KOROK® SEISMIC RESOURCE

FEBRUARY 2025

KOROK

KOROK
FIRE AND ACOUSTIC WALL SYSTEMS

KOROK Seismic Resource

Leading the Market in Seismic Testing

KOROK® has recently undergone comprehensive seismic testing, setting a new benchmark to support our fire and acoustic wall performance.

For over 25 years, we have delivered high-performance solutions across the residential, industrial, and commercial markets.

The Purpose Behind Our Testing

To understand and determine the behaviour and performance of KOROK wall panels when subjected to seismic design loads occurring between structural slabs within buildings.

To demonstrate how KOROK® panels respond in correlation with drift levels for both in-plane and out-of-plane conditions, and to support the construction industry with tested solutions.

By undertaking this seismic testing, KOROK® reinforces its commitment to superior building resilience, helping to minimize damage, lower repair costs, and maintain operational continuity after earthquakes.

Importance of Seismic Resilience

The 2010/2011 Christchurch earthquakes and the more recent 2013 Lower North Island earthquakes illustrated the vulnerability of building non-structural elements (partitions, building services and piping)

Widespread damage and loss of business continuity due to the poor performance of non-structural elements was widely observed

The Canterbury Earthquakes Royal Commission identified the need to improve the performance of non-structural elements in earthquakes with one of the recommendations focussed on improving non-structural element performance. "To prevent or limit the amount of secondary damage, engineers and architects should collaborate to minimise the potential distortion applied to non-structural elements. Particular attention must be paid to prevent the failure of non-structural elements blocking egress routes."

Design and Performance considerations

Consideration should also be given to acoustic and fire requirements of the partition when determining how seismic movements are accommodated. This should include checking solutions at the service and partition interface.

Proven Seismic Performance

Conducted at BRANZ in 2024, our seismic tests followed FEMA 461 and NZS 1170.5:2004 standards, confirming KOROK® panels has the ability to withstand high levels of drift. No other system in New Zealand has undergone such rigorous testing with multiple wall configurations and variations.

Application in High-Importance Structures

As the ultimate All-in-One solution for fire & acoustic-rated wall systems, KOROK® panels offer unmatched performance for high-importance structures.

With strong seismic performance and the ability to withstand high drift limits, KOROK® panels are ideal for IL3 and IL4 buildings, such as hospitals, emergency response centres, and essential utilities. KOROK® provides stakeholders, architects, and engineers with confidence in a durable, high-performance solutions.

Test Set-up:

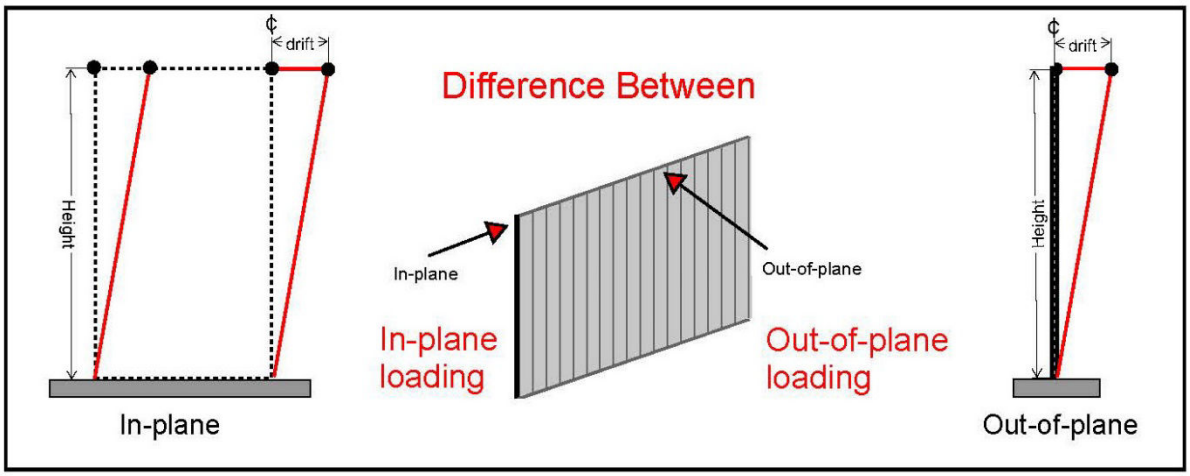
- **Panel Specifications:** 78 mm thick KOROK® panels with a zinc-coated steel skin and an aerated concrete core. Nominal wall dimensions 3.600mm high x 3.280mm wide
- **Configurations:** Vertical panel, Horizontal panel and horizontal to vertical panel installations.
- **Key Variations:** Apertures, service penetrations, head C-track: screw fixing vs. no screw fixing.

Key Test Observations:

- **Damage Progression:** Early stages showed no visible damage, but as movement increased, minor effects like screw loosening and slight lifting at channel ends began to appear. More noticeable panel lifting and channel buckling tended to emerge at higher displacement levels.
- **Repair and Retesting:** Remedial was categorized into different states with corresponding repair actions. Some panels were retested after repairs to assess any impact on performance.
- **Performance Results:** Detailed observations, results, graphs, and photos highlight the performance of the panels under different conditions. **KOROK® panels met or exceeded test criteria in all configurations.**
- **Penetrations & Apertures:** No recorded damage to penetrations or apertures C-track at high displacement drift.

KOROK® is redefining seismic resilience in New Zealand, providing unmatched protection and performance for high-importance structures

In-plane and Out-of-plane Illustration



Damage States Table

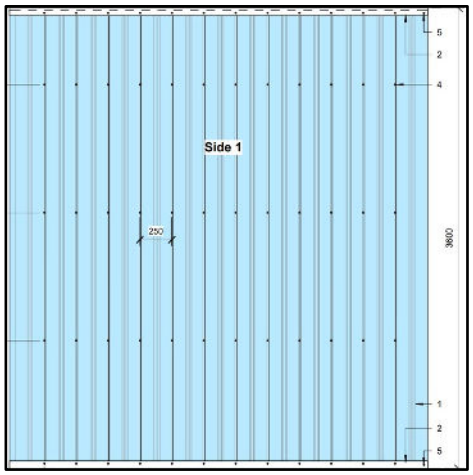
Damage State Reference		Description	Repair Action
1a		Screws losing 1-2 threads	No action required
1b		Screws losing 3-4 threads	No action required
2a		Screws either disengaged completely or loose enough to require replacement	Removal and replacement of screws, in the effected areas.
2b		Permanent deformation of the channel around apertures	Replacement
3		Permanent deformation of the bottom or top channel around apertures	Replacement

Test 1 - In-plane loading of 78mm KOROK® with head track fixing. Vertical panel installation with no apertures.

Damage State Reference		Description	Repair Action
1a		Screws losing 1-2 threads	No action required

	TEST 1	
Step	Displ (mm)	Drift %
1	1.4mm	0.04%
2	2.2mm	0.06%
3	2.9mm	0.08%
4	3.9mm	0.11%
5	5.4mm	0.15%
6	7.6mm	0.21%
7	10.8mm	0.30%
8	15.1mm	0.42%
9	21.2mm	0.59%
10	25mm	0.69%
11	29.5mm	0.82%
12	41.4mm	1.15%
13	45mm	1.25%
14	58.3mm	1.62%
15 1a	81.4mm	2.26%
16	90mm	2.50%

Displacement is applied to the left and right of center



Test Wall Configuration

The test wall configuration included screws installed in the top and bottom C-tracks, with a nominal height of 3.600 meters and a width of 3.280 meters. The test range consisted of 16 displacement steps, varying from 1.4 mm (0.04% drift) to 90 mm (2.5% drift), with drift rates ranging from 0.5 mm/s to 2 mm/s.

Overall Performance

The KOROK wall system demonstrated outstanding seismic resilience, maintaining its structural integrity even under rigorous testing conditions. Throughout the in-plane seismic test, the wall exhibited exceptional durability, with no damage to the panels or C-tracks, even at the highest drift levels. While a number of central screws loosened in the later test cycles, this was expected and easily remedied with simple replacements - highlighting the system's robust design and ease of maintenance.

KOROK walls provide unmatched performance in seismic events, ensuring long-term reliability, reduced repair costs, and minimal downtime after an earthquake. If you're looking for a proven, high-performance wall system for seismic resilience, KOROK is the clear choice.

NOTE: A separate Out-of-plane test was conducted in the same configuration. No damage to the wall was observed. Screws, panels and C-tracks all remained as built.

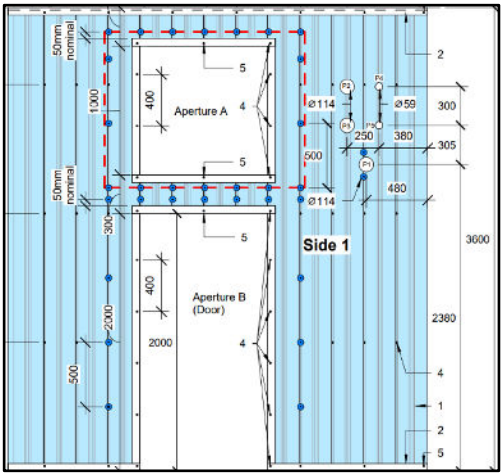
For a technical presentation and further information, please contact the technical team at KOROK.

Test 5 - In-plane loading of 78mm KOROK® with head track fixing. Vertical panel installation with apertures and circular penetrations.

Damage State Reference		Description	Repair Action
1a		Screws losing 1-2 threads	No action required
1b		Screws losing 3-4 threads	No action required
2a		Screws either disengaged completely or loose enough to require replacement	Removal and replacement of screws, 50mm above or below panel to panel screws. Channel screw replacement 20mm above or below

TEST 5		
Step	Displ (mm)	Drift %
1	1.4mm	0.04%
2	2.2mm	0.06%
3	2.9mm	0.08%
4	3.9mm	0.11%
5	5.4mm	0.15%
6	7.6mm	0.21%
7	10.8mm	0.30%
8	15.1mm	0.42%
9	21.2mm	0.59%
10	25mm	0.69%
11	29.5mm	0.82%
12	41.4mm	1.15%
13	45mm	1.25%
14	58.3mm	1.62%
15	81.4mm	2.26%
16	90mm	2.50%

Displacement is applied to the left and right of center



Test Wall Configuration

The test wall configuration included screws installed in the top and bottom C-tracks, along with additional panel-to-panel aperture screws. The nominal wall dimensions were 3600 mm in height and 3280 mm in width. The test range consisted of 16 displacement steps, ranging from 1.4 mm (0.04% drift) to 90 mm (2.5% drift), with drift rates varying between 0.5 mm/s and 4 mm/s.

Overall Performance

KOROK's wall system once again proved its seismic resilience, delivering outstanding structural performance even under high levels of drift. Despite being subjected to 16 displacement steps, the panels and C-tracks remained stable, with no permanent damage, demonstrating the system's ability to maintain integrity.

Minimal movement was observed, with only minor screw adjustments required at higher drift levels - an easy fix that ensures long-term durability. Even penetrations, such as pipe installations, remained completely intact, reinforcing KOROK's reliability in complex building environments. The C-tracks around door openings and apertures also showed no damage, highlighting the system's superior engineering for high-performance seismic resilience.

NOTE: A separate Out-of-plane test was conducted in the same configuration. No damage to the wall was observed. Screws, panels and C-tracks all remained as built.

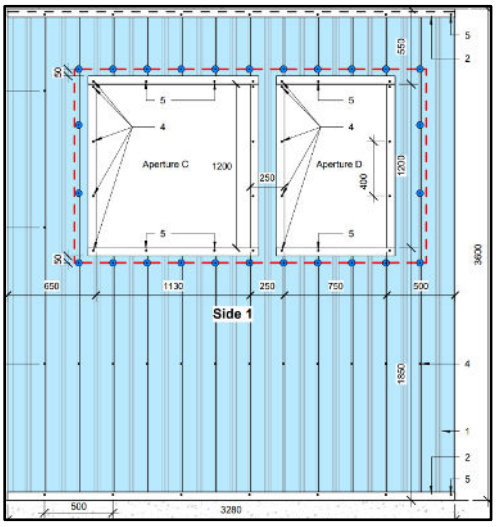
For a technical presentation and further information, please contact the technical team at KOROK.

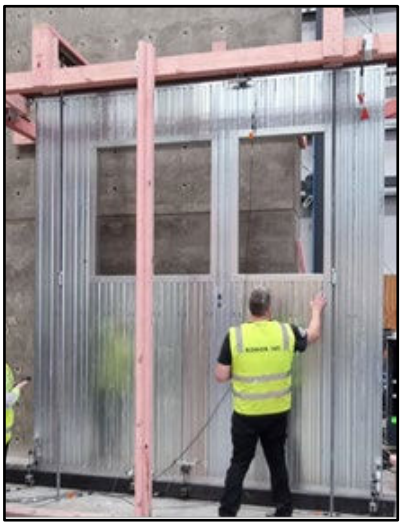
Test 9 - In-plane loading of 78mm KOROK® with head track fixing. Vertical panel installation with apertures.

Damage State Reference		Description	Repair Action
1a		Screws losing 1-2 threads	No action required
1b		Screws losing 3-4 threads	No action required
2a		Screws either disengaged completely or loose enough to require replacement	Removal and replacement of screws, 50mm above or below panel to panel screws. Channel screw replacement 20mm above or below

TEST 9		
Step	Displ (mm)	Drift %
1	1.4mm	0.04%
2	2.2mm	0.06%
3	2.9mm	0.08%
4	3.9mm	0.11%
5	5.4mm	0.15%
6	7.6mm	0.21%
7	10.8mm	0.30%
8	15.1mm	0.42%
9	21.2mm	0.59%
10	25mm	0.69%
11	29.5mm	0.82%
12	41.4mm	1.15%
13	45mm	1.25%
14	58.3mm	1.62%
15	81.4mm	2.26%
16	90mm	2.50%

Displacement is applied to the left and right of center





Test Wall Configuration

The test wall configuration included screws installed in the top and bottom C-tracks, along with additional panel-to-panel aperture screws. The wall had nominal dimensions of 3600 mm in height and 3280 mm in width. The test range consisted of 16 displacement steps, varying from 1.4 mm (0.04% drift) to 90 mm (2.5% drift), with drift rates ranging from 0.5 mm/s to 4 mm/s.

Overall Performance

KOROK's wall system once again proved its seismic durability, maintaining structural integrity even under extreme displacement levels. Throughout 16 rigorous test cycles, the system remained intact, with the panels and C-tracks holding firm—demonstrating exceptional resilience in seismic conditions.

Even at peak drift levels, only minor, expected screw adjustments were observed, and the system's bottom C-track temporarily flexed before returning to its natural shape—showcasing its ability to absorb movement without permanent deformation. Importantly, the apertures and surrounding C-tracks remained undamaged, reinforcing KOROK's reliability in real-world applications where penetrations and structural stability are critical.

NOTE: A separate Out-of-plane test was conducted in the same configuration. No damage to the wall was observed. Screws, panels and C-tracks all remained as built.

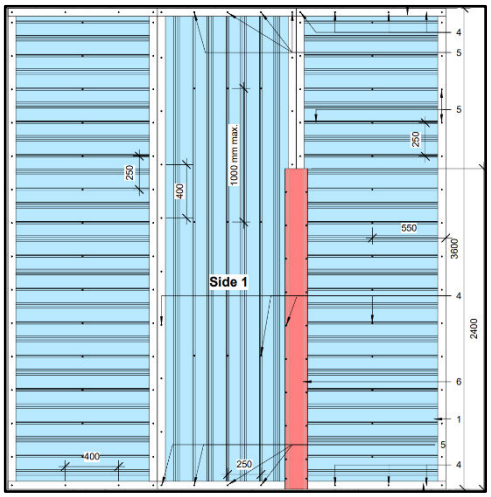
For a technical presentation and further information, please contact the technical team at KOROK.

Test 13 - In-plane loading of 78mm KOROK® with head track fixing. Horizontal to Vertical panel installation.

Damage State Reference		Description	Repair Action
1a		Screws losing 1-2 threads	No action required
1b		Screws losing 3-4 threads	No action required
2a		Screws either disengaged completely or loose enough to require replacement	Removal and replacement of screws, 50mm above or below panel to panel screws. Channel screw replacement 20mm above or below

TEST 13		
Step	Displ (mm)	Drift %
1	1.4mm	0.04%
2	2.2mm	0.06%
3	2.9mm	0.08%
4	3.9mm	0.11%
5	5.4mm	0.15%
6	7.6mm	0.21%
7	10.8mm	0.30%
8	15.1mm	0.42%
9	21.2mm	0.59%
10	25mm	0.69%
11	29.5mm	0.82%
12	41.4mm	1.15%
13	45mm	1.25%
14	58.3mm	1.62%
15	81.4mm	2.26%
16	90mm	2.50%

Displacement is applied to the left and right of center



Test Wall Configuration

The test wall configuration included all C-tracks and panels fixed on both sides, with fire flashing face-fixed, and measured approximately 3600 mm in height by 3280 mm in width. The test range consisted of 16 displacement steps, ranging from 1.4 mm (0.04% drift) to 90 mm (2.5% drift), with drift rates varying between 0.5 mm/s and 5 mm/s.

Overall Performance

KOROK's wall system once again proved its strength and reliability under extreme seismic conditions. Throughout the majority of the test, the wall remained structurally sound, with no permanent damage to the panels or top C-tracks - even under increasing drift levels.

At higher displacements, minor expected screw loosening and temporary movement in the bottom C-track were observed, but the system continued to perform as designed. Even at peak seismic stress, the top and bottom C-track screws held firm, demonstrating KOROK's ability to maintain structural integrity when it matters most. Engineered for durability, minimal maintenance, and long-term stability, it's the trusted choice for projects demanding the highest levels of safety and performance.

NOTE: A separate Out-of-plane test was conducted in the same configuration. No damage to the wall was observed. Screws, panels and C-tracks all remained as built.

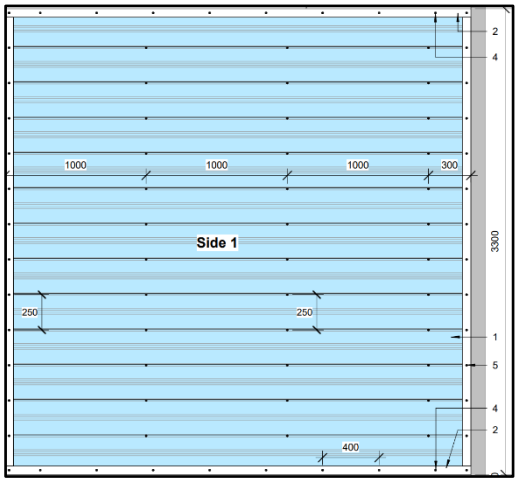
For a technical presentation and further information, please contact the technical team at KOROK.

Test 16 - In-plane loading of 78mm KOROK® with fixings 1 side only. Horizontal panel installation with no apertures.

Damage State Reference		Description	Repair Action
1a		Screws losing 1-2 threads	No action required
1b		Screws losing 3-4 threads	No action required
2a		Screws either disengaged completely or loose enough to require replacement	Removal and replacement of screws, 50mm above or below panel to panel screws. Channel screw replacement 20mm above or below

	TEST 16	
Step	Displ (mm)	Drift %
1	1.4mm	0.04%
2	2.2mm	0.06%
3	2.9mm	0.08%
4	3.9mm	0.11%
5	5.4mm	0.15%
6	7.6mm	0.21%
7	10.8mm	0.30%
8	15.1mm	0.42%
9	21.2mm	0.59%
10	25mm	0.69%
11	29.5mm	0.82%
12	41.4mm	1.15%
13	45mm	1.25%
14	58.3mm	1.62%
15	81.4mm	2.26%
16	90mm	2.50%

Displacement is applied to the left and right of center



Test Wall Configuration

The wall configuration consists of horizontal panels connected to the C-track and spanning between SHS posts on each side of the wall, with top and bottom C-tracks present. The nominal dimensions are 3600 mm in height and 3300 mm in width. The test range included 16 displacement steps, varying from 1.4 mm (0.04% drift) to 90 mm (2.5% drift), with drift rates ranging from 0.5 mm/s to 5 mm/s.

Overall Performance

KOROK's horizontal panel system demonstrated strong seismic resilience, holding firm through the majority of the test with no visible damage or structural compromise. Even under increasing drift levels, the wall maintained its integrity, with the C-tracks and steel post connections remaining completely intact.

Only at the highest displacement cycles some screw disengagement occur, highlighting fastener movement as the primary stress point—while the core structure of the system stayed solid. This performance reinforces KOROK's reliability in demanding seismic environments, ensuring that key structural elements remain undamaged and functional.

NOTE: A separate Out-of-plane test was conducted in the same configuration. No damage to the wall was observed. Screws, panels and C-tracks all remained as built.

For a technical presentation and further information, please contact the technical team at KOROK.