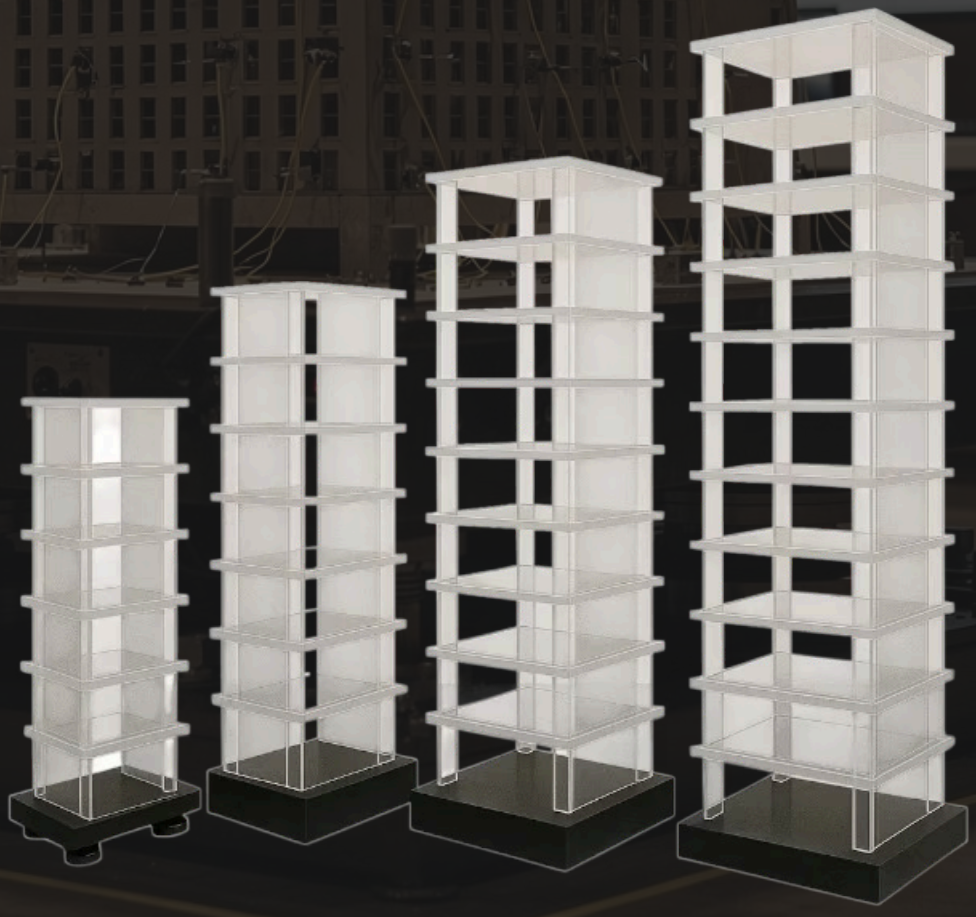
QUAKELOGIC

QL-ShakeTower™ Model Structure

Modular 1–6 Story Structure for Fixed-Base & Base-Isolation Seismic Testing

The QL-ShakeTower™ is a transparent, modular multi-story model for seismic education and research. Compatible with QuakeLogic shake tables, it easily configures from 1 to 6 stories. It uniquely demonstrates fixed-base and base-isolated behavior side-by-side, vividly contrasting foundation responses to identical seismic events.

This versatile tool makes complex earthquake engineering tangible. Its transparent design clearly illustrates mode shapes, resonance, damping, inter-story drift, soft-story mechanisms, and the benefits of base isolation. Every deformation and oscillation is visible, transforming abstract principles into impactful learning.



Kit Contents & Component Specifications

Base & Floor System

- Robust 18" × 12" × 4" base plate with integrated base-isolation.
- Six 8" × 8" floor slabs for 1–6 story configurations.

Transparent Walls

- Twelve 6" × 8" high-clarity acrylic side panels.
- Premium plexiglass for structural visibility and rigidity.

Connection Hardware

- Precision T-connectors for wall-to-slab joints.
- L-brackets for roof assembly, base clamps for shake table.
- Complete screw, bolt, and alignment hardware included.

The QL-ShakeTower™ kit's components are precision-manufactured for consistent performance and ease of assembly. The transparent design allows clear observation of structural behavior, making complex seismic concepts visible for both educational and research applications.

Assembly Guide: Base Installation & Mode Switching

Base Installation: Step-by-Step

1. Position the base plate at the center of the shake table.
2. Install all four clamps at designated mounting points.
3. Tighten clamps in a cross-pattern sequence for even pressure.

Pro Tip

Always verify clamp tightness before each test session. Loose clamps can alter results.

Mode Selection Overview

The QL-ShakeTower™ features a revolutionary mode-switching mechanism for instant comparison of isolated versus non-isolated seismic responses.

Fixed-Base Mode

Isolation bolts: INSTALLED

Structure rigidly connected to shake table.

- Higher natural frequencies
- Greater acceleration amplification
- Maximum inter-story drift

Demonstrates traditional fixed-foundation seismic response.

Base-Isolation Mode

Isolation bolts: REMOVED

Base moves independently from superstructure.

- Reduced acceleration transmission
- Longer effective periods
- Concentrated displacement at base

Demonstrates modern seismic protection strategies.

Switching modes in seconds allows powerful "before and after" demonstrations. Students observe dramatically different structural responses to identical seismic inputs, making abstract isolation principles concrete and memorable.

Assembly Guide: Building Your Stories

With your base secured and mode selected, you're ready to construct the vertical structure. The modular story-by-story assembly process is intuitive yet precise, allowing you to build anywhere from a single-story model to a full six-story structure. Each story follows the same fundamental sequence, creating a rhythm that makes assembly quick while ensuring structural consistency across all levels.

01

Install Side Walls

Position two 6" × 8" acrylic panels. Attach with 2 T-connectors per wall (top/bottom). Ensure walls are vertical.

02

Add Floor Slab

Place an 8" × 8" floor slab evenly on top of the walls. Confirm it is perfectly level.

03

Lock Connections

Secure slab to walls with 4 T-connectors (under slab, near corners). Tighten firmly, avoiding cracking. Test connection for stability.

04

Repeat for Each Story

Repeat steps 1-3 for additional stories. Periodically check vertical alignment.

Assembly Best Practices

- Work on a flat, stable surface
- Handle acrylic by edges
- Tighten connectors in stages
- Check alignment after each story
- Keep spare connectors accessible

Common Assembly Mistakes

- Overtightening connectors (cracking acrylic)
- Skipping level checks
- Mixing up connector orientations
- Rushing assembly
- Ignoring small misalignments

The beauty of the modular design becomes apparent as you build—each story is independent yet integrated, allowing you to configure the structure for specific teaching objectives or research parameters. A two-story model excels at demonstrating fundamental mode shapes, while a six-story structure reveals complex higher-mode participation and soft-story effects. Take your time during assembly, verify each connection, and you'll create a structural model that performs reliably through hundreds of test cycles.

Installation & Structural Behavior Modes

Roof Installation

- Position final 8" × 8" slab on uppermost story.
- Use L-brackets (not T-connectors) for superior stability.
- Secure with 4 L-brackets at each corner.
- Tighten evenly for level alignment and to prevent stress.

Roof Mass Considerations

Roof mass significantly influences natural frequencies and mode shapes. Use optional mass blocks to study varying roof mass ratios, a key seismic design parameter.

Structural Behavior Modes

Your QL-ShakeTower™ demonstrates two seismic response philosophies, transforming it into a powerful teaching instrument for earthquake engineering.

Fixed-Base Configuration

- Traditional seismic response, direct ground motion transfer.
- Structure resists forces through inherent strength/stiffness.
- Results in higher natural frequencies and acceleration.

Key Demonstrations:

- **Resonance Effects:** Amplification when frequencies match.
- **Soft-Story Mechanisms:** Deformation in weaker stories.
- **Mode Shapes:** Visualize vibration modes.
- **Inter-Story Drift:** Measure relative floor displacement.

Base-Isolated Configuration

- Modern protection technology, superstructure decoupled from ground.
- Isolation layer absorbs and dissipates seismic energy.
- Dramatically lower accelerations in upper stories.
- Displacement concentrated in the isolation system.

Key Demonstrations:

- **Isolation Principles:** Base moves, upper stories stable.
- **Energy Dissipation:** Observe absorption in isolation layer.
- **Reduced Structural Demand:** Compare acceleration vs. fixed-base.
- **Enhanced Stability:** Improved performance during resonance.

This side-by-side comparison creates impactful learning moments. Students observe starkly different responses to identical ground motion, making abstract concepts like "period shifting" and "energy dissipation" immediately understandable. This demonstrates why base isolation is a gold standard for critical facilities.

Safety Guidelines & Best Practices

The QL-ShakeTower™ requires proper handling and maintenance for reliable service, accurate results, and a safe learning environment.

Prevent Acrylic Cracking

- Never overtighten connectors.
- Avoid twisting or bending panels.
- Never drop components.

Alignment Verification

- Ensure walls are perfectly vertical.
- Verify floors are level.
- Correct alignment prevents amplified motion.

Shake Table Safety

- Confirm clamps are secure.
- Verify isolation mode before testing.
- Keep hands and loose items clear during operation.

Pre-Test Checklist

1. Inspect acrylic for damage.
2. Verify all connectors are tight.
3. Confirm base clamps are secure.
4. Check isolation mode setting.
5. Clear workspace.
6. Brief participants on emergency stops.
7. Verify motion limits.

Post-Test Maintenance

1. Inspect for loosened connections.
2. Clean acrylic panels.
3. Check for micro-cracks.
4. Store components flat.
5. Organize connectors.
6. Document any damage.
7. Retighten loosened connections.

Develop a culture of careful handling and regular inspection. A well-maintained model produces consistent, reliable results for effective engineering education.

Educational & Research Applications

The QL-ShakeTower™ makes complex seismic concepts tangible through visual, hands-on demonstrations. Its transparent, modular design is indispensable for engineering education and research at all levels.

Engineering Fundamentals

Observe natural frequencies, resonance, and damping in real-time. The transparent structure clarifies internal forces and deformations for introductory courses.

Base Isolation Demos

Compare fixed-base and isolated configurations. Understand how base isolation reduces accelerations and concentrates displacement, demonstrating modern seismic protection.

Story Drift Visualization

Visualize and measure inter-story drift. See drift concentration, dangerous soft stories, and how irregularities amplify deformations, linking visuals to calculations.

Soft-Story Collapse Demo

Safely demonstrate soft-story collapse due to reduced stiffness. Students witness concentrated deformation in weak stories, reinforcing seismic design principles.

Advanced Research Applications

Scaled Response Studies

Ideal for parametric research on:

- Mass distribution
- Stiffness irregularities
- Damping modifications
- Base isolation
- Torsional effects

Sensor Integration

Compatible with external data acquisition systems:

- Accelerometers
- Displacement transducers
- Strain gauges
- High-speed cameras
- Force sensors

Platform Compatibility

Works seamlessly with all available shake tables in the market

Research potential extends beyond the classroom. Graduate students can conduct systematic parametric studies impractical at full scale. Its transparent design allows non-contact measurements. Modular nature enables rapid reconfiguration. The QL-ShakeTower™ offers the flexibility, precision, and visibility needed for quality research.

Technical Summary & Available Options

The QL-ShakeTower™ offers refined seismic testing for education and research. This summary provides key specifications for procurement, planning, and setup.

Feature	Specification
Story Configuration	1–6 modular levels (expandable to 8–10)
Wall Panels	High-clarity acrylic, 6" × 8", transparent for deformation visualization
Floor Slabs	8" × 8" precision slabs, consistent mass
Base Platform	18" × 12" × 4" with switchable base-isolation
Operating Modes	Fixed-base (bolts in) and base-isolation (bolts out)
Connection System	T-connectors (floor-wall), L-brackets (roof)
Visibility	360° transparent design for deformation observation
Shake Table Mounting	4-point clamp system, compatible with standard research platforms
Assembly Time	15–30 minutes for 6-story setup
Reconfiguration	Tool-free story add/remove in minutes
Material Durability	Acrylic rated for 1000+ test cycles (with proper handling)
Educational Level	High school through graduate engineering

vailable Configuration Options

Customize your QL-ShakeTower™ with optional enhancements for specific research or curriculum needs.

Extended 8–10 Story Version

For advanced high-rise behavior studies. Includes extra slabs, panels, and connectors to demonstrate complex mode effects. Ideal for advanced courses.

Adjustable Roof Mass Block

Variable mass blocks (500g, 1kg, 2kg) to study roof mass effects on frequencies and mode shapes. Essential for research.

Enhanced Damping Isolation Layer

Upgraded isolation system with tunable damping. Demonstrates energy dissipation and its role in base isolation performance. Includes multiple damping configurations.

Replacement Acrylic Panel Kit

Spare panel set for high-use labs. Ensures uninterrupted sessions. Includes 12 wall panels, 6 floor slabs, and storage case. Recommended for intensive testing.

Reinforced Corner Connection Upgrade

Heavy-duty reinforcements for extreme testing. Allows higher shake table intensities without damage. Designed for maximum seismic input research.

System Package Includes

- 6-story structural components
- Connectors and hardware
- Shake table mounting clamps
- Assembly instructions
- Safety guidelines
- Educational activity guide
- Digital resources
- One-year warranty

Shipping & Support

QL-ShakeTower™ ships fully packaged in protective foam within a durable carrying case. Components are organized and labeled. Setup support is available via phone, email, or video.

Training workshops for staff, plus online video tutorials and troubleshooting guides.

The QL-ShakeTower™ is an investment in engineering education. Its transparency, modularity, and base-isolation create memorable learning experiences. For new programs, lab upgrades, or research expansion, the QL-ShakeTower™ delivers performance, versatility, and educational impact. Transform seismic concepts into visual demonstrations that inspire future earthquake engineers.

QuakeLogic: Precision Seismic Testing

QuakeLogic Shake Table Systems set new standards for seismic simulation and structural dynamics testing, empowering research labs, universities, and engineering facilities with precision, safety, and control.

Connect with QuakeLogic: Your Precision Partner

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Our Commitment to Excellence

Certified Quality

Compliance with international standards for reliability, performance, and safety.

Industry Leadership

Advanced shake table and motion simulation technologies with precision, repeatability, and ease of use.

Client Success

Responsive technical support, installation, and after-sales assistance.

Explore Our Product Portfolio

Scan for Solutions

Discover QuakeLogic's advanced seismic testing technologies. Enhance your research and testing environments with exceptional accuracy, multi-axis capabilities, and comprehensive safety.

www.products.quakelogic.net