



TECTONUS
RESILIENT SEISMIC SOLUTIONS

DMAX Seismic Brace

DMAX INTRODUCTION & DESIGN GUIDE

DECREASE DEMAND MAXIMIZE SAVINGS

With high damping and low overstrength, DMAX braces allow engineers to unlock a cascade of system wide savings across structure and foundations.

Low overstrength – driver of capacity design

- Capacity design governs most of the structure, not just lateral elements
- Small changes in overstrength → big changes in columns, diaphragms, foundations
- BRBs / EBFs rely on yielding for energy dissipation - typical overstrength factors: 1.6–2.5 (given strain hardening and material variability)

Precise tunability – optimized activation force

- Tuneable to within +/-1kN
- Allowing to reduce the demand in irregular structures with high torsional demands
- More control of stiffness effect in different principal directions of the building

Application – new build and retrofit

- Can be used in any braced frame building – BRB, EBF, CBF
- Straight swap for a BRB in terms of performance (drift etc)
- Supplied as a full-length brace, pin-to-pin, including pins

Advantages

- High damping
- Low overstrength – 1.15
- No yielding elements
- Comparable system price to leading BRB suppliers

CUSTOMER TESTIMONIAL

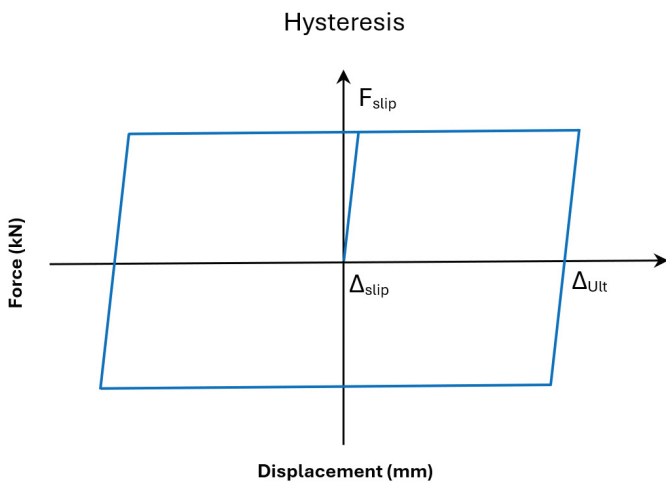


With comparable pricing to other lateral systems like EBFs and BRBs, the DMAX system's high effective damping and lower overstrength factor have allowed us to achieve significant cost savings across the entire lateral system, including braces, columns, diaphragms, and foundations."

Nathan Watson, Director – DHC Structural + Civil

DMAX IS A STRAIGHT SWAP FOR A BRB, EBF OR CBF

- E-P-P (Elastic-Perfectly-Plastic) hysteretic performance
- Highest possible damping ratio
- Proprietary material on friction surfaces
- Individually performance tested
- No maintenance required
- No replacement post-event as there will be no damage to the brace
- An example profile; 2000kN @6m length: 350mm x 350mm






DMAX vs Other Bracing Systems

The table shows impact of ductility and overstrength on capacity design for different bracing systems. DMAX ductility can be further optimized via non-linear methods.

CASE	DESIGN WITH BRBs	DESIGN WITH EBFs	DESIGN WITH DMAX BRACES
Brace capacity (kN)	1000	1000	1000
Overstrength factor for Capacity Design	1.6 to 2.5 (case-by-case)	1.4 to 1.7 (case by case)	1.15 (all the time)
Force demand in the capacity protected element (kN)	$1000 \times 1.6 = 1600$ (min.)	$1000 \times 1.4 = 1400$ (min.)	$100 \times 1.15 = 1150$

DMAX GUIDANCE

To quickly assess project feasibility replace the current bracing element (EBF, BRB etc) and use the following DMAX factors:

	 USA	 CANADA	 NEW ZEALAND
Ductility	8 (R)	4.8 (R _d R _o)	3.5 (μ)
Overstrength	1.15	1.15	1.15

Further modeling and analysis can be done to refine the design and verify the ductility.

- ETABS and SAP2000, use 'Plastic-Wen' Link element
- PERFORM3D, use 'Inelastic Bar' element with E-P-P properties.

Tectonus offers comprehensive design support services for modelling and design:

- 1. Discuss.** Reach out at any point for a discussion with our engineering team.
- 2. Design.** We can support you through modelling, analysis, detailed design and peer review.
We issue PSI for permitting.
- 3. Deliver.** We work with the contractor to deliver devices according to the construction schedule.

CUSTOMER TESTIMONIAL



We found Tectonus very knowledgeable and supportive throughout the process. These guys are easy to collaborate with, and they talk the same “seismic expert” language with TEKTON.”

Ioannis Prionas, CEO – TEKTON Consulting Engineers

DMAX – PERFORMANCE TESTING

OSHPD/HCAI Tested

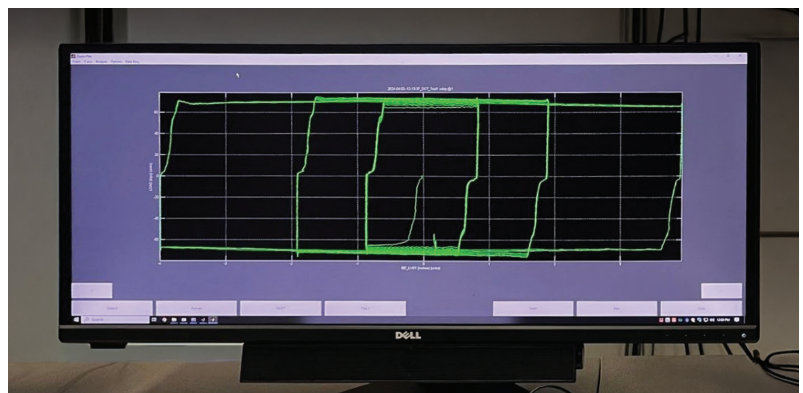
The first friction-based damper to meet HCAI Protocols for deployment in Californian hospitals (regarded as the most stringent in the US, beyond ASCE7-22).

Testing conducted at ATLSS Engineering Research Center, Lehigh University PA, USA. 20 prototypes from 40 to 180 kips (178 to 801kN) tested in three phases. The dynamic and wind loading phases were conducted at a frequency of 0.65 Hz.

The number and amplitudes of the loading cycles were:

- 10 cycles at +/-27mm **(20% of the maximum displacement)**
- 5 cycles at +/-53mm **(40%)**
- 3 cycles at +/-106mm **(80%)**

Unique dynamic performance with a tolerance lower than +/-15% tested at Lehigh Structures lab, US.



Brace Lateral Stability

The lateral stability of the new generation DMAX brace is provided by an external jacket which acts as a robust anti buckling mechanism. This results in a slimmer profile and lower overall brace cost (patent pending).

To demonstrate the stable performance of Tectonus DMAX brace, full scale testing of low-to-high capacity braces (300 to 3000kN) have been successfully conducted at the Structures Lab of the Auckland University of Technology and the Tectonus testing facility.

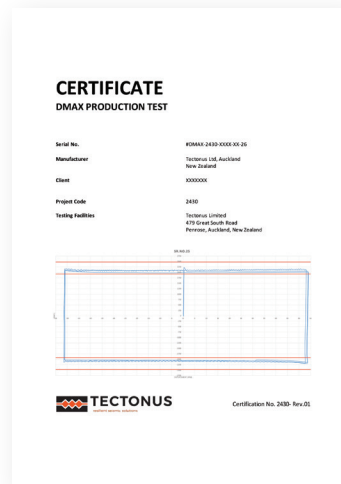
DELIVERY

Production Testing

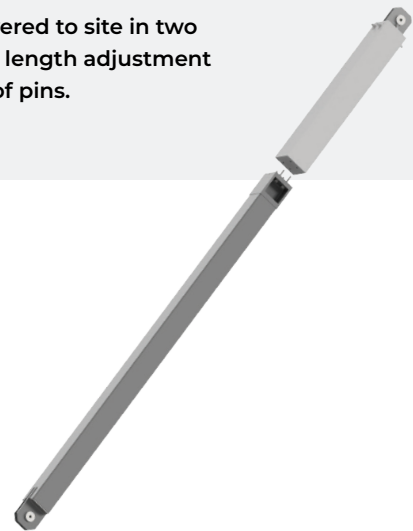
Every single damper module is tested to the design level earthquake load demand before shipment.

Unlike BRBs which are yieldable – every DMAX brace can be tested to the engineer's specific design level earthquake load demand.

Each brace is supplied with a test certificate to assure engineer and owner of the device's quality and performance.



The brace body and damping module are delivered to site in two parts – ready to be bolted together. This allows length adjustment by finger shimming and enabling easy fitting of pins.



In Construction

Installation of a DMAX brace is more like a conventional steel brace than a BRB.

- Tolerances better than AISC approved 1/32"
- Lower weight due to hollow section – no concrete filling
- SHS sections can fit within standard wall profiles
- Surfaces primed and ready to paint (fire retardant paint, optional)
- Link beam detailing cf. EBFs
- Retrofits: minimal gusset or foundation strengthening
- Warranty 25 years / Design life 50 years.

DMAX – PROJECT EXAMPLES

Engineers are seeing strong use cases for DMAX braces in projects where reducing seismic demand unlocks value engineering benefits.

Where DMAX can deliver most value:

- High seismicity regions
- High importance level (IL3/4)
- Poor soils / high foundation cost
- Tall and irregular structures
- Capacity-limited existing structures
- Sensitivity to future code changes (e.g. TS 1170.5).

Forte Hospital Extension, Christchurch NZ

The Forte Private Hospital extension comprises a multi-storey steel structure, requiring a solution that balanced structural performance, constructability, and foundation risk.

Lateral stability was achieved using Tectonus DMAX damping braces arranged in concentrically braced frames across key gridlines. The system provided equivalent global performance to conventional bracing, while introducing controlled energy dissipation and reducing force demands transferred to the foundations.

Key project driver

A key project driver was foundation capacity within variable ground conditions. Adoption of the DMAX system reduced peak pile tension demands by approximately 10–15%, providing risk reduction where the design was previously constrained by pile capacity limits. This enabled optimisation of foundation elements, including reduced beam depths and reinforcement, while maintaining overall system robustness.

The superstructure steel tonnage remains comparable to conventional solutions, with localised stiffness increases incorporated to manage out-of-balance brace actions.

The design also considered emerging seismic provisions (TS 1170.5 Class VI) demonstrating the ability to satisfy TS hazard at larger drifts, without any increase in cost.



DMAX BRACE INFORMATION



PRODUCT CODE	CAPACITY	DESIGN DISPLACEMENT RANGE	STEEL HOLLOW SECTION SIZE (Square size – thinness wall thickness) BRACE LENGTH (pin to pin) – mm				
			3000	4000	5000	6000	7000
	kN	mm					
DMAX-50	50	± 25 to 300	51x51x6.4	64x64x4.8	–	–	–
DMAX-100	100	± 25 to 300	64x64x6.4	76x76x8.0	102x102x3.2 89x89x4.8	–	–
DMAX-150	150	± 25 to 300	76x76x3.8	76x76x9.5	102x102x4.8 89x89x8.0	127x127x4.8 102x102x8.0	–
DMAX-200	200	± 25 to 300	76x76x6.4	89x89x6.4	127x127x4.8 102x102x6.4	127x127x4.8	–
DMAX-250	250	± 25 to 300	76x76x9.5	89x89x9.5 102x102x9.5	127x127x4.8	127x127x6.4 127x127x6.4	152x152x4.8
DMAX-300	300	± 25 to 300	89x89x6.4	102x102x6.4	127x127x4.8 127x127x8.0	152x152x4.8 127x127x11	152x152x6.4
DMAX-350	350	± 25 to 300	89x89x8.0	102x102x8.0 127x127x6.41	152x152x4.8 27x127x9.5	152x152x4.8 152x152x6.4	178x178x4.8
DMAX-400	400	± 25 to 300	89x89x9.5	127x127x4.8 127x127x8.0	152x152x4.8 127x127x11	152x152x6.4 152x152x8.0	178x178x4.8
DMAX-450	450	± 25 to 300	102x102x8.0	127x127x6.4 127x127x8.0	152x152x4.8 127x127x13	152x152x6.4 152x152x8.0	178x178x4.8
DMAX-500	500	± 25 to 300	102x102x8.0	127x127x6.4 127x127x9.5	152x152x6.4 152x152x8.0	178x178x4.8 152x152x9.5	178x178x6.4
DMAX-600	600	± 25 to 300	102x102x9.5	127x127x8.0 127x127x13	152x152x6.4 152x152x9.5	178x178x6.4 152x152x13	178x178x8.0
DMAX-700	700	± 25 to 300	152x152x4.8 127x127x8.0	152x152x6.4 127x127x9.5	178x178x6.4 152x152x8.0	178x178x6.4 152x152x11	203x203x6.4 178x178x8.0
DMAX-800	800	± 25 to 300	127x127x8.0 127x127x11	152x152x8.0 152x152x9.5	178x178x6.4 152x152x13	178x178x8.0 178x178x9.5	203x203x6.4
DMAX-900	900	± 25 to 300	152x152x6.4 27x127x9.5	152x152x8.0 127x127x13	178x178x8.0 152x152x11	203x203x6.4 178x178x9.5	1203x203x8.0 178x178x11
DMAX-1000	1000	± 25 to 300	152x152x8.0 127x127x11	178x178x6.4 152x152x9.5	178x178x8.0 152x152x11	203x203x8.0 178x178x9.5	203x203x8.0 178x178x13
DMAX-1250	1250	± 25 to 300	152x152x9.5 152x152x11	178x178x8.0 178x178x9.5	203x203x8.0 203x203x9.5	254x254x6.4 203x203x11	254x254x6.4
DMAX-1500	1500	± 25 to 300	152x152x11	203x203x8.0 178x178x11	203x203x9.5 203x203x11	254x254x8.0 254x254x8.0	305x305x6.4
DMAX-1750	1750	± 25 to 300	178x178x11 178x178x13	203x203x9.5	203x203x9.5 203x203x13	254x254x8.0	254x254x9.5
DMAX-2000	2000	± 25 to 300	178x178x13 203x203x11	254x254x8.0 203x203x13	254x254x9.5	254x254x9.5 254x254x11	305x305x8.0
DMAX-2250	2250	± 25 to 300	203x203x13 203x203x13	254x254x9.5	254x254x9.5 254x254x11	305x305x8.0 254x254x13	305x305x8.0
DMAX-2500	2500	± 25 to 300	–	305x305x8.0 254x254x11	254x254x11	305x305x9.5	305x305x9.5
DMAX-2750	2750	± 25 to 300	–	305x305x9.5 254x254x11	305x305x9.5 254x254x13	305x305x9.5 254x254x13	305x305x11
DMAX-3000	3000	± 25 to 300	–	254x254x13	254x254x13	305x305x11	305x305x11
DMAX-3250	3250	± 25 to 300	–	305x305x11	305x305x11	305x305x11	305x305x13
DMAX-3500	3500	± 25 to 300	–	305x305x13	305x305x13	305x305x13	–
DMAX-3750	3750	± 25 to 300	–	–	305x305x13	–	–

Note: For capacities larger than 3750 kN, two or more DFFJ devices will be used for the DMAX assembly.

DMAX BRACE SHS SIZES



PRODUCT CODE	CAPACITY	DESIGN DISPLACEMENT RANGE	STEEL HOLLOW SECTION SIZE (Square size - thinness wall thickness) BRACE LENGTH (pin to pin) - feet				
			10	13	16	20	23
	kips	inch					
DMAX-50	12	± 1 to 12	2x2x1/4"	2.5x2.5x3/16"	-	-	-
DMAX-100	23	± 1 to 12	2.5x2.5x1/4"	3x3x5/16"	4x4x1/8" 3.5x3.5x3/16"	-	-
DMAX-150	34	± 1 to 12	3x3x1/8"	3x3x3/8"	4x4x3/16" 3.5x3.5x5/16"	5x5x3/16" 4x4x5/16"	-
DMAX-200	45	± 1 to 12	3x3x1/4"	3.5x3.5x1/4"	5x5x3/16"	5x5x3/16" 4x4x1/4"	-
DMAX-250	57	± 1 to 12	3x3x3/8"	3x3x3/8"	5x5x3/16" 4x4x3/8"	5x5x1/4"	6x6x3/16" 5x5x1/4"
DMAX-300	68	± 1 to 12	3.5x3.5x1/4"	4x4x1/4"	5x5x3/16"	6x6x3/16" 5x5x5/16"	6x6x1/4" 5x5x7/16"
DMAX-350	79	± 1 to 12	3.5x3.5x5/16"	4x4x5/16"	6x6x3/16" 5x5x1/4"	6x6x3/16" 5x5x3/8"	7x7x3/16" 6x6x1/4"
DMAX-400	90	± 1 to 12	3x3x3/8"	5x5x3/16"	6x6x3/16" 5x5x5/16"	6x6x1/4" 5x5x7/16"	7x7x3/16" 6x6x5/16"
DMAX-450	102	± 1 to 12	4x4x5/16"	5x5x1/4"	6x6x3/16" 5x5x5/16"	6x6x1/4" 5x5x1/2"	7x7x3/16" 6x6x5/16"
DMAX-500	113	± 1 to 12	4x4x5/16"	5x5x1/4"	6x6x1/4" 5x5x3/8"	7x7x 3/16" 6x6x5/16"	6x6x3/8"
DMAX-600	135	± 1 to 12	4x4x3/8"	5x5x5/16"	6x6x1/4" 5x5x1/2"	7x7x1/4" 6x6x3/8"	7x7x5/16" 6x6x1/2"
DMAX-700	158	± 1 to 12	6x6x3/16" 5x5x5/16"	6x6x1/4" 5x5x3/8"	7x7x1/4" 6x6x7/16"	7x7x1/4" 6x6x5/16"	8x8x1/4" 7x7x5/16"
DMAX-800	180	± 1 to 12	5x5x5/16"	6x6x5/16" 5x5x7/16"	7x7x1/4" 6x6x3/8"	7x7x5/16" 6x6x1/2"	8x8x1/4" 7x7x3/8"
DMAX-900	203	± 1 to 12	6x6x1/4" 5x5x3/8"	6x6x7/16" 5x5x1/2"	7x7x5/16" 6x6x5/16"	8x8x1/4" 7x7x3/8"	8x8x5/16" 7x7x7/16"
DMAX-1000	225	± 1 to 12	6x6x5/16" 5x5x7/16"	7x7x1/4" 6x6x3/8"	7x7x5/16" 6x6x7/16"	8x8x5/16" 7x7x3/8"	8x8x5/16" 7x7x1/2"
DMAX-1250	281	± 1 to 12	6x6x3/8"	7x7x5/16" 6x6x7/16"	8x8x5/16" 7x7x3/8"	10x10x1/4" 8x8x3/8"	10x10x1/4" 8x8x7/16"
DMAX-1500	338	± 1 to 12	6x6x7/16"	8x8x5/16" 7x7x7/16"	8x8x3/8"	10x10x5/16" 8x8x7/16"	12x12x1/4" 10x10x5/16"
DMAX-1750	394	± 1 to 12	7x7x7/16"	8x8x3/8"	8x8x3/8" 7x7x1/2"	10x10x5/16" 8x8x1/2"	10x10x3/8"
DMAX-2000	450	± 1 to 12	7x7x1/2"	10x10x5/16" 8x8x7/16"	10x10x3/8" 8x8x1/2"	10x10x3/8"	12x12x5/16" 10x10x7/16"
DMAX-2250	506	± 1 to 12	8x8x1/2"	10x10x3/8" 8x8x1/2"	10x10x3/8"	12x12x5/16" 10x10x7/16"	12x12x5/16" 10x10x1/2"
DMAX-2500	562	± 1 to 12	-	12x12x5/16" 10x10x7/16"	10x10x7/16"	12x12x3/8"	12x12x3/8"
DMAX-2750	619	± 1 to 12	-	12x12x3/8" 10x10x7/16"	12x12x3/8" 10x10x1/2"	12x12x3/8" 10x10x1/2"	12x12x7/16"
DMAX-3000	675	± 1 to 12	-	10x10x1/2"	10x10x1/2"	12x12x7/16"	12x12x7/16"
DMAX-3250	731	± 1 to 12	-	12x12x7/16"	12x12x7/16"	12x12x7/16"	12x12x1/2"
DMAX-3500	787	± 1 to 12	-	12x12x1/2"	12x12x1/2"	12x12x1/2"	-
DMAX-3750	843	± 1 to 12	-	-	12x12x1/2"	-	-



COST-EFFECTIVE | HIGH PERFORMANCE | DELIVERED ON-TIME | ON-BUDGET

- Backed by industry veterans: Andrew Reding (Fletcher CEO), Anthony Leighs (Leighs Construction) and Herrick Steel
- 1000's of devices installed across projects in NZ, USA, Canada and Japan
- Devices assembled and individually tested at a high-capacity 15,000 sq ft facility
- ISO 9001 certified and compliant with ASCE-7, ASCE-41, OSHPD, EC8, NZS1170.5.

FEATURED PRODUCTS BY TECTONUS

Engineers have several different Tectonus systems they can apply in their designs depending on building and lateral system type and the performance objectives.



TECTONUS DMAX

Straight swap for BRBs / EBFs but with lower overstrength

Tectonus DMAX braces are a straight swap for BRBs / EBFs / SCBFs. With high damping (50%) and best-in-class overstrength factor (1.15) structural designers use DMAX to reduce seismic demand and maximize cost savings in structure and foundations.



TECTONUS HOLD DOWNS

Shear wall hold downs that dampen and recenter

Seismic-rated hold downs for rocking re-centering shear walls (timber or concrete) that reduce forces on the structure leading to thinner walls, lighter foundations and reduced detailing complexity. Compact and easy to install, enabling offsite assembly and faster erection.



TECTONUS XBRACE

Tension-only cross braces but with 3X more ductility

Lightweight and easy to install, these cross braces are commonly applied in low-rise buildings – new and retrofit. With Tectonus technology these cross braces have a 3X increase in seismic capacity, creating cost-saving opportunities in structure and foundations.



TECTONUS RSFJ BRACE

Braces that dampen and recenter all-in-one system

Applicable as steel or timber braces, RSFJ braces allow engineers to control residual drift almost to zero without the cost and complexity of base isolation. For critical braced-frame buildings where damage and downtime avoidance are key design drivers.

TECTONUS DMAX SEISMIC BRACE

DECREASE DEMAND | MAXIMIZE SAVINGS

CUSTOMER TESTIMONIAL



The system's highly effective damping and lower overstrength factor has allowed us to achieve significant cost savings across the entire lateral system – including braces, columns, diaphragms and foundations.”

Nathan Watson, Director – DHC Structural + Civil



Specialists in seismic engineering, we are driven to set a higher standard for earthquake resilience. Let's work together to make our cities and communities safer.

Talk to an expert.

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US ph – 1-888-440-9717