overloading. Repairs include:

- **Epoxy Injection** – Fills cracks to restore structural integrity.
- **Concrete Spalling Repairs –** Uses high-strength grout and/or fiber-reinforced materials to provide additional strength and prevent future failures.

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SEISMIC RETROFITTING IN STRUCTURAL REPAIRS

Seismic retrofitting strengthens existing buildings to improve earthquake resistance. Retrofits vary depending on the building type and structural vulnerabilities but often include:

- **Roof-to-wall connections, continuity ties, re-entrant corners (standard)**

Additional measures, if needed, include:

- **Concrete Work** – Reinforcing existing footings or adding new ones
- **Moment-Resisting Frames** – Improves lateral stability and energy dissipation.
- **Shear Walls** – Increases resistance to lateral forces.
- **Diaphragm Strengthening** – Reinforces roof and floor systems to maintain structural integrity.

POST-REPAIR MONITORING AND MAINTENANCE

Structural repairs restore integrity, but ongoing monitoring is essential to prevent future failures**.**

- **Scheduled Inspections** – Identifies early signs of deterioration in repaired components.
- **Load Monitoring** – Prevents excessive stress on reinforced areas, particularly in roofs and beams.
- **Long-Term Maintenance Planning** – Ensures structural upgrades remain effective over time.

REGULATORY COMPLIANCE AND PERMITTING

All structural repairs must meet **local building codes and seismic safety regulations**. Key considerations include:

- **Understanding Local Codes** – Ensuring repairs meet seismic and structural safety requirements.
- **Obtaining Necessary Permits** – Securing approval for modifications before work begins.
- **Coordinating with Inspectors** – Verifying that repairs are completed according to code.

DOCUMENTATION AND RECORD-KEEPING

Proper documentation is essential for liability protection and future reference. Best practices include:

- **Maintaining Repair Records** – Detailed logs of all structural modifications.
- **Updated Drawings** – Updated plans reflecting the completed work.
- **Keeping Documentation** – Ensures compliance with insurance and lender requirements, supports property assessments, and facilitates future sales.

COST CONSIDERATIONS & ROI

Understanding structural repair costs helps building owners plan and budget effectively.

- **Factors Affecting Costs** – Materials, labor, and permit fees.
- **Long-Term Benefits** – Reduces risk, enhances safety, and minimizes liability.
- **Property Value Impact** – Well-maintained buildings retain and grow in value.

STRUCTURAL REPAIRS FOR HISTORIC BUILDINGS

Historic structures require specialized techniques to balance preservation and safety:

- **Preserving Architectural Integrity** – Maintaining original materials while reinforcing strength.
- **Working with Preservation Societies** – Ensuring compliance with historical building standards.
- **Using Specialized Repair Methods** – Techniques such as masonry stabilization, foundation reinforcement, and traditional material restoration**.**

PARTNER WITH EXPERTS IN STRUCTURAL REPAIRS

Structural repairs are essential for maintaining building safety, compliance, and long-term performance. Ensuring repairs are properly assessed, designed, and implemented requires expertise in engineering and construction best practices**.**

At **Saunders Seismic**, we specialize in seismic retrofitting, structural repairs, and commercial building reinforcements, serving industrial, commercial, and multi-family properties. Our experienced team works with engineers, property owners, and facility managers to deliver tailored repair solutions that meet the latest building codes and safety standards.

For expert guidance on structural repairs and retrofits, contact Saunders Seismic today.